



ರೈಲು ಮೂಲಸೌಲಭ್ಯಅಭಿವೃದ್ಧಿ ಕಂಪನಿ (ಕರ್ನಾಟಕ) ನಿಯಮಿತ
रेल इन्फ्रास्ट्रक्चर डेवलपमेंट कंपनी (कर्नाटक) लिमिटेड
Rail Infrastructure Development Company (Karnataka) Limited

K RIDE

(A Joint Venture of Govt. of Karnataka and Ministry of Railways)

TENDER No. K RIDE/2023-24/OW/WORK_INDENT10

DATE: 27.09.2023

TENDER DOCUMENT

NAME OF WORK:

Construction of Boundary Wall, Watch Tower and other miscellaneous & associated works in Airforce Station at Jalahalli in connection with BSRP.

RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED (K-RIDE)

Samparka Soudha, 1st Floor,
Dr. Rajkumar Road,
Opposite Orion Mall,
Rajajinagar 1st Block, Bengaluru-560010

Tel.: 080-24482800, +91-6364890801

Email: ed.kride@kride.in

TENDER DOCUMENT

(Through e-Tendering Mode)

NAME OF WORK:

CONSTRUCTION OF BOUNDARY WALL, WATCH TOWER AND OTHER MISCELLANEOUS & ASSOCIATED WORKS IN AIRFORCE STATION AT JALAHALLI IN CONNECTION WITH BSRP.

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SCHEDULE OF BIDDING PROCESS:

SL. NO.	EVENT DESCRIPTION	DATE
1.	TENDER NO:	K RIDE/2023-24/OW/WORK_INDENT10; Date 27.09.2023
2.	TENDER DOCUMENT CAN BE DOWNLOADED FROM	28.09.2023
3.	PERIOD OF SALE OF TENDER DOCUMENT	NA
4.	LAST DATE FOR SALE OF TENDER DOCUMENT	NA
5.	LAST DATE FOR RECEIVING QUERIES	The tenderer is requested to submit any questions in writing or by cable to reach the Employer not later than two days after the Pre-Bid meeting on or before dated as notified in GoK e-procurement portal
6.	PRE-BID MEETING AT VENUE	As notified in GoK e-procurement portal
7.	AUTHORITY RESPONSE TO QUERIES LATEST BY	10 days from the date of pre-bid meeting
8.	LAST DATE FOR SALE OF TENDER DOCUMENT	Upto Bid Due Date
9.	LAST DATE AND TIME FOR RECEIPT OF BIDS	01.11.2023, IST 15:00 hrs. (Only electronic tender permitted.)
10.	DATE AND TIME OF OPENING OF COVER ONE OF TENDER (TECHNICAL BID)	02.11.2023, IST 15:30 hrs.
11.	PLACE OF OPENING OF COVER ONE OF TENDERS (TECHNICAL BID)	The opening of the Technical Bid shall take place at e-procurement portal of K-RIDE i.e., https://kppp.karnataka.gov.in
12.	PLACE OF OPENING OF COVER TWO OF TENDERS (FINANCIAL BID)	The opening of the Financial Bid shall take place at e-procurement portal of K-RIDE i.e., https://kppp.karnataka.gov.in
13.	DATE AND TIME OF OPENING OF COVER TWO OF TENDERS (FINANCIAL BID)	Will be intimated to the Qualified Tenderers through Karnataka Public Procurement Portal.
14.	ADDRESS FOR COMMUNICATION	Executive Director (Civil) K-RIDE (Rail Infrastructure Development Company (Karnataka) Limited) #8, 1 st Floor, Samparka Soudha, Dr. Rajkumar Road, Opposite Orion Mall Rajajinagar 1 st Block, BENGALURU Tel.: 080-24482800, +91-6364890801. E Mail: ed.kride@kride.in

SECTION - 1

NOTICE FOR INVITATION FOR TENDERS
(IFT)

K- RIDE [Rail Infrastructure Development Company (Karnataka) Limited]**INVITATION FOR TENDERS
(Through e-tendering mode)**Tender Notice No. **K RIDE/2023-24/OW/WORK_INDENT10**Date: **27.09.2023**

RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED (K-RIDE), a Joint Venture of Government of Karnataka and Ministry of Railways with its corporate office, at #8, 1st Floor, Samparka Soudha, Dr. Rajkumar Road, Opposite Orion Mall, Rajajinagar 1st Block, Bengaluru-560010, India, invites Bids from eligible Bidders, for the construction of works detailed below under Single stage Two Packet system (Technical Bid and Financial Bid in separate packets).

NAME OF WORK	TENDER SECURITY / EMD	PERIOD OF COMPLETION
Construction of Boundary Wall, Watch Tower and other miscellaneous & associated works in Airforce Station at Jalahalli in connection with BSRP	Tender Security / EMD as mentioned in Section 2 and as per form BDF-1 shall be submitted. (Bids without Tender Security / EMD will be summarily rejected)	12 months

NOTES:

1. The scope of work is broadly, "Construction of various structures like Boundary wall, Watch Tower etc. along with its associated works including its Design & the supply of materials from the approved source and demolition of structures as per the instructions of Engineer – in – Charge at Airforce Station, Jalahalli, in connection with Bengaluru Suburban Railway Project (BSRP)"
2. The detailed terms and conditions of the Project, including the scope of the works, services and obligations are mentioned in Employer's Requirement, Conditions of Contract (CC, SCC, PCC, and Contract Data) and all other related documents in the Bid Document.
3. The tenderers are advised to examine the Project in greater detail, and to carry out, at their cost, all such studies and analysis as may be required for submitting their respective Bids for award of the contract.
4. The tenderers shall submit the tender through e - procurement portal. The tenderers shall submit scanned copies of their registration certificate, work done certificates and any other documents online. More information can be had from the website www.kppp.karnataka.gov.in.
5. On the scheduled date of opening of Bids, initially, only the Technical Bids will be opened through Karnataka Public Procurement Portal. The Technical Bids will be evaluated by K-RIDE in accordance with the stipulated Qualification and Evaluation criteria. No amendments or changes to the Bids would be permitted after the opening of Bids.
6. Financial Bids of tenderers, qualified in the Technical Evaluation, will be opened on the date and at the time advised by K-RIDE through e-tendering portal. The Financial Bids are evaluated, and the Contract is awarded to the tenderer, whose tender has been determined to be the lowest evaluated substantially responsive tender.
7. The tenderers are advised to note the eligibility and minimum qualifying criteria specified in the Section 2: Instruction to Tenderers.
8. Tenders must be accompanied by a Tender Security / EMD as per ITT 13.7 in the form mentioned in Section 3: Qualification Information / Bidding Forms - in any one of the forms as specified. The Tender Security / EMD shall have

to be valid for 45 days beyond the validity of the tender, specified in the tender documents. Any tenders received without Bid security will be summarily rejected.

9. Incomplete tenders will be considered non-responsive and such tenders will not be considered for further evaluation.
10. Tender Documents can be downloaded free of cost from Karnataka Public Procurement Portal i.e., <https://kppp.karnataka.gov.in> from 28.09.2023 and the tenders must be submitted online via Karnataka Public Procurement Portal only.
11. Drawings referred in the tender document, if any, but not uploaded with the tender document, can be viewed in this office on any working day. The tenderer can also have a copy of the same on payment of non-refundable cost of ₹ 5,000/- (Rupees Five Thousand only) by a e-Payment mode (credit card/debit card/net banking/UPI) in favour of Rail Infrastructure Development Company (Karnataka) Limited (K-RIDE), Bengaluru.
12. It will be the responsibility of the tenderers, who are submitting their tender based on the tender documents downloaded by them on a particular date, to check for any Addendum/Corrigendum issued in this regard after the date of their downloading, from the relevant website from time to time and to ensure submission of their bids along with all Addenda/Corrigenda. Bids submitted without all Addenda/Corrigenda will be treated as incomplete.
13. **Validity** of the tender: The tenders shall remain valid for a period of **180 days** after the submission deadline prescribed by the Employer. A tender valid for a shorter period will be summarily rejected as non-responsive.
14. In case of need, K-RIDE may request the tenderers to extend the period of validity of their tenders. The request will be made in writing. If a Bid security is requested in accordance with ITT 13, it shall also be extended up to the date mentioned in the letter of request for extension. The tenderers may refuse the request without forfeiting their Tender Security. Tenderers extending the validity of their tenders shall not be either required or permitted to modify their tender.
15. **Pre-Bid meeting:** A Pre- Bid meeting will be held on **11.10.2023 at 15:30 hrs. IST** in the office of K-RIDE, Bengaluru to understand / discuss the issues / queries with regard to the Bid Document, if any, as stated in Clause - 8 of ITT of the Tender document. The queries may be answered subsequently, based on their merits. However, the **queries** shall be sent to K-RIDE by bidders **on or before 15:00 hrs. IST on 09.10.2023** through E-mail (ed.kride@kride.in) or through hard copy addressed to:

Executive Director (Civil),
K-RIDE [Rail Infrastructure Development Company (Karnataka) Limited],
#8, 1st Floor, Samparka Soudha, Dr. Rajkumar Road, Opposite Orion Mall,
Rajajinagar 1st Block, Bengaluru-560010

Prospective bidders shall keep checking the websites for any change in the above dates and times.

16. REGISTRATION IN E-TENDERING PORTAL:

- a. The tenderers are required to enroll on the e-tendering Portal (<https://eproc.karnataka.gov.in> or <https://kppp.karnataka.gov.in>) by clicking on the link "Tenderers Registration" on the e-tender Portal by paying requisite registration fee, as applicable.
- b. As part of the enrolment process, the tenderers will be required to choose a unique user name and assign a password for their accounts.
- c. The tenderers are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication with the tenderer.
- d. Upon enrolment, the tenderers will be required to register their valid Digital Signature Certificate (Only Class III Certificates with signing & encryption key) issued by any Certifying Authority recognized by CCA, India with their profile.

- e. Only one valid DSC should be registered by a tenderer. Please note that the tenderers are responsible to ensure that they do not lend their DSCs to others, which may lead to misuse.
- f. The tenderers shall then login to the site through the secured log-in process by entering their user ID/password and the password of the DSC / e-Token.
- g. Once the tenderers have searched and selected the proposals, they are interested in, they can pay nonrefundable processing fee as mentioned in the Karnataka Public Procurement Portal.
- h. The scanned copies of all original documents shall be uploaded on e-tendering Portal (<https://kppp.karnataka.gov.in>).
- i. For any query regarding e-procurement on the Karnataka Public Procurement Portal, the tenderers can contact helpdesk number **+91-8046010000, +91-8068948777, support@epochhelpdesk.com**

17. PRECAUTIONS FOR SUBMITTING/PREPARATION OF PROPOSALS THROUGH E-TENDERING PORTAL

- a. The tenderers, in advance, shall make ready the proposal documents to be submitted, as indicated in the proposal documents / schedule and they shall be in PDF/JPEG formats.
 - b. The tenderers, without waiting till last minute, shall log into the website, well in advance, for the submission of the proposal, so that it gets uploaded well in time i.e., on or before the deadline of the proposal submission time. The bidders themselves will be responsible for any delay in the last minute due to any issues whatsoever viz., server issues, connectivity issues etc.
 - c. The tenderer has to digitally sign and upload the required proposal documents as indicated in the Bid Document.
 - d. The server time (which is displayed on the Employer's dashboard) will be considered as the standard time for referencing the deadlines for submission of the proposals by the bidders, opening of proposals etc.
18. The tenderers shall furnish the Name of the individual / firm / Company / Joint venture with address and telephone number with place of registration, year of incorporation etc.
19. Tenders by a joint venture of contractors is permitted subject to conditions indicated in tender document.
20. The application made by the firm / company / Joint Venture shall be signed by a person holding the Power of Attorney, in which case the tenderer shall furnish a copy of Power of Attorney.
21. Bids submitted through any other mode will not be entertained.
22. Deleted.
23. All necessary certificates/documents in support fulfilling qualifying criteria stipulated shall be scanned separately and attached to bid document. The original documents if required by the Employer shall be produced whenever asked by Employer on Technical Bid/ Financial Bid.
24. Deleted.
25. Site visit and verification of information:

The tenderers are, in their own interest, encouraged to submit their respective Bids after visiting the Project site and ascertaining for themselves the site conditions, traffic, location, surroundings, climate, availability of power, water & other utilities for construction, access to site, handling and storage of materials, weather data, all applicable laws and regulations, and any other matter considered relevant by them. The tenderers are advised to visit the site and familiarize themselves with the Project within the stipulated time of submission of the bids. No extension of deadline either for submission of pre-bid queries or for submission of bids is likely to be considered on

this pretext.

It will be deemed that by submitting a bid, the tenderers have:

- (a) made a complete and careful examination of the Bidding Documents, Schedules annexed to the bid document.
 - (b) received all relevant information requested from K-RIDE.
 - (c) accepted the risk of inadequacy, error or mistake in the information provided in the Bidding Documents or furnished by or on behalf of the Authority relating to any of the matters referred to in Clause 25 above. Technical details and drawings provided in the Bid Document are tentative and for indicative purpose. No claim will be admissible at any stage on this account.
 - (d) satisfied themselves about all matters, things, and information, including matters referred to in Clause 25 herein above, necessary and required for submitting an informed Bid in the interest of complete execution of the Project in accordance with the Bidding Documents and performance of all obligations there under.
 - (e) acknowledged and agreed that inadequacy, lack of completeness or incorrectness of information provided in the Bidding Documents or ignorance of any of the matters referred to in Clause 25 herein above shall not be a basis for any claim for compensation, damages, extension of time for performance of their obligations, loss of profits etc. from the Authority, or a ground for termination of the Agreement by the Contractor.
 - (f) acknowledged that there is no Conflict of Interest, and
 - (g) agreed to be bound by the undertakings provided by them under and in terms hereof.
26. K-RIDE will not be liable for any omission, mistake, or error in respect of any of the above or on account of any matter or thing arising out of or concerning or relating to the Tender document, including any error or mistake therein or in any information or data given in this bid document.
 27. The qualification criteria as indicated in bid document shall be met by the tenderers intending to submit bids.
 28. The tenderers shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the Govt. of Karnataka, Govt of India, and any PSUs thereof.
 29. Conditional Tenders will not be accepted and will be summarily rejected.
 30. K-RIDE will not be responsible for any delay by the bidder in accessing Karnataka Public Procurement Portal.
 31. The rates quoted by the tenderer shall be inclusive of all Taxes, Duties etc.
 32. Building and other construction workers welfare: The tenderer shall subscribe 1% of gross amount of each bill payable to him in respect of contract to the building and other construction workers welfare cess as per GO No: LD 300 LET 2006, Bengaluru, dated: 18-01-2007. The amount of subscription will be recovered out of payable amount to him in each bill. This component is deemed to have been included in the quoted rate.
 33. **Last Date of Receipt and opening of Bids:** The tenders, complete in all respects, shall be submitted through Karnataka Public Procurement Portal <https://kppp.karnataka.gov.in> not later than **15.00 hrs. IST on 01.11.2023** and will be opened on **02.11.2023 at 15.30 hrs. IST**. If the office of K-RIDE happens to be closed on the date of opening of tender, the tenders will be opened on the next working day at the same time and venue.
 34. K-RIDE will not be responsible for any delays in the receipt of tenders by K-RIDE. Late Tenders (received after stipulated date and time of submission of Tenders) will not be accepted under any circumstances. K-RIDE reserves the right to accept/reject any or all the proposals without assigning any reason thereof.
 35. K-RIDE reserves the right to either postpone or to cancel the entire process of tender.

36. Any suit or application, arising out of any dispute or differences on account of this tender shall be filed in a competent court at Bengaluru, Karnataka only and no other court or any other district of the country or any other country shall have any jurisdiction in the matter.
37. For any **Query regarding e tendering portal / tender submission**, the following **helpdesk numbers** can be contacted **on any working day from 10:30 am to 05:00 pm**, till closing date and time of bids:

+91-8046010000, +91-8068948777

Email: support@epochhelpdesk.com

38. **Address for Communication:** Interested eligible tenderers may obtain further information (with regard to the bid document) required, if any, from the address given below **on any working day from 10:30 am to 05:30 pm**, till the last date for submission of queries / closing date, as applicable for the information sought.

Pre-bid queries - in the guise of information, will not be entertained after the deadline for their submission.

Queries regarding e tendering portal, tender submission and related minor issues shall not be addressed to the address below and shall be got clarified from helpdesk mentioned above.

Executive Director (Civil)

**K-RIDE [Rail Infrastructure Development Company (Karnataka) Limited],
#8, 1st Floor, Samparka Soudha, Dr. Rajkumar Road, Opposite Orion Mall
Rajajinagar 1st Block, Bengaluru-560010**

Tel.: 080-24482800, +91-6364890801

E-mail: ed.kride@kride.in

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SECTION – 2

INSTRUCTIONS TO TENDERERS (ITT)

SECTION 2: INSTRUCTIONS TO TENDERERS (ITT)
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A. GENERAL

1. SCOPE OF THE TENDER

1.1. RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED (K-RIDE), a Joint Venture of Government of Karnataka and Ministry of Railways, with its corporate office at #8, 1st Floor, Samparka Soudha, Dr. Rajkumar Road, Opposite Orion Mall, Rajajinagar 1st Block, Bengaluru-560010, India, invites tenders from eligible tenderers, for the works detailed in the invitation for the Tenders (IFT).

2. ELIGIBLE TENDERERS

2.1. The tenderers, who wish to participate, shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by Govt. of Karnataka / Govt of India / PSUs.

2.2. JOINT VENTURES

Tendering by a joint venture of Contractors is permissible subject to following conditions:

If the Applicant comprises a number of firms combining their resources in a joint venture, the legal entity constituting the joint venture and the individual partners in the joint venture shall be registered after award of work and shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by Govt. of Karnataka, Govt of India, and PSUs.

- a. The joint venture must collectively satisfy the Qualification criteria. For this purpose, the following data of each member of the joint venture may be added together to meet the collective qualifying criteria:
 - i. Average annual turnover (sub clause 3.2a)
 - ii. Particular experience including key production rates (Sub clause 3.2b & c)
 - iii. Financial means (sub clause 3.3 b: Liquid Assets, 3.6: Assessed Available Tender Capacity & the audited balance sheets or other financial statements acceptable to the Employer, for the specified five financial years shall be submitted and they must demonstrate the current soundness of the tenderer's financial position and prospective long-term profitability.
 - iv. Personnel capabilities (sub clause 3.3c: List of minimum key staff / position required during the contract implementation)
 - v. Equipment capabilities (sub clause 3.3a: own / lease equipment)
- b. Each partner must satisfy the following criteria individually:
 - i. General construction experience for the period of years stated in tender document (Instructions to tenderers): The intending tenderer/firm/company/joint venture shall provide evidence that it has been actively engaged in the similar work as specified in sub clause 3.2 b, for at least for a period of five years and the period ending last day of the month previous to the month of bid submission. (From FY: 2018-19 to FY: 2022-23)
 - ii. Adequate sources to meet financial commitments on the other contracts (Sub clause 3.5: Accessed Available Tender Capacity)
 - iii. Financial Soundness (Instructions to Tenderers: The intending tenderer/ firm/ company shall provide the audited balance sheets or other financial statements acceptable to the Employer for the period mentioned in para (i) above and must demonstrate the current soundness of the tenderer's financial position and indicate prospective long-term profitability. If deemed necessary, the Employer shall have the authority to make enquiries with the tenderer's bankers).
 - iv. Litigation History (Instructions to Tenderers: The intending tenderer/firm/company/ joint venture shall provide accurate information on the related application form about any litigation or Arbitration resulting from contracts completed or on going under its execution over the period

mentioned in para (i) above. Any history of awards against the tenderer or any partner of a joint venture or failure to provide accurate information on the same may result in rejection of the tenderer).

- v. In accordance with the above, the bid shall include all related information required for individual partners in the joint venture.
- c. **Joint venture is restricted to 3 (three) number of partners.** One of the partners, who is responsible for performing a key function in contract management or is executing a major component of the proposed contract, shall be nominated as being in charge during the tendering periods and, in the event of a successful tender, during contract execution. The partner in charge shall be authorized to incur liabilities and receive instructions for and on behalf of any and all partners of the joint venture; this authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the partners.
- d. All partners of the joint venture shall be legally liable, jointly, and severally, during the tendering process and for the execution of the contract in accordance with the contract terms, and a statement to this effect shall be included in the authorization mentioned under Sub-Clause 2.2(d) above. **To enable the above, each of the partners of the joint venture shall meet not less than 25% of the qualifying criteria specified for Average annual turnover and Line of credit / liquid assets. All members of the joint venture must have experience in execution of similar work.**
- e. A copy of the Joint Venture Agreement (JVA) entered into by the partners shall be submitted with the bid. Pursuant to Sub-Clauses 2.2(c) to 2.2(f) above, the JVA shall include among other things: the JV's objectives; the proposed management structure; the contribution of each partner to the joint venture operations; the commitment of the partners to joint and several liability for due performance; recourse/sanctions within the JV in the event of default or withdrawal of any partner; and arrangements for providing the required indemnities.

The lead partner shall enter into a Joint Venture agreement on a Rs. 200.00 stamp paper in the prescribed format which shall be concluded prior to Tender and enclosed to the Tender document. A JV Partner shall not enter in to multiple JVs with different tenderers for the same work.

- f. The qualification of a joint venture does not necessarily qualify any of its partners to tender individually or as a partner in any other joint venture or association. In case of dissolution of a joint venture prior to the submission of tenders, any of the constituent firms may qualify if they meet all of the qualification requirements, subject to the return approval of the Employer. Individual members of a dissolved joint venture may participate as sub-contractor to qualified applicants, subject to the provisions mentioned below:
- i. "No firm can be a sub-contractor while submitting a tender individually or as a partner of a joint venture in the same tendering process. A firm, if acting in the capacity of sub-contractor in any tender, may participate in more than one tender, but only in that capacity. A tenderer who submits, or participates in, more than one tender will cause all the proposals in which the tender has participated, to be disqualified."
- ii. A firm shall submit only one tender in the same tendering process, either individually as a tenderer or as partner of Joint Venture.
- iii. The necessary certificates/documents in support of pre-qualification criteria fulfilled as stipulated shall be scanned and attached to the bid document. Scanned signature of the tenderer/authorized representatives of the tenderer shall be attached while uploading the tender document.
- iv. Any tenderer, who is otherwise technically qualified, withdraws from the tender process at any stage before a final decision is taken on the tender, the EMD of such tenderer shall be forfeited and the name of such tenderer shall be removed from the category list of contractors at least for a minimum period of one year in K-RIDE beside making such tenderer liable for being blacklisted.

- v. Tenders submitted by all tenderers in the process of tender evaluation will be opened even if the tenderer withdraws from the tender process by not submitting the original documents for verification or for any other reasons and the prices quoted by them will be looked into, to ascertain if there is any collusion amongst the tenderers to determine the competitiveness of the L1 price quoted by other tenderers, as per the decision by the K-RIDE.
- vi. Prior to awarding of the work, the Lowest (L-1) tenderer should produce the original documents in support of the uploaded documents to enter in to the agreement. If the lowest tenderer (L-1) does not produce the original documents for entering into the agreement, then his tender can be treated as non-responsive tender as per clause 26(4) of the KTPP Rules. The name of the tenderers who do not produce the original documents shall be removed/debarred from the select list of K-RIDE enrollment and barred from participation in any of the tenders to be invited by K-RIDE apart from forfeiting the EMD paid.
- vii. The bidder, JV Partner shall not be under Corporate Debt Restructuring (CDR)/ Strategic Debt Restructuring (SDR) or Bureau of Industrial & financial reconstruction (BIFR) in Five years to bid submission date. In this regard, the bidder shall submit along with bid, a certificate with a declaration that, the bidder is not under CDR/SDR or BIFR.
- viii. Further information about e-tendering can be had from Karnataka Public Procurement Portal <https://kppp.karnataka.gov.in>

3. QUALIFICATION OF THE TENDERER.

3.1. All the tenderers shall provide the requested information accurately and sufficient details in section 3: Qualification information. The Joint Venture shall have to be formed prior to the Bidding.

- a. Pre-qualification will be based on tenderers meeting all the following minimum pass-fail criteria regarding their general and particular construction experience, financial position, personnel and equipment capabilities, and other relevant information as demonstrated by the tenderer's responses in the Information Forms attached to the Letter of Technical Bid. Additional requirements for joint ventures are given in para 2.2.

3.2. The following qualification criteria should be met by the intending tenderers.

- a. Required average annual turnover (In all classes of civil engineering construction work only): The intending tenderer / firm / company / Joint Venture should have achieved a **MINIMUM AVERAGE ANNUAL CONSTRUCTION TURNOVER of ₹ 55.50 Crore in Five Financial Years from 2018-19 to 2022-23 (both inclusive).**

NOTE: The tenderers shall submit certificates to this effect which may be **attested certificates** from the concerned **Departments/Client or Audited balance sheet** duly certified by the Statutory Auditor / Chartered Accountant. The Turnover certificate duly certified by Statutory Auditor / Chartered Accountant should be uploaded. Financial turnover of previous years will be given a weightage of 10% per year or part thereof up to the month previous to the Bid submission month as indicated in qualification information (Tender Forms) Form FIN-2 based on the rupee value to bring them to **FY: 2023-24 price level.**

- b. **The tenderer / Firm / Company / JV should have satisfactorily completed at least one similar work, as mentioned in Note (ii) below, of value not less than ₹ 17.25 Crore at FY: 2023-24 price level in the five financial years (from FY 2018-19 to FY2022-23 both inclusive) and till the last day of the month previous to the month of bid submission.**

NOTE:

- i. The criteria above apply to the Individual tenderer/Firm/company/Joint venture also. Certificate regarding the same duly signed by an officer not below the rank of the Executive Engineer shall be submitted along with the Technical Bid. (The certificate from Project Manager of Client/Concessionaire OR Independent Engineer (Project Management Consultant of Client/Concessionaire) duly validated by the Employer/SPV/Corporation can also be considered).
- ii. **Similar Work** is defined as below:

For para 3.2 b “Any Civil Engineering Work”.

- iii. The contract is considered as satisfactorily completed if 80% or more of the work is physically completed which is to be substantiated by a certificate from the Employer, who has awarded the contract to the Bidder and the contract amount so received should be equal to or more than the minimum value as per eligibility criteria 3.2 (b). The certificate from Project Manager of Client/Concessionaire OR Independent Engineer (Project Management Consultant of Client/Concessionaire) duly validated by the Employer/SPV/Corporation shall also be considered.
 - iv. For completed works, the value of work done shall be updated to current FY 2023-24 price level assuming 10% inflation for Indian rupees every year or part thereof up to the month previous to the Bid submission month. The value of work done shall be inclusive of taxes, GST, duties and Price Variations. Credentials if submitted in foreign currency shall be converted into Indian currency i.e., Indian Rupee as under: Bids will be compared in Indian Rupees only. The exchange rate of foreign currency shall be applicable 28 days before the tender submission date. For conversion of foreign currency to Indian Rupee exchange rates published by Financial Benchmarks India Private limited (www.fbil.org.in) 28 (twenty-eight) days before the date of bid submittal will be considered. In case the particular day happens to be a holiday the exchange rate published on the next working day will be considered. In case of works in foreign currency the effect of inflation is considered as included, as the exchange rate prevailing 28 (twenty-eight) days before tender submission is being considered for conversion to Indian Rupees.
 - v. In case of JV/Consortium, full value of the work, if done by the same JV shall be considered. However, if qualifying work (s) done by them in JV/Consortium having different constituents, then the value of work as per their percentage participation in such JV/Consortium shall be considered.
- c. Deleted
- d. Deleted

3.3. Each tenderer should further demonstrate the following:

- a. Deleted
- b. **LIQUID ASSETS:** The tenderer/firm/company/Joint Venture should furnish details of liquid assets and or availability of credit facilities of ₹ 8.75 Crore for the work mentioned above for meeting the required funds in the form of own funds/credit lines/certificate from scheduled Nationalized Bank. The tenderer shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit and other financial means (independent of any contractual advance payment) sufficient to meet the construction cash flow requirements for the subject contract in the event of stoppage, startup, or other delays in payment, of the minimum estimated amount stated above, net of the applicant’s commitments for other contracts.

The Bidder should have access to or has available liquid assets, lines of credit and other financial means to meet cash flow. The audited balance sheet and/or banking reference certified by Chartered Accountant with their stamp, signature and membership number shall be submitted by the tenderer along with the Tender.

Banking reference should contain in clear terms the amount that bank will be in position to lend for this work to the applicant/member of the joint venture/Consortium. In case the Net Current Assets (as seen from the balance sheet) are negative, only the banking references will be considered. Otherwise, the aggregate of Net Current Assets and submitted banking references will be considered for working out the Liquidity.

The banking reference should be, from a scheduled Bank in India it should not be more than three months old as on date of submission of Bids.

In case of JV firm's overall liquidity of JV firm shall be assessed by arithmetic sum of liquidity of all members of JV as specified in JV matrix.

- c. **LIST OF MINIMUM KEY TECHNICAL PERSONNEL:** List of Minimum Key Technical personnel required for the work are as under and should be enrolled in company/ firm/Joint Venture under Employment

register and document should be uploaded. The Contractor shall have a competent team of Managers, Engineers, Technical staff etc. so as to complete the work satisfactorily as per various requirements of the contract. The Key Positions not limited to (and in addition to other manpower requirement as given in the Tender document) and corresponding qualification and experience are as under:

Sl. No.	Designation	Qualification	Experience level (For similar works)	Min. No. Required
1.	Project Manager (Team Leader)	Bachelor's Degree/Post Graduate Degree in Civil Engineering	Minimum 12 years total experience	1
2.	Senior Engineer / Civil	Bachelor's Degree or Diploma in Civil Engineering	Minimum 05 years total experience for Bachelor's Degree (or) Minimum 08 years total experience for Diploma	2

Notes:

The CVs to be given for Serial No. 1 & 2 as per Form-6 of section-3 and for Serial No. 1 & 2 the details of required Personnel's/Staff to be given as per Form-5 of section-3 (Qualification information / Bidding Forms).

- 3.4. To qualify for a package of contracts made up of this and other contracts for which tenders are invited in this IFT, the tenderer must demonstrate having experience and resources to meet the aggregate of the qualifying criteria for the individual contracts.
- 3.5. Sub-contractors' experience and resources will not be taken into account in determining the tenderer's compliance with the Qualifying Criteria.
- 3.6. **BID CAPACITY:** tenderers who meet the above specified minimum qualifying criteria, will only be qualified, if their available tender capacity is more than ₹ 35 Crore. The available tender capacity will be calculated as under:
- a. **Assessed available tender capacity = (A*N*1.5 - B)** Where,

A = Maximum value of civil engineering works executed in any one year during the five financial years ending 31.03.2023 and the financial year 2023-24 (till the last day of the month previous to the month of bid submission) taking into account the completed as well as works in progress.

N = Number of years prescribed for completion of the works for which tenders are invited.

B = Value at current price level (updated up to the month previous to the Bid submission month) of existing commitments and on-going works to be completed during the next two and half years (*period of completion of the works for which Tenders are invited*).

Note: Updation of Price Level shall be done at 10% per year

The statements showing the value of existing commitments and on-going works as well as the stipulated period of completion remaining for each of the works listed should be countersigned by the Employer in charge, not below the rank of an Executive Engineer or equivalent.

3.7. NETWORTH:

The Bidder's net worth for the last Financial Year calculated as the difference between **total** assets and **total** liabilities **should be Positive**.

The Bidder's net worth for the last Financial Year calculated as the difference between **current** assets and **current** liabilities **should be Positive**.

3.8. Even though the tenderers meet the above criteria, they are subject to be disqualified if they have:

- a. made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or
- b. record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.; and/or
- c. participated in the previous Tender for the same work and had quoted unreasonably high tender prices and could not furnish rational justification.

3.9. ELIGIBILITY CRITERIA TABLE/MATRIX:

Requirement	Single Entity	Joint Venture			Submission Requirements
		Lead Partner	Other Partners	All partners combined	
Clause: 3.2.(a)	Must meet 100% of the requirement	Must meet 50% of the requirement	Must meet 25% of the requirement	Must meet 100% of the requirement	Form FIN-2
Clause: 3.2 (b)	Must meet 100% of the requirement	Must meet 50% of the requirement	Must meet 25% of the requirement	Must meet 100% of the requirement	Form at para 1.3/Section:3
Clause: 3.3 (b)	Must meet the requirement	Must meet 50% of the requirement	Must meet 25% of the requirement	Must meet 100% of the requirement	Form at para 1.10 / section:3
Clause: 3.3 (c)	Must meet the requirement	All Partners Combined Must Meet 100% requirement			Form No.5 & 6 of Section 3
Clause: 3.6	Must meet the requirement	All Partners Combined Must Meet 100% of requirement			Form at para 1.5 / Section:3 and Form FIN-3 / section:3
Clause: 3.7	Must meet the requirement	Must meet the requirement	Must meet the requirement	Must meet the requirement	Form FIN-1/ Section:3

3.10. The applicant must attach with their application, a note giving a general description on the approach to the construction methods, technologies, quality assurance schemes proposed, deployment schedule of equipment proposed to be used, etc., for ensuring completion of the work as per specifications within the desired time-frame.

4. ONE TENDER PER TENDERER:

4.1. Each tenderer shall submit only one tender for one package. A tenderer who submits or participates in more than one Tender (other than as a sub-contractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the tenderer's participation to be disqualified.

5. COST OF TENDERING:

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

6. SITE VISIT:

- 6.1. The tenderer at his own responsibility and risk is encouraged to visit and examine the Site of Works and its surroundings and obtain all information that may be necessary for preparing the Tender and entering into a contract for construction of the Works. The cost of visiting the Site shall be at the tenderer's own expense.

B -TENDER DOCUMENTS

7. CONTENT OF TENDER DOCUMENTS

- 7.1. The set of tender documents shall have all the Sections given in content page.

8. CLARIFICATION OF TENDER DOCUMENTS

- 8.1. A prospective tenderer requiring any clarification of the tender documents may notify the Employer in writing or by cable (hereinafter "cable" includes telex, E-Mail and facsimile) at the Employer's address indicated in the invitation to tender. The Employer will respond to any request for clarification which he receives earlier than the date mentioned in the e-procurement portal of Karnataka for queries. Copies of the Employer's response will be forwarded to all purchasers of the tender documents, including a description of the enquiry but without identifying its source.

8.2. Pre-Bid meeting:

- a. The tenderer or his authorized representative is invited to attend a pre-bid meeting which will take place at the office of K-RIDE Bengaluru.

Venue:

#8, 1st Floor, Samparka Soudha, Dr. Rajkumar Road,
Opposite Orion Mall, Rajajinagar 1st Block,
Bengaluru-560010
Tel +91-6364890801.
Date: **11.10.2023**, Time: IST **15:30 hrs**.

Prospective bidders shall keep checking the website kride.in for any change in the above date/time.

- b. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.
- c. The tenderer is requested to submit any questions in writing or by cable to reach the Employer not later than the date and time mentioned in Section 1.
- d. Any modification of the tender documents listed in Sub-Clause 7.1 which may become necessary as a result of the pre-bid meeting will be made by the Employer exclusively through the issue of an Addendum pursuant to Clause 9 and not through the minutes of the pre-tender meeting.
- e. Attending Pre-Bid meeting is not mandatory for the tenderers. Non-attendance at the Pre-Bid meeting will not be a cause for disqualification of any tenderer.

9. AMENDMENT OF TENDER DOCUMENTS

- 9.1. Before the deadline for submission of Tenders, the Employer may modify the tender documents by issuing addendum
- 9.2. Any corrigendum / addendum issued shall be part of the tender documents and shall be made available on the website or e-portal. The Provisions in corrigenda/ addenda shall take priority over the Tender Documents issued previously.
- 9.3. DELETED

C. PREPARATION OF TENDERS

10. DOCUMENTS COMPRISING THE TENDER

10.1. The Tender submitted by the tenderer shall be in two covers (documents) and shall contain the documents as follows:

a. First Cover (Document):

- i. Earnest Money Deposit;
- ii. Qualification Information as per formats given in Section 3;

b. Second Cover (Document):

- i. The Tender (in the format indicated in Section: 4) (as per Karnataka Public Procurement Portal)
- ii. Priced Schedule (Section 9); online through Karnataka Public Procurement Portal, no hardcopy of commercials should be attached or disclosed. (As per Karnataka Public Procurement Portal)

And any other materials required to be completing and submitting by tenderers in accordance with these instructions. The documents listed under Sections 3, 4, 6 and 9 shall be filled in without exception. (As per Karnataka Public Procurement Portal).

10.2. DELETED

11. TENDER PRICES

11.1. The contract shall be for the whole works as described in Sub-Clause 1.1, based on the Price Schedule submitted by the tenderer.

11.2. The tenderer shall fill the total amount (both in figures and words) for each schedule of the Works described in the Price Schedule along with total tender price (both in figures and words). Schedules for which no amount or lumpsum price is entered by the tenderer will not be paid by the Employer when executed and shall be deemed to be covered in the Priced schedule. Corrections, if any, shall be made by crossing out, initialing, dating and rewriting.

11.3. All duties, taxes (including prevailing rate of GST) and other levies payable by the contractor under the contract, or for any other cause, shall be included in the Price schedule, prices and total Tender Price submitted by the tenderer.

11.4. The amount quoted by the tenderer shall be subject to adjustment during the performance of the Contract in accordance with the provisions of Clause of the Conditions of Contract.

12. TENDER VALIDITY

12.1. Tenders shall remain valid for a period not less than **180 (one hundred and eighty) days** after the deadline date for tender submission specified in Clause 16. A tender valid for a shorter period will be rejected by the Employer as non-responsive.

12.2. In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the tenderers may extend the period of validity for a specified additional period. The request and the tenderers' responses shall be made in writing or by cable. A tenderer may refuse the request without forfeiting his earnest money deposit. A tenderer agreeing to the request will not be required or permitted to modify his tender, but will be required to extend the validity of his earnest money deposit till the period of the extension, and in compliance with Clause 13 in all respects.

13. EARNEST MONEY DEPOSIT (TENDER/BID SECURITY)

13.1. Earnest Money Deposit/Tender security (as per Karnataka Public Procurement Portal). The tenderer shall furnish, as part of his tender, earnest money deposit in the amount as shown in column 4 of the Table of IFT for this particular work. This earnest money deposit shall be in favour of Rail Infrastructure Development Company (Karnataka) Limited Payable at Bengaluru and may be in the form of Banker's cheque/ Demand draft/Pay Order or Specified small saving instruments pledged to K-RIDE, Bengaluru/ unconditional Bank guarantee, in favour of Rail Infrastructure Development Company (Karnataka) Limited Payable at Bengaluru.

- 13.2. Instruments having fixed validity issued as earnest money deposit for the tender shall be valid for 45 days beyond the validity of the tender.
- 13.3. Any tender not accompanied by an acceptable earnest money deposit and not secured as indicated in Sub-Clauses 13.1 and 13.2 above shall be rejected by the Employer as non-responsive.
- 13.4. The earnest money deposit of unsuccessful tenderers will be returned within 30 days of the end of the tender validity period specified in Sub-Clause 12.1.
- 13.5. The earnest money deposit of the successful tenderer will be discharged when the tenderer has signed the Agreement and furnished the required Performance Security.
- 13.6. The earnest money deposit may be forfeited:
- a. If the tenderer withdraws the Tender after tender opening during the period of tender validity;
 - b. If the tenderer does not accept the correction of the Tender Price, pursuant to Clause 24; or
 - c. In the case of a successful tenderer, if the tenderer fails within the specified time limit to
 - i. sign the Agreement; or
 - ii. furnish the required Performance Security.

14. FORMAT AND SIGNING OF TENDER

- 14.1. The tenderer shall submit the Tender electronically before the submission date and time published in Karnataka Public Procurement Portal. The tenderer must submit Technical and Financial Tender as described in ITT.
- 14.2. All pages of the tender where entries or amendments have been made shall be initialed by the person signing the tender. The Tender shall contain no alterations or additions, except those to comply with instructions issued by the Employer, or as necessary to correct errors made by the tenderer, in which case such corrections shall be initialed by the person signing the Tender.

Language of Tender	The language of the Tender: English
Technical Tender	Alternative technical solutions are not permitted.
Technical Tender Documents	All the Forms of Section 3: Qualification Information/Bidding Forms.
Alternative Bids/Tenders	Alternative Bids are not permitted.
Currencies of Tender and Payment	The amount (Lumpsum Price) shall be quoted by the tenderer entirely in Indian Rupees (INR) only. The rates quoted by the bidder in schedule through Karnataka e-procurement portal will only be considered for Evaluation and comparison purposes, the currencies of the Tender shall be converted in to Indian Rupees.
Any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the Person signing the Tender	The written confirmation of authorization to sign on behalf of the tenderer shall consist of: <ol style="list-style-type: none"> a. In case of Private/Public Companies, a POA from the Director of the Company who has been authorized by the Board of Directors through resolution to sign on behalf of the Company. Copy of Board Resolution shall also be submitted. b. In case of proprietorship tenderers, Power of Attorney by the Proprietors. c. In case of partnership tenderers, Power of Attorney duly signed by all the partners. d. In case of Limited Liability Partnership (LLP), a POA from the Director of the Company who has been authorized by the Board of Directors through resolution to sign on behalf of the Company. Copy of Board Resolution shall also be submitted. e. In case of Joint Venture, Power of Attorney duly signed by individual partners to the Lead partner as per the form given in Section-4 with stipulated documents.

- 14.3. The Bid shall be digitally signed by using class-III digital signature of a person who is dully authorized to sign on behalf of the bidder. This authorization shall consist of a written confirmation as specified in the BDS and shall be attached to the bid. The name and position held by each person signing the authorization

must be typed or printed below the signature. If either the Letter of Technical Bid or Letter of Price Bid or Bid-Security Declaration (if applicable) is not signed, the Bid shall be rejected. All pages of the bid, except for un-amended printed literature, shall be signed or initialed by the person signing the bid.

- a. If the Tender is submitted by proprietary firm, it shall be signed by the proprietor above his full name, full name of his firm with his current address.
- b. If the Tender is submitted by a firm in partnership, it shall be signed by a partner holding the power of Attorney for the firm. A certified copy of the Partnership deed and power of attorney shall accompany the Tender; Alternatively, it shall be signed by all the partners.
- c. If the Tender is submitted by a limited company or a limited corporation, it shall be signed by a duly authorized person holding the power of attorney for the firm. A certified copy of the power of attorney shall accompany the Tender.
- d. If a Tender is submitted by a Joint venture/Consortium, each firm in the Joint venture/Consortium shall furnish the evidence admissible in law / Power of Attorney to sign the Form of Tender and Lead member as stated in JV Agreement shall sign the Tender documents for submission of Tender.
- e. Any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the Tender.

D. SUBMISSION OF TENDERS

15. SEALING AND MARKING OF TENDERS

15.1. The tenderer shall submit the Tender electronically before the submission date and time published.

16. DEADLINE FOR SUBMISSION OF THE TENDERS

16.1. Tenders must be submitted online through Karnataka Public Procurement Portal to the Employer on or before the date as specified in the Karnataka Public Procurement Portal and the submission of tender is the responsibility of the tenderer.

16.2. The Employer may extend the deadline for submission of tenders by issuing an amendment, if necessary in the opinion of Employer, in which case all rights and obligations of the Employer and the tenderers previously subject to the original deadline will then be subject to the new deadline.

17. LATE TENDERS

17.1. In online e-procurement system, the tenderer shall not be able to submit the Tender after the Tender submission time and date as the icon for the task in the Karnataka Public Procurement Portal will not be available. Any Tender received by the Employer after the deadline prescribed in Clause 16 will be rejected.

17.2. "It shall be the responsibility of the tenderers to ensure that their tender is submitted in the Karnataka public procurement portal within the last date and time specified for the receipt of the tenders.

18. MODIFICATION AND WITHDRAWAL OF TENDERS

18.1. The tenderer may modify and correct or upload any relevant document in the portal till tender submission date and time, as published in the Karnataka Public Procurement Portal.

18.2. No Tender may be modified after the deadline for submission of Tenders.

18.3. Withdrawal or modification of a Tender between the deadline for submission of Tenders and the expiration of the original period of Tender validity specified in Clause 12.1 above or as extended pursuant to Clause 12.2 may result in the forfeiture of the earnest money deposit pursuant to Clause 13.

18.4. DELETED

E. TENDER OPENING AND EVALUATION

19. **OPENING OF FIRST COVER (Document):** Opening of First Cover (Document) of all Tenders and evaluation to determine qualified tenderers:

- 19.1. The Employer will open the First Cover(s) (Document) of all the Tenders received (except those received late or withdrawn), including modifications for First Cover (Document) made pursuant to Clause 18, in the presence of the tenderers or their representatives who choose to attend as per Karnataka Public Procurement Portal on the date and the place specified in Clause 16. In the event of the specified date of Tender opening being declared a holiday for the Employer, the Tenders will be opened at the appointed time and location on the next working day.
- 19.2. DELETED
- 19.3. The name of the tenderer, the presence or absence of earnest money deposit (amount, format and validity), the submission of qualification information and such other information as the Employer may consider appropriate will be announced by the Employer at the opening.
- 19.4. The Employer will prepare minutes of the Tender opening, including the information disclosed to those present in accordance with Sub-Clause 19.3.
- 19.5. DELETED
- 19.6. The Employer will evaluate and determine whether each tender (a) meets the eligibility criteria defined in ITT Clause 2 is accompanied by the required earnest money deposit as per stipulations in ITT Clause 13 and meets the minimum qualification criteria stipulated in ITT Clause 3. The Employer will draw out a list of qualified tenderers after deliberations by a committee constituted for this purpose.

20. OPENING OF SECOND COVER (DOCUMENT) OF QUALIFIED TENDERERS AND EVALUATION:

- 20.1. The Employer will inform all the Qualified tenderers the time, date and venue fixed for the opening of the Second Cover (Document) containing the priced Tenders published in Karnataka Public Procurement Portal. The Employer will open the Second Covers (Document) of Qualified tenderers at the appointed time and date in the presence of the tenderers or their representatives who choose to attend. In the event of the specified date of financial Tender opening being declared a holiday for the Employer, the Second Covers (Document) will be opened at the appointed time and location on the next working day.
- 20.2. DELETED
- 20.3. The names of tenderers, the Tender prices, the total amount of each Tender, any discounts/rebate, Tender modifications and withdrawals, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening. No Tender shall be rejected at Tender opening.
- 20.4. The Employer will prepare minutes of the Second Cover (Document) Tender opening, including the information disclosed to those present in accordance with Sub-Clause 20.3.

21. PROCESS TO BE CONFIDENTIAL

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

22. CLARIFICATION OF TENDERS

- 22.1. To assist in the examination, evaluation, and comparison of Tenders, the Employer may, at his discretion, ask any tenderer for clarification of his Tender, including breakdowns of Lumpsum Price. The request for clarification and the response shall be in writing or by cable, but no change in the price or substance of the Tender shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Tenders in accordance with Clause 24.
- 22.2. No tenderer shall contact the Employer on any matter relating to its Tender from the time of the Tender opening to the time the contract is awarded.

If they have any query/clarification related to e-Procurement on the Karnataka Public Procurement Portal, contact e-Procurement Help desk from 10:30 AM to 5:00 PM on any working day. Ph. No.:

+91-8046010000/ 8068948777 or support@eprochelpdesk.com Karnataka Public Procurement Portal through query option on or before specified time.

22.3. Any effort by the tenderer to influence the Employer in the Employer's Tender evaluation, Tender comparison or contract award decisions may result in the rejection of the tenderers' tender.

23. EXAMINATION OF TENDERS AND DETERMINATION OF RESPONSIVENESS

23.1. Prior to the detailed evaluation of Tenders, the Employer will determine whether each tender; (a) has been properly signed; and (b) is substantially responsive to the requirements of the Tender documents.

23.2. A Substantially Responsive Tender is one which conforms to all the terms, conditions, and specifications of the Tender documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the tender documents, the Employer's rights or the tenderer's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other tenderers presenting Substantially Responsive Tenders.

23.3. If a tender is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

24. CORRECTION OF ERRORS

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

a. where there is a discrepancy between the amount in figures and in words, the lower of the two will govern.

24.2. The amount stated in the Tender will be adjusted by the Employer in accordance with the above procedure for the correction of errors and, with the concurrence of the tenderer, shall be considered as binding upon the tenderer. If the tenderer does not accept the corrected amount the Tender will be rejected, and the earnest money deposit may be forfeited in accordance with Sub-Clause 13.6 (b).

25. EVALUATION AND COMPARISON OF TENDERS

25.1. The Employer will evaluate and compare only the Tenders determined to be substantially responsive in accordance with Clause 23.

25.2. In evaluating the Tenders, the Employer will determine for each Tender the evaluated Tender Price by adjusting the Tender Price as follows:

a. Making any correction for errors pursuant to Clause 24; and
b. Deleted.

25.3. The Employer reserves the right to accept or reject any variation, deviation, or alternative offer. Variations, deviations, and alternative offers and other factors which are in excess of the requirements of the Tender documents or otherwise result in unsolicited benefits for the Employer shall not be taken into account in Tender evaluation.

25.4. The estimated effect of the price adjustment conditions under Clause 40 of the Conditions of Contract, during the implementation of the Contract, will not be taken into account in tender Evaluation

25.5. If the tender of the successful tenderer is seriously unbalanced in relation to the Employer's estimate of the cost of the work to be performed under the contract, the Employer may require the tenderer to produce detailed price analyses for any or all items of Priced Schedule, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require that the amount of the performance security set forth in Clause 29 be increased at the expense of the successful tenderer to a level sufficient to protect the Employer against financial loss in the event of default of the successful tenderer under the contract.

F. AWARD OF CONTRACT

26. AWARD CRITERIA

26.1. Subject to Clause 27, the Employer will award the Contract to the tenderer whose Tender has been determined to be substantially responsive to the Tender documents and who has offered the lowest evaluated Tender Price, provided that such tenderer has been determined to be (a) eligible in accordance with the provisions of Clause 2, and qualified in accordance with the provisions of Clause 3.

27. EMPLOYER'S RIGHT TO ACCEPT ANY TENDER AND TO REJECT ANY OR ALL TENDERS

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

28. NOTIFICATION OF AWARD AND SIGNING OF AGREEMENT

28.1. The tenderer whose Tender has been accepted will be notified of the award by the Employer prior to expiration of the Tender validity period by cable, telex, e-mail or facsimile confirmed by registered letter. This letter (hereinafter and in the *Conditions of Contract* called the "Letter of Acceptance") will state the sum that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").

28.2. The notification of award will constitute the formation of the Contract, subject only to the furnishing of Performance Security in accordance with the provisions of Clause 29. Until a formal contract is prepared and executed, the notification of award shall constitute a binding Contract.

28.3. The Agreement will incorporate all agreements between the Employer and the successful tenderer. It will be kept ready for signature of the successful tenderer in the office of Employer within 30 days following the notification of award along with the Letter of Acceptance. Within 20 days of receipt, the successful tenderer will sign the Agreement and deliver it to the Employer.

28.4. Upon the furnishing by the successful tenderer of the Performance Security, the Employer will promptly notify the other tenderers that their Tenders have been unsuccessful.

29. PERFORMANCE SECURITY

20.1 Within 28 days of receipt of the Letter of Acceptance, the successful tenderer shall deliver to the Employer a Performance Security in any of the forms given below for an amount equivalent to 3% of the Contract price plus additional security for unbalanced tenders (additional security at 50% of the estimated cost of the unbalanced component) in accordance with Clause 25.5 of ITT and Clause 43 of the Conditions of Contract.

- a) E-Bank Guarantee/Demand draft/Pay Order/ BG in favour of K-RIDE, Bangalore or
- b) A bank guarantee in the form given in Section 10.

20.2 If the Performance Security deposit is provided by the successful tenderer in the form of Bank Guarantee, it shall be issued either by a Nationalized / Scheduled Bank.

20.3 The Performance Security deposit if furnished in the form of E-Bank guarantee, demand draft if requested, be converted to interest bearing securities at the cost of the contractor.

20.4 Failure of the successful tenderer to comply with the requirements of sub-clause 29.1 and clause 29 of additional ITT, shall constitute sufficient grounds for cancellation of the tender award and forfeiture of the Earnest Money Deposit.

30. ADVANCE PAYMENT AND SECURITY:

30.1. The Employer will provide an advance payment on the contract price as stipulated in the condition of contract subject to the maximum as stated in the contract data.

31. CORRUPT OR FRAUDULENT PRACTICES

31.1. "Corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of the public official in the procurement process or in contract execution;

"Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Procurement Entity, and includes collusive practice

among the tenderers either prior to or after tender submission, designed to establish tender prices at artificial non-competitive levels and to deprive the Procurement Entity of the benefits of free and open competition;”. The debarment action shall be taken as per KTPP Act.

31.2. K-RIDE requires that the tenderers/Suppliers/Contractors observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, K-RIDE:

- a. will reject a proposal for award if it determines that the tenderer recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;
- b. will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a K-RIDE contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a K-RIDE contract.

31.3. Furthermore, tenderers shall be aware of the provision stated in sub-clause 50.2 of the Conditions of Contract.

32. PURCHASE PREFERENCE TO MAKE IN INDIA:

32.1. The provisions of revised ‘Public Procurement (Preference to Make in India) Order 2017’ issued by Department of Industrial Policy and Promotion under Ministry of Commerce and Industry vide letter no. P-45021/2/2017-PP (BE-II) dated 28.05.2018 shall be applicable to the tendering process and award of the contract shall be done accordingly. In this connection, the minimum local content shall be 50% and the margin of purchase preference shall be 20%. For award of contract, para 3.c. of the revised ‘Public Procurement (Preference to Make in India) Order 2017’ shall be applicable in addition to the other provisions in the tendering documents in this regard.

33. APPEAL:

33.1. The tenderer shall submit online appeal within 30 days period from the date of receipt of order to the Employer through the Karnataka Public Procurement Portal. The Employer may after giving opportunity to the parties pass such order as it deems fit and such order shall be final.

ADDITIONAL INSTRUCTIONS TO TENDERERS
(THIS SHOULD BE READ IN CONTINUATION OF ITT)

ITT Clause Ref.	Description
2.3	<p>The following paras are added:</p> <p>Wherever the word JV is mentioned, it should be read as JV/Consortium.</p> <p>For any purpose herein, ‘Joint Venture’ means an ad hoc association of firms that pool their resources and skills to undertake a large or complex contract in the role of “Contractor,” with all firms (partners in the JV) being legally liable, jointly and severally, for the execution of the Contract in the event of a partner’s withdrawal.</p> <p>A tenderer may be a natural person, private entity, government-owned entity, or any combination of them with a format intent to enter into an agreement or under an existing agreement in the form of a Joint venture or consortium. The tenderer must ensure the following</p> <ol style="list-style-type: none"> a. In case of Single Entity: <ol style="list-style-type: none"> i. Submit Power of Attorney authorizing the signatory of the Tender to commit the tenderer. b. In case of Joint Venture/ Consortium: <ol style="list-style-type: none"> i. The number of partners in the JV/ Consortium shall not be more than three. ii. At the time of bidding, the tenderer (JV) to submit the JV Agreement, as per the form given in Section 3: Qualification and Information/Bidding Forms. On issue of LOA, the JV/Consortium Agreement should be registered and shall be submitted along with the performance security.

	<p>iii. The JV/ Consortium shall nominate a Representative through Power of Attorney (Form given in Section 3) who shall have the authority to conduct all business for and on behalf of any and all the parties of the JV/ Consortium during the Tendering process and, in the event the JV/ Consortium is awarded the Contract, during contract execution.</p> <p>iv. Submit Power of Attorney by individual partners to lead partners as per the form given in Section 3.</p> <p>v. In case a Joint Venture/ Consortium is the successful tenderer, the appropriate Joint Venture/ Consortium Agreement for execution of work should be entered by the Joint Venture/ Consortium partners. The duly signed Joint Venture/ Consortium Agreement should be submitted along with the tender submission.</p> <p>vi. The lead member as aforesaid shall be authorized to incur liabilities and receive instructions for and on behalf of any and all the partners of the Joint venture/Consortium and the entire execution of the contract.</p> <p>vii. All members of the Joint venture/Consortium shall be Jointly and severally responsible for the execution of the Contract.</p> <p>viii. Change in constitution or percentage participation of JV/Consortium shall not be permitted at any stage after submission of Tenders</p> <p>c. Only firms that are registered or incorporated in India are eligible to compete. Any tenderer from a country which shares a land with India will be eligible to Tender in this tender only if the tenderer is registered with the Competent Authority.</p> <p>d. "Tenderer from a country which shares a land border with India" for the purpose of this Order means: -</p> <p>i. An entity incorporated, established, or registered in such a country; or</p> <p>ii. A subsidiary of an entity incorporated, established, or registered in such a country; or</p> <p>iii. An entity substantially controlled through entities incorporated, established, or registered in such a country; or</p> <p>iv. An entity whose beneficial owner is situated in such a country; or</p> <p>v. An Indian (or other) agent of such an entity; or</p> <p>vi. A natural person who is a citizen of such a country; or,</p> <p>vii. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above</p> <p>e. The beneficial owner for the purpose of above clause will be as under:</p> <p>i. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person(s), has a controlling ownership interest or who exercises control through other means.</p> <p>Explanation-</p> <p>(a) "Controlling ownership interest" means ownership of or entitlement to more than twenty-five percent of share or capital or profits of the company;</p> <p>(b) "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue their shareholding or management rights or shareholders agreements or voting agreements;</p> <p>ii. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;</p> <p>iii. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical</p>
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	<p>person, has ownership of or entitlement to more than fifteen percent of the property or capital or profit of such association or body of individuals;</p> <p>iv. Where no natural person is identified under (i) or (ii) or (iii) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;</p> <p>v. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.</p>
<p>2.4</p>	<p>The tenderer shall submit a Certificate stating that they have read the above clause using the appropriate Performa given in Section 3 - Form 3C1 & 3C2.</p> <p>Tenderers having a conflict of interest will be disqualified. The conflict of interest is detailed below.</p> <p>A tenderer or any of its constituents shall not have conflict of interest. All tenderers found to have a conflict of interest shall be disqualified. A tenderer may be considered to be in a conflict of interest with one or more parties in this Tendering process, if, including but not limited to:</p> <p>a. they have controlling shareholders in common; or</p> <p>b. they receive or have received any direct or indirect subsidy from any of them; or</p> <p>c. they have the same legal representative for purposes of this Tender; or</p> <p>d. they have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the Tender of another tenderer, or</p> <p>e. any firm, either individually or in Joint Venture (JV)/ Consortium, submits more than one offer irrespective of whether the firm is quoting against this Tender. The Tenders submitted by two different tenderers, having any common participant in JV/ Consortium formation or any common partner in partnership firms, or an individual will be treated as having conflict of interest or</p> <p>f. a tenderer who is Sub-contractor to another tenderer will be treated as having conflict of interest. However, this does not limit the inclusion of the same sub-contractor in more than one Tender.</p> <p>g. a tenderer participated as a consultant in the preparation of the design or specifications of the contract that is the subject of the Tender; or</p> <p>h. A tenderer was affiliated for any period(s) during last two years before the date of issue of Invitation for Tenders with a firm or entity that has been hired (or is proposed to be hired) by the Employer as Engineer for the contract.</p>
<p>2.5</p>	<p>The tenderer will be disqualified if,</p> <p>a. The tenderer or any of its constituents has been blacklisted/ banned from business dealings with all Government Departments by the Government of Karnataka or by Ministry of Railways or by K-RIDE at any time till finalization of Tenders, except in cases where such blacklisting/ banning has been withdrawn by Competent Authority or has ceased or expired on the deadline for submission of the Tenders, for which satisfactory evidence is to be produced.</p> <p>b. Any previous contract of the tenderer or any of its constituents had been fully terminated or part terminated for its failure as a JV/ Consortium partner with forfeiture of its full Performance Security, by Rail Infrastructure Development Company (Karnataka) Ltd.(K-RIDE) at any time starting from 3 years before the deadline for submission of Tenders and up to one day before the date of opening of price Tenders;</p> <p>Provided, however, there is no stay order or declaration by any Court against such termination of the contract by Rail Infrastructure Development Company (Karnataka) Ltd. or such termination of the contract has not been revoked by Rail Infrastructure Development Company (Karnataka)</p>

	<p>Ltd or competent authority of K-RIDE has not passed an order of non-applicability of disqualification of the tenderer or any of its constituents despite such termination.</p> <p>c. The tenderer or any of its constituents has been imposed delay damages of 5% or more of contract value by K-RIDE due to delay in the implementation of any previous contract within the period of last 2 years before the deadline for submission of Tenders (Period of 2 years shall be reckoned from the date on which the total accrued amount of Delay Damages has reached 5% or more of the contract price) or such accrued delay damages has not been fully recovered before the deadline for submission of Tenders on account of contractor's request for deferring recovery to maintain cash flow and K-RIDE has acceded to the same in the interest of the project or the work under the previous contract in question has not been completed before the deadline for submission of Tenders, unless imposition of such delay damages has been set aside by the Competent Authority.</p> <p>d. The tenderer or any of its constituents:</p> <p>i. has suffered bankruptcy/insolvency or</p> <p>ii. has any ongoing case of insolvency before the NCLT/ any applicable Court where Interim Resolution Professional (IRP) has been appointed or is at any later stage of the insolvency process, as on the deadline of submission of Tenders or thereafter till finalization of Tenders.</p> <p>e. The tenderer is found ineligible by the Employer, in accordance with ITB-3.</p> <p>f. The tenderer or its constituent(s) has been declared by K-RIDE to be a poor performer and the period of poor performance is still in force on the deadline for submission of Tenders.</p> <p style="text-align: center;">OR</p> <p>The tenderer or its constituent(s) has been declared by K-RIDE to be a poor performer at any time after the deadline for submission of Tenders and upto one day before the date of opening of price Tenders.</p> <p>g. The tenderer or any of its constituents has changed its name or created a new business entity as covered by the definition of "Allied Firm" under para 1102 (iii) of Chapter XI of Vigilance Manual of Indian Railways (available on website of Indian Railways), consequent to having been banned from business dealings or suspended from business dealings or having been declared poor performer.</p> <p>The tenderer shall submit an affidavit stating that they are not liable to be disqualified as per this sub clause using the Form PS3 given in Section-3: Qualification and Information/Bidding Forms. Non-submission of an affidavit by the tenderer shall result in summary rejection of his Tender.</p> <p>Tenderers shall immediately inform the Employer in case they cease to fulfil eligibility in terms of ITT clause 2 above. In case the tenderer fails to inform the Employer or submits a false affidavit, his Tender shall be summarily rejected and Tender security shall be forfeited. The tenderer shall also be liable for Banning of Business dealings for a period up to five years.</p>
<p>2.6</p>	<p>PARTNERS IN CASE OF JV/CONSORTIUM</p> <p>a. Lead partner must have a minimum of 50% participation in the JV/Consortium.</p> <p>b. Partners having 25% or more percentage participation shall be termed as substantial partner/other Partners.</p> <p>c. In case of JV/Consortium, change in constitution or percentage participation shall not be permitted at any stage after the bid submission.</p> <p>The bidder, in case of JV/Consortium, shall clearly and unambiguously define the role and responsibilities for each partner in the JV agreement submitted as per Form JV/4 of Section-3, providing clearly that any abrogation/subsequent re-assignment of any responsibility by any partner of JV/Consortium in favour of</p>

	<p>other JV/Consortium partner or any change in constitution of partners of JV/Consortium (without written approval of Client) from the one given in JV agreement at tender stage, will be treated, as 'breach of contract condition' and/or 'concealment of facts' as the case may be and acted accordingly. All Members of the JV/ Consortium must have experience in execution of similar work.</p>
3.3(a)	<p>The following para is added:</p> <p>Materials, Equipment and Services</p> <p>The materials, equipment and services to be supplied under the Contract shall be from the approved sources as specified in Section 8A: Works Requirements and Price Schedule Section-9.</p>
7.3	<p>The following para is added:</p> <p>The Employer is not responsible for the completeness of the Bidding Document and their Addenda, if they were not obtained directly from the source stated by the Employer in the Invitation for Bids.</p> <p>The Bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Document. Failure to furnish all the information or documentation required by the Bidding Document may result in the rejection of the bid.</p>
8.1.1	<p>Additional Para</p> <p>The Employer shall endeavour to respond to the questions raised or clarifications sought by the Bidders. However, the Employer reserves the right not to respond to any question or provide any clarification, in its sole discretion, and nothing in this Clause shall be taken or read as compelling or requiring the Employer to respond to any question or to provide any clarification.</p> <p>The Employer may also on its own motion, if deemed necessary, issue interpretations and clarifications to all Bidders. All clarifications and interpretations issued by the Employer shall be deemed to be a part of the Bidding Documents. Verbal clarifications and information given by the Employer, or its employees or representatives shall not in any way or manner be binding on the Employer.</p>
8.3	<p>The following para is added:</p> <p>The Pre-Bid meeting may also be attended through video conferencing (VC). Those tenderers who wish to join the meeting through Video Conferencing shall send a request email on the email id (i.e., ed.kride@kride.in) till 3 working days before the scheduled date of pre-bid meeting up to 15:00 hours IST. A link for Video Conferencing will be sent by K-RIDE to such tenderers only. Any request for VC received after the given date and time for sending the link for VC will not be entertained.</p> <p>Please note that the request received from the tenderers (With details of the Company, its address, and the name and designation of the person attending the VC) will only be entertained. They shall also mention the email id through which VC is desired to be joined. K-RIDE may allow a maximum of two email Ids for one company to participate in the VC. Only one person will be allowed through one Email ID. The tenderers can join the VC through the link provided to them on Email ID.</p> <p>During the pre-bid meeting, the prospective tenderers may clarify/explain their queries submitted by them earlier (before the time limit as mentioned in Section 1). The clarifications/answers may not be given in the pre-bid meeting itself. The responses of K-RIDE will be intimated to the tenderers (who sought the clarification) in due course, depending upon the merits of the query. K-RIDE reserves the right not to respond to any question/query or to provide any clarification, in its sole discretion, without assigning any reason thereof.</p>
10.0	<p>Document comprising Technical and Financial Bid:</p> <p>The following para to be read as:</p> <p>The Bidders shall submit the Technical BID & Financial Bid online through e-procurement portal (https://kppp.karnataka.gov.in), only comprising of the following documents along with supporting documents as appropriate.</p>

10.3	<p>The following para is added:</p> <p>Documents Comprising the Tender</p> <ol style="list-style-type: none"> i. The Tender shall comprise of Tender Security/Tender Security Declaration, Technical Tender and Price Tender. The tenderer shall submit the Tender through Karnataka Public Procurement Portal. ii. On the stipulated date of opening of Tenders, initially, only the Technical Tenders are opened through Karnataka Public Procurement Portal. The Technical Tenders shall be evaluated by the Employer in accordance with the stipulated Qualification and Evaluation criteria. No amendments or changes to the tenders would be permitted after the opening of the tenders. iii. tenderers who are qualified in the technical evaluation their price Tender shall be opened at a date and time advised by the Employer(K-RIDE) through e-tendering portal. The Price Tenders are evaluated and the Contract is awarded to the tenderer whose Tender has been determined to be the lowest evaluated substantially responsive Tender. <p>The Technical Tender shall contain the following:</p> <ol style="list-style-type: none"> i. All the Forms of Section-3: Qualification Information/Bidding Forms including letter of technical Bid (LTB) shall be scanned and uploaded. ii. The tenderer shall furnish a commitment in Letter of Technical Bid (LTB) for deployment of equipment and personnel as stipulated in Section 8A: Employers Work's Requirement. iii. The tenderer shall furnish commitment in LTB for submitting construction method statement for all major activities of work and get this approved from the engineer prior to the commencement of work on that activity in case of award of contract. iv. The tenderer shall furnish a commitment in Letter of Technical Bid (LTB) for adhering to mobilisation and construction schedule as stipulated in Section 8A: Employers Work's Requirement. v. The tenderer should note that non-submission of the Letter of Technical Bid (LTB) by the tenderer will result in summary rejection of his/her Tender. vi. The tenderer shall submit the Approach and Methodology for performing the assignment by using appropriate Performa given in Section 3: Qualification Information/Bidding Forms. vii. Scanned copy of Tender Security/Tender Security Declaration form (Section 3), in accordance with ITT Clause 13; viii. Scanned copy of written confirmation authorizing the signatory of the Tender to commit the tenderer, any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed or initialled by the person signing the Tender. ix. Scanned copy of documentary evidence with establishing the tenderer's qualifications to perform the contract; To establish its qualifications to perform the Contract in accordance with Section 2: ITT the tenderer shall submit as part of its technical Tender the information requested in the corresponding information sheets included in Section 3: Qualification Information/Bidding Forms. x. Domestic tenderers, individually or in joint ventures, applying for eligibility for domestic preference shall supply all information required to satisfy the criteria for eligibility. xi. Scanned copy of Approach and Methodology - Performa given in Section-3: Qualification Information/Bidding Forms xii. Scanned copy of Joint Venture Agreement entered into by all partners <p>The Price Tender shall contain the following:</p> <ol style="list-style-type: none"> i. Scanned copy of Letter of Price Bid
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	<ul style="list-style-type: none"> ii. All documents mentioned in Section-3 shall be scanned and submitted. iii. Filled/completed schedules as required including Price Schedule in accordance with ITT Clauses should be submitted through Karnataka Public Procurement Portal only; iv. The tenderer shall submit through Karnataka Public Procurement Portal, separate Technical Proposal and Price Proposal, using the appropriate Submission Sheets furnished in Section-3: Qualification Information/Bidding Forms. These Forms must be completed without any alterations to their format, and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested. a. The tenderer shall submit, as part of the Price Tender, the Schedules, including the Price Schedule through Karnataka Public Procurement Portal only.
<p>11.5</p>	<p>Tender Prices and Discounts</p> <p>The following para to be read as:</p> <ul style="list-style-type: none"> a. The prices quoted by the tenderer in the Letter of Price Tender (LPB) and in the price schedule shall conform to the requirements specified below. b. In the Price Schedule, the amount against each schedule is to be quoted. From this, price of such schedules has been worked out and indicated in the summary sheet in the Price Schedule. The tenderer shall quote lumpsum price as per format for such schedule in the summary sheets. (No rate and amount shall be quoted in technical bid.) c. The tenderer shall fill in the amount against each schedule of the price schedule. Items against which no amount or price is entered by the tenderer will not be paid for by the Employer when executed and shall be deemed to be covered by the rate quoted in the price schedule. d. The price/ percentage to be quoted in the letter of Price Tender, in accordance with ITT, shall be the total price of the Tender. e. The tenderer can modify his/her Tender and resubmit it any number of times through Karnataka Public Procurement Portal before the deadline for submission of Tenders. Any other correspondence in connection with the Tender is not permissible and shall not be considered in Tender evaluation. f. Unless otherwise provided in the ITT and the Contract, the rate quoted by the tenderer are subject to adjustment during the performance of the Contract in accordance with the provisions of the Conditions of Contract. In such a case, the indices and weightages for the price adjustment formulae shall be as specified in the Tables of Adjustment Data included in Contract Data. g. All duties, taxes including GST, royalties, cess and other levies payable by the Contractor under the Contract, or for any other cause (including standard specifications), as of the date shall be included in the lumpsum amount of Price Schedule and the total Tender Price submitted by the tenderer. h. GST shall be paid by the tenderer as applicable in accordance with the prevailing rules of Government of India. i. tenderers should note that during the progress of the works, the foreign currency requirements of the outstanding balance of the Contract Price may be adjusted by agreement between the Employer and the Contractor in order to reflect any changes in foreign currency requirements for the Contract, in accordance with Sub-Clause 14/ITT (Currencies of Bid and Payment) of the Conditions of Contract. Any such adjustment shall be affected by comparing the percentages quoted in the Tender with the amounts already used in the Works and the Contractor's future needs for imported items. j. tenderer should note that non-submission of the Letter of Price Bid (LPB) by the tenderer shall result in summary rejection of his Tender.

	<p>k. Online alternative price tender corresponding to the alternative Technical Tender, If permissible, in accordance with ITT Clause 14;</p>
<p>13.7</p>	<p>The following para is added:</p> <p>In this tender, a tender security/ EMD of Rs. 34,50,000/- (Rupees Thirty – Four Lakh and Fifty Thousand only) shall have to be paid.</p> <p>In this tender, the tender security/ EMD as mentioned in Table of Section 1 of the contract through e-payment in the e-procurement portal using any of the following five options only:</p> <p>Online Modes</p> <ol style="list-style-type: none"> 1. Credit Card. 2. Debit Card. 3. Net Banking <p>Offline Modes</p> <ol style="list-style-type: none"> 4. National Electronic Fund Transfer (NEFT). 5. Over the Counter (OTC) – DD/ Banker’s cheque/ Unconditional Bank Guarantee/ Pay Order/ Specified small savings instruments pledged to K-RIDE. <p>Out of this 34,50,000/- (Rupees Thirty – Four Lakh and Fifty Thousand only), Rs. 5,00,000/- (Rupees Five Lakh only) shall have to be paid through ‘Online Modes’. This Rs. 5,00,000/- (Rupees Five Lakh only) shall be directly transferred to e-proc pooling account at the time of submission of bids.</p> <p>The balance amount of Rs. 29,50,000/- (Rupees Twenty – Nine Lakh and Fifty Thousand only) shall be paid through ‘Offline Modes’.</p> <p>For offline modes i.e. NEFT and OTC, the bidder has to complete the payment as per the user manual given in e-procurement portal and shall mention the bank transaction reference number in the e-proc portal to complete the bidding procedures.</p> <p>For further details, kindly Click on the link, https://eproc.karnataka.gov.in/eproportal/pages/contractors.jsp and click on User Manuals & Refer e-payments or https://kppp.karnataka.gov.in and on downloads tab click on User Manuals for Tenderers.</p> <p>The EMD shall have to be valid for 45 days beyond the validity of the tender. The scanned copy of the BG should be uploaded to the tender in the e-procurement platform. The Original Bank Guarantee shall compulsorily be produced & submitted for verification after the bid submission closing time but before the opening of the technical bid date and time as specified in e-portal to Executive Director (Civil) in K-RIDE office. The bidder shall note that the Original Bank Guarantee submitted through post/in person, if it does not reach before the opening of the technical bid date and time as specified in e-portal to the Executive Director (Civil) in K-RIDE office, the bid will not be considered for technical evaluation. The bids of the contractors who have failed to produce and submit the original bank guarantee of earnest money deposit of tender before the opening of the technical bid date and time as specified in e-portal to the concerned GM, the bids will not be opened. Even if they are opened by default/manual/electronic error, the bids will not be considered for technical evaluation and the bids will be rejected. In case of non-reconciliation of tender earnest money deposit receipt of payment in Government of Karnataka central pooling account held at the ICICI Bank, the bid gets rejected.</p> <p>Bank Guarantee Format</p> <ol style="list-style-type: none"> i. An unconditional bank guarantee using the Form given in Section 3: Qualification Information and Bidding Forms. The bank guarantee shall be from a bank having minimum net worth of over INR 500 million from the specified banks as under: <ol style="list-style-type: none"> (i) a Scheduled Bank in India, or (ii) a Foreign Bank having their operations in India, or (iii) a Foreign Bank which do not have operations in India is required to provide a counter-guarantee by State Bank of India,

<p>ii. The Scheduled Bank issuing the Bank Guarantee must be on “Structure Financial Messaging System (SFMS)” platform. A separate advice of the BG shall be invariable be sent by the issuing bank to the Employer’s Bank through SFMS and only after this the BG shall become operative and acceptable to the Employer.</p> <p>Further, the Tender Security in Original form along with a copy of “MT760COV (in case of Bank Guarantee message) / MT767COV (in case of Bank Guarantee amendment message) Report” sent by the BG issuing Bank Sealed in an envelope shall be submitted, as stated in ITT 15.</p> <p>The Issuing Bank shall send the SFMS to:</p> <p>Beneficiary: Rail Infrastructure Development Company (Karnataka) Limited (K-RIDE) Bank Name: Canara Bank Branch: Prime Corporate Branch Account No. 0430201012110 IFSC Code: CNRB0002636</p> <p>The Tender security shall be valid up to 45 days beyond tender validity, or up to the date mentioned in the letter of request for extension, if any under ITT 12.</p> <p>In case the tenderer has opted for Tender security in the form of an unconditional Bank Guarantee, the tenderer should upload the scanned copy of Bank Guarantee with the Tender. Non submission of scanned copy of Bank Guarantee with the tender on e-tendering portal and non-submission of original Bank Guarantee within the specified period shall lead to summary rejection of tender. The details of the BG, physically submitted should match with the details available in the uploaded scanned copy and the data entered during Tender submission time, failing which the Tender will be rejected.</p> <p>a. Unless otherwise specified in the BDS, any Tender not accompanied by an enforceable and compliant Tender security as required in accordance with ITT, will be summarily rejected by the Employer as non-responsive.</p> <p>b. The Tender security of the tenderer who have been determined to be unqualified for opening of their financial Tender will be returned within 15 working days after the opening of financial Tender. The Tender security of unsuccessful tenderers will be returned within 15 working days after issue of LOA to the successful tenderer.</p> <p>c. DELETED</p> <p>d. The Tender security may be forfeited:</p> <p>d i) If a tenderer withdraws its Tender during the period of Tender validity specified by the tenderer on the Letter of Tenders, except as provided in ITT Clause 12 or</p> <p>d ii) if a tenderer misrepresents or omits the facts in order to influence the procurement process;</p> <p>d iii) if the successful tenderer fails to:</p> <p>sign the Contract in accordance with ITT Clause 28; furnish a performance security in accordance with ITT 29; accept the correction of its Tender Price pursuant to ITT 24; or furnish a domestic preference security if so required</p> <p>d iv) if the undertaking of the affidavit submitted by the tenderer or its constituents in pursuance to ITT clause 2 or any of the declarations of Letter of Technical Tender or Letter of Price Tender submitted by the tenderer has been found to be false at any stage during the process of Tender evaluation.</p> <p>iii. e. The Tender Security of a JV/ Consortium shall be in the name of the JV/Consortium that submits the Tender or the lead member of the JV/Consortium. If the JV/Consortium has not been legally constituted at the time of Tendering, the Tender Security shall be in the names of all future partners as named in the letter of intent of JV /Consortium mentioned in ITT Clause 2)</p>

<p>14</p>	<p>The following para is added:</p> <p>The Tender, as well as all correspondence and documents relating to the Tender exchanged by the tenderer and the Employer, shall be written in English. Supporting documents and printed literature that are part of the Tender may be in another language provided they are accompanied by an accurate translation of the relevant passages in English in which case, for purposes of interpretation of the Tender, such translation shall govern.</p>
<p>15</p>	<p>Sealing and Marking of Tenders</p> <p>The following para to be read as:</p> <p>The tenderer shall submit the technical Tender, Price Tender and the Tender Security/Tender Security Declaration through Karnataka Public Procurement Portal i.e., https://kppp.karnataka.gov.in. The original of the Technical Proposal, which will contain all Forms of Section 3 except Price Schedule of Section 9 and all other relevant data specified in the Tender document.</p> <p>The Price Bid, shall be submitted through Karnataka Public Procurement Portal only. This “PRICE BID” will contain only Price Schedule and all other relevant data specified in this Tender document. All forms should be typed on the tenderer’s’ letter head as per the exact format of the Forms.</p> <p>The above forms should be scanned and submitted through Karnataka Public Procurement Portal.</p> <p>No details about price proposal shall be disclosed directly or indirectly in the technical proposal failing which the Tender shall be rejected. Only Electronic Tender submission and opening procedure are permitted.</p> <p>In addition to above, the bidder shall submit the copy of one complete set of technical proposal document (signed and stamped uploaded technical proposal documents including page numbers through Karnataka Public Procurement Portal) to K-RIDE office within 2 (two) working days of bid submission date. However, the evaluation of tender will be based on the technical proposal documents uploaded in Karnataka Public Procurement Portal only.</p>
<p>19.7</p>	<p>The following para is added:</p> <p>Tender Opening</p> <ol style="list-style-type: none"> a. The Employer shall conduct the opening of Technical Tenders through Karnataka Public Procurement Portal i.e., https://kppp.karnataka.gov.in on the date and at the time mentioned. b. At the end of the evaluation of the Technical Tenders, the Employer will intimate the tenderers who have submitted substantially responsive technical proposals and who have been determined as being qualified for award to attend the opening of the price Proposals. The date and time, of the opening of Price Tenders will be advised through email. The tenderers shall be given reasonable notice for the opening of Price Tenders. c. The Employer will notify tenderers in writing who have been rejected on the grounds of being substantially non-responsive to the requirements of the Tendering Document and who have been determined as being not qualified as a result of evaluation of technical proposal and their Price Tender shall not be opened. The Tender Security of the tenderers shall be returned after due process. d. The Employer shall conduct the opening of Price Tenders through Karnataka Public Procurement Portal i.e., https://kppp.karnataka.gov.in of all tenderers who have submitted substantially responsive Technical Tenders and who have been determined qualified as a result of technical evaluation.

<p>23.4</p>	<p>The following para is added:</p> <p>Deviations, Reservations, and Omissions</p> <p>During the evaluation of Tenders, the following definitions apply:</p> <ol style="list-style-type: none"> a. "Deviation" is a departure from the requirements specified in the Tendering Document; b. "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Tendering Document; and c. "Omission" is the failure to submit part or all of the information or documentation required in the Tendering Document.
<p>24.3</p>	<p>The following para is added:</p> <p>Nonconformities, Errors, and Omissions</p> <ol style="list-style-type: none"> a. Provided that a Tender is substantially responsive, the Employer may waive any nonconformities in the Tender that do not constitute a material deviation, reservation or omission. b. Provided that a Tender is substantially responsive, the Employer may request the tenderer to submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the Tender related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any aspect of the price of the Tender. Failure of the tenderer to comply with the request may result in the rejection of its Tender.
<p>24.4</p>	<p>The following para is added:</p> <p>Correction of Arithmetical Errors and Omissions in Tender and Evaluation of Tender Price</p> <ol style="list-style-type: none"> a. Provided that the Tender is substantially responsive, the Employer shall correct arithmetical errors and omissions in the Tender and then arrive at the Evaluated Tender Price on the following basis: <ol style="list-style-type: none"> i. If there is a discrepancy between the price mentioned in the summary sheet of the Price Schedule and the price that is obtained by calculation i.e., addition of each schedule in the summary sheet of Price Schedule, then the quoted rate of each schedule shall prevail and the price shall be corrected accordingly. ii. if the rate has been quoted both in words and in figures and there is a discrepancy in such amount, then the lower of the two shall prevail and shall be considered for evaluation of the price of the schedule. iii. If the rate has been quoted either in words or in figures only, then the same shall be considered for evaluation of the price of the schedule. iv. If no amount has been indicated for any particular schedule in words, as well as in figures, irrespective of the fact whether the tenderer has written or not written, in such cases, the lumpsum amount of the schedule shall be considered as zero and shall be calculated accordingly; v. if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected. vi. Deleted. b. If the tenderer has submitted the lowest evaluated Tender does not accept the correction of errors and omissions as per above provisions, its Tender shall be disqualified and its Tender security shall be forfeited or its Tender-Securing Declaration executed.

25.6	<p>The following para is added:</p> <p>Conversion to Single Currency</p> <p>For evaluation and comparison purposes the currencies of the Tender shall be converted into Indian Rupees as stated in BDS.</p> <p>An Abnormally Low Tender is one in which the Tender price, in combination with other elements of the Tender, appears so low that it raises material concerns as to the capability of the tenderer to perform the contract at the offered price. The Employer may in such cases seek written clarifications from the tenderer, including detailed price analysis of its Tender price in relation to scope, schedule, allocation of risks and responsibilities, and any other requirements of the Tender document. If, after evaluating the price analyses, the Employer determines that the tenderer has substantially failed to demonstrate its capability to deliver the contract at the offered price, the Employer may reject the Tender/proposal.</p> <p>Additional Performance Security in case of abnormally low Tenders will have to be submitted.</p> <p>The calculation sheet is as below:</p> <p>If the bid, which results in the lowest Evaluated Bid Price is substantially on lower side and/or seriously unbalanced in the opinion of the Employer as per criteria defined below, the Employer may require the bidder to submit additional performance security as under: -</p> <p>a. If overall price quoted by the L1 bidder is below the engineer's estimated price by more than 10% and the difference between overall price quoted by the L1 and L2 is more than 5% of the estimated price, then the bid price of L1 bidder shall be treated as substantially on lower side and such bidder shall be bound to furnish additional performance security equal to the $(0.9 \times \text{engineer's estimated price} - \text{L1 price})$ or $(0.95 \times \text{L2 price} - \text{L1 price})$ whichever is lower, on this account. Example below demonstrates the method of calculation to arrive at additional performance security:</p> <p>Suppose overall price quoted by the L1 bidder is 17% below the estimated price and the overall price quoted by L2 bidder is 8% below the estimated price. In this case the overall price quoted by the L1 bidder is lower by more than 10% of the estimated price and also the difference between overall price quoted by the L2 and L1 bidder is more than 5% of the estimated price, hence the L1 bidder shall be required to furnish additional performance security for an amount equal to $\{0.9 \times \text{engineer's estimated price} - (1-17/100) \times \text{engineer's estimated price}\} = \{0.07 \times \text{engineer's estimated price}\} = 7\%$ of engineer's estimated price or $\{0.95 \times (1-8/100) \times \text{engineer's estimated price} - (1-17/100) \times \text{engineer's estimated price}\} = \{0.044 \times \text{engineer's estimated price}\} = 4.4\%$ of engineer's estimated price; whichever is lower.</p> <p>As per the above L1 bidder shall be required to submit additional performance security of 4.4% of engineer's estimated price.</p> <p>b. If for any bill/schedule of quantities % age above or below quoted by the bidder on the estimated price is beyond 15% below the overall % age difference between the quoted contract price and the engineers estimated price, then the price for that particular schedule shall be treated as seriously unbalanced and bidder shall be bound to furnish additional performance security for such unbalanced price. Example below demonstrates the method of calculation to arrive at unbalanced price and additional performance security:</p> <p>Suppose for the L1 bidder overall % age difference between quoted contract price and the engineers estimated price;</p> <p>$(\text{Overall contract price} - \text{Overall estimated price}) \times 100 \div \text{overall estimated price} = +4\%$</p> <p>Maximum % age below permitted over estimated price of any bill / schedule in this case = $+4 - 15 = -11\%$</p> <p>Suppose for the L1 bidder has quoted 20% below estimated price then the pricing shall be treated as unbalanced and the bidder shall be required to furnish additional performance security for an amount equal to $(20 - 11)\%$ of the estimated price.</p>
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<p>26.2</p>	<p>The following para is added:</p> <p>Award Criteria</p> <p>a. The Employer will award the contract to the tenderer, whose tender is substantially responsive to the Tendering Document, provided further that the tenderer is determined to be qualified to perform the contract satisfactorily and whose offer has been determined to be the lowest evaluated subject to ITT below. In case of more than one Tenders are evaluated to be lowest, the contract will be awarded to the tenderer with higher average annual construction turnover (calculated as total certified payments received for contracts in progress or completed) in equivalent INR within the last two financial years.</p> <p>b. The Employer has the right to review at any time prior to award of contract that the qualification criteria as specified in Section-3: Qualification Information and Bidding Forms are still being met by the tenderer whose offer has been determined to be the lowest evaluated Tender. A Tender shall be rejected if the qualification criteria as specified in Section-3: Qualification Information and Bidding Forms are no longer met by the tenderer whose offer has been determined to be the lowest evaluated Tender. In this event the Employer shall proceed to the next lowest evaluated Tender to make a similar reassessment of that tenderer's capabilities to perform satisfactorily.</p>
<p>29.5</p>	<p>The following para is added:</p> <p>Performance Security</p> <p>The successful tenderers shall have to submit a Performance Guarantee (PG) Within Twenty-Eight (28) days from the date of issue of Letter of Acceptance (LOA). Extension of time for submission of PG beyond 28 days up to 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 28 days, i.e. from 29th day after the date of issue of LOA. Further if the 60th day happens to be declared holiday in the office of K-RIDE, 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 terminate. In case contract is terminated, K-RIDE will be entitled to forfeit the Tender security and other dues payable against to the contract. In case the tenderer has not submitted by security on the strength of their registration as a start-up recognized by the Department of Industrial Policy and Promotion (DIPP) under Ministry of Commerce and Industry, DIPP shall be informed to this effect. The failed contractor shall be debarred from participating in re-tender for that work.</p> <p>Failure of the successful tenderer to submit the above-mentioned Performance Security or to sign the Contract Agreement shall constitute sufficient grounds for the annulment of the award and forfeiture of the Tender security or execution of the Tender-Securing Declaration.</p> <p>The above provision shall also not apply to the furnishing of a Domestic Preference Security, if so required.</p>
<p>Clause: 34</p>	<p>LITIGATION HISTORY: (Please see Annexure Tendering Forms)</p> <p>The tenderer/tenderers should provide accurate information on any litigation or arbitration resulting from contracts completed or under its execution over the five years as on date of submission of this tender.</p> <p>If the litigation started by the tenderer without recourse to measures of Dispute Resolution and Arbitration as provided in the Contract or the litigation in respect of challenge of award of Arbitration by the tenderer, will be treated as Litigation case indulged by the tenderer for this Para of Litigation History. A consistent history of awards against the Applicant or any partner of a joint venture may result in failure of the application.</p> <p>Note: The tenderers including each of the partners of a Joint Venture, should provide information on any history of litigation or Arbitration resulting from contracts executed in the 5 years as on date of submission of this tender. A separate sheet should be used for each partner of a Joint Venture</p>

Clause: 35	Jurisdiction of Courts The Tendering process shall be governed by and construed in accordance with the laws of India and the Courts as indicated in Tender Data Sheet shall have exclusive jurisdiction over all the disputes/issues arising under, pursuant to and/ or in connection with the Tendering process. The Jurisdiction of Courts is Bengaluru, Karnataka
Clause: 36	Stamp duties and charges: The contractor has to bear the stamp duties and charges for agreements/registration.

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SECTION-3

**QUALIFICATION INFORMATION &
BIDDING FORMS**

INDEX
SECTION-3: QUALIFICATION INFORMATION & BIDDING FORMS

This Section contains the forms which are to be completed by the Bidder and to be submitted as part of this Bid.

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K-RIDE

A) QUALIFICATION INFORMATION/BIDDING FORMS

1. QUALIFICATION INFORMATION

The information to be filled in by the Tenderer hereunder will be used for purposes of computing Tender capacity as provided for in Clause 2 of the Instructions to Tenderers. This information will not be incorporated in the Contract.

1.1. Constitution or legal status of Tenderer

Place of Registration: _____ [Attach copy]

Principal place of business: _____ [Attach Copy]

Total value of construction works executed and payments received in the following five Financial Years (attach certificate from Statutory Auditors)

2018-2019: _____

2019-2020: _____

2020-2021: _____

2021-2022: _____

2022-2023: _____

1.2. Work performed as Contractor (in the same name) on works of similar nature over during the five financial years specified in 1.2 above. (Refer para 3.2 b (I) and 3.2 b(II) of section :2 ITT).

Refer para 3.2 b (I) of section:2 ITT).

Project Name	Name of Employer	Description of Work	Contract Number	Value of Contract ₹. Cr.	Date of Issue of Work Order	Specified Period of Completion	Actual Date of Completion	If Partner in a JV/ Consortium, Specify Participation in Total Contract	Remarks Explaining Reasons for Delay in Completion of
1	2	3	4	5	6	7	8	9	10

Notes:

If the qualifying work of similar nature is done by a joint venture/consortium, then Value shall be considered as per percentage participation by the member(s) in that joint venture/consortium.

1.3. Value of similar nature of work completed shall be updated to 2022-23 price level as per table given below.

Financial year	2018-19	2019-20	2020-21	2021-22	2022-23
Indian Currency					
Foreign Currency					

For completed works, the value of work done shall be updated to FY 2022-23 price level assuming 10% inflation for Indian rupees every year or part thereof up to the month previous to the Bid submission month. Credentials if submitted in foreign currency shall be converted into Indian currency i.e., Indian Rupee as under: Bids will be compared in Indian Rupees only. The exchange rate of foreign currency shall be applicable 28 days before the tender submission date. For conversion of foreign currency to Indian Rupee exchange rates published by Financial Benchmarks Private limited (www.fbil.org.in) 28 days before the date of bid submission will be considered. In case, the particular day happens to be a holiday, the exchange rate published on the next working day will be considered. In case of works in foreign currency, the effect of inflation is considered as included, as the exchange rate prevailing 28 days before tender submission is being considered for conversion to Indian Rupees,

The bidder shall attach a copy of the Certificate(s) issued by the employer in support of the information being furnished in the above form, failing which the claim of the bidder shall be liable to be rejected (in case of experience as a sub-contractor, the employer shall be the owner of the Project who has engaged the main Contractor).

(SEAL AND SIGNATURE OF THE BIDDER)

1.4. Quantities of work executed as contractor (in the same name) during the five financial years as mentioned below.

Year	Name of Work	Name of Employer	Quantity of work performed (As mentioned in Qualification of the Tenderer Clause 3.2)					Remarks (Indicate contract Reference Contract no., Award Date, Completion Date, Role in Contract, Total Contract Amount, JV Participation Proportion)
			Completion of PSC Super Structure Launching (Km)	Completion of 40 m Pre-Cast PSC Girder/ Steel I Girder (No.)	Earthwork in Cutting and Embankment (In Cum)	RCC and PSC Concrete (In Cum)	Detailed Design Experience	
2018-2019								
2019-2020								
2020-2021								
2021-2022								
2022-2023								

Note:

Copy of Certificate(s) issued by the employer in support of the information being furnished above, shall be attached with each respective form, as per detailed requirements indicated in clause 3.2 (c) and 3.2 (d) of Section 2 failing which the claim of the bidder shall be liable to be rejected (in case of experience as a sub-contractor, the employer shall be the owner of the Project who has engaged the main Contractor).

(SEAL AND SIGNATURE OF THE BIDDER)

- 1.5. Information on works for which Tenders have been submitted and works which are yet to be completed as on the date of this Tender.

- 1.5.1. Existing commitments and on-going works:

Description of Work	Place & State	Contract No. & Date	Name and Address of Employer	Value of Contract (₹. in Crores)	Stipulated Period of Completion	Value of Works Remaining to be Completed (₹. In Crores) (Attach Certificate from Engineer in charge)	Anticipated Date of Completion
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

- 1.5.2. Works for which Tenders already submitted:

Description of Work	Place & State	Name and Address of Employer	Estimated Value of Works (₹. In Crores)	Stipulated Period of Completion	Date when decision is Expected	Remarks if Any
(1)	(2)	(3)	(4)	(5)	(6)	(7)

- 1.6. The items of equipment are considered essential for successfully carrying out the works. The Tenderer should furnish all the information listed below. (The item of the equipment required nos. and capacity should match with those specified in ITT clause 3.3(a))

Item of Equipment	Requirement			Owned and Available no's/Age/Capacity/Condition	Remarks (The details of hired/leased Equipment Details to be Indicated)
	Nos.	Capacity	Owned		

- 1.7. Reports on the financial standing of the tenderer, such as profit and loss statements and auditor's reports for the five years;
- 1.8. Qualification and experience of the key technical and management personnel in permanent employment with the tenderer and those that are proposed to be deployed on this contract, if awarded.
- 1.9. Name, address, and telephone, telex, and fax numbers of the Tenderers' bankers who may provide references if contacted by the Employer.

- 1.10. Evidence of access to financial resources to meet the qualification requirement specified in ITT Clause 3.3 (b): Cash in hand, Letter of Credit etc. List them and attach certificate from the Banker in the suggested format given in Section 3, Form No.CL3 & CL4.
- 1.11. Proposals for subcontracting components of works amounting to more than 20% of the contract price.

Item of Work	Value of Sub-Contract	Identified Sub-Contractor (Name and Address)	Experience of Similar Works (Attach Certificates from the Respective Employers)	Remarks (Undertaking from Specialist Subcontractors to be Provided as per Form CL-2)

- 1.12. Information on litigations in which the Tenderer is involved:

Litigation History

(This has reference to Eligibility cum Qualification Criteria document.)

Name of Tenderer or member of Joint Venture: -

Sl. No.	Name of the Employer/ Client	Name of the Work	No. of Cases in the Work	Cause of Litigation/ Arbitration/ Details of Disputes	Year	Litigation/ Arbitration Initiated by	Award in Favor of Tenderer/ Client	Disputed Amount	Remarks Showing Present Status

Note:

Tenderers including each of the partners of a Joint Venture, should provide information on any history of litigation or Arbitration resulting from contracts executed in the 05 years and ending last day of the month previous to the month of bid submission. A separate sheet should be used for each partner of a Joint Venture.

- 1.13. The proposed methodology and program of construction, backed with equipment planning and deployment, duly supported with broad calculations and quality control procedures proposed to be adopted, justifying their capability of execution and completion of the work as per technical specifications within the stipulated period of completion as per milestones.

APPROACH & METHODOLOGY PROPOSED FOR PERFORMING THE ASSIGNMENT

Name of Project: “_____”

The approach and methodology will be detailed precisely under the following topics:

- a. Understanding of the assignment
- b. Work Breakdown structure/ Work plan.
- c. Composition of the Team
- d. Organizational set up/ Construction methodology for execution of the work as outline in Section 8A
- e. Documentation and procedures to be prepared, adopted and furnished to K-RIDE (Rail Infrastructure Company (Karnataka) Limited.)
- f. Reporting Procedure
- g. Sourcing of Material

Note:

The approach and methodology shall be precise and relevant to the assignment. Bar charts shall be included.

B. ADDITIONAL QUALIFICATION INFORMATION/BIDDING FORMS

Form: PS1

LETTER OF TECHNICAL BID

Date _____

Invitation for Bid No.: _____

To,

We, the undersigned, declare that:

- a. We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Tenderer (ITT).
- b. We offer to execute the Works in conformity with the Bidding Documents.
- c. Our bid shall be valid for a period of 180 days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
- d. If our bid is accepted, we commit to obtain a performance security in accordance with the Bidding Documents.
- e. If our bid is accepted, we commit to deploy key equipment and key personnel consistent with the requirements stipulated in Section 8A: Works Requirements.
- f. If our bid is accepted, we commit to submit work method statements for all major activities and get these approved from the engineer prior to commencing work on such activities. We also understand that the work shall be executed as per the approved method statements and KEY DATES without any deviations and delay in completion.
- g. We, including any subcontractors or suppliers for any part of the contract, do not have any conflict of interest in accordance with ITT clause 2.4.
- h. We declare that we are not participating, as a Bidder or as a subcontractor, in more than one bid in this bidding process in accordance with ITT clause 2.2, other than alternative offers submitted in accordance with ITT clause 14.
- i. We declare that we are not liable to be disqualified in Accordance with ITT clause 2.5, and we are enclosing the affidavit for the same as per the Performa given in the bid document.
- j. We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed; and
- k. We have not made any deviations from the requirement of the bidding document and we have also not made any tampering or changes in the bidding documents on which the bid is being submitted and if any tampering or changes are detected at any stage, we understand the bid will invite summary rejection and invocation of bid security declaration, the contract will be liable to be terminated along with forfeiture of performance security, even if LOA has been issued.
- l. We understand that we will be considered for participating for which we have submitted the bid security(ies) declaration form and we will be considered for award, subject to fulfilling the eligibility criteria as given in bidding document.
- m. If our bid is accepted, we opt to take payment into the bank account, nominated by us.

- n. We declare that the submission of this bid confirms that no agent, middleman, or any intermediary has been, or will be engaged to provide any services or any other item of work related to the award and performance of this contract. We further confirm and declare that no agency commission or any payment which may be construed as an agency commission has been, or will be, paid and that the bid price does not include any such amount. We acknowledge the right of the Employer, if he finds to the contrary, to declare our bid to be noncompliant and if the contract has been awarded to declare the contract null and void
- o. We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.
- p. A Power of Attorney to sign and submit this letter is attached.
- q. Having inspected the site, examined the complete bid document including Employer's requirements, Conditions of Contract, Special Conditions of Contract, Particular Conditions of Contract, Technical Specifications, Safety, Health & Environment (SHE) Manual, Eligibility Cum Qualification Criteria, Instructions to Bidder and Addenda/Corrigendum etc., thereto (if any) for above mentioned work and prepared the bid entirely in accordance with all the requirements of the bid document and agree entirely with them.
- r. We here by confirm that we have visited the sites of work and have become conversant with the local conditions of working.
- s. For the purpose of your evaluation, study, review and decision-making we are ready to let you inspect our business premises / site, etc.
- t. We authorize K-RIDE or any of their authorized representative to approach, enquire, verify and check the matter furnished in our submission with the concerned client / owner of the Project / Contract and the concerned Banker of reference provided by us.
- u. We undertake to hold in confidence all documents and information whether Technical or Commercial supplied to us at any time by or on behalf of K-RIDE in connection with this bid and without your written authority or as otherwise required by law not to publish or otherwise disclose the same.
- v. If our bid is accepted, we agree to establish our project office in Bengaluru and also the project offices and site offices fully furnished for Employer and Engineer within the time limits and as per the conditions specified in the bid document.
- w. We have submitted the Statement of Integrity, Eligibility, Social, and Environmental Responsibility signed and abide by the same.
- x. We understand that this Bid shall be governed by and construed in all respects according to the laws for the time being force in India and that the courts at Bengaluru will have exclusive jurisdiction in the matter.
- y. We undertake that, in competing for (and, if the award is made to us, in executing) the above contract, we will strictly observe the laws against fraud and corruption in force in India namely "Prevention of Corruption Act 1988".
- i. We hereby confirm that this Tender complies with the Tender validity and Earnest money deposit required by the Tender documents.
- z. We confirm and declare that by virtue of our signature below, to the best of knowledge and belief that the information provided by us as required in this Bid Document, all supporting and explanatory information is truthful and exact.

Name _____
_____ In the capacity of _____

Signed _____

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

Date: _____

(SEAL AND SIGNATURE OF THE BIDDER)

Form: PS 2

LETTER OF PRICE BID

(To be separately given for each package on the Letter head of the Firm)

(Centre of E-governance has disabled submission of documents pertaining to financial proposal in e-portal. Bidders are requested to enter the Financial Proposal in the respective cell provided in the e-portal. This format of Financial Proposal is only for reference).

Date _____

Invitation for Bid No _____

To,

We, the undersigned, declare that:

- a. We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Clause no. 9, Section 2 Instructions to Bidders (ITBT).
- b. We offer to execute the Work in conformity with the Bidding Documents.
- c. We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed; and
- d. The total price of our Bid is indicated in the price schedule in e-procurement portal.
- e. We have not made any deviations from the requirement of the bidding document and we have also not made any tampering or changes in the bidding documents on which the bid is being submitted and if any tampering or changes are detected at any stage, we understand the bid will invite summary rejection and forfeiture of bid security/the contract will be liable to be terminated along with forfeiture of performance security, even if LOA has been issued.
- f. We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.

Name: _____

In the capacity of: _____

Signed: _____

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

Date: _____

Seal:

Form: PS 3

FORMAT FOR AFFIDAVIT TO BE SUBMITTED BY BIDDER ALONGWITH THE BID

(To be separately given for each package)

*(To be executed in presence of Public Notary on non-judicial stamp paper of the appropriate value in accordance with relevant stamp Act. The stamp paper has to be in the name of the bidder) ***

I _____ (Name and designation) ** _____ appointed as the attorney/authorized signatory of the bidder (including its constituents), M/s. _____ (hereinafter called the bidder) for the purpose of the Bid for the work of _____ as per the bid No. _____ of K-RIDE, do hereby solemnly affirm and state on behalf of the bidder including its constituents as under:

1. *That the bidder or any of its constituents has not been Blacklisted/ banned for business dealings for all Government Departments or by Ministry of Railways or by K-RIDE at any time and/or no such blacklisting is in force as on the deadline for submission of bids.
2. *That none of the previous contracts of the bidder or any of its constituents had been terminated/rescinded for Contractor's failure or part terminated for its failure as a JV/ Consortium partner with forfeiture of its full Performance Security, by Rail Infrastructure Development Company (Karnataka) Ltd. during the period of last 3 years before the deadline for submission of bids.

(Add Proviso of Clause 2, (ITT) suitably, if any Contract was so terminated).

3. *The bidder or any of its constituents has not been imposed liquidated damages of 5% or more of contract value by any Government Department or by Ministry of Railways or by K-RIDE due to delay in the implementation of any previous contract (either in the capacity of a single entity or as constituent of any other JV/ Consortium) within the period of last 2 years before the deadline for submission of bid [2 years shall be reckoned from the date on which imposed L.D. has exceeded 5% of the contract price] and there are no such accrued delay damages which has not been fully recovered before the deadline for submission of bids on account of contractor's request for deferring recovery to maintain cash flow and K-RIDE has acceded to the same in the interest of the project and the work under the previous contract in question has been completed before the deadline for submission of bid, unless imposition of such delay damages has been set aside by the Competent Authority.
4. That the Bidder or any of its constituents is neither Bankrupt/Insolvent nor is in the process of winding-up nor is such a case pending before any Court on the deadline of submission of the bid.
5. *That the name of the Bidder or any of its constituents is not on the list of "Poor Performer" of any Government Department or by Ministry of Railways or by K-RIDE as on the deadline for submission of bid.
6. We declare that the bidder or any of its constituents have not either changed their name or created a new business entity. Consequent to having been banned business dealings for specified period which is not over or suspended business dealings or having been declared as poor performer.
7. We declare and certify that balance sheets for five financial years including that for the latest concluded financial year are being submitted.

8. OR

- i. We declare and certify that balance sheet for the latest concluded financial year has not been finalized till date and that is why we are furnishing financial data for five financial years ignoring the latest concluded financial year.

9. (# - Delete whichever is not applicable) **.

10. We declare and certify that we have not made any misleading or false representation in the forms, statements and attachments in proof of the qualification requirements.
11. We declare that the information and documents submitted along with the bid by us are correct and we are fully responsible for the correctness of the information and documents, submitted by us.
12. We understand that in case we cease to fulfil the requirements of qualifying and eligibility criteria at any time after opening of bids and till finalization of bids, it will be our bounden duty to inform the Employer of our

changed status immediately and in case of our failure to do so, our bid shall be rejected and bid security declaration form shall be forfeited. In case such failure comes to the notice of Employer at any time after award of the contract, it will lead to termination of the contract and forfeiture of Bid or Performance Security. We shall also be liable for Banning of Business dealings up to a period of five years.

13. We understand that if the contents of the affidavit are found to be false at any stage during bid evaluation, it will lead to rejection of our bid and forfeiture of the bid security. Further, we *[insert name of the bidder]* ** _____ and all our constituents understand that we shall be liable for banning of business dealings up to a period of five years.
14. We declare and certify that we have not made any misleading or false representation in the forms, statements and attachments in proof of the qualification requirements.
15. We also understand that our offer will be evaluated based on the documents/credentials submitted along with the offer and same shall be binding upon us.
16. We declare that the information and the document submitted along with the tender by us are correct and we are fully responsible for the correctness of the information and documents, submitted by us.
17. We undersigned that if the certificate regarding Eligibility Criteria submitted by us are found to be forged/false or incorrect at any time during process for evaluation of tenders, it shall lead to forfeiture of the tender EMD besides banning of business for five years in K-RIDE. Further, we (Insert name of the Tenderer)** _____ and all our constituents understand that our offer shall be summarily rejected.
18. We also understand that if the certificate submitted by us are found to be false/forged or incorrect at any time after the award of contract, it will lead to termination of the contract, along with forfeiture of EMD/SD and performance guarantee besides any other action provided in the contract including banning of business for five years in K-RIDE.

(SEAL AND SIGNATURE OF THE BIDDER)

Verification:

We above named tenderer do hereby solemnly affirm and verify that the contents of our above affidavit are true and correct. Nothing has been concealed and no part of it is false.

(SEAL AND SIGNATURE OF THE BIDDER)

**Modify the contents wherever necessary, in terms of sub-clause 2 ITT.*

*** The contents in Italics are only for guidance purpose and details as appropriate, are to be filled in suitably by Bidder.*

Attestation before Magistrate/Public Notary

Form – BDF/1

FORMAT OF BID SECURITY (BANK GUARANTEE)

WHERE AS _____ having its registered office at _____ (hereinafter called the Bidder) has submitted his bid dated _____ for the work Construction of Boundary Wall, Watch Tower and other miscellaneous & associated works in Airforce Station at Jalahalli in connection with BSRP (hereinafter called "the Works") KNOW ALL PEOPLE by these presents that we, _____ having its registered office at _____ (hereinafter called the Bank) are bound unto the Managing Director, Rail Infrastructure Development Company Karnataka Ltd (K-RIDE), Bengaluru (hereinafter called "the Employer") in the sum of ₹. _____ (Rupees _____) for which payment well and truly to be made to the said Employer the Bank binds itself, his successors and assigns by these presents; SEALED with the Common Seal of the said Bank this day _____

THE CONDITIONS OF THIS OBLIGATION ARE:

1. If after Bid opening the Bidder withdraws his Bid during the period of Bids validity specified in the Form of Bid.

OR

2. If the Bidder having been notified of the acceptance of his Bid by the Employer during the period of Bid Validity.
 - a. Fails or confuses to execute the form of Agreement in accordance with the instructions to Bidders, if required; or
 - b. Fails or refuse to furnish the Performance Security, in accordance with the instruction to Bidders; or
 - c. Does not accept the correction of the Bid Price pursuant to clause 24.

We undertake to pay to the Employer up to the above amount upon receipt of his first written demand, without the Employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him owing to the conditions of one or both of the two conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date 180 days after the deadline for submission of bids as such deadline is stated in the instructions to Bidders of as it may be extended by the Employer, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank not later than the above date

DATE _____

SIGNATURE OF THE BANK _____

WITNESS _____

SEAL _____

Form: JV/Consortium/1

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

(On each Firm's Letter Head)

No _____

Dated: _____

From,

To,

The General Manager,

Rail Infrastructure Development Company (Karnataka) Limited,

"Samparka Soudha", 1st Floor, B.E.P Premises (Opp. Orion Mall),

Rajajinagar 1st Block, Bengaluru - 560 010.

Gentlemen,

Ref: _____ "[Insert name of work] _____".

Ref: Your notice for Invitation for Bid (IFB) _____

1. We wish to confirm that our company/firm (delete as appropriate) has formed a Joint Venture/ Consortium by name of _____ with for the purposes associated with IFB referred to above.

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

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

OR

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

3. 'In this group we act as leader and, for the purposes of applying for qualification, represent the Joint Venture/ Consortium.'
4. In the event of our group being awarded the contract, we agree to be jointly with _____ (names of other members of our JV/Consortium) _____ and severally liable to the (K-RIDE) Rail Infrastructure Development Company (Karnataka) Limited, Bengaluru, its successors and assigns for all obligations, duties and responsibilities arising from or imposed by the contract subsequently entered into between Rail Infrastructure Development Company (Karnataka) Limited, Bengaluru and our JV/ Consortium.
5. *I/We, further agree that entire execution of the contract shall be carried out exclusively through the lead partner.

Yours faithfully,

(Signature)

(Name of Signatory)

(Capacity of Signatory)

Seal

* Delete as applicable

Form: JV/Consortium/2

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

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

Know all men by these presents, we ... do hereby constitute, appoint and authorize Mr./Ms. who is presently employed with us and holding the position ofas our attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to our bid for the work of ...Including signing and submission of all documents and providing information/responses to Rail Infrastructure Development Company (Karnataka) Limited, Bangalore, representing us in all matters, dealing with Rail Infrastructure Development Company (Karnataka) Limited, Bangalore, in all matters in connection with our bid for the said project and if successful, till the whole of the bid process.

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

Dated this the _____ day of _____ 2023

(Signature of authorized Signatory)

(Signature and Name in Block letters of Signatory)

Seal of Company

Witness

Witness 1:

Name:

Address:

Occupation:

Witness 2:

Name:

Address:

Occupation:

*Notes:

- i. To be executed by all the partners individually, in case of a Joint Venture/ Consortium.
- ii. The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required the same should be under common seal affixed in accordance with the required procedure.
- iii. Also wherever required, the executants(s) should submit for verification the extract of the charter documents and documents such as resolution/ power of attorney in favour of the person executing this power of attorney for the designation of power hereunder on behalf of the bidder.

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

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

POWER OF ATTORNEY

Whereas Rail Infrastructure Development Company (Karnataka) Limited Bangalore, has invited Bids for the work of
Whereas, the members of the Joint Venture/ Consortium comprising of M/s. _____, M/s.
_____ and M/s. _____
are interested in submission of bid for the work of ... [Insert name of work] ... in accordance with the terms and conditions contained in the bidding documents.

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

NOW THIS POWER OF ATTORNEY WITNESSETH THAT:

We, M/s. _____, hereby designate M/s. _____, being one of the partners of the Joint Venture/ Consortium, as the lead partner of the Joint Venture/ Consortium, to do on behalf of the Joint Venture/ Consortium, all or any of the acts, deeds or things necessary or incidental to the Joint Venture's/ Consortium's bid for the contract, including submission of bid, participating in conferences, responding to queries, submission of information/ documents and generally to represent the Joint Venture/ Consortium in all its dealings with K-RIDE/ Railway or any other Government Agency or any person, in connection with the contract for the said work until culmination of the process of bidding till the contract agreement is entered into with the Rail Infrastructure Development Company (Karnataka) Limited, Bangalore and thereafter till the expiry of the contract agreement.

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

Dated this the _____ Day of _____ 2023.

(Signature)

(Name in Block letters of Executant)

Seal of Company

Witness 1:

Name:

Address:

Occupation:

Witness 2:

Name:

Address:

Occupation:

Notes:

1. To be executed by all the Partners of the JV/Consortium except the lead Partner.
2. The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required the same should be under common seal affixed in accordance with the required procedure.

Form: JV/Consortium/4

DRAFT FORMAT OF JOINT VENTURE/CONSORTIUM AGREEMENT

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

and

M/s. _____ having its registered office at _____ (here in after referred to as _____) in the capacity of a Joint Partner of the other part.

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

WHEREAS:

Rail Infrastructure Development Company (Karnataka) Limited (K-RIDE) [hereinafter referred to as "Employer"] has invited bids for ... "[Insert name of work] _____" Vide LOA No _____ awarded contract.

NOW, THEREFORE, THE PARTIES AGREE AS FOLLOWS:

1. The following documents shall be deemed to form and be read and construed as an integral part of this AGREEMENT.
 - i. Notice for Bid, and
 - ii. Bidding document
 - iii. Any Addendum/Corrigendum issued by Rail Infrastructure Development Company (Karnataka) Limited
 - iv. The bid submitted on our behalf jointly by the Lead Partner.
 - v. Letter of Acceptance issued by Rail Infrastructure Development Company (Karnataka) Ltd.
2. The 'Parties' have studied the documents and LOA issued to enter into Joint Venture/ Consortium as under and have agreed to participate.
3. M/s _____ shall be the lead member of the JV/ Consortium for all intents and purpose and shall represent the Joint Venture/ Consortium in its dealing with the Employer. For the purpose of execution, the parties agree to nominate _____ as the leader duly authorized to sign and submit all documents and enter into correspondence with the Employer.
4. The 'Parties' have resolved that the distribution of share and responsibilities between the JV/Consortium partners is as under
 - i. Lead Partner Share _____ %
Responsibilities
 - a. Key Activities and %age execution assigned

 - b. Price Schedule No. and %age execution assigned

 - ii. Joint Venture/ Consortium Partner Share _____ %

Responsibilities

- a. Key Activities and %age execution assigned

- b. Price Schedule No. and %age execution assigned

- iii. Joint Venture/ Consortium Partner Share _____%

Responsibilities

- a. Key Activities and %age execution assigned

- b. Price Schedule No. and %age execution assigned

Note: In case any Bill or items of a Bill are proposed to be executed by more than one JV/ Consortium partner then indicate the breakup of that Item/Bill no. for each JV/ Consortium partner.

5. JOINT AND SEVERAL RESPONSIBILITIES

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

6. ASSIGNMENT AND THIRD PARTIES

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

7. EXECUTIVE AUTHORITY

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

8. GUARANTEES AND BONDS

Performance Security and other Securities of a JV/ Consortium shall be in the name of the JV/ Consortium that submits the bid.

9. BID SUBMISSION

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

10. INDEMNITY

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

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

11. DOCUMENTS & CONFIDENTIALITY

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

12. ARBITRATION

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

13. VALIDITY

This Agreement shall remain in force till the DLP (Defect Liability Period) is over and Securities are released.

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

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

16. NOTICES BETWEEN JV/ CONSORTIUM PARTNERS

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

Lead Partner

(Name & Address)

Other Partner

(Name & Address)

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

M/s. _____

(Seal)

Witness

1. _____ (Name & Address)

2. _____ (Name & Address)

M/s. _____

(Seal)

BIDDERS QUALIFICATION

To establish its Qualifications to perform the contract in accordance with Section 2 (Qualification Information) the Bidder shall provide the information requested in the corresponding Information Sheets included hereunder.

To establish its qualifications to perform the contract in accordance with Section 2 (Qualification Criteria) the Bidder shall provide the information requested in the corresponding Information Sheets included hereunder.

Form ELI - 1: Bidder's Information Sheet

Bidder's Information	
Bidder's Legal Name	
Bidder's Country of Constitution	
Bidder's Year of Constitution	
Bidder's Legal Address in Country of Constitution	
Bidder's Authorized Representative (Name, Address, Telephone Numbers, Fax Numbers, e-mail Address)	

The bidder shall attach copies of the following original documents with the form:

1. In case of single entity, articles of incorporation or constitution of the legal entity named above, in accordance with ITT clause 2.
2. Authorization to represent the firm or JV/ Consortium named in above, in accordance with ITT clause 14.
3. In case of JV/ Consortium, JV/ Consortium agreement, in accordance with ITT clause 2.

(SEAL AND SIGNATURE OF THE BIDDER)

FORM ELI - 2: JV/ CONSORTIUM INFORMATION SHEET

Each member of a JV/ Consortium must fill in this form separately

JV / Consortium Information	
Bidder's legal name	
JV/ Consortium Partner's Legal Name	
JV/ Consortium Partner's Country of Constitution	
JV/ Consortium Partner's Year of Constitution	
JV/ Consortium Partner's Legal Address in Country of Constitution	
JV/ Consortium Partner's Authorized Representative Information (Name, Address, Telephone numbers, Fax numbers, e-mail address)	
Bidder's Bank Details: Name of the Bank and branch: Account Number: IFSC code: Bank's Contact Number and Fax Number: PAN: GST Registration No:	

The bidder shall attach copies of the following original documents with the form:

1. Articles of incorporation or constitution of the legal entity named above, in accordance with ITT clause 2.
2. Authorization to represent the firm named above, in accordance with ITT clause 14.

Note: Following needs to be submitted by the bidder;

- i. Affidavit in case of Proprietary firm.
- ii. Partnership Deed in case of partnership firm.
- iii. Memorandum & Article of Association in case of Public/Private limited company.
- iv. Authorization/POA in favour of Authorised Signatory of bidder to sign the bid.

(SEAL AND SIGNATURE OF THE BIDDER)

FORM FIN-1: FINANCIAL SITUATION

(Each Bidder or each member of a JV/Consortium must fill in this form separately)

NAME OF BIDDER/JV/CONSORTIUM PARTNER

Sl. No.	Description	Financial Data for 5 Financial Years [Indian National Rupees]				
		Year 1:	Year 2:	Year 3:	Year 4:	Year 5:
1	Total Assets					
2	Current Assets					
3	Total Liabilities					
4	Current Liabilities					
5	Net Worth [= 1 – 3]					
6	Working Capital [= 2 - 4]					
7	Profit Before Tax (PBT)					

1. The bidder shall attach copies of the following original documents with the form

Copies of the audited balance sheets, including all related notes, and income statements for the five years, as indicated above, complying with the following conditions.

 - i. All such documents reflect the financial situation of the Bidder or partner to a JV/ Consortium, and not sister or parent companies.
 - ii. Historic financial statements must be audited by a certified accountant.
 - iii. Historic financial statements must be complete, including all notes to the financial statements.
 - iv. Historic financial statements must correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted).
2. Contents of this form should be certified by a Statutory Auditor
 - i. In the event that the audited accounts for the latest concluded Financial Year are not available, the Bidder shall furnish information pertaining to the five financial years after ignoring the latest concluded financial year. In case, the bidder submits audited financial information for the last six or more years, only the figures for the five years (from FY 2017-18 to FY 2021-22) shall be considered for evaluation.
 - ii. Financial data for last five financial years has to be submitted by the bidder along with audited balance sheets. The financial information of the Bidder must be certified either by the Independent Financial Auditor (statutory Auditor) of the company appointed under the companies' Act.
 - iii. In case any discrepancy in data is found between the balance sheet and the financial information submitted, the data as available in the balance sheet will be considered.
 - iv. In case the audited balance sheet of the year 2021-22 is not made available by the Bidder, he has to submit an affidavit certifying that 'The Balance Sheet has actually not been audited so far'. In such a case the financial data of '4' audited financial years (i.e., 2017-18, 2018-19, 2019-20, 2020-21) will be taken into consideration for evaluation. If audited balance sheet of any year other than the year 2021-22 is not submitted, then the bid will be considered as non-responsive.
 - v. In case the company's financial year is from Jan 19 to Dec 19, then it will be considered under financial year 2019 – 20. Similar procedure will be applicable for other financial years also.

(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 Statutory Auditor)

Name of Statutory Auditor: _____

Registration No: _____

(Seal)

K-RIDE

FORM FIN-2: ANNUAL CONSTRUCTION TURNOVER FOR THE 5 FINANCIAL YEARS.

Each Bidder or each member of a JV/ Consortium must fill in this form separately:

NAME OF BIDDER/JV/CONSORTIUM PARTNER:

Sl. No.	Year	Annual Turnover	Multiplying Factor	Updated Annual Turnover
		INR	INR	INR
1	2018-2019			
2	2019-2020			
3	2020-2021			
4	2021-2022			
5	2022-2023			

Annual Turnover Data for the 5 Financial Years. (Construction Only)			
Year	Amount Currency	Exchange Rate	Indian National Rupees Equivalent
Average Annual Construction Turnover for 5 Financial Years.			

1. The information supplied shall be substantiated by data in the audited balance sheets and profit and loss accounts for the relevant years and submitted as attachments to form Fin-1 in respect of the bidder or all partners constituting the bidder.
2. Contents of this form should be Certified by a Statutory Auditor.
3. In the event that the audited accounts for the latest Financial Year are not available, the Bidder shall furnish information pertaining to last three financial years after ignoring the latest financial year. In case the bidder submits audited financial information for the last four or more years, only the figures for the latest three years shall be considered for evaluation.

(SEAL AND SIGNATURE OF THE BIDDER)

FORM FIN-3: CURRENT CONTRACT COMMITMENTS / WORKS IN PROGRESS

Bidders and each partner to a JV/Consortium should provide information on their current commitments on all contract that have been awarded, or which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

Contract Commitments

Sl. No.	Description of Work	Contract No. & Date	Name & address of Employer, Tel./Fax/ Email	Value of Contract in INR	Stipulated Period of Completion	Value of Balance Work	Anticipated Date of Completion
1	2	3	4	5	6	7	8
1							
2							
3							
4							
5							
Total							

For calculation of 'Updated contract value' in column 5 above, assume inflation as per multiplying Factors given in FIN-2.

1. Bidder should provide information on their current commitments or all contracts that have been awarded or for which a letter of intent or acceptance has been received or for contracts approaching completion but for which a completion certificate is yet to be issued.
2. The exchange rate of foreign currency shall be applicable 28 days before the tender submission date. For conversion of foreign currency to Indian Rupee exchange rates published by Financial Benchmarks Private limited (www.fbil.org.in) 28 days before the date of bid submittal will be considered. In case the particular day happens to be a holiday the exchange rate published on the next working day will be considered. In case of works in foreign currency the effect of inflation is considered as included, as the exchange rate prevailing 28 days before tender submission is being considered for conversion to Indian Rupees,

Note: Enclose Certificate(s) from Engineer(s) In charge (not below the rank of Executive Engineer) for Value of outstanding work. In case it is not feasible to furnish certificate from all the units the bidder should record the following certificate on Fin 3:

"Certified that current commitments on all the contracts that have been awarded or for which a letter of intent or acceptance has been received or for the works in progress or the works approaching completion, value of outstanding work has been indicated in the above table correctly. It is further certified that if later on the employer discovers that information provided in the table is incorrect then the employer will treat our bid invalid and it will be liable for rejection"

(SEAL AND SIGNATURE OF THE BIDDER)

FORM NO. 1

DELETED

K-RIDE

FORM NO. 2

CHECKLIST FOR CLAUSES PERTAINING TO SUMMARY

REJECTION OF BID

We, the undersigned, declare that we have read and understood the content of ITT clauses section:2 mentioned below. We also understand that our bid shall be summarily rejected in case we fail to comply the requirements of undermentioned clauses:

ITT Clause No. Section 2	Reason for Summary Rejection	Form No.
2.5	Non-submission of Affidavit	Form PS-3
11.5 & 22	Non-submission of immediate information to the Employer in case Bidder ceases to fulfill eligibility in terms of ITT.	-
ITT	Letter of Technical Bid	Form PS-1
11.5	Quoting more than one Lumpsum Amount for any Schedule	Price schedule- Section:9
11.5	Non-Submission of the Letter of Price Bid (LPB)	(Form:PS-2)
13	Bid not Accompanied with bid Security	(BDF/1)
14	Bid not Accompanied with Power of Attorney/General Power of Attorney to Sign on Behalf of the Bidders	JV/Consortium/1/2/3

(SEAL AND SIGNATURE OF THE BIDDER)

FORMAT FOR CERTIFICATE TO BE SUBMITTED BY BIDDER ALONGWITH THE BID

(On the letter head of the Firm)

We/I, _____, having registered office at _____ do hereby certify that "I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; I certify that this bidder is not from such country or, if from such a country, has been registered with the Competent Authority. I hereby certify that this bidder fulfils all requirements in this regard and is eligible to be considered. (Where applicable, evidence of valid registration by the competent Authority shall be attached.)"

Dated this _____ day of _____, 2023

For: _____

Authorized Signatory Signature: _____

Full Name: _____

Place: _____

K-RIDE

(SEAL AND SIGNATURE OF THE BIDDER)

**FORMAT FOR CERTIFICATE TO BE SUBMITTED BY
BIDDER ALONGWITH THE BID FOR SUB CONTRACTING**

(On the letter head of the Firm)

We/I, _____, having registered office at _____
do hereby certify that "I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries; I certify that this bidder is not from such a country or, if from such a country, has been registered with the competent Authority and will not sub-contractor any work to a contractor from such countries unless such contractor is registered with the competent Authority. I hereby certify that his bidder fulfils all requirements in this regard and is eligible to be considered. (Where applicable, evidence of valid registration the Competent Authority shall be attached.)"

Dated this _____ day of _____, 2023

For- _____

Authorized Signatory Signature _____

Full Name: _____

Place: _____

(SEAL AND SIGNATURE OF THE BIDDER)

3. Form 4

4. DELETED

K-RIDE

KEY PERSONNEL FOR THE WORK

MINIMUM QUALIFICATION AND EXPERIENCE REQUIRED FOR KEY PERSONNEL TO BE DEPLOYED FOR THE WORK

Sl. No.	Key Personnel	Qualifications & Total Experience	Minimum Number of Personnel Required	Name of the key Personnel Proposed	Qualification	Total Number of Years of Experience	Number of Years Works in Similar Works Experience
1	Project Manager (Team Leader)	BE Civil with 12 years' experience					
2	Senior Engineer / Civil	Minimum 05 years total experience for Bachelor's Degree (or) Minimum 08 years total experience for Diploma					

Note:

- Further details to be updated as per clause 3.3 (c) of section 2 ITT.

(Signature)

(Name of Signatory)

.....

(Capacity of Signatory)

.....

Seal.....

.....

Form 6

FORMAT OF CURRICULUM VITAE (CV) FOR PROPOSED KEY PROFESSIONAL STAFF

Proposed Position:

Name of Firm:

Name of Staff:

Profession:

Date of Birth:

Years with Firm/Entity: Nationality:

Membership in Professional Societies:

Detailed Tasks Assigned:

Key Qualifications:

[Give an outline of staff member's experience and training most pertinent to tasks on assignment. Describe degree of responsibility held by staff member on relevant previous assignments and give dates and locations]

Education:

[Summarize college/university and other specialized education of staff member and degrees obtained.]

Employment Record:

[Starting with present position, list in reverse order every employment held. List all positions held by staff member since graduation, giving dates, names of employing organizations, titles of positions held, and locations of assignments. Also give types of activities performed and client references, where appropriate.]

Period	Name of Employing Organization	Name of the Project	Title / Position	Activity performed	Location of the Assignment

Languages:

[For each language, indicate proficiency: excellent, good, fair, or poor; in speaking, reading, and writing]

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe me, my qualifications, and my experience.

Date:

[Signature of staff member and authorized representative of the Firm] Day/Month/Year

Full name of Staff Member: _____

Full name of the Authorized Representative: _____

**POWER OF ATTORNEY (POA) FOR SUBMITTING BID
(FOR SINGLE ENTITY/SOLE BIDDER ONLY)**

Know all men by these presents, we _____ (name and address of the registered office) do hereby constitute, appoint and authorize Mr./Ms. _____ (name and residential address) who is presently employed with us and holding the position of _____ as our attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to our bid for the Project, including signing and submission of all documents and providing information/responses to K-RIDE, representing us in all matters before K-RIDE, and generally dealing with K-RIDE in all matters in connection with our Bid for the Project.

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

_____ (Signature)
(Name, Title and address) of the Person issuing the POA.

Notes:

- i. The bidder should submit the notarized Power of Attorney.
- ii. The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required the same should be under common seal affixed in accordance with the required procedure.
- iii. The bidder should submit following additional document in support of the POA as case-to-case basis:
 - a) Proprietorship Affidavit in case of Proprietary bidder.
 - b) Partnership deed in case of partnership bidder.
 - c) Board Resolution in case of a Public/Private limited company.
 - d) Memorandum & Article of Association in case of a Public/Private limited company.
 - e) Board Resolution in case of a Limited Liability Partnership.

FORM CL-2

UNDERTAKING FROM NOMINATED/IDENTIFIED SUB-CONTRACTOR

(REFER CLAUSE OF 3.2 (C) / (D) OF ITT)

(On the Letterhead of Nominated/Identified Sub-Contractor)

I/We, _____ (Legal Name of Nominated/Identified Subcontractor) hereby confirm that we are associating with _____ (Legal name of the bidder) for the work of _____ (Name of work as stated in Invitation for Bids {IFB}), for the key activity stated in clause 3.2 (c)/(d) of ITT (if applicable).

I/We hereby undertake that in case M/s _____ (Legal name of the bidder) are awarded the work of _____ (Name of work as stated in Invitation for Bids {IFB}), the key activity stated in clause 3.2 (c)/(d) of ITT shall be undertaken by us as per bid conditions (if applicable).

STAMP & SIGNATURE OF AUTHORISED

SIGNATORY OF
NOMINATED/IDENTIFIED SUB CONTRACTOR

STAMP & SIGNATURE OF AUTHORISED

SIGNATORY OF BIDDER

AVAILABILITY OF FINANCIAL RESOURCES

(SECTION-2, ITT CLAUSE 3.3 (B))

Bidders must demonstrate sufficient financial resources, comprising of Working Capital supplemented by credit line statements or overdraft facilities to meet the Bidder's financial requirements for its current contract commitments, and the subject contract.

In case of a Joint Venture, each Joint Venture Partner must fill out this form separately and provide the Joint Venture Partner's name:

Joint Venture Partner: _____

Financial Resources		
No.	Source of financing	Amount (equivalent)
1	Working Capital	
2	Credit Line	
Total Available Financial Resources		

To be considered, Credit Line must be substantiated by a letter from the bank issuing the line of credit, specific for the subject contract, as prescribed. Any letter or document not complying with this requirement shall not be considered as supplementary financial resources.

Note:

In case the financial statement data is other than Indian Rupees, the equivalent Indian Rupees with the exchange rates as defined in the Section-2, ITT.

EVIDENCE OF AVAILABILITY OF CREDIT LINE FINANCIAL RESOURCES

(SECTION-2 ITT, CLAUSE:3(B))

[Each Bidder must fill out this form to demonstrate financial resources comprising credit line statements or overdraft facilities.]

Project Name:

Bidding Package Name and Identification Number: _____ (to be filled in as indicated in ITT 1) _____

BANK CERTIFICATE

This is to certify that M/s _____ is a reputed company with a good financial standing.

If the contract for the work, namely _____ is awarded to the above firm, we shall be able to provide overdraft / credit facilities to the extent of Rs _____ to meet their working capital requirements for executing the above contract.

__Sd.____

Name of Bank: _____

Senior Bank Manager _____

Address of the Bank _____

[In case of Joint Venture, change the text as follows:]

This is to certify that M/s _____ who has formed a Joint Venture with M/s _____ and M/s _____ for participating in this bid, is a reputed company with a good financial standing.

If the contract for the work, namely _____ is awarded to the above joint venture, we shall be able to provide overdraft / credit facilities to the extent of ₹. _____ to M/s _____ to meet their working capital requirements for executing the above contract.

Form EXP-1

**WORK EXPERIENCE CERTIFICATE
TO WHOM SO EVER IT MAY CONCERN**
(Issued for the purpose of Quoting in K-RIDE tenders)

M/s/Sri _____ (Name and address of the contractor) is a working contractor of this unit and was awarded the following work. The relevant details of the work are as under:

Sl. No	Description	Details
1	Name of work	
2	Acceptance Letter No and Date	
3	Agreement Number, Date and Name of the Agency	
4	Agreement Value in Rupees (in words and figures)	
5	Due Date of Completion	
6	Actual Date of Completion of Work	
7	Value of Final Bill if Passed (in words)	
8	Work Completed but Final Measurements Not Recorded. a) Amount Paid so far as in CC bill No.	
9	Work Completed. Final Measurements Recorded with Negative Variation a) Amount so far Paid as in CC bill No.	
10	Work Completed. If Final Measurements Recorded with Positive Variation which is not Sanctioned yet. Original Agreement Value of Last Sanctioned Agreement Value whichever is Lower.	
11	Scope of work (Broad category of Works i.e., the Name of the Work in the Agreement on which Work is	
12	Details of Values of Major Components/ Works Executed in the Completed Work.	

Note:

The Certificate to satisfy similar work should be signed by an officer not lower than JAG officer in Railways and Executive Engineer rank or equivalent grade in other department of Govt. of India/State Government/PSUs of Government of India / State Undertaking and Competent Authority of Public Listed Company.

Signature: _____

Name of Officer: _____

Designation: _____

Address: _____

Office Seal: _____

Phone/FAX No.: _____

Date: _____

--00--00--00--00--

SECTION - 4

**FORM OF TENDER, LETTER OF
ACCEPTANCE, NOTICE TO PROCEED WITH
THE WORK AND AGREEMENT FORM ETC.**

SL. NO.	TITLE	FORM NUMBER	PAGE NO.
1	LETTER OF ACCEPTANCE	FORM-1	80
2	ISSUE OF NOTICE TO PROCEED WITH THE WORK	FORM-2	81
3	AGREEMENT FORM	FORM-3	82

K-RIDE

FORM OF TENDER (DELETED)

Please refer Form PS-1 of Section 3: Qualification Information & Bidding Forms.

K-RIDE

LETTER OF ACCEPTANCE

(On the Letter head of the Employer)

[Date]_____

To: _____ [name and address of the Contractor]

Dear Sirs,

This is to notify you that your Bid dated _____ for the execution of "Construction of Boundary Wall, Watch Tower and other miscellaneous & associated works in Airforce Station at Jalahalli in connection with BSRP", vide Tender No: K-RIDE/2023-24/OW/WORK_INDENT10, Dated: 27.09.2023 for the Accepted Contract Amount of Rupees _____ [amount in words and figures], as corrected and modified in accordance with the Instructions to Tenderers is hereby accepted by the Competent Authority of K RIDE.

You are hereby requested to furnish Performance Security plus additional security for unbalanced tenders in accordance with of Clause 25.5 of ITT, in the form detailed in Clause 29.1 of ITT and clause 43 of the conditions of contract for an amount of ₹. _____ (As defined in contract data) within 28 days of the receipt of this letter of acceptance, valid up to 30 days from the date of expiry of Defects Liability Period i.e., up to _____ and sign the contract.

Yours faithfully,

Authorized Signature

Name and Title of Signatory

Name of Agency.

ISSUE OF NOTICE TO PROCEED WITH THE WORK

(On the Letter head of the Employer)

[Date] _____

To

_____ (Name and address of the Contractor)

Dear Sirs:

With reference to LOA, for the Construction of Boundary Wall, Watch Tower and other miscellaneous & associated works in Airforce Station at Jalahalli in connection with BSRP. You are hereby instructed to proceed with the execution of the said works in accordance with the contract documents.

Yours faithfully,

(Signature, Name and Title of Signatory

Authorized to Sign on behalf of Employer)

K-RIDE

AGREEMENT FORM

This agreement is made on the _____ day of _____ 20_____, between

_____ (Name and Address of Employer) (herein after called “the Employer”) of the one part
and _____

[name and address of contractor] (herein after called “the Contractor”) of the other part.

Whereas the Employer is desirous that the Contractor execute Construction of Boundary Wall, Watch Tower and other miscellaneous & associated works in Airforce Station at Jalahalli in connection with BSRP advertised vide Tender No. K-RIDE/2023-24/OW/WORK_INDENT10 dated: 27.09.2023 (herein after called “The Works”) and the Employer has accepted the Tender by the Contractor for the execution and completion of such Works and the remedying of any defects therein at a contract price of Rupees _____

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. In this Agreement, words and expression shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to, and they shall be deemed to form and be read and construed as part of this Agreement.
2. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all aspects with the provisions of the Contract.
3. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying the defects wherein the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.
4. The following documents shall be deemed to form and be read and construed as part of this Agreement,

The documents forming the Contract shall be interpreted in the following order of priority:

- i. This Contract Agreement and the Appendices hereto.
- ii. Letter of Acceptance
- iii. Notice to proceed
- iv. Letter of Bid and the Price Schedule submitted by the Contractor.
- v. Addendums, Corrigendum and Pre-bid clarifications to the Tender
- vi. Contract Data, Special provisions (if any)
- vii. Particular Conditions of Contract (PCC)
- viii. General Conditions of Contract (GCC) / Conditions of Contract (CC)
- ix. Employers Requirements including scope of works, the Schedules.
- x. Technical specification, Safety, Health & Environment Manual
- xi. Design and Drawings
- xii. Any other documents pertaining to tender, issued by the Employer
- xiii. Contractor’s Technical Proposal
- xiv. Any other documents pertaining to tender, submitted by the contractor

If an ambiguity or discrepancy is found in the documents, the Engineer will bring the same to the notice of the Employer and the Employer will issue necessary clarification or instruction, as per the need.

In witness whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

The Common Seal of _____

was hereunto affixed in the presence of:

Signed, Sealed and Delivered by the said _____

in the presence of:

Binding Signature of Employer _____

Binding Signature of Contractor _____

K-RIDE

SECTION – 5

**CONDITIONS OF CONTRACT(CC) AND
SPECIAL CONDITIONS OF CONTRACT (SCC)**

**CONDITIONS OF CONTRACT
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CONDITIONS OF CONTRACT

A. GENERAL

1. DEFINITIONS

- 1.1. Terms which are defined in the Contract Data are not also defined in the Conditions of Contract but keep their defined meanings. Bold letters are used to identify defined terms.
- i. **Bill of Quantities** means the priced and completed Bill of Quantities forming part of the Tender.
 - ii. The **Completion Date** is the date of completion of the Works as certified by the Employer in accordance with Sub Clause 46.1.
 - iii. The **Contract** is the contract between the Employer and the Contractor to execute, complete and maintain the Works. It consists of the documents listed in Clause 2.2 below.
 - iv. The **Contract Data** defines the documents and other information which comprise the Contract.
 - v. The **Contractor** is a person or corporate body or Joint Venture whose Tender to carry out the Works has been accepted by the Employer.
 - vi. The **Contractor's Tender** is the completed Tender document submitted by the Contractor to the Employer.
 - vii. The **Contract Price** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.
 - viii. **Days** are calendar days; **months** are calendar months.
 - ix. A **Defect** is any part of the Works not completed in accordance with the Contract.
 - x. The **Defects liability period** is the period named in the Contract Data and calculated from the Completion Date.
 - xi. **Employer/Authority** is the party who will employ the contractor to carry out the works. The terms Employer and K-RIDE used in this Bid Document are synonymous to each other.
 - xii. **Equipment** is machinery and vehicles brought to the site by the contractor for complete execution of the work. It also includes the equipment provided to the Employer / Engineer for supervision and monitoring.
 - xiii. The **Initial Contract price** is the Contract Price listed in the Employer's Letter of Acceptance.
 - xiv. The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the Contract Data. The Intended Completion Date may be revised only by the Employer by issuing an extension of time.
 - xv. **"Joint Venture"** means an ad hoc association of firms that pool their resources and skills to undertake a large or complex contract in the role of "Contractor," with all firms (partners in the JV) being legally liable, jointly and severally, for the execution of the Contract in the event of a partner's withdrawal.
 - xvi. **Materials** are all supplies, including consumables, used by the contractor for incorporation in the Works.
 - xvii. **"Notice to Proceed"** The Employer shall give a notice to the contractor stating the commencement date. This notice shall be given not less than 14 days before the commencement date.
 - xviii. **Plant** is any integral part of the Works which is to have a mechanical, electrical, electronic or chemical or biological function.
 - xix. The **Site** is the area defined as such in the Contract Data.

- xx. **Specification** means the Specification of the Works included in the Contract and any modification or addition made shall be certified by the Engineer and approved by Employer.
- xxi. The **Commencement Date** is given in the Contract Data. It is the date when the Contractor shall commence execution of the works. It does not necessarily coincide with any of the Site access Dates.
- xxii. A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract which includes work on the Site.
- xxiii. A **Variation** is any change to the works, which instruction is given by the Employer/Engineer which varies the Works.
- xxiv. The **Works** means the permanent works and temporary works or either of them as appropriate and the Contract requires the Contractor to construct, install and turn over to the Engineer/Employer.

2. INTERPRETATION

- 2.1. In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Employer will provide instructions clarifying queries about the Conditions of Contract.
- 2.2. The documents forming the Contract shall be interpreted in the following order of priority:
 - i. This Contract Agreement and the Appendices hereto.
 - ii. Letter of Acceptance
 - iii. Notice to proceed
 - iv. Letter of Bid and the Price Schedule submitted by the Contractor.
 - v. Addendums, Corrigendum and Pre-bid clarifications to the Tender
 - vi. Contract Data, Special provisions (if any)
 - vii. Particular Conditions of Contract (PCC)
 - viii. General Conditions of Contract (GCC) / Conditions of Contract (CC)
 - ix. Employers Requirements including scope of works, the Schedules.
 - x. Technical specification, Safety, Health & Environment Manual
 - xi. Design and Drawings
 - xii. Any other documents pertaining to tender, issued by the Employer
 - xiii. Contractor's Technical Proposal
 - xiv. Any other documents pertaining to tender, submitted by the contractor

If an ambiguity or discrepancy is found in the documents, the Engineer will bring the same to the notice of the Employer and the Employer will issue necessary clarification or instruction, as per the need.

3. LAW GOVERNING CONTRACT

- 3.1. The law governing the Contract is the Laws of India supplanted by the Karnataka Local Acts.

4. EMPLOYER'S DECISIONS

- 4.1. Except where otherwise specifically stated, the Employer will decide contractual matters between the Employer and the Contractor.

5. DELEGATION

- 5.1. The Employer may delegate any of his duties and responsibilities to other people after notifying the Contractor and may cancel any delegation after notifying the Contractor.

6. COMMUNICATIONS

- 6.1. Communications between parties which are referred to in the conditions are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act).

7. SUBCONTRACTING

- 7.1. The Contractor may propose to subcontract a part of the work for the approval of the Engineer but shall not assign the part of work to the Sub-Contractor without the approval of the Employer in writing. Subcontracting does not alter the Contractor's obligations.

8. OTHER CONTRACTORS

- 8.1. The Contractor shall cooperate and share the Site with approval from the Employer with other contractors, public authorities, utilities, and the Engineer.

9. PERSONNEL

- 9.1. The Contractor shall employ the technical personnel (of number and qualifications) as may be stipulated by K-RIDE from time to time during the execution of the work. The technical staff so employed shall be available at site as may be stipulated by the Employer/Engineer.
- 9.2. If the Employer asks the Contractor to remove a person who is a member of the Contractor's staff or his work force stating the reasons, the Contractor shall ensure that the person leaves the Site with immediate effect and has no further connection with the work in the Contract.

10. EMPLOYER'S AND CONTRACTOR'S RISKS

- 10.1. The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.

11. EMPLOYER'S RISKS

- 11.1. The Employer is responsible for the excepted risks which are:
- a. Rebellion, riot commotion or disorder unless solely restricted to employees of the Contractor or his Sub Contractors arising from the conduct of the Works; or
 - b. a cause due solely to the design of the Works, other than the Contractor's design; or
 - i. could not have reasonably foreseen; or
 - ii. could reasonably have foreseen, but against which he could not reasonably have taken at least one of the following measures;
 - a. prevent loss or damage to physical property from occurring by taking appropriate measures or
 - b. insure against such loss or damage

12. CONTRACTOR'S RISKS

- 12.1. All risks of loss of or damage to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks are the responsibility of the Contractor.

13. INSURANCE:

- 13.1. The Contractor shall prior to commencing the works, effect and thereafter maintain insurances, in the joint names of the Employer and the Contractor, (cover from the first working day after the Commencement Date to the end of Defects Liability Period), in the amounts stated in the Contract Data:
- i. for loss of or damage to the Works, Plants and Materials and the Contractor's Equipment;

- ii. for liability of both Parties for loss, damage, death and injury to third parties or their property arising out of the Contractor's performance of the Contract including the Contractor's liability for damage to the Employer's property other than the Works and
- iii. for liability of both Parties and of any Employer's representative for death and injury to the Contractor's personnel except to the extent that liability arises from the negligence of the Employer, any Employer's representative or their Employees.

13.2. Policies and certificates for insurance shall be delivered by the Contractor to the Employer for his approval before the Commencement Date. All such insurance shall provide for compensation to be payable to rectify the loss or damage incurred. All payments received from insurers relating to loss or damage shall be held jointly by the Parties and used for the repair of the loss or damage or as compensation for loss or damage that is not to be repaired.

13.3. If the Contractor fails to effect or keep in force any of the insurances referred to in the previous sub-clauses or fails to provide satisfactory evidence, policies or receipts, the Employer may without prejudice to any other right or remedy, effect insurance for the cover relevant to such default and pay the premiums due and recover the same as a deduction from any other monies due to the Contractor. If no payments are due, the payment of the premiums shall be a debt due.

13.4. Alterations to the terms of an insurance shall not be made without the approval of the Employer.

13.5. Both Parties shall comply with any conditions of the insurance policies.

14. SITE INVESTIGATION REPORTS:

14.1. The Contractor, in preparing the tender, shall rely on any site investigation reports referred in the Contract data, supplemented by any information available to the Tenderer.

15. QUERIES ABOUT THE CONTRACT DATA

15.1. The Employer will clarify queries on the Contract Data, if any.

16. CONTRACTOR TO CONSTRUCT THE WORKS

16.1. The Contractor shall construct the Works in accordance with the Specification and Drawings.

17. THE WORKS TO BE COMPLETED BY THE INTENDED COMPLETION DATE

17.1. The Contractor may commence execution of the Works on the Commencement Date and shall carry out the Works in accordance with the program submitted by the Contractor, as updated with the approval of the Employer, and complete them by the Intended Completion Date.

18. APPROVAL BY THE ENGINEER:

18.1. The Contractor shall submit Specification and drawings showing the proposed Temporary Works to Engineer who is to approve them if they comply with the Specifications and Drawings.

18.2. The Contractor shall be responsible for the design of Temporary Works and Permanent works.

18.3. The Engineer's approval does not alter the Contractor's responsibility for design of the Temporary Works and Permanent works.

18.4. The Contractor shall obtain approval of Designers to design of the Temporary and Permanent Works.

18.5. All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Engineer before their use.

19. SAFETY

19.1. The Contractor shall be responsible for the safety of all activities on the Site.

20. DISCOVERIES

20.1. Anything of historical or other interest or of significant value unexpectedly discovered on the Site is the property of the Employer. The Contractor is to notify the Employer of such discoveries and carry out the Employer's instructions for dealing with them.

21. ACCESS TO THE SITE

- 21.1. The Employer shall give access to all parts of the Site to the Contractor progressively, If access of a part is not given by the date stated in the Contract Data the Employer is deemed to have delayed the start of the relevant activities and this will be compensation event.
- 21.2. The Contractor shall allow the Engineer & Employer and any person authorized by the Employer access to the Site, to any place where work in connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plant are being manufactured / fabricated / assembled for the works.

22. INSTRUCTIONS

- 22.1. The Contractor shall carry out all instructions of the Engineer & Employer which comply with the applicable laws where the Site is located.

23. PROCEDURE FOR RESOLUTION OF DISPUTES:

- 23.1. If the Contractor is not satisfied with the decision taken by the Employer, the dispute shall be referred by either party to Arbitration within 30 days of the notification of the Employer's decision.
- 23.2. If neither party refers the dispute to Arbitration within the above 30 days, the Employer's decision will be final and binding.
- 23.3. The Arbitration shall be conducted in accordance with the arbitration procedure stated in the Special Conditions of Contract.

B. TIME CONTROL

24. PROGRAM

- 24.1. Within the time stated in the Contract Data the Contractor shall submit to the Engineer for approval of a Program showing the general methods, arrangements, order, and timing for all the activities in the Works.
- 24.2. The Engineer's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Engineer again at any time. A revised Program is to show the effect of Variations and Compensation Events.

25. EXTENSION OF THE INTENDED COMPLETION DATE

- 25.1. The Employer may extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date, in the opinion of Employer.
- 25.2. The Employer shall decide whether and by how much to extend the Intended Completion Date within 28 days of the Contractor asking the Employer for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information.

26. DELAYS ORDERED BY THE EMPLOYER

- 26.1. The Employer may instruct the Contractor to delay the start or progress of any activity within the Works for any reason, which may not be communicated to the Contractor.

27. MANAGEMENT MEETINGS

- 27.1. The Employer may require the Contractor to attend a management meeting. The business of a management meeting shall be to review the progress achieved and the plans for remaining work.
- 27.2. The responsibility of the parties for actions to be taken is to be decided by the Employer either at the management meeting or after the management meeting and stated in writing to be distributed to all who attended the meeting.

C. QUALITY CONTROL

28. IDENTIFYING DEFECTS

28.1. The Engineer shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. To confirm a Defect, the Engineer may instruct the Contractor and to uncover and test any work that the Engineer considers may have a Defect.

29. TESTS

29.1. If the Engineer instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect the test shall be a Compensation Event.

30. CORRECTION OF DEFECTS

30.1. The Employer shall give notice to the Contractor of any Defects before the end of the Defect Liability Period, which begins at Completion and is defined in the Contract Data. The Defects Liability Period is deemed to have been extended (even after the end of Defect Liability Period, if the Defect has been brought to the notice of the contractor within the Defect Liability Period) as long as Defects (already notified) remain to be corrected.

30.2. Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Employer's notice.

31. UNCORRECTED DEFECTS

31.1. If the Contractor has not corrected a Defect within the time specified in the Employer's notice, the Employer will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

D. COST CONTROL

32. PRICE SCHEDULE:

32.1. The Price Schedule shall contain items of the Design and construction, installation, testing, and commissioning work to be done by the Contractor.

32.2. The Price Schedule is used to calculate the Contract Price. The Contractor is paid as per stage wise payment of work done as per Price Schedule.

33. VARIATIONS

33.1. The Employer shall have power to order the Contractor to do any or all of the following as considered necessary or advisable during the progress of the work by him:

- a. Increase or decrease of any item of work included in the Price Schedule;
- b. Omit any item of work;
- c. Change the character or quality or kind of any item of work;
- d. Change the levels, lines, positions and dimensions of any part of the work;
- e. Execute additional items of work of any kind necessary for the completion of the works; and
- f. Change in any specified sequence, methods or timing of construction of any part of the work.

33.2. The Contractor shall be bound to carry out the work in accordance with any instructions in this connection, which may be given to him in writing by the Employer and such alteration shall not vitiate or invalidate the contract.

33.3. Variations shall not be made by the Contractor without an order in writing by the Employer, provided that no order in writing shall be required for increase or decrease in the quantity of an item appearing in the Price Schedule so long as the work executed conforms to the approved drawings.

33.4. The Contractor shall promptly request in writing to the Employer to confirm verbal orders and the officer issuing oral instructions shall confirm it in writing within 30 days of request, failing which the work shall be

carried out as though there is no variation. In case variation is approved it shall be accompanied with Price Schedule failing which the contractor shall be responsible for deviation if any.

34. PAYMENTS FOR VARIATIONS

- 34.1. Payment for change of scope shall be made in accordance with the payment schedule specified in the change of scope order. The Contractor shall execute and be bound for variations of all change of scope of orders till the price does not exceed 25% of the Contract Price as specified in LOA/Original agreement.
- 34.2. The rates for additional, substituted or altered item of work, Contractor shall be requested to submit his quotation for the items supported by analysis of the rate or rates claimed, within 7 days.
- 34.3. If the Contractor's quotation is determined unreasonable, the Employer may order the Variation and make a change to the Contract Price which shall be based on Employer's own forecast of the effects of the Variation on the Contractor's costs.
- 34.4. Under no circumstances the Contractor shall suspend the work on the plea of non-settlement of rates for items falling under this Clause.

35. SUBMISSION OF BILLS FOR PAYMENT

- 35.1. The Contractor shall submit to the Engineer monthly bills of the value of the work completed less the cumulative amount paid previously.
- 35.2. The Engineer shall check the Contractor's bill and determine the value of the work executed which shall comprise of (i) value of the quantities of the items as per stage payment of Price Schedule and (ii) valuation of Variations and Compensation Events.
- 35.3. The Engineer may exclude any item paid in a previous bill or reduce the proportion of any item previously paid in the light of later information.

36. PAYMENTS

- 36.1. Payments shall be adjusted for deductions for advance payments other than recoveries in terms of contract and taxes, at source as applicable under law. The Employer shall pay the Contractor within 60 days of submission of bill. The Contractor shall be liable to pay liquidated damages for shortfall in progress.
- 36.2. Items of the Works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed to be covered in lumpsum Price of the Contract.

37. DELETED.

38. TAX

- 38.1. The rates quoted by the Contractor shall be deemed to be inclusive of the sales Tax, GST and other taxes that the Contractor will have to pay for the performance of this Contract. The Employer will perform such duties in regard to the deduction of such taxes at source as per applicable law.

39. PRICE ADJUSTMENT

CHANGE IN COSTS - PRICE ADJUSTMENT

PRICE ADJUSTMENT CLAUSE FOR WORKS CONTRACTS

Contract price shall be adjusted for increase or decrease in rates and prices of labour, materials, fuels and lubricants in accordance with the following principles and procedures and as per formula given here under.

- i. The price Adjustment shall apply for the work done from the date of commencement up to the end of original period of completion and shall not apply to work carried out beyond the stipulated period of completion for reasons attributable to the Contractor.
- ii. The Price adjustment shall be determined during each quarter from the formula given in contract data.
- iii. Following expression and meanings are assigned to the work done during the quarter:

R=Total value of work done during the month shall include the value of materials on which secured advance has been granted, if any during the month less the value of materials in respect of which the secured advance has been recovered, if any, during the month. This excludes the cost of work on items for which rates were fixed under Variations Clause 34 & 35/PCC for which the escalation will be regulated as mutually agreed at the time of fixation of rate. It will also exclude the value of work done during the month which was programmed to be done prior to this month as per work schedule in the agreement.

- iv. To the extent that full compensation for any rise or fall in costs to the contractor is not covered by the provisions of this or other Clauses in the Contract, the unit rates included in the contract shall be deemed to include amounts to cover the contingency of such other rise or fall in costs.

40. LIQUIDATED DAMAGES

40.1. The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the Contract Data for each day that the Completion Date is later than the Intended Completion Date (for the whole of the works or the milestone as stated in the Contract Data). The total amount of liquidated damages shall not exceed the amount defined in the Contract Data. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages does not affect the Contractor's liabilities.

40.2. If the Intended Completion Date is extended after liquidated damages have been paid, the Employer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment of bill.

41. ADVANCE PAYMENTS

41.1. The Employer shall make payment to the Contractor of the amounts stated in the Contract Data by the date stated in the Contract Data, against provision by the Contractor of an unconditional bank guarantee in a form acceptable to the Employer issued by a Nationalized/Scheduled Bank in amounts equal to the advance payment. The guarantee shall remain valid until the advance payment has been repaid, but the amount of the guarantee shall be progressively reduced by the amounts repaid by the Contractor. The advance payments shall be repaid with prevailing bank interest.

41.2. The Contractor is to use the advance payment only to pay for Mobilization expenses required specifically for execution of the Works. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Employer through Engineer.

41.3. The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuation of the work done, variations, price adjustments, compensation events or liquidated damages

42. SECURITIES

42.1. The Performance Security (including additional security for unbalanced tenders) shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and type of instrument acceptable to the Employer. The Performance Security as indicated in the contract data shall be valid until a date 30 days from the date of expiry of Defects Liability Period and the additional security for unbalanced tenders shall be valid until a date 30 days from the date of issue of the certificate of completion. The security deposit will be released against BG.

43. COST OF REPAIRS

43.1. Loss or damage to the Works or Materials to be incorporated in the Works between the Commencement Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

E. FINISHING THE CONTRACT

44. COMPLETION

44.1. The Contractor shall request the Employer to issue a Certificate of Completion of the Works and the Employer will do so upon deciding that the Work is completed.

45. TAKING OVER

45.1. The Employer shall take over the Site and the Works within seven days of issuing a certificate of Completion.

46. FINAL ACCOUNT

46.1. The Contractor shall supply to the Employer a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Employer shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within 90 days of receiving the Contractor's account if it is correct and complete. If it is not, the Employer shall issue within 90 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Employer shall decide on the amount payable to the Contractor and make payment within 60 days of receiving the Contractor's revised account.

47. AS BUILT DRAWINGS AND /OR OPERATING AND MAINTENANCE MANUALS

47.1. If "As Built Drawings" (Completion Drawing) and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the Contract Data.

47.2. If the Contractor does not supply the Drawings by the dates stated in the Contract Data, or they do not receive the Engineer's approval, the Employer shall withhold the amount stated in the Contract Data from payments due to the Contractor.

48. TERMINATION

48.1. The Employer may terminate the Contract if the other party causes a fundamental breach of the Contract.

48.2. Fundamental breaches of Contract include, but shall not be limited to the following:

- i. the Contractor stops work for 45 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Engineer;
- ii. "DELETED"-
- iii. The Contractor becomes bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
- iv. "DELETED"-
- v. the Engineer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Engineer;
- vi. the Contractor does not maintain a security which is required;
- vii. the Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the Contract data; and
- viii. if the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in the executing the Contract.

For the purpose of this paragraph: "corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution. "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Borrower, and includes collusive practice among Tenderers (prior to or after Tender submission) designed to establish Tender prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition."

48.3. When either party to the Contract gives notice of a breach of contract to the Employer for a cause other than those listed under Sub Clause 49.2 above, the Employer shall decide whether the breach is fundamental or not.

48.4. Notwithstanding the above, the Employer may terminate the Contract for convenience.

48.5. If the Contract is terminated, the Contractor shall stop the work immediately, make the Site safe and secure and leave the Site as soon as reasonably possible.

49. PAYMENT UPON TERMINATION

- 49.1. If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer shall prepare bill for the value of the work done less advance payments received up to the date of the bill, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the Contract Data. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer.
- 49.2. If the Contract is terminated at the Employer's convenience, the Engineer shall prepare bill for the value of the work done, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works and less advance payments received up to the date of the certificate, less other recoveries due in terms of the contract, and less taxes due to be deducted at source as per applicable law and make payment accordingly.

50. PROPERTY

- 50.1. The materials on the Site, Plant, Equipment which belong to the Employer and all Temporary Works and Works are deemed to be the property of the Employer, if the Contract is terminated because of a contractor's default.

51. RELEASE FROM PERFORMANCE

- 51.1. If the Contract is frustrated by any event entirely outside the control of either the Employer or the Contractor, the Employer shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which commitment was made.

F. SPECIAL CONDITIONS OF CONTRACT

52. LABOUR

- 52.1. The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.
- 52.2. The Contractor shall, if required by the Engineer, deliver to the Engineer a return in detail, in such form and at such intervals as the Engineer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such other information as the Engineer may require.

53. COMPLIANCE WITH LABOUR REGULATIONS

- 53.1. During continuance of the Contract, the Contractor and his sub-contractors shall abide at all times by all existing labour enactments and rules made there under, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made there under, regulations or notifications including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, Employer shall have the right to deduct any money due to the Contractor including his amount of security deposit. The Employer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.
- 53.2. The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Employer at any point of time.

54. PROTECTION OF ENVIRONMENT

- 54.1. The Contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other

causes arising as a consequence of his methods of operation. During continuance of the contract, the Contractor and his sub-contractors shall abide at all times by all existing enactments on environmental protection and rules made there under, regulations, notifications and bye-laws of the State or Central Government, or local authorities and any other law, bye-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority.

55. CLAIMS, DISPUTES AND ARBITRATION

55.1. CONTRACTOR'S CLAIMS

- i. If the Contractor considers himself to be entitled to any extension of the Time for Completion and/or any additional payment, under any Clause of these Conditions or otherwise in connection with the Contract, the Contractor shall give notice to the Employer with a copy to the Engineer, describing the event or circumstance giving rise to the claim. The notice shall be given as soon as practicable, and not later than 28 days after the Contractor became aware, or should have become aware, of the event or circumstance.
- ii. If the Contractor fails to give notice of a claim within such period of 28 days, the Time for Completion shall not be extended, the Contractor shall not be entitled to additional payment, and the Employer shall be discharged from all liability in connection with the claim. Otherwise, the following provisions of this Sub-Clause shall apply.
- iii. The Contractor shall also submit any other notices which are required by the Contract, and supporting particulars for the claim, all as relevant to such event or circumstance.
- iv. The Contractor shall keep such contemporary records as may be necessary to substantiate any claim, either on the Site or at another location acceptable to the Employer. Without admitting the Employer's liability, the Engineer may, after receiving the copy of the notice under this Sub-Clause, monitor the record-keeping and/or instruct the Contractor to keep and provide further contemporary records. The Contractor shall permit the Engineer to inspect all these records, and shall (if instructed) submit copies to the Engineer.
- v. Within 45 days after the Contractor became aware (or should have become aware) of the event or circumstance giving rise to the claim, or within such other period as may be proposed by the Contractor and approved by the Engineer, the Contractor shall send to the Employer a fully detailed claim which includes full supporting particulars of the basis of the claim and of the extension of time and/or additional payment claimed. If the event or circumstance giving rise to the claim has a continuing effect:
 - a. this fully detailed claim shall be considered as interim;
 - b. the Contractor shall send further interim claims at monthly intervals, giving the accumulated delay and/or amount claimed, and such further particulars as the Engineer may reasonably require; and
 - c. the Contractor shall send a final claim within 28 days after the end of the effects resulting from the event or circumstance, or within such other period as may be proposed by the Contractor and approved by the Engineer.
- vi. Within 45 days after receiving a claim or any further particulars supporting a previous claim, or within such other period as may be proposed by the Engineer and approved by the Contractor, the Employer will respond with approval, or with disapproval and detailed comments. He may also request any necessary further particulars, but shall nevertheless give his response on the principles of the claim within such fixed period of time.
- vii. Each Payment Certificate shall include such amounts for any claim as have been reasonably substantiated as due under the relevant provision of the Contract. Unless and until the particulars supplied are sufficient to substantiate the whole of the claim, the Contractor shall only be entitled to payment for such part of the claim as he has been able to substantiate.
- viii. The Employer shall proceed in accordance with Sub-Clause: [Determinations] to agree or determine (i) the extension (if any) of the Time for Completion (before or after its expiry) in accordance with Sub-

Clause: [Extension of Time for Completion], and/or (ii) the additional payment (if any) to which the Contractor is entitled under the Contract.

- ix. The requirements of this Sub-Clause are in addition to those of any other Sub-Clause which may apply to a claim. If the Contractor fails to comply with this or another Sub-Clause in relation to any claim, any extension of time and/or additional payment shall take account of the extent (if any) to which the failure has prevented or prejudiced proper investigation of the claim, unless the claim is excluded under the second paragraph of this Sub-Clause.

56. AMICABLE SETTLEMENT

- i. In case any dispute between the Engineer and the Contractor for which claim has already been made by the contractor, remains unresolved, the Contractor shall, then, give notice of dissatisfaction and intention to commence arbitration to the Employer duly specifying the subject of the dispute or difference as also the amount of claim item wise. The Parties shall make attempts to settle the dispute amicably before the commencement of arbitration as per procedure set by K-RIDE. However, unless both Parties agree otherwise, demand for arbitration may be made by the Contractor after ninety days from the day on which a notice of dissatisfaction and intention to commence arbitration was given, even if no attempt at amicable settlement has been made.
- ii. **PROCEDURE FOR AMICABLE SETTLEMENT IN CONTRACTS**
- a. Amicable Settlement Committee at senior management level shall make an attempt to resolve the issues/disputes within 90 days of request by the Contractor.
- b. The Amicable Settlement Committee comprises of the first two officers (mentioned below) of K-RIDE in case the issue involves Civil Engineering discipline and three officers (mentioned below) in case the issues involve other discipline(s) of the engineering (other than Civil engineering):
- c. ED/K-RIDE directly in-charge of the project;
- d. GM(Finance)/Concerned finance officer, and
- e. ED/K-RIDE (in the same order) directly in-charge of the project of other discipline(s) - in case the issues involve other discipline(s) of the engineering.
- f. Whenever the Contractor submits a request for amicable settlement, MD/K-RIDE should forward the same to concerned GM/K-RIDE (in the same order) directly in-charge of the project. GM/K-RIDE on receipt of the same shall issue a note to the concerned finance officer and concerned GM/K-RIDE of other discipline (in case the issues involved other discipline(s) of engineering), about the request for amicable settlement to be dealt by him/her/them and fix a date in consultation with him/her/them for a hearing. The date should then be communicated to MD/K-RIDE, GM/K-RIDE of other department (if the issues involved their department) and Contractor for presenting their case before the Amicable Settlement Committee.
- g. This being an additional workload like arbitration, the Committee members shall be paid fee by K-RIDE at the rates payable to the Arbitrators of K-RIDE.

57. ARBITRATION

Any dispute, in respect of which amicable settlement has not been reached, arising between the Employer and the Domestic or Foreign Contractor related to any matter arising out of or connected with this contract, then the contractor shall be entitled to demand in writing that the dispute or difference be referred to arbitration.

Only such dispute(s) or difference(s) in respect of which the demand had been made for amicable settlement under GCC 4.2 but could not be settled, shall be referred to arbitration.

The Arbitration proceedings shall commence from the day, a written and duly quantified demand for arbitration is received by Managing Director, Rail Infrastructure Development Company (Karnataka) Limited, Bengaluru/K-RIDE).

The disputes so referred to arbitration shall be settled in accordance with the Indian Arbitration & Conciliation Act, 1996 and any statutory modification or re-enactment thereof.

Any dispute or difference or claim arising out of, or in connection with, or relating to the present contract or the breach, termination or invalidity thereof shall be referred and settled under the Arbitration Centre – Karnataka (Domestic and International) Rules 2012, by one or more arbitrators appointed in accordance with its rules.

58. PROCEDURE FOR APPOINTMENT OF ARBITRATORS: THE ARBITRATORS SHALL BE APPOINTED AS PER FOLLOWING PROCEDURE:

- i. Any dispute or difference or claim arising out of, or in connection with, or relating to the present contract or the breach, termination or invalidity thereof shall be referred and settled under the Arbitration Centre – Karnataka (Domestic and International) Rules 2012, by one or more arbitrators appointed in accordance with its rules.
- ii. Arbitration proceedings shall be held at Bengaluru, India or at a place where K-RIDE's (dealing the contract) office is located, and the language of the arbitration proceedings and that of all documents and communications between the Parties shall be in English.
- iii. Where the Arbitral award is for the payment of money, no interest shall be payable on whole or any part of the money for any period till the date on which the award is made.
- iv. The fees and other charges of the conciliator/arbitrators shall be as per the fee structure fixed by the Employer with reference to the Rules of Arbitration Centre – Karnataka (Domestic and International) Rules 2012. The cost of arbitration shall be borne equally by the respective parties.
- v. Performance under the contract shall continue during the arbitration proceedings and payments due the Contractor by the Employer shall not be withheld, unless they are the subject matter of the arbitration proceeding.

59. EXCEPTED MATTERS

The following are the list of excepted matters in arbitration.

- a. Assistance by Employer for the Stores to be obtained by the Contractor.
- b. Illegal Gratification.
- c. Meaning and intent of specifications and Drawings.
- d. Rates for Non-tendered items of works.
- e. Signing of "No claim Certificate"
- f. Measurement of works.
- g. Provisions of Payment of Wages Act 1936.
- h. Provisions of Contract Labour (Regulation and Abolition) Act, 1970.
- i. Provisions of Employees Compensation Act 1923.
- j. Provisions of Mines Act 1952.
- k. Right of Employer to determine the Contract
- l. Payment on determination of Contract by Employer.
- m. Bonus clause as per clause 26.14 of PCC

60. JURISDICTION OF COURTS

The Contract Agreement shall be subject to exclusive jurisdiction of Courts as indicated in the Contract Data. The Jurisdiction of Courts is Bengaluru, Karnataka.

61. SETTLEMENTS THROUGH COURT

It is a term of this contract that the Contractor shall not approach any Court of Law for settlement of such disputes or differences unless an attempt has first been made by the parties to settle such disputes or differences through Dispute resolution as above.

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SECTION – 6

CONTRACT DATA

SN	Conditions	CC/PCC Sub Clause	Data
1.	Employer's name and address	IFT Clause-9	Executive Director (Civil) Rail Infrastructure Development Company (Karnataka) Limited, #8, 1 st Floor, Samparka Soudha, Dr. Rajkumar Road, Opposite Orion Mall Rajajinagar 1 st Block, Bengaluru-560010 Tel +91-6364890801 E-mail: ed.kride@kride.in
2.	Engineer's name and address	PCC Clause xi, Definition	Executive Director (Civil) #8, 1 st Floor, Samparka Soudha, Dr. Rajkumar Road, Opposite Orion Mall Rajajinagar 1 st Block, Bengaluru-560010 Tel +91-6364890801 E-mail: ed.kride@kride.in
3.	A. Mobilisation date for resources, establishment and survey B. Start of Designs	PCC Clause LV, Definition ER Part 2 , Clause 4	The contractor shall mobilise resources, establishment, survey from 28 days of issue of LOA. The contractor shall start the activity of Designs immediately after issue of LOA.
4.	Commencement Date	CC Clause 1.1 (xvii) Definitions	Date of receipt of LOA (Letter of Acceptance).
5.	Site	CC Clause 1.1(xix) Definitions	Site means the places where the permanent works are to be executed and to which plant & materials are to be delivered, and the any other places specified in the contract as forming part of the site.
6.	Time for Completion	IFT Section-1 Page-1 Table	12 Months
7.	Defects Liability Period	New Clause 6.1/PCC	180 days from the date of completion of this contract.
8.	Electronic transmission systems	IFT Clause-9	E-mail: ed.kride@kride.in
9.	Governing Law	Clause 3.1/CC Page No.108	Laws of India supplanted by the Karnataka Local Acts
10.	Language for communications	Clause 4.3.2/CC Page No. 121	English
11.	Time for the Parties entering into a Contract Agreement	Clause-1/CC Definitions	28 days from the date of issue of Letter of Acceptance.
12.	Time for access to the Site	Section-8 Employer Requirements Part-2, Annexure-2	The time for site access shall be provided progressively, generally taking into account the approved program of works and as per Annexure-2, Section-8 Employer Requirements Part-2.
13.	Engineer's Duties and Authority	New Clause-3.1/PCC	Variations resulting in an increase / decrease of the Accepted Contract Amount shall require approval of the Employer.

SN	Conditions	CC/PCC Sub Clause	Data
14.	Performance Security	New Clause-4.19/PCC	The Performance Security will be in the form of a Bank guarantee, from a Public Sector Bank in India or from a Foreign bank having branch in India or from such Foreign bank which has tie up with a PSU bank in India for an amount of 10% of the Accepted Contract Amount and in the same currency of the Accepted Contract Amount.
15.	Normal working hours	PCC/Clause-1.5	24x7 in shifts as per the local government regulation but subject to permission from the Relevant authorities. Obtaining permission from the Relevant Authorities and planning the Works to complete within the Time of Completion shall be the Contractor's responsibility.
16.	Delay damages/penalties for the works	Section 8A Part-1	As per Employer's Requirement .
17.	Maximum amount of Delay damages/ Liquidated Damages (LD)	Clause No.41 Section-5 of CC	The maximum amount of liquidated damages for the whole of the works is 10% (Ten percent) of final contract price
18.	Total advance payment	42.1 & 42.2 of PCC	I. Mobilization Advance: As per Section-7/PCC, Clause 42.1. II. Advance against Plant and Machinery: As per Section-7/ PCC Clause 42.2.
19.	Mobilization	PCC 42.1	5% of the contract price (In Two Installments of 2.5% each). The advance payment will be paid to the contractor no later than 30 days after fulfillment of contract conditions.
20.	Recovery of advances paid	42.4/PCC	The recovery of the Mobilization and Plant and Machinery Advances shall be made from each bill in equal monthly instalments commencing after 15% of contract value is billed and recovery to be completed within 85% of the contract value and the recovery shall be made at the rate 10% of the amount the Interim payment certificate until such time as loan has been repaid, always provided that the loan shall be completely repaid prior to the expiry of the original time for completion pursuant to Clauses 17 and 26.
21.	Percentage of Retention Money/ Security Deposit (SD)	PCC/New Clause 4.20	5%
22.	Limit of Retention Money/SD (Security Deposit)	PCC/New Clause 4.20	As per Section-7/PCC, New Clause 4.2 Security Deposit
23.	Interim Payment Certificates	37.1/PCC	Application for Interim Payment Certificate as per clause 37.1, PCC.
24.	Minimum Amount of Interim Payment Certificates	37.3/PCC	0.5% of the Accepted Contract Amount

SN	Conditions	CC/PCC Sub Clause	Data
25.	Maximum total liability of the Contractor to the Employer	22.2.2 /PCC	The Accepted Contract Amount.
26.	Periods for submission of insurance: a Evidence of insurance b Relevant Policies	CC/13	From the date of issue of Letter of Acceptance: a. 28 days b. 45 days
27.	Maximum amount of deductibles for insurance of the Employer's risks	CC/13	1% of the Contract amount for each occurrence.
28.	Professional Indemnity	PCC 13.6	Deleted
29.	Minimum amount of third-party insurance	PCC/13.8	Deleted
30.	Bonus for early completion	PCC/26.14	As per the Section-7, PCC Clause-26.14 Bonus for early completion.
31.	Date by which the Arbitrator shall be appointed	CC/4.3	The Arbitration proceedings shall commence from the day, a written and duly quantified demand for arbitration is received by Managing Director, Rail Infrastructure Development Company (Karnataka) Limited, Bengaluru / K-RIDE).
32.	Arbitrator Remuneration	CC/4.3.4	The fees and other charges of the conciliator/arbitrators shall be as per the fee structure fixed by the Engineer / Employer with reference to the Rules of Arbitration Centre – Karnataka (Domestic and International) Rules 2012. The cost of arbitration shall be borne equally by the respective parties.
33.	Language of Arbitration	CC/4.3	English
34.	Place of Arbitration	CC/4.3	Bengaluru, India
35.	Jurisdiction of Court	CC/5.1	The Contract Agreement shall be subject to exclusive jurisdiction of Courts as indicated in the Contract Data. The Jurisdiction of Courts is Bengaluru, Karnataka
36.	The Methodology and Program of Construction	25 Section-5 of CC	Employer's Requirements, Section 8A, Part2, Appendix 4 Program Requirements
37.	Site Investigation Reports	14 Section-5 of CC	Deleted
38.	The Schedule of Key and Critical Equipment to be deployed on the work as per agreed program of construction	3.3 of ITT, 25 Section-5 of CC	Employer's Requirements, Section 8A, Part-1, Appendix-05

SN	Conditions	CC/PCC Sub Clause	Data
39.	Price Adjustment	PCC-Clause 40.1/40.1.7/Clause- 40/CC	PRICE VARIATION Adjustment for changes in cost for the work of elevated viaduct, minor bridges and earth work etc., of suburban corridor. Contract price shall be adjusted for increase or decrease in rates and prices of labour, materials, fuels and lubricants in accordance with the following principles and procedures and as per formula given under Clause 40.1/PCC Section-7
40.	Milestone dates/key dates	Employer's Requirements/Section 8A/Part-1/Annexure-1	As per Employer's Requirements, Section 8A, Part-1, Annexure-1.
41.	As built drawings	Clause-48/Section-5/CC	The date by which "as-built" drawings (in suitable scale) in 2 sets are required is within 30 days of issue of certificate of completion of Whole or Section of the Work as the case may be. [Cl. No.48 Section-5 of CC]
42.	Termination by employer	Section-5/Clause-49.1/CC/Clause-49.6/PCC	The following events shall also be fundamental breach of the contract: [Cl. No.49.2 Section-5 of CC] The contractor has contravened Sub-clause 7.1 and Cl. No. 9 Section-5 of CC. The percentage to apply to the value of the work not completed representing the Employer's additional cost for completing the works shall be 30% [Cl. no. 51.1, Section- 5 of CC]

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SECTION - 7

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PARTICULAR CONDITIONS OF CONTRACT (PCC)

The following Particular Conditions of Contract (PCC) shall supplement the Conditions of Contract CC/GCC/SCC/Contract Data. Whenever there is a conflict, the provisions herein shall prevail over those in the CC/GCC/SCC/Contract Data. The conditions indicated in PCC will be on priority as compared to the conditions of CC/GCC/SCC/Contract Data.

CC/SCC REFERENCE CLAUSE	DESCRIPTION
<p>CLAUSE-1/CC DEFINITIONS</p>	<p>i. The following paras are added to the Existing CC Clauses.</p> <p>ii. “Contract Agreement” The Parties shall enter into a Contract Agreement within 28 days after the Contractor receives the Letter of Acceptance, unless they agree otherwise.</p> <p>iii. “Letter of Acceptance” means the letter of formal acceptance, signed by the Employer, of the Letter of Bid, including any annexed memoranda comprising agreements between and signed by both Parties. If there is no such letter of acceptance, the expression “Letter of Acceptance” means the Contract Agreement and the date of issuing or receiving the Letter of Acceptance means the date of signing the Contract Agreement.</p> <p>iv. “Letter of Bid” means the document entitled letter of bid, which was completed by the Contractor and includes the signed offer to the Employer for the Works.</p> <p>v. “Drawings” means the drawings of the Works, as included in the Contract, and any additional and modified drawings issued by (or on behalf of) the Employer in accordance with the Contract.</p> <p>vi. “Schedules” means the document(s) entitled schedules, completed by the Contractor and submitted with the Letter of Bid, as included in the Contract. Such document may include the Price schedule, data, lists, and schedules of rates and/or prices.</p> <p>vii. “Bid/Tender” means the Letter of Technical Bid and Letter of Price Bid and all other documents which the Contractor submitted with the Letter of Technical Bid and Letter of Price Bid, as included in the Contract.</p> <p>viii. “Employer’s Requirements” means the document entitled ‘Employer’s Requirements’ as part of Works Requirements and as included in the Contract, and any additions and modifications to such document in accordance with the Contract. Such document specifies the purpose, scope, and/or design and/or other technical criteria, for the works.</p> <p>Parties and Persons</p> <p>ix. “Party” means the Employer or the Contractor, as the context requires.</p> <p>x. “Engineer” means the official nominated by the Employer (Executive Director/Civil) to act as the Engineer for the purposes of the Contract and named in the Contract Data, or other person appointed from time to time by the Employer and notified to the Contractor under New-Clause 3.4 [Replacement of the Engineer]. The official nominated to act as an Engineer would be an employee of Rail Infrastructure Development Company (Karnataka) Ltd (K-RIDE). The official may be different for different level of functions as nominated by ED/Civil/KRIDE.</p> <p>xi. “Contractor’s Representative” means the person named by the Contractor in the Contract or appointed from time to time by the Contractor under New-Clause 4.21 [Contractor’s Representative], who acts on behalf of the Contractor.</p> <p>xii. “Employer’s Representative” means the person named by the Employer in the Contract or appointed from time to time by the Employer who acts on behalf of the Employer.</p> <p>xiii. “Employer’s Personnel” means the Engineer, the assistants referred to in New-Clause 3.2 [Delegation by the Engineer] and all other staff, labour and other employees of the Engineer and of the Employer; and any other personnel notified to the Contractor, by the Employer or the Engineer, as Employer’s Personnel.</p> <p>xiv. “Contractor’s Personnel” means the Contractor’s Representative and all personnel whom</p>

CC/SCC REFERENCE CLAUSE	DESCRIPTION
	<p>the Contractor utilises on Site, who may include the staff, labour and other employees of the Contractor and of each Subcontractor; and any other personnel assisting the Contractor in the execution of the Works.</p> <p>xv. “GOI” means Government of India.</p> <p>xvi. “Base Date” means the date 28 days prior to the deadline for submission of bids.</p> <p>xvii. “Tests on Completion” means the tests which are specified in the Contract or agreed by both Parties or instructed as a Variation, and which are carried out under Clause 30 [Tests on Completion] before the Works or a Section (as the case may be) are taken over by the Employer.</p> <p>xxviii. “Day” means any (working or non-working) calendar day from 00:00 hrs. to 24:00 hrs.</p> <p>xix. “Time Period”: Any reference to time period commencing “from” the specified day or date “till” or “until” a specified day shall include both such days.</p> <p>xx. Any reference to “Time” shall be according to Indian Standard Time (IST).</p> <p>xxi. Money and Payments</p> <p>xxii. “Accepted Contract Amount” means the amount accepted in the Letter of Acceptance for the execution and completion of the Works and the remedying of any defects. In the Letter of Acceptance, the Accepted Contract Amount shall have i.e. (i) the base amount including GST (ii) the rates quoted by the contractor shall be deemed to be inclusive of the sales, GST and other taxes (Section -5; CONDITIONS OF CONTRACT (CC) AND SPECIAL CONDITIONS OF CONTRACT (SCC), Clause 39</p> <p>xxiii. “Cost” means all expenditure reasonably incurred (or to be incurred) by the Contractor, whether on or off the Site, including overhead and similar charges, but does not include profit.</p> <p>xxiv. “Final Statement” means the statement defined in Sub-Clause 37.12 [Application for Final Payment Certificate].</p> <p>xxv. “Foreign Currency” means a currency in which part (or all) of the Contract Price is payable, but not the Local Currency.</p> <p>xxvi. “Local Currency” means the currency in Indian Rupees.</p> <p>xxvii. “Statement” means a statement submitted by the Contractor as part of an application, under Clause 37 and 40 [Contract Price and Payment], for a payment certificate</p> <p>xxviii. Works and Goods</p> <p>xxix. “Contractor’s Equipment” means all apparatus, machinery, vehicles and other things required for the execution and completion of the Works and the remedying of any defects. However, Contractor’s Equipment excludes Temporary Works, Employer’s Equipment (if any), Plant, Materials and any other things intended to form or forming part of the Permanent Works.</p> <p>xxx. “Goods” means Contractor’s Equipment, Materials, Plant and Temporary Works, or any of them as appropriate.</p> <p>xxxi. “Permanent Works” means the permanent works to be executed by the Contractor under the Contract.</p> <p>xxxii. “Section” means a part of the Works specified in the Contract Data as a Section (if any).</p> <p>xxxiii. “Temporary Works” means all temporary works of every kind (other than Contractor’s Equipment) required on Site for the execution and completion of the Permanent Works and the remedying of any defects.</p>

CC/SCC REFERENCE CLAUSE	DESCRIPTION
	<p>xxxiv. Other Definitions</p> <p>xxxv. “Contractor’s Documents” means the calculations, computer programs and other software, drawings, manuals, models and other documents of a technical nature (if any) supplied by the Contractor under the Contract.</p> <p>xxxvi. “Country” means India, the country in which the Site (or most of it) is located, where the Permanent Works are to be executed.</p> <p>xxxvii. “Employer’s Equipment” means the apparatus, machinery and vehicles (if any) made available by the Employer for the use of the Contractor in the execution of the Works, as stated in the Specification; but does not include Plant which has not been taken over by the Employer.</p> <p>xxxviii. “Laws” means all national (or state) legislation, statutes, ordinances and other laws, and regulations and by-laws of any legally constituted public authority.</p> <p>xxxix. “Site” means the places where the Permanent Works are to be executed and to which Plant and Materials are to be delivered, and any other places as may be specified in the Contract as forming part of the Site.</p> <p>xl. “Unforeseeable” means not reasonably foreseeable and against which adequate preventive precautions could not reasonably be taken by an experienced contractor by the date for submission of the Bid.</p> <p>xli. “Railway” means a railway, or any portion of a railway for public carriage of passengers and goods as defined in the Railways ACT 1989. Any reference to railway means the Indian Railways and the respective Zonal Railway</p> <ul style="list-style-type: none"> (a) References to any legislation or any provision thereof shall include amendment or re-enactment or consolidation of such legislation or any provision thereof so far as such amendment or re-enactment or consolidation applies or is capable of applying to any transaction entered into hereunder; (b) References to laws of India or Indian law or regulation having the force of law shall include the laws, acts, ordinances, rules, regulations, bye laws or notifications which have the force of law in the territory of India and as from time to time may be amended, modified, supplemented, extended or re-enacted; (c) References to a “person” and words denoting a natural person shall be construed as a reference to any individual, firm, company, corporation, society, trust, government, state or agency of a state or any association or partnership (whether or not having separate legal personality) of two or more of the above and shall include successors and assigns; (d) References to “construction” or “building” include, unless the context otherwise requires, survey and investigation, design, developing, engineering, procurement, supply of plant, materials, equipment, labour, delivery, transportation, installation, processing, fabrication, testing, and commissioning of the Railway Project, including maintenance during the Construction Period, removing of defects, if any, and other activities incidental to the construction and “construct” or “build” shall be construed accordingly; (e) The damages payable by either Party to the other of them, as set forth in this Agreement, whether on per diem basis or otherwise, are mutually agreed genuine pre-estimated loss and damage likely to be suffered and incurred by the Party entitled to receive the same and are not by way of penalty (the “Damages”);

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	<p>xlii. “Agreement” means this Agreement, its Recitals, the Schedules hereto and any amendments thereto made in accordance with the provisions contained in this Agreement;</p> <p>xliii. “Applicable Laws” means all laws, brought into force and effect by Government of India or the State Government(s) including rules, regulations and notifications made thereunder, and judgements, decrees, injunctions, writs and orders of any court of record, applicable to this Agreement and the exercise, performance and discharge of the respective rights and obligations of the Parties hereunder, as may be in force and effect during the subsistence of this Agreement;</p> <p>xliv. “Applicable Permits” means all clearances, licenses, permits, authorisations, no objection certificates, consents, approvals and exemptions required to be obtained or maintained under Applicable Laws in connection with the construction of the Railway Project during the subsistence of this Agreement;</p> <hr/> <p>xlv. “Defect” means any defect or deficiency in Construction of the Works or any part thereof, which does not conform with the Specifications and Standards;</p> <p>xlvi. “Encumbrances” means, in relation to the Railway Project, any encumbrances such as mortgage, charge, pledge, lien, hypothecation, security interest, assignment, privilege or priority of any kind having the effect of security or other such obligations, and shall include any designation of loss payees or beneficiaries or any similar arrangement under any insurance policy pertaining to the Railway Project, where applicable herein but excluding utilities referred to in Clause 14 of Employer’s Requirement Part-1;</p> <p>xlvii. Deleted</p> <p>xlviii. “Good Industry Practice” means the practices, methods, techniques, designs, standards, skills, diligence, efficiency, reliability and prudence which are generally and reasonably expected from a reasonably skilled and experienced contractor engaged in the same type of undertaking as envisaged under this Agreement and which would be expected to result in the performance of its obligations by the Contractor in accordance with this Agreement, Applicable Laws and Applicable Permits in reliable, safe, economical and efficient manner;</p> <p>xlix. “Government Instrumentality” means any department, division or sub-division of the Government or the State Government and includes any commission, board, authority, agency or municipal and other local authority or statutory body, including panchayat, under the control of the Government or the State Government, as the case may be, and having jurisdiction over all or any part of the Railway Project or the performance of all or any of the services or obligations of the Contractor under or pursuant to this Agreement;</p> <p><i>l.</i> “Important Bridge” means a bridge having a linear waterway of 300 meters or a total water way of 1000 sqm or more;</p> <p><i>li.</i> “Intellectual Property” means all patents, trademarks, service marks, logos, get-up, trade names, internet domain names, rights in designs, blue prints, programs and manuals, drawings, copyright (including rights in computer software), database rights, semi-conductor, topography rights, utility models, rights in know-how and other intellectual property rights, in each case whether registered or unregistered and including applications for registration, and all rights or forms of protection having equivalent or similar effect anywhere in the world;</p> <p><i>lii.</i> “Major Bridge” means a bridge having a linear waterway of 18 meters or more or which has a clear opening of 12 meters or more in spans;</p> <p><i>liii.</i> “Material Adverse Effect” means a material adverse effect of any act or event on the ability of either Party to perform any of its obligations under and in accordance with the provisions of this Agreement and which act or event causes a material financial burden or loss to either Party;</p>

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	<p>liv. “Minor Bridge” means a bridge having a linear waterway of less than 18 meters or which has a clear opening of less than 12 meters or in spans;</p> <p>lv. “Mobilisation Date” as given in the contract data; The contractor shall mobilise resources, establishment, survey and design works from 28 days of issue of LOA.</p> <p>lvi. “Power Block” means the length of the railway line between two railway stations, on which the overhead equipment (OHE) is de-energized and earthed to enable the Contractor to execute construction or maintenance works</p> <p>lvii. “Project Assets” means all physical and other assets relating to (a) tangible assets such as civil works and equipment including [foundations, embankments, pavements, road surface, interchanges, bridges, culverts, road over-bridges, drainage works, traffic signals, sign boards, kilometer-stones, electrical systems, communication systems, rest areas, relief centers, maintenance depots and administrative offices]; and (b) Project Facilities situated on the Site;</p> <p>lviii. “Right of Access” (ROA) means unrestricted access to the site, together with all way leaves, easements, and other rights of way, howsoever described, necessary for construction of the Project in accordance with this Agreement.</p> <p>lix. “Right of Way” (ROW) means right to pass through the Site, free from encroachments and encumbrances, together with all way leaves, easements, unrestricted access, and other rights of way, howsoever described, necessary for construction of the Project in accordance with this Agreement.</p> <p>lx. “Right of Usage for Construction” (RUC) means unrestricted and progressive access to the site free from those encumbrances sufficient enough, in the opinion of the Employer, to facilitate construction of structures programmed in the near future, together with all way leaves, easements and other rights of way, howsoever described, necessary for construction of the Project in accordance with this Agreement.</p> <p>lxi. “Specifications and Standards” means the specifications and standards relating to the quality, quantity, capacity and other requirements for the Railway Project, as set forth in Schedule-D, and any modifications thereof, or additions thereto, as included in the design and engineering for the Railway Project submitted by the Contractor to, and expressly approved by, the Employer.</p> <p>lxii. “Sub-contractor” means any person or persons to whom a part of the Works has been subcontracted by the Contractor and the permitted legal successors in title to such person, but not an assignee to such person</p> <p>lxiii. “Works” means all works including survey and investigation, design, engineering, procurement, construction, Plant, Materials, temporary works, and other things necessary to complete the Railway Project in accordance with this Agreement; and</p> <p>lxiv. “WPI” means the wholesale price index for various commodities as published by the Ministry of Commerce and Industry, GOI and shall include any index which substitutes the WPI, and any reference to WPI shall, unless the context otherwise requires, be construed as a reference to the WPI published for the period ending with the preceding month.</p>

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<p>CLAUSE-1/CC</p>	<p>The Following Paras Are Added To The Existing CC Clauses.</p> <p>Employer’s Name And Address:</p> <p style="padding-left: 40px;">K-RIDE (Rail Infrastructure Development Company (Karnataka) Limited) (A Joint venture of GoK and MoR) #8, 1st Floor, Samparka Soudha, Dr. Rajkumar Road, Opposite Orion Mall Rajaji Nagar 1st Block Bengaluru – 560010 Tele: 080-24482800</p> <p>Employer’s Authorised Representative and Address:</p> <p style="padding-left: 40px;">Executive Director (Civil) K-RIDE (Rail Infrastructure Development Company (Karnataka) Limited) #8, 1st Floor, Samparka Soudha, Dr. Rajkumar Road, Opposite Orion Mall Rajaji Nagar 1st Block Bengaluru – 560010 Tele: +91 6364890801; Tele: 080-24482800 E – Mail: ed.kride@kride.in</p>
<p>CLAUSE -2.1/CC INTERPRETATION.</p>	<p>The Following Paras Are Added To The Existing CC Clauses:</p> <p>(a) provisions including the word “agree,” “agreed” or “agreement” require the agreement to be recorded in writing;</p> <p>(b) “written” or “in writing” means hand-written, type-written, printed or electronically made, and resulting in a permanent record; and</p> <p>(c) the word “tender” is synonymous with “bid”, and “tenderer” with “bidder” and the words “tender documents” with “bid documents”;</p>
<p>CLAUSE-2.2/CC. PRIORITY OF DOCUMENTS</p>	<p>Replace The Existing Sub Clause 2.2 Of CC:</p> <p>The documents forming the Contract are to be taken as mutually explanatory of one another. For the purposes of interpretation, the priority of the documents shall be in accordance with the following sequence:</p> <ol style="list-style-type: none"> i. Contract Agreement and the Appendices thereto. ii. Letter of Acceptance iii. Notice to Proceed iv. Letter of Bid (in the format given with bid document) and accepted Price Schedule v. Addenda, Corrigenda and Pre-bid clarifications to the Tender vi. Contract Data, Special provisions (if any) vii. Particular Conditions of Contract (PCC) viii. General Conditions of Contract (GCC) / Conditions of Contract (CC) ix. Employers Requirements including scope of works, the Schedules. x. Technical specification, Safety, Health & Environment Manual xi. Design and Drawings xii. Any other documents pertaining to tender, issued by the Employer xiii. Contractor’s Technical Proposal xiv. Any other related documents pertaining to tender, approved by the Employer <p>If an ambiguity or discrepancy is found in the documents, the Engineer will bring the same to the</p>

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	notice of the Employer and the Employer will issue necessary clarification or instruction, as per the need.
CLAUSE-6.1/CC, COMMUNICATIONS	<p>The Following Para Is Added to The Existing CC Clause</p> <p>Wherever these Conditions provide for the giving or issuing of approvals, certificates, consents, determinations, notices, requests and discharges, these communications shall be: in writing and delivered by hand (against receipt), sent by mail or courier, or transmitted using any of the agreed systems of electronic transmission as stated in the Contract Data; and delivered, sent or transmitted to the address for the recipient's communications as stated in the Contract Data.</p>
CLAUSE- 7/CC SUB-CONTRACTORS	<p>The Following Paras Are Added to The Existing CC Clauses:</p> <p>7.1 Definition of Nominated/ Identified Subcontractor</p> <p>In the Contract, "Nominated Subcontractor/ Identified subcontractor" means a Subcontractor:</p> <ul style="list-style-type: none"> (a) who is stated in the Contract as being a nominated Subcontractor, or (b) whom the Engineer, under Clause 7/CC [Sub-contracting], approves to employ as a Subcontractor. <p>SUB-CONTRACTORS</p> <p>The Contractor shall not subcontract the whole of the Works. The Contractor shall be responsible for the acts or defaults of any Subcontractor, his agents, or employees, as if they were the acts or defaults of the Contractor.</p> <p>Unless otherwise stated in the Conditions of Contract:</p> <ul style="list-style-type: none"> (a) The Contractor shall not be required to obtain consent to suppliers solely of Materials, or to a subcontract for which the Subcontractor is named in the Contract or as specifically provided in the Contract data or value of any sub-contract for Works, provided that such works are not for the key activities. (b) The prior consent of the Engineer shall be obtained to other proposed Subcontractors and/or suppliers. While submitting his proposal in this regard, the Contractor shall ensure that; <ul style="list-style-type: none"> (i) Total value of Works requiring such consent for subcontracting shall not be more than 50% (fifty per cent) of the Contract Price; (ii) The proposed subcontractor must have executed works of 40% of value of the proposed subcontract through a single contract during last seven years; and (iii) No banning/blacklisting/declaration as poor performer by K-RIDE is in force on the proposed subcontractor (on the date of grant of consent by the Engineer); (iv) No contract of the proposed subcontractor has been terminated by K-RIDE during the last two years (to be reckoned from the date of grant of consent by the Engineer); (v) The Contractor shall submit the proposal for subcontracting with the name, particulars and the relevant experience of the proposed subcontractor. (c) The Contractor shall give the Engineer not less than 28 days' notice of the intended date of the commencement of each Subcontractor's work, and of the commencement of such work on the Site; (d) Each subcontract shall include provisions which would entitle the Employer to require the subcontract to be assigned to the Employer under New-Clause 4.23/PCC [Assignment of Benefit of Subcontract] (if or when applicable) or in the event of termination under Sub-Clause 49.7/PCC. [Termination by Employer]; and (e) On getting consent from the Engineer, the Contractor shall provide to the Engineer copy of

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	<p>the agreement entered with such subcontractor.</p> <p>The Contractor shall ensure that the requirements imposed on the Contractor by New-Clause 1.6/PCC [Confidential Details] apply equally to each Subcontractor.</p> <p>Where practicable, the Contractor shall give fair and reasonable opportunity for contractors from the Country to be appointed as Subcontractors.</p> <p>The Contractor shall endeavor to resolve all matters and payments amicably and speedily with the sub-contractors.</p> <p>The Contractor shall indemnify and hold the Employer harmless against and from any claim of subcontractors or suppliers of the materials.</p> <p>The Contractor shall release payment to the Sub-contractors/Suppliers promptly and shall endeavor to resolve all issues amicably and speedily with the Sub-contractors/Suppliers, so that the execution of work is not affected in any manner whatsoever.</p> <p>In case a Sub-contractor/Supplier represents to the Engineer in writing with supporting documents, stating that he has not received payment due as per the agreement/work or purchase order for the works executed by such Sub-contractor or supplies made by such Supplier, which have been covered in previous Payment Certificates and the Engineer finds such representation having merit, the Engineer, before issuing next Payment Certificate, may forward a copy of the representation to the Contractor requesting the Contractor to supply reasonable evidence that the amount stated to be outstanding by the Sub-contractor/Supplier for the works executed or supplies made, which have been covered in previous Payment Certificates has been paid and if not, why the same is not payable. The Engineer may recommend to make payment to the Sub-contractor/Supplier unless the Contractor submits reasonable evidence to the Engineer:</p> <ul style="list-style-type: none"> (i) that the amount claimed has been paid, or (ii) satisfying the Engineer in writing that the Contractor is entitled to withhold or that the amount is not payable. <p>On the recommendation of the Engineer, the Employer may (at his sole discretion) directly pay to the Sub-contractor/Supplier the amount due for and on behalf of the Contractor, part or all of such amounts previously certified (less applicable deductions) as are found due to the Sub-contractor/Supplier by the Engineer. The Employer shall adjust the amount paid directly to the Sub-contractor/Supplier from any amount due to the Contractor. The Contractor shall repay the amount, in case no amount is found due by the Employer to the Contractor.</p> <p>That the payment by Employer, on behalf of the Contractor to its Sub-contractor/Supplier, shall not alter any terms of agreement between the Employer and the Contractor and nor the same shall result in any privity of contract between the Employer and the Sub-contractor/Supplier.</p> <p>Assignment of Contractor's and Sub-contractor's Obligations:</p> <p>The Contractor shall not assign a right or benefit under the Contract without first obtaining Employer's prior written consent, otherwise than by:</p> <ul style="list-style-type: none"> A. a charge in favor of the Contractor's bankers of any money due or to become due under the Contract, or B. assignment to the Contractor's insurers (in cases where the insurers have discharged the Contractor's loss or liability) of the Contractor's right to obtain relief against any other party liable. <p>If a Subcontractor's obligations extend beyond the expiry date of Defects Liability Period, then the Contractor shall assign the benefits of such obligations to the Employer.</p> <p>In the event that a sub-contractor of any tier provides to the Contractor or any other sub-contractor a warranty in respect of Plant, Materials or services supplied in connection with the Works, or</p>

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	<p>undertakes a continuing obligation of any nature whatsoever in relation to such Plant, Materials or services (including without limitation an obligation to maintain stocks of spare parts) extending for a period exceeding that of the Defects Liability Period or where there is more than one Defects Liability Period exceeding that of the latest Defects Liability Period, and if the Engineer so directs in writing within 21 days of the expiry of the Defects Liability Period or the latest Defects Liability Period (as the case may be), the Contractor shall immediately assign or obtain the assignment of the benefit of such warranty or obligation to the Employer or at the direction of the Employer, to any third party.</p> <p>Specialist Subcontracting</p> <p>If an Applicant intends to subcontract any highly specialized elements of the Works to specialist subcontractors, such elements and the proposed subcontractors shall be clearly identified, and the experience and capacity of the subcontractors shall be described in the relevant Information Forms.</p> <p>Acceptable Substitutes</p> <p>With reference to subcontracting & specialist subcontracting, the Employer may require Applicants to provide more information about their proposals. If any proposed subcontractor is found ineligible or unsuitable to carry out an assigned task, the Employer may request the Applicant to propose an acceptable substitute, and may conditionally pre-qualify the Applicant accordingly, before issuing an invitation to tender.</p> <p>7.2 Objection To Nomination</p> <p>The Contractor shall not be under any obligation to employ a nominated Subcontractor against whom the Contractor raises reasonable objection by notice to the Engineer as soon as practicable, with supporting particulars. An objection shall be deemed reasonable if it arises from (among other things) any of the following matters, unless the Employer agrees to indemnify the Contractor against and from the consequences of the matter:</p> <ul style="list-style-type: none"> (a) there are reasons to believe that the Subcontractor does not have sufficient competence, resources or financial strength; (b) the subcontract does not specify that the nominated Subcontractor shall indemnify the Contractor against and from any negligence or misuse of Goods by the nominated Subcontractor, his agents and employees; or (c) the subcontract does not specify that, for the subcontracted work (including design, if any), the nominated Subcontractor shall: <ul style="list-style-type: none"> (i) undertake to the Contractor such obligations and liabilities as will enable the Contractor to discharge his obligations and liabilities under the Contract, and (ii) Indemnify the Contractor against and from all obligations and liabilities arising under or in connection with the Contract and from the consequences of any failure by the Subcontractor to perform these obligations or to fulfil these liabilities. <p>7.3 Payments To Nominated Subcontractors</p> <p>The Contractor shall pay to the nominated Subcontractor the amounts which the Engineer certifies to be due in accordance with the subcontract. These amounts plus other charges shall be included in the Contract Price in accordance with Clause 34/PCC, except as stated in Sub-Clause 7.4/PCC [Evidence of Payments]</p> <p>7.4 Evidence Of Payments</p> <p>Before issuing a Payment, Certificate which includes an amount payable to a nominated Subcontractor, the Engineer may request the Contractor to supply reasonable evidence that the</p>

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	<p>nominated Subcontractor has received (Within 7 days of receipt of previous payment by the contractor) all amounts due in accordance with previous Payment Certificates, less applicable deductions for retention or otherwise. Unless the Contractor, submits this reasonable evidence to the Engineer, or</p> <ul style="list-style-type: none"> (i) satisfies the Engineer in writing that the Contractor is reasonably entitled to withhold or refuse to pay these amounts, and (ii) submits to the Engineer reasonable evidence that the nominated Subcontractor has been notified of the Contractor's entitlement, <p>then the Employer may (at his sole discretion) pay, direct to the nominated Subcontractor, part or all of such amounts previously certified (less applicable deductions) as are due to the nominated Subcontractor and for which the Contractor has failed to submit the evidence described in subparagraphs (a) or (b) above. The Contractor shall then repay, to the Employer, the amount which the nominated Subcontractor was directly paid by the Employer.</p> <p>7.5 Assignment Of Benefit Of Subcontract</p> <p>If a Subcontractor's obligations extend beyond the expiry date of the relevant Defects Notification Period and the Engineer, prior to this date, instructs the Contractor to assign the benefit of such obligations to the Employer, then the Contractor shall do so. Unless otherwise stated in the assignment, the Contractor shall have no liability to the Employer for the work carried out by the Subcontractor after the assignment takes effect.</p>
<p>CLAUSE11/CC EMPLOYER'S RISKS</p>	<p>The Clause 11 Of CC Is Modified As Under</p> <p>Risk And Responsibility</p> <p>11.1 Indemnities</p> <p>The Contractor shall indemnify and hold harmless the Employer, the Employer's Personnel, Employers Representative, and their respective agents, against and from all claims, damages, losses and expenses (including legal fees and expenses) in respect of:</p> <ul style="list-style-type: none"> (a) bodily injury, sickness, disease, or death, of any person including railway user whatsoever arising out of or in the course of or by reason of the Contractor's design (if any), the execution and completion of the Works and the remedying of any defects, unless attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, or any of their respective agents, and (b) damage to or loss of any property, real or personal (other than the Works), to the extent that such damage or loss arises out of or in the course of or by reason of the Contractor's design (if any), the execution and completion of the Works and the remedying of any defects, unless and to the extent that any such damage or loss is attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, their respective agents, or anyone directly or indirectly employed by any of them. <p>The Employer shall indemnify and hold harmless the Contractor, the Contractor's Personnel, and their respective agents, against and from all claims, damages, losses and expenses (including legal fees and expenses) in respect of:</p> <ul style="list-style-type: none"> (1) bodily injury, sickness, disease, or death, which is attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, or any of their respective agents, and (2) the matters for which liability may be excluded from insurance cover, as described in subparagraphs (d)(i), (ii) and (iii) of Sub-Clause 13.8/PCC [Insurance Against Injury to Persons and Damage to Property].

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	<p>11.2 Contractor's Care of The Works</p> <p>The Contractor shall take full responsibility for the care of the Works and Goods from the Commencement Date until the Taking-Over Certificate is issued (or is deemed to be issued under Sub-Clause 46.1/PCC [Taking Over of the Works and Sections]) for the Works, when responsibility for the care of the Works shall pass to the Employer. If a Taking-Over Certificate is issued (or is so deemed to be issued) for any Section or part of the Works, responsibility for the care of the Section or part shall then pass to the Employer.</p> <p>After responsibility has accordingly passed to the Employer, the Contractor shall take responsibility for the care of any work which is outstanding on the date stated in a Taking-Over Certificate, until this outstanding work has been completed.</p> <p>If any loss or damage happens to the Works, Goods or Contractor's Documents during the period when the Contractor is responsible for their care, from any cause not listed in Sub-Clause 11.3/PCC [Employer's Risks], the Contractor shall rectify the loss or damage at the Contractor's risk and cost, so that the Works, Goods and Contractor's Documents conform with the Contract.</p> <p>The Contractor shall be liable for any loss or damage caused by any actions performed by the Contractor after a Taking-Over Certificate has been issued. The Contractor shall also be liable for any loss or damage which occurs after a Taking-Over Certificate has been issued and which arose from a previous event for which the Contractor was liable.</p> <p>11.3 Employer's Risks</p> <p>The risks referred to herein below, in so far as they directly affect the execution of the works in the Country, are:</p> <ul style="list-style-type: none"> (a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies, (b) rebellion, terrorism, sabotage by persons other than the Contractor's Personnel, revolution, insurrection, military or usurped power, or civil war, within the Country, (c) riot, commotion, or disorder within the Country by persons other than the Contractor's Personnel, (d) munitions of war, explosive materials, ionising radiation or contamination by radio-activity, within the Country, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity, (e) pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds, (f) use or occupation by the Employer of any part of the Permanent Works, except as may be specified in the Contract, and (g) design of any part of the Works by the Employer's Personnel or by others for whom the Employer is responsible. <p>11.4 Consequences of Employer's Risks:</p> <p>If and to the extent that any of the risks listed in Sub-Clause 11.3/PCC above results in loss or damage to the Works, Goods or Contractor's Documents, the Contractor shall promptly give notice to the Engineer and shall rectify this loss or damage to the extent required by the Engineer.</p> <p>If the Contractor suffers delay and/or incurs Cost from rectifying this loss or damage, the Contractor shall give a further notice to the Employer and shall be entitled subject to Sub-Clause 56.1/SCC [Contractor's Claims] to:</p> <ul style="list-style-type: none"> (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause [Extension of Time for Completion], and (b) In the case of sub-paragraphs (f) and (g) of Sub-Clause 11.3/PCC [Employer's Risks],

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	<p>Cost shall be payable.</p> <p>After receiving this further notice, the Employer shall proceed in accordance with New-Clause 3.5/PCC [Determinations] to agree or determine these matters.</p> <p>11.5.1 Intellectual and Industrial Property Rights</p> <p>In this Sub-Clause, “infringement” means an infringement (or alleged infringement) of any patent, registered design, copyright, trademark, trade name, trade secret or other intellectual or industrial property right relating to the Works; and “claim” means a claim (or proceedings pursuing a claim) alleging an infringement.</p> <p>Whenever a Party does not give notice to the other Party of any claim within 28 days of receiving the claim, the first Party shall be deemed to have waived any right to indemnity under this Sub-Clause.</p> <p>The Employer shall indemnify and hold the Contractor harmless against and from any claim alleging an infringement which is or was:</p> <ul style="list-style-type: none"> (a) an unavoidable result of the Contractor’s compliance with the Contract, or (b) a result of any Works being used by the Employer: <ul style="list-style-type: none"> (i) for a purpose other than that indicated by, or reasonably to be inferred from, the Contract, or (ii) in conjunction with anything not supplied by the Contractor, unless such use was disclosed to the Contractor prior to the Base Date or is stated in the Contract. <p>The Contractor shall indemnify and hold the Employer harmless against and from any other claim which arises out of or in relation to (i) the manufacture, use, sale or import of any Goods, or (ii) any design for which the Contractor is responsible.</p> <p>If a Party is entitled to be indemnified under this Sub-Clause, the indemnifying Party may (at its cost) conduct negotiations for the settlement of the claim, and any litigation or arbitration which may arise from it. The other Party shall, at the request and cost of the indemnifying Party, assist in contesting the claim. This other Party (and its Personnel) shall not make any admission which might be prejudicial to the indemnifying Party, unless the indemnifying Party failed to take over the conduct of any negotiations, litigation or arbitration upon being requested to do so by such other Party.</p> <p>11.5.2 Copyright</p> <p>As between the Parties, the Contractor shall retain the copyright and other Intellectual Property rights in the Contractor’s Documents and other design documents made by (or on behalf of) the Contractor. The Contractor shall be deemed (by signing this Agreement) to give to the Employer a non-terminable transferable non-exclusive royalty-free licence to copy, use and communicate the Contractor’s Documents, including making and using modifications of them. This licence shall:</p> <ul style="list-style-type: none"> (a) apply throughout the actual or intended working life (whichever is longer) of the relevant parts of the Works, (b) entitle any person in proper possession of the relevant part of the Works to copy, use and communicate the Contractor’s Documents for the purposes of completing, operating, maintaining, altering, adjusting, repairing, and demolishing the Works, and (c) in the case of Contractor’s Documents which are in the form of computer programs and other software, permit their use on any computer on the Site and other places as envisaged by this Agreement, including replacements of any computers supplied by the Contractor: <p>As between the Parties, the Employer shall retain the copyright and other Intellectual Property rights in this Agreement and other documents made by (or on behalf of) the</p>

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	<p>Employer. The Contractor may, at its cost, copy, use, and obtain communication of these documents for the purposes of this Agreement. They shall not, without the Employer's consent, be copied, used or communicated to a third party by the Contractor, except as necessary for the purposes of the contract.</p> <p>11.6 Limitation of Liability</p> <p>Neither Party shall be liable to the other Party for loss of use of any Works, loss of profit, loss of any contract or for any indirect or consequential loss or damage which may be suffered by the other Party in connection with the Contract, provided that this exclusion shall not apply to any obligation of the Contractor to pay Delay Damages to the Employer under Sub-Clause 26.6/PCC [Delay Damages].</p> <p>The total liability of the Contractor to the Employer, under or in connection with the Contract other than under New-Clause 4.37/PCC [Electricity, Water and Gas], New Clause 4.38/PCC [Employer's Equipment and Free-Issue Material], Sub-Clause 11.1/PCC [Indemnities] and Sub-Clause 11.5/PCC [Intellectual and Industrial Property Rights], shall not exceed the sum as specified in the Contract Data or if nothing is specified in the Contract Data, the accepted Contract Amount.</p> <p>This Sub-Clause shall not limit liability in any case of fraud, deliberate default, or reckless misconduct by the defaulting Party.</p> <p>The maximum total liability of Contractor is accepted contract amount.</p> <p>11.7 Use of Employer's Accommodation/ Facilities</p> <p>The Contractor shall take full responsibility for the care of the Employer provided accommodation and facilities, if any, as detailed in the Specification, from the respective dates of hand-over to the Contractor until cessation of occupation (where hand-over or cessation of occupation may take place after the date stated in the Taking-Over Certificate for the Works).</p> <p>If any loss or damage happens to any of the above items while the Contractor is responsible for their care arising from any cause whatsoever other than those for which the Employer is liable, the Contractor shall, at his own cost, rectify the loss or damage to the satisfaction of the Engineer. The decision of Employer is final in this regard.</p>
<p>CLAUSE 13/CC INSURANCE</p>	<p>The Following Paras Are Added To The Existing Cc Clauses.</p> <p>Insurance</p> <p>13.6 General Requirements for Insurances</p> <p>In this Clause, "insuring Party" means, for each type of insurance, the Party responsible for effecting and maintaining the insurance specified in the relevant Sub-Clause.</p> <p>Wherever the Contractor is the insuring Party, each insurance shall be effected with insurers and in terms approved by the Employer. These terms shall be consistent with any terms agreed by both Parties before the date of the Letter of Acceptance. This agreement of terms shall take precedence over the provisions of this Clause.</p> <p>If a policy is required to indemnify joint insured, the cover shall apply separately to each insured as though a separate policy had been issued for each of the joint insured. If a policy indemnifies additional joint insured, namely in addition to the insured specified in this Clause,</p> <ul style="list-style-type: none"> (i) the Contractor shall act under the policy on behalf of these additional joint insured except that the Employer shall act for Employer's Personnel, (ii) additional joint insured shall not be entitled to receive payments directly from the insurer or to have any other direct dealings with the insurer, and (iii) the insuring Party shall require all additional joint insured to comply with the conditions stipulated in the policy.

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	<p>The Contractor shall provide to the Employer, within 28 days of the Commencement Date, evidence of professional liability insurance maintained by its Design Director and/or consultants to cover the risk of professional negligence in the design of Works. The professional liability cover shall be for a sum of not less than [6% (Six per cent)] of the Contract Price and shall be maintained until the end of the Defects Liability Period.</p> <p>Waiver Of Subrogation</p> <p>All insurance policies in respect of the insurance obtained by the Contractor pursuant to this Insurance clause shall include a waiver of any and all rights of subrogation or recovery of the insurers thereunder against, inter alia, the Employer, and its assigns, successors, undertakings and their subsidiaries, Affiliates, employees, insurers and underwriters, and of any right of the insurers to any set-off or counterclaim or any other deduction, whether by attachment or otherwise, in respect of any liability of any such person insured under any such policy or in any way connected with any loss, liability or obligation covered by such policies of insurance.</p> <p>Cross Liabilities</p> <p>Any such insurance maintained or effected in pursuance of this Insurance clause shall include a cross liability clause such that the insurance shall apply to the Contractor and to the Employer as separately insured.</p> <p>Accident or Injury to Workmen</p> <p>Notwithstanding anything contained in this Agreement, it is hereby expressly agreed between the Parties that the Employer shall not be liable for or in respect of any damages or compensation payable to any workman or other person in the employment of the Contractor or Sub-contractor, save and except as for death or injury resulting from any act, omission or default of the Employer, its agents or servants. The Contractor shall indemnify and keep indemnified the Employer from and against all such claims, proceedings, damages, costs, charges, and expenses whatsoever in respect of the above save and except for those acts, omissions, or defaults for which the Employer shall be liable.</p> <p>Insurance Against Accident To Workmen</p> <p>The Contractor shall effect and maintain during the Agreement such insurances as may be required to insure the Contractor's personnel and any other persons employed by it on the Railway Project from and against any liability incurred in pursuance of this Insurance clauses Provided that for the purposes of this para, the Contractor's personnel/any person employed by the Contractor shall include the Sub-contractor and its personnel. Provided further that in respect of any persons employed by any Sub-contractor, the Contractor's obligations to insure as aforesaid under this para shall be discharged if the Sub-contractor shall have insured against any liability in respect of such persons in such manner that the Employer is indemnified under the policy. The Contractor shall require such Sub-contractor to produce before the Employer, when required, such policy of insurance and the receipt for payment of the current premium within 10 (ten) days of such demand being made by the Employer.</p> <p>Application Of Insurance Proceeds</p> <p>The proceeds from all insurance claims, except for life and injury, shall be applied for any necessary repair, reconstruction, reinstatement, replacement, improvement, delivery or installation of the Railway Project and the provisions of this Agreement in respect of construction of Works shall apply mutatis mutandis to the Works undertaken out of the proceeds of insurance.</p> <p>Compliance With Policy Conditions</p> <p>The Contractor expressly acknowledges and undertakes to fully indemnify the Employer from and against all losses and claims arising from the Contractor's failure to comply with conditions imposed by the insurance policies effected in accordance with this Agreement.</p>

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	<p>Periods For Submission Of Insurance:</p> <p>a) evidence of insurance: Before start date of work.</p> <p>b) relevant policies: Before start date of work.</p> <p>Each policy insuring against loss or damage shall provide for payments to be made in the currencies required to rectify the loss or damage. Payments received from insurers shall be used for the rectification of the loss or damage.</p> <p>The relevant insuring Party shall, within the respective periods stated in the Contract Data (calculated from the Commencement Date), submit to the other Party:</p> <p>(a) evidence that the insurances described in this Clause have been effected, and</p> <p>(b) copies of the policies for the insurances described in Sub-Clause 13.7/PCC [Insurance for Works and Contractor's Equipment] and Sub-Clause 13.8/PCC [Insurance against Injury to Persons and Damage to Property].</p> <p>(c) If the contractor fails to submit evidence and copies of the policies as mentioned in (a) & (b) above to prove that the policies have been obtained within the period specified in the contract data, and submits the same later on and from the submitted evidence it is found that the policies have not been obtained within the period specified, the Employer shall recover double the cost of the premium for the period the policies have been delayed.</p> <p>When each premium is paid, the insuring Party shall submit evidence of payment to the other Party. Whenever evidence or policies are submitted, the insuring Party shall also give notice to the Engineer.</p> <p>Each Party shall comply with the conditions stipulated in each of the insurance policies. The insuring Party shall keep the insurers informed of any relevant changes to the execution of the Works and ensure that insurance is maintained in accordance with this Clause.</p> <p>Neither Party shall make any material alteration to the terms of any insurance without the prior approval of the other Party. If an insurer makes (or attempts to make) any alteration, the Party first notified by the insurer shall promptly give notice to the other Party.</p> <p>If the insuring Party fails to effect and keep in force any of the insurances it is required to effect and maintain under the Contract, or fails to provide satisfactory evidence and copies of policies in accordance with this Sub-Clause, the other Party may (at its option and without prejudice to any other right or remedy) effect insurance for the relevant coverage and pay the premiums due. The insuring Party shall pay double the amount of these premiums to the other Party, and the Contract Price shall be adjusted accordingly.</p> <p>Nothing in this Clause limits the obligations, liabilities or responsibilities of the Contractor or the Employer, under the other terms of the Contract or otherwise. Any amounts not insured or not recovered from the insurers shall be borne by the Contractor and/or the Employer in accordance with these obligations, liabilities, or responsibilities. However, if the insuring Party fails to effect and keep in force an insurance which is available and which it is required to effect and maintain under the Contract, and the other Party neither approves the omission nor effects insurance for the coverage relevant to this default, any moneys which should have been recoverable under this insurance shall be paid by the insuring Party.</p> <p>Payments by one Party to the other Party shall be subject to New-Clause 2.4/PCC [Employer's Claims] or Sub-Clause 56.1/SCC [Contractor's Claims], as applicable.</p> <p>The Contractor shall be entitled to place all insurance relating to the Contract (including, but not limited to the insurance referred to Clause 13/CC/PCC with insurers from any eligible source country.</p> <p>13.7 Insurance for Works And Contractor's Equipment</p>

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	<p>The Contractor shall insure the Works, Plant, Materials, including those issued by the Employer and Contractor's Documents for not less than the full reinstatement cost including the costs of demolition, removal of debris and professional fees and profit, subject to a maximum value indicated in Contract Data. This insurance shall be effective from the date by which the evidence is to be submitted under sub-paragraph (a) of Sub-Clause 13.6/PCC [General Requirements for Insurances], until the date of issue of the Taking-Over Certificate for the Works.</p> <p>The insuring Party shall maintain this insurance to provide cover until the date of issue of the Performance Certificate, for loss or damage for which the Contractor is liable arising from a cause occurring prior to the issue of the Taking-Over Certificate, and for loss or damage caused by the Contractor in the course of any other operations (including those under New-Clause 6/PCC [Defects Liability]).</p> <p>The insuring Party shall insure the Contractor's Equipment for not less than the full replacement value, including delivery to Site. For each item of Contractor's Equipment, the insurance shall be effective while it is being transported to the Site and until it is no longer required as Contractor's Equipment.</p> <p>Unless otherwise stated in the Conditions of Contract/SCC, insurances under this Sub-Clause:</p> <ul style="list-style-type: none"> (a) shall be effected and maintained by the Contractor as insuring Party, (b) shall be in the joint names of the Parties, who shall be jointly entitled to receive payments from the insurers, payments being held or allocated between the Parties for the sole purpose of rectifying the loss or damage, (c) shall cover all loss and damage from any cause not listed in Sub-Clause 11.3/PCC [Employer's Risks], (d) shall also cover loss or damage to a part of the Works which is attributable to the use or occupation by the Employer of another part of the Works, and loss or damage from the risks listed in sub-paragraphs (c), (g) and (h) of Sub-Clause 11.3/PCC [Employer's Risks], excluding (in each case) risks which are not insurable at commercially reasonable terms, with deductibles per occurrence of not more than the amount stated in the Contract Data (if an amount is not so stated, this sub-paragraph (d) shall not apply), and (e) may however exclude loss of, damage to, and reinstatement of: <ul style="list-style-type: none"> i) part of the Works which is in a defective condition due to a defect in its design, materials or workmanship (but cover shall include any other parts which are lost or damaged as a direct result of this defective condition and not as described in sub-paragraph (ii) below), ii) a part of the Works which is lost or damaged in order to reinstate any other part of the Works if this other part is in a defective condition due to a defect in its design, materials or workmanship, iii) a part of the Works which has been taken over by the Employer, except to the extent that the Contractor is liable for the loss or damage, and iv) [DELETED] <p>If, more than one year after the Base Date, the cover described in sub-paragraph (d) above ceases to be available at commercially reasonable terms, the Contractor shall (as insuring Party) give notice to the Employer, with supporting particulars. The Employer shall then (i) be entitled subject to New-Clause 2.4/PCC [Employer's Claims] to payment of an amount equivalent to such commercially reasonable terms as the Contractor should have expected to have paid for such cover, and (ii) be deemed, unless he obtains the cover at commercially reasonable terms, to have approved the omission under Sub-Clause 13.6/PCC [General Requirements for Insurances].</p>

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	<p>13.8 Insurance Against Injury To Persons And Damage To Property</p> <p>The insuring Party shall insure against each Party's liability for any loss, damage, death or bodily injury which may occur to any physical property (except things insured under Sub-Clause 13.7/PCC [Insurance for Works and Contractor's Equipment]) or to any person (except persons insured under Sub-Clause 13.9/PCC [Insurance for Contractor's Personnel]), which may arise out of the Contractor's performance of the Contract and occurring before the issue of the Performance Certificate.</p> <p>This insurance shall be for a limit per occurrence of not less than the amount stated in the Contract Data, with no limit on the number of occurrences. If an amount is not stated in the Contract Data, this Sub-Clause shall not apply.</p> <p>Unless otherwise stated in the Special Conditions of Contract, the insurances specified in this Sub-Clause:</p> <ul style="list-style-type: none"> (a) shall be effected and maintained by the Contractor as insuring Party, (b) shall be in the joint names of the Parties, (c) shall be extended to cover liability for all loss and damage to the Employer's property including Railways Property (except things insured under Sub-Clause 13.7/PCC) arising out of the Contractor's performance of the Contract, and (d) may however exclude liability to the extent that it arises from: <ul style="list-style-type: none"> (i) the Employer's right to have the Permanent Works executed on, over, under, in or through any land, and to occupy this land for the Permanent Works, (ii) damage which is an unavoidable result of the Contractor's obligations to execute the Works and remedy any defects, and (iii) a cause listed in Sub-Clause 11.3/PCC [Employer's Risks], except to the extent that cover is available at commercially reasonable terms. <p>13.9 Insurance For Contractor's Personnel</p> <p>The Contractor shall abide by the provisions of ESIC Act, 1948 (extended from time to time) to take care of insurance against liability for claims, damages, losses, and expenses (including legal fees and expenses) arising from injury, sickness, or disease. In addition, the contractor shall also maintain insurance against liability for claim of death of any person employed by the Contractor or any other of the Contractor's Personnel.</p> <p>The Employer and the Engineer shall also be indemnified under the policy of insurance, except that this insurance may exclude losses and claims to the extent that they arise from any act or neglect of the Employer or of the Employer's Personnel.</p> <p>The insurance shall be maintained in full force and effect during the whole time that these personnel are assisting in the execution of the Works. For a Subcontractor's employees, the insurance may be effected by the Subcontractor, but the Contractor shall be responsible for compliance with this Clause.</p> <p>Maximum number of deductibles for insurance of Employer's risks: Nil</p>
<p>CLAUSE- 22/CC. RIGHT OF ACCESS TO THE SITE</p>	<p>The Following Para Is Added To The Existing Cc Clause:</p> <p>The Employer will make all-out efforts to give the Contractor shared RUC (Right of Usage for Construction) within the time (or times) stated in the Contract Data. The RUC is shared i.e., it may not be exclusive to the Contractor. If, under the Contract, the Employer is required to give (to the Contractor) possession of any foundation, structure, plant or means of access, the Employer will make all-out efforts to do so in the time and manner stated in the bid document. In case there is an encumbrance/obstruction at an isolated location, which in the opinion of the Engineer/Employer</p>

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	<p>does not constitute a major problem in the execution of part/full work at/around that location, the RUC at such a location is deemed to have been given. The decision of Employer is final in this regard. However, the Employer may withhold any such right until the Performance Security has been received.</p> <p>If no such time is stated in the Contract Data, the Employer will make all-out efforts to give the Contractor RUC of the site within such times as may be required to enable the Contractor to proceed in accordance with the programme submitted under Sub-Clause 25.3/PCC [Programme].</p> <p>If the Contractor suffers delay as a result of a failure by the Employer to give any such right or possession within such time, the Contractor shall give notice to the Engineer and shall be entitled to:</p> <p style="padding-left: 40px;">(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 26.5/PCC [Extension of Time for Completion], and</p> <p>After receiving this notice, the Engineer shall proceed in accordance with New-Clause 3.5/PCC [Determinations] to agree or determine these matters.</p> <p>However, if and to the extent that the Employer's failure was caused by any error or delay by the Contractor, including an error in, or delay in the submission of, any of the Contractor's Documents, the Contractor shall not be entitled to such extension of time.</p> <p>The Contractor shall prepare, at his cost, approach roads to the site of work and this cost will not be reimbursed by the Employer. The Employer reserves the right to make use of these service roads for themselves or other Contractors working on the project, as and when necessary, without any payment to the Contractor. The barricading to the extent feasible subject for carrying out the works and suitable barricading width for off-road structures in stages as per the approved sequence of construction. The employer shall grant the contractor RUC progressively for the completion of works. The contractor will draw/ modify the schedule for completion of work according to progressive RUC of such sites.</p>
<p>CLAUSE 25 OF CC PROGRAMME</p>	<p>The Following Paras Are Added To The Existing Cc Clauses.</p> <p>25.3 Programme</p> <p>The Contractor shall submit a detailed time programme to the Employer within 28 days after receiving the notice under Sub-Clause 26.3/PCC [Commencement of Works]. The program shall include the physical and Financial Progress vis-à-vis program and forecast cash flow adopting Project Management Software Primavera/Sure Track/MS Project or as mutually agreed. The program must identify the milestones, interface requirements and program reporting elements. The Contractor shall supply, free of cost one set of authorized software to the Employer and the Engineer and the soft copy of structured program for the project. This shall be updated every month. The Contractor shall also submit a revised programme whenever the previous programme is inconsistent with actual progress or with the Contractor's obligations. Each programme shall include:</p> <p style="padding-left: 40px;">(a) the order in which the Contractor intends to carry out the Works, including the anticipated timing of each stage of design (if any), Contractor's Documents, procurement, manufacture of Plant, delivery to Site, construction, erection, and testing,</p> <p style="padding-left: 40px;">(b) each of these stages for work by each nominated Subcontractor (as defined in Clause 7/PCC [Nominated Subcontractors]),</p> <p style="padding-left: 40px;">(c) the sequence and timing of inspections and tests specified in the Contract, and</p> <p style="padding-left: 40px;">(d) a supporting report which includes:</p> <p style="padding-left: 80px;">(i) a general description of the methods which the Contractor intends to adopt, and of the major stages, in the execution of the Works, and</p>

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	<p>(ii) details showing the Contractor's reasonable estimate of the number of each class of Contractor's Personnel and of each type of Contractor's Equipment, required on the Site for each major stage.</p> <p>Unless the Employer, within 21 days after receiving a programme, gives notice to the Contractor stating the extent to which it does not comply with the Contract, the Contractor shall proceed in accordance with the programme, subject to his other obligations under the Contract. The Employer's Personnel shall be entitled to rely upon the programme when planning their activities.</p> <p>The Contractor shall promptly give notice to the Employer of specific probable future events or circumstances which may adversely affect the work, increase the Contract Price, or delay the execution of the Works. The Employer may require the Contractor to submit an estimate of the anticipated effect of the future event or circumstances, and/or a proposal under Sub-Clause 34.2/PCC [Procedure for change of scope].</p> <p>If, at any time, the Employer gives notice to the Contractor that a programme fails (to the extent stated) to comply with the Contract or to be consistent with actual progress and the Contractor's stated intentions, the Contractor shall submit a revised programme to the Employer within 15 days in accordance with this Sub-Clause.</p>
<p>CLAUSE 26 OF CC EXTENSION OF THE INTENDED COMPLETION DATE</p>	<p>The Following Paras Are Added To The Existing CC Clauses.</p> <p>26.3 Commencement Of Works</p> <p>The Employer shall give the Contractor not less than 14 days' notice for Commencement of work. Unless otherwise stated in the Special Conditions of Contract, the Commencement of work shall be within the number of days after the Contractor receives the Letter of Acceptance as specified in Contract Data.</p> <p>The Contractor shall commence the execution of the Works as soon as is reasonably practicable after the Commencement Date, and shall then proceed with the Works with due expedition and without delay.</p> <p>26.4 Time For Completion</p> <p>The Contractor shall complete the whole of the Works, and each Section (if any), within the Time for Completion for the Works or Section (as the case may be), including:</p> <ul style="list-style-type: none"> (a) achieving the passing of the Tests on Completion, and (b) completing all work which is stated in the Contract as being required for whole of the Works or Section(s) to be considered to be completed for the purposes of taking-over under Sub-Clause 46.1/PCC [Taking Over of the Works and Sections]. <p>26.5 Extension Of Time For Completion</p> <p>The Contractor shall be entitled subject to Sub-Clause 56.1/SCC [Contractor's Claims] to an extension of the Time for Completion if and to the extent that completion for the purposes of Sub-Clause 46.1/PCC [Taking-Over of the Works and Sections] is or will be delayed by any of the following causes:</p> <ul style="list-style-type: none"> a) Delay in providing the access to the site, environmental clearances, in accordance with the provisions of this Agreement. b) Change of Scope, unless an adjustment to the Scheduled Completion Date has been agreed under change of scope. c) Variation (unless an adjustment to the Time for Completion has been agreed under Sub-Clause 34.2/PCC [Procedure for change of scope]) or other substantial change in the quantity of an item of work included in the Contract, d) a cause of delay giving an entitlement to extension of time under a Sub-Clause of these

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	<p>Conditions,</p> <p>e) Occurrence of Force Majeure event.</p> <p>f) any delay, impediment or prevention caused by or attributable to the Employer, the Employer's Personnel, or the Employer's other contractors.</p> <p>If the Contractor considers himself to be entitled to an extension of the Time for Completion, the Contractor shall give notice to the Employer in accordance with Sub-Clause 56.1/SCC [Contractor's Claims]. When determining each extension of time under Sub-Clause 56.1/SCC the Engineer shall review previous determinations and may increase, but shall not decrease, the total extension of time.</p> <p>26.6 DELETED.</p> <p>26.7 Rate of Progress</p> <p>If, at any time:</p> <p>(a) actual progress is too slow to complete within the Time for Completion, and/or</p> <p>(b) progress has fallen (or is expected to fall) behind the current programme under Sub-Clause 25.3/PCC [Programme],</p> <p>other than as a result of a cause listed in Sub-Clause 26.5/PCC [Extension of Time for Completion], then the Employer/Engineer may instruct the Contractor to submit, under Sub-Clause 25.3/PCC [Programme], a revised programme and supporting report describing the revised methods which the Contractor proposes to adopt in order to expedite progress and complete within the Time for Completion.</p> <p>Unless the Employer/Engineer notifies otherwise, the Contractor shall adopt these revised methods, which may require increases in the working hours and/or in the numbers of Contractor's Personnel and/or Goods, at the risk and cost of the Contractor. If these revised methods cause the Employer to incur additional costs, the Contractor shall subject to New-Clause 2.4/PCC [Employer's Claims] pay these costs to the Employer, in addition to delay damages (if any) under Sub-Clause 26.8/PCC below</p> <p>26.8 Extension of Time For Completion With Delay Damages</p> <p>If the Contractor fails to comply with Sub-Clause 26.4/PCC [Time for Completion for entire work or for specified section wise completion period], and he is not entitled to an extension of time under sub clause 26.5/PCC then the employer may grant extension of time with delay damage in such case, the Contractor shall subject to New-Clause 2.4/PCC [Employer's Claims] pay delay damages to the Employer for this default. These delay damages shall be the sum stated in the Contract Data, which shall be paid for every day which shall elapse between the relevant Time for Completion and the date stated in the Taking-Over Certificate. However, the total amount due under this Sub-Clause shall not exceed the maximum amount of delay damages (if any) stated in the Contract Data.</p> <p>Further, if the contractor fails to achieve physical/financial targets as per the agreed programme for a consecutive period of 3 months without any valid reasons, other than attributable to the contractor, a provisional recovery of delay damages shall be made from the next interim payment certificate @ 1/10th of the sum of delay damages stated in the contract data, for the entire period of 3 months. Such recovery shall continue from the further interim payment certificates till the contractor is able to make good the shortfall and achieve the cumulative targets as per agreed programme. On achieving the cumulative progress targets as per agreed programme, the entire amount recovered till that month, shall be refunded to the contractor in the next interim payment certificate. In case the contractor is unable to make good the shortfall and achieve the cumulative targets resulting in delay in completion of the project, then the provisional recoveries made shall be adjusted against the delay damages to be finally imposed on the contractor.</p>

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	<p>These delay damages shall be the only damages due from the Contractor for such default, other than in the event of termination under Sub-Clause 49.7/PCC [Termination by Employer] prior to completion of the Works. These damages shall not relieve the Contractor from his obligation to complete the Works, or from any other duties, obligations or responsibilities which he may have under the Contract.</p> <p>26.9 Suspension of Work</p> <p>The Employer/Engineer may at any time instruct the Contractor to suspend progress of part or all of the Works. During such suspension, the Contractor shall protect, store, and secure such part or the Works against any deterioration, loss or damage.</p> <p>The Employer/Engineer may also notify the cause for the suspension. If and to the extent that the cause is notified and is the responsibility of the Contractor, the following Sub-Clauses 26.10, 26.11 and 26.12 of PCC shall not apply.</p> <p>26.10 Consequences of Suspension</p> <p>If the Contractor suffers delay and/or incurs Cost from complying with the Engineer's instructions under Sub-Clause 26.9/PCC [Suspension of Work] and/or from resuming the work, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 56.1/SCC [Contractor's Claims] to:</p> <p style="padding-left: 40px;">(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 26.5/PCC [Extension of Time for Completion], and</p> <table border="1"> <thead> <tr> <th>SN</th> <th>Suspension Period</th> <th>Extension of Time</th> <th>Compensation for the Suspension Period</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Up to 30 days</td> <td>NO</td> <td>NO</td> <td>Employer may give extension of time in exceptional circumstances</td> </tr> <tr> <td>2</td> <td>30-60 days</td> <td>YES</td> <td>NO</td> <td>Extension of time as considered proper by the Employer</td> </tr> <tr> <td>3</td> <td>Above 60 days</td> <td>YES</td> <td> A. As per Daily rate of wages for idle labour/employees B. 70% of the rate for hire charges for idle plant and machinery (excluding cost of fuel and lubricants) 15% above all these items to cover overhead costs </td> <td>Compensation as assessed by the Engineer on submission of documentary proof by the Contractor will be recommended by the Engineer and may be considered by the Employer</td> </tr> </tbody> </table> <p style="padding-left: 40px;">(b) payment of any such Cost, which shall be included in the Contract Price.</p> <p>After receiving this notice, the Employer shall proceed in accordance with New-Clause 3.5/PCC [Determinations] to agree or determine these matters and bring them to the notice of the Employer for further action.</p> <p>The Contractor shall not be entitled to an extension of time for, or to payment of the Cost incurred in, making good the consequences of the Contractor's faulty design, workmanship or materials, or of the Contractor's failure to protect, store or secure in accordance with Sub-Clause 26.9/PCC</p>				SN	Suspension Period	Extension of Time	Compensation for the Suspension Period	Remarks	1	Up to 30 days	NO	NO	Employer may give extension of time in exceptional circumstances	2	30-60 days	YES	NO	Extension of time as considered proper by the Employer	3	Above 60 days	YES	A. As per Daily rate of wages for idle labour/employees B. 70% of the rate for hire charges for idle plant and machinery (excluding cost of fuel and lubricants) 15% above all these items to cover overhead costs	Compensation as assessed by the Engineer on submission of documentary proof by the Contractor will be recommended by the Engineer and may be considered by the Employer
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	<p>[Suspension of Work].</p> <p>If suspension is ordered by the Employer/Engineer for reasons other than those mentioned in Sub Clause 26.9/PCC then the Contractor's entitlement is in the table below.</p> <p>However, Employer's decision is final and binding in regard to defining suspension and specifying the suspension period. Contractor has no right to claim or appeal against this decision.</p> <p>26.11 Payment for Plant and Materials in Event of Suspension</p> <p>The Contractor shall be entitled to payment of the value (as at the date of suspension) of Plant and/or Materials, if:</p> <ul style="list-style-type: none"> (a) the work on Plant or delivery of Plant and/or Materials has been suspended for more than 60 days, (b) the Contractor has marked the Plant and/or Materials as the Employer's property in accordance with the Engineer's instructions, and (c) Such materials or plant is received at site <p>26.12 Prolonged Suspension</p> <p>If the suspension under Sub-Clause 26.9/PCC [Suspension of Work] has continued for more than 90 days, the Contractor may request the Employer's permission to proceed. If the Employer does not give permission within 28 days after being requested to do so, the Contractor may, by giving notice to the Employer, treat the suspension as an omission under Clause 34/PCC [Variations and Adjustments] of the affected part of the Works. If the suspension affects the whole of the Works, the Contractor may give notice of termination under relevant sub-clause (Termination by Contractor).</p> <p>26.13 Resumption Of Work</p> <p>After the permission or instruction to proceed is given, the Contractor and the Engineer shall jointly examine the Works and the Plant and Materials affected by the suspension and the Engineer shall submit a report, duly countersigned by Contractor, to the Employer. The Contractor shall make good any deterioration or defect in or loss of the Works or Plant or Materials, which has occurred during the suspension.</p> <p>26.14 Bonus for Early Completion:</p> <p>In the event that, the Completion Date occurs prior to the Scheduled Completion Date, the Contractor shall be entitled to receive a payment of bonus equivalent to 1% (one per cent) of the Contract Price for per month (part of the month to be excluded) by which the Project Completion Date precedes the Scheduled Completion Date, but subject to a maximum of 3% (three per cent) of the Contract Price. Provided, however, that the payment of bonus, if any, shall be made only after the issue of the Completion Certificate. For the avoidance of doubt, the Parties agree that for the purpose of determining the bonus payable hereunder, the Contract Price shall always be deemed to be the amount and shall exclude any revision thereof for any reason.</p> <p>If the Contractor achieves completion of the whole of the Works prior to the intended Completion Date prescribed in Contract data (Extension of time pursuant to Clause 26.5/PCC or any other clause of these conditions will not be considered), the Employer shall pay to the Contractor a sum stated in the Contract data as bonus for early completion, for every calendar month which shall elapse between the date of completion of all items of works as stipulated in the contract, including variations ordered by the Engineer and the time prescribed in Clause 26.4.</p> <p>For the purpose of calculating bonus payments, the time given in the Bid for completion of the whole works is fixed and unless otherwise agreed, no adjustment of the time by reasons of granting an extension of time pursuant to clause 26.5/PCC or any other clause of these conditions will be allowed. Any period falling short of completed month shall be ignored for the purpose of</p>

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	<p>computing the period relevant for the payment of bonus.</p> <p>Amount Of Bonus For Early Completion</p> <p>1% of initial Contract Price per month (part of the month to be excluded) for completion of whole works.</p> <p>Maximum Limit Of Bonus</p> <p>3% of Contract Price.</p> <p>(For earlier completion of the work as a whole from the stipulated original date of completion as per contract, a bonus payment of as above shall be paid to the contractor. The Employer's decision is final and binding on the contractor so far as bonus payment to the contractor is concerned).</p>
	<p>26.15 Suspension of Unsafe Construction Works</p> <ol style="list-style-type: none"> 1. Upon recommendation of the Engineer to this effect, or on its own volition in cases of emergency or urgency, the Employer may by notice require the Contractor to suspend forthwith the whole or any part of the Works if, in the reasonable opinion of the Engineer or the Employer, as the case may be, such work threatens the safety of the Users and or other persons on or about the Project. 2. The Contractor shall, pursuant to the notice under the above clause, suspend the Works or any part thereof for such time and in such manner as may be specified by the Employer and thereupon carry out remedial measures to secure the safety of suspended works, the Users, other persons and vehicles on or about the Project including pedestrians. The Contractor may by notice require the Engineer to inspect such remedial measures forthwith and make a report to the Employer recommending whether or not the suspension hereunder may be revoked. Upon receiving the recommendations of the Engineer, the Employer shall either revoke such suspension or instruct the Contractor to carry out such other and further remedial measures as may be necessary in the reasonable opinion of the Employer, and the procedure set forth in this Clause shall be repeated until the suspension hereunder is revoked. 3. Subject to the provisions of the contract, all reasonable costs incurred for maintaining and protecting the Works or part thereof during the period of suspension (the "Preservation Costs"), shall be borne by the Contractor. 4. If suspension of Works is for reasons not attributable to the Contractor, the Engineer shall determine any Time Extension to which the Contractor is reasonably entitled.
<p>CLAUSE-30/CC TESTS</p>	<p>The Following Paras Are Added To The Existing Cc Clauses.</p> <p>30.2 Contractor's Obligations:</p> <p>The Contractor shall carry out the Tests on Completion in accordance with this Clause and New Clause 5.4/PCC [Testing], after providing the documents in accordance with sub-paragraph (d) of New-Clause 4.1/PCC [Contractor's General Obligations].</p> <p>The Contractor shall give to the Engineer not less than 21 days' notice of the date after which the Contractor will be ready to carry out each of the Tests on Completion. Unless otherwise agreed, Tests on Completion shall be carried out within 14 days after this date, on such day or days as the Engineer shall instruct.</p> <p>In considering the results of the Tests on Completion, the Engineer shall make allowances for the effect of any use of the Works by the Employer on the performance or other characteristics of the Works. As soon as the Works, or a Section, have passed any Tests on Completion, the Contractor shall submit a certified report of the results of these Tests to the Engineer.</p> <p>The Contractor shall carry out the Tests on Completion at his own cost in accordance with the</p>

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	<p>Contract and shall provide the documents in accordance with New-Clauses 3.1/PCC and the Contractor shall give, to the Engineer, 21 days' notice of the date after which the Contractor will be ready to carry out the Tests on Completion. Unless otherwise agreed, such Tests shall be carried out within 14 days after this date, on such day or days as the Engineer shall instruct.</p> <p>Unless otherwise stated in Conditions of Contract/SCC, the Tests on Completion shall be carried out in the following sequence:</p> <ul style="list-style-type: none"> (a) pre-commissioning test, which shall include appropriate instructions and (“dry” or “cold”) functional tests to demonstrate that each item of the Plant and Work can safely undertake the next stage (b) Commissioning Test, which shall include the specified operational tests to demonstrate Works or Sections can be operated safely and as specified under all available operating condition (c) trial operation which shall demonstrate that the Works or Section perform reliably and in accordance with the Contract <p>The Contractor at his own cost shall arrange all tools, equipment, gadgets, facilities or as deemed necessary by the Engineer for such tests, in considering the results of the Tests on Completion, the Engineer shall make allowances for the effect of any use of the Works by the Employer on the performance or other characteristics of the Works. As soon as the Works, or a Section, have passed the Tests on Completion described in sub-paragraphs (a) (b) or (c), the Contractor shall provide the Engineer and the Employer with a certified report of the results of all such Tests.</p> <p>30.3 Delayed Tests</p> <p>If the Tests on Completion are being unduly delayed by the Employer, New-Clause 5.4/PCC [Testing] (fifth paragraph) and/or Sub-Clause 46.3/PCC [Interference with Tests on Completion] shall be applicable.</p> <p>If the Tests on Completion are being unduly delayed by the Contractor, the Engineer may by notice require the Contractor to carry out the Tests within 21 days after receiving the notice. The Contractor shall carry out the Tests on such day or days within that period as the Contractor may fix and of which he shall give notice to the Engineer.</p> <p>If the Contractor fails to carry out the Tests on Completion within the period of 21 days, the Employer’s Personnel may proceed with the Tests at the risk and cost of the Contractor. The Tests on Completion shall then be deemed to have been carried out in the presence of the Contractor and the results of the Tests shall be accepted as accurate.</p> <p>30.4 Retesting</p> <p>If the Works, or a Section, fail to pass the Tests on Completion, New-Clause 5.5/PCC [Rejection] shall apply, and the Employer or the Engineer may require the failed Tests, and Tests on Completion on any related work, to be repeated under the same terms and conditions.</p> <p>30.5 Failure To Pass Tests On Completion</p> <p>If the Works, or a Section, fail to pass the Tests on Completion repeated under Sub-Clause 30.4/PCC [Retesting], the Engineer shall be entitled to:</p> <ul style="list-style-type: none"> (a) order further repetition of Tests on Completion under Sub-Clause 30.4; (b) if the failure deprives the Employer of substantially the whole benefit of the Works or Section, reject the Works or Section (as the case may be), in which event the Employer shall have the same remedies as are provided in sub-paragraph (c) of New-Clause 6.4/PCC [Failure to Remedy Defects]; or (c) issue a Taking-Over Certificate, if the Employer so requests.

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	<p>In the event of sub-paragraph (c), the Contractor shall proceed in accordance with all other obligations under the Contract, and the Contract Price shall be reduced by such amount as shall be appropriate to cover the reduced value to the Employer as a result of this failure. Unless the relevant reduction for this failure is stated (or its method of calculation is defined) in the Contract, the Employer may require the reduction to be (i) agreed by both Parties (in full satisfaction of this failure only) and paid before this Taking-Over Certificate is issued, or (ii) determined and paid under New-Clause 2.4 [Employer's Claims] and New-Clause 3.5 [Determinations].</p> <p>30.6 Contractor's Obligations</p> <p>Notwithstanding the provisions of New-clauses 4.1/PCC, clause 30.2 to 30.5/PCC the provisions in subsequent sub-clauses shall apply for works of Permanent Way, signalling and telecommunication and railway electrification excluding General Electrical Services.</p> <p>(a) The Contractor shall be responsible for the execution of temporary and/or permanent works which may require the prior sanction/approval of Commissioner of Railway Safety (CRS) in accordance with extant rules for "The Railways opening for Public Carriage of Passengers" was amended from time to time. And applicable as and when the works are undertaken. The Contractor shall initiate the process for approval at least 120 (One-Hundred and Twenty) days prior to undertaking such works which require the approval of Commissioner of Railway Safety (CRS) and furnish draft documentation to the Engineer.</p> <p>(b) The Contractor shall ensure that existing services and operations for public carriage of passengers or goods, are not affected except those, which are essentially required to be regulated for execution of works. Such items of works shall be planned and coordinated through the Engineer.</p> <p>(i) Prior to the commencement of commercial operations of passenger traffic, the Employer may permit trial train operations and freight train operations on at-grade portion. The Contractor shall be responsible for maintaining the facilities ensuring safety of operations as per specifications.</p>
<p>CLAUSE 34/CC VARIATIONS & CLAUSE 35/CC PAYMENT FOR VARIATIONS.</p>	<p>The Following Paras Are Added To The Existing Cc Clause 34.</p> <p>34.1 Change Of Scope.</p> <p>34.1.1 The Employer may, notwithstanding anything to the contrary contained in this Agreement, require the Contractor to make modifications or alterations to the Works ("Change of Scope") before the issue of the Completion Certificate either by giving an instruction or by requesting the Contractor to submit a proposal for Change of Scope involving additional cost or reduction in cost. Any such Change of Scope shall be made and valued in accordance with the provisions of this contract.</p> <p>34.1.2 Change of Scope shall mean:</p> <p>a) change in specifications of any item of Works;</p> <p>b) omission of any work from the Scope of the Project</p> <p>c) any additional work, Plant, Materials or services which are not included in the Scope of the Project, including any associated Tests on completion of construction.</p> <p>34.1.3 If the Contractor determines at any time that a Change of Scope will, if adopted,</p> <p>(i) accelerate completion,</p> <p>(ii) reduce the cost to the Employer of executing, maintaining or operating the Railway Project,</p> <p>(iii) improve the efficiency or value to the Employer of the completed Railway Project, or</p>

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	<p>(iv) otherwise, be of benefit to the Employer, it shall prepare a proposal with relevant details at its own cost. The Contractor shall submit such proposal, supported with the relevant details including the amount of reduction in the Contract Price, if any, to the Employer to consider such Change of Scope. The Employer shall, within 30 (Thirty) days of receipt of such proposal, either accept such Change of Scope with modifications, if any, and initiate proceedings therefor in accordance with this Article or reject the proposal and inform the Contractor of its decision. For the avoidance of doubt, the Parties agree that the Contractor shall not undertake any Change of Scope without a Change of Scope Order being issued by the Employer, save and except any Works necessary for meeting any emergency.</p> <p>34.2 Procedure For Change Of Scope</p> <p>34.2.1 In the event of the Employer determining that a Change of Scope is necessary, it may direct the Engineer to issue to the Contractor a notice specifying in reasonable detail the works and services contemplated thereunder (the "Change of Scope Notice").</p> <p>34.2.2 Upon receipt of a Change of Scope Notice, the Contractor shall, with due diligence, provide to the Employer and the Engineer such information as is necessary, together with preliminary documentation in support of:</p> <ul style="list-style-type: none"> (a) the impact, if any, which the Change of Scope is likely to have on the Project Completion Schedule if the works or services are required to be carried out during the Construction Period; and (b) the options for implementing the proposed Change of Scope and the effect, if any, each such option would have on the costs and time thereof, including the following details: <ul style="list-style-type: none"> (i) break down of the quantities, unit rates and cost for different items of work; (ii) proposed design for the Change of Scope; and (iii) proposed modifications, if any, to the Project Completion Schedule of the Railway Project. <p>For the avoidance of doubt, the Parties expressly agree that, subject to the provisions of Clause 34.4.2 the Contract Price shall be increased or decreased, as the case may be, on account of Change of Scope.</p> <p>34.2.3 The Contractor's quotation of rates/costs for the Change of Scope shall be determined on the following principles:</p> <ul style="list-style-type: none"> (A) The rate for various items to be executed through change of scope order shall be estimated on the basis of analysis of rates of KPWD/ IR-USSOR / CPWD / BESCO / BWSSB (as per the order, whichever is applicable for item of works and such rates shall be indexed with reference to the WPI once every year at the commencement of the financial year, with the base being the month and year of the publication of the said schedule of rates; provided. (B) In case, any items are not available in 13.2.3 (A), then such rates shall be determined by applying the prevailing market rates of various input construction materials, labour, machinery and T & P in accordance with Good Industry Practice by the Employer/ Engineer. (C) No claims for overheads and profit shall be payable except for market rates where overheads including profit shall be 20%. The priority of reference for deriving rate shall be in the same order as stated above 13.2.3(A). Until such time as such rate(s) are agreed or fixed, the Engineer, after consultation with the Employer, shall

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	<p>determine the provisional rate(s) to enable IPC to be issued by the Engineer.</p> <p>34.2.4 Upon reaching an agreement, the Employer shall issue an order (the "Change of Scope Order") requiring the Contractor to proceed with the performance thereof. In the event that the Parties are unable to agree, the Employer may:</p> <p>(a) issue a Change of Scope Order requiring the Contractor to proceed with the performance thereof at the rates and conditions approved by the Employer till the matter is resolved in accordance with Article Dispute resolution (Clause 56 of SCC); or</p> <p>(b) proceed in accordance with Clause 34.5</p> <p>34.2.5 The provisions of this Agreement, insofar as they relate to Works and Tests, shall apply mutatis mutandis to the works undertaken by the Contractor under this clause 34.</p> <p>34.3 Payment For Change Of Scope</p> <p>Payment for Change of Scope shall be made in accordance with the payment schedule specified in the Change of Scope Order.</p> <p>34.4 Restrictions On Change Of Scope</p> <p>34.4.1 No Change of Scope shall be executed unless the Employer has issued the Change of Scope Order save and except any Works necessary for meeting any Emergency.</p> <p>34.4.2 Unless the Parties mutually agree to the contrary, the total value of all Change of Scope Orders shall not exceed 25% of the Contract Price.</p> <p>34.4.3 Notwithstanding anything to the contrary in this contract, no change arising from any default of the Contractor in the performance of its obligations under this Agreement shall be deemed to be Change of Scope, and shall not result in any adjustment of the Contract Price or the Project Completion Schedule.</p> <p>34.5 Power Of The Employer To Undertake Works</p> <p>34.5.1 In the event the Parties are unable to agree to the proposed Change of Scope Orders in accordance with Clause 34.2, the Employer may, after giving notice to the Contractor and considering its reply thereto, award such works or services to any person on the basis of open competitive bidding from amongst bidders who are pre-qualified for undertaking the additional work; provided that the Contractor shall have the option of matching the first ranked bid in terms of the selection criteria, subject to payment of 2% (two per cent) of the bid amount to the Employer, and thereupon securing the award of such works or services. For the avoidance of doubt, it is agreed that the Contractor shall be entitled to exercise such option only if it has participated in the bidding process and its bid does not exceed the first ranked bid by more than 10% (ten per cent) thereof. It is also agreed that the Contractor shall provide assistance and cooperation to the person who undertakes the works or services hereunder, but shall not be responsible for rectification of any Defects and/or maintenance of works carried out by other agencies.</p> <p>34.5.2 The works undertaken in accordance with this Clause 34.5 shall conform to the Specifications and Standards and shall be carried out in a manner that it should not cause any disruption to the Project and also minimise adverse effect to main contractor. The provisions of this Agreement, insofar as they relate to Works and Tests, shall apply mutatis mutandis to the works carried out under this Clause 34.5.</p> <p>Variations And Adjustments.</p> <p>34.6 Right to Vary</p> <p>Variations may be initiated by the Employer at any time prior to issuing the Taking-Over Certificate for the Works, either by an instruction or by making a request to the Contractor to submit a</p>

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	<p>proposal.</p> <p>The Contractor shall execute and be bound for variations of all change of scope of orders till the price does not exceed 25% of the Contract Price as specified in LOA/Original agreement</p> <p>34.7 Adjustments For Changes In Legislation</p> <p>Contract Price shall be adjusted to take account of any increase or decrease in Cost resulting from a change in the Laws of the Country (including the introduction of new Laws and the repeal or modification of existing Laws) or in the judicial or official governmental interpretation of such Laws, made after the Base Date, which affect the Contractor in the performance of obligations under the Contract.</p> <p>If the Contractor suffers (or will suffer) delay and/or incurs (or will incur) additional Cost as a result of these changes in the Laws or in such interpretations, made after the Base Date, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 56.1/SCC [Contractor's Claims] to:</p> <ul style="list-style-type: none"> (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 26.5/PCC [Extension of Time for Completion], and (b) payment of any such Cost, which shall be included in the Contract Price. <p>After receiving this notice, the Employer shall proceed in accordance with New-Clause 3.5 [Determinations] to agree or determine these matters.</p> <p>In case there is a decrease in cost as a result of changes of Law by Legislation after the Base Date, the Employer shall proceed in accordance with New-Clause 3.5 (determination) to agree or determine these matters.</p> <p>Notwithstanding the foregoing, the Contractor shall not be entitled to such an extension of time if the same shall already have been taken into account in determining an extension and such Cost shall not be separately paid if the same shall already have been taken into account in the indexing of any inputs to the table of adjustment data in accordance with the provisions of Sub-Clause PVC/Contract Data.</p>
<p>CLAUSE 35/CC PAYMENT FOR VARIATIONS.</p>	<p>DELETED</p>
<p>CLAUSE 37/CC PAYMENTS.</p>	<p>The Clause 37 Of Cc Is Replaced With The Following.</p> <p>Payments.</p> <p>37.0 Procedure For Estimating The Payment For The Works</p> <ol style="list-style-type: none"> 1. The Employer shall make interim payments to the Contractor, as certified by the Engineer on completion of a stage, for a length, number or area as specified, and valued in accordance with the proportion of the Contract Price assigned to each item and its stage and payment procedure in Lumpsum Price schedule and contract price weightages. 2. The Contractor shall base their claim for interim payment for the stages completed till the end of the month for which the payment is claimed, valued in accordance with para 1 supported with necessary particulars and documents in accordance with this Agreement. 3. Any reduction in the Contract Price arising out of Change of Scope or the Works withdrawn, as the case may be, shall not affect the amounts payable for the items or stage payments thereof which are not affected by such Change of Scope or withdrawal. The Parties further agree that the adjustments arising out of the aforesaid modifications shall be carried out in a manner that the impact of such modifications is restricted to the said Change of Scope or withdrawal, as the case may be, and does not alter the payments due

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	<p>for and in respect of items or stage payments which do not form part of such Change of Scope or withdrawal.</p> <p>4. Stage Payment Statement For Works</p> <p>The Contractor shall submit a statement (the "Stage Payment Statement"), in 3 copies, by the 7th (seventh) day of a month to the Engineer in the prescribed form, showing the amount calculated in accordance with Para 3 above to which the Contractor considers itself entitled for the completed stage(s) of Works. The Stage Payment Statement shall be accompanied with the progress reports and any other supporting documents. The Contractor shall not submit any claim for payment of incomplete stages of work. In the event that there is no claim for a month in accordance with the provisions of this Para 4, the Contractor shall submit a nil claim to the Engineer.</p> <p>5. Stage Payment For Works</p> <ul style="list-style-type: none"> i. Deleted ii. Deleted. iii. In cases where there is a difference of opinion as to the value of any stage, the opinion of the Engineer shall prevail and interim payments shall be made to the Contractor on this basis; provided that the foregoing shall be without prejudice to the Contractor's right to raise a Dispute. iv. The Engineer may, for reasons to be recorded, withhold from payment: <ul style="list-style-type: none"> (a) the estimated value of work or obligation that the Contractor has failed to perform in accordance with this Agreement and in respect of which the Engineer had notified the Contractor; and (b) the estimated cost of rectification of any Works which have not been constructed in accordance with this Agreement. v. Payment by the Employer shall not be deemed to indicate the Employer's acceptance, approval, consent or satisfaction with the work done. vi. In the event the amounts released by the Employer under para 5 (i) exceed the amount finally determined by the Engineer pursuant to para 5 (ii) to para 5 (iv), the difference thereof shall be accounted for in the next IPC. <p>Time Of Payment</p> <p>The Employer shall pay to the Contractor any amount due under any payment certificate issued by the Engineer in accordance with the provisions of the contract.</p> <p>37.1 Application For Interim Payment Certificates</p> <p>Payments shall be adjusted for deductions for advance payments other than recoveries in terms of contract and taxes, at source as applicable under law. The Contractor shall be liable to pay liquidated damages for shortfall in progress. Items of the Works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.</p> <p>The Contractor shall submit a Statement in six copies to the Engineer in accordance with the payment procedure specified by the Engineer, after the end of each month, in a form approved by the Engineer, showing in detail the amounts to which the Contractor considers himself to be entitled, together with supporting documents which shall include the report on the progress during this month in accordance with New-Clause 4.39/PCC [Progress Reports] and Record Measurement Sheets.</p> <p>The Statement shall include the following items, as applicable, which shall be expressed in the</p>

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	<p>various currencies in which the Contract Price is payable, in the sequence listed:</p> <ul style="list-style-type: none"> (a) the estimated contract value of the Works executed and the Contractor's Documents produced up to the end of the month (including Variations but excluding items described in sub-paragraphs (b) to (g) below); (b) any amounts to be added and deducted for changes in legislation and changes in cost, in accordance with Sub-Clause 34.7/PCC [Adjustments for Changes in Legislation] and Sub-Clause PVC/Contract Data [Adjustments for Changes in Cost]; (c) any amount to be deducted for retention, calculated by applying the percentage of retention stated in the New clause 4.20: Security deposit of PCC/section 7) to the total of the above amounts, until the amount so retained by the Employer reaches the limit of Retention Money (if any) stated in the Contract Data; (d) Any amounts to be added and deducted for the advance payments and repayments in accordance with sub clause 42.0/PCC [Advance Payment]; (e) any amounts to be added and deducted for Materials in accordance with New-Clause 13/PCC [Materials intended for the Works]; (f) any other additions or deductions which may have become due under the Contract or otherwise, including those under Clause 56.1/SCC [Claims, Disputes and Arbitration]; and (g) the deduction of amounts certified in all previous Payment Certificates. (h) for invoicing as per GST Laws, the estimated contract value of the Works executed in terms of (a) above and any amounts added or deducted as per (b) to (g) above is to be broken up in two components i.e. (i) the base amount excluding GST (ii) GST component (calculated at the rate for works contract service as per GST Laws). (i) Statement of interim payments certificates should be submitted by the Contractor to the Engineer by the 7th day of each month for the work executed upto the end of the previous month. (j) An amount to be deducted for the payments to be made to different Departments towards payments liable to be made by the Contractor <p>37.2 Schedule Of Payments</p> <p>If the Contract includes a schedule of payments specifying the installments in which the Contract Price will be paid, then unless otherwise stated in this schedule:</p> <ul style="list-style-type: none"> (a) the installments quoted in this schedule of payments shall be the estimated contract values for the purposes of sub-paragraph (a) of Sub-Clause 37.1/PCC [Application for Interim Payment Certificates]; (b) New-Clause 13/PCC [Provisional payment against material at site] shall not apply; and (c) if these installments are not defined by reference to the actual progress achieved in executing the Works, and if actual progress is found to be less than that on which this schedule of payments was based, then the Engineer may proceed in accordance with New-Clause 3.5/PCC [Determinations] to agree or determine revised installments, which shall take account of the extent to which progress is less than that on which the installments were previously based. <p>If the Contract does not include a schedule of payments, the Contractor shall submit non-binding estimates of the payments which he expects to become due during each quarterly period. The first estimate shall be submitted within 28 days after the Commencement Date. Revised estimates shall be submitted at quarterly intervals, until the Taking-Over Certificate has been issued for the Works.</p>

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	<p>37.3 Issue Of Interim Payment Certificates</p> <p>No amount will be certified or paid until the employer has received and approved the performance security. Thereafter, within 10 (ten) days of receipt of the bill from the contractor, the Engineer shall broadly determine the amount due to the contractor releasing 80% of the amount. After preliminary scrutiny and certifications by the Engineer, Payment of 80% of the certified net payment due (after recoveries and deductions), will be made by the Employer within 10 working days of receiving a statement and supporting documents from the Engineer.</p> <p>The remaining 20% of the bill shall be recommended by Engineer after detail scrutiny and subsequent comments within 30 days of receipt of the bill from the contractor. After the submission of bill from the Engineer to the Employer, remaining 20% amount: of the bill shall be released within 15 working days by Employer. Any discrepancy shall be rectified in the next payment to the contractor.</p> <p>However, prior to issuing the Taking-Over Certificate for the Works, the Engineer shall not be bound to issue the Interim Payment Certificate in an amount which would (after retention and other deductions) be less than the minimum amount of Interim Payment Certificates (if any) stated in the Contract Data. In this event, the Engineer shall give notice to the Contractor accordingly.</p> <p>An Interim Payment Certificate shall not be withheld for any other reason, although:</p> <ul style="list-style-type: none"> (a) if anything supplied or work done by the Contractor is not in accordance with the Contract, the cost of rectification or replacement may be withheld until rectification or replacement has been completed; and/or (b) if the Contractor was or is failing to perform any work or obligation in accordance with the Contract, and had been so notified by the Engineer, the value of this work or obligation may be withheld until the work or obligation has been performed. <p>The Engineer may in any Payment Certificate make any correction or modification that should properly be made to any previous Payment Certificate. A Payment Certificate shall not be deemed to indicate the Engineer's acceptance, approval, consent or satisfaction.</p> <p>37.4 Payment</p> <p>The Employer shall pay to the Contractor:</p> <ul style="list-style-type: none"> (a) The first Installment of the advance payment within 28 (Twenty-eight) days after signing the contract agreement or 21 days after receiving the documents in accordance with new clause 4.19/PCC (Performance Security) and sub clause 42.0/PCC (Advance Payment) whichever is later; (b) (i) Within 10 (ten) days of receipt of the bill from the Contractor, the Engineer shall broadly determine the amount due to the Contractor and recommend releasing 80% of the amount. After preliminary scrutiny and certifications by the Engineer, payment of 80% of the certified net payment due (after recoveries and deductions), will be made by the Employer within 10 (ten) working days of receiving a statement and supporting documents from the Engineer subject to the condition that last interim payment certificate has been settled after detailed check. In the event of the contractor submitting bills based on false measurements, the Employer will issue a written warning to Contractor and the Engineer to the effect that the facility of 80% payment without detailed check will be withdrawn in future. If the Contractor repeats the misconduct this facility will be withdrawn as decided by the Employer. The decision of the representative of the Employer is final in this regard. (ii) The remaining 20% of the bill shall be recommended by Engineer after detail scrutiny and subsequent comments within 30 (thirty) days of receipt of the bill from the contractor. After the submission of bill from the Engineer to the Employer, remaining 20% amount of the bill shall be released within 15 (fifteen) working days by Employer. Any discrepancy shall be

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	<p>rectified in the next payment to the contractor; and</p> <p>(c) the amount certified in the Final Payment Certificate within 56 days after the Employer receives this Payment Certificate or, the undisputed amount shown in the Final Statement, within 56 days after the date of notification of the suspension.</p> <p>Payment of the amount due, unless specified in the Contract Data, shall be made in INR into the bank account, nominated by the Contractor.</p> <p>However, in case of JV, The Employer shall have the right to release payments solely to the Lead Member and shall not in any manner be responsible or liable for the internal allocation of payments among members of the Joint Venture.</p> <p>The said payment shall not alter any obligation of the JV and its individual Partners under the Agreement and their obligations under the agreement shall remain joint and several.</p> <p>A foreign company (either single entity or JV partner), shall have to submit proof of having opened their project office in India before any payment (including advance payment) is released to such a company. The required proof here shall be a copy of the report containing information as per format prescribed by Reserve Bank of India submitted to the Director General of Police (DGP) of the state concerned in which project office has been established.</p> <p>37.5 DELETED</p> <p>37.6 Delayed Payment</p> <p>If the Contractor does not receive payment in accordance with Sub-Clause 37.4/PCC [Payment], the Contractor shall be entitled to receive interest compounded monthly on the amount unpaid during the period of delay. This period shall be deemed to commence on the date for payment specified in Sub-Clause 37.4/PCC [Payment], irrespective (in the case of its sub-paragraph (b)) of the date on which any Interim Payment Certificate is issued.</p> <p>Unless otherwise stated in the Special Conditions of Contract, the interest amount be calculated at the annual rate of 7% (seven percent).</p> <p>The Contractor shall be entitled to this payment without formal notice or certification, and without prejudice to any other right or remedy, if the Contractor submits the complied (Fulfilled) documents.</p> <p>37.7 DELETED</p> <p>37.8 DELETED</p> <p>37.9 DELETED</p> <p>37.10 DELETED</p> <p>37.11 Statement At Completion</p> <p>Within 84 days after receiving the Taking-Over Certificate for the Works, the Contractor shall submit to the Employer/Engineer six copies of a Statement at completion with supporting documents, in accordance with Sub-Clause 37.7/PCC [Application for Interim Payment Certificates], showing:</p> <ul style="list-style-type: none"> (a) the value of all work done in accordance with the Contract up to the date stated in the Taking- Over Certificate for the Works, (b) any further sums which the Contractor considers to be due, and (c) an estimate of any other amounts which the Contractor considers will become due to him under the Contract. Estimated amounts shall be shown separately in this Statement at completion.

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	<p>The Engineer shall then certify in accordance with Sub-Clause 37.3/PCC [Issue of Interim Payment Certificates].</p> <p>Within 56 days after receiving the Performance Certificate, the Contractor shall submit, to the Engineer, six copies of a draft final statement as per procedure prescribed by the Employer / Engineer, with supporting documents showing in detail in a form approved by the Employer / Engineer:</p> <p>37.12 Application For Final Payment Certificate</p> <p>Within 56 days after receiving the Performance Certificate, the Contractor shall submit, to the Engineer, six copies of a draft final statement as per procedure prescribed by the Engineer, with supporting documents (including Contractor's certificate in terms of Sub-Clause 1.22/SCC showing in detail in a form approved by the Engineer:</p> <ul style="list-style-type: none"> (a) the value of all work done in accordance with the Contract, and (b) any further sums which the Contractor considers to be due to him under the Contract or otherwise. <p>If the Engineer disagrees with or cannot verify any part of the draft final statement, as per procedure prescribed by the Engineer the Contractor shall submit such further information as the Engineer may reasonably require and shall make such changes in the draft as may be agreed between them. The Contractor shall then prepare and submit to the Engineer the final statement as agreed. This agreed statement is referred to in these Conditions as the "Final Statement".</p> <p>However, if, following discussions between the Engineer and the Contractor and any changes to the draft final statement which are agreed, it becomes evident that a dispute exists, the Engineer shall deliver to the Employer (with a copy to the Contractor) an Interim Payment Certificate for the agreed parts of the draft final statement. Thereafter, if the dispute is finally resolved under Sub-Clause 56/SCC [Obtaining Dispute Board's Decision] or Sub-Clause 57/SCC [Amicable Settlement], the Contractor shall then prepare and submit to the Employer (with a copy to the Engineer) a Final Statement.</p> <p>37.13 Discharge</p> <p>When submitting the Final Statement, the Contractor shall submit a discharge which confirms that the total of the Final Statement represents full and final settlement of all moneys due to the Contractor under or in connection with the Contract. This discharge may state that it becomes effective when the Contractor has received the Performance Security and the outstanding balance of this total, in which event the discharge shall be effective on such date.</p> <p>37.14 Issue Of Final Payment Certificate</p> <p>Within 28 days after receiving the Final Statement and discharge in accordance with Sub-Clause 37.12/PCC [Application for Final Payment Certificate] and Sub-Clause 37.13/PCC [Discharge], the Engineer shall issue, to the Employer, the Final Payment Certificate which shall state:</p> <ul style="list-style-type: none"> (a) the amount which he fairly determines is finally due, and (b) after giving credit to the Employer for all amounts previously paid by the Employer and for all sums to which the Employer is entitled, the balance (if any) due from the Employer to the Contractor or from the Contractor to the Employer, as the case may be. <p>If the Contractor has not applied for a Final Payment Certificate in accordance with Sub-Clause 37.12/PCC [Application for Final Payment Certificate] and Sub-Clause 37.13/PCC [Discharge], the Engineer shall request the Contractor to do so. If the Contractor fails to submit an application within a period of 28 days, the Engineer shall issue the Final Payment Certificate for such amount as he fairly determines to be due and submit to the Employer.</p>

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	<p>37.15 Cessation Of Employer's Liability</p> <p>The Employer shall not be liable to the Contractor for any matter or thing under or in connection with the Contract or execution of the Works, except to the extent that the Contractor shall have included an amount expressly for it:</p> <ul style="list-style-type: none"> (a) in the Final Statement and (b) in the Statement at completion described in Sub-Clause 37.11/PCC [Statement at Completion] (except for matters or things arising after the issue of the Taking-Over Certificate for the Works). <p>However, this Sub-Clause shall not limit the Employer's liability under his indemnification obligations, or the Employer's liability in any case of fraud, deliberate default, or reckless misconduct by the Employer.</p> <p>37.16 Currencies Of Payment</p> <ul style="list-style-type: none"> a) The Contract Price shall be paid in Indian Rupees (INR) only. <p>37.17 Tax Deduction At Source (TDS):</p> <p>Tax deductions will be made at source as per statutory requirement from every payment made to the Contractor at rates notified from time to time.</p> <ul style="list-style-type: none"> i. Tax deduction at source (TDS): Income Tax/ TDS on GST deduction shall be as per law. ii. Labour Cess & Royalties: The labour Cess & Royalties will be deducted as per norms of applicable law from each IPCs and remitted to the respective Authorities <p>37.18 Production Of Vouchers</p> <ul style="list-style-type: none"> a. The Contractor shall, whenever required by the Employer / Engineer, produce or cause to be produced for examination by the Engineer, any quotation, invoice, cost or other account books, vouchers, receipts, letters, memoranda or any copy of or extract from any such documents and also furnish information and returns, as may be required, relating to the execution of this Contract or relevant for verifying or ascertaining the cost of execution of this Contract or ascertaining the Materials supplied by the Contractor are in accordance with the Specifications laid down in the Contract. The Engineer's decision on the question of relevancy of any documents, information or returns shall be final and binding on the parties. b. If any part or item of the Work is allowed to be carried out by a Sub-Contractor, assignee or any subsidiary or allied firm, the Engineer shall have power to secure the books of such Sub-Contractor, assignee or any subsidiary or allied firm through the Contractor, and shall have power to examine and inspect the same. The above obligations are without prejudice to the obligations of the Contractor under any statute, rules or orders. <p>37.19 Withholding And Lien For Sums Claimed</p> <ul style="list-style-type: none"> (i) The Employer shall have lien on and over all materials of every description, tools, tackles, plant, equipment, or any amount due and/or that may become due and payable to the Contractor under the Contract, and / or on and over the deposit of Performance Security or other amount or amounts made under the Contract and which may become payable to the Contractor. Employer may exercise a general lien also. (ii) And further, unless the Contractor pays and clears immediately on demand any claim of the Employer, the Employer shall at all times be entitled to deduct the amount of the said claim from the amount, securities and / or deposits which may have become or will become payable to the Contractor under the existing contract, or under any other Contract or transaction whatsoever between the Employer and the Contractor even if the matter

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	<p>stands referred to Arbitration. The Contractor shall have no claim for any interest or damage whatsoever in respect of any amounts withheld or treated as withheld under the lien referred to above and duly notified as such to the Contractor.</p> <p>37.20 Signature On Receipts For Payments</p> <p>Every receipt of payment to Contractor including refund of the Performance Security shall be signed by the person authorized to do so on his behalf. In the event of death of any of the Contractor's partners in case the Contractor is a partnership firm, during the currency of the Contract, it is hereby expressly agreed that every receipt by any one of surviving Contractor's partners, shall, if so signed as aforesaid, be a good and sufficient discharge as aforesaid, provided that nothing in this Clause shall be deemed to prejudice or affect any claim, which the Employer may hereafter have against the legal representatives of any Contractor's partner so dying, for or in respect of breach of any of the conditions of the Contract. Provided also that nothing contained in this clause shall be deemed to prejudice or affect the respective rights and obligations of the Contractor's partners, or of the legal heirs / representatives of any deceased Contractor / partner interest.</p> <p>37.21 Post Payment Audit</p> <p>It is an agreed term of the Contract, that the Employer reserves to himself the right to carry out a post payment audit and / or technical examination of the Works, and the Final bill including all supporting vouchers, abstracts, etc., and to make a claim on the Contractor for the refund of any excess amount paid to him, if as a result of such examination, any over-payment to him is discovered to have been made in respect of any work done or alleged to have been done by the Contractor, under the Contract. If any under-payment is discovered, the same shall be paid by the Employer to the Contractor. Such payments or recoveries, however, shall not carry any interest.</p> <p>37.22 Recovery Of Money Due To The Employer</p> <p>All damages (including, without limitation, liquidated damages), costs, charges, expenses, debts, or sums for which the Contractor is liable to the Employer under any provision of the Contract may be deducted by the Employer from amount due to the Contractor under the Contract including, without limitation, and the Employer shall have the power to recover any balance not so deducted from amount due to the Contractor under any other contract between the Employer and the Contractor</p> <p>When the Contractor has assigned to a third party the right to receive amount due, or, to become due, under the Contract to the Contractor or charged such amount in favor of a third party, the Employer's right to deduct damages (including without limitation liquidated damages), costs, charges, expenses, debts or sums for which the Contractor is liable to the Employer from amount due to the Contractor under the Contract shall be limited to the right expressed above.</p>
<p>CLAUSE-38/CC</p>	<p>DELETED.</p>
<p>CLAUSE-40/CC PRICE ADJUSTMENT</p>	<p>The Following Paras Are Added To The Existing Cc Clauses.</p> <p>40.1 Contract Price</p> <ol style="list-style-type: none"> 1. The Employer shall make payments to the Contractor for the Works on the basis of the lump sum price accepted by the Employer in consideration of the obligations specified in this Agreement, which shall be subject to adjustments in accordance with the provisions of this Agreement. The Parties further agree that save and except as provided in this Agreement, the Contract Price shall be valid and effective until issue of Completion Certificate. 2. The Contract Price includes all duties, taxes, royalty, and fees that may be levied in accordance with the laws and regulations in force as on the Base Date on the Contractor's equipment, Plant, Materials, and supplies acquired for the purpose of this Agreement and

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	<p>on the on the Works undertaken under this Agreement. Nothing in this Agreement shall relieve the Contractor from its responsibility to pay any tax including any tax that may be levied in India on profits made by it in respect of this Agreement.</p> <p>3 The Contract Price shall not be adjusted to take account of any unforeseen difficulties or costs, unless otherwise provided for in this Agreement.</p> <p>4 Unless otherwise specified in this Agreement, the Contract Price covers all the Contractor's obligations for the Works under this Agreement and all things necessary for the Construction thereof and for the rectification of any Defects in the Railway Project.</p> <p>5 All payments under this Agreement shall be made in Indian Rupees.</p> <p>Unless otherwise stated in the Special Conditions of Contract:</p> <p>(a) the Contract Price shall be agreed or determined under Clause 34.3/PCC [Payment for Variation] and be subject to adjustments in accordance with the Contract;</p> <p>(b) the Contractor shall pay all taxes, duties and fees required to be paid by him under the Contract, and the Contract Price shall not be adjusted for any of these costs except as stated in Sub-Clause 34.7/PCC [Adjustments for Changes in Legislation];</p> <p>(c) any quantities which may be set out in the Price schedule or other Schedule are estimated quantities and are not to be taken as the actual and final quantities:</p> <p style="padding-left: 40px;">(i) of the Works which the Contractor is required to execute, or</p> <p style="padding-left: 40px;">(ii) for the purposes of New-Clause 7/PCC [Measurement and Evaluation]; and</p> <p>(d) the Contractor shall submit to the Engineer, within 28 days after the Commencement Date, a proposed breakdown of each lump sum price in the Schedules, if applicable. The Engineer may take account of the breakdown when preparing Payment Certificates, but shall not be bound by it.</p> <p>(e) It may be noted that in the event of the Contractor not making the due payments stated in sub-clause (b) above, and the concerned party puts up a claim with the Employer / Engineer, then the Employer / Engineer may make such payments and deduct the same from the sums due to the Contractor.</p> <p>40.1.6 Change In Law</p> <p>Change in Law means the occurrence or coming into force of the following, at any time after the last Date of submission of tender:</p> <p>Any new Central and State Taxes, duties, cess, levies, which is imposed or any existing Central and State Taxes, duties, cess, levies & royalties are withdrawn after the due date of submission of tender and which impacts the performance of the contractor with increased cost, or which results in extra financial gains to the contractor due to decreased cost in execution of contract. Such additional or reduced cost shall be certified by the Engineer after examining records provided by the contractor and shall be paid by or credited to the employer.</p> <p>Change in the rate of any existing tax (Including GST) will be considered as change in law and additional or the reduced cost shall be paid by or credited to the Employer, as the case may be.</p>
<p>CLAUSE 42/CC ADVANCE PAYMENT</p>	<p>The Following Paras Are Replaced To The Existing 42/CC Clauses.</p> <p>Advance Payment:</p> <p>42.1 Mobilization Advance</p> <p>The Employer shall make payment, as an Interest-bearing advance for mobilization, when the Contractor submits a guarantee in accordance with this Sub-Clause. The total advance payment, the number and timing of instalments (if more than one), and the applicable currencies and</p>

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	<p>proportions, shall be as stated in the Contract Data.</p> <p>Unless and until the Employer receives this guarantee, or if the total advance payment is not stated in the Contract Data, this Sub-Clause shall not apply.</p> <p>The Engineer shall issue an interim payment certificate for the first installment of mobilization advance after receiving an application for advance payment (under sub clause 37.1/PCC [Application for Interim Payment Certificates]) and after the Employer receives</p> <p>(i) The Performance Security in accordance with New-Clause 4.19/PCC [Performance Security] and</p> <p>(ii) A guarantee in amounts and currencies equal to the advance payment plus 10%. The next installment shall be released only when the contractor submits statement of having utilized the previous installment of mobilization advance and the Employer is satisfied that the utilization has been done in purposeful manner.</p> <p>The Mobilization Advance shall be interest bearing and secured by BG equivalent to 110% of the advance amount</p> <p>Mobilization advance payment: Comprises of the percentage of Accepted Contract Amount payable in the currencies and proportions in which the Accepted Contract Amount is payable and in installments as mentioned below;</p> <table border="1"> <thead> <tr> <th>Mobilisation Advance</th> <th>Instalments</th> </tr> </thead> <tbody> <tr> <td>As per request of the Contractor subject to a maximum of 5%</td> <td>Two Equal Instalments (maximum 2.5% each)</td> </tr> </tbody> </table> <p>Timing of Mobilization Advance Payment: First Installment of the advance payment within 28 (Twenty-eight) days after signing the contract agreement or 21 days after receiving the documents in accordance with new clause 4.19/PCC (Performance Security) and sub clause 42.0/PCC (Advance Payment) whichever is later.</p> <p>Second Installment shall be released only when the contractor submits statement of having utilized the First Installment of mobilization Advance and the Employer is satisfied that the utilization has been done in purposeful manner. This shall be released within 21 days from the date of receipt of Bank guarantee acceptable to the Employer.</p> <p>Interest on Advance Payment: At the rate of SBI MCLR+2% interest per annum on reducing balances. The Interest rate is applicable from the date of submission of IPC / advance request by contractor.</p> <p>42.2 Advance Against Plant And Machinery</p> <p>This advance is payable in Indian Rupees/respective currencies as quoted in the Tender and accepted by the Employer against plant, equipment and machinery, provided the same have reached the site, or in the case of new items meant specifically for the works, firm purchase order has been placed and the in the name of Contractor. The plant and machinery shall be valued by the Engineer as follows:</p> <p>(a) New items: 80% of purchase price</p> <p>(b) Used items in working order: 80% of the depreciated value as assessed by the Engineer</p> <p>(c) Items valued at less than Rs. 1,000,000 (₹. One million) per unit: Not to be considered</p> <p>The total advance for Plant and Machinery shall be limited to 10% of the Contract Price and will carry an interest rate of SBI MCLR +2% interest per annum on reducing balances. The Interest rate is applicable from the date of submission of IPC / advance request by contractor It will be paid against submission of Bank Guarantees for 110% of advance value for each stage of advance to</p>	Mobilisation Advance	Instalments	As per request of the Contractor subject to a maximum of 5%	Two Equal Instalments (maximum 2.5% each)
Mobilisation Advance	Instalments				
As per request of the Contractor subject to a maximum of 5%	Two Equal Instalments (maximum 2.5% each)				

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	<p>be given by each member of the consortium/JV in proportion to their participation as per format given in section 10: Formats, from an Indian Schedule bank (excluding Cooperative Banks) or from a schedule Foreign Bank as defined in Section 2l of RBI Act 1934 read with Second Schedule. All bank Guarantees should be payable in Bengaluru at the designated branch. The Plant and Machinery Advance shall be interest bearing and secured by BG equivalent to 110% of the advance amount.</p> <p>The Contractor should give an Undertaking that “No advance/loan has been taken against the subject plant & machinery from any other individual/financial institution/ mobilization etc.” If a wrong/false undertaking is given, all the BGs can be forfeited and the contract is liable for termination under clause 49 of CC/PCC.</p> <p>The Advance against Plant and Machinery will be paid within 30 days after receipt of the Contractor’s written request by the Employer which is recommended by the Engineer and submission of Bank Guarantees for procurement of plant and machinery.</p> <p>Wherever Bank Guarantee or any other instrument is to be extended or fresh BG to be obtained, the cost towards getting extension of BG or fresh BG and other incidental charges will be on Contractor’s account.</p> <p>The Contractor</p> <ul style="list-style-type: none"> i. Shall submit the invoice and RC book (wherever applicable) in original, at the time of obtaining advance amount. ii. Shall furnish all four Bank Guarantees one time as per Condition of Contract. iii. Shall execute an Indemnity bond in favor of an Employer as against Third Party claim. iv. Shall not seek the possession of machinery brought to the site till the Advance obtained from Employer is fully settled. <p>The machinery and equipment brought to the site shall be exclusively intended for the execution of the work of Employer and shall not be removed without the consent of the Engineer and same shall be available at project site till completion of the work.</p> <p>The Contractor shall indemnify and hold harmless, the Employer against all actions, suits, proceedings, claims, damages, losses, expenses, demands pertaining to Advance amount towards plant and machinery.</p> <p>The Contractor shall not remove any Equipment or Machinery from the site without the prior permission of the Engineer.</p> <p>The Contractor</p> <ul style="list-style-type: none"> a) Shall not mortgage/create charge/hypothecate/encumber, in any way the machineries and equipment brought to site from the amounts advanced by Employer and shall give an undertaking in writing to that effect in favor of Employer. b) Shall not sell or alienate any part/portion of machinery and equipment without the consent of Employer. c) In the event of any such sale/alienation of any portion or part of machinery, Employer shall hold First Charge and the proceeds of such sale or alienation shall be appropriated towards the loan/ credit/ advance in respect of plant and machinery brought to the site by contractor. d) All Materials and Plants shall, upon their incorporation into Works, be free from any and all Encumbrances without the Employer being required to make any payment to any person on account of any costs, compensation, expenses and charges for such Materials, Plants and Works. <p>42.3 Guarantees</p>

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	<p>Advances as mentioned in sub-clauses 42.1/PCC above, shall be payable against acceptable Bank Guarantees from banks as specified in New-clause 4.19/PCC. The guarantees shall be in the form as given in Section 10 (Contract Forms) or in another form approved by the Employer. The Contractor shall ensure that the guarantees are valid and enforceable until the advance amount paid as has been repaid, but its amount may be progressively reduced by the amount repaid by the Contractor as indicated in the Payment Certificates. If the terms of the guarantee specify its expiry date, and the advance payment has not been repaid by the date 28 days prior to the expiry date, the Contractor shall extend the validity of the guarantee until the advance payment has been repaid.</p> <p>42.4 Recovery Of Advances</p> <p>Unless stated otherwise in the Contract Data, the advance payment shall be repaid through percentage deductions from the interim payments determined by the Engineer in accordance with Sub-Clause 37.3/PCC [Issue of Interim Payment Certificates], as follows:</p> <p>(a) deductions shall commence in the next interim Payment Certificate following that in which the total of all certified interim payments (excluding the advance payment) exceeds 15 percent of the Accepted Contract Amount Less Provisional Sums or passage of six months from the date of release of first advance payment, whichever is earlier; and</p> <p>(b) deductions shall be made for accrued interest on the advance up to the month and advance at the rate stated in the Contract Data of the amount of each Interim Payment Certificate (excluding the advance payment and deductions and repayments of retention) in the currencies and proportions of the advance payment until such time as the advance payment and accrued interest has been repaid; provided that the advance payment and accrued interest shall be completely repaid prior to the time when 85 percent of the Accepted Contract Amount has been certified for payment. If the amount of interim payment certificate is not sufficient for recovery of accrued interest or in the opinion of the Employer satisfactory progress is not being achieved by the contractor, then the contractor will have to deposit the accrued interest and return the mobilization advance in part or in full as demanded by the Employer, failing which Employer shall have the right to encash the Bank Guarantee(s)</p> <p>The contractor shall always have the option to start repayment earlier and/or to complete the repayment earlier than the due date.</p> <p>If the advance payment has not been repaid prior to the issue of the Taking-Over Certificate for the Works or prior to termination under Clause 49.0/PCC [Termination by Employer] or New-Clause 8/PCC [Force Majeure] (as the case may be), the whole of the balance then outstanding shall immediately become due and payable by the Contractor to the Employer.</p> <p>42.5 Repayment Rate Of Advance Payment:</p> <p>10% (Ten percent) of the amount of each running account bill payment.</p> <p>42.6 Advances To Be Used Only For This Work</p> <p>The advances shall be used by the Contractor strictly for the purpose of the Contract, and for the purpose for which they are paid. Under no circumstances, shall the advances be diverted for other purposes. Any such diversion shall be construed as a breach of the Contract and the Contractor shall be asked to return the advance at once and pay interest at 15% per annum till the advance is recovered back from him. The Contractor shall return the advance and pay the interest in one go without demur.</p> <p>Employer retains the right for any other remedy prescribed for breach of Contract in this regard.</p> <p>The Contractor, if required by the Engineer shall provide the details of Utilisation of Mobilisation advance.</p> <p>42.7 If the Advance Payment has not been fully repaid prior to Termination under Force majeure</p>

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	<p>event or termination Clause, as the case may be, the whole of the balance then outstanding shall immediately become due and payable by the Contractor to the Employer. In the event of Termination for Contractor Default, the Advance Payment shall be deemed to carry interest at an annual rate of SBI MCLR+2% from the date of Advance Payment to the date of recovery by encashment of bank guarantee for the Advance Payment. For the avoidance of doubt, the aforesaid interest shall be payable on each instalment of the Advance Payment, regardless of whether the instalment or any part thereof has been repaid to the Employer prior to Termination.</p>
<p>CLAUSE 46/CC TAKING OVER</p>	<p>The Clause 46 Of Cc Replaced With The Following Paras.</p> <p>Employer Taking Over</p> <p>46.1 Taking Over of The Works And Sections</p> <p>The Employer shall take over the Site and the Works within after issuing a certificate of Completion. Except as stated in Sub-Clause 30.5/PCC [Failure to Pass Tests on Completion], the Works shall be taken over by the Employer/Railway when the Works have been completed in accordance with the Contract, including the matters described in Sub-Clause 26.4/PCC [Time for Completion] and except as allowed in sub-paragraph (a) below, and</p> <p>(ii) a Taking-Over Certificate for the Works has been issued, or is deemed to have been issued in accordance with this Sub-Clause.</p> <p>The Contractor may apply by notice to the Engineer for a Taking-Over Certificate not earlier than 14 days before the Works will, in the Contractor's opinion, be complete and ready for taking over. If the Works are divided into Sections, the Contractor may similarly apply for a Taking-Over Certificate for each Section.</p> <p>In case the works are to be taken over in accordance with sub-clause 30.6/PCC, the completed works will be taken over by K-RIDE.</p> <p>The Engineer shall, within 28 days after receiving the Contractor's application:</p> <p>(a) issue the Taking-Over Certificate to the Contractor, stating the date on which the Works or Section were completed in accordance with the Contract, except for any minor outstanding work and defects which will not substantially affect the use of the Works or Section for their intended purpose (either until or whilst this work is completed, and these defects are remedied); or</p> <p>(b) reject the application, giving reasons and specifying the work required to be done by the Contractor to enable the Taking-Over Certificate to be issued. The Contractor shall then complete this work before issuing a further notice under this Sub-Clause.</p> <p>If the Engineer fails either to issue the Taking-Over Certificate or to reject the Contractor's application within the period of 28 days, and if the Works or Section (as the case may be) are substantially in accordance with the Contract, the Taking-Over Certificate shall be deemed to have been issued on the last day of that period.</p> <p>46.2 Taking Over Of Parts Of The Works</p> <p>The Engineer may, at the sole discretion of the Employer, issue a Taking-Over Certificate for any part of the Permanent Works.</p> <p>The Employer shall not use any part of the Works (other than as a temporary measure which is either specified in the Contract or agreed by both Parties) unless and until the Engineer has issued a Taking-Over Certificate for this part. However, if the Employer does use any part of the Works before the Taking-Over Certificate is issued:</p> <p>(a) the part which is used shall be deemed to have been taken over as from the date on which it is used,</p>

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	<p>(b) the Contractor shall cease to be liable for the care of such part as from this date, when responsibility shall pass to the Employer, and</p> <p>(c) if requested by the Contractor, the Engineer shall issue a Taking-Over Certificate for this part.</p> <p>After the Engineer has issued a Taking-Over Certificate for a part of the Works, the Contractor shall be given the earliest opportunity to take such steps as may be necessary to carry out any outstanding Tests on Completion. The Contractor shall carry out these Tests on Completion as soon as practicable before the expiry date of the relevant Defects Notification Period.</p> <p>If the Contractor incurs Cost as a result of the Employer taking over and/or using a part of the Works, other than such use as is specified in the Contract or agreed by the Contractor, the Contractor shall (i) give notice to the Engineer and (ii) be entitled subject to Sub-Clause 56.1/SCC [Contractor's Claims] to payment of any such Cost, which shall be included in the Contract Price. After receiving this notice, the Engineer shall proceed in accordance with New—Clause 3.5/PCC [Determinations] to agree or determine this Cost and profit.</p> <p>If a Taking-Over Certificate has been issued for a part of the Works (other than a Section), the delay damages thereafter for completion of the remainder of the Works shall be reduced. Similarly, the delay damages for the remainder of the Section (if any) in which this part is included shall also be reduced. For any period of delay after the date stated in this Taking-Over Certificate, the proportional reduction in these delay damages shall be calculated as the proportion which the value of the part so certified bears to the value of the Works or Section (as the case may be) as a whole. The Engineer shall proceed in accordance with New-Clause 3.5/PCC [Determinations] to agree or determine these proportions. The provisions of this paragraph shall only apply to the daily rate of delay damages under Sub-Clause 26.8/PCC [Delay Damages], and shall not affect the maximum amount of these damages.</p> <p>46.3 Interference With Tests On Completion</p> <p>If the Contractor is prevented, for more than 14 days, from carrying out the Tests on Completion by a cause for which the Employer/Engineer/other Contractors of the Employer, are responsible, the Employer shall be deemed to have taken over the Works or Section (as the case may be) on the date when the Tests on Completion would otherwise have been completed.</p> <p>The Engineer shall then issue a Taking-Over Certificate accordingly, and the Contractor shall carry out the Tests on Completion as soon as practicable, before the expiry date of the Defects Notification Period. The Engineer shall require the Tests on Completion to be carried out by giving 14 days' notice and in accordance with the relevant provisions of the Contract.</p> <p>If the Contractor suffers delay and/or incurs Cost as a result of this delay in carrying out the Tests on Completion, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 56.1/SCC [Contractor's Claims] to:</p> <ul style="list-style-type: none"> (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 26.5/PCC [Extension of Time for Completion], and (b) payment of any such Cost, which shall be included in the Contract Price. <p>After receiving this notice, the Engineer shall proceed in accordance with New-Clause 3.5/PCC [Determinations] to agree or determine these matters.</p> <p>46.4 Surfaces Requiring Reinstatement</p> <p>Except as otherwise stated in a Taking-Over Certificate, a certificate for a Section or part of the Works shall not be deemed to certify completion of any ground or other surfaces requiring reinstatement.</p>
CLAUSE-49/CC	The Following Paras Are Added To The Existing Cc Clauses.

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TERMINATION	<p>Termination By Employer</p> <p>49.6 Notice To Correct/Notice Of Termination</p> <p>If the Contractor fails to carry out any obligation under the Contract as mentioned below, but not limited to the obligations mentioned herein below, the Employer may serve the contractor with a 14 days' notice in writing calling upon the Contractor to make good the failure and to remedy it. If the Contractor;</p> <ul style="list-style-type: none"> (a) fails to comply with New-Clause 4.19/PCC [Performance Security], (b) abandons the Works or otherwise plainly demonstrates the intention not to continue performance of his obligations under the Contract, (c) without reasonable excuse fails to: <ul style="list-style-type: none"> (i) proceed with the Works in accordance with Clause 26/CC/PCC [Commencement, Delays and Suspension], or (ii) comply with a notice issued under New-Clause 5.5 [Rejection] or New-Clause 5.6/PCC [Remedial Work], within 28 days after receiving it, or (iii) adhere to the agreed programme of work / activity on the critical path, by a margin of 10% of the stipulated period, or (iv) take steps to deploy competent and adequate number of personnel, and equipment to achieve progress as per agreed programme or (v) adhere to the instructions of Engineer/Employer persistently or (vi) comply any provision of the contract or (vii) provide the Engineer/Employer or their representative proper facilities for inspecting the works or any part thereof as required, under New-Clause 5.3/PCC (Inspection) and New-clause 5.4/PCC (Testing). (d) subcontracts the whole or major part of the Works or assigns the Contract without prior written consent of the Employer., <p>If the Contractor does not, within 14 days of receipt of notice under this sub-clause, proceed to make good his default in so far as the same is capable of being made good and carry on the work of complying with such direction as contained in the notice under sub clause 49.6/PCC to the entire satisfaction of the Engineer/Employer, the Employer shall be entitled to take action under sub-clause 49.6/PCC, 49.7/PCC below,</p> <p>In case of Contractor's repeated failure to adhere to the agreed program, and whereas the contractor has been served with a Notice to Correct under Clause 49.6 of PCC, if the Contractor approaches K-RIDE with a revised program with specific monthly physical and financial targets along with the proposal to deploy matching inputs in the form of manpower and other resources to the satisfaction of the Employer, then the Employer may consider whether to proceed with termination of the contract under Clause 49.7/PCC or to continue with the contract. However, the request to continue with the contract shall only be considered if the Contractor supports his earnestness to adhere to the revised program by submitting additional Performance Security in the form of Bank Guarantee(s) of specified number and value as decided by the Employer (total value of which will not exceed 10% of the contract price). The encashment of these additional Bank Guarantee(s) shall be linked with the non-achievement of agreed physical/financial targets agreed upon by the Contractor and the Employer.</p> <p>In case the Contractor's failure is limited to only some of the works, and in response to Notice to Correct under Clause 49.6 of PCC, the contractor approaches the Employer that such works may be offloaded from him and got executed through another agency and additional cost incurred, if any, should be recovered from his dues, the Employer, on being convinced that the anticipated</p>

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	<p>additional cost for such works will not be substantial and can be recovered from the dues of the contractor and that such offloading will help in improving the overall progress of the project, may agree to such offloading without any repercussion on the performance security and/or additional bank guarantees, if any, submitted by the contractor. However, the Employer will not be under any compulsion to agree to such a request. The Contractor shall be informed of the LOA issued to other agency(ies) for such works.</p> <p>In case the Contractor does not approach the Employer for offloading but the Employer is convinced that:</p> <ul style="list-style-type: none"> (i) offloading of some works will help in improving the progress of the project; (ii) termination/part termination of the contract at this stage will not be in the interest of the project; (iii) the anticipated additional cost for such works will not be substantial and can be recovered from the dues of the Contractor; <p>The Employer may issue 7 days' notice to the Contractor stating the resources required to be deployed against each work. If the Contractor fails to deploy the required resources as indicated in the notice, the employer shall offload such works and proceed with getting the works executed through other agency(ies). The Contractor shall be informed of the LOA issued to other agency(ies) for such works.</p> <p>Offloading under the sub clause 49.6/PCC shall be without any repercussion on the performance security and/or additional bank guarantees, if any, submitted by the contractor. The Contractor would have no future claim on this account and the extra expenditure so incurred, if any, by the Employer in getting the offloaded work done, shall be recovered from subsequent payment certificates or any other dues of the Contractor</p> <p>49.7 Termination By Employer</p> <p>The Employer shall be entitled to terminate the Contract as a whole or any part or parts (as may be specified in the Notice of Termination under any of the above Sub-Clause issue) if the Contractor:</p> <ul style="list-style-type: none"> (a) fails to comply with the directions contained in the notice under Sub-Clause 49.6/PCC [Notice to Correct/ Notice of Termination], (b) becomes bankrupt or insolvent, goes into liquidation, has a receiving or administration order made against it by Court or Statutory Authority him, compounds with his creditors, or carries on business under a receiver, trustee, or manager for the benefit of his creditors, or if any act is done or event occurs which (under applicable Laws) has a similar effect to any of these acts or events, or (c) gives or offers to give (directly or indirectly) to any person any bribe, gift, gratuity, commission or other thing of value, as an inducement or reward: <ul style="list-style-type: none"> (i) for doing or forbearing to do any action in relation to the Contract, or (ii) for showing or forbearing to show favor or disfavor to any person in relation to the Contract, <p>or if any of the Contractor's Personnel, agents or Subcontractors gives or offers to give (directly or indirectly) to any person any such inducement or reward as is described in this sub-paragraph I. However, lawful inducements and rewards to Contractor's Personnel shall not entitle termination.</p> <ul style="list-style-type: none"> (d) a resolution for winding up of the Contractor is passed, or any petition for winding up of the Contractor is admitted by a court of competent jurisdiction and a provisional liquidator or receiver is appointed and such order has not been set aside within 90 (ninety) days of the date thereof or the Contractor is ordered to be wound up by a court except for the purpose

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	<p>of amalgamation or reconstruction; provided that, as part of such amalgamation or reconstruction, the entire property, assets and undertaking of the Contractor are transferred to the amalgamated or reconstructed entity and that the amalgamated or reconstructed entity has unconditionally assumed the obligations of the Contractor under this Agreement; and provided that:</p> <ul style="list-style-type: none"> (i) the amalgamated or reconstructed entity has the capability and experience necessary for the performance of its obligations under this Agreement; and (ii) the amalgamated or reconstructed entity has the financial standing to perform its obligations under this Agreement and has a credit worthiness at least as good as that of the Contractor as at the Commencement Date; <p>(e) failure to complete the Punch List items within the periods stipulated.</p> <p>(f) the Contractor fails to rectify any Defect, the non-rectification of which shall have a Material Adverse Effect on the Project, within the time specified in this Agreement or as directed by the Engineer;</p> <p>(g) the Contractor creates any Encumbrance in breach of this Agreement;</p> <p>(h) the Contractor has failed to fulfil any obligation, for which failure Termination has been specified in this Agreement</p> <p>(i) the Contractor commits a default in complying with any other provision of this Agreement if such a default causes a Material Adverse Effect on the Project or on the Employer</p> <p>In any of these events or circumstances, the Employer may, by Notice Terminate the contract with immediate effect.</p> <p>The Employer's election to terminate the Contract shall not prejudice any other rights of the Employer, under the Contract or otherwise.</p> <p>The Contractor shall remove all his plants and machinery from the site then leave the Site and deliver any required Goods, all Contractors' Documents, and other design documents made by or for him, to the Engineer within 7 days from the issue of Notice of Termination, failing which Delay Damages as prescribed for delay in completion of works shall be imposed as per provision of clause 26.8/PCC However, the Contractor shall use his best efforts to comply immediately with any reasonable instructions included in the notice of Termination</p> <ul style="list-style-type: none"> (i) for the assignment of any subcontract, and (ii) for the protection of life or property or for the safety of the Works. <p>After termination, the Employer may complete the Works and/or arrange for any other entities to do so. The Employer and these entities may then use any Goods, Contractor's Documents and other design documents made by or on behalf of the Contractor for completing the work.</p> <p>49.8 Valuation At Date Of Termination</p> <p>As soon as practicable after a notice of termination under Sub-Clause 49.7/PCC [Termination by Employer] has taken effect, the Engineer shall proceed in accordance with Sub-Clause 3.5/PCC [Determinations] to agree or determine the value of the Works, Goods and Contractor's Documents, and any other sums due to the Contractor for work executed in accordance with the Contract. For this purpose, the contractor shall be notified the date for witnessing of measurements and handing over of the materials for which contractor has already been paid. In case the contractor fails to attend or send a representative even after such notice, the Engineer shall export proceed with measurements of the works executed and taking over of plants and materials etc. for which payment has already been made to the contractor, which shall be treated as final.</p>

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	<p>49.9 Payment After Termination</p> <p>After a notice of termination under Sub-Clause 49.7/PCC [Termination by Employer] has taken effect, the Employer may:</p> <ul style="list-style-type: none"> (a) proceed in accordance with New-Clause 2.4/PCC [Employer's Claims], (b) encash the Performance Guarantee and forfeit the Performance Security: <ul style="list-style-type: none"> i. In full including additional Performance Guarantee amount if any taken in terms of ITT and not due for release on the date of issue of termination letter, in case of termination of the contract as a whole; or ii. in part/parts proportionate to the contract price of the bill/schedule to which the terminated part of work belongs i.e. $P = (A \times B) \div C$ where, P = Proportionate Bank Guarantee Amount A = Contract Price of the particular bill/schedule to which the terminated part of work belongs B = Performance Guarantee amount in terms of CC New- clause 4.19/PCC C = Total Contract Price <p>Plus, additional Performance Guarantee amount if any taken in terms of ITT and not due for release on the date of issue of termination letter against that particular bill/Schedule to which the terminated part of the work belongs in case of termination in part/parts.</p> <ul style="list-style-type: none"> (c) release any payment due to the contractor for works executed prior to termination and evaluation under clause 49.8/PCC (valuation at date of termination, however, if by this time the Contractor has failed to make a payment due to the Employer, the same will be deducted from the payment due and any balance remaining shall then be paid to the Contractor.) <p>49.10 Employer's Entitlement To Termination For Convenience</p> <p>The Employer shall be entitled to terminate the Contract, at any time for the Employer's convenience, by giving notice of such termination to the Contractor. The termination shall take effect 28 days after the later of the dates on which the Contractor receives this notice or the Employer returns the Performance Security. The Employer shall not terminate the Contract under this Sub-Clause in order to execute the Works himself or to arrange for the Works to be executed by another contractor or to avoid a termination of the Contract by the Contractor.</p> <p>After this termination, the Contractor shall proceed in accordance with the relevant clause and shall be paid in accordance with New-Clause 8/PCC [Payment and Release in case of Optional Termination].</p> <p>49.11.1. Requirements After Termination</p> <p>Upon Termination of this Agreement in accordance with the provisions of this clause 49, the Contractor shall comply with and conform to the following:</p> <ul style="list-style-type: none"> (a) deliver to the Employer all Plant and Materials which shall have become the property of the Employer under this clause 49; (b) deliver all relevant records, reports, Intellectual Property and other licenses pertaining to the Works, other design documents and in case of Termination occurring after the Provisional Certificate has been issued, the "as built" Drawings for the Works; (c) transfer and/or deliver all Applicable Permits to the Employer to the extent permissible under Applicable Laws; and

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	<p>(d) vacate the Site within seven days.</p> <p>49.11.2 Other Rights and Obligations of The Parties</p> <p>Upon Termination for any reason whatsoever</p> <p>(a) property and ownership in all Materials, Plant and Works and the Railway Project shall, as between the Contractor and the Employer, vest in the Employer in whole, free from any and all Encumbrances; provided that the foregoing shall be without prejudice to Clause 49.11.3;</p> <p>(b) risk of loss or damage to any Materials, Plant or Works and the care and custody thereof shall pass from the Contractor to the Employer; and</p> <p>(c) the Employer shall be entitled to restrain the Contractor and any person claiming through or under the Agreement from entering upon the Site or any part of the Project except for taking possession of materials, stores, implements, construction plants and equipment of the Contractor, which have not been vested in the Employer in accordance with the provisions of this Agreement.</p> <p>49.11.3 Payment On Termination</p> <p>After termination under Sub-Clause-49.7/PCC the Employer shall return the Performance Security, and shall pay the Contractor an amount calculated and certified in accordance with the following conditions:</p> <p>A. The value of approved materials actually brought to the site and reasonably required to execute the works during next three months, as per approved programme, and</p> <p>B. Value of work completed up to date by the Contractor at rates specified in the Contract, after taking into account any deductions, retentions, and set off.</p> <p>C. In addition, a sum not exceeding 2% (two percent) of the value of the work remaining incomplete on the date of Termination notice taking effect.</p> <p>The payment as above are full compensation for termination under this clause and the Contractor has no claim for damages or other entitlements whether under the contract or otherwise.</p> <p>In case of termination/ foreclosure of the Contract under whatsoever circumstances, any remaining tools, plants, equipment's and surplus materials of the Employer with the Contractor will be returned to the Employer at Employer's depot at the Contractor's cost. In case of the failure of the Contractor to do so, the Employer will be entitled to recover their cost from the Contractor from the amount becoming due to the Contractor or from any other amount due in any other contracts.</p> <p>The decision of the Engineer of the amount to be recovered will be final decision and full credit at rates initially charged to the Contractor shall be allowed for such materials. Similarly, the Employer shall be entitled to recover the cost of the unreturned material, plants, equipment and tools from the Contractor, where such material has been supplied free of cost and plants, equipment and tools, free of cost or on lease basis to the Contractor as stipulated in the Contract.</p> <p>49.12 Termination by Contractor</p> <p>49.12.1 Default of Employer</p> <p>In the event of the Employer becoming bankrupt or, being a company, going into liquidation, other than for the purpose of a scheme of reconstruction or Amalgamation, then, the Contractor may give notice requiring the Employer to remedy the default within 28 days after receipt of the notice. If the Employer fails to remedy the default or fails to propose steps reasonably acceptable to the Contractor to do so and in that case, the Contractor may terminate the Contract after issue of 14 days notice to the Employer with a copy to the Engineer. In this case, the Contractor shall be compensated as per Sub Clause no.49.12.4.</p>

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	<p>The Engineer's decision on the amount payable on this account shall be final and binding.</p> <p>49.12.2 Contractor's Entitlement To Suspend The Work</p> <p>If the Contractor suspends work or reduces the rate of progress of work in accordance with the provisions of this Sub-Clause and thereby suffers delay or incurs costs the Engineer shall, after due consultation with the Employer and the Contractor, determine any extension of time to which the Contractor is entitled under sub-clause-26.5/PCC</p> <p>49.12.3 Cessation Of Work By Contractor</p> <p>After termination under Sub-49.12.3, the Contractor shall:</p> <ol style="list-style-type: none"> a. Cease all further work, except for such work as may be necessary and instructed by the Engineer for the purpose of making safe or protecting those parts of the Works already executed, and any Work required to leave the Site in a clean and safe condition, b. Hand over all Construction and/or Manufacture Documents, Plant and Materials for which the Contractor has received payment, c. Hand over those parts of other Works executed by the Contractor up to the date of termination, and d. Remove all Contractor's which is on the Site and repatriate all his staff and labour from the Site. <p>Any such termination shall be without prejudice to any other right of the Contractor under the Contract.</p> <p>49.12.4 Payment On Termination</p> <p>After termination under Sub-Clause 49.12.1 the Employer shall return the Performance Security, and shall pay the Contractor an amount calculated and certified in accordance with the following conditions:</p> <ol style="list-style-type: none"> a. The value of approved materials actually brought to the site and reasonably required to execute the works during next three months, as per approved programme, and b. Value of work completed up to date by the Contractor at rates specified in the Contract, after taking into account any deductions, retentions, set off. c. In addition a sum not exceeding 2% (two percent) of the value of the work remaining incomplete on the date of Termination notice taking effect. <p>The payment as above are full compensation for termination under this clause and the Contractor has no claim for damages or other entitlements whether under the contract or otherwise.</p> <p>49.12.5 In case of termination/ foreclosure of the Contract under whatsoever circumstances, any remaining tools, plants, s and surplus materials of the Employer with the Contractor will be returned to the Employer at Employer's depot at the Contractor's cost. In case of the failure of the Contractor to do so, the Employer will be entitled to recover their cost from the Contractor from the amount becoming due to the Contractor or from any other amount due in any other contracts. The decision of the Engineer of the amount to be recovered will be final decision and full credit at rates initially charged to the Contractor shall be allowed for such materials. Similarly, the Employer shall be entitled to recover the cost of the unreturned material, plants, and tools from the Contractor, where such material have been supplied free of cost and plants, and tools, free of cost or on lease basis to the Contractor as stipulated in the Contract.</p> <p>49.13 Survival</p> <p>Termination of this Contract</p> <ol style="list-style-type: none"> a. shall not relieve the Contractor or the Employer of any obligations already incurred

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	<p>hereunder which expressly or by implication survives Termination hereof and</p> <p>b. except as otherwise provided in any provision of this Contract expressly limiting the liability of either party, shall not relieve either party of any obligations or liabilities for loss or damage to the other Party arising out of or caused by acts or omissions of such Party prior to the effectiveness of such Termination or arising out of such Termination</p> <p>49.13 Corrupt Or Fraudulent Practices</p> <p>If the Employer determines that the Contractor has engaged in corrupt, fraudulent, collusive or coercive practices, in competing for or in executing the Contract, then the Employer may, after giving 14 days' notice to the Contractor, terminate the Contractor's employment under the Contract and expel him from the Site, and the provisions of Clause 49 CC/PCC shall apply as if such expulsion had been made under Sub-Clause 49.7/PCC.</p> <p>For the purposes of this Sub-Clause:</p> <p>(a) "corrupt practice" means the offering, giving, receiving or soliciting of anything of "value to influence the action of a public official in the procurement process or in the Contract execution.</p> <p>(b) "fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of the Contract to the detriment of the Employer, and includes collusive practice among Bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Employer of the benefits of free and open competition</p> <p>(c) "collusive practice" means a scheme or arrangement between two or more bidders, with or without the knowledge of the Employer, designed to establish bid prices at artificial, non-competitive levels.</p> <p>(d) "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the procurement process or affect the execution of a contract.</p>
<p>CLAUSE 1/SCC LABOUR</p>	<p>The Following New-Paras Are Added To The Existing Scc Clauses.</p> <p>1.1 Engagement Of Staff And Labour</p> <p>Except as otherwise stated in the Specification, the Contractor shall make arrangements for the engagement of all staff and labour, local or otherwise, and for their payment, housing, feeding and transport.</p> <p>The Contractor is encouraged, to the extent practicable and reasonable, to employ staff and labor with appropriate qualifications and experience from sources within the Country.</p> <p>1.2 Rates Of Wages And Conditions Of Labour</p> <p>The Contractor shall pay rates of wages, and observe conditions of labour, which are not lower than those established for the trade or industry where the work is carried out. If no established rates or conditions are applicable, the Contractor shall pay rates of wages and observe conditions which are not lower than the general level of wages and conditions observed locally by employers whose trade or industry is similar to that of the Contractor.</p> <p>If the Employer is obliged to provide amenities or arrange payment of wages to contract labour employed by the contractor either directly or through sub-contractor under the contract on account of failures on the part the contractor to provide the amenities and / or arrange payment of wages to the contract labour as required of him under the provision of the applicable acts / rules made there under, the Engineer/Employer shall be at liberty without prejudice to the rights of Engineer/Employer under Section 20(2) and 21(4) of the Contract Labour (Regulation and Abolition) Act 1970 to recover the whole or part of the expenditure so</p>

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	<p>incurred on the wages so paid by the Engineer/Employer/Railway from the security deposit and/or from any sum or sums due to the Contractor whether under this contract or any other contract.</p> <p>The Contractor shall inform the Contractor's Personnel about their liability to pay personal income taxes in the Country in respect of such of their salaries, wages, allowances, and any benefits as are subject to taxes under the Laws of the Country for the time being in force, and the Contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such Laws.</p> <p>The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made there-under, regulation or notifications including amendment. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/ regulations including amendments, if any, on the part of the Contractor, the Engineer/Employer shall have the right to deduct any money due to the contractor including his amount of performance security. The Employer/Engineer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.</p> <p>The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Employer at any point of time.</p> <p>The Contractor shall duly comply with the provisions of the Apprentices Act 1961 (III of 1961), the rules made there under and the orders that may be issued from time to time under the said Act and the said Rules and on his failure or neglect to do so he shall be subject to all liabilities provide by the said Act and said Rules.</p> <p>The Contractor and his Sub Contractors shall comply with all applicable Labour Laws, and should not employ Child Labour for construction and maintenance activities. The Contractor shall provide appropriate facilities for children in Construction Camp sites.</p> <p>The Contractors shall not differentiate wages between men and women for work of equal value</p> <p>1.3 Persons In The Service Of Employer</p> <p>The Contractor shall not recruit, or attempt to recruit, staff and labour from amongst persons in the service of the Employer or the Engineer.</p> <p>1.4 Labour Laws</p> <p>The Contractor shall comply with all the relevant Labour Laws applicable to the Contractor's Personnel, including Laws relating to their employment, health, safety, welfare, immigration, and emigration, and shall allow them all their legal rights. The Contractor and his sub-contractors shall be responsible to ensure at his own cost, compliance to all laws, bye-laws, rules and regulations for the time being in force pertaining to the employment of local or imported labour and shall take all necessary precautions to ensure and preserve the health and safety of all staff employed directly or through sub-contractors or petty contractors on the works which shall include all the acts listed in Appendix-1 but not limited to the same.</p> <p>The Contractor shall require his employees to obey all applicable Laws, including those concerning safety at work.</p> <p>During continuance of the Contract, the Contractor and his Sub-Contractors shall abide at all times by all existing labor enactments and rules made thereunder, regulations, notifications and bye laws of the State or Central government or local authority and any other labor laws (including rules), regulations, bye laws that may be passed or notification that may be issued under any labor law in future either by the State or the Central Government or the local</p>

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	<p>authority. Salient features of some of the major labor laws that are applicable to construction industry are given in Appendix -1 to these Conditions of Contract</p> <p>1.5 Working Hours</p> <p>No work shall be carried out on the Site on locally recognized days of rest, or outside the normal working hours stated in the Contract Data, unless:</p> <ul style="list-style-type: none"> (a) otherwise stated in the Contract, (b) the Employer / Engineer gives consent, or (c) the work is unavoidable, or necessary for the protection of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Engineer. (d) The Contractor, generally will have to carry out work during night hours also and in shifts unless specifically provided otherwise in the Contract. No increase in rates or extra payments shall be admissible for night work. Wherever night working is carried out by Contractor, temporary lighting arrangements as per approved layout shall be provided, installed, maintained for the duration of the contract and removed after completion of work. Flashing lights to warn the traffic on roads shall be used at all times on all obstructions. No extra payment will be made for the provision of temporary lighting, flashing lights and for maintenance. It is to be noted that the works are being undertaken in an urban area. (e) Should there be complaints received by members of the public regarding excessive noise or vibration, etc. especially at night, and if such complaints are valid, then the contractor shall take remedial measures to prevent such nuisance. No extra payment will be made to the contractor for the provision of such measures. (f) Working hours during the Defect liability period will be curtailed when certain system become operational <p>1.6 Facilities For Staff And Labour</p> <p>Except as otherwise stated in the Specification, the Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor's Personnel. The Contractor shall also provide facilities for the Employer's and Engineer's Personnel visiting site and project/site offices as stated in the bid document.</p> <p>The Contractor shall not permit any of the Contractor's Personnel to maintain any temporary or permanent living quarters within the structures forming part of the Permanent Works.</p> <p>1.7 Health And Safety</p> <p>The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's Personnel. In collaboration with local health authorities, the Contractor shall ensure that medical staff, first aid facilities, sick bay and a standing arrangement for ambulance service are available at a phone call at all times at the Site and at any accommodation for Contractor's and Employer's Personnel, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.</p> <p>In the event of any outbreak of illness of an epidemic nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government or the local medical or sanitary authorities, for the purpose of dealing with and overcoming the same. The Contractor shall appoint an accident prevention officer at the Site, responsible for maintaining safety and protection against accidents. This person shall be qualified for this responsibility, and shall have the authority to issue instructions and take protective measures to prevent accidents. Throughout the execution of the Works, the Contractor shall provide whatever is required by this person to exercise this responsibility and provide whatever is</p>

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	<p>required by the Employer, in this regard.</p> <p>The Contractor shall send, to the Engineer, details of any accident as soon as practicable after its occurrence.</p> <p>HIV-AIDS Prevention. The Contractor shall conduct an HIV-AIDS awareness programme via an approved service provider, and shall undertake such other measures as are specified in this Contract to reduce the risk of the transfer of the HIV virus between and among the Contractor's Personnel and the local community, to promote early diagnosis and to assist affected individuals.</p> <p>Epidemics</p> <p>In the event of any outbreak of illness of an epidemic nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government or the local medical or sanitary authorities, for the purpose of dealing with and overcoming the same.</p> <p>Records of Safety and Health</p> <p>The Contractor shall maintain such records and make such reports concerning safety, health and welfare of persons and damage to property as the Engineer may from time to time prescribe.</p> <p>Submission of Returns</p> <p>The contractor shall be responsible for timely submission of all returns and statements to the concerned authorities in full compliance of all rules, bye-laws and regulations for the time being in force.</p> <p>The Contractor shall throughout the contract (including the Defects Notification Period): (i) conduct Information, Education and Consultation Communication (IEC) campaigns, at least every other month, addressed to all the Site staff and labor (including all the Contractor's employees, all Sub-Contractors and Consultants' employees, and all truck drivers and crew making deliveries to Site for construction activities) and to the immediate local communities, concerning the risks, dangers and impact, and appropriate avoidance behavior with respect to of Sexually Transmitted Diseases (STD)—or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular; (ii) provide male or female condoms for all Site staff and labor as appropriate; and (iii) provide for STI and HIV/AIDS screening, diagnosis, counseling and referral to a dedicated national STI and HIV/AIDS program, (unless otherwise agreed) of all Site staff and labor.</p> <p>The Contractor shall include in the program to be submitted for the execution of the Works under Sub-Clause 25.3 an alleviation program for Site staff and labour and their families in respect of Sexually Transmitted Infections (STI) and Sexually Transmitted Diseases (STD) including HIV/AIDS. The STI, STD and HIV/AIDS alleviation program shall indicate when, how and at what cost the Contractor plans to satisfy the requirements of this Sub-Clause and the related specification. For each component, the program shall detail the resources to be provided or utilized and any related sub-contracting proposed. The program shall also include provision of a detailed cost estimate with supporting documentation. Payment to the Contractor for preparation and implementation this program shall not exceed the Provisional Sum dedicated for this purpose.</p> <p>1.8 Contractor's Superintendence</p> <p>Throughout the execution of the Works, and as long thereafter as is necessary to fulfil the Contractor's obligations, the Contractor shall provide all necessary superintendence to plan, arrange, direct, manage, inspect and test the work.</p> <p>Superintendence shall be given by a sufficient number of persons having adequate knowledge of the language for communications (defined in Sub-Clause 3/CC [Law and Language]) and of the operations to be carried out (including the methods and techniques required, the hazards likely to be encountered and methods of preventing accidents), for the satisfactory and safe execution of the Works.</p>

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	<p>The Contractor shall employ the key personnel named in the Schedule of Personnel as referred to in the Contract Data to carry out the functions stated in the Schedule or other personnel approved by the Engineer. The Engineer will approve any proposed replacement of key personnel only if their qualifications, abilities and relevant experience are substantially equal to or better than those of the personnel listed in the Schedule.</p> <p>1.9 Contractor's Personnel</p> <p>The Contractor's Personnel shall be appropriately qualified, skilled and experienced in their respective trades or occupations. The Engineer may require the Contractor to remove (or cause to be removed) any person employed on the Site or Works, including the Contractor's Representative if applicable, who:</p> <ul style="list-style-type: none"> (a) persists in any misconduct or lack of care, (b) carries out duties incompetently or negligently, (c) fails to conform with any provisions of the Contract, or (d) persists in any conduct which is prejudicial to safety, health, or the protection of the environment. <p>If the Engineer asks the Contractor to remove a person who is a member of the Contractor's staff or his work force stating the reasons, the Contractor shall ensure that the person leaves the Site within Forty-Eight (48) hours and has no further connection with the work in the Contract. The replacement person shall be appointed within fourteen (14) days of the notification by the Engineer.</p> <p>A reasonable proportion of the Contractor's Superintending Staff shall have a working knowledge of the English language or the Contractor shall have available on site at all times a sufficient number of competent interpreters to ensure the proper transmission of instructions and information. In case the person is not effective in the view of Employer and of the same thing is communicated to the Contractor by the Employer, the Contractor shall appoint (or cause to be appointed) a suitable replacement person</p> <p>1.10 Records Of Contractor's Personnel And Equipment</p> <p>The Contractor shall submit, to the Employer and the Engineer, details showing the number of each class of Contractor's Personnel and of each type of Contractor's Equipment on the Site. Details shall be submitted each calendar month, in a form approved by the Employer, until the Contractor has completed all work which is known to be outstanding at the completion date stated in the Taking-Over Certificate for the Works</p> <p>1.11 Disorderly Conduct</p> <p>The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst the Contractor's Personnel, and to preserve peace and protection of persons and property on and near the Site</p> <p>1.12 Foreign Personnel</p> <p>The Contractor may bring in to the country any foreign personnel who are necessary for the execution of the Works to the extent allowed by the applicable Laws. The Contractor shall ensure that these personnel are provided with the required residence visas and work permits. The Employer will, without any financial liability, if requested by the Contractor, use his best endeavours in a timely and expeditious manner to assist the Contractor in obtaining any local, state, national, or government permission required for bringing in the Contractor's personnel.</p> <p>The Contractor shall be responsible for the return of these personnel to the place where they were recruited or to their domicile. In the event of the death in the Country of any of these personnel or members of their families, the Contractor shall similarly be responsible for</p>

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	<p>making the appropriate arrangements for their return or burial. Contractor shall also be responsible for any legal liabilities during their stay.</p> <p>1.13 Supply Of Foodstuffs</p> <p>The Contractor shall arrange for the provision of a sufficient supply of suitable food as may be stated in the Specification at reasonable prices for the Contractor's Personnel for the purposes of or in connection with the Contract</p> <p>1.14 Supply Of Water</p> <p>The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor's Personnel</p> <p>1.15 Measures Against Insect And Pest Nuisance</p> <p>The Contractor shall at all times take the necessary precautions to protect the Contractor's Personnel employed on the Site from insect and pest nuisance, and to reduce their danger to health. The Contractor shall comply with all the regulations of the local health authorities, including use of appropriate insecticide</p> <p>The Contractor shall provide his staff and labour with suitable prophylactics for the prevention of malaria, and take steps to prevent the formation of stagnant pools of water. He shall comply with all the regulations of the local health authorities in these respects and shall in particular arrange to spray thoroughly with approved insecticides all buildings erected on the site such treatment shall be carried out at least once a year or as instructed by the Engineer. The Contractor shall warn his staff and labour of the dangers of diseases like Malaria, Filariasis and other contagious diseases etc. and also regarding, Scorpions, Snakes, Wild animals etc. and preventive actions required to be taken by the labour and staff.</p> <p>1.16 Alcoholic Liquor Or Drugs</p> <p>The Contractor shall not, otherwise than in accordance with the Laws of the Country, import, sell, give barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift barter or disposal thereto by Contractor's Personnel.</p> <p>1.17 Arms and Ammunition</p> <p>The Contractor shall not give, barter, or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so.</p> <p>1.18 Festivals and Religious Customs</p> <p>The Contractor shall respect the Country's recognized festivals, days of rest and religious or other customs.</p> <p>1.19 Funeral Arrangements</p> <p>The Contractor shall be responsible, to the extent required by local regulations, for making any funeral arrangements for any of his local employees who may die while engaged upon the Works.</p> <p>1.20 Prohibition of Forced or Compulsory Labour</p> <p>The contractor shall not employ "forced or compulsory labour" in any form. "Forced or compulsory labour" consists of all work or service, not voluntarily performed, that is extracted from an individual under threat of force or penalty.</p> <p>1.21 Prohibition of Harmful Child Labour</p> <p>The Contractor shall not employ any child to perform any work that is economically exploitative, or is likely to be hazardous to, or to interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.</p>

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	<p>1.22 Employment Records of Workers</p> <p>The Contractor shall keep complete and accurate records of the employment of labour at the Site. The records shall include the names, ages, genders, hours worked and wages paid to all workers. These records shall be summarized on a monthly basis and shall be available for inspection by the Engineer during normal working hours. These records shall be included in the details to be submitted by the Contractor under Sub-Clause 1.10/SCC of PCC [Records of Contractor's Personnel and Equipment].</p>
	<p>In addition to the above, the Contractor shall register his firm/company etc. on website 'www.shramikkalyan.indianrailways.gov.in' and upload requisite details of labour and their payment in this portal. These details shall be available in public domain. The Registration/ updation on Portal shall be done as under:</p> <ul style="list-style-type: none"> (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. Employer/Engineer shall approve the contractor's registration in the portal within 7 days of receipt of such request. (b) Contractor once approved by any Employer/Engineer, can create password with login ID (PAN No.) for subsequent use of portal for all LoAs issued in his favour. (c) The contractor once registered on the portal, shall provide details of his Letter of Acceptances (LoA) / Contract Agreements on shramikkalyan portal within 15 days of issue of any LoA for approval of concerned Employer/Engineer. Employer/Engineer shall update (if required) and approve the details of LoA filled by contractor within 7 days of receipt of such request. (d) After approval of LoA by Employer/Engineer, contractor shall fill the salient details of contract labours engaged in the contract and ensure updating of each wage payment to them on shramikkalyan portal on monthly basis. (e) It shall be mandatory upon the contractor to ensure correct and prompt uploading of all salient details of engaged contractual labour & payments made thereof after each wage period.
<p>CLAUSE 40/CC/40.1/ PCC PRICE ADJUSTMENT / CONTRACT DATA</p>	<p>40.1.7 Add The Sub-Clause For Price Adjustment With The Following:</p> <p>PRICE VARIATION / ADJUSTMENT</p> <p>Adjustment for changes in cost for the work of elevated viaduct, minor bridges and earth work etc., of suburban corridor.</p> <p>Contract price shall be adjusted for increase or decrease in rates and prices of labour, materials, fuels and lubricants in accordance with the following principles and procedures and as per formula given here under.</p> <p>The amounts payable to the Contractor shall be adjusted for rises or falls in the cost of labour, Goods and other inputs to the Works, by the addition or deduction of the amounts determined by the formulae prescribed in this Sub-Clause. To the extent that full compensation for any rise or fall in Costs is not covered by the provisions of this or other Clauses, the Accepted Contract Amount shall be deemed to have included amounts to cover the contingency of other rises and falls in costs.</p> <p>(A) Adjustment Formula</p> <p>The adjustment to be applied to the amount otherwise payable to the Contractor, as valued in accordance with the appropriate Schedule and certified in Payment Certificates, shall be determined from formulae in which the Contract Price is payable. No adjustment is to be applied to work valued on the basis of Cost or current prices. The formulae shall be of the following:</p>

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	<p>Following expressions and meanings are assigned to the work done during each month.</p> <p>R=Total value of work done during the month shall include the value of materials on which secured advance has been granted, if any during the month less the value of materials in respect of which the secured advance has been recovered, if any, during the month. This excludes the cost of work on items for which rates were fixed under Variations Clause 34.3/PCC for which the escalation will be regulated as mutually agreed at the time of fixation of rate. It will also exclude the value of work done during the month which was programmed to be done prior to this month as per work schedule in the agreement.</p> <p>Following expressions and meanings are assigned to the work done during each month.</p> <p>V=VL +VF+VM+VP+VS+VC Where</p> <p>V = Total adjustment on account of all components.</p> <p>VL = Adjustment on account of Labour component.</p> <p>VF = Adjustment on account of High-speed diesel component.</p> <p>VM = Adjustment on account of other materials component.</p> <p>VP = Adjustment on account of Plant, machinery and spares.</p> <p>VS = Adjustment on account of steel component.</p> <p>VC = Adjustment on account of cement component.</p> <p>co-efficient to total cost = 0.15</p> <p>Adjustment for Labour Component:</p> <p>Price adjustment for increase or decrease in the cost due to labour shall be paid in accordance with following formula. (Base: 2016=100).</p> <p>VL= 0.85 X R X PL x [(Li – Lo)/Lo] Where</p> <p>VL= Increase or decrease in the cost of work during the month under consideration due to change in rates for local labour</p> <p>Lo =. The average consumer price index for industrial workers for Bangalore Centre as applicable for the month preceding the date of opening of the tenders as published by Labour Bureau, Ministry of Labour, GOI.</p> <p>Li = The average consumer price index for industrial workers for Bangalore Centre during the 'month under consideration' as published by Labour Bureau, Ministry of Labour, GOI.</p> <p>PL (cost co-efficient of labour to the total cost) = 0.23</p> <p>Adjustment for High-Speed Diesel component:</p> <p>Price adjustment for increase or decrease in the cost of High-Speed Diesel component shall be paid in accordance with following formula (Base: 2011-12=100).</p> <p>VF = 0.85 X R X PF x [(Fi –Fo)/Fo] where</p> <p>VF = Increase or decrease in the cost of work during the month under consideration due to change in rates for High-Speed Diesel components.</p> <p>Fo = The average wholesale price index for fuel and lubricants as published by RBI bulletin / Economic Advisor GOI as applicable for the month proceeding the date of opening of the tenders.</p> <p>Fi = The average wholesale price index for fuel and lubricants as published by RBI Bulletin / Economic Advisor GOI as applicable during the "month under consideration".</p>

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	<p>PF (cost co-efficient of fuel and lubricants to the total cost) = 0.10</p> <p>Adjustment on account of other materials component:</p> <p>Price adjustment for increase or decrease in the cost of other materials component shall be paid in accordance with following formula (Base: 2011-12=100).</p> <p>VM = 0.85 X R X PM x [(Mi – Mo)/Mo] where</p> <p>VM = Increase or decrease in the cost of work during the month under consideration due to change in rates for other material components.</p> <p>Mo = The all-India whole sale price index for all commodities as applicable for the month preceding the date of opening of Tenders as published by Office of the Economic Adviser.</p> <p>Mi = The all-India whole sale price index for all commodities for the 'month under consideration' as published by Office of the Economic Adviser.</p> <p>PM= (cost co-efficient of other materials to the total cost) = 0.12</p> <p>Adjustment on account of Plant, machinery and spares:</p> <p>Price adjustment for increase or decrease in the cost of plant, machinery and spares component shall be paid in accordance with following formula (Base: 2011-12=100).</p> <p>VP = 0.85 X R X PP x [(Pi – Po)/Po] where</p> <p>VP = Increase or decrease in the cost of work during the month under consideration due to change in rates for plant, machinery and spares components.</p> <p>Po = the all-India wholesale price index for manufacture of machinery for mining, quarrying and construction as applicable for the month preceding the date of opening of Bids as published by Office of the Economic Adviser.</p> <p>Pi = the all India wholesale price index for manufacture of machinery for mining, quarrying and construction for the 'month under consideration' as published by Office of the Economic Adviser.</p> <p>PP (cost co-efficient of Plant, machinery and spares to the total cost) = 0.14</p> <p>Adjustment on account of steel component:</p> <p>Price adjustment for increase or decrease in the cost of Steel shall be paid in accordance with following formula. (Base: 2011-12=100)</p> <p>VS = 0.85 X R X PS x [(Si – So)/So] where</p> <p>VS= Increase or decrease in the cost of work during the month under consideration due to change in rates for Structural Steel / TMT rebars / MS Steel / Pre-stressing strands.</p> <p>So = The all-India wholesale price index for Mild Steel – Long products as applicable for the month preceding the date of opening of Bids as published by Office of the Economic Adviser.</p> <p>Si = The all-India wholesale price index for Mild Steel – Long products for the 'month under consideration' as published by Office of the Economic Adviser.</p> <p>PS (cost co-efficient of steel to the total cost) =0.27</p> <p>Adjustment on account of cement component:</p> <p>Price adjustment for increase or decrease in the cost of cement shall be paid in accordance with following formula. (Base: 2011-12=100)</p> <p>VC = 0.85 X R X PC x [(Ci – Co)/Co] where</p> <p>VC= Increase or decrease in the cost of work during the month under consideration due to</p>

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	<p>change in rates for cement component.</p> <p>Co = The all-India wholesale price index for Ordinary Portland Cement as applicable for the month preceding the date of opening of Tender as published by Office of the Economic Adviser.</p> <p>Ci = The all-India wholesale price index for Ordinary Portland Cement for the 'month under consideration' as published by Office of the Economic Adviser.</p> <p>PC (cost co-efficient of Cement to the total cost) = 0.14</p> <p>Period of Work under consideration will mean as under:</p> <ol style="list-style-type: none"> i. In the case of first Bill the period from the month of signing of agreement to the month of measurement of the first bill. ii. In the case of second and subsequent interim payment certificate and Final bills, the Period from the month of measurement for previous bill to the month of measurement of that bill. iii. As per provisions of contract (Clause 37.3/PCC) interim payments certificates are to be submitted by the contractor on monthly basis for the works/supply of items pertaining to a particular month. However, in case a bill is submitted for a period pertaining to more than a calendar month the average indices for those months and previous month(s) shall be used for calculation purpose. <p>Responsibility of arranging the RBI indices/Economic advisor indices/Labour Bulletins desired by the Employer or the Engineer shall rest with the Contractor.</p> <p>(B) Procedure in case of Delay in Availability of Final RBI Indices/Economic advisor indices</p> <p>Where the final Price Indices are not available in the Economic advisor, while making payment towards interim payment certificate, payment towards Price Variation will be made on provisional basis based on the indices available, to be adjusted in subsequent bills as and when the final Indices figures become available.</p> <p>(C) Adjustment on Account of Price Variation</p> <p>Adjustment on account of Price Variations may be positive (in which case extra amount shall be paid to the Contractor), or negative (in which case the amount of Price Variation shall be recovered from the Contractor). Adjustment on account of Price Variation shall be calculated separately, for each period, between two successive dates of measurements for bills and paid along with each bill as claimed by the contractor.</p> <p>After verifying the bill, the Engineer shall certify the adjustment amount and advise the same to the Employer along with the interim payment certificate. Should any extra amount be due to Contractor, the Employer shall pay the same. Any amount due from Contractor on account of negative adjustment shall be recovered from his pending or other bills at the earliest.</p> <p>The above adjustment on account of Price Variation payment shall be made to the contractor in accordance with the proportion stipulated in Schedule of Payment Currencies by using exchange rate on the last day of the period to which a particular interim payment certificate is related as per the website of Reserve Bank of India (RBI). In case the exchange rate on the above date, is not available in this web site, it will be as per the web site of Financial Benchmark India Private Limited (FBIL) as recommended by RBI.</p> <p>In case the exchange rate of particular currency is not available on the above date in both these websites then the exchange rate as per the website of the Central Bank of that country to which this currency belongs will be adopted. In case the exchange rate of that currency is not directly available in INR on that website then the currency will be first converted to USD as per the exchange rate between that foreign currency and US Dollar on that web site and</p>

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	<p>then converted from USD to INR as per RBI or FBIL exchange rate between US Dollar and INR, as prevailing on the said date.</p> <p>(D) Limit of Price Adjustment</p> <p>Provided that, in determining all such price adjustment in accordance with the aforesaid Sub Clauses:</p> <ol style="list-style-type: none"> a. No account will be taken of any amount by which any cost incurred by the Contractor has been increased by default or negligence of the Contractor. b. If the Contractor fails to complete the work within time for completion prescribed under Clause 26.4 the adjustment of prices thereafter until the completion of the works shall be made using either the indices or prices, whichever is more favourable to the Employer, provided that if an extension of time is granted pursuant to Sub-Clause 26.5/PCC, the above position shall apply to the adjustments made after expiry of such extension of time. <p>(E) Price Variation during extended period of completion</p> <p>The price adjustment as worked out above i.e., either increase or decrease will be applicable up to the stipulated Completion Date of the Works, including the extended period of completion where such extension has been granted under Sub-Clause 26.5/PCC and where such an extension has been granted, the price adjustment will be due as follows:</p> <ol style="list-style-type: none"> a. In a. In case the indices increase above the indices applicable to a bill made on the last date of original completion period or the extended period under Sub-Clause 26.5/PCC, the price adjustment for the period of extension granted in accordance with Sub-Clause 26.5/PCC will be limited to the amount payable as per the indices applicable to a statement made on the last date of the original completion period or the extended period as the case may be. b. In case the indices fall below the indices applicable to a statement made on the last date of the original or extended period of completion, then the lower indices will be adopted for Price Adjustment for the period of extension
NEW CLAUSE-1.1	<p>Assignment</p> <p>Neither Party shall assign the whole or any part of the Contract or any benefit or interest in or under the Contract. However, either Party:</p> <ol style="list-style-type: none"> i. may assign the whole or any part with the prior agreement of the other Party, at the sole discretion of such other Party, and ii. may, as security in favour of a bank or financial institution, assign its right to any moneys due, or to become due, under the Contract.
NEW CLAUSE -1.2	<p>Care and Supply of Documents</p> <p>The Specification and Drawings shall be in the custody and care of the Employer. Unless otherwise stated in the Contract, two copies of the Contract and of each subsequent Drawing shall be supplied to the Contractor, who may make or request further copies at the cost of the Contractor.</p> <p>Each of the Contractor's Documents shall be in the custody and care of the Contractor, unless and until taken over by the Employer. Unless otherwise stated in the Contract, the Contractor shall supply to the Engineer six copies of each of the Contractor's Documents.</p> <p>The Contractor shall keep, on the Site, a copy of the Contract, publications named in the Specification, the Contractor's Documents (if any), the Drawings and Variations and other communications given under the Contract. The Employer's Personnel shall have the right of</p>

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	<p>access to all these documents at all reasonable times.</p> <p>If a Party becomes aware of an error or defect in a document which was prepared for use in executing the Works, the Party shall promptly give notice to the other Party of such error or defect.</p>
NEW CLAUSE-1.3	Deleted.
NEW CLAUSE-1.4	<p>Employer's Use of Contractor's Documents</p> <p>As between the Parties, the Contractor shall retain the copyright and other intellectual property rights in the Contractor's Documents and other design documents made by (or on behalf of) the Contractor.</p> <p>The Contractor shall be deemed (by signing the Contract) to give to the Employer a non-terminable transferable non-exclusive royalty-free licence to copy, use and communicate the Contractor's Documents, including making and using modifications of them. This licence shall:</p> <ul style="list-style-type: none"> (a) apply throughout the actual or intended working life (whichever is longer) of the relevant parts of the Works, (b) entitle any person in proper possession of the relevant part of the Works to copy, use and communicate the Contractor's Documents for the purposes of completing, operating, maintaining, altering, adjusting, repairing and demolishing the Works, and (c) in the case of Contractor's Documents which are in the form of computer programs and other software, permit their use on any computer on the Site and other places as envisaged by the Contract, including replacements of any computers supplied by the Contractor. <p>The Contractor's Documents and other design documents made by (or on behalf of) the Contractor shall not, without the Contractor's consent, be used, copied or communicated to a third party by (or on behalf of) the Employer for purposes other than those permitted under this Sub-Clause.</p>
NEW CLAUSE-1.5	<p>Contractor's Use of Employer's Documents</p> <p>As between the Parties, the Employer shall retain the copyright and other intellectual property rights in the Specification, the Drawings and other documents made by (or on behalf of) the Employer. The Contractor may, at his cost, copy, use, and obtain communication of these documents for the purposes of the Contract. They shall not, without the Employer's consent, be copied, used or communicated to a third party by the Contractor, except as necessary for the purposes of the Contract.</p>
NEW CLAUSE-1.6	<p>Confidential Details</p> <p>The Contractor shall disclose all such confidential and other information as the Engineer may reasonably require in order to verify the Contractor's compliance with the Contract.</p> <p>The Contractor shall treat the details of the Contract as private and confidential, except to the extent necessary to carry out the Contractor's obligations under the Contract or to comply with applicable Laws. The Contractor shall not publish or disclose any particulars of the Works without the previous agreement of the Employer. However, the Contractor shall be permitted to disclose any publicly available information, or information otherwise required to establish his qualifications to compete for other projects.</p>
NEW CLAUSE-1.7	<p>Compliance with Laws</p> <p>The Contractor shall, in performing the Contract, comply with applicable laws. Unless otherwise stated in the Special Conditions of Contract:</p> <ul style="list-style-type: none"> a) the Employer shall have obtained (or shall obtain) the planning, zoning or similar permission for the Permanent Works, and any other permissions described in the Specification as having been (or being) obtained by the Employer; and the Employer shall

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	<p>indemnify and hold the Contractor harmless against and from the consequences of any failure to do so; and</p> <p>b) the Contractor shall give all notices, pay all taxes, duties and fees, and obtain all permits, licences and approvals, as required by the Laws in relation to the execution and completion of the Works and the remedying of any defects; and the Contractor shall indemnify and hold the Employer harmless against and from the consequences of any failure to do so.</p>
<p>NEW CLAUSE-1.8</p>	<p>Joint Venture — Joint and Several Liability</p> <p>If the Contractor constitutes (under applicable Laws) a Joint Venture of two or more persons/firms:</p> <p>(a) these persons shall be deemed to be jointly and severally liable to the Employer for the performance of the Contract;</p> <p>(b) these persons shall notify the Employer of their leader who shall have authority to bind the Contractor and each of these persons; and</p> <p>(c) the Contractor shall not alter its composition or legal status without the prior consent of the Employer.</p> <p>(d) In the event of default by any partner of Joint Venture, on or after achieving 25% of the financial progress (excluding advance if any) the lead partner or remaining partner(s), in case the defaulting partner is the lead partner, shall notify the Employer within twenty eight (28) days of the occurrence and within Fifty six (56) days of the said notification, the lead partner or remaining partner(s), who are not the defaulting partner, shall assign the works of the defaulting partner, to equally competent party with prior consent of the Employer. For this purpose, the term “equally competent party” shall mean as under:</p> <p>“The new JV partner replacing the defaulting partner should meet the EQC requirement of package/combination of packages which was met by the defaulting partner on the basis of which the original tender was awarded.”</p> <p>The replacement of any defaulting partner, with the new partner shall be subject to the condition that the new partner has to submit additional performance security equal to 10% of balance cost of work of the JV partner being replaced. The performance security submitted by the defaulting partner shall also continue with K-RIDE till satisfactory completion of the work.</p> <p>(e) Notwithstanding the consent of the Employer for change in composition or legal status of the Joint Venture the partners shall continue to be jointly and severally liable to the Employer.</p> <p>(f) The Joint Venture shall enter into a Joint Venture Agreement incorporating the provisions of sub-paras (a) to (l) based upon the form annexed to the Conditions of Contract. The JV agreement shall indicate precisely the specific role of all members of the JV in respect of planning, design, construction equipment, key personnel, work execution, and financing of the project. The authority to sign the JV Agreement shall be evidenced by approved legal instruments.</p> <p>Notwithstanding the contents of the sub-clauses above, if the performance of any JV partner is not found satisfactory by the Employer, in respect of the responsibilities assigned to him as per JV agreement which is a part of this agreement, the Employer may issue notice of such default to the said JV partner or the JV (depending upon reasons of default) and declare the said JV partner or the JV as Poor Performer. The issue of such notice shall automatically debar the JV partner or JV as the case may be from participating in any K-RIDE tender from the date of issue of notice of default.</p>

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NEW CLAUSE-1.9	<p>Inspections by the Employer</p> <p>The Contractor shall permit the Employer and/or persons appointed by the Employer to inspect the Site and/or the Contractor's records relating to the performance of the Contract.</p>
NEW CLAUSE-1.10	<p>Bidder's Credentials:</p> <p>The bidder shall submit an affidavit on a stamp paper to the effect that all the documents submitted by her along with her bid are true. This shall be mandatory all bids. The bid shall be summarily rejected if the bidder fails to submit this undertaking along with the bid.</p> <p>After opening the financial bid, the tender committee shall verify the credentials of the bidder who is declared as the lowest bidder (L1) for their authenticity. In case the credentials of L1 are not found to be in order, The bid shall be treated as technically unresponsive and thus invalid. The process shall be repeated for the next higher bidder till the valid L1 is established. If any document (or copy thereof) submitted by a bidder is found to be false/forged:</p> <ol style="list-style-type: none"> a) The bidder/each partner/member of the bidding firm shall be liable to legal actions apart from punitive actions, as decided by competent authority of K-RIDE. In such an eventuality. The bid shall also be summarily rejected. b) If the contract has already been awarded, or Letter of Acceptance (LoA) has been issued and in the event of any failure to comply with the above, the contract shall be terminated, irrespective of the stage of progress in execution of the work. In such an eventuality, Security Deposit (SD), performance Guarantee (PG) and partial/full payments otherwise due to the contractor, in respect of the partial/full work executed by the contractor, shall be forfeited by the K-RIDE. c) Other punitive actions, like banning the bidder and partners/members of the bidding firm for future dealings with K-RIDE/Government of India/ Government of Karnataka may also be taken.
	<p>2. THE EMPLOYER</p>
NEW CLAUSE 2.0	<p>Obligations of the Employer</p> <ol style="list-style-type: none"> 1. The Employer shall, at its own cost and expense, undertake, comply with and perform all its obligations set out in this Agreement or arising hereunder. 2. The Employer shall be responsible for the correctness of the Scope of the Project, Project Facilities, Specifications and Standards and the criteria for Testing of the completed Works. 3. The Employer shall, upon receiving the Performance Security, provide to the Contractor: <ol style="list-style-type: none"> (a) the Right of Access in accordance with the provisions progressively. (b) all environmental and forest clearances as required and approval of the general arrangement drawings (the "GAD") from road authorities to enable the Contractor to construct road over-bridges and under-bridges at level crossings on the Railway Project in accordance with the Specifications and Standards, and subject to the terms and conditions specified in such approval. 4. In the event that <ol style="list-style-type: none"> (i) the Employer does not procure fulfilment of any or all of the obligations set forth in para 3 above within the period specified in respect thereof, and (ii) the delay has not occurred as a result of breach of this Agreement by the Contractor or due to Force Majeure, the Employer shall extend Time Extension in accordance with the provisions. 5. The Employer agrees to provide support to the Contractor and undertakes to observe, comply with and perform, subject to and in accordance with the provisions of this Agreement

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	<p>and Applicable Laws, the following:</p> <ul style="list-style-type: none"> a) upon written request from the Contractor, and subject to the Contractor complying with Applicable Laws, provide reasonable support to the Contractor in procuring Applicable Permits required from any Government Instrumentality for implementation of the Project; b) upon written request from the Contractor, provide reasonable assistance to the Contractor in obtaining access to all necessary infrastructure facilities and utilities, including water and electricity. c) procure that no barriers that would have a material adverse effect on Works are erected or placed on or about the Railway Project by any Government Instrumentality or persons claiming through or under it, except for reasons of Emergency, national security or law and order; d) not do or omit to do any act, deed or thing which may in any manner be violative of any of the provisions of this Agreement; e) support, cooperate with and facilitate the Contractor in the implementation of the Project in accordance with the provisions of this Agreement.
NEW CLAUSE-2.1	<p>Permits, Licenses or Approvals</p> <p>The Employer shall (where he is in a position to do so) provide reasonable assistance to the Contractor at the request of the Contractor:</p> <ul style="list-style-type: none"> (a) by obtaining copies of the Laws of the Country which are relevant to the Contract but are not readily available, and (b) for the Contractor's applications for any permits, licences or approvals required by the Laws of the Country: <ul style="list-style-type: none"> (i) which the Contractor is required to obtain under New-Clause 1.7/PCC [Compliance with Laws], (ii) for the delivery of Goods, including clearance through customs, and (iii) for the export of Contractor's Equipment when it is removed from the Site.
NEW CLAUSE -2.2	<p>Employer's Personnel</p> <p>The Employer will be responsible for ensuring that the Employer's Personnel and the Employer's other contractors on the Site:</p> <ul style="list-style-type: none"> (a) co-operate with the Contractor's efforts under New-Clause 4.24/PCC [Co-operation], and (b) take actions similar to those which the Contractor is required to take under sub-paragraphs (a), (b) and (c) of New-Clause 4.26/PCC [Safety Procedures] and under New-Clause 4.36/PCC [Protection of the Environment].
NEW CLAUSE-2.3	<p>Employer's Financial Arrangements</p> <p>The Employer has sourced the funds to finance the project</p> <p>Assignment by the Employer</p> <p>The Employer shall be fully entitled without the consent of the Contractor, to assign the benefit of the Contract or any part thereof and any interest therein or there under to any third party.</p>
NEW CLAUSE-2.4	<p>Employer's Claims</p> <p>If the Employer considers himself to be entitled to any payment under any Clause of these Conditions or otherwise in connection with the Contract, and/or to any extension of the Defects Notification Period, the Employer or the Engineer shall give notice and particulars to the Contractor. However, notice is not required for payments due under New-Clause 4.37/PCC</p>

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	<p>[Electricity, Water and Gas], under New-Clause 4.38/PCC [Employer's Equipment and Free-Issue Material], or for other services requested by the Contractor.</p> <p>The notice shall be given as soon as practicable after the Employer became aware, or should have become aware, of the event or circumstances giving rise to the claim. A notice relating to any extension of the Defects Notification Period shall be given before the expiry of such period.</p> <p>The particulars shall specify the Clause or other basis of the claim, and shall include substantiation of the amount and/or extension to which the Employer considers himself to be entitled in connection with the Contract. The Engineer shall then proceed in accordance with New-Clause 3.5/PCC [Determinations] to agree or determine (i) the amount (if any) which the Employer is entitled to be paid by the Contractor, and/or (ii) the extension (if any) of the Defects Notification Period in accordance with New-Clause 6.12/PCC Extension of Defects Notification Period].</p> <p>This amount may be included as a deduction in the Contract Price and Payment Certificates. The Employer shall only be entitled to set off against or make any deduction from an amount certified in a Payment Certificate, or to otherwise claim against the Contractor, in accordance with this Sub-Clause.</p>
	<p>3.THE ENGINEER</p>
<p>NEW CLAUSE-3.1</p>	<p>“Engineer” means the person nominated by the Employer to act as the Engineer for the purposes of the Contract and named in the Contract Data, or other person appointed from time to time by the Employer and notified to the Contractor under New-Clause 3.4 [Replacement of the Engineer]. The person nominated to act as an engineer may be an employee of Rail Infrastructure Development Company (Karnataka) Ltd (K-RIDE) or an employee of a Project Management Consultancy firm engaged by K-RIDE for project management as per the discretion of the Employer.</p> <p>Engineer's Duties and Authority</p> <p>The Employer shall appoint the Engineer who shall carry out the duties assigned to him in the Contract. The Engineer's staff shall include suitably qualified engineers and other professionals who are competent to carry out these duties.</p> <p>The Engineer shall have no authority to amend the Contract.</p> <p>The Engineer may exercise the authority attributable to the Engineer as specified in or necessarily to be implied from the Contract.</p> <p>However, the Engineer shall obtain the specific approval of the Employer before taking action under the-following Sub-Clauses of these Conditions:</p> <ol style="list-style-type: none"> a) New-Clause 4.30/PCC [Unforeseeable Physical Conditions] Agreeing or determining an extension of time and/or additional cost. b) Sub-Clause 26.5/PCC [Extension of Time for Completion] Agreeing or determining extension of time. c) New-Clause 6.9/PCC [Performance Certificate] Issue of Performance Certificate. d) Sub-Clause 34. Except, <ol style="list-style-type: none"> (i) in an emergency situation as determined by the Engineer and as amplified in sub-paras (h) and (i) below, or (ii) DELETED e) Sub-Clause 34.2 – Procedure for change of scope: Approving a proposal for Variation submitted by the Contractor in accordance with Sub Clause 34.1. f) Sub-Clause 37.16 -Payment in applicable Currencies: Specifying the amount payable in

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	<p>each of the applicable currencies for a Variation.</p> <p>g) Clause 56.1/SCC: Contractor Claims for extension of time and/or additional payment.</p> <p>h) Providing Power block or Traffic block to the contractor.</p> <p>i) Giving any instruction to the contractor, outside the scope of the Engineer.</p> <p>j) DELETED</p> <p>Notwithstanding the obligation, as set out above, to obtain approval, if, in the opinion of the Engineer, an emergency occurs affecting the safety of life or of the Works or of adjoining property, he may, without relieving the Contractor of any of his duties and responsibility under the Contract, instruct the Contractor to execute all such work or to do all such things as may, in the opinion of the Engineer, be necessary to abate or reduce the risk. The Contractor shall forthwith comply, despite the absence of approval of the Employer, with any such instruction of the Engineer. The Engineer shall determine an addition to the Contract Price, in respect of such instruction, in accordance with Clause 34/PCC and shall notify the Contractor accordingly, with a copy to the Employer.</p> <p>k) In case the emergency mentioned in above Sub-para occurs on account of failure of Contractor, by way of not adhering to the approved scheme of work or not taking adequate safety precautions or by any other reason attributable to the contractor, then no additional amounts shall be paid to the Contractor for attending to such emergencies and the Contractor shall be liable for Employer's claims.</p> <p>l) Clause 7/PCC regarding deployment of Sub-Contractors.</p>
NEW CLAUSE-3.2	<p>Delegation by the Engineer</p> <p>The Engineer may from time to time assign duties and delegate authority to assistants, and may also revoke such assignment or delegation. These assistants may include a resident engineer, and/or independent inspectors appointed to inspect and/or test items of Plant and/or Materials. The assignment, delegation or revocation shall be in writing and shall not take effect until copies have been received by both Parties.</p> <p>However, unless otherwise agreed by both Parties, the Engineer shall not delegate the authority to determine any matter in accordance with New-Clause 3.5/PCC [Determinations].</p> <p>Assistants shall be suitably qualified persons, who are competent to carry out these duties and exercise this authority, and who are fluent in the language for communications defined in Sub-Clause 3/CC [Law and Language].</p> <p>Each assistant, to whom duties have been assigned or authority has been delegated, shall only be authorised to issue instructions to the Contractor to the extent defined by the delegation. Any approval, check, certificate, consent, examination, inspection, instruction, notice, proposal, request, test, or similar act by an assistant, in accordance with the delegation, shall have the same effect as though the act had been an act of the Engineer. However:</p> <p>(a) any failure to disapprove any work, Plant or Materials shall not constitute approval, and shall therefore not prejudice the right of the Engineer to reject the work, Plant or Materials;</p> <p>(b) if the Contractor questions any determination or instruction of an assistant, the Contractor may refer the matter to the Engineer, who shall promptly confirm, reverse or vary the determination or instruction.</p>
NEW CLAUSE-3.3	<p>Instructions of the Engineer</p> <p>The Engineer may issue to the Contractor (at any time) instructions and additional or modified Drawings which may be necessary for the execution of the Works and the remedying of any defects, all in accordance with the Contract. The Contractor shall only take instructions from the Engineer, or from an assistant to whom the appropriate authority has been delegated under this</p>

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	<p>Clause. If an instruction constitutes a Variation, Clause34/PCC [Variations and Adjustments] shall apply.</p> <p>The Contractor shall comply with the instructions given by the Engineer or delegated assistant, on any matter related to the Contract. Whenever practicable, their instructions shall be given in writing. If the Engineer or a delegated assistant,</p> <ul style="list-style-type: none"> (a) gives an oral instruction and (b) receives a written confirmation of the instruction, from (or on behalf of) the Contractor, within two working days after giving the instruction, and (c) does not reply by issuing a written rejection and/or instruction within two working days after receiving the confirmation, (d) then the confirmation shall constitute the written instruction of the Engineer or delegated assistant (as the case may be).
NEW CLAUSE-3.4	<p>Replacement of the Engineer</p> <p>Notwithstanding New-Clause 3.1/PCC, if the Employer intends to replace the Engineer, the Employer shall, not less than 21 days before the intended date of replacement, give notice to the Contractor of the name, address and relevant experience of the replacement Engineer.</p>
NEW CLAUSE-3.5	<p>Determinations</p> <p>Whenever these Conditions provide that the Engineer shall proceed in accordance with this New-Clause 3.5/PCC to agree or determine any matter, the Engineer shall consult with each Party in an endeavour to reach agreement. If agreement is not achieved, the Engineer shall make a fair determination in accordance with the Contract, taking due regard of all relevant circumstances.</p> <p>The Engineer shall give notice to both Parties of each agreement or determination, with supporting particulars. Each Party shall give effect to each agreement or determination unless and until revised under Clause 56/SCC [Claims, Disputes and Arbitration].</p>
NEW CLAUSE-3.6	<p>Remuneration of the Engineer</p> <p>The remuneration, cost and expenses of the Engineer shall be borne by the Employer</p>
NEW CLAUSE-3.7	<p>Interim Arrangement</p> <p>In the event that the Employer has not appointed an Engineer, or the Engineer so appointed has relinquished its functions, the Employer may, in the interim, designate and authorise any person to discharge the functions of the Engineer in accordance with the provisions of this Agreement, save and except that such person shall not exercise any functions relating to review, comment, approval or inspection as specified in this Agreement for and in respect of the Engineer, and such functions shall be discharged as and when an Engineer is appointed in accordance with the provisions of this Agreement. Provided, however, that nothing contained in this Clause shall in any manner restrict the rights of the Employer to enforce compliance of the provisions of this Agreement.</p>
	<p>4.THE CONTRACTOR</p>
NEW CLAUSE-4.1	<p>Contractor's General Obligations</p> <p>4.1.1 Subject to and on the terms and conditions of this Agreement, the Contractor shall undertake the survey, investigation, design, engineering, procurement, and construction of the Railway Project and observe, fulfil, comply with and perform all its obligations set out in this Agreement or arising hereunder.</p> <p>4.1.2 The Contractor shall comply with all Applicable Laws and Applicable Permits (including renewals as required) in the performance of its obligations under this Agreement.</p>

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	<p>4.1.3 Save and except as otherwise provided in this Agreement or Applicable Laws, as the case may be, the Contractor shall, in discharge of all its obligations under this Agreement, conform with and adhere to Good Industry Practice at all times.</p> <p>4.1.4 The Contractor shall remedy any and all loss or damage to the Railway Project, occurring on or after the Commencement Date and until the date of Provisional Certificate, with respect to the Works completed prior to the issuance of the Provisional Certificate and/or Completion Certificate, with respect to the Works referred to in the Punch List, at its own cost, save and except to the extent that any such loss or damage shall have arisen from any default of the Employer or on account of a Force Majeure Event in which case the provisions of New Clause 8/PCC/ Force majeure shall apply.</p> <p>4.1.5 The Contractor shall remedy any and all loss or damage to the Railway Project during the Defects Liability Period at its own cost, to the extent that such loss or damage shall have arisen out of the reasons specified.</p> <p>4.1.6 The Contractor shall, at its own cost and expense, in addition to and not in derogation of its obligations elsewhere set out in this Agreement:</p> <ul style="list-style-type: none"> (a) make, or cause to be made, necessary applications to the relevant Government Instrumentalities with such particulars and details as may be required for obtaining Applicable Permits and obtain and keep in force and effect such Applicable Permits in conformity with Applicable Laws; (b) procure, as required, the appropriate proprietary rights, licenses, agreements and permissions for Materials, methods, processes, know-how and systems used or incorporated into the Railway Project; (c) make reasonable efforts to maintain harmony and good industrial relations among the personnel employed by it or its Sub-contractors in connection with the performance of its obligations under this Agreement; (d) ensure and procure that its Sub-contractors comply with all Applicable Permits and Applicable Laws in the performance by them of any of the Contractor's obligations under this Agreement; (e) always act in a manner consistent with the provisions of this Agreement and not cause or fail to do any act, deed or thing, whether intentionally or otherwise, which may in any manner be violative of any of the provisions of this Agreement; (f) support, cooperate with and facilitate the Employer in the implementation and operation of the Project in accordance with the provisions of this Agreement; (g) ensure that the Contractor and its Sub-contractors comply with the safety and welfare measures for labour in accordance with Applicable Laws and Good Industry Practice; (h) keep, on the Site, a copy of Agreement, publications named in Agreement, the Drawings, Documents relating to the Project, Change of Scope Orders and other communications sent under Agreement, and provide access to all these documents at all reasonable times to the Engineer and its Mobilized personnel; (i) cooperate with other contractors employed by the Employer and with personnel of any other public authority; and (j) not interfere unnecessarily or improperly with the convenience of the public, or the access to and use and occupation of all the existing facilities within the Right of Access, irrespective of whether they are public or in the possession of the Employer or of others. (k) to provide reasoned comments on any information relating to the contractor's

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	<p>activities under or pursuant to the agreement, which the Employer may publish.</p> <p>(l) The Contractor shall undertake all necessary superintendence to plan, arrange, direct, manage, inspect and test the Works</p> <p>4.1.7 Electricity, water and other services</p> <p>The Contractor shall be responsible for procuring of all power, water and other services that it may require for the Railway Project.</p> <p>4.1.8 Unforeseeable difficulties</p> <p>Except as otherwise specified in the Agreement:</p> <p>(a) the Contractor accepts complete responsibility for having foreseen all difficulties and costs of successfully completing the Works;</p> <p>(b) the Contract Price shall not be adjusted to take account of any unforeseen difficulties or costs; and</p> <p>(c) the Scheduled Completion Date shall not be adjusted to take account of any unforeseen difficulties or costs.</p> <p>For the purposes of this Clause, unforeseeable difficulties include physical conditions like man-made or natural physical conditions including sub-surface and hydrological conditions which the Contractor encounters at the Site during execution of the Works.</p> <p>4.1.9 Safety at work site</p> <p>The Contractor and its sub-contractors shall follow the safety instructions and take all safety measures for workmen and vehicles plying in the work area in accordance with Applicable Laws, Good Industry Practice and the provisions of this Agreement.</p> <p>The Contractor shall design (to the extent specified in the Contract), execute and complete the Works in accordance with the Contract and with the Engineer's instructions, and shall remedy any defects in the Works.</p> <p>The Contractor shall provide the Plant and Contractor's Documents specified in the Contract, and all Contractor's Personnel, Goods, consumables and other things and services, whether of a temporary or permanent nature, required in and for this design, execution, completion and remedying of defects.</p> <p>All equipment, and material, to be incorporated in or required for the Works shall be procured from approved sources as stipulated in the Contract.</p> <p>i. All plants / equipment to be deployed on the work shall carry designated authority certificate. Where not specified, it shall have third party safety certificate for the safe working of the equipment and shall be renewed after every 3 months. This certificate shall be produced to the Engineer as and when required.</p> <p>ii. All the construction plant shall be provided with the experienced operators having valid license issued by the competent authority.</p> <p>iii. Any material or equipment not meeting the approval of the Engineer shall be removed from the site immediately.</p> <p>iv. All Contractor's Equipment and Temporary Works provided by the Contractor shall, when brought on to the site, be deemed to be exclusively intended for execution of the Works and not be removed without the consent in writing of the Engineer. Such consent shall not be unreasonably withheld or delayed.</p> <p>The Contractor shall be responsible for the adequacy, stability and safety of all Site operations and of all methods of construction. Except to the extent specified in the Contract, the Contractor (i)</p>

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	<p>shall be responsible for all Contractors' Documents, Temporary Works, and such design of each item of Plant and Materials as is required for the item to be in accordance with the Contract, and (ii) shall not otherwise be responsible for the design or specification of the Permanent Works.</p> <p>The Contractor shall throughout the execution of the Works including the carrying out of any testing, commissioning or remedying of any defect:</p> <ol style="list-style-type: none"> i. provides and maintain all lights, guards, fences and warning signs and watchmen when and where necessary or required by the Engineer or by laws or by any relevant authority for the protection of the Works and for the safety and convenience of the public and all persons on or in the vicinity of the Site; and ii. Contractor is required to take note of all the necessary provisions in Employer's Safety, Health and Environment Manual (SHE Manual) and the Contractor's price shall be inclusive of all the necessary costs to meet the prescribed safety standards as specified in the Special Conditions of Contract. In the case, the Contractor fails in the above; the Employer may provide the necessary arrangements and recover the costs from the Contractor
NEW CLAUSE-4.2	<p>Tools, Plants and Equipment Supplied by the Employer</p> <ol style="list-style-type: none"> i. Except for any specific item mentioned in the Special Conditions of Contract or in Employer's Requirements, the Contractor shall provide all tools, plants and Equipment for the Works. In respect of such exceptional tools, plants or Equipment committed to be provided by the Employer under terms and conditions specified in the Special Conditions of Contract, the Contractor shall take all reasonable care and shall be responsible for all damages or loss caused by him, his representatives, sub-contractors or his workmen or others while they are in his charge. ii. No tools, plant and equipment shall be supplied by the Employer. Unless specifically incorporated in special conditions, the Contractor has to arrange all tools, plant, equipment required for the work. iii. On completion of the Works, the Contractor shall hand over the unused balance of the tools, plants and Equipment supplied by the Employer to the Employer back in good order and repair, fair wear and tear expected, and shall be responsible for any failure to account for the same or any damage done thereto. iv. The decision of the Engineer as to the amount recoverable from the Contractor on this account shall be final and binding.
NEW CLAUSE-4.3	<p>Employer's Materials</p> <p>Except for items mentioned in the Special Conditions of Contract, the Contractor shall provide all materials for the Works. Material if any, to be provided by Employer will be done only in a phased manner as per pre-approved program, against a Bank Guarantee for the value of the Material and at terms and conditions for issue, upkeep, usage, return and recovery of such Materials as specified in Special Conditions of Contract.</p>
NEW CLAUSE-4.4	<p>Sheds, Stores, Yards</p> <p>It shall be the responsibility of the Contractor to provide at his own expense the required sheds, store houses, and yards for both Permanent and Temporary Works and provide free access to the Engineer and the Engineer's Representative who will have right of inspection including that of instructing the Contractor to remove a particular material from the stores and not to use the same on the Works.</p>
NEW CLAUSE-4.5	<p>Temporary Works</p> <p>The Contractor's proposals for erection of all ancillary and temporary works shall be in conformity with the proposals submitted along with the Tender and modifications thereto as approved by</p>

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	<p>Engineer.</p> <p>The Contractor shall submit drawings, supporting design calculations of Temporary works, where called for by the Engineer and other relevant details of all such works to the Engineer for approval at least one month before he desires to commence such works. Approval by the Engineer of any such proposal shall not relieve the Contractor of his responsibility for sufficiency of such works.</p> <p>All temporary works necessary for the proper execution of the Works shall be provided and maintained by the Contractor at his cost (unless otherwise provided in tender document) and subject to the consent of the Engineer shall be removed by Contractor at his own expense when they are no longer required and in such manner as the Engineer shall direct. In case the Contractor fails to remove the temporary works on completion the Engineer is authorized to get the same removed and recover the cost thereof from the Contractor.</p>
NEW CLAUSE-4.6	<p>Access for Employer and Engineer</p> <p>The Contractor shall allow at all times the Employer, Engineer or the Engineer's assistant or any other person authorised by the Engineer access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plant are being manufactured, fabricated and/or assembled for the Works. The Contractor shall ensure that sub contracts if any shall contain provisions entitling the Engineer or any person authorised by him to have such access.</p>
NEW CLAUSE-4.7	<p>Access Road and Way Leave</p> <ol style="list-style-type: none"> I. Providing access roads/ way leaves to the site will be Contractor's responsibility. II. The Contractor shall pay the statutory vehicle license and permit fees for use of public roads. The Contractor's heavy construction or tracked equipment shall not travel on any public road or bridge, unless the Contractor has made arrangements with the authority concerned and has obtained the approval of the Engineer to such arrangements. III. The Contractor shall repair any damage to the road or bear the cost thereof due to movement of contractor's plants and equipment, vehicles etc. to the specifications and satisfaction of road authorities as well as of Engineer. IV. The Contractor shall plan transportation of construction materials to work site in accordance with traffic regulations enforced by local traffic authorities from time to time and in such a way that congestion on the roads and road accidents are avoided. The Contractor should study this aspect thoroughly before quoting for the work.
NEW CLAUSE-4.8	<p>Contractor to keep Site Clear</p> <ol style="list-style-type: none"> i. During the execution of the Works, the Contractor shall keep the Site free from all unnecessary obstruction, and shall store or dispose of any Contractor's Equipment or surplus materials. The Contractor shall clear away and remove from the Site any wreckage, rubbish or Temporary Works no longer required. ii. On completion of the works, the Contractor shall clear away and remove from site all Constructional Plant, surplus material and Temporary Works. He should leave the whole of the site and Works in a clean, tidy and workman like condition to the satisfaction of the Engineer. iii. On completion of Work the Contractor shall also clear away the labour camps, hutments and other related installations and restore the land to its original condition to the satisfaction of the Engineer within 45 days of the physical completion of Work. The cost on account of delay in return of land and reinstatement of original condition within the stipulated time as determined by Engineer will be recovered from the Contractor's dues. iv. All garbage shall be removed from site daily or as they accumulate. All surface and sub-soil

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	<p>drains shall be maintained in a clean, sound and satisfactory state of performance. No extra payment shall be made on this account.</p> <p>v. No final payment in settlement of the accounts for Works shall be made till, in addition to any other condition necessary for such final payment, site clearance and clearances of labour camps etc. shall have been affected by him. Such clearance may be made by the Engineer through any other agency at the expense of the Contractor in the event of the Contractor's failure to comply with this provision within 7 days after receiving notice to that effect from the Engineer. All expenses on such removal / clearance shall be debit able to the Contractor as loans due from the Contractor to the Employer, and the Employer shall be competent to recover the same from Contractor's on-account or final bills, or from Performance Security amount or from any other amount payable to the Contractor in any other Contract.</p>
NEW CLAUSE-4.9	<p>Security of the Site</p> <p>I. The Contractor shall take all measures necessary to ensure security, including exercising control over all persons and vehicles which are employed or engaged on the Site or in connection with the Works or the other works comprising the Project and with the security arrangements applicable to any other site within the Project.</p> <p>II. The Contractor shall arrange the issue of passes for the admission of all persons and vehicles to the Site or to any part thereof and may refuse admission to or remove from the Site any person or vehicle failing to show an appropriate pass on demand to any duly authorized person.</p> <p>III. If required by the Engineer, the Contractor shall submit a list identifying all persons to whom passes have been issued together with two photographs of each person and all entities to which a pass has been issued in respect of any vehicle and shall satisfy the Engineer of the bonafides of any such person or entity.</p> <p>IV. The Contractor shall not, without the written permission of the Engineer or otherwise in accordance with the Contract, allow access to the Site to any person unless the presence on Site of such person is necessary in connection with the execution of the Works or with the discharge of the duties of any relevant authority.</p> <p>V. The Contractor shall be wholly responsible for security of site and Works. The Contractor shall follow relevant Safety and Security instructions issued by the concerned Authorities from time to time and shall work in close coordination with the concerned Authorities.</p>
NEW CLAUSE-4.10	<p>Contractor's Operations on Site</p> <p>I. The Contractor shall confine his operations to the Site, and to any additional area which may be provided to the Contractor and agreed by the Engineer as working areas. The Contractor shall take all necessary precautions to keep his personnel and equipment within the Site and such additional areas, and to keep and prohibit them from encroaching on adjacent land.</p> <p>II. The Contractor, after obtaining any necessary consent from any relevant authority, shall submit to the Engineer proposals showing the layout of pedestrian routes, lighting, signs, and guarding any road opening or traffic diversion which may be required in connection with the execution of the Works and which the Contractor intends to construct. Any consent given by the Engineer to such proposals shall not relieve the Contractor of any obligation under the Contract or absolve the Contractor from any liability for or arising from such proposals or the implementation thereof.</p> <p>III. All lights provided by the Contractor shall be so placed or screened as not to interfere with signs, signals or lights. The Contractor shall not in any way obscure or affect signs, signals or lights, in use by any relevant authority. In the event that the Contractor does so, the</p>

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	<p>Contractor shall pay all costs associated with the re-fitting, re-instating or provision of alternatives for any sign, signal or light, obscured or affected.</p> <p>IV. For the purposes of this Clause only, "Site" shall include off-Site places of manufacture or storage and the Contractor's Work Areas and shall include, areas provided to the Contractor by others.</p>
NEW CLAUSE-4.11	<p>Publicity</p> <p>The Contractor shall not publish or otherwise circulate alone or in conjunction with any other person, any articles, photographs or other materials relating to the Contract, the Site, the Works, the Project or any part thereof, nor impart to the press, or any radio or television network any information relating thereto, nor allow any representative of the media access to the Site, Contractor's Works Areas, or off-Site place of manufacture, or storage except with the permission, in writing, of the Employer. The Contractor shall ensure that his sub-contractors of any tier shall be bound by a like obligation and shall, if so required by the Employer, enforce the same at his own expense. The provisions of this Sub-Clause shall not exempt the Contractor from complying with any statutory provision in regard to the taking and publication of photographs.</p>
NEW CLAUSE-4.12	<p>Disclosure of Relationship</p> <p>If the Contractor or any partner of the Contractor or Director of the Contractor's company is closely related to any of the Officers of the Employer or the Engineer, or alternatively, if any close relative of an officer of the Employer or the Engineer has financial interest / stake in the Contractor's firm, the same shall be disclosed by the Contractor at the time of filing his tender. Any failure to disclose the interest involved, shall entitle the Employer to rescind the Contract, without payment of any compensation to the Contractor. The Contractor shall note that he is prohibited from developing such interest during the Contract period.</p>
NEW CLAUSE-4.13	<p>Use of Explosives</p> <p>Explosives if required on the Work shall be used by Contractor only with prior Approval of the Engineer and in the manner and to the extent permitted by him. The explosives shall be handled, stored in a special magazine to be provided at the cost of the Contractor and used under the strict supervision of persons licensed for this purpose under the requisite statutory rules and regulations. The Contractor shall take all precautions in transporting and using the explosives and avoid damage to nearby structures and utilities. The Contractor shall be responsible for taking all the precautions in the usage of the explosives at Contractor's cost, sole risk and responsibility. The Contractor shall hold the Employer harmless and indemnify for the above.</p>
NEW CLAUSE-4.14	<p>In Pursuance with this Policy, the Employer</p> <p>a. Will reject the Tender for the Work or rescind the Contract, if the Employer determines that the Tenderer/Contractor has engaged in corrupt or fraudulent practices.</p> <p>b. Will declare a Tenderer/Contractor ineligible, either indefinitely or for a minimum period of 2 years from the date of identification of such prohibited conduct, to be awarded a Contract/s if the Employer at any time determines that the Contractor has engaged in corrupt or fraudulent practices in competing for, or in executing the Contract.</p>
NEW CLAUSE-4.15	<p>Compensation to Contractor on Rescission of Contract under this clause</p> <p>In the event of rescission of Contract, the Contractor shall not be entitled to any compensation whatsoever, except for the work done up to the date of rescission.</p>

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NEW CLAUSE-4.16	<p>Quality Assurance</p> <p>Unless otherwise stated in Special Conditions of Contract and/or Employer's Requirement, the Contractor shall institute a quality assurance system to demonstrate compliance with the requirements of the Contract. Such system shall be in accordance with the details stated in the Contract. Compliance with the quality assurance system shall not relieve the Contractor of his duties, obligations or responsibilities.</p> <p>Details of all procedure and compliance documents shall be submitted to the Engineer for his consent before each execution stage is commenced</p>
NEW CLAUSE-4.17	<p>Work by Persons Other than Contactor</p> <ol style="list-style-type: none"> I. If the Contractor shall fail to carry out any work required under the Contract or refuse to comply with any instruction or order given by the Employer / Engineer in accordance with the Contract within a reasonable time, the Employer may give the Contractor 14 days' notice in writing to carry out such work or comply with such instruction. II. If the Contractor fails to comply with such notice, the Employer shall be entitled to carry out such work or instruction by his own workmen or by other contractors in whatever manner the Employer decides, be it single Tender or limited Tender or open Tender or on entrustment basis without any right of appeal by the contractor. III. However, in case of emergencies/urgencies/affecting safety the period of 14 days' notice shall be 24hours notice in writing. The Classification of work as emergencies/urgencies/affecting safety is the prerogative of Employer and his decision is final and binding on the contractor. Without prejudice to any other right or remedy, all additional expenditure properly incurred by the Employer in having such work or instruction carried out shall be recoverable by the Employer from the Contractor. IV. If by reason of any accident or failure or other event occurring to, in, or in connection with the Works any remedial or other work shall, in the opinion of the Employer, be urgently necessary and the Contractor is unable or unwilling at once to do such remedial or other work, the Engineer may authorize the carrying out of such remedial or other work by a person other than the Contractor. V. If the remedial or other work so authorized by the Engineer is work, which, in the Engineer's opinion, the Contractor was liable to do under the Contract; all expenses properly incurred in carrying out the same shall be recoverable by the Employer from the Contractor. Provided that the Employer / Engineer shall, as soon after the occurrence of any such emergency as may be reasonably practicable, notify the Contractor thereof in writing.
NEW CLAUSE-4.18	<p>Confidentiality of Information</p> <ol style="list-style-type: none"> I. The Contractor shall not use or divulge, except for the purpose of the Contract or with the written permission of the Employer, any information relating to the Works or the Project provided in the Contract or otherwise provided by the Employer, or the Engineer. The Contractor shall ensure that his sub-contractors of any tier shall be bound by a like confidentiality undertaking. II. The Employer, Engineer and any third party to whom an assignment has been made in accordance with New-clause 2.3/PCC may use any information provided by the Contractor in accordance with the Contract. The Employer shall use reasonable endeavours to ensure that the Engineer and any third party referred to in aforesaid New-clause 2.3/PCC shall not; divulge such information except for any purpose connected with the Contract. <p>On completion of the works, the contractor shall arrange to furnish to the Employer two (2) bound</p>

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	<p>sets of all “As Built” drawings for every component of the Works at his own cost, all such copies being on Polyester film of quality to be approved by the Engineer or his Representative. The Taking – over Certificate of the Works, as per the provisions of Clause 46.1/PCC herein, shall not be issued by the Engineer in the event of the Contractor’s failure to furnish the aforesaid “As Built” drawings for the entire works.</p> <p>If the Contract specifies that the Contractor shall design any part of the Permanent Works, then unless otherwise stated in the Special Conditions of Contract:</p> <ul style="list-style-type: none"> (a) the Contractor shall submit to the Engineer the Contractor’s Documents for this part in accordance with the procedures specified in the Contract; (b) these Contractor’s Documents shall be in accordance with the Specification and Drawings, shall be written in the language for communications defined in Sub-Clause 3/CC [Law and Language], and shall include additional information required by the Engineer to add to the Drawings for co-ordination of each Party’s designs; (c) the Contractor shall be responsible for this part and it shall, when the Works are completed, be fit for such purposes for which the part is intended as are specified in the Contract; and (d) prior to the commencement of the Tests on Completion, the Contractor shall submit to the Engineer the “as-built” documents and operation and maintenance manuals in accordance with the Specification and in sufficient detail for the Employer to operate, maintain, dismantle, reassemble, adjust and repair this part of the Works. Such part shall not be considered to be completed for the purposes of taking-over under Sub-Clause 46.1/PCC [Taking Over of the Works and Sections] until these documents and manuals have been submitted to the Engineer.
<p>NEW CLAUSE-4.19</p>	<p>Performance Security</p> <p>The Contractor shall obtain (at his cost) a Performance Security and an additional Performance Security, if any in terms of ITT 25.6, for proper performance of the contract, for the amount, currencies and validity period for Performance Security stated in the Contract Data. If an amount is not stated in the Contract Data, this Sub-Clause shall not apply.</p> <p>The Contractor shall deliver the Performance Security and additional Performance Security, if any, to the Employer within 28 days after receiving the Letter of Acceptance, and shall send a copy to the Engineer. The Performance Security/additional Performance Security shall be issued by an entity and from within a country (or other jurisdiction) approved by the Employer and shall be in the form as given in Section 10 (Formats) or in another form specifically approved by the Employer.</p> <p>The procedure for obtaining Performance Guarantee is outlined below:</p> <p>The successful bidder shall have to submit a Performance Guarantee (PG) within 28 (Twenty-eight) days from the date of issue of Letter of Acceptance (LOA). Extension of time for submission of PG beyond 28 (Twenty-eight) days and up to 60 days from the date of issue of LOA may be given by the Employer who is competent to sign the contract agreement. However, a penal interest of 12% per annum shall be charged for the delay beyond 28(Twenty-eight) days, i.e. from 29th 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 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 Earnest Money Deposit and other dues payable against that contract. In case a tenderer has not submitted Earnest Money Deposit on the strength of their registration as a Start-up recognized by Department for promotion of industry and internal trade (DPIIT) under Ministry of Commerce and Industry, DPIIT shall be informed to this effect. The failed Contractor shall be debarred from participating in re-tender for that work.</p>

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	<p>The Performance Security/additional Performance Security shall be, at the Contractor's option, in any of the following forms:</p> <ul style="list-style-type: none"> (i) An unconditional Bank Guarantee in the prescribed format (ii) A Pay Order / Demand Draft drawn on a Scheduled / Nationalized Bank in India in favour of "Rail Infrastructure Development Company (Karnataka) Ltd" payable at Bangalore. (iii) FDR in favour of "Rail Infrastructure Development Company (Karnataka) Ltd." (free from any encumbrance). (iv) A online bank transfer to K-RIDE account. <p>The Bank Guarantee shall be from a bank having minimum net-worth of over INR 500 million from the specified banks as under:</p> <ul style="list-style-type: none"> (i) a Schedule Bank in India, or (ii) a Foreign Bank having their operations in India, or (iii) a Foreign Bank which does not have operations in India is required to provide a counter-guarantee by State Bank of India, <p>The Scheduled Bank issuing the Bank Guarantee must be on "Structured Financial Messaging System (SFMS)" platform. A separate advice of the BG shall be invariable be sent by the issuing bank to the Employer's Bank through SFMS and only after this the BG shall become operative and acceptable to the Employer.</p> <p>The Issuing Bank shall send the SFMS to:</p> <p style="padding-left: 40px;">Beneficiary: Rail Infrastructure Development Company (Karnataka) Ltd. (K-RIDE) Bank Name: Canara Bank Branch: Prime Corporate Branch Account No. 0430201012110 IFSC Code: CNRB0002636</p> <p>In case the contractor is a JV; the Performance Security/additional Performance Security, if any in terms of ITB 35.5, shall be submitted by each JV Partner separately on behalf of the JV in favour of K-RIDE in proportion of their respective percentage share specified in the JV Agreement. The additional Performance Security shall be submitted by the partner(s) responsible for execution of schedule(s) (as per JV agreement) against which additional Performance Security is required to be submitted in terms of ITB 35.5.</p> <p>However, Submission of Performance Guarantee Security by individual partners on behalf of the JV shall in no way dilute their Joint & Several responsibility. The Employer shall be entitled to recover the amount of Bank Guarantees individually and / or from all the Partners jointly at its discretion."</p> <p>The Contractor shall ensure that the Performance Security/additional Performance Security is valid and enforceable until the Contractor has executed and completed the Works and remedied defects, if any. If the contractor does not complete the work for any reasons whatsoever, the terms of the Performance Security/ additional Performance Security specify its expiry date, and the Contractor has not become entitled to receive the Performance Certificate by the date 28 days prior to the expiry date, the Contractor shall be bound to extend the validity of the Performance Security/additional Performance Security until the Works have been completed and any defects have been remedied.</p> <p>Failure of the successful Tenderer to furnish the required Performance Security shall be a ground for the annulment of the award of Contract and execution of the Tender Securing Declaration.</p>

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	<p>Release of performance security</p> <p>(i) The whole or such portion of the Performance Security amount shall be liable to be forfeited by the Employer at the discretion of the Employer, in the event of any breach of Contract on the part of the Contractor.</p> <p>(ii) After completion of the entire Work, the Performance Security shall be released to the Contractor, on issue of last Taking Over Certificate if more than one Certificate exist, by the Engineer, the release of Performance Security shall not relieve the Contractor from his obligations and liabilities, to make good that may be detected during the Defects Liability Period.</p> <p>The Guarantees shall be unconditional and irrevocable. The Employer shall return the Performance Security to the Contractor within 21 days after receiving a copy of the Performance Certificate or passing of the Final Payment Certificate whichever is later. However, on completion of specified section(s) and successful passage of defect liability period for such section(s) along with execution of any leftover works at the time of completion of such section(s), the contractor shall be entitled for release of 90% of the proportionate Performance Security calculated as specified in Contract Data subject to the condition that Engineer certifies that no recoveries are pending in the contract. In case Engineer points out amount to be recovered then the contractor shall be entitled for release of 90% of the proportionate Performance Security calculated as specified in Contract Data minus the amount to be recovered.</p> <p>The Employer shall return additional Performance Security submitted in terms of ITB 35.5 as per the following;</p> <p>(a) If the Contractor submits an application stating that all the works against the particular schedule(s)/bill(s) for which additional Performance Security was submitted in terms of ITB 35.5 have been completed in all respect, then the Employer, on being satisfied with the claim of the Contractor, shall return the full additional Performance Security against the particular schedule(s). Decision of the Employer regarding completion of works against a particular schedule/bill shall be final and binding on the Contractor.</p> <p>(b) If the Contractor submits an application stating that majority of the works (physical progress being not less than 90%) against the particular schedule(s)/bill(s) for which additional Performance Security was submitted in terms of ITB 35.5 have been completed and execution of balance works is held up for reasons not attributable to the Contractor, then the Employer, on being satisfied with the claim of the Contractor, shall return 75% of the amount of additional Performance Security against the particular schedule(s). The balance amount of additional Performance Security shall however be returned only after completion of the works against the particular schedule(s)/bill(s) for which additional Performance Security was submitted in terms of ITB 35.5, in all respects to the satisfaction of the Employer. Decision of the Employer regarding completion of works against a particular schedule/bill shall be final and binding on the Contractor.</p> <p>Without limitation to the provisions of the rest of this Sub-Clause, whenever the Engineer determines an addition or a reduction to the Contract Price as a result of a change in cost and/or legislation or as a result of a Variation amounting to more than 25 percent of the portion of the Contract Price payable in a specific currency, the Contractor shall at the Engineer's request promptly submit Performance Guarantee @ 10% of the increased amount over the original contract price in a specific currency. On the other hand, if the value of contract price decreases by more than 25% of the original contract price payable in a specific currency, Performance Guarantee @ 10% of the decrease in contract price from the original contract price in a specific currency shall be returned to the contractor, on his request.</p> <p>Wherever the contract is terminated under Clause 49.7/PCC, the Performance Guarantee shall be</p>

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	<p>encashed by the Employer:</p> <ul style="list-style-type: none"> i) in full including additional Performance Guarantee amount, if any, taken in terms of clause 25.5 and 29 of ITT and not due for release on the date of issue of termination letter in terms of this clause, in case of termination of the contract as a whole; or ii) at the discretion of the Employer it may be encashed in part/parts proportionate to the Contract price of the bill/schedule to which the terminated part of work belongs i.e $P=(A \times B) \div C$ where <p>P=Proportionate Bank Guarantee Amount.</p> <p>A=Contract price of the particular bill/schedule to which the terminated part of work belongs.</p> <p>B=Performance Guarantee amount in terms of CC New-clause 4.19/PCC</p> <p>C=Total Contract price.</p> <p>Plus, additional performance Guarantee amount, if any, taken in terms of sub clause 25.5 and 29 of ITT and not due for release on the date of issue of termination letter in terms of this clause against this particular bill/schedule to which the terminated part of the work belongs, in case of termination in part/parts.</p> <p>The balance work should be got done separately, and independently by K-RIDE without risk and cost of the original contractor. The original contractor shall be debarred from participating in the tender for executing the balance work. If the failed contractor is a JV or a partnership firm, then every member/partner of such a firm would be debarred from participating in the tender for the balance work either in his/her individual capacity or as a partner of any other JV/partnership firm.</p> <p>In case the Contractor fails to perform the Contract or any JV partner fails to perform its obligations under the JV agreement, which is a part of this agreement, the Employer may issue notice of such default to the said JV partner or the JV (depending upon reasons of default) and declare the said JV partner or the JV as Poor Performer. The issue of such notice shall automatically debar the JV partner or JV, as the case may be, from participating in any K-RIDE tender from the date of issue of notice of default. The relevant performance security including additional performance security, if any, in terms of sub clauses 25.5 and 29 of ITT submitted by the Contractor or submitted on behalf of JV partner to the extent not due for release at the time of contemplation of such action shall be encashed and forfeited either fully or in proportion of the percentage share of that partner in the JV agreement, as the case may be.</p>
<p>NEW CLAUSE-4.20</p>	<p>Security Deposit:</p> <p>Security Deposit equal to 10 percent of the amount due to the Contractor in IPC's/ Running bills from time to time will be retained, so as to maintain a reserve in the hands of the Employer equal to 5 percent of the Contract Price in respective currencies.</p> <p>4.2 (a) Release of Security Deposit:</p> <p>Deleted</p> <p>4.2.b (i) Refund of Security Deposit:</p> <p>Security Deposit mentioned in clause above shall be returned to the Contractor along with or after, the following:</p> <ul style="list-style-type: none"> (a) Final Payment of the Contract and (b) Execution of Final Supplementary Agreement or Certification by Engineer that K-RIDE has No Claim on Contractor and (c) Maintenance Certificate issued, on expiry of the maintenance period.

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	<p>4.2.b (ii) Forfeiture of Security Deposit: Whenever the contract is rescinded as a whole under clause 49 of CC/PCC, the Security Deposit already with K-RIDE under the contract shall be forfeited. However, in case the contract is rescinded in part or parts under clause 49 of CC/PCC, the Security Deposit shall not be forfeited.</p> <p>4.2.(c) 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 New-Clause 4.19/PCC of this clause will be payable with interest accrued thereon.</p> <p>4.2.(d) When contract amount exceeds the contract price due to variation in quantities of certain BOQ items on the higher side or due to operation of additional non tendered items as per site requirement, the additional retention money at 5% of the increased amount shall be recovered from Interim Payment bills. The additional Security Deposit recovery shall start when the actual cumulative payment exceeds the original Contract Price.</p> <p>4.2.(e) Wherever Bank Guarantee or any other instrument is to be extended or fresh BG to be obtained, the cost towards getting extension of BG or fresh BG will be on contractor's account.</p>
<p>NEW CLAUSE -4.21</p>	<p>Contractor Representative:</p> <p>The Contractor shall depute his Representative to attend all the review meetings notified by the Employer / Engineer.</p> <p>Facilities for and Co-ordination with Others</p> <p>The Contractor shall not impede and shall afford all necessary facilities, access and/or services to the Employer, Engineer, Designated Contractors, utility undertakings, other relevant authorities and other contractors (whether employed by the Employer or not) who are carrying out on, or in the vicinity of, the Site, works not included in the Contract but forming part of the Project:</p> <p>A. The Contractor shall take all reasonable steps to ensure that the Works are co-ordinated and integrated with the Design, manufacture, installation execution and testing of such other works and shall in particular (but without limitation):</p> <ol style="list-style-type: none"> i. comply with any direction which the Engineer may give for the integration of the Design with the design of any other part of the Project; ii. consult, liaise and co-operate with those responsible for carrying out such other works, including where necessary, in the preparation of the respective designs, the preparation of co-ordinated programmes, method statements, co-ordination drawings and specifications together with arrangements of service priorities and zoning; <p>B. The Contractor shall undertake Design co-ordination with other contractors who are carrying out works forming part of the Project as described in the Employer's Requirements. At the end of each such co-ordination period, the Contractor and the other contractor with whose works the interface period refers shall jointly state in writing that their design co-ordination activities are complete and that their respective designs are integrated and can be finalised without interference with each other's designs or the designs with which their designs have already been integrated.</p> <p>A copy of this joint written statement shall be provided to the Engineer within 7 days of the end of the said design co-ordination period. Unless and until copies of all relevant and necessary design co-ordination statements have been submitted to the Engineer, the Engineer shall be entitled to suspend any review or further review of the Contractor's or the other contractor's design submissions. Such suspension shall not be grounds for the Contractor to claim nor shall be entitled to receive an extension of time or additional payments.</p>

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	<p>C. The Contractor shall share within the Site, staging, storage and unloading areas for the use of Designated Contractors, if any, who are undertaking civil work, fare collection system, supply, testing and commissioning of Rolling Stock, escalators, lifts, signalling and telecommunications and traction power installation works, etc. Separate locations shall be provided for each such contractor. The exact size and location of these staging, storage and unloading areas, and the commencement date shall be co-ordinated and agreed during the design interface period with each Designated Contractor.</p> <p>D. Any other contract which depends for its execution on the Contract or upon which the Contract is dependent for its own execution shall be identified by the Engineer as a "Designated Contract". The Contractor shall provide attendance on Designated Contractors in accordance with the Employer's Requirements and as instructed by the Engineer. The identity of the contractor for a Designated Contract may not be known before the execution of the Contract but this shall not be a ground for the Contractor to object to the subsequent appointment of a Designated Contractor</p> <p>E. The Contractor shall in accordance with the requirements of the Engineer co-ordinate his own Works with that of Designated Contractors through Co-ordinated Installation Programme (CIP) stated in the Employer's Requirements, or as the Engineer may require, and shall afford the Designated Contractors all reasonable opportunities for carrying out their works.</p> <p>F. The Contractor shall afford all reasonable opportunities, for carrying out their work, to other contractors employed by the Employer and their workmen respectively and the workmen of the Employer who may be engaged on or near the Site of any work, ancillary to the Works, but not included in the Contract and shall not cause them inconvenience.</p> <p>G. If the Contractor shall suffer delay by reason of failure by any Designated Contractor to meet the specified installation interfacing and co-ordination, completion dates, which delay shall be caused otherwise than by fault of the Contractor, or, if compliance with sub-clause (f) herein shall involve the Contractor in delay beyond that which could be reasonably foreseen by an experienced contractor at the time of tender, then the Engineer shall take such delay into account in determining any extension of time to which the Contractor is entitled under the Contract.</p> <p>H. It shall be the responsibility of the Contractor to ensure that the full extent of the Works under the Contract and the works to be carried out by Designated Contractors within the Works or, in, on, under, through and over the Site are co-ordinated and integrated in their design, manufacture, installation and construction. Such responsibility shall neither be mitigated nor in any other way affected by virtue of similar responsibilities being placed on other contractors.</p> <p>The Contractor shall be deemed to have made adequate allowance in the Contract Price and in the Works Programme in respect of these obligations.</p> <p>If any act or omission of the Contractor whether directly or indirectly results in the delay in the execution of the works of a Designated Contractor, the Contractor, in addition to his liability in respect of liquidated damages if they become due, shall pay to the Employer, or the Engineer may deduct from Interim Payment Certificates such amount as the Engineer shall have certified in respect of additional payments or costs to the Designated Contractor in respect of such delay.</p>
NEW CLAUSE-4.22	DELETED
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NEW CLAUSE-4.24	<p>Co-operation</p> <p>The Contractor shall, as specified in the Contract or as instructed by the Engineer, allow</p>

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	<p>appropriate opportunities for carrying out work to:</p> <ul style="list-style-type: none"> (a) the Employer's Personnel, (b) any other contractors employed by the Employer, and (c) the personnel of any legally constituted public authorities, <p>who may be employed in the execution on or near the Site of any work not included in the Contract.</p> <p>Any such instruction shall constitute a Variation if and to the extent that it causes the Contractor to incur Unforeseeable Cost. Services for these personnel and other contractors may include the use of Contractor's Equipment, Temporary Works or access arrangements which are the responsibility of the Contractor.</p> <p>If, under the Contract, the Employer is required to give to the Contractor possession of any foundation, structure, plant or means of access in accordance with Contractor's Documents, the Contractor shall submit such documents to the Engineer in the time and manner stated in the Specification.</p>
<p>NEW CLAUSE-4.25</p>	<p>Setting Out</p> <p>The Contractor shall set out the Works in relation to original points, lines and levels of reference specified in the Contract or notified by the Engineer. The Contractor shall be responsible for the correct positioning of all parts of the Works, and shall rectify any error in the positions, levels, dimensions or alignment of the works, notifying the Engineer within 28 days of the date of commencement</p> <p>In the event of such discrepancy arising during the course of the work, for which Employer's documents are handed over after the date of commencement, the contractor shall seek clarifications within 14 days of receipt of such documents</p> <p>The Employer shall be responsible for any errors in these specified or notified items of reference, but the Contractor shall use reasonable efforts to verify their accuracy before they are used.</p> <p>Contractor shall promptly notify the Employer and the Engineer of any error, omission, fault, or any other defect in the design, drawing or specifications for the works, which he discovers when reviewing the Contract Documents, and in the process of execution of the Works. The Contractor shall be responsible to ensure correlation in various drawings and Price schedule, before commencement and execution of work. In case of any discrepancy the Contractor shall bring it to notice of the Engineer for clarification within 28 days of the issue of Letter of Acceptance. In the event of such discrepancy arising during the course of the work, for which drawings are given after the date of issue of Letter of Acceptance, the Contractor shall seek clarifications within 14 days of receipt of such drawings.</p> <p>Notwithstanding with any other provision, the Contractor shall have to pay penalty for damage to Railway cable in terms of clause C 15 of the JPO as given in para 1.2 of Chapter 1. (Safety and Security) of Section 8 and shall also indemnify the Employer against any losses, damages to property or life in terms of para 1.11 and 1.12 of the chapter 1. (Safety and Security) of Section 8.</p>
<p>NEW CLAUSE-4.26</p>	<p>Safety Procedures</p> <p>The Contractor shall follow the provisions laid down in Chapter 1. (Safety and Security) of Section 8 and shall:</p> <ul style="list-style-type: none"> (a) comply with all applicable safety regulations, (b) take care for the safety of all persons entitled to be on the Site, (c) use reasonable efforts to keep the Site and Works clear of unnecessary obstruction so as to avoid danger to these persons,

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	<p>(d) provide fencing, lighting, guarding and watching of the Works until completion and taking over under Clause 46/PCC [Employer's Taking Over], and</p> <p>(e) provide any Temporary Works (including roadways, footways, guards and fences) which may be necessary, because of the execution of the Works, for the use and protection of the public and of owners and occupiers of adjacent land.</p> <p>Additional Safety Precautions</p> <p>(1) The Contractor shall comply with all the precautions as required for the safety of the workmen by the I.L.O Convention No.62 as far as they are applicable to the Contract. The Contractor shall provide all necessary safety appliances; such as safety goggles, helmets, masks, etc. to the workmen and the staff.</p> <p>(2) Suitable scaffolds shall be provided for workmen for all work that cannot safely be done from the ground, or from solid construction except for such short period work as can be done safely from ladders. When a ladder is used, an extra labourer shall be engaged for holding the ladder and if the ladder is used for carrying materials as well, suitable foot-holds and hand-holds shall be provided on the ladder, which shall be given an inclination not steeper than 1/4 to 1 (1/4 horizontal in 1 vertical).</p> <p>(3) Scaffolding or staging more than 3.25 meters above the ground or floor, swung or suspended from an overhead support or erected with stationary support, shall have a guard rail properly attached, bolted, braced and otherwise secured at least 1 meter high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such openings as maybe necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying in from the support or structure.</p> <p>(4) Working platforms, gangways and stairways shall be so constructed that they do not sag unduly or unequally, and if the height of any platform or gangway or stairway is more than 3.25 meters above ground level or floor level, it shall have closely spaced boards, have adequate width and be suitably provided with guard rails as described in (3) above.</p> <p>(5) Every opening in the floor of a structure or in a working platform shall be provided with suitable means to prevent fall of persons or materials by providing suitable fencing or railing with a minimum height of one meter.</p> <p>(6) Safe means of access and egress shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9 meters in length. The width between side rails in a rung ladder shall in no case be less than 30 cm for ladders up to and including 3 meters in length. For longer ladders the width shall be increased at least 6 mm for each additional 30 cm of length. Spacing of steps shall be uniform and shall not exceed 30 cm.</p> <p>(7) Adequate precautions shall be taken to prevent danger from electrical equipment. Adequate safety measures shall be taken when any work is undertaken near any live highly charged electric wire. Necessary shutdown may be arranged, where and whenever essential. All rules in force in this connection shall be fully complied with. The Contractor shall ensure all precautions to prevent any accidents due to electrocution or otherwise.</p> <p>(8) No materials on any of the sites shall be so stacked or placed as to cause danger or inconvenience to any person or the public. The Contractor shall provide all necessary fencing and lights to protect the public from accidents and shall be bound to bear the expenses of defending every suit, action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and costs which may be awarded in any such suit, action or proceedings to any such person or which may with the consent of the Contractor be paid to compromise any</p>

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	<p>claim by any such person.</p> <p>(9) Excavation and Trenching: All trenches, 1.5 meters or more in depth, shall at all times be supplied with at least one ladder for each 20 meters in length or fraction thereof, Ladders shall be extended from the bottom of the trench to at least 1 meter above the surface of the ground. The sides of a trench, which is 1.5 meters or more in depth shall be stepped back to provide a suitable slope, or be securely held by timber bracing so as to avoid the danger of side collapse. Excavated material shall not be placed within 1.5 meters of the edge of any trench or half the depth of the trench, whichever is more. Excavation shall be made from the top to the bottom. Under no circumstances shall undermining or undercutting be done.</p> <p>(10) Demolition: Before any demolition work is commenced and also during the process of the work:</p> <p>(a) All roads and open areas adjacent to the work site shall either be closed or suitably protected.</p> <p>(b) No electric cable or apparatus, which is liable to be a source of danger other than a cable or apparatus used by operators, shall remain electrically charged:</p> <p>(c) All practical steps shall be taken to prevent danger to persons employed by the Employer, from risk of fire or explosion, or flooding. No floor, roof or other part of a building shall be so overloaded with debris or materials as to render it unsafe.</p> <p>(11) All necessary personal safety equipment as considered adequate by the Engineer shall be available for use of persons employed on the site and maintained in a condition suitable for immediate use; and the Contractor shall take adequate steps to ensure proper use of such equipment by those concerned.</p> <p>(a) Workers employed on mixing asphaltic materials, cement, lime mortars, concrete etc. shall be provided with protective footwear and protective goggles.</p> <p>(b) Those engaged in handling any material, which is injurious to the eyes, shall be provided with protective goggles.</p> <p>(c) Those engaged in welding works shall be provided with welder's protective eye-shield.</p> <p>(d) Stone breakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.</p> <p>(e) When workers are employed in sewers and manhole, which are in use, the contractor shall ensure that manhole covers are open and manholes are ventilated at least for an hour before workers are allowed to go into them. Manholes so open shall be cordoned off with suitable railing and provide warning signals or boards to prevent accidents to the public.</p> <p>(f) The Contractor shall not employ men below the age of 18 years and women, on the work of painting with products containing lead in any form. Whenever men above the age of 18 years are employed on the work of lead painting, the following precautions shall be taken.</p> <p>(g) No paint containing lead or lead products shall be used except in the form of paste or readymade paint.</p> <p>(h) Suitable face masks shall be supplied for use by workers when paint is applied in the form of spray or a surface having lead paint dry rubbed and scrapped.</p> <p>(j) Overalls shall be supplied by the Contractor to workmen and adequate facilities shall be provided to enable workers to wash during and at the close of any day's work.</p> <p>(12) When work is performed near any place where there is risk of drowning all necessary equipment shall be provided and kept ready for use and all necessary steps taken for</p>

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	<p>prompt first aid treatment of all injuries likely to be sustained during the course of the work.</p> <p>(13) Use of hoisting machines and tackle including their attachments, anchorage and supports shall conform to the following:</p> <p>(a) These shall be of good mechanical construction, sound material and adequate strength and free from patent defects and shall be kept in good working order, be regularly inspected and properly maintained.</p> <p>b) Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength, and free from defects</p> <p>c) Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age of 21 shall be in charge of any hoisting machine including scaffold equipment. Only trained men over the age of 21 shall be permitted to give signals to such plant and appliance operators.</p> <p>d) For every hoisting machine and every chain hook, shackle, swivel and pulley block used in hoisting, lowering or as means of suspension, safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with safe working load. In case of a hoisting machine or a variable safe working load, each safe working load and conditions under which it is applicable shall be clearly indicated. No part of any machine or any gear referred to in the paragraph above shall be loaded beyond safe working load except for the purpose of testing.</p> <p>e) In case of the Employer's machine, safe working load shall be notified by the Engineer or his Representative. As regards Contractor's machines, the Contractor shall notify safe working load of each machine to the Engineer or his Representative, whenever he brings it to the site of work and get it verified by him.</p> <p>(14) Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances shall be provided with efficient safeguards; hoisting appliances shall be provided with such means as will reduce the risk of accident during descent of load to the minimum. Adequate precautions shall be taken to reduce to the minimum risk of any part of a suspended load becoming accidentally displaced. When workers are employed on electrical installations, which are already utilized, insulating mats, working apparel such as gloves, sleeves and boots, as may be necessary, shall be provided. Workers shall not wear any rings, watches and carry keys or other materials which are good conductor of electricity.</p> <p>(15) All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in a safe condition and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities shall be provided at or near places of work.</p> <p>(16) These safety provisions shall be brought to the notice of all concerned by displaying on a notice board at a prominent place at the work location. Persons responsible for ensuring compliance with the Safety Code shall be named therein by the Contractor.</p> <p>(17) To ensure effective enforcement of the rules and regulations relating to safety precautions, arrangements made by the contractor shall be open to inspection by the Engineer or his Representative.</p> <p>(18) Notwithstanding anything contained in conditions (1) to (17) above, the Contractor shall at its own costs, remain liable to comply with the provisions of all acts, rules, regulations, and bylaws for the time being in force in India and applicable in this matter.</p> <p>(19) For work carried out in the vicinity of any wharf or quay, the Contractor shall abide by all the provisions of the Dock Workers (Safety, Health and Welfare) Scheme, 1961.</p> <p>(20) The Contractor shall at his own expense provide protective safety Equipment like gloves and</p>

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	<p>footwear for all labour engaged on concrete mixing work and all other types of working involving the use of tar, cement, etc. to the satisfaction of the Engineer or his Representative, and on his failure to do so, the employer shall be entitled to provide the same and recover the cost from the Contractor.</p> <p>The Contractor shall be responsible for observance, by the sub-contractors, of the foregoing provisions.</p> <p>(21) All construction labour at all-time shall use personal protective equipment like, safety shoes, helmets and reflective jackets in all activities at site. This shall be ensured without fail on each work site. Failing to comply with this, provision shall attract penalty of Rs. 500/- per occasion per staff.</p> <p>Notwithstanding with any other provision, the Contractor shall have to pay penalty for damage to Railway cable in terms of clause C 15 of the JPO as given in para 1.2 of Chapter 1. (Safety and Security) of Section 8 and shall also indemnify the Employer against any losses, damages to property or life in terms of para 1.11 and 1.12 of the chapter 1. (Safety and Security) of Section 8).</p>
NEW CLAUSE-4.27	<p>Quality Assurance</p> <p>The Contractor shall institute a quality assurance system to demonstrate compliance with the requirements of the Contract. The system shall be in accordance with the details stated in the Contract. The Engineer shall be entitled to audit any aspect of the system.</p> <p>Details of all procedures and compliance documents shall be submitted to the Engineer for information before each design and execution stage is commenced. When any document of a technical nature is issued to the Engineer, evidence of the prior approval by the Contractor himself shall be apparent on the document itself.</p> <p>Compliance with the quality assurance system shall not relieve the Contractor of any of his duties, obligations or responsibilities under the Contract.</p> <p>Quality Control</p> <p>Within 28 days of the issue of the Letter of acceptance, the Contractor shall submit to the Engineer, for his consent, his proposed Site Quality Plan based on the Outline Quality Plan and the Employer's Requirements. The quality manual should address the quality system as required by ISO 9001-1991. Any supplement to the Site Quality Plan shall be submitted at least 14 days before commencement of the relevant work.</p> <p>Upon the Engineer notifying his consent to the Site Quality Plan, or any supplement thereto, the Contractor shall, adhere to the principles and procedures contained in such document, except where the Engineer gives his consent to any amended or varied version thereof. The Contractor shall cause any sub-contractors to adhere to this Plan.</p> <p>The Contractor shall appoint a suitably qualified and experienced person, not otherwise engaged in the performance of the Contract, to act as manager of the quality assurance system and shall provide such other personnel and resources as required to ensure effective operation of the quality assurance system. The said manager shall carry out audits of the application of the quality assurance system, and ensure effective quality control and delivery of quality assurance.</p> <p>The Contractor shall provide all necessary access, assistance and facilities to enable the Engineer to carry out surveillance visits both on and off the Site to verify that the quality assurance system is being properly and fully implemented. No extra payment shall be made in this regard and the cost of the Work under this element shall be deemed to be included in the Contract Price.</p> <p>Quality control records and Documents</p> <p>The Contractor shall hand over to the Engineer a copy of all its quality control records and documents before the Completion Certificate is issued.</p>

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	<p>Video recording</p> <p>During the Construction Period, the Contractor shall provide to the Employer for every quarter, a video recording, which will be compiled into a 3 (three) hour digital video disc or any substitute thereof, covering the status and progress of Works in that month. The video recording shall be provided to the Employer no later than 15 (fifteen) days after the close of each month after the Commencement Date.</p>
<p>NEW CLAUSE-4.28</p>	<p>Site Data</p> <p>The Employer shall have made available to the Contractor for his information, prior to the Base Date, all relevant data in the Employer's possession on sub-surface and hydrological conditions at the Site, including environmental aspects. The Employer shall similarly make available to the Contractor all such data which come into the Employer's possession after the Base Date. The Contractor shall be responsible for interpreting all such data.</p> <p>To the extent which was practicable (taking account of cost and time), the Contractor shall be deemed to have obtained all necessary information as to risks, contingencies and other circumstances which may influence or affect the Bid or Works. To the same extent, the Contractor shall be deemed to have inspected and examined the Site, its surroundings, the above data and other available information, and to have been satisfied before submitting the Bid as to all relevant matters, including (without limitation):</p> <ul style="list-style-type: none"> (a) the form and nature of the Site, including sub-surface conditions, (b) the hydrological and climatic conditions, (c) the extent and nature of the work and Goods necessary for the execution and completion of the Works and the remedying of any defects, (d) the Laws, procedures and labour practices of the Country, and (e) the Contractor's requirements for access, accommodation, facilities, personnel, power, transport, water and other services. (f) Data made available by the Employer in accordance with the preceding paragraph shall be deemed to include data listed elsewhere in the contract as open for inspection at the address stipulated in the Contract.
<p>NEW CLAUSE-4.29</p>	<p>Sufficiency of the Accepted Contract Amount</p> <p>The Contractor shall be deemed to:</p> <ul style="list-style-type: none"> a) have satisfied himself as to the correctness and sufficiency of the Accepted Contract Amount, and b) have based the Accepted Contract Amount on the data, interpretations, necessary information, inspections, examinations and satisfaction as to all relevant matters referred to in New-Clause 4.28/PCC [Site Data]. <p>Unless otherwise stated in the Contract, the Accepted Contract Amount covers all the Contractor's obligations under the Contract (including those under Provisional Sums, if any) and all things necessary for the proper execution and completion of the Works and the remedying of any defects</p>
<p>NEW CLAUSE-4.30</p>	<p>Unforeseeable Physical Conditions</p> <p>In this Sub-Clause, "physical conditions" means natural physical conditions and man-made and other physical obstructions and pollutants, which the Contractor encounters at the Site when executing the Works, including sub-surface and hydrological conditions but excluding climatic</p>

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	<p>conditions.</p> <p>If the Contractor encounters adverse physical conditions which he considers to have been Unforeseeable, the Contractor shall give notice to the Engineer as soon as practicable.</p> <p>This notice shall describe the physical conditions, so that they can be inspected by the Engineer, and shall set out the reasons why the Contractor considers them to be Unforeseeable. The Contractor shall continue executing the Works, using such proper and reasonable measures as are appropriate for the physical conditions, and shall comply with any instructions which the Engineer may give. If an instruction constitutes a Variation, Clause 34/PCC [Variations and Adjustments] shall apply.</p> <p>If and to the extent that the Contractor encounters physical conditions which are Unforeseeable, gives such a notice, and suffers delay and/or incurs Cost due to these conditions, the Contractor shall be entitled subject to Sub-Clause 56.1/SCC [Contractor's Claims] to:</p> <ul style="list-style-type: none"> (a) An extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 26.5/PCC [Extension of Time for Completion], and (b) Payment of any such Cost, which shall be included in the Contract Price. <p>After receiving such notice and inspecting and/or investigating these physical conditions, the Engineer shall proceed in accordance with New-Clause 3.5/PCC [Determinations] to agree or determine (i) whether and (if so) to what extent these physical conditions were Unforeseeable, and (ii) the matters described in sub-paragraphs (a) and (b) above related to this extent.</p> <p>However, before additional Cost is finally agreed or determined under sub-paragraph (ii), the Engineer may also review whether other physical conditions in similar parts of the Works (if any) were more favorable than could reasonably have been foreseen when the Contractor submitted the Bid. If and to the extent that these more favorable conditions were encountered, the Engineer may proceed in accordance with New-Clause 3.5/PCC [Determinations] to agree or determine the reductions in Cost which were due to these conditions, which may be included (as deductions) in the Contract Price and Payment Certificates. However, the net effect of all adjustments under sub-paragraph (b) and all these reductions, for all the physical conditions encountered in similar parts of the Works, shall not result in a net reduction in the Contract Price.</p> <p>The Engineer may take account of any evidence of the physical conditions foreseen by the Contractor when submitting the Bid, which may be made available by the Contractor, but shall not be bound by any such evidence.</p>
<p>NEW CLAUSE-4.31</p>	<p>1. Time for access to the Site</p> <p>The contractor is required to work on the basis of shared access at the work site duly coordinating with the interfacing contractors. The access given to the contractor is not exclusive to him and the access shall be shared as per the works and sequences required at site. The land given access is for the purpose of permanent, its associated temporary works and storing materials required at site for next one week. For the purpose of stacking of materials ancillary arrangements, offices etc. the contractor need to make its own arrangements elsewhere.</p> <p>Access to the work area shall be given in a phased manner as per Annexure 2 of Employer's requirements, Part 2 and as required to meet the Key Dates given in Appendix-1 of Section 8 / Part 1 of Employer's Requirement. The contractor shall take these dates into the work programme. In case if a particular land area is not available for access, employer may give alternate areas in lieu of the same and the contractor shall accordingly plan his works to cater to such changes without any extra cost on such account. Even after such provision, if access to any area gets delayed, then for the purpose of reckoning the delay, the latter among the dates mentioned in the Annexure 2 and the date by which contractor required such area in the approved programme shall be considered. Further that the progress of works in the areas where access is given is to the satisfaction of the employer, then the contractors entitlement towards such delays shall be as</p>

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	under			
	Period of delay in Access to the work area (delay reckoned as per above mentioned paragraphs and as noted under)	Extension of Time	Compensation for the period of Delay in Access to the work area	Remarks
	Up to 14 days	No	No	
	15 to 30 days	Yes	No	Extension of time as due considered by the employer
	Above 30 days and up to 60 days (Without prior notice)	Yes (As assessed by engineer and approved by employer duly considering the program.)	The contractor will be paid least among the following (1) and (2): (1) As per Daily rate of wages for idle labour/employees. 70% of the rate for hire charges for idle plant and machinery (excluding cost of fuel and lubricants) 15% above all these items to cover overhead costs OR (2) 0.014% of Contract value per day for the proportionate* area of land not given access to beyond 30 days up to the time of handing over. (* = Area not given access / Total area)	Compensation as assessed by the Engineer and approved by Employer on submission of documentary proof by the Contractor to the Engineer's satisfaction. The contractor shall get the documentary proof verified by Engineer on daily basis from the day of occurrence.
	Above 60 days from the due date for handing over and up to 18 months from the date of issue of LOA. (without prior notice)	Yes (As assessed by engineer and approved by employer duly considering the programme)	The Contractor will be paid least among the following (1) and (2): (1) The charges for one-time demobilization and remobilization of the machines demobilized due to nonavailability of site OR	The contractor will be allowed to demobilize up on receiving notice of demobilizing any machinery that may remain idle due to the delay in handing over of the site. The contractor has to remobilize the required machinery when the site is handed over without any compensation

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			(2) 0.014% of Contract value per day for the proportionate* area of land not given access to beyond 30 days up to the time of handing over. (* = Area not given access/ Total area)	towards the same.
	After 18 months from LOA and up to the original contract period or the approved extended period of completion.	Yes (As assessed by engineer and approved by employer duly considering the programme)	The Contractor will be paid least among the following (1) and (2): (1) The charges for one-time demobilization and remobilization of the machines demobilized due to nonavailability of site OR (2) 0.014% of Contract value per day for the proportionate* area of land not given access to beyond 30 days up to the time of handing over. (* = Area not given access/ Total area)	The contractor will be allowed to demobilize up on receiving notice of demobilizing any machinery that may remain idle due to the delay in handing over of the site. The contractor has to re mobilize the required machinery when the site is handed over without any compensation towards the same
	After 18 months from LOA and up to the original contract period, if the Engineer Determines that the contractor will not be able to complete the works within the original contract period, even if the stretches are handed over within the original contract period or the extended period as approved	No	No compensation except for the following 1) The value of approved materials actually brought to the site and reasonably required to execute the works during next three months, as per approved works programme, and 2) Value of work completed up to date by the Contractor at rates specified in the contract, after taking into account any deduction, set off etc. and 3) In addition, a sum not exceeding 2% of the value of the work remaining incomplete on the date of termination notice taking effect	Contractor may ask for deletion from the contract of that part of the works which have not been handed over to him. If the Engineer determines that the works of the not handed over sections cannot be Completed within the original contract period.

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	<p>If "Prior Notice" for the purpose of the Table, has been given either by the Employer or the Engineer at least 30 days before the due date of handing over of any site, that hand over is likely to be delayed, then no compensation will be applicable up to a delay of 60 days from the due date of handing over. The period of delay in the above table shall therefore commence 60 days after the original handing over date and subject to the paras mentioned above the table. However, this clause shall not apply if the works are suspended under GCC Clause 8.8 Suspension of works. Apart from this, the Contractor has no other remedies in connection with any delay in handing over of the sites and the same is an excepted matter.</p> <p>2. Protection of Site from encroachments</p> <p>The Contractor shall maintain a round-the-clock vigil over the Site and shall ensure and procure that no encroachment thereon takes place. During the Construction Period, the Contractor shall protect the Site from any and all occupations, encroachments or Encumbrances, and shall not place or create nor permit any Sub-contractor or other person claiming through or under the Agreement to place or create any Encumbrance or security interest over all or any part of the Site or the Project Assets, or on any rights of the Contractor therein or under this Agreement, save and except as otherwise expressly set forth in this Agreement. In the event of any encroachment or occupation on any part of the Site, the Contractor shall report such encroachment or occupation forthwith to the Employer and undertake its removal at its own cost and expenses.</p> <p>3. Temporary Right of Access</p> <p>The Contractor shall bear all costs and charges for any temporary Right of Access required by it in connection with access to the Site. The Contractor shall obtain, extra Railway land or Government Land, Private land & any other such facilities beyond ROA on or outside the site as may be required for the purposes of the Railway Project and the performance of its obligations under this Agreement, at his cost.</p> <p>4. Access to the Employer and the Engineer and other project partners.</p> <p>4.1 The Right of Access given to the Contractor hereunder shall always be subject to the Right of Access of the Employer and the Engineer and their employees and agents for inspection, viewing and exercise of their rights and performance of their obligations under this Agreement, or project related works shall be coordinated / interfaced with mutual consent with least interference to the others work.</p> <p>4.2 The Contractor shall ensure, subject to all relevant safety procedures, that the Employer and others as above has unrestricted access to the Site during any Emergency or otherwise and works.</p> <p>5. Geological and archaeological finds</p> <p>It is expressly agreed that mining, geological or archaeological rights do not form part of this Agreement with the Contractor for the Works, and the Contractor hereby acknowledges that it shall not have any mining rights or interest in the underlying minerals, fossils, antiquities, structures or other remnants or things either of particular geological or archaeological interest and that such rights, interest and property on or under the Site shall vest in and belong to the Employer or the concerned Government Instrumentality. The Contractor shall take all reasonable precautions to prevent its workmen or any other person from removing or damaging such interest or property and shall inform the Employer forthwith of the discovery thereof and comply with such instructions as the Employer or the concerned Government Instrumentality may reasonably give for the removal of such property.</p>
NEW CLAUSE-4.32	Avoidance of Interference

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	<p>The Contractor shall not interfere unnecessarily or improperly with:</p> <ul style="list-style-type: none"> a) the convenience of the public, or b) the access to and use and occupation of all roads and footpaths, irrespective of whether they are public or in the possession of the Employer or of others or c) Passenger amenities at stations and station platforms. <p>The Contractor shall indemnify and hold the Employer harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from any such unnecessary or improper interference.</p>
<p>NEW CLAUSE-4.33</p>	<p>Access Route</p> <p>The Contractor shall be deemed to have been satisfied as to the suitability and availability of access routes to the Site. The Contractor shall use reasonable efforts to prevent any road or bridge from being damaged by the Contractor's traffic or by the Contractor's Personnel. These efforts shall include the proper use of appropriate vehicles and routes.</p> <p>Except as otherwise stated in these Conditions:</p> <ul style="list-style-type: none"> (a) the Contractor shall (as between the Parties) be responsible for any maintenance which may be required for his use of access routes; (b) the Contractor shall provide all necessary signs or directions along access routes, and shall obtain any permission which may be required from the relevant authorities for his use of routes, signs and directions; (c) the Employer shall not be responsible for any claims which may arise from the use or otherwise of any access route; (d) the Employer does not guarantee the suitability or availability of particular access routes; and (e) Costs due to non-suitability or non-availability, for the use required by the Contractor, of access routes shall be borne by the Contractor.
<p>NEW CLAUSE-4.34</p>	<p>Transport of Goods</p> <p>Unless otherwise stated in the Special Conditions of Contract:</p> <ul style="list-style-type: none"> (a) the Contractor shall give the Engineer not less than 21 days' notice of the date on which any Plant or a major item of other Goods will be delivered to the Site; (b) the Contractor shall be responsible for packing, loading, transporting, receiving, unloading, storing and protecting all Goods and other things required for the Works; and (c) the Contractor shall indemnify and hold the Employer harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from the transport of Goods, and shall negotiate and pay all claims arising from their transport.
<p>NEW CLAUSE-4.35</p>	<p>Contractor's Equipment</p> <p>The Contractor shall be responsible for all Contractors' Equipment. When brought on to the Site, Contractor's Equipment shall be deemed to be exclusively intended for the execution of the Works. The Contractor shall not remove from the Site any major items of Contractor's Equipment without the consent of the Engineer. However, consent shall not be required for vehicles transporting Goods or Contractor's Personnel off Site</p> <p>In the event of Contractor imports any equipment the following shall apply"</p> <p>A. Custom Clearance: The Employer will assist the contractor, when required by furnishing</p>

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	<p>letters of recommendation for obtaining expeditious clearance through customs of constructional plants, material and other things required for the works and then for re-export, if any. The following publications, may be referred to by the contractor for guidance about custom regulations etc.:</p> <ul style="list-style-type: none"> i. Import & export policy, together with amendments, if any, published by Govt. of India, Ministry of Commerce. ii. Hand Book of Procedures, together with amendments, if any, Volume 1 and 2 published by Ministry of Commerce. iii. Customs Tariff, together with amendments, if any published by Central Customs. <p>The Contractor shall be responsible to follow the latest rules and regulations without any liability of the Employer.</p> <p>B. Re-export of Contractors equipment: The contractor shall obtain all the relevant information regarding procedure for the import and subsequent re-export of his equipment and materials from the Chief Controller of Imports and Exports, Bangalore, and shall inform himself and keep himself informed on the details of custom charges and draw-back regulations as applicable to the items of Constructional plant. The contractor shall provide the necessary guarantee/bonds where these are required by the customs notwithstanding that import licenses may be granted in the name of Employer.</p> <p>C. Conditions of hire of the contractor's equipment: A certified copy of the agreement in respect of any item of Equipment held by contractor under any agreement for hire or hire purchase thereof, shall be supplied to the Engineer/Employer."</p>
NEW CLAUSE-4.36	<p>Protection of the Environment</p> <p>The Contractor shall take all reasonable steps to protect the environment (both on and off the Site) and to limit damage and nuisance to people and property resulting from pollution, noise and other results of his operations.</p> <p>The Contractor shall ensure that emissions, surface discharges and effluent from the Contractor's activities shall not exceed the values stated in the Specification or prescribed by applicable Laws.</p>
NEW CLAUSE-4.37	<p>Electricity, Water and Gas</p> <p>The Contractor shall be responsible for the provision of all power, water and other services he may require for the project work or other equipment's at his own cost.</p> <p>In case, Railway administration permits subject to approval by local authority, borewell may be dug for the purpose of wate requirements to the project at his risk and cost. After the project work is completed and handed over to Employer.</p>
NEW CLAUSE-4.38	DELETED.
NEW CLAUSE-4.39	<p>Progress Reports</p> <p>Unless otherwise stated in the Special Conditions of Contract, monthly progress reports shall be prepared by the Contractor and submitted to the Employer and the Engineer in six copies. The first report shall cover the period up to the end of the first calendar month following the Commencement Date. Reports shall be submitted monthly thereafter, each within 7 days after the last day of the period to which it relates.</p> <p>Reporting shall continue until the Contractor has completed all work which is known to be outstanding at the completion date stated in the Taking-Over Certificate for the Works.</p> <p>Each report shall include:</p> <p>Charts and detailed descriptions of progress, including each stage of design (if any), Contractor's</p>

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	<p>Documents, procurement, manufacture, delivery to Site, construction, erection and testing; and including these stages for work by each nominated Subcontractor (as defined in Clause 7/PCC (Nominated Subcontractors)),</p> <p>Photographs showing the status of manufacture and of progress on the Site; for the manufacture of each main item of Plant and Materials, the name of the manufacturer, manufacture location, percentage progress, and the actual or expected dates of:</p> <ul style="list-style-type: none"> (i) commencement of manufacture, (ii) Contractor's inspections, (iii) tests, and (iv) shipment and arrival at the Site; <p>the details described in Sub-Clause 1.10/SCC of PCC [Records of Contractor's Personnel and Equipment];</p> <ul style="list-style-type: none"> a) copies of quality assurance documents, test results and certificates of Materials; b) list of notices given under New-Clause 2.4/PCC [Employer's Claims] and notices given under Sub-Clause 56.1/SCC [Contractor's Claims]; c) safety statistics, including details of any hazardous incidents and activities relating to environmental aspects and public relations; and d) Comparisons of actual and planned progress of all activities, with details of any events or circumstances which may jeopardise the completion in accordance with the Contract, and the measures being (or to be) adopted to overcome delays.
NEW CLAUSE-4.40	<p>Security of the Site</p> <p>Unless otherwise stated in the Special Conditions of Contract:</p> <ul style="list-style-type: none"> (a) the Contractor shall be responsible for keeping unauthorised persons off the Site, and (b) authorised persons shall be limited to the Contractor's Personnel and the Employer's Personnel; and to any other personnel notified to the Contractor, by the Employer or the Engineer, as authorised personnel of the Employer's other contractors on the Site.
NEW CLAUSE-4.41	<p>Contractor's Operations on Site</p> <p>The Contractor shall confine his operations to the Site, and to any additional areas which may be obtained by the Contractor and agreed by the Engineer as working areas. The Contractor shall take all necessary precautions to keep Contractor's Equipment and Contractor's Personnel within the Site and these additional areas, and to keep them off adjacent land.</p> <p>During the execution of the Works, the Contractor shall keep the Site free from all unnecessary obstruction, and shall store or dispose of any Contractor's Equipment or surplus materials. The Contractor shall clear away and remove from the Site any wreckage, rubbish and Temporary Works which are no longer required.</p> <p>Upon the issue of a Taking-Over Certificate, the Contractor shall clear away and remove, from that part of the Site and Works to which the Taking-Over Certificate refers, all Contractor's Equipment, surplus material, wreckage, rubbish and Temporary Works. The Contractor shall leave that part of the Site and the Works in a clean and safe condition.</p> <p>However, the Contractor may retain on Site, during the Defects Notification Period, such Goods as are required for the Contractor to fulfill obligations under the Contract.</p>
NEW CLAUSE-4.42	<p>Design – General Obligations:</p> <p>Drawings for Permanent works:</p>

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	<p>Preliminary Drawings (Tentative) showing general dimensions & details elaborating the scope of work (not based on detailed design) will be supplied along with the Tender documents. The design and Drawings of permanent works are in the scope of contractor.</p> <p>Design, Drawings and Specifications:</p> <p>The Contractor shall Design temporary works such as false work, form work, staging scheme, LG etc. required to perform their work and shall get the same and related working drawings approved by the Engineer. The Contractor would supply 6 sets of these drawings to the Engineer for the latter's use.</p> <p>Shop Drawings</p> <p>Based on "Good for Construction" drawings issued by Engineer the Contractor shall prepare shop / fabrication drawings to scale as directed indicating the required details. The shop drawings shall be prepared before execution of work, after taking actual site dimensions and all existing and proposed services / structures etc. The shop / fabrication drawings shall be checked by independent consultant prior to submission to the Engineer for approval.</p> <p>Shop drawings submitted by the Contractor shall be in sufficient detail to indicate the type, size, arrangement, breakdown for packing and shipment, the external connections, fixing arrangements required, the dimensions required for installation and interconnections with other equipment and materials, clearances and spaces required between various portions and any other information specifically called for.</p> <p>Approval of Engineer of any such proposal / drawings shall not relieve the contractor of his responsibility of sufficiency of such works. It shall be the responsibility of the Contractor to promptly bring to the notice of the Engineer any error or discrepancy in the Contract documents and obtains his orders thereon. Only stated dimensions are to be taken and not those obtained from scaling drawings. In case any feature of the work is not fully described and set forth in the Drawings and Specifications, the Contractor shall forthwith apply to the Engineer for further instructions, Drawings or Specifications.</p>
<p>NEW CLAUSE-4.43</p>	<p>Fossils</p> <p>All fossils, coins, articles of value or antiquity, and structures and other remains or items of geological or archaeological interest found on the Site shall be placed under the care and authority of the Employer. The Contractor shall take reasonable precautions to prevent Contractor's Personnel or other persons from removing or damaging any of these findings.</p> <p>The Contractor shall, upon discovery of any such finding, promptly give notice to the Engineer, who shall issue instructions for dealing with it. If the Contractor suffers delay and/or incurs Cost from complying with the instructions, the Contractor shall give a further notice to the Engineer and shall be entitled subject to Sub-Clause 56.1/SCC [Contractor's Claims] to:</p> <ul style="list-style-type: none"> (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 26.5/PCC [Extension of Time for Completion], and (b) payment of any such Cost, which shall be included in the Contract Price. <p>After receiving this further notice, the Engineer shall proceed in accordance with New-Clause 3.5/PCC [Determinations] to agree or determine these matters.</p>
	<p>5. Plant, Materials And Workmanship.</p>
<p>NEW CLAUSE-5.1</p>	<p>Manner of Execution</p> <p>The Contractor shall carry out the manufacture of Plant, the production and manufacture of Materials, and all other execution of the Works:</p> <ul style="list-style-type: none"> (a) in the manner (if any) specified in the Contract,

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	<p>(b) in a proper workmanlike and careful manner, in accordance with recognised good practice, and</p> <p>(c) with properly equipped facilities and non-hazardous Materials, except as otherwise specified in the Contract.</p>
NEW CLAUSE-5.2	<p>Samples</p> <p>The Contractor shall submit the following samples of Materials, and relevant information, to the Engineer for consent prior to using the Materials in or for the Works:</p> <p>(a) manufacturer's standard samples of Materials and samples specified in the Contract, all at the Contractor's cost, and</p> <p>(b) additional samples instructed by the Engineer as a Variation.</p> <p>Each sample shall be labelled as to origin and intended use in the Works.</p>
NEW CLAUSE-5.3	<p>Inspection</p> <p>The Employer's Personnel shall at all reasonable times:</p> <p>(a) have full access to all parts of the Site and to all places from which natural Materials are being obtained, and</p> <p>(b) during production, manufacture and construction (at the Site and elsewhere), be entitled to examine, inspect, measure and test the materials and workmanship, and to check the progress of manufacture of Plant and production and manufacture of Materials.</p> <p>The Contractor shall give the Employer's Personnel full opportunity to carry out these activities, including providing access, facilities, permissions and safety equipment. No such activity shall relieve the Contractor from any obligation or responsibility.</p> <p>The Contractor shall give notice to the Engineer whenever any work is ready and before it is covered up, put out of sight, or packaged for storage or transport. The Engineer shall then either carry out the examination, inspection, measurement or testing without unreasonable delay, or promptly give notice to the Contractor that the Engineer does not require to do so. If the Contractor fails to give the notice, he shall, if and when required by the Engineer, uncover the work and thereafter reinstate and make good, all at the Contractor's cost.</p> <p>Inspection and technical audit by the Employer</p> <p>The Employer or any representative authorised by the Employer in this behalf may inspect and review the progress and quality of the construction of Works and issue appropriate directions to the Engineer and the Contractor for taking remedial action in the event the Works are not in accordance with the provisions of this Agreement.</p> <p>External technical audit</p> <p>At any time during construction, the Employer may appoint an external technical auditor to conduct an audit of the quality of the Works. The findings of the audit, to the extent accepted by the Employer, shall be notified to the Contractor and the Engineer for taking remedial action in accordance with this Agreement. The Contractor shall provide all assistance as may be required by the auditor in the conduct of its audit hereunder. Notwithstanding anything contained in this Clause, the external technical audit shall not affect any obligations of the Contractor or the Engineer under this Agreement.</p> <p>Inspection of construction records</p> <p>The Employer shall have the right to inspect the records of the Contractor relating to the Works.</p>
NEW CLAUSE-5.4	<p>Tests:</p> <p>I. For determining that the Works conform to the Specifications and Standards, the Engineer</p>

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	<p>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 or his authorized representative may witness or participate in such tests conducted or cause to be conducted by the Contractor. Documentation of test records to be maintained by Contractor and Engineer or his authorized representative shall scrutinize 100% Testing records of all tests conducted as per existing guidelines of Indian Railways and Indian Road Congress.</p> <p>In the event that results of any tests conducted under in the above Clause 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.</p> <p>II. Examination of work before covering up</p> <p>In respect of the work which the Engineer is entitled to examine, inspect, measure or test before it is covered up or put out of view or any part of the work is placed thereon, the Contractor shall give notice to the Engineer whenever any such work is ready and before it is covered up. The Engineer shall then either carry out the examination, inspection or testing without unreasonable delay, or promptly give notice to the Contractor that the Engineer does not require to do so. Provided, however, that if any work is of a continuous nature where it is not possible or prudent to keep it uncovered or incomplete, the Contractor shall notify the schedule of carrying out such work to give sufficient opportunity, not being less than 3 (three) business days' notice, to the Engineer to conduct its inspection, measurement or test while the work is continuing. Provided further that in the event the Contractor receives no response from the Engineer within a period of 3 (three) business days from the date on which the Contractor's notice hereunder is delivered to the Engineer, the Contractor shall be entitled to assume that the Engineer would not undertake the said inspection.</p> <p>This Sub-Clause shall apply to all tests specified in the Contract, other than the Tests after Completion (if any).</p> <p>The Contractor shall provide all apparatus, assistance, documents and other information, electricity, equipment, fuel, consumables, instruments, labour, materials, and suitably qualified and experienced staff, as are necessary to carry out the specified tests efficiently. The Contractor shall agree, with the Engineer, the time and place for the specified testing of any Plant, Materials and other parts of the Works.</p> <p>The Engineer may, under Clause 34/PCC [Variations and Adjustments], vary the location or details of specified tests, or instruct the Contractor to carry out additional tests. If these varied or additional tests show that the tested Plant, Materials or workmanship is not in accordance with the Contract, the cost of carrying out this Variation shall be borne by the Contractor, notwithstanding other provisions of the Contract.</p> <p>The Engineer shall give the Contractor not less than 24 hours' notice of the Engineer's intention to attend the tests. If the Engineer does not attend at the time and place agreed, the Contractor may proceed with the tests, unless otherwise instructed by the Engineer, and the tests shall then be deemed to have been made in the Engineer's presence.</p> <p>If the Contractor suffers delay and/or incurs Cost from complying with these instructions or as a</p>

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	<p>result of a delay for which the Employer is responsible, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 56.1/SCC [Contractor's Claims] to:</p> <ul style="list-style-type: none"> (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 26.5/PCC [Extension of Time for Completion], and (b) payment of any such Cost, which shall be included in the Contract Price. <p>After receiving this notice, the Engineer shall proceed in accordance with New-Clause 3.5/PCC [Determinations] to agree or determine these matters.</p> <p>The Contractor shall promptly forward to the Engineer duly certified reports of the tests. When the specified tests have been passed, the Engineer shall endorse the Contractor's test certificate, or issue a certificate to him, to that effect. If the Engineer has not attended the tests, he shall be deemed to have accepted the readings as accurate.</p>
NEW CLAUSE-5.5	<p>Rejection</p> <p>If, as a result of an examination, inspection, measurement or testing, any Plant, Materials or workmanship is found to be defective or otherwise not in accordance with the Contract, the Engineer may reject the Plant, Materials 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 Contract.</p> <p>If the Engineer requires this Plant, Materials or workmanship to be retested, the tests shall be repeated under the same terms and conditions. If the rejection and retesting cause the Employer to incur additional costs, the Contractor shall subject to New-Clause 2.4/PCC [Employer's Claims] pay these costs to the Employer.</p> <p>The Contractor shall not be entitled to any extension of time on account of rectifying any Defect or retesting as specified in this Clause.</p> <p>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 Employer be liable for the same in any manner.</p>
NEW CLAUSE-5.6	<p>Remedial Work</p> <p>Notwithstanding any previous test or certification, the Engineer may instruct the Contractor to:</p> <ul style="list-style-type: none"> (a) remove from the Site and replace any Plant or Materials which is not in accordance with the Contract, (b) remove and re-execute any other work which is not in accordance with the Contract, and (c) Execute any work which is urgently required for the safety of the Works, whether because of an accident, unforeseeable event or otherwise. <p>The Contractor shall comply with the instruction within a reasonable time, which shall be the time (if any) specified in the instruction, or immediately if urgency is specified under sub-paragraph I.</p> <p>If the Contractor fails to comply with the instruction, the Employer shall be entitled to employ and pay other persons to carry out the work. Except to the extent that the Contractor would have been entitled to payment for the work, the Contractor shall subject to New-Clause 2.4/ PCC [Employer's Claims] pay to the Employer all costs arising from this failure.</p>
NEW CLAUSE-5.7	<p>Ownership of Plant and Materials</p> <p>Each item of Plant and Materials shall, to the extent consistent with the Laws of the Country, become the property of the Employer at whichever is the earlier of the following times, free from liens and other encumbrances:</p>

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	<p>(i) when it is delivered to the Site;</p> <p>(ii) when the Contractor is entitled to payment of the value of the Plant and Materials under Sub-Clause 26.11/PCC [Payment for Plant and Materials in Event of Suspension].</p> <p>Unless otherwise stated in the Specification, the Contractor shall pay all royalties, rents and other payments for:</p> <ul style="list-style-type: none"> a) natural Materials obtained from outside the Site, and b) the disposal of material from demolitions and excavations and of other surplus material (whether natural or man-made), except to the extent that disposal areas within the Site are specified in the Contract.
	<p>6. Defect Liability</p>
<p>NEW CLAUSE-6.1</p>	<p>Defects Liability</p> <p>6.1 Defects Liability Period</p> <p>6.1.1 The Contractor shall be responsible for all the Defects and deficiencies, except usual wear and tear in the Railway Project or any part thereof, till the expiry of a period of 180 days commencing from the completion date.</p>
<p>NEW CLAUSE 6.2</p>	<p>6.2 Remedy and Rectification of Defects and Deficiencies</p> <p>6.2.1 Without prejudice to the provisions of Clause 6.2.2, the Contractor shall repair or rectify all Defects and deficiencies observed by the Engineer during the Defects Liability Period within a period of 15 (fifteen) days from the date of notice issued by the Employer / Engineer in this behalf, or within such reasonable period as may be determined by the Engineer at the request of the Contractor, in accordance with Good Industry Practice.</p> <p>6.2.2 During a period of 2 (two) months from the date of issuance of Completion Certificate, the Contractor shall retain sufficient staff and spares at Project for procuring prompt replacement, installation or re-installation of any defective parts.</p>
<p>NEW CLAUSE 6.3</p>	<p>6.3 Cost of Remedying Defects</p> <p>For the avoidance of doubt, any repair or rectification undertaken in accordance with the provisions of Clause 6.2, including any additional tests, shall be carried out by the Contractor at its own risk and cost, to the extent that such rectification or repair is attributable to:</p> <ul style="list-style-type: none"> (a) the design of the Project; (b) Works, Plant, Materials or workmanship not being in accordance with this Agreement and the Specifications and Standards; (c) improper maintenance during construction of the Railway Project by the Contractor; or (d) failure by the Contractor to comply with any other obligation under this Agreement.
<p>NEW CLAUSE 6.4</p>	<p>Contractor's failure to Rectify Defects</p> <p>In the event that the Contractor fails to repair or rectify such Defect or deficiency within the period specified in Clause 6.2, the Employer shall be entitled to get the same repaired, rectified or remedied at the Contractor's cost so as to make the Railway Project conform to the Specifications and Standards and the provisions of this Agreement. All costs consequent thereon shall, after due consultation with the Employer and the Contractor, be determined by the Engineer. The cost so determined, and an amount equal to 20% (twenty per cent) of such cost as Damages, shall be recoverable by the Employer from the Contractor and may be deducted by the Employer from any monies due to the Contractor.</p>

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NEW CLAUSE-6.5	<p>Removal of Defective Work</p> <p>If the defect or damage cannot be remedied expeditiously on the Site and the Employer gives consent, the Contractor may remove from the Site for the purposes of repair such items of Plant as are defective or damaged. This consent may require the Contractor to increase the amount of the Performance Security by the full replacement cost of these items, or to provide other appropriate security.</p>
NEW CLAUSE-6.6	<p>Further Tests</p> <p>If the work of remedying of any defect or damage may affect the performance of the Works, the Engineer may require the repetition of any of the tests described in the Contract. The requirement shall be made by notice within 28 days after the defect or damage is remedied.</p> <p>These tests shall be carried out in accordance with the terms applicable to the previous tests, except that they shall be carried out at the risk and cost of the Party liable, under New-Clause 6.3/PCC [Cost of Remedying Defects], for the cost of the remedial work.</p>
NEW CLAUSE-6.7	<p>Right of Access</p> <p>Until the Performance Certificate has been issued, the Contractor shall have such Right of Access to the Works as is reasonably required in order to comply with this Clause, except as may be inconsistent with the Employer's reasonable security restrictions.</p>
NEW CLAUSE-6.8	<p>Contractor to search cause</p> <p>6.8.1 The Engineer may instruct the Contractor to examine the cause of any Defect in the Works or part thereof before the expiry of the Defects Liability Period.</p> <p>6.8.2 In the event any Defect identified under Clause 6.8.1 is attributable to the Contractor, the Contractor shall rectify such Defect within the period specified by the Engineer, and shall bear the cost of the examination and rectification of such Defect.</p> <p>6.8.3 In the event such Defect is not attributable to the Contractor, the Engineer shall, after due consultation with the Employer and the Contractor, determine the costs incurred by the Contractor on such examination and notify the same to the Contractor, with a copy to the Employer, and the Contractor shall be entitled to payment of such costs by the Employer.</p>
NEW CLAUSE-6.9	<p>Performance Certificate</p> <p>Performance of the Contractor's obligations shall not be considered to have been completed until the Employer has issued the Performance Certificate to the Contractor, stating the date on which the Contractor completed his obligations under the Contract.</p> <p>The Employer shall issue the Performance Certificate within 28 days after the latest of the expiry dates of the Defects Notification Periods, or as soon thereafter as the Contractor has supplied all the Contractor's Documents and completed and tested all the Works, including remedying any defects.</p> <p>Only the Performance Certificate shall be deemed to constitute acceptance of the Works.</p>
NEW CLAUSE-6.10	<p>Unfulfilled Obligations</p> <p>After the Performance Certificate has been issued, each Party shall remain liable for the fulfilment of any obligation which remains unperformed at that time. For the purposes of determining the nature and extent of unperformed obligations, the Contract shall be deemed to remain in force.</p> <p>Emergency defect rectification</p> <p>If any defect or damage, is one requiring immediate attention from safety, environmental or operational viewpoint, the Engineer has the authority to proceed with rectification in any manner</p>

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	suitable and deduct such sums from the Contract Price
NEW CLAUSE-6.11	<p>Clearance of Site</p> <p>Upon receiving the Performance Certificate, the Contractor shall remove any remaining Contractor's Equipment, surplus material, wreckage, rubbish and Temporary Works from the Site.</p> <p>If all these items have not been removed within 28 days after the Employer receives a copy of the Performance Certificate, the Employer may sell or otherwise dispose of any remaining items. The Employer shall be entitled to be paid the costs incurred in connection with, or attributable to, such sale or disposal and restoring the Site.</p> <p>Any balance of the moneys from the sale shall be paid to the Contractor. If these moneys are less than the Employer's costs, the Contractor shall pay the outstanding balance to the Employer.</p>
NEW CLAUSE-6.12	<p>Extension of Defects Liability Period</p> <p>6.12.1 The Defects Liability Period shall be deemed to be extended till the identified Defects under Clause 6.2 have been remedied.</p> <p>6.12.2 Any Materials or Works with Defects identified under Clause 6.2 and replaced or repaired during the Defects Liability Period or the extended Defects Liability Period, as the case may be, would be further warranted for a period of twelve (12) months from the date of completion of such repair or replacement.</p> <p>6.12.3 The Contractor shall upon termination or expiry of this Agreement or upon expiry of the Defects Liability Period, assign any outstanding benefit in respect of any subcontract or any warranty, to the Employer or to such other person as the Employer may direct.</p>
	7.Measurment And Evaluation
NEW CLAUSE 7.1	<p>Works to be Measured</p> <p>The Works shall be measured, and valued for payment, in accordance with this Clause.</p> <p>Whenever the Engineer requires any part of the Works to be measured, reasonable notice shall be given to the Contractor's Representative, who shall:</p> <ul style="list-style-type: none"> (a) promptly either attend or send another qualified representative to assist the Engineer in making the measurement, and (b) supply any particulars requested by the Engineer. <p>If the Contractor fails to attend or send a representative, the measurement made by (or on behalf of) the Engineer shall be accepted as accurate.</p> <p>Except as otherwise stated in the Contract, wherever any Permanent Works are to be measured from records, these shall be prepared by the Engineer. The Contractor shall, as and when requested, attend to examine and agree the records with the Engineer, and shall sign the same when agreed. If the Contractor does not attend, the records shall be accepted as accurate.</p> <p>If the Contractor examines and disagrees the records, and/or does not sign them as agreed, then the Contractor shall give notice to the Engineer of the respects in which the records are asserted to be inaccurate. After receiving this notice, the Engineer shall review the records and either confirm or vary them. If the Contractor does not so give notice to the Engineer within 14 days after being requested to examine the records, they shall be accepted as accurate.</p>
NEW CLAUSE 7.2	<p>Method of Measurement</p> <p>Except as otherwise stated in the Contract and notwithstanding local practice:</p> <ul style="list-style-type: none"> (a) measurement shall be made of the net actual quantity of each item of the Permanent

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	<p>Works, and</p> <p>(b) the method of measurement shall be in accordance with the Price schedule or other applicable Schedules.</p>
NEW CLAUSE 7.3	<p>Omissions</p> <p>Whenever the omission of any work form's part (or all) of a Variation, the value of which has not been agreed, if:</p> <ul style="list-style-type: none"> a) the Contractor will incur (or has incurred) cost which, if the work had not been omitted, would have been deemed to be covered by a sum forming part of the Accepted Contract Amount; b) the omission of the work will result (or has resulted) in this sum not forming part of the Contract Price; and c) this cost is not deemed to be included in the evaluation of any substituted work; <p>then the Contractor shall give notice to the Engineer accordingly, with supporting particulars. Upon receiving this notice, the Engineer shall proceed in accordance with New-Clause 3.5/PCC [Determinations] to agree or determine this cost, which shall be included in the Contract Price.</p>
NEW CLAUSE 8	<p>Force Majeure</p> <p>If at any time, during the continuance of this contract, the performance in whole or in part by either party of any obligation under this contract shall be prevented or delayed by reason of any war, hostility, acts of public enemy, civil commotion, sabotage, serious loss or damage by fire, explosions, epidemics, pandemics, strikes, lockouts or acts of God (hereinafter referred to 'events') provided, notice of the happening of any such event is given by either party to the other within 14 days from the date of occurrence thereof, neither party shall by reason of such event, be entitled to terminate this contract nor shall either party have any claim for damages against the other in respect of such non-performance of delay in performance, and works under the contract shall be resumed as soon as practicable after such event has come to an end or ceased to exist, and decision of the Engineer as to whether the works have been so resumed or not shall be final and conclusive, provided further that if the performance in whole or in part of any obligation under this contract is prevented or delayed by reason of any such event for a continuous period exceeding 84 days, either party may at its option terminate the contract by giving notice to the other party.</p> <p>Payment and Release in case of such Optional Termination</p> <p>Upon such termination, the Engineer shall determine the value of the work done and issue a Payment Certificate which shall include:</p> <ul style="list-style-type: none"> a) The amounts payable for any work carried out for which a price is stated in the contract; b) The Cost of Plant and Materials ordered for the Works which have been delivered to the Contractor, or of which the contractor is liable to accept delivery; this Plant and materials shall become the property of (and be at the risk of) the Employer when paid for by the Employer, the Contractor shall place the same at the Employer's disposal; c) Other Costs or liabilities supported by necessary documentary evidence which in the circumstances were reasonably and necessarily incurred by the Contractor in the expectation of completing the Works as per mutually agreed programme. d) The Cost of removal of Temporary Works and Contractor's Equipment from the Site and the return of these items to the Contractor's works in his country (or to any other destination at no greater cost)
NEW CLAUSE-9	Defect Liability Period (DLP): 180 Days

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NEW CLAUSE-10	<p>Integrated Testing and System Commissioning</p> <p>Integrated Testing: Tests on Completion shall also include Integrated Testing. The Contractor shall, following satisfactory completion of tests on his works, equipment, sub-systems or system, perform, at the direction of the Engineer, programme of tests to verify and confirm the compatibility and complete performance of his works, equipment, sub-systems or system with the works, equipment, sub-systems or system provided by others.</p> <p>Compilation of Test Results: The results of the Integrated Testing and Commissioning shall be compiled and evaluated by the Engineer and the Contractor</p> <p>Retesting: If the Works, or a part thereof, or a Section, fail to pass the Integrated Testing and Commissioning, the Engineer may order such failed tests to be repeated with the same terms and conditions. If such failure and retesting result from a default of the Contractor and cause the Employer to incur costs, the same shall be recoverable from the Contractor by the Employer, and may be deducted by the Employer from any amount due, or to become due, to the Contractor.</p> <p>Failure to Pass Test: If the Works, or a part thereof, or a Section, fail to pass Integrated Testing and Commissioning and the Contractor in consequence proposes to make any adjustment or modification to the Works or a part thereof, or a section, the Engineer may, with the approval of the Employer, instruct the Contractor to carry out such adjustment or modification, at his own cost and to satisfy the requirements of Integrated Testing and Commissioning within such time as the Employer / Engineer may deem to be reasonable.</p> <p>Statutory Requirements: The Contractor shall carry out all statutory tests and trials, under the supervision of the Engineer, necessary for obtaining sanction of the competent authority for opening the system for public carriage of passengers as mentioned in the Special Conditions of Contract.</p>
NEW CLAUSE-11	<p>Conflict of Interest: The remuneration of the Tenderer shall constitute the Tenderer's sole remuneration in connection with this Contract or the Services and, the Tenderers shall not accept for their own benefit any trade commission, discount or similar payment in connection with activities pursuant to this Contract or to the Services or in the discharge of their obligations hereunder, and the Tenderers shall use their best efforts to ensure that any Personnel either of them, similarly shall not receive any such additional remuneration Neither the Tenderer nor the Personnel of either of them shall engage, either directly or indirectly, in any of the following activities:</p> <p>(a) during the term of this Contract, any business or professional activities in India which would conflict with the activities assigned to them under this Contract</p> <p>The tenderer shall not be one of the following:</p> <p>(i) A firm which has been engaged by the Employer to provide consulting services for the preparation related to procurement for or implementation of this project.</p> <p>(ii) Any association/affiliation (inclusive of parent firms) of a firm or an organization mentioned in para (i) above.</p> <p>(iii) A Tenderer who lends, or temporarily seconds its personnel to firms or organizations which were engaged in consulting services for the preparation related to procurement for or implementation of the project, if the personnel would be involved in any capacity on the same project.</p> <p>Jurisdiction of Court in case of dispute or differences arising on account of this tender: Any suit or application, arising out of any dispute or differences on account of this tender shall be filed in a competent court at Bangalore, Karnataka only and no other court or any other district of the country shall have any jurisdiction in the matter.</p>
NEW CLAUSE-12	Special/Acceleration Advance

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	<p>Employer at his sole discretion, may provide Interest bearing Special/Acceleration Advance based on the recommendation of the Engineer to expedite works or to bring forward the completion date(s) and on account of immediate additional mobilization to complete balance works as targeted. The maximum cumulative Special/Acceleration Advance shall be 5% of the Accepted contract amount, which shall be released in stages as and when deemed appropriate as decided by the Engineer/Employer. The advance released at a time shall not exceed 1% of the Accepted contract amount. The Special Acceleration Advance shall be interest bearing and secured by BG equivalent to 110% of the advance amount.</p> <p>Interest on Advance Payment: At the rate of SBI MCLR+2% interest per annum on reducing balances. The Interest rate is applicable from the date of submission of IPC/ advance request by contractor.</p>
NEW CLAUSE-13	DELETED
NEW CLAUSE-14	DELETED
NEW CLAUSE-15	Language for communications- English
NEW CLAUSE-16	<p>Time for access to Site</p> <p>As per Annexure -2 of Employer's Requirements Part-2.</p>
NEW CLAUSE-17	<p>Employers' Bank details for Letter of Credit</p> <p>(a) Bangalore Prime Corporate Branch</p> <p>Canara Bank, MG Road, Bengaluru-560001 IFSC Code – CNRB0002636 A/c No - 0430201012110</p> <p>(b) Issuance/ reimbursing branch for LC</p> <p>Shall be indicated later.</p>
NEW CLAUSE-18	<p>18.1 Representations and warranties of the Contractor</p> <p>The Contractor represents and warrants to the Employer that:</p> <ol style="list-style-type: none"> it is duly organised and validly existing under the laws of India, and has full power and authority to execute and perform its obligations under this Agreement and to carry out the transactions contemplated hereby; it has taken all necessary corporate and other actions under Applicable Laws to authorise the execution and delivery of this Agreement and to validly exercise its rights and perform its obligations under this Agreement; this Agreement constitutes its legal, valid and binding obligation, enforceable against it in accordance with the terms hereof, and its obligations under this Agreement will be legally valid, binding and enforceable obligations against it in accordance with the terms hereof; it is subject to the laws of India, and hereby expressly and irrevocably waives any immunity in any jurisdiction in respect of this Agreement or matters arising thereunder including any obligation, liability or responsibility hereunder; the information furnished in the Bid and as updated on or before the date of this Agreement is true and accurate in all respects as on the date of this Agreement; the execution, delivery and performance of this Agreement will not conflict with, result in the breach of, constitute a default under, or accelerate performance required by any of the

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	<p>terms of its memorandum and articles of association or any Applicable Laws or any covenant, contract, agreement, arrangement, understanding, decree or order to which it is a party or by which it or any of its properties or assets is bound or affected;</p> <p>g) there are no actions, suits, proceedings, or investigations pending or, to its knowledge, threatened against it at law or in equity before any court or before any other judicial, quasi-judicial or other authority, the outcome of which may result in the breach of this Agreement or which individually or in the aggregate may result in any material impairment of its ability to perform any of its obligations under this Agreement;</p> <p>h) it has no knowledge of any violation or default with respect to any order, writ, injunction or decree of any court or any legally binding order of any Government Instrumentality which may result in any material adverse effect on its ability to perform its obligations under this Agreement and no fact or circumstance exists which may give rise to such proceedings that would adversely affect the performance of its obligations under this Agreement;</p> <p>(i) it has complied with Applicable Laws in all material respects and has not been subject to any fines, penalties, injunctive relief or any other civil or criminal liabilities which in the aggregate have or may have a material adverse effect on its ability to perform its obligations under this Agreement;</p> <p>(j) no representation or warranty by it contained herein or in any other document furnished by it to the Authority or to any Government Instrumentality in relation to Applicable Permits contains or will contain any untrue or misleading statement of material fact or omits or will omit to state a material fact necessary to make such representation or warranty not misleading;</p> <p>(k) no sums, in cash or kind, have been paid or will be paid, by it or on its behalf, to any person by way of fees, commission or otherwise for securing the contract or entering into this Agreement or for influencing or attempting to influence any officer or employee of the Employer in connection therewith;</p> <p>(l) all information provided by the {selected bidder/ members of the Consortium/Joint Venture} in response to the tender or otherwise, is to the best of its knowledge and belief, true and accurate in all material respects; and</p> <p>(m) nothing contained in this Agreement shall create any contractual relationship or obligation between the Employer and any Sub-contractors, designers, consultants or agents of the Contractor.</p> <p>18.2 Representations and warranties of the Employer.</p> <p>The Employer represents and warrants to the Contractor that:</p> <p>a) it has full power and authority to execute, deliver and perform its obligations under this Agreement and to carry out the transactions contemplated herein and that it has taken all actions necessary to execute this Agreement, exercise its rights and perform its obligations, under this Agreement;</p> <p>b) it has taken all necessary actions to authorise the execution, delivery and performance of this Agreement;</p> <p>c) it has the financial standing and capacity to perform its obligations under this Agreement;</p> <p>d) this Agreement constitutes a legal, valid and binding obligation enforceable against it in accordance with the terms hereof;</p> <p>e) it has no knowledge of any violation or default with respect to any order, writ, injunction or any decree of any court or any legally binding order of any Government Instrumentality which may result in any material adverse effect on the Employer's ability to perform its</p>

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	<p>obligations under this Agreement;</p> <p>f) it has complied with Applicable Laws in all material respects;</p> <p>g) it has good and valid right to the Site.</p> <p>18.3 Disclosure</p> <p>In the event that any occurrence or circumstance comes to the attention of either Party that renders any of its aforesaid representations or warranties untrue or incorrect, such Party shall immediately notify the other Party of the same. Such notification shall not have the effect of remedying any breach of the representation or warranty that has been found to be untrue or incorrect nor shall it adversely affect or waive any obligation of either Party under this Agreement.</p>
<p>NEW CLAUSE-19</p>	<p>Disclaimer</p> <p>19.1 The Contractor acknowledges that prior to the execution of this Agreement, the Contractor has, after a complete and careful examination, made an independent evaluation of the Tender, Scope of the Project, Specifications and Standards, Site, local conditions, physical qualities of ground, subsoil and geology, traffic volumes, suitability and availability of access routes to the Site and all information provided by the Employer or obtained, procured or gathered otherwise, and has determined to its satisfaction the accuracy or otherwise thereof and the nature and extent of difficulties, risks and hazards as are likely to arise or may be faced by it in the course of performance of its obligations hereunder. Save as provided in New Clause 2.0/PCC and New Clause 18.2/PCC, the Employer makes no representation whatsoever, express, implicit or otherwise, regarding the accuracy, adequacy, correctness, reliability and/or completeness of any assessment, assumptions, statement or information provided by it and the Contractor confirms that it shall have no claim whatsoever against the Employer in this regard.</p> <p>19.2 The Contractor acknowledges and hereby accepts to have satisfied itself as to the correctness and sufficiency of the Contract Price.</p> <p>19.3 The Contractor acknowledges and hereby accepts the risk of inadequacy, mistake or error in or relating to any of the matters set forth in Clause 19.1/PCC above and hereby acknowledges and agrees that the Employer shall not be liable for the same in any manner whatsoever to the Contractor, or any person claiming through or under any of them, and shall not lead to any adjustment of Contract Price or Scheduled Completion Date.</p> <p>19.4 The Parties agree that any mistake or error in or relating to any of the matters set forth in Clause 19.1/PCC above shall not vitiate this Agreement, or render it voidable.</p> <p>19.5 In the event that either Party becomes aware of any mistake or error relating to any of the matters set forth in Clause 19.1/PCC above, that Party shall immediately notify the other Party, specifying the mistake or error.</p> <p>19.6 Except as otherwise provided in this Agreement, all risks relating to the Project shall be borne by the Contractor; and the Employer shall not be liable in any manner for such risks or the consequences thereof.</p>
<p>NEW CLAUSE-20</p>	<p>Completion Certificate</p> <p>20.1 Tests on Completion</p> <p>20.1.1 No later than 60 (sixty) days prior to the likely completion of the Railway Project, the Contractor shall prepare and submit to the Engineer the documents required for seeking approval of the Commissioner of Railway Safety in accordance with the provisions of the Railways Opening for Public Carriage of Passenger Rules, the Indian Railway Permanent Way Manual or the Indian Railways Manual of A.C. Traction, as the case may be, and notify the Engineer of its intent to subject the Railway Project to</p>

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	<p>Tests. After ensuring and procuring that the documents required to be submitted to the Commissioner for Railway Safety meet the requirements of Applicable Laws, the Engineer shall, in consultation with the Contractor, determine the date and time of each of the Tests, and inform the Employer who may designate its representative to witness the Tests. The Contractor shall provide such assistance as the Engineer may reasonably require for conducting the Tests.</p> <p>20.1.2 All Tests shall be conducted in accordance with as per relevant Schedule at the cost and expense of the Contractor; provided, however, that the trial running on railway track shall be undertaken at the cost and expense of the Employer. The Engineer shall observe, monitor and review the results of the Tests to determine compliance of the Railway Project with Specifications and Standards and if it is reasonably anticipated or determined by the Engineer during the course of any Test that the performance of the Railway Project or Section or any part thereof, does not meet the Specifications and Standards, it shall have the right to suspend or delay such Test and require the Contractor to remedy and rectify any Defect or deficiency. Upon completion of each Test, the Engineer shall provide to the Contractor and the Employer copies of all Test data including detailed Test results. For the avoidance of doubt, the Parties expressly agree that the Engineer may require the Contractor to carry out or cause to be carried out additional Tests, in accordance with Good Industry Practice, for determining the compliance of the Railway Project thereof with the Specifications and Standards.</p> <p>20.2 Provisional Certificate</p> <p>20.2.1 Upon completion of Tests, the Engineer shall satisfy itself that the Tests have been successful and the Railway Project is fit for opening to traffic. Upon such determination, the Engineer shall issue to the Contractor and the Employer a certificate substantially in the form set forth in relevant Schedule (the "Provisional Certificate"). The Engineer may issue a Provisional Certificate even if certain works forming part of the Railway Project are not yet completed and in such an event, the Provisional Certificate shall have appended thereto a list of outstanding items signed jointly by the Engineer and the Contractor (the "Punch List"). For the avoidance of doubt and by way of illustration, the Punch List may include [fencing, tree plantation, rest areas].</p> <p>20.2.2 Upon issuance of the Provisional Certificate, the Engineer shall forward to the Employer (i) copies of all Test data including Test results, and (ii) the documents submitted by the Contractor for seeking approval of the Commissioner of Railway Safety in accordance with the provisions of the Railways Opening for Public Carriage of Passenger Rules, the Indian Railway Permanent Way Manual/ or the Indian Railways Manual of A.C. Traction, as the case may be, for obtaining authorisation from the Commissioner for Railway Safety.</p> <p>20.2.3 The Contractor shall assist the Employer during inspection and tests to be conducted by the Commissioner of Railway Safety for determining compliance of the Railway Project with Applicable Laws and the provisions of this Agreement.</p> <p>20.2.4 The Parties hereto expressly agree that the Engineer may, upon request of the Employer to this effect, issue a Provisional Certificate for part of the Railway Project and the provisions of above Clauses shall apply mutatis mutandis to such Provisional Certificate. The issuance of the provisional certificate will not absolve the contractor of its obligations to complete the remaining part of Railway Project.</p> <p>20.2.5 The risk of loss or damage to any Materials, Plant or Works in the Railway Project or part thereof, as the case may be, and the care and custody thereof shall pass from the Contractor to the Employer upon issuance of Provisional Certificate for the Railway Project or part thereof.</p>

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	<p>20.3 Completion of Punch List items</p> <p>All items in the Punch List shall be completed by the Contractor within 90 (ninety) days of the date of issuance of the Provisional Certificate and for any delay thereafter, other than for reasons solely attributable to the Employer or due to Force Majeure, the Employer shall be entitled to recover Damages from the Contractor to be calculated and paid for each day of delay until all items are completed, at the lower of (a) 0.1% (zero point one per cent) of the Performance Security, and (b) 0.2% (zero point two per cent) of the cost of completing such items as estimated by the Engineer. Subject to payment of such Damages, the Contractor shall be entitled to a further period not exceeding 120 (one hundred and twenty) days for completion of the Punch List items. For the avoidance of doubt, it is agreed that if completion of any item in the Punch List is delayed for reasons attributable to the Employer or due to Force Majeure, the completion date thereof shall be determined by the Engineer in accordance with Good Industry Practice, and such completion date shall be deemed to be the date of issue of the Provisional Certificate for the purposes of Damages, if any, payable for such item under this Clause.</p> <p>20.4 Completion Certificate</p> <p>20.4.1 Upon completion of all items in the Punch List and issuance of authorisation by the Commissioner of Railway Safety, the Engineer shall issue forthwith to the Contractor and the Employer a completion certificate substantially in the form (the "Completion Certificate") separately for and in respect of each Provisional Certificate issued.</p> <p>20.4.2 Upon receiving the Completion Certificate, the Contractor shall remove its equipment, materials, debris and temporary works from the Site within a period of 15 (fifteen) days thereof, failing which the Employer may remove or cause to be removed, such equipment, materials, debris and temporary works and recover from the Contractor an amount equal to 120% (one hundred and twenty per cent) of the actual cost of removal incurred by the Employer.</p> <p>20.5 Rescheduling of Tests</p> <p>If the Engineer certifies to the Employer and the Contractor that it is unable to issue the Completion Certificate or Provisional Certificate, as the case may be, because of events or circumstances on account of which the Tests could not be held or had to be suspended, the Contractor shall be entitled to re-schedule the Tests and hold the same as soon as reasonably practicable.</p>

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NEW CLAUSE -21	<p>Traffic Regulation</p> <p>21.1 Traffic regulation by the Contractor</p> <p>21.1.1 The Contractor shall take all the required measures and make arrangements for the safety of any persons and vehicles on or about the Site during the construction of the Railway Project or a Section thereof in accordance with Good Industry Practice, and Applicable Laws. It shall provide, erect and maintain all such barricades, signs, markings, flags, and lights as may be required by Good Industry Practice for the safety of the traffic using any public roads or access along or across the Section under construction.</p> <p>21.1.2 All works shall be carried out in a manner creating least interference to traffic passing along or across the Railway Project or a Section thereof. The Contractor shall ensure that proper passage is provided for the traffic. Where it is not possible or safe to allow traffic on the existing road or passage, a temporary diversion of proper specifications shall be constructed by the Contractor at its own cost. The Contractor shall take prior approval of the Engineer for any proposed arrangement for traffic regulation during Construction, which approval shall not be unreasonably withheld.</p> <p>21.1.3 In the event any construction work is required to be executed in close proximity of an existing operating system of Railways, the Contractor shall make arrangements for the safety of such system in accordance with the provisions of the 'Compendium of Instructions on Safety at work Sites' issued by the Employer and Good Industry Practice.</p>
NEW CLAUSE -22	<p>Liability And Indemnity</p> <p>22.1 General indemnity</p> <p>The Contractor will indemnify, defend, save and hold harmless the Employer and its officers, servants, agents, Government Instrumentalities and Government owned and/or controlled entities/enterprises, (the "Employer Indemnified Persons") against any and all suits, proceedings, actions, demands and third party claims for any loss, damage, cost and expense of whatever kind and nature, whether arising out of any breach by the Contractor of any of its obligations under this Agreement or from any negligence under the Agreement, including any errors or deficiencies in the design documents, or tort or on any other ground whatsoever, except to the extent that any such suits, proceedings, actions, demands and claims have arisen due to any negligent act or omission, or breach or default of this Agreement on the part of the Employer Indemnified Persons.</p> <p>22.2 Indemnity by the Contractor</p> <p>22.2.1 Without limiting the generality of Clause 22.1, the Contractor shall fully indemnify, hold harmless and defend the Employer and the Employer Indemnified Persons from and against any and all loss and/or damages arising out of or with respect to:</p> <ul style="list-style-type: none"> (a) failure of the Contractor to comply with Applicable Laws and Applicable Permits; (b) payment of taxes required to be made by the Contractor in respect of the income or other taxes of the Sub-contractors, suppliers and representatives; or (c) non-payment of amounts due as a result of Materials or services furnished to the Contractor or any of its Sub-contractors which are payable by the Contractor or any of its Sub-contractors. <p>22.2.2 Without limiting the generality of the provisions of this LIABILITY AND INDEMNITY, the Contractor shall fully indemnify, hold harmless and defend the Employer Indemnified Persons from and against any and all suits, proceedings, actions, claims, demands, liabilities and damages which the Employer Indemnified Persons may hereafter suffer,</p>

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	<p>or pay by reason of any demands, claims, suits or proceedings arising out of claims of infringement of any domestic or foreign patent rights, copyrights or other Intellectual Property, proprietary or confidentiality rights with respect to any materials, information, design or process used by the Contractor or by the Sub-contractors in performing the Contractor's obligations or in any way incorporated in or related to the Project. If in any such suit, action, claim or proceedings, a temporary restraint order or preliminary injunction is granted, the Contractor shall make every reasonable effort, by giving a satisfactory bond or otherwise, to secure the revocation or suspension of the injunction or restraint order. If, in any such suit, action, claim or proceedings, the Railway Project, or any part thereof or comprised therein, is held to constitute an infringement and its use is permanently enjoined, the Contractor shall promptly make every reasonable effort to secure for the Employer a license, at no cost to the Employer, authorising continued use of the infringing work. If the Contractor is unable to secure such license within a reasonable time, the Contractor shall, at its own expense, and without impairing the Specifications and Standards, either replace the affected work, or part, or process thereof with non-infringing work or part or process, or modify the same so that it becomes non-infringing.</p> <p>22.3 Notice and Contest of Claims</p> <p>In the event that either Party receives a claim or demand from a third party in respect of which it is entitled to the benefit of an indemnity under this Agreement (the "Indemnified Party") it shall notify the other Party (the "Indemnifying Party") within 15 (fifteen) days of receipt of the claim or demand and shall not settle or pay the claim without the prior approval of the Indemnifying Party, which approval shall not be unreasonably withheld or delayed. In the event that the Indemnifying Party wishes to contest or dispute the claim or demand, it may conduct the proceedings in the name of the Indemnified Party, subject to the Indemnified Party being secured against any costs involved, to its reasonable satisfaction.</p> <p>22.4 Defence of Claims</p> <p>22.4.1 The Indemnified Party shall have the right, but not the obligation, to contest, defend and litigate any claim, action, suit or proceeding by any third party alleged or asserted against such Party in respect of, resulting from, related to or arising out of any matter for which it is entitled to be indemnified hereunder, and reasonable costs and expenses thereof shall be indemnified by the Indemnifying Party. If the Indemnifying Party acknowledges in writing its obligation to indemnify the Indemnified Party in respect of loss to the full extent provided by this Agreement, the Indemnifying Party shall be entitled, at its option, to assume and control the defence of such claim, action, suit or proceeding, liabilities, payments and obligations at its expense and through the counsel of its choice; provided it gives prompt notice of its intention to do so to the Indemnified Party and reimburses the Indemnified Party for the reasonable cost and expenses incurred by the Indemnified Party prior to the assumption by the Indemnifying Party of such defence. The Indemnifying Party shall not be entitled to settle or compromise any claim, demand, action, suit or proceeding without the prior written consent of the Indemnified Party, unless the Indemnifying Party provides such security to the Indemnified Party as shall be reasonably required by the Indemnified Party to secure the loss to be indemnified hereunder to the extent so compromised or settled.</p> <p>22.4.2 If the Indemnifying Party has exercised its rights under Clause 22.3, the Indemnified Party shall not be entitled to settle or compromise any claim, action, suit or proceeding without the prior written consent of the Indemnifying Party (which consent shall not be unreasonably withheld or delayed).</p> <p>22.4.3 If the Indemnifying Party exercises its rights under Clause 22.3, the Indemnified Party shall nevertheless have the right to employ its own counsel, and such counsel may</p>

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NEW CLAUSE -23	<p>participate in such action, but the fees and expenses of such counsel shall be at the expense of the Indemnified Party, when and as incurred, unless:</p> <ol style="list-style-type: none"> a. the employment of counsel by such party has been authorised in writing by the Indemnifying Party; or b. the Indemnified Party shall have reasonably concluded that there may be a conflict of interest between the Indemnifying Party and the Indemnified Party in the conduct of the defence of such action; or c. the Indemnifying Party shall not, in fact, have employed independent counsel reasonably satisfactory to the Indemnified Party, to assume the defence of such action and shall have been so notified by the Indemnified Party; or d. the Indemnified Party shall have reasonably concluded and specifically notified the Indemnifying Party either: <ol style="list-style-type: none"> (i) that there may be specific defences available to it which are different from or additional to those available to the Indemnifying Party; or (ii) that such claim, action, suit or proceeding involves or could have a material adverse effect upon it beyond the scope of this Agreement: <p>Provided that if Sub-clauses (b), (c) or (d) of this Clause 22.4.3 shall be applicable, the counsel for the Indemnified Party shall have the right to direct the defence of such claim, demand, action, suit or proceeding on behalf of the Indemnified Party, and the reasonable fees and disbursements of such counsel shall constitute legal or other expenses hereunder.</p> <p>22.5 No Consequential Claims</p> <p>Notwithstanding anything to the contrary contained in this new clause 22, the indemnities herein provided shall not include any claim or recovery in respect of any cost, expense, loss or damage of an indirect, incidental or consequential nature, including loss of profit, except as expressly provided in this Agreement.</p> <p>22.6 Survival on Termination</p> <p>The provision of this new clause 22 shall survive the Termination of this agreement.</p> <p>Contents Of Employer's Requirements</p> <p>23.1 All the contents, conditions, instructions, appendices etc. mentioned in Employer's Requirements (Part 1 and Part 2) shall have an overriding effect over any contradictory / different conditions, if any, in CC or PCC or anywhere else in the bid document and the provisions of Employer's Requirements only shall apply in all such cases.</p> <p>23.2 The decision of Employer is final in this regard.</p>
NEW CLAUSE -24	Irrespective of whether its mentioned Employer/Engineer in the Bid Document, the instructions of the Employer will have an overriding effect over the instructions of Engineer.

APPENDIX A

SALIENT FEATURES OF SOME MAJOR LABOUR LAWS APPLICABLE TO ESTABLISHMENTS ENGAGED IN BUILDING AND OTHER CONSTRUCTION WORK

(The laws as current on the date of bid opening will apply)

- a) **Employees Compensation Act 1923:** The Act provides for compensation in case of injury by accident arising out of and during the course of employment.
- b) **Payment of Gratuity Act 1972:** Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years' service or more or on death the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.
- c) **Employees Provident Fund and Miscellaneous Provisions Act 1952 (since amended):** The Act Provides for monthly contributions by the employer plus workers @ 10% or 8.33%. The benefits payable under the Act are:
 - (i) Pension or family pension on retirement or death, as the case may be.
 - (ii) Deposit linked insurance on the death in harness of the worker.
 - (iii) payment of P.F. accumulation on retirement/death etc.
- d) **Maternity Benefit Act 1951:** The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.
- e) **Contract Labour (Regulation & Abolition) Act 1970:** The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the Principal Employer by Law. The Principal Employer is required to take Certificate of Registration and the Contractor is required to take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Employer if they employ 20 or more contract labour.
- f) **Minimum Wages Act 1948:** The Employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Construction of Buildings, Roads, Runways are scheduled employments.
- g) **Payment of Wages Act 1936:** It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.
- h) **Equal Remuneration Act 1979:** The Act provides for payment of equal wages for work of equal nature to Male and Female workers and for not making discrimination against Female employees in the matters of transfers, training and promotions etc.
- i) **Payment of Bonus Act 1965:** The Act is applicable to all establishments employing 20 or more employees. The Act provides for payments of annual bonus subject to a minimum of 8.33% of wages and maximum of 20% of wages to employees drawing Rs.7000/-per month or the minimum wage as fixed by the appropriate government whichever is higher. The Act does not apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of this Act.
- j) **Industrial Disputes Act 1947:** The Act lays down the machinery and procedure for resolution of Industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.
- k) **Industrial Employment (Standing Orders) Act 1946:** It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the Employer on matters provided in the Act and get the same certified by the designated Employer.

- l) **Trade Unions Act 1926:** The Act lays down the procedure for registration of trade unions of workmen and employers. The Trade Unions registered under the Act have been given certain immunities from civil and criminal liabilities.
- m) **Child and Adolescent Labour (Prohibition & Regulation) Act 1986:** The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of Child Labour is prohibited in Building and Construction Industry.
- n) **Inter-State Migrant Workmen's (Regulation of Employment & Conditions of Service) Act 1979:** The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The Inter-State migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home up to the establishment and back, etc.
- o) **The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996 and the Cess Act of 1996:** All the establishments who carry on any building or other construction work and employs 10 or more workers are covered under this Act. All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the Government. The Employer of the establishment is required to provide safety measures at the building or construction work and other welfare measures, such as Canteens, First-Aid facilities, Ambulance, Housing accommodations for workers near the work place etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.
As per Central Government's Notification No.S.O.2899 dated 26.09.1996 under this act, the cess shall be levied @1% of cost of construction works which shall be deducted from each bill of the payment due to the contractor.
- p) **Factories Act 1948:** The Act lays down the procedure for approval at plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power engaged in manufacturing process.
- q) **The Employees State Insurance Act, 1948 (Act No. 34 of 1948) (Provisions as extended from time to time):** An Act to provide for certain benefits to employees in case of sickness, maternity and 'employment injury' and to make provision for certain other matters in relation thereto.

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SECTION - 8A

EMPLOYER'S REQUIREMENT

GENERAL INFORMATION

AND

SCOPE OF WORK

PART-1

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SECTION 8A: PART-1

EMPLOYER'S REQUIREMENTS
GENERAL INFORMATION & SCOPE OF WORK

I) NAME OF THE WORK

Construction of Boundary wall, Watch tower and other miscellaneous and associated works in Airforce Station at Jalahalli, Bangalore in connection with BSRP

II) BRIEF SCOPE

The proposed work is in Airforce Station Jalahalli. The work mainly consists of demolition and reconstruction of boundary wall, perimeter wall, integrated watch tower, parking shed, Airmen/DSC Guard post and other miscellaneous and associated works in Airforce Station Jalahalli at Jalahalli at all required locations. The scope also includes interfacing and coordination with other contractors at the intersection points and with other agencies, wherever required, for design and construction.

DEMOLITION AND RECONSTRUCTION OF BOUNDARY WALL

- I. Demolition and reconstruction (including design) of boundary wall of length 10 km (approx.) and other associated works in Airforce Station Jalahalli at Jalahalli.

The work comprises of Demolition and reconstruction of boundary wall and gate, demolition of existing structure wood/brick work/steel/RCC/precast/stone masonry, barricading, earthwork, PCC, RCC, fencing, painting, supply, area drainage and fixing concertina coil and barbed wire complete as per Military Engineering specifications (MES). Safety and security as per Indian Airforce/MES Specifications at required locations forms the scope of this work.

PERIMETER WALL AND INTEGRATED WATCH TOWER

- II. Design and Construction of Perimeter wall and integrated watch tower including internal services and other associated works in Airforce Station Jalahalli at Jalahalli.

The work comprises of Design and construction of watch tower, plastered wall, paint Road, water supply, Electric supply, Sewage disposal, area, Fencing, security wall, gate, supply and installation of silent Diesel engine DG set, footpath with interlocking tiles and complete as per Military Engineering specifications (MES). Safety and security as per Indian Airforce/MES Specifications at required locations forms the scope of this work.

PARKING SHED

- III. Design and Construction of Car parking shed with permanent specification RCC framed structure, solid block masonry wall including all internal services and other associated works in Airforce Station Jalahalli at Jalahalli.

The work comprises of design and construction of Car parking shed, excavation, PCC, RCC Framed structure, solid block masonry wall including all internal services and complete as per Military Engineering specifications (MES). Safety and security as per Indian Airforce/MES Specifications at required locations forms the scope of this work.

AIRMEN/DSC GUARD POST

- IV. Design and Construction of Airmen/DSC Guard post and other associated works in Airforce Station Jalahalli at Jalahalli.

The work comprises of design and construction of Airmen/DSC Guard post, excavation, PCC,RCC Framed structure, septic tank, solid block masonry wall including all internal services, water supply, electric supply, external electrification area drainage, road/path, sewage disposal and complete as per Military Engineering specifications (MES). Safety and security as per Indian Airforce/MES Specifications at required locations forms the scope of this work.

MISCELLANEOUS WORKS

- V. Miscellaneous items for works shall be executed under schedule -K latest schedule of rates published by KPWD.

The scope of work also includes provision & maintenance of one Project Offices earmarked for the Employer separately, at the locations approved by the Employer till the end of DLP. The locations, layouts, construction standards, materials, furniture, appliances, other furnishings, tools, personnel, maintenance standards, hygienic standards etc. in all these offices shall be as approved by the Competent Authority of the Employer and the decision of the Employer is final in this regard.

III) BROAD SCOPE OF THE WORK

The broad scope of work includes the Design, Proof Checking of the Designs by a separate approved agency of repute and Construction/provision of the following:

- a. Designs and drawings of all the permanent/temporary structures
- b. Road widening, side drains & other allied works
- c. All temporary traffic diversion works, which will be required for the smooth flow of running traffic in order to carry out the works without any interruption
- d. Submission of completion (i.e., 'As-Built') drawings and other related documents as specified
- e. Maintenance of existing roads, service roads, footpaths, etc. during the entire contract period and during the defect liability period
- f. Tree cutting, preservation and disposal (or) translocation / afforestation in lieu of cutting
- g. Demolition of RCC framed structures, Brick masonry buildings including basement etc.
- h. Construction of temporary road as required for diversion / widening to facilitate the movement of traffic, dismantling of any existing roads / footpaths
- i. Provision of fully furnished Project offices with all appliances, vehicles, equipment, personnel etc.
- j. Maintenance of the completed works during the contract period as specified and during the defect liability period

IV) DETAILED SCOPE OF WORK

1.0 OBJECTIVE

The objective of the contract is Design, Proof Checking of the Designs by a any IIT/IISc Bangalore/NIT. In full recognition of this objective, and with full acceptance of the obligations, liabilities and risks which may be involved, the contractor shall undertake the execution of the Works. The general and specific requirements of the employer are detailed out in this document for understanding of the bidders and for mandatory compliance by the contractor. The Employer's requirements have been divided into different sections / sub-heads for convenience only. They do not restrict any cross-references. The contractor shall take into account inter-relations between various parts of works. No claim shall be entertained on account of compartmental interpretations.

1.1 DETAILED SCOPE OF THE WORK

A. WORK

- 1) Provision of foundation works for different structures i.e., open foundations / rafts for columns / column / beam / slab (wherever required) up to the minimum founding depths as per the drawings in accordance with the actual soil parameters as obtained from detailed sub-surface exploration / GTI as specified or directed.
- 2) Construction methodology is required to be approved by K RIDE before carrying out the works. The founding level will be decided by Employer/Geotechnical Engineer during the construction.

- 3) Open Foundations (M-25 (Design Mix) as per IS-456-2000 or higher grade) resting at any depth depending upon the site condition shall include excavation, leveling course, PCC, dewatering, sheet piling / soldier piling & wooden lagging, suitable shoring if required, Backfilling complete in all respects
- 4) Provision of RCC column, beam, slab, stair case, lintels etc. as specified or as directed. Drainage arrangement will be as per detailed design.
- 5) Providing and laying M-25 (Design Mix) as per IS-456-2000 or higher grade if required, using 20mm maximum nominal size aggregates of reinforced cement concrete at all levels including the cost of cement, fine aggregates, coarse aggregates for all structures of all size, shapes & heights for foundation, Median, entry structure columns, beam, plinth beam, staircase, lift walls, parapets, slab, including centering, shuttering, propping, staging, scaffolding, curing, necessary tools, plants, machinery and all related operations etc. using steel shuttering & steel props.

Form work shall be designed using of vibrators. The scope includes cost of providing grooves, chamfers, mouldings, cut-outs, necessary fixtures, sleeves for various purposes, shear connectors etc., complete as per drawings, specifications and as directed by the Employer. The scope shall include cost of using required dosage of admixture in concrete for obtaining required workability as per specification & approval of Employer.

No cold joints are permitted. However cold joint at the junction and at the top surface of the starter of column are permitted, where cold joints are unavoidable. In that case old concrete surface should have adequate shear key depressions, reinforced dowels and a layer of concrete bonding compound. Concrete retarder compound shall also be used at the concrete surface of starter pier above the pile cap. The scope is inclusive of all above bonding agents / methods. However, if any additional cold joints are unavoidable due to the reasons not beyond the control of contractor, all above bonding measures shall be on account of the contractor.

- 6) Providing footways with provision for cable ducts, parapet walls, verges, expansion joints, drainage spouts and approach ramp, taking suitable measures for the smooth flow of traffic on road or as directed
- 7) Providing TMT-500D / 550D grade steel bar reinforcement (conforming to IS:1786, HYSD Fe 500 / 550 grade) at all heights & depth including straightening bars, cutting, bending, hooking binding with approved quality 18 gauge G.I binding wire, after placing in position tying, lapping and / or welding wherever required and anchoring to the adjoining members wherever necessary as per drawings (Laps, Hooks and Wastages shall not be measured and paid) including cost of all materials, bar bending charges, labour, lead & lifts etc., Complete as per specifications and as directed including welding involved towards stray current protection effects as per the system approved by Employer.

As far as possible bars of the maximum length available shall be used. For bars having larger diameter more than 20mm mechanical couplers shall be provided as per Technical Specifications and no lap shall be permitted. Welding in lieu is not permitted unless specified in the drawings or as instructed by the Engineer. Laps joints are permitted in column, raft, and slab.

All works shall be carried out as per approved drawings, relevant codal provisions, technical specifications (corrected up to date) and as directed by the engineer-in-charge.

- 8) Earth work in filling with contractor's own earth of approved quality in specified layers with loading, unloading, all lead and lifts, rehandling, transportation, spreading in layers, compaction using vibratory compactors of adequate capacity, benching of slopes, sectioning to profile, clearing of debris / garbage / vegetation / shrubs etc., using contractor's vehicles, machinery, labour, consumables etc.

The Scope includes loading, unloading and disposal of surplus excavated material using covered trucks to contractor's dumping yard with all leads and lifts and as directed by the Employer. The contractor shall ensure that during transportation, the carried material does not spill out. The contractor to ensure sprinkling of water over the road regularly to avoid the dust formation.

- 9) Earthwork in excavation by mechanical means (Hydraulic excavator) in cutting, in formation etc. at ramps covering all over retaining walls. The Scope includes loading, unloading and disposal of surplus excavated material using covered trucks to contractor's dumping yard with all leads and lifts and as directed by the

Engineer. The contractor shall ensure that during transportation, the carried material does not spill out. The contractor to ensure sprinkling of water over the road regularly to avoid the dust formation.

- 10) Providing safety barricading with contractor's materials and labour including all leads and lifts complete as directed by Engineer in charge. including foundation work duly ensuring the safety of Defence/Airforce assets/structures.
- 11) Maintaining including watch & ward and repairs of the barricading provided as per above item no.11 including cost of all contractors' men, materials, tools and plants required in this regard.

B. EARTHWORK/CUTTING INCLUDING BOUNDARY WALL AND DRAINS:

The Design of formation and specification for 25 T axle load shall be referred and followed.

The scope includes the following:

1) Earthwork in embankment

Earthwork shall be provided with contractor's own earth, wherever required.

The drainage arrangement side drains at toe / ground level, drains at berm level, catch water drains / saucer drains are included in the scope of work.

- 2) Earthwork in cutting by mechanical means (Hydraulic excavator) including leading disposing off the surplus unusable cut spoils to outside of Defence limits as per directions of the employer including cutting in hard rock requiring blasting, cutting in rock requiring controlled blasting and chiseling.

The scope includes loading, unloading and disposal of surplus excavated material using covered trucks to contractor's dumping yard with all leads and lifts and as directed by the Employer.

- 3) Construction of side drains, yard drains, catch water drains, etc. to the designed profile. The contractor shall ensure that during transportation, the carried material does not spill out.
- 4) Supply, planting ornamental plants including mixing of good earth, sand saw dust and leaf mould watering with contractor's materials, transportation etc., with all lead and lift complete etc.
- 5) Providing safety barricading with contractor's materials and labour including all leads and lifts complete as directed by Engineer in charge. including foundation work duly ensuring the safety of Defence Airforce assets/structures.
- 6) Maintaining including watch & ward and repairs of the barricading provided as per above item including cost of all contractors' men, materials, tools and plants required in this regard
- 7) Providing & laying Reinforced cement concrete M-25 (Design Mix) as per IS-456-2000 or higher grade using 20mm maximum nominal size aggregates, reinforced cement concrete using Portland slag cement (Directly from manufacture or blending of OPC+GGBS) for following concrete works: Open Foundation / stepped foundation / Raft, Combined Footing, Columns, Grade beam, water tank, septic tank and Structures of road widening works such as foundation, substructures and superstructures, boundary Wall foundations, return walls, slabs, road median, drains, etc. including excavation for all depths from lowest ground level through existing water bound macadam road / bituminous road / concrete road / soil / moorum / hard rock / soft rock old structures below ground as encountered of all thicknesses, dismantling other structures, dead utilities, dewatering, pumping and bailing out water, strutting and shoring, formwork, backfilling in foundation with good earth / quarry dust / sand watering, compacting with a vibratory plate compactor complete as per specifications.

The scope includes loading, unloading and disposal of surplus excavated material using covered trucks to contractor's dumping yard with all leads and lifts and as directed by the Engineer. The contractor shall ensure that during transportation, the carried material does not spill out. The scope includes cost of using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer, curing of concrete.

- 8) Levelling Course: Providing & laying plain cement concrete M15 grade using 20mm maximum nominal size aggregates in open foundation, stepped foundation, combined footing, raft foundation, retaining walls, return walls, walls, U / G water tank, culverts, drains, slab on grade, tie beams, basements, levelling course or any other works as directed by the Engineer, etc. rate is inclusive of required dosage of admixture in concrete for obtaining required workability and as per specifications, approved drawings, laid in layers not exceeding 15cms thick layers, as per drawing including cost of all material, form work / shuttering, dewatering during concreting, vibrating, compacting, curing, hire charges of machinery, all lead and lift, loading, unloading, transporting, stacking, finishing the exposed faces etc., complete.
- 9) Skin reinforcement, if necessary, shall be provided.
- 10) Demolition and removing of existing structures including foundation in concrete, masonry to entire satisfaction of the Engineer-in charge, with all men, material & equipment
- 11) Providing Weep Holes in stone masonry / Plain / Reinforced concrete abutment, wing wall, return wall, retaining walls and drains with 100 mm pipe extending through the full width of the structure with slope of 1V:20H towards drawing force.

C. MISCELLANEOUS: INCLUDING ROADS, BARRICADING, QUALITY, INTERFACE WORK, CASTING YARD, SITE OFFICE AND EQUIPMENT, PERSONNEL ETC.

1. Preliminary works such as site clearance, barricading, trial trenching etc., wherever required
2. Designs and drawings of all the structures
3. Road widening, side drains & other allied works, and construction of service roads at required locations
4. All temporary traffic diversion works, which will be required for the smooth flow of running traffic in order to carry out the works without any interruption including all safety precautions, signage, barricading, emergency lighting, traffic marshals, look-out men / watchmen etc.
5. Tree cutting, preservation and disposal (or) translocation along the alignment for cutting / disposal / Translocation / afforestation in lieu of cutting / Translocation
6. Demolition of RCC framed structures, Brick masonry buildings including basement etc. as existing at site without making damage to adjacent structures, utilities and taking away and disposing all the debris and released materials etc.
7. Geotechnical investigation bores as per the design requirement to be carried out as directed by Employer
8. Conducting survey and fixing bench marks and alignment markers
9. Necessary permanent diversion of Utilities
10. Temporary barricading wherever required
11. Carrying out GPR survey to locate underground utilities up to 6m depth with a corridor width of 5mx5m grid as directed by Engineer
12. Design, construction & maintenance (till the end of DLP) of at least 1 (one) no. of Project Office (earmarked for Employer separately)
 - a. The area of Project office will be as approved by ED/K RIDE within the overall limit of area mentioned in Appendix-06, read in conjunction with clause 1.3 of Appendix-06 for additional offices.
 - b. Project offices: The locations of the Project Offices shall be approved by the Employer. The work of providing the above project offices for Employer shall be commenced in the right earnest and at the earliest, but not later than 10 (Ten) days from the date of issue of LOA. The project offices shall be made fully functional with doors and windows, proper layout design (approved by ED (Civil) / K-RIDE) with all furniture, equipment, appliances, seating arrangement, computers, printers, vehicles,

personnel, high speed broadband internet and Wi-Fi routers, etc. (as mentioned in the Employer's requirement) within 45 (Forty-Five) days from the date of issue of LOA. Liquidity damages as decided by the Employer are applicable in case of delay.

- c. The area, locations, layouts, designs, disposition of doors and windows, other technical requirements, furniture, computers & printers, appliances, seating arrangement, materials of doors & windows, landline internet connections, WIFI routers etc., of project office shall be as per the requirement of Employer & as decided and approved by ED (CIVIL) /K-RIDE.
- d. The specifications, equipment and other requirements of Project offices are given in detail in Appendix-06.

NOTE: All the requirements of offices, furnishings, equipment, appliances, tools, maintenance standards, personnel – including their qualifications and expertise, are designed for effective execution and close monitoring of the progress and quality of work.

13. Demolition / dismantling of road, footpath, kerb stone, central verge, boundary wall, etc.

The contractor must visit the site and ascertain actual magnitude of quantum of work involved for footpaths, kerb stone, central verge, boundary wall, etc. and nothing shall be payable on this account. Retrieved materials obtained from demolition / dismantling shall be property of the owner. Acquiring and evacuation of the properties will be done by the concerned authorities.

14. Construction of temporary road as required for diversion / widening to facilitate the movement of traffic, dismantling of any existing roads / footpaths etc., for temporary diversion / widening and construction of temporary footpaths, diversion / widening for traffic diversion and its regular satisfactory maintenance as directed by Employer

15. Provision of arrangement of camera at the site of work to transmit the work under progress wirelessly to the Project Office and other offices (the cameras need to be shifted to the current location of the work, for eg. linear works like compound wall etc.).

16. Any other item of work as may be required to be carried out for completing the construction works in all respects in accordance with the provisions of the Contract and to ensure the structural stability and safety during and after construction works to be performed, including all general works preparatory to the construction and works of any kind necessary for the due and satisfactory construction, completion and maintenance of the works according to the intent and meaning of the drawings and technical specifications adopted, to best standards and orders that may be issued by the Employer from time to time, compliance of all Conditions of Contract, supply of all materials, apparatus, plants, equipment, tools, fuel, water, strutting, timbering, transport, offices, stores, workshops, staff, labour and the provision of proper and sufficient protective works, diversion, temporary fencing, lighting and watching required for the safety of the public and protection of works on adjoining land; first -aid equipment, sanitary accommodation for the staff and workmen, effecting and maintenance of all insurances, the payment of all wages, salaries, fees, royalties, duties or the other charges arising out of the execution of works and the regular clearance of rubbish, clearing of garbage / debris / pile heads from the embankment and premises of project/site offices, clearing up and leaving the site perfect and tidy on completion

17. Surveying by establishing DGPS control points and TBMs, True and proper setting out and layout of the works marking of alignment and pier locations, vertical & horizontal clearances for the elevated section including modifications, if any, as per drawings

No extra amount will be paid to re-do or to re-establish any of the survey points. The control points shall be fixed using DGPS double frequency and the accuracy of 1 in 50,000 or better shall be assured.

18. Providing temporary barricade as per the approved drawing, painting (including primer of approved quality) with synthetic enamel paint of approved colour, quality and brand, painting letters and logo of K-RIDE, including maintenance of the same duly cleaning the same on fortnightly basis and immediately repainting whenever required, arrangement for blinker lights on barricades during night as per requirement and as per the instruction of the Employer

Barricading should be rugged and fixed / anchored in ground firmly during the construction. It shall be maintained in position till completion of all works at the relevant location. Nothing extra will be paid for dismantling and re-erecting the barricades at a different location. The barricades shall be relocated as the work progresses and as directed by the Employer.

19. Felling of trees of girth as directed (measured at a height of 1m above ground level) with lead and stacking of material including preservation
20. Boring of 150 mm dia. (confirmatory bore holes), in all types of soil (Locations to be decided by the Employer) up to 3m in hard rock or 30m boring whichever is earlier and collecting core samples in rock for determination of core recovery, RQD and carrying out compressive strength test on rock samples

The scope shall include boring in soil, conducting SPT and collecting samples at 3m depth intervals and submitting bore log reports with soil classifications / SPT, Drilling 3m in hard rock with double barrel core for obtaining samples for testing of core recovery, RQD and compressive strength as per standard practice, Preparation and submission of report containing core recovery, RQD, Compressive strength at Hard Rock Locations with all lead and lifts and as per the directives of Employer. The scope also includes refilling and reinstating surface and disposing off surplus materials.

21. Submitting colour photographs (soft copies and printouts of photos) of the works as directed by the Employer at intervals as instructed by the Employer along with submission of MPR for every month

The photographs shall be submitted in 3 copies each of size not less than 225mm x 175mm each in album form, apart from 3 soft copies of all photographs. The photographs chosen should cover important activities of the work.

22. Carrying out GPR survey to locate underground utilities up to 6m depth with a corridor width of 5 m x 5 m grid as directed by Employer

The scope shall also include preparation of report and drawings both in soft and hard copy.

23. Diagonal Cross trenching works for identifying underground Utility to the required length, width and depth, which includes excavation in all types of soil, hard soil, rock, footpath, bitumen road, concrete road, medians etc. cutting of all types road surfaces and backfilling the same with available excavated earth.

The scope also includes surveying and taking coordinates of the existing Utility and submitting the reports (hard & soft copy) of the same as per the directions of the Employer.

24. Trenching for identification of utilities and re-location / diversion of utilities if encountered

25. Striking out of centre line by using total station theodolite either before commencing work and fixing centre line stones of size 150x150x600 mm with CC 1:3:6 mix with 40mm metal in a pit of size 300x300x600 at every 100-meter interval on straight and at every 50m interval on curve etc.

26. Preparation of computer aided GAD / completion drawings in AO size in tracing film and 6 copies of ammonia paper print for each Minor bridge by contractor with his own materials, manpower, tools and etc., complete with bridge details submitted by the Defence and as directed by Employer in charge. drawings in 7 copies, 1 tracing film, 6 ammonia paper print copies and soft copy should be handed over to Employer

27. Dismantling of existing structures after ensuring necessary approval from the competent authority of the concerned department. The structures like buildings, retaining walls, Compound walls and other structure comprising of masonry, cement concrete, pre-stressed / reinforced cement concrete, Steel structures, brick / tile work in cement mortar, stone masonry rubble in cement mortar, stone pitching / dry stones spalls, removal of all types of Hume pipes, cement concrete pavements, kerb stones, BS slab / precast slabs of drain / footpath, paver blocks of footpaths, removal of silt or silt mixed with sand, etc. including T&P and scaffolding wherever necessary, including disposal of dismantled material with all lead and lifts including all labour, hire charges all machineries etc., complete by any mechanical means or any other means as direct by Employer. Loading / Unloading G.I. sheets, rails, joists, built up sections, angles, C.I., Ductile pipes, A.C Pipes, or G.I. pipes RCC / PCC beams / slabs and other miscellaneous ironwork or wood work

28. The scrap materials will be the property of the contractor except the materials of local authorities (BBMP, BWSSB, BESCO, BSNL) and Defence.
29. Supplying and laying interlocking pre-cast CC block pavers of approved design factory manufactured of specified grade cement concrete on foot paths, circulating area, road junctions etc, including setting in position over 25mm thick bedding layer of fine sand, filling the joints with fine sand, levelling including compaction as per IS 15658, minimum of 80mm thick blocks of M35 grade for medium traffic
30. Supplying and laying of Hume pipes as directed
31. Supplying and fixing precast RCC gratings including cost of all materials, transportation, labour etc. complete (60x40 cm) with all lead and lifts
32. Tree cutting to facilitate the construction works
33. Tree cutting, preservation and disposal (or) Translocation along the alignment for cutting/disposal/translocation/afforestation (as per the norms of Forest Department) in lieu of cutting/translocation
34. The applicable permits/ permissions for felling of trees / Translocation shall be arranged by Employer. The tree cutting and disposal is included in the scope of work. The cut trees will be the property of the contractor. However, the contractor shall deposit an amount not less than Reserve Price of the trees (as fixed by Forest Department/ BBMP) plus FDT (Forest Development Tax) to KRIDE for onward transmission to Defence/BBMP/Forest Department, as the case may be.
35. Transportation for disposal of tree trunks, branches, roots, complete including loading and unloading as per BBMP / Forest and local authority guidelines
36. Preparation of earth ball of tree roots of desired depth & diameters including necessary soil tests
37. Dislodging, lifting, transportation and translocation tree from original place to the new place including all arrangements, labour etc. for successfully completing the work
38. Translocation the marked trees of various species and specified girth to the place shown by the Employer with all lead and lift, tools, plant, men & machinery and necessary preparation such as:
39. Excavating pits of adequate size, arranging loose soil, mixing of manure, fertilizer, insecticides etc., to ensure survival of the trees being translocated
40. Maintenance of tree i.e., watering, soil heaping, spray of insecticides till the end of DLP or three years from the date of Translocation, whichever is earlier. All above operations shall be executed as per the specifications
41. Providing & fixing hard drawn steel wire fabric reinforcement, straightening, cutting, cleaning, bending, tying, lap / butt welding placing including binding with mild steel annealed binding wire of 18 SWG in all structural concrete at all heights and depths, with all lead and lift. etc. complete as per drawing, specifications and directions of Employer for fencing including vertical posts & RCC foundations.
42. Rain water harvesting: Providing and constructing the Rain water harvesting system where ever required including boring / drilling of bore well of 300mm dia for casting / strainer pipes prescribed in the drawing, excavation in all type of soils / rock, constructing BW chamber, foundation, RCC top slab, plastering, CI manhole cover, filling / packing gravels in the chamber and the annular space in the bore, filling granules in the vertical pipe, laying HDPE pipe from piers to chamber, etc., complete as per the approved drawing
43. Transportation of all usable materials like B.S slabs / precast RCC slab, cement concrete blocks, interlocking paver blocks, kerb stones, steel items, Telephone Poles. Electric Poles to designated site as directed by Employer by mechanical transportation including all lift, lead, loading, unloading, labour, machinery etc.
44. Supplying and filling in foundations / backfilling in marshy / clayey foundation pits with granite / trap broken stones of 300mm and downsize with approved sand including hand packing, ramming,

watering, including the Scope of all materials and labour with all lead and lifts etc., complete as directed by Employer.

45. Design, build and maintaining project office fully furnished for the use of Employer as per the layout drawing, specifications, & Employer Requirements-Scope of work
46. The power supply arrangements and cables shall be provided by contractor. The security and safety of the equipment will be the responsibility of the contractor. The necessary precautions for avoidance of accident at site by any equipment or cable to be ensured by contractor. The dedicated service Employer / Service provider Employer to be deputed for full time. The repair / replacement shall be done within 24Hrs. positively.
47. Any other item of work as may be required to be carried out for completing the construction of structures as specified in drawings including all necessary interface works with infrastructure contractors, system contractors, etc. in all respects in accordance with the provisions of the Contract and / or to ensure the structural stability and safety during and after construction

D. ROAD WORKS

1. Portable barricades in construction Zone: Installation of steel portable barricade with horizontal rail 300mm wide, 2.5m in length fitted on a 'A' frame made with 45x45x5mm angle iron section, 1.5m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150mm in width at an angle of 45 degree, 'A' frame painted with two coats of yellow paint, complete as per IRC: SP:55-2001 including cost of all materials, labour, loading, lead, lift, transporting etc., complete as per specification
2. Traffic cones: Supplying of red fluorescent with white reflective sleeve traffic cones made of low-density polyethylene (LDPE) material with a square base of 390x390x35mm and a height of 770mm, 4Kg in weight, placed at 1.5m interval all as per BS-873 including cost of all material, labour, loading, unloading, lead, lift, transporting, etc., complete
3. Retro-Reflectorized Road traffic signs: Supplying and fixing of retro-reflectorized cautionary, mandatory and informatory sign as per IRC: 67- 2001 made of high intensity grade micro prismatic HIP type-IV sheeting, including lettering fixed over aluminum sheeting, 2 mm thick firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing
4. Manufacturing of Retro-reflective board - Caution Indicator / Stop indicator / Speed indicator / Whistle Board / any other board with 1.50 mm thick MS plate and MS plate stiffeners on M.S. T angles 75 mm x 75 mm x 6 mm and 4.75 m long approximately as per the specified drawing including cutting, drilling holes in the angles, providing hold fasts, bolts and nuts with washers of required size, bolting, welding
5. Providing supplying and fixing in position, boundary pillars of standard design as per latest IRC with K-RIDE / Defence logo on it with reinforced cement concrete of M15 grade
6. Clearing and grubbing of land for roads, including uprooting of vegetation, grass, bushes, shrubs, saplings and trees of girth up to 300 mm
7. Removal of earlier felled tree stumps and disposal of unserviceable materials and stacking of serviceable material (used or auctioned) with all lead and lifts including removal and disposal of top organic soil not exceeding 150 mm in thickness including all labour, hire charges of all machineries etc., complete with all lead & lifts by suitable machinery
8. Excavation for roadwork in all types of soil by mechanical means including cutting and loading to tippers, trimming bottom and side slopes, in accordance with requirements of lines, grades and cross section, and transportation with all & lift lead complete as per specifications, including scarifying the existing bituminous
9. Construction of embankment for road work with approved materials gravel / Moorum with all lifts and leads, transporting to site, spreading, grading to required slope and compacting to meet requirement complete as per specification, including cost of gravel / moorum, watering charges & compaction by vibratory roller to 95% of modified proctors density. MORTH Specification No.305

10. Construction of sub grade and earthen shoulder with approved material Gravel / Moorum with all lifts & lead, transporting to site, Spreading, grading to required slope and compacted to meet requirement of table No.300-2 complete as per specification, including cost of earth, watering charges & compaction by vibratory roller to 97% of modified proctors density MORTH Specification No.305 including compaction
11. Construction of granular sub-base Grading-V as Sub-base and drainage layer by providing coarse graded crushed stone aggregates of granite / trap / basalt material, mixing in a mechanical mix plant at OMC, Carriage of mixed material to work site, spreading in uniform layers with motor grader on prepared surface and compacting with vibratory power roller to achieve the 98% proctor density, complete as per specifications. Clause 401 of MORTH V revision
12. Providing, laying, spreading and compacting crushed stone aggregates of granite / trap / basalt to Wet Mix Macadam specifications including pre mixing the material with water at OMC in mechanical mix plant carriage of mixed materials by tipper to site, laying in uniform layers with paver in sub-base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density complete as per specifications, MORTH specification No.406
13. Providing and applying primer coat with S.S bitumen emulsion on prepared surface of granular base such as WMM including cleaning of road surface and spraying primer at the rate of 0.60kg per sqm using mechanical means complete as per specifications. Clause 502 of MORTH V revision
14. Providing and applying tack Coat using approved bitumen on the bituminous surface at the rate of 0.25Kg per Sqm, heating bitumen in boiler fitted with spray set (excluding cleaning of Road Surface) as per Specifications. Clause 503 of MORTH V revision
15. Providing and laying dense graded bituminous macadam using crushed aggregates of specified grading, premixed with VG30 grade bituminous binder and transporting the hot mix to work site, laying to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction in all respects complete as per specifications. Clause 505 of MORTH V revision. Using 40 / 60 TPH capacity H.M.P with sensor paver Gr-II with 4.5% VG-30 Bitumen
16. Providing and laying bituminous concrete using crushed aggregates of specified grading, premixed with bituminous binder and filler, transporting the hot mix to work site, laying with a paver finisher to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction in all respects as per specifications. Clause 507 of MORTH V revision. Using 40 / 60 TPH capacity H.M.P with sensor paver Gr-II with 5.4% VG-30 Bitumen
17. Filling pot holes and patch repairs with bituminous concrete
18. Road Marking with Hot Applied Thermoplastic Compound with Reflectorizing Glass Beads on Bituminous Surface / Concrete Surface. Painting lines, dashes, arrows etc., on roads in two coats on new work with ready mixed road marking paint conforming to IS: 164 on bituminous surface
19. Painting two coats on new concrete surfaces: Painting two coats after filling the surface with synthetic enamel paint in all shades on new plastered concrete surfaces including cost of all materials, labour, loading, unloading, lead, lift, transporting etc., complete as per specification
20. Road delineators: Supplying and installation of delineators (Roadway indicators, hazard markers, object markers), 80-100cm high above ground level, painted black and white in 15cm wide strips, fitted with 80x100mm rectangular or 75mm circular reflectorized panels at the top, buried or pressed into the ground and conforming to IRC-79 as per drawings including cost of all materials, labour, loading, unloading, lead, lift, transporting, etc., complete as per specification
21. Supplying and fixing pre cast solid concrete kerb stones made out of M15 / 20 (CC 1:2:4) and finished with CM 1:3 Plastering and finishing, cutting, with all lead and lifts etc., complete of size 450 x 200x 400mm

E. SALIENT FEATURES OF DESIGN AND CONSTRUCTION AND OTHER INSTRUCTIONS

1. Preliminary works such as site clearance, barricading, trial trenching etc., wherever required, shall be taken up simultaneously along with mobilization activities.

2. All the concerned structures shall be designed as per the directions of Employer.
3. The contractor shall design the structures as per the relevant codes and as directed by the Employer.
4. Any new design or arrangement being proposed by the tenderer shall be in conformity with the contemporary best practice.
5. Design and Construction of open / raft / footing / pile foundations and construction including column, column, beam, slab, stair case, lintels, compound wall etc.
6. The indicative drawings considered in the tender document are for only for reference. The contractor may propose different plan according to the site condition with the recommendation of the Employer for the approval of the Employer. At obligatory portions or where there are constraints, spans could be longer/shorter based on the site conditions. The decision of the Employer is final in this regard.
7. Stray current corrosion prevention measures (including extra rebars in various RCC / PSC structural members) for earthing shall be adopted wherever necessary.
8. Preparing detailed designs, general drawings and working drawings for various components of the works and obtaining approval in respect thereof from the Employer, inclusive of incorporation of all modifications, alterations, changes, etc. shall be carried out as per the direction of Employer & Employer.
9. The shape and appearance of structures shall be as decided by K-RIDE from aesthetics and economy point of view.
10. Pre-cast structures can be constructed in the interest of rapid progress. The final decision will be by K-RIDE as per site requirement, site feasibility and considerations of safety.
11. Rapid construction is essential for the project, due to strict requirements on work zone safety, traffic control during construction and working in Defence area.
12. All necessary safety precautions shall be taken. The contractor is solely responsible for any untoward incident due to unsafe practices. Suitable capacity cranes of adequate numbers required shall be mobilized. Suitable supporting system and its equipment shall be provided at site as directed by Employer, if required.
13. Doglegged staircases of adequate numbers shall be provided for accessibility and inspection. Price quoted shall be inclusive for the above work.
14. Pre-cast structures are preferable, wherever possible and feasible. However, the scheme needs the approval of Employer.
15. For all structures, the design shall be done by the contractor and shall be approved by K-RIDE.
16. Solar panels are planned to be fixed as per requirements. The designers shall take this into account in their design & all fixtures required to mount the panels shall be fixed by the contractor at his own cost.
17. Earth filling area shall be done with proper compaction with Contractor's own good earth up to plinth level wherever required. For the area falling on the road, backfilling shall be done with sand only. Good earth means gravel, moorum, sand (excluding clay and silt) & similar to the soil which is used for earth work in embankment. Further details are in technical details of tender document.
18. Some of the major Utilities cannot be diverted. The contractor shall take into consideration the existence of these Utilities and propose the foundations at these locations accordingly.
19. Before carrying out the work at site, necessary permissions from various local agencies like BWSSB / GAIL / BSNL /BESCOM and Defence authorities / Road authorities such as SWR, NHAI, BBMP, PWD, Traffic Police etc., shall be required to be obtained by the contractor. The Employer will assist only by way of issue of necessary support letters.
20. The levels, measurements and other information concerning the existing site as shown on the drawings are believed to be correct and indicative, but the contractor should verify them for himself and also examine the nature of the ground as no claim or allowance whatsoever will be entertained on account of

- any error or omission in the levels or strata turning out different during execution from what is shown on the drawings. The contractor should validate the L- Section and horizontal / vertical by ensuring best fit alignment without any speed reductions in the design speed using applicable latest software.
21. The permanent traffic diversions shall be carried out in consultation with traffic police. Contractor shall provide traffic diversion proposals, traffic marshals, cones, traffic diversion boards etc., as desired by Traffic Police. The text for painting will be given by K-RIDE.
 22. The road works and allied works shall be carried out in co-ordination with BBMP as per MORTH, specifications. On award of work, the contractor shall start the road work along and complete the same.
 23. The applicable permits / permissions for felling of tress / translocation shall be arranged by Employer. The tree cutting and disposal shall be arranged by contractor and the scope is inclusive of the same. The applicable permits/ permissions for felling of tress / Translocation shall be arranged by Employer. The cut trees will be the property of the contractor. However, the contractor shall deposit an amount not less than Reserve Price of the trees (as fixed by Forest Department/ BBMP) plus FDT (Forest Development Tax) to KRIDE for onward transmission to Defence/BBMP/Forest Department, as the case may be.
 24. The contractor to reference points at regular intervals all along the alignment. The contractor along with the Employer should verify the details of these alignment pillars.
 25. GFC drawing requirement shall be planned by the contractor based on his three-month rolling Programme and the GFC drawings shall be issued accordingly.
 26. The contractor shall make the detailed traffic diversion plans in consultation with Bengaluru Traffic Police. The work is to be executed with proper liaison with Bengaluru Traffic Police. Necessary assistance will be given by Employer. The scheme should be such that minimum of two lane of traffic on each direction of the road should be available for the smooth flow of traffic. The contractor should inspect the site.
 27. The contractor shall liaise with the Utility Authorities for carrying out the work expeditiously, wherever required, so that works at particular locations are not delayed. In case he comes across any utilities also he shall liaise with the agency concerned for necessary diversion; the cost of diversion shall be paid by Employer under the relevant item of Schedule-L of Price schedule. Contractor shall provide any temporary support for the utilities, if needed, but at no extra cost.
 28. The contractor shall provide temporary barricading during construction at site, work areas (i.e., Construction site, store, site office, casting yard etc.) and locations where road vehicles / pedestrians are moving, Construction sites as directed by Employer. The temporary barricade of 2m height along the alignment near to Defence boundary / acquisition line and road footpath and the Defence standard barricade are included in the scope of work.
 29. The contractor shall provide temporary barricade during construction at site, work areas (i.e., Construction site, store, site office, casting yard etc.) and locations where road vehicles / pedestrians are moving, along the at-grade section / Viaduct / Stations / Construction sites as directed by Employer. The above work shall be executed as per the technical specifications. The contractor shall provide & maintain barricading as per the drawings.
 30. Any untoward incident due to any gaps in barricading will be the sole responsibility of the contractor. The barricade and its efficiency shall be monitored by dedicated staff of the contractor all the 24 hours till completion of the work.
 31. Once barricade has been provided and work started, removal of barricade is not permitted till completion of construction.
 32. While erecting barricade, the bottom gap between barricade and road / ground should be plugged with cement concrete from inside.
 33. Adequate blinking lights on barricade during night time must be ensured. The cost of this item should include provision for power pack / Generator set etc. so as to ensure the blinking of lights in night time as long as barricades are in position at the work spot.

34. After completion of the entire work, the barricades shall be removed by the contractor and transported away from the Right of Way.
35. In addition, the contractor shall be required to carry out various interface works as per interfacing requirements.
36. The necessary interfacing / liaison and arrangements with systems contractors shall be done by the contractor and shall form part of the work. Inserts for Electrical, etc., shall be provided as per drawing and the amount is included in scope.
37. The land for setting up casting yards, stacking yards, offices etc., as required, shall be arranged by the contractor at his own cost. No land for casting yards / stacking yards / project offices / site offices / laboratories / contractor's offices / camps etc., will be provided by the Employer. The Employer also does not guarantee any vacant Defence land for these purposes. However, assistance can be provided by the Employer by giving recommendation letters etc., to the concerned authorities and it is the responsibility of the contractor to find out and arrange lands etc. for the above.

The contractor shall carry out as soon as possible, but not later than the deadlines specified,

 - a. Setting up of fully fledged site laboratories, as per the requirements.
 - b. Setting up concrete batching & mixing plants.
 - c. Setting up of Contractor's site offices.
 - d. Setting up site offices for Employer
38. The contractor shall provide the Key Personnel as per Appendix-04 and the Office accommodation, equipment, appliances, vehicles, personnel etc. as per Appendix-06.
39. GADs attached with this tender are tentative. However, they should be verified at site for feasibility. Contractor's Design team shall explore alternate proposals for K-RIDE approval.
40. Providing concrete for all works deemed to be inclusive of the cost towards design mix production of concrete by batching plant, transit mixer, transportation of concrete with all leads and lifts, form work, shuttering including staging as required, pouring of concrete by pump/tower crane to all heights /depths, tremie or other approved means, compaction by vibrators, curing by approved means such as water, steam or curing compound and all labour, tools, plants, machinery required for execution of work complete in all respects including de-shuttering after completion of work and rendering & finishing etc.
41. Shuttering required for concrete work shall be of steel except wherever there are site constraints as decided by the Employer.
42. Boring of 150 mm dia. confirmatory borehole shall be done in all types of soil (Locations to be decided by the Employer) up to 3m in hard rock or 30m boring whichever is earlier and collecting core samples in rock for determination of core recovery, RQD and carrying out compressive strength test on rock samples.
43. Diagonal Cross trenching works for identifying underground utility to the required length, width and depth, which includes excavation in all types of soil, hard soil, rock, footpath, bitumen road, concrete road, medians etc. cutting of all types road surfaces and backfilling the same with available excavated earth.
44. Design and Drawings shall be developed in conformity with the Specifications and Standards set forth in Schedules and Employers Requirement and scope of work. The contractor shall appoint a proof check consultant (the "Proof Consultant"). If demanded by "Client" or "The Employer", third party proof check shall be done without any financial implication. Contractor shall submit detailed designer's organization chart to the Employer.
45. Wherever night working is carried out by contractor, temporary lighting arrangements as per approved layout shall be provided, installed, maintained for the duration of the contract.
46. The contractor shall at all-time carryout the work on either side of road / service road in a manner creating least interference to the flow of traffic. The contractor shall take prior approval of the Employer / Defence and traffic police regarding traffic arrangements and diversion of traffic during construction.

47. The contractor shall take suitable and sufficient measures as per SHE manual for working at night.
48. The debris, waste materials of the median shall be cleared and disposed properly.
49. The scope of work shall include detailed survey, soil investigation, fixing an optimized span configuration avoiding shifting of utilities. Contractor is advised to carry out his own investigation and collect necessary site details while quoting his rates. K-RIDE will not be responsible for any cost implications due to any hindrance due to Utilities falling in the alignment. The chainage / drawings of major utilities which may not be possible to be shifted shall be identified by the contractor in, advance, and the contractor is advised to consider the same while planning / locating the foundation. Utilities maybe verified by contractor physically at site. The contractor shall ensure that no foundation of pier is located throughout the length in such locations. If at all, contractor is required to take up diversion of utilities, payment towards the same shall be made as per Schedule-L of Price Schedule.
50. Demolition / dismantling of RCC framed / steel structures / buildings, masonry buildings, , compound walls, drains, Toe walls & retaining walls including basement, ground and above floors as existing at site without making damages to the adjacent structures, Utilities, etc. including disposing off retrieved materials out of the site of work.
51. Contractor shall get necessary permission / NOC from the Defence, Road, Police and other concerned regulatory authorities for blocking services and working in such locations K-RIDE will Facilitate for getting them permission from concerned regulatory authorities for working in such locations.
52. Contractor shall study traffic pattern all along the Corridor & ensure optimized at the detailed design stage taking into consideration of traffic requirement and width of road.
53. Disposal of surplus materials including excavation spoils etc., to the dumping site approved by the Employer, irrespective of lead and lift (ascent / descents).
54. Drain diversions are in the scope of work.
55. True and proper setting out of the layout, benchmarks and provision of all necessary labour, instruments and appliances for survey as specified or as directed;
56. The cost of final carpeting of the roads or new road construction before handing over the roads to road owning agency is included in the scope.
57. Also, final restoration of footpaths as per modified specifications and drawings, as per requirements of the road owning agency, is also included in the scope.
58. Deployment of adequate traffic guards, supervisor, in-charge and provision of traffic signboards, hand delineators, portable signals etc., and as accepted by Employer & the cost of the same are included in the Scope.
59. All aspects of quality assurance, including testing of materials and other components of the work, as specified, or as directed are in the scope.
60. The contractor shall ensure cleanliness of the roads and footpaths by deploying man power for the same. The contractor shall ensure proper brooming, cleaning and washing of roads and footpaths at regular intervals or as and when required or directed throughout the entire stretch till the currency of the contract including disposal of sewage. Regular interval implies that Roads and Foot-paths should be maintained in clean condition throughout. Nothing extra is payable on this account.
61. The contractor shall obtain the details of investigation independently. No claim whatsoever on account of any discrepancy in the sub surface conditions that may be actually encountered at the time of execution work and those given in these tender documents shall be admissible to the contractor under any circumstances.
62. The contractor should find out the capacity of the quarries and accordingly plan procurement of coarse / fine aggregates either from the existing quarries or establish their own quarries and crushing arrangements.

63. It is the responsibility of the contractor to thoroughly examine the site of work and all constraints before submitting the bid.
64. Any services affected by the works must be temporarily supported by the contractor. The work of temporarily supporting and protecting the public utility, services during execution of the works shall be deemed to be part of the contract and the amounts are included in scope of schedule. Nothing extra shall be payable on this account.
65. The contractor shall take all precautions for safeguarding the environment during the course of the construction of the works. He shall abide by all laws, bye-laws, rules and regulations in force governing pollution and environmental protection, that are applicable in the area where the works are situated. The contractor must take all necessary steps, specially, to avoid dust nuisance during construction of the works.
66. Levels, measurements and other information concerning the existing site as shown on the drawings are believed to be correct and indicative, but contractors should verify them for themselves and also examine the nature of the ground as no claim or allowance whatsoever will be entertained on account of any error or omission in the levels or strata turning out different during execution from what is shown on the drawings.
67. Any incidental works required to be carried out in this regard shall be the responsibility of the contractor and the amounts are included in scope of schedule. Nothing extra shall be payable on this account. In case any new items are required for such works, the same will be processed as per the need on mutual consent.
68. Preliminary works such as site clearance, barricading, trail trenching etc., wherever required, shall be taken up simultaneously along with mobilization activities.
69. The contractor shall at all-time carryout the work on either side of road / service road in a manner creating least interference to the flow of traffic. The contractor shall take prior approval of the Employer and traffic police regarding traffic arrangements and diversion of traffic during construction.
70. Works to be performed shall also include all general works, including Road widening and allied works of any kind necessary for the due and satisfactory construction, completion and maintenance of the works to the intent and meaning of the drawings adopted and technical specifications, to best Employing standards and orders that may be issued by the Employer from time to time.
71. Road works and allied works shall be carried out in co-ordination with BBMP as per MoRTH specifications.
72. Road widening works, wherever required, are in the scope of contract. Further, if diversions of roads need any upgradation, as desired by the Employer, the contractor shall carry out the works. Road widening and drainage work shall be completed before the commencement of work at any particular location.
73. Restoration of Road and allied works shall be done immediately after completion of work up to road level or as per instructions of Employer.
74. Tree cutting and (or) translocation along the alignment shall be arranged by Contractor at her / his own cost. The applicable permits / permissions for felling of trees or translocation will be arranged by Employer. However, no clear time limits can be specified for the same.
75. Demolition of RCC framed structures, Brick masonry buildings including basement etc. as existing at site without making damage to adjacent structures, utilities and taking away and disposing all the debris and released materials etc., shall be done by contractor, the amount of the same is included in the price schedule.
76. All disposable excavated material shall be collected and transported for disposal at contractor's dumping yard, which shall be approved by the relevant authorities. Dumping yard area cannot be provided by the Employer.

77. The tyres of the vehicles leaving site shall be cleaned with Jet Wash to avoid spillage of earth / mud on public roads. The contractor shall ensure cleanliness of public roads and footpaths, through which contractor's vehicles / personnel move, by deploying man power for the same. Contractor shall ensure proper cleaning and washing of roads and footpaths on all the times throughout the entire stretch till the currency of the contract including disposal of sweep age. Nothing extra shall be payable on this account.
78. Contractor shall be required to mobilize resources for taking up work at a number of locations simultaneously. Planning of resources may be done at least to meet these requirements.
79. The bidder may ascertain availability of suitable / preferred type of soil for embankment and lead / lift involved before quoting his rates / price.
80. Maintaining and keeping the Existing Defence, structures and adjacent roads clean in the area of work and where construction machineries ply is the responsibility of the contractor.
81. Sufficient measures to minimize water, air and noise pollution at/ near the area of the work shall be undertaken by the contractor.
82. All aspects of quality assurance, including testing of materials and other components of the work, as specified and as directed by the Employer shall be ensured.
83. Clearing of site and handing over of all the Works, as specified or as directed by Employer shall be ensured.
84. Maintenance of the completed Work during the maintenance period as directed by Employer shall be ensured.
85. Submission of completion (i.e., 'As-Built') drawings and other related documents as specified shall be ensured.
86. Contractor shall not display any name-board for the works without the written permission of the Employer.
87. No labor camp shall be allowed at work site and in Defence area or any unauthorized place. The proposed sites for labour camps shall be got approved by the Employer.
88. All goods and materials to be incorporated in the works shall be new, unused, and of the most recent or current models, and they shall incorporate all recent improvements in design and materials, unless provided for otherwise in the contract.
89. If Employer wishes to engage third party consultants for quality control assessment, apart from the quality control and field tests by the Employer, the contractor shall co-operate with both Quality control authorities and the third party.
90. The above list is not exhaustive. Any other minor requirement inadvertently missed out in the above list, shall be complied with. The contractor shall execute the work as per the requirement of BSRP and as per the latest and best practices. In case of any dispute, the decision of ED (Civil) /K-RIDE is final in this regard and also with regard to whether the requirement is minor or not.

V) GENERAL INFORMATION, INSTRUCTIONS AND MISCELLANOUS ISSUES

1. ITEMS PAYABLE UNDER LUMPSUM COMPONENT OF THE WORK IN SCHEDULE - K

The items against the scope of the work include (but not limited to) the following:

- a) Shifting of Utilities required, if any
- b) Any other items

2. PHASES OF WORK

The contractor shall execute the work in two phases:

- a) Design Phase

b) ConstructionPhase

The Design Phase shall commence on the date of issue of Letter of Acceptance. There is no relation of Design Phase with the Notice to Proceed. This phase shall include the preparation and submission of:

- c) The Preliminary Design
- d) The Definitive Design; and
- e) The GFC Drawings.

The Design Phase will be complete upon the issue of a Notice in respect of the comprehensive and complete GFC Drawings submission for the whole of the Permanent Works.

The Design and GFC drawings shall be submitted by contractor and after scrutiny, Employer shall issue Good for Construction (GFC) drawings to contractor for the execution of works in accordance with the agreed terms and conditions of the Contract Agreement.

3. REFERENCE DOCUMENTS

The following Documents shall be referred in conjunction with each other (not necessarily in the same order) by the contractor for construction work as these are mutually complementary to each other:

- a) Good for Construction Drawings issued by the Employer
- b) Employer's Requirements
- c) Instructions
- d) Technical Specifications and explanatory notes
- e) Contract Conditions
- f) Particular Conditions of Contract
- g) Bill of Quantities
- h) Indian and International Standards referenced in the bid document
- i) The schedules and any other documents forming part of the Contract
- j) Any other related section in the bid document

The contractor shall always promptly seek advice from the Employer in the event of conflicts among above cited documents, before taking any action in respect of any item of work, where such a conflict has a potential to affect any aspect of the work. In case of conflict, the Employer's decision will be final and binding.

4. GENERAL PROJECT INFORMATION

The project site is located in and around Bengaluru City. The tendered work is BSRP project for Indian Airforce Station Jalahalli at Jalahalli.

5. AVAILABILITY OF LAND

Complete land for the execution of works is available. The contractor shall take additional land on lease / rent basis temporarily for installation of his facilities like batching plant / Casting Yard / Site Work Shops / Project offices / Site offices etc. The tenderers are advised to conduct a detailed study and cater for all such expenditure in the bid.

6. SITE INFORMATION

The project site is located in and around Bengaluru City. Bengaluru is well connected to other parts of the country by Road, Rail and Air. It has an International Airport. The location of the work and the general particulars are shown in the drawings enclosed with the bid documents.

7. GENERAL CLIMATIC CONDITIONS

Bengaluru is located in meridians of 12° N latitude and 77°3' E Longitude, spread over an area of 531 sqm km. located at an altitude of 900m, Bengaluru boasts of delightful weather around the year registering a maximum temperature of around 34° centigrade in summer and a minimum temperature

of around 14° centigrade in winter. However, there have been instances of break of these maximum and minimum. Bengaluru receives both the Southwest and Northeast Monsoons, getting an annual average rainfall of 760 mm, generally during the months of May to September / October. Bengaluru falls in Seismic Zone II.

8. OBTAINING CLEARANCES / CERTIFICATES FROM AUTHORITIES

Contractor shall arrange well in advance, stage-wise (if required), submission of all the required documents and drawings for approval of other concerned authorities and arrange for their inspection and obtain approval / completion certificates with respect to the work, as required. All clearances from the Statutory Authorities are the responsibility of the contractor. Contractor shall obtain and deliver to the Employer, on completion of the works, the final Inspection Report and approval from the Authorities.

9. RESTRICTIONS IN WORKING

- i. The various items of construction work shall have to be carried out in/along narrow roads / streets of Bengaluru city besides/across/parallel to the existing Defence area where there are buildings adjacent to the road / track.
- ii. There are restrictions for movement of trucks and heavy vehicles (ex: trailers) carrying construction materials.
- iii. There are some one-way roads where traffic can't move in both directions.
- iv. The construction of structures shall be planned in such a manner that they do not obstruct or interfere with the existing roads, Defence security and other Utilities.
- v. Special care shall be taken to restrict the noise pollution further, to the minimum levels. The bidder should take all these facts into account while quoting rates and devise his methodology of working accordingly.
- vi. Where work is required to be carried out at locations adjacent to such Existing, roads, Utilities, structures, monuments, religious structures, etc., suitable safety and protection arrangements shall be ensured. Nothing extra will be payable on these accounts. It shall also be ensured that no damage is caused to any such element and Employer shall be indemnified against such damage at no extra cost.

10. PROVISIONAL ACCEPTANCE

- i. Immediately after completion of works / such part of works, the contractor shall certify and advise the Employer in writing that the works are (i) complete (ii) ready for satisfactory commercial service and (iii) ready to be handed over. He will also place at the disposal of the Employer the required staff for checking it and putting it into operation.
- ii. The test or tests as stipulated in approved Technical Specifications shall be carried out jointly by the Employer and the contractor within a month after the receipt of the contractor's notification as stated in sub-Para above.
- iii. The provisions contained in the relevant CC clause shall be followed for taking over of the installations.

Use of Rejected / Sub Standard Items / Equipment

In the event of such rejection as aforesaid, the Employer shall, without prejudice to his other rights and remedies and in particular without prejudice to his rights under the clause just preceding, be entitled to the use of the rejected / substandard equipment / item for a time reasonably sufficient to enable him to obtain other replacement. During such period, if the rejected / substandard equipment / item is used commercially the contractor shall not be entitled to the payment on energization until such rejected equipment is rectified and / or replaced, but the Employer shall not be entitled to claim any damages arising out of rejected / substandard equipment / item in respect of such period.

11. GUARANTEE

- i. The contractor shall guarantee satisfactory working of the installations erected by him, for a period of 6 (Six) months from the date of completion of DLP or from the date of Provisional Acceptance by the Employer whichever is earlier. The guarantee for spares (if any) should be coincident with the guarantee for erected equipment. The provisions contained in the relevant clause shall be followed for rectification of defects.
- ii. During the defect liability period the contractor shall keep available an experienced Engineer and necessary equipment to attend to any defective installations / work resulting from defective erection and / or defects in the equipment supplied by the contractor. The contractor shall bear the cost of all modifications, additions or substitutions that may be considered necessary due to faulty materials, design or workmanship for the satisfactory working of the equipment. The final decision shall rest with the Employer.
- iii. During the defect liability period the contractor shall be liable for the replacement at site of any parts which may be found defective in the equipment whether such equipment be of his own manufacture or those of his sub-contractor whether arising from faulty design, materials, workmanship or negligence in any manner on the part of the contractor provided always that such defective parts as are not repairable at site are promptly returned to the contractor if so required by him at his (Contractor's) own expenses. In case of type defects in Contractor's equipment and components detected during guarantee period, contractor shall replace all such items irrespective of the fact whether all such items have failed or not. The contractor shall bear the cost of repairs carried out on his behalf by the Employer at site. In such a case, the contractor shall be informed about the works proposed to be carried out by the Employer.
- iv. If it becomes necessary for the contractor to replace or renew any defective portion of the equipment under the Para aforesaid then the provision of the said Para shall also apply to the portions of the equipment so replaced or renewed until the expiration of six months from the date of such replacement or renewal or until the end of the above-mentioned period whichever is later. Such extension shall not apply in case of defects of a minor nature, the decision of the Employer or his nominee being final in the matter. If any defect be not remedied within a reasonable time during the aforesaid period, the Employer may proceed to do work at the contractor's risk and expense, but without prejudice to any other rights and remedies which the Employer may have against the contractor in respect of such defects or faults.
- v. The repaired or renewed parts shall be delivered and erected on site free of charge to the satisfaction of Employer.

12. ACCOUNTABILITY AND DISPOSAL OF RELEASED MATERIALS

- i. The contractor shall liaison with the Employer to finalize the procedure for taking over of the whole or part of the section and for disposal of the released materials.
- ii. All released materials shall be handed over to the authorized representative of the Employer at the specified depot/location.
- iii. The material released on account of modifications / alterations shall be accounted by the contractor in the presence of the Employer and the Employer's Representative, except for the material permitted by the Employer to be re-used.
- iv. If any shortfall of released material is noticed at the time of completion of the work, the contractor shall be liable to pay for the shortfall as per the prevailing rates. Else, the same will be recovered from the final bill of the contractor as per the extant policy of K-RIDE.

13. CODES AND SPECIFICATIONS

The works shall be carried out as per Specifications. Wherever reference is made in the Contract to specific standards and codes to be met by the goods and materials to be furnished and work performed or tested the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless otherwise expressly stated in the Contract. Where such standards and codes are national or relate to a particular country or region, other authoritative standards which ensure an equal or higher quality than the standards and codes specified will be

accepted subject to the Employer's prior review and written approval. Differences between the standards specified and the proposed alternative standards must be fully described in writing by the contractor and submitted to the Employer at least 28 days prior to the date when the contractor desires the Employer's approval. In the event the Employer determines that such proposed deviations do not ensure equal or higher quality, the contractor shall comply with the standards specified in the documents.

- (a) The Standard Specifications of Defence (MES) / IS / IRC and the list of codes and manuals given in the annexure thereof shall be prime governing (MES, IS, IRC codal provisions / MORTH / CPWD).
- (b) Where there is conflict between provisions in MES & IS specifications, provisions in MES specifications shall prevail.
- (c) Where there is no provision of specifications in MES, provisions in IS specifications should be adopted. Where there are no provisions in MES and IS Specifications, provisions in IRC Specifications should be followed.
- (d) The decision of Employer is final and binding in the interpretation of the clause of the codes of practice and specifications of this tender and no claim whatsoever shall be entertained on this account from the contractor.

14. SURVEY AND FIXING WORKING BENCH MARKS AND ALIGNMENT MARKERS

The work of conducting survey and fixing bench marks and alignment markers before the start of any work on this tender is included in the works covered by the present Tender.

14.1 Bench Marks

1. The contractor shall establish bench marks with reference to the permanent bench marks available with the Survey of India. The details of these bench marks along with their reduced levels shall be marked on the alignment drawings indicating the plan and 'L' section which form a part of the tender. The contractor along with the Employer shall verify the details in the first instance, soon after getting access to the site. If any mistakes are detected in these details of these bench marks, the same shall be indicated to the Employer. The mistakes detected shall be corrected in consultation with the Employer. These corrections should be got approved by the Employer before starting of any other work.
2. The contractor shall then, in presence of the Employer, establish working bench marks at short intervals, adequately connecting them to the reference bench marks set up by the Employer in the Project length. The working bench mark levels should be got approved from the Employer. An up-to-date record of all bench marks including approved corrections, if any, shall be maintained by the contractor and also by the Employer.
3. All levels taken for making out the longitudinal section and cross section should be related only to these working bench marks.

14.2 Alignment

1. The contractor shall fix alignment reference points on pillars, cast and erected as per the specifications, at regular intervals all along the alignment. The contractor along with the Employer shall verify the details of these alignment pillars. If any mistakes are detected in these details, the same should be indicated to the Employer before starting any work. These detected mistakes should be corrected by the contractor in consultation with the Employer. These corrections should be got approved from the Employer.
2. The contractor shall then, in presence of the Employer, establish working alignment reference markers at shorter intervals, adequately connecting them to the reference pillars set up by the Employer in the Project length. The location of these pillars and subsidiary alignment markers, if any, should be got approved from the Employer. An up-to-date record of all alignment pillars, and corrections, if any done, shall be maintained by the contractor and also the Employer.

3. The Employer, when necessary, will provide the contractor with the data necessary for setting out of the centerline. All dimensions and levels shown on the drawing or mentioned in the documents forming part of or issued under the contract shall be verified by the contractor on the site; he shall immediately inform the Employer of any apparent errors or discrepancies noticed in such dimensions or levels. The noticed mistakes shall be corrected in consultation with the Employer. These corrections shall have the approval of the Employer.
4. The contractor will be entirely responsible for accurate setting out of the works and safeguarding all survey monuments, bench marks, alignment references etc. The work of setting out shall be deemed to be a part of the general works preparatory to the execution of work and no separate payment shall be made for the same.
5. For the entire duration of the contract, the work of setting out shall be deemed to be a part of the general works preparatory to the execution of work and no separate payment shall be made for the same.

14.3 Interfacing and Integrations of Works

1. The contractor shall take full responsibility in terms of organizing, managing, coordinating and administrating the interfacing of all components of works including all issues related to and arising out of such tasks. The contractor shall interface with all concerned authorities and other contractors as required to complete the work satisfactorily within the stipulated period.
2. Under consideration and application of the above clause, the contractor shall have the obligation to liaise with the other contractors and Authorities to obtain all necessary technical information, all necessary information concerning organization of works, coordinating the works etc. which are necessary to assess, mitigate, take care of contractual obligations, risks, liabilities and whatsoever arising out of interfacing, Engineering issues, organization of the works etc. The Employer shall not be held liable in any way, throughout the preparation of the offer and / or execution of the works and / or maintenance period and / or defects liability period for any omissions, misunderstanding, negligence etc. arising out of interfacing, coordinating, organizing etc. of the works. The Employer will not entertain any claim arising out of misunderstanding, miscommunication, omission, withholding of necessary / required information or whatsoever between the concerned contractors / Authorities concerning interfacing, organizing etc. of works. In case of any claim arising from any of the contractors, as aforesaid, referring to interfacing and / or interfacing related issues, the Employer will hold the concerned contractors liable for not taking care of their contractual obligation concerning interfacing, organizing, co-ordination etc. of the related works.
3. Needless to say, that commissioning of this project requires close coordination among various agencies executing the works in this section, the Employer, the Employer and the Defence authorities, wherever applicable. The contractor shall therefore plan all his works requiring interfacing with other agencies, meticulously, in consultation and coordination with all concerned parties, in advance, for expeditious execution, without causing any delay either to his works or those of others.
4. If, in the opinion of Employer, any delay in execution of any part of the Project requiring interfacing is attributable to the failures of the contractor to take adequate steps for smooth execution of such works, then the Employer will have the right to take necessary steps to organize and streamline such works, including excluding the requisite portion of work from the scope of the contractor and getting the same executed by other agencies, at the risk and cost of the contractor.

14.4 SURVEY EQUIPMENT

1. The contractor shall provide the survey equipment and other accessories as per the instructions of Employer as and when required. He should also provide all necessary help as required by the Employer for inspecting and checking the works, whenever required.

2. All power requirements for execution of works shall be arranged by the contractor from his own resources. Subject to availability of power, the Employer may recommend to the Defence Authorities for providing power connection. No guarantee whatsoever is given by the Employer in this regard. The contractor shall bear the cost of installation and payment of necessary charges for providing such power connections as per the Terms and Conditions of the Defence. However, in the event of non-availability of Power from Defence, the contractor shall make necessary arrangements to tie up with the local Electricity Authorities etc. for supply of Power, till all the works are over.

15. DAMAGE TO PROPERTY

The contractor shall organize all his activities so as not to cause any damage to the property of Defence or that of other agencies or any third party. In spite of taking all precautions, in the unfortunate event of any damage to any property, there could be claims by the affected parties. The contractor shall not only indemnify the Employer against the claims made by the affected parties but also settle the matters with the affected parties as per law. If the nature of damage is one of that affecting the train movements or causing a safety hazard to the public, then the situation will be treated as an emergency and the Employer reserves the right to take all necessary steps as deemed necessary to restore train operations or to remove the hazardous situation or to mitigate the damage, at the risk and cost of the contractor.

16. STRUCTURAL ELEMENTS, SHAPE AND FORM

The bidder shall note different structural elements in shape, form and structural configuration in plain. The structural elements may be skew, tapered, curved etc. The bidder shall include these factors while quoting his rates. All the above shall be covered in the quoted rates and nothing extra shall be payable towards this.

16.1. Stability of the elements

During construction, the stability of each element must be ensured until the connections through which the stability is achieved, are fully operative. This might require temporary supporting, bracing etc. This is contractor's responsibility, and no extra payment will be made.

16.2. Stability of the Structure

The overall stability of the structure must be ensured during each phase of constructions. This might require special provisions. This is also contractor's responsibility and no extra payment will be made.

16.3. Temporary Works

Traffic barricade with reflective tapes and other necessary traffic signages should be provided wherever required so that safety is ensured during day and night continuously. Temporary traffic diversion for smooth flow of traffic during construction including necessary traffic signs, repairs to the diverted route / service lanes, if required, restoration of diverted route to original condition etc. shall be done by contractor at his cost.

Contractor shall also provide any temporary support for the utilities, wherever required, at no extra cost to Employer.

16.4. Design for Temporary Works

The Design should cover all the items pertaining to all temporary works, traffic diversion scheme, form work, casting and stacking yard, staging, launching scheme for girders / beams and / or transportation scheme for various structural elements and materials to be transported to and from site during construction period.

Contractor shall formulate a practical and viable scheme for design / fabrication of shuttering, scaffolding / staging, casting, curing, testing and launching / erection of girders / beams / and all other structures.

17. DRAWINGS

1. The Drawings furnished with the Bid documents are indicative and approximate and may require changes at the time of actual execution of works based on actual site conditions. Drawings furnished with the Bid Documents show the level of works based on available data. These may change at the time of actual execution of works based on actual site conditions without additional cost.
2. Tender drawings represent Employer's proposal based on preliminary design and conceptual plans, which are indicative.

17.1. GFC Drawings:

The Design and drawings are the responsibility of contractor. GFC drawing requirement shall be planned by the contractor based on his Programme and the GFC drawings shall be submitted accordingly.

Errors, Omissions and Discrepancies in Specifications and Drawings:

- a. It shall be the responsibility of the contractor to promptly bring to the notice of Employer any error, omission fault, defects or discrepancy in the contract documents, specifications and drawings for the work which are discovered while reviewing the contract documents or in the process of execution of the works and obtain his orders thereon.
- b. Only stated dimensions shall be taken and not those obtained from scaling the drawings.
- c. In case of errors, omissions, faults, defects and / or disagreement on the drawings or between the drawings and specifications the following principles shall be followed
 - i. As between the written description or written dimensions on the drawing and the corresponding one in the specifications, the former shall apply.
 - ii. As between the written description of the item in Bill of Quantities and the detailed description in the specification of the same item, the former shall prevail.
 - iii. The drawings on a large scale shall take precedence over those on a smaller scale; and
 - iv. Drawings approved as construction drawings from time to time shall supersede corresponding drawings previously approved.

The decision of K-RIDE will be final on this matter.

17.2. Meaning and intent of specifications and Drawings

If any ambiguity arises as to the meaning and intent of any portion of the specifications and drawing or as to execution or quality of any work or material, or as to the measurement of the works, the decision of the Employer thereon shall be final subject to the appeal (within 7 days of such decision being intimated to the contractor) to Employer, who shall have the power to correct any errors, omissions, or discrepancies in the specifications, drawings, classifications of works or materials and whose decision in the matter in dispute or doubt shall be final and conclusive.

17.3. Responsibility for Specifications, Design and Drawings

Specifications

MES / IS / MORTH / CPWD, KPWD specification / other Specifications / Codes viz. IS, MES, DSR etc. shall be procured by the contractor from the market. One set of these specifications shall always be kept at contractor's site office for reference.

Standards guaranteeing a level of quality or performance equivalent or superior to those indicated will also be accepted. Reference to trademarks or other specific designations that are

necessary to explain the nature of the products required does not necessarily mean that the same specific product / brand has to be used, but it means that any other product of equal or superior quality or performance is also acceptable, subject to prior approval of the Employer to be obtained in writing for adopting the new standards which are not provided in the contract.

17.4. Drawings for Permanent Works

- i. Preliminary Drawings as listed showing general dimensions & details elaborating the scope of work (not based on detailed design) are supplied along with the bid documents. These drawings are broadly indicative of the work to be carried out. These drawings are not "Construction Drawings" and details indicated therein are for general guidance only and shall be modified by the contractor, to incorporate additional details as per design, and as described in the Specifications.
- ii. The Permanent Work shall be carried out in accordance with the "Good for Construction" (GFC) drawings as would be issued to the contractor by the Employer duly signed and stamped. The contractor shall not take cognizance of any drawings, designs, specifications, etc. not bearing Employer's signature and stamp. Similarly, the contractor shall not take cognizance of instructions given by any other Authority except the instructions given by the tender calling authority / competent authority or the nominated official of the Employer / the nominated official of Employer, in writing. Construction drawings shall be supplied progressively by the contractor during execution of work, well in time (giving sufficient margin of time, as decided by the Employer, for their scrutiny and issue), for each activity.
- iii. GFC drawings / Advance copies required for the next one months' work shall ordinarily be submitted by the contractor to Employer for his planning, procuring etc.
- iv. The "Good for Construction" drawings shall be prepared by the contractor after the award of work.
- v. No deviation shall be made from GFC drawings by the contractor.

17.5. Design, Drawings and Specifications for Temporary / Ancillary works.

- i. Contractor's proposal for erection of all Ancillary and Temporary works shall be in conformity with the proposals submitted along with the bid and / or as approved by Employer.
- ii. The contractor would design all the Ancillary and Temporary works including temporary supports, false work, formwork, staging scheme etc. and will submit the same and related working drawings to the Employer for approval, after getting them proof checked by an IIT/IISc Bangalore/NIT or any other approved institution. Bar Cutting and bending schedule for the reinforcement, shop drawings for fabrication work etc. shall also be prepared by the contractor and submitted for Employer's approval.
- iii. Shop drawings
 - (a) All reference points shall be in relation to the levels and locations, given in the Architectural and Services drawings duly cross-checked on site and confirmed. All locations and levels should be indicated with respect to grid and reduced levels with respect to the Bench Mark adopted for the Project and indicated in the drawings issued by the Employer.
 - (b) The contractor shall verify the dimensions of all the necessary structural, architectural, Mechanical, Electrical & Plumbing (MEP) Services and other elements, relevant to the system being done, before proceeding with the preparation of the shop drawings and proceeding with the physical work at site and make suitable adjustments to accommodate within the spaces available.
- iv. Approval of Employer of any such proposal / drawings shall not relieve the contractor of his responsibility of sufficiency of such works.

17.6. Drawing Management

1. The contractor shall submit all such drawings for Temporary / Ancillary works and shop drawings to the Employer well in advance before he desires to commence the works and get the same approved from the Employer. These drawings should be submitted only after they have been duly detailed, checked and verified within the contractor's organization ensuring that the details and data shown / furnished on the drawings are correct and that the requirements of other disciplines have been taken care of. The names and complete signatures of the contractor's personnel responsible for the drawings shall be contained on each drawing. Any drawing which does not contain the above names and signatures shall be summarily returned to the contractor and treated as not having been submitted.
 2. The drawings submitted for approval shall be in any one of the standard sizes - AO, AI, A2, A3 or A4, in accordance with Indian standards and as specified.
 3. All drawings shall show the following particulars in the lower right-hand corner in addition to the contractor's name.
 - (i) Project Title
 - (ii) Name of the Employer
 - (iii) Name of Consultant
 - (iv) Contract No.
 - (v) Title of Drawing
 - (vi) Scale
 - (vii) Date of Drawing
 - (viii) Contractor's Drawing Number
 - (ix) Space for the Employer's drawing number
 - (x) Name of the Employer
 - (xi) Name of Review Consultant
 - (xii) This drawing is based on Drawing No.(s.)
 - (xiii) Further detail is given on Drawing No.(s.)
 4. Each drawing shall carry a revision number, date of revision and brief details of revisions carried out. Whenever any revision is carried out, the revision number must be updated. The revisions carried out on the drawing shall be clearly marked by clouding and each cloud revision shall be numbered by marking the revision number in triangle.
 5. All dimensions on drawings shall be in metric units, unless otherwise specified. However, all levels shall be in metres.
 6. A template with the above information shall be got approved from K-RIDE before start of the work.
 7. All shop drawings shall be prepared on CAD using AUTO-CAD Version 2010 or higher.
- 17.7. Shop drawings shall be prepared for the following works:**
- i. Reinforcing bar bending schedules
 - ii. Working drawings for placing of reinforcement
 - iii. All form works, Shuttering and Scaffoldings
 - iv. Shop / Fabrication drawings for structural steel for PEB
 - v. Metal work (ferrous and non-ferrous) for inserts, structural work in built up sections etc.
 - vi. Seismic joints
 - vii. Expansion joints
 - viii. Construction joints
 - ix. Waterproofing
- 17.8. Drawing Management at Site**
- (i) The contractors shall ensure that all drawings (to be laminated at contractors' cost) meant for further fabrication, erection and field work are issued to their personnel in a controlled

manner. A proper record shall be maintained to show to whom the drawing is issued and to ensure that the latest revision of the drawing is being followed for further work.

- (ii) All superseded drawings shall be promptly withdrawn from the personnel to whom they are issued and stamped "SUPERSEDED" in RED. The contractor shall maintain a register of drawings, with their revision / issue number, as received from the Employer and a record of their distribution to the designated personnel within their organization. A certificate to that effect along with list of drawings withdrawn during the month shall be incorporated in the monthly progress report.
- (iii) In case of revision of Approved Drawings for Temporary / Ancillary and Shop Drawings, if any, at any time before the completion of the work, the contractor shall make such revisions and proceed in the same manner and observe procedure for obtaining approval of the Employer as for the approval of the original drawings.
- (iv) The contractor shall maintain at Site a set of the drawings issued by the Employer on which changes shall be progressively marked and signed by the Employer so that "As-Built" drawings can be made correctly and expeditiously at the end of the work.

17.9. Documents by Contractor

- i. The contractor shall submit to the Employer, for approval, Quality Assurance plans, design calculations, material specifications for each item and system, samples, as may be called for in the Specifications or as the Employer may reasonably require. Wherever necessary, the contractor shall provide as built dimensions to facilitate proper Good for Construction drawings being prepared for various construction detailing.
- ii. Number of Copies of Drawings for Temporary / Ancillary works / Shop drawings and Documents
- iii. All Shop drawings / drawings for Temporary and Ancillary works, Documents, Schedules etc. and revisions thereof shall be submitted by the contractor to the Employer in 6 copies. Copies required in excess of these shall also be borne by the contractor at his own cost.

17.10. Completion Drawings

On completion of the work in all respects the contractor shall submit the following

- i. Six sets of "As Built Drawings" in the standard sizes of A0, A1 each containing complete set of drawings for every component of work on approved scale indicating the work "As Built". Each set shall also contain technical literature.
- ii. These drawings shall be prepared on CAD using Auto-Cad version (latest, as directed by Employer) and shall be recorded on writable memory devices and one set of these devices shall also be submitted.
- iii. Four sets of catalogues of all manufactured materials with the name and addresses of the manufacturers for all equipment provided by the contractor.
- iv. The contractor shall also submit one set of original "As Built" drawings on polyester film or as directed by the Employer.

The Certificate of Completion of Works as per the provisions in the General Conditions of Contract will not be issued by the Employer in the event of Contractor's failure to furnish aforesaid "As Built" drawings for the entire works.

17.11. Plans and Drawings for Layout of Plant and Equipment

The contractor shall submit the following information, in triplicate, to the Employer, for approval, within the time stipulated against each item given below:

- i. A general layout plan for construction plant and equipment required for execution of work, within thirty days from the date of issue of "Letter of Acceptance".

- ii. Drawings or prints showing the locations of major facilities which he proposes to put up at site, at least fourteen days prior to the commencement of the respective work; and
- iii. Any other details and drawings as required under the contract, within the time as specified in the contract.

Cost of all the above activities shall be deemed to be included in the quoted rates of various items of the Price schedule and nothing extra shall be paid for on this account.

18. TRAFFIC MANAGEMENT

- i. The contractor shall make the detailed traffic diversion plans in consultation with Bengaluru Traffic Police. The work is to be executed with proper liaison with Bengaluru Traffic Police. Necessary assistance in the form of issuing letters to the authorities concerned, will be given by K-RIDE. The scheme should be such that a minimum of two lane of traffic on each direction of the road should be available for the smooth flow of traffic. The contractor should inspect the site and observe the traffic flow and pattern before making the diversion plans.
- ii. The permanent traffic diversions will be carried out in consultation with traffic police. Contractor shall provide traffic diversion proposals, traffic marshals, cones, traffic diversion boards etc., as desired by Traffic Police.
- iii. Traffic barricade shall be with reflective tapes, traffic signages, traffic sign board, signals, road delineator reflective lights, traffic cones etc. Deployment of adequate man power shall be for all 24 hrs in 8hrs shifts. Day and night management of the above including all other necessary provisions, wherever required, shall be taken care of so that safety is ensured during day and night continuously. Temporary traffic diversion for smooth flow of traffic during construction including necessary traffic signs, repairs to the diverted routes / service lanes.
- iv. It includes but not limited to Diversion to other adjoining parallel roads or other suitable roads including strengthening of the same and all provision and maintaining the flow of traffic towards the diverted route with minimal inconvenience to the flow of affected traffic and close liaison with Traffic Department of Bengaluru.
- v. The contractor shall take necessary and adequate measures to ensure uninterrupted traffic flow within the work area during the currency of the work. It shall be the responsibility of the contractor to provide suitable and acceptable diversions for the passage of the traffic. Contractor shall ensure that at no time, his construction equipment interrupts the movement of the traffic on the road and IR Track.
- vi. The contractor shall prepare a comprehensive Traffic Management Plan. The contractor shall also draw a phased program for traffic arrangements / diversions and get it approved from the Employer / Employer and Traffic Police well in advance with respect to every stage of construction.
- vii. If traffic diversions require construction of temporary roads and / or improvement of the existing roads, the design / drawings for the same including diversion of utilities etc. (if required) shall be prepared by the contractor using the specifications not inferior to that of the existing roads / utilities and get it approved from the Employer / Employer and Traffic Police. Payment for the same shall be made under relevant item of Price Schedule.
- viii. Before taking up the work in a particular stretch, all the traffic diversion plans applicable to that particular area shall be implemented as per the approved plans / drawings and trial runs carried out to the entire satisfaction of Employer / Traffic Police. If, during trial runs, some modifications are suggested, the same shall be also being carried out before start of work.
- ix. The contractor shall take all necessary measures for safety of traffic during construction and provide, erect and maintain such barricades (as approved by Employer) having marking with reflective paint, signs / sign boards, pavement markings, flags, lights, traffic marshals and flagmen as may be required and / or directed by the Employer for guiding, information and protection of the traffic approaching or passing through the stretch. Red lanterns or flashing warning lights of suitable type spaced suitable intervals mounted on barricades along the diversions shall be provided and kept operational and maintained throughout from sunset to sunrise.

19. LIGHTING AND FIRE PREVENTION

- i. Wherever night working is carried out by Contractor, temporary lighting arrangements of required lumen as per approved layout shall be provided, installed, maintained for the duration of the contract and removed after completion of work by and at the expense of the contractor.
- ii. Flashing lights to warn the traffic on roads shall be used at all times on all obstructions.
- iii. Contractor shall provide and maintain adequate firefighting equipment and take adequate fire precautions for the safety of all personnel, plant, and material including temporary and permanent works and shall take action to prevent damage to or destruction by fire of trees, shrubs and grasses.
- iv. No extra payment will be made for the provision of temporary lighting, flashing lights and fire prevention measures and entire cost of all such work shall be deemed to have been included in the Scope of Price schedule.

20. UTILITIES

- i. Necessary permanent diversion of utility services shall be undertaken by contractor. The contractors shall liaise with the Utility Authorities for carrying out the work expeditiously wherever required so that works at particular locations are not delayed. In case they come across any utilities also they shall have to liaise with the agency concerned for the necessary diversion; the cost of diversion shall be paid by Employer under the relevant item of Schedule-K of Price schedule. Contractor shall provide any temporary support for the utilities if called for, but at no extra cost.
- ii. If any utilities are met, the contractor shall temporarily support or temporarily divert the same at his own cost. In case, this is not possible as decided by Employer, then the same will be permanently diverted by the contractor and the payment will be made under respective item in the relevant payment schedule of Works under KPWD / BWSSB / BESCOM-SR 2021-22 (Schedule-K).
- iii. For the existing utilities owned by Defence, where the shifting thereof can take place only after certain works for its shifting have been completed by the contractor, the concerned contractor shall, undertake and complete the works required for its shifting first. The concerned contractor in this case may be the contractor executing the present work or another contractor, as directed by the Employer.
- iv. Contractor should make his own survey for identification of underground / above ground utilities;
- v. New utilities: In the event the construction of any work is affected by a new utility, the contractor shall be entitled to a reasonable Time Extension in accordance with the provisions of contract. The decision of Employer is final in this regard.

20.1. Damage to Utilities

The contractor shall be responsible for any theft, damage and / or protection of all the existing utilities within the site of work during currency of the Contract. In case of any theft / damage occurring to these utilities while working or otherwise, the contractor shall immediately inform both the Employer's representative and the Employer's representative as well the utility owning agency and restore the same immediately to the entire satisfaction of the utility owning agency. Any damage due to working / negligence / fault of the contractor (the decision of Employer in this regard shall be final and binding), the same shall be repaired / made good by the contractor at his own cost. Any damage / compensation / penalty etc. if charged by the utility owning agency in this regard shall also be payable by the contractor and no claim in this regard will be entertained by the Employer. Any legal action to be faced in this regard shall also be the responsibility of the contractor. The contractor shall always keep indemnified the Employer against all these issues.

21. RESPONSIBILITIES OF CONTRACTOR

21.1. The contractor shall carry out expeditiously and without delay the following works

- a. Identify and get approved the sources of various major construction materials.
- b. Material testing and mix designs of concrete as contemplated in the specifications.
- c. Setting up of fully fledged site laboratories as per the requirements.

- d. Setting up concrete batching & mixing plant.
- e. Project office for Employer.
- f. Contractor's site office setup.
- g. Any other pre-requisite items required for final execution.
- h. Any other items specified in other sections of contract.

22. ASSOCIATED WORKS DEEMED INCLUDED IN SCOPE OF PERMANENT WORKS

Contractor's Organization and Plant & Equipment

Project Organization Plan

- i) The Contractor's Personnel shall be deployed & maintained in consultation with the Employer and as per the requirements. The Contractor's Superintendence shall be also properly deployed and maintained to carry out the construction activities as described in the relevant General Conditions of Contract (GCC) clause.
- ii) The contractor shall submit an updated Project Organization Plan which includes complete project organization chart during the Construction Phase adding functions and personnel necessary to perform the Works during the Construction Phase in accordance with the conditions of the Contract. This plan shall be updated and resubmitted whenever there are changes to the staff and / or the organizational structure. The plan shall show the management structure and state clearly the duties, responsibilities and authority of key staff member.
- iii) The contractor shall deploy the key personnel of requisite qualification and experiences. In case Employer instructs (in writing) the contractor to remove a person of his work force stating the reasons, the contractor shall ensure that the person leaves the Work Area within seven days and shall have no further connection with the Works in the Contract. The Employer, in case, feels that a person of contractor's work force should leave, the matter shall be brought to the notice of the Employer by the Employer for issuing suitable instructions to the contractor, after the Employer is satisfied.
- iv) During the Construction Phase, the contractor shall maintain the Design Team in his organization independent of the Construction Team to deal with Preliminary design, definitive design and working drawings.
- v) The minimum requirements for man-power are attached as Appendix 4 [Organization charts and key positions] to the Employer's Requirement.

22.1. Plant and Equipment

- a) The minimum Plant and equipment as shall be maintained in consultation with Employer as per the requirements.
- b) The minimum requirements for plant & equipment are attached as Appendix 5 [Plant and Equipment] to the Employer's Requirement.

23. PENALTY FOR NON-COMPLIANCE

Notwithstanding the provisions elsewhere in the bid documents, the contractor shall be penalized as detailed below:

- a) Correction of Defects

If the Employer determines that any item or part of it was constructed with bad workmanship and / or using sub-standard construction materials,

Sl. No.	Nature of Defects (Indicative only)	Penalty (Rs.)
1.	Not maintaining plumb line, level in concrete works / observing honey combs on the finished surface of concrete	5,000 / - each case
2.	Usage of unapproved / sub-standard materials	15,000 / - each case

The above said penalty is envisaged to act as deterrent against bad workmanship and usage of sub-standard construction materials by the contractor and shall be imposed for every occurrence. These penalties are non-refundable.

APPENDIX-01

1. PROGRAMME REQUIREMENTS

1.1 General

1.1.1. Construction Programme and project monitoring

1. The contractor shall propose and submit his detailed construction program separately and as per the procedure detailed in the scope of work. Contractor may be asked to schedule and complete the work phase wise / area wise in a phased manner fixing priorities to different stretches of the work to give access to other interfacing contracts as mentioned in the Bid documents.
2. The tentative construction program shall be submitted within the period as specified in the Bid document for approval of the Employer as 'Baseline Program'. The base line program shall clearly reflect interface and access dates for other civil / system-wide contracts. The basis of the time schedule for each activity such as productivity of man and machines and time cycle of each activity and resource planning shall be submitted along with the base line program.
 - a. After the work has started, the contractor shall deliver in the first week of every month to the Employer and the Employer an update of the Construction Program showing changes, if any, in planning or progress scheduling and reflecting the progress of all the activities of the network and the project status as at the end of previous month.
 - b. If the contractor falls behind the approved Construction Program by more than one month, he shall, within fourteen days of the date of such information, submit to the Employer for approval, a revision of the construction program showing the proposed measures, including augmentation of plant, labor and material resources to complete the works on time.
 - c. Whenever the contractor proposes to change the construction program, he shall immediately advise the Employer in writing and, if the Employer considers the change a major one, the contractor shall submit a revised program for the approval of the Employer.
 - d. Detailed Network Plan (Works Program): Detailed Network Plan shall be prepared by the contractor for each and every activity within the same time frame and in the same sequence. Activity at this level shall not be more than 15 days' duration, except for summary items like procurement / mobilization etc.

1.2 Works Programme

- 1.2.1 The Works Programme shall show the contractor's plan for organizing and carrying out whole of the Works.

- 1.2.2 Tasks in the Works Programme shall be sufficiently detailed to describe activities and events that include, but are not limited to, the following:
- (a) Key Dates, and Works Area Hand-over Dates and Interface dates.
 - (b) All physical work to be undertaken in the performance of the Contract obligations, including Temporary Works,
 - (c) The requested date for issue of any drawings or information by the Employer,
 - (d) Procurement of major materials and the delivery and / or partial delivery date on-Site of principal items of Contractor's Equipment,
 - (e) Commissioning date of Contractor's major equipment
 - (f) Any off-site work such as production or pre-fabrication of components,
 - (g) Installation of temporary construction facilities,
 - (h) Interface periods with Designated Contractors or utility undertakings,
 - (i) Design, supply and / or construction activities of sub-contractors,
 - (j) Any outside influence which will or may affect the Works.
- 1.2.3 The Works Programme shall show achievement of all Key Dates, Interface dates and Works Area Hand-over Dates. The Works Program shall also show all Milestones, but the Milestones shall not be taken as imposing any constraints that in any way affect the logic or limit any other dates in the program.
- 1.2.4 Activity descriptions shall be unique, describing discrete elements of work. Any activity creating an imposed time or other constraint shall be fully defined by the contractor.
- 1.2.5 The Works Programme shall be organized in a logical work-breakdown-structure including work stages and phases, and shall clearly indicate the critical path(s).
- 1.2.6 Activity duration shall not exceed 15 days, unless otherwise consented to by the Employer, except non-construction activities such as submittals, submittal reviews, procurement and delivery of materials or equipment and concrete curing. The contractor shall submit a Program / Project Calendar cross reference clearly indicating the allowance for holidays.
- 1.2.7 The Works Program, in each submission, shall be accompanied by an Activity Report and a Narrative Statement as described below in both electronic and hard copy format (time scale logic diagrams in A1 / A3 size, reports in A4 size).
- 1.2.8 Activity Report shall list all activities, and events in the Works Program, sorted by activity identification number.
- The Activity Report shall include the following for each activity and event:
- i. Activity identification number and description,
 - ii. Duration expressed in Days,
 - iii. Early and late start & early and late finish dates. Planned start and finish dates,
 - iv. Calculated total float and free float,
 - v. Predecessor and successor(s), accompanying relationships and lead / lag duration,
 - vi. Imposed time or date constraints,
 - vii. Calendar.

1.3 Narrative Statement

The Narrative shall be a comprehensive statement of the contractor's plan and approach for the execution of the Works and the achievement of key dates, handover dates, submission dates and any intermediate dates. It shall incorporate outline method statements in respect of major items of work including construction sequences, launching scheme, resources required including primary

item of plant, Construction Equipment required, person responsible, quality checks, inspection and test procedures, tolerances, Temporary Works and the like, risk analysis, etc. for carrying out that activity. It shall fully explain the reasons for the main logic links in the Program and include particulars of how activity duration is established. This shall include estimated quantities, production rates, hours per shift, work days per week and a listing of the major items of Construction Equipment planned for use on the project. Activities, which may be expedited by use of overtime or additional shifts, shall be identified and explained. A listing of holidays, and other special non-work days being used for the computer reports shall be included.

1.4 Weekly review

Once a week, on a day mutually agreed to by the Employer and the contractor, a meeting will be held to assess progress by the contractor during the previous week. The contractor shall submit a construction schedule listing activity completed and in-progress from the previous week and the activities scheduled for the succeeding two weeks based on the detailed Works Program. Copies of the schedule shall be submitted on A3 sized papers.

1.5 Project Calendar

For the Project, the contractor shall adopt 7 days a week calendar, identical calendar for the purpose of programming and Execution of Works. Official documents shall be transacted during 6 days' week – Monday through Saturday. For Project purposes, a week begins at 00:01 hours on a Monday and ends at 23:59 hours on a Sunday. The completion of an activity or the achievement of an event when given a week number shall be taken to mean midnight on the Sunday at the end of the numbered week. An access date or activity start date when given as a week number shall be taken to mean 00:01 hours on a Monday of the Numbered week.

1.6 Programme and Report Submission Format

The contractor shall submit one (1) original and six (6) copies and one (1) reproducible (for Programs) of all submissions to the Employer. All submissions shall be in A0, A1, A3 or A4 size, as appropriate except as may otherwise be agreed by the Employer. In addition, the computerized program and report shall be submitted in compatible discs. The format for all Program and Report submissions shall be strictly in accordance with the format as stated herein or as requested by the Employer.

2. MONTHLY PROGRESS REPORTS

2.1 General

The contractor shall submit to the Employer, a Monthly Progress Report, in a format approved by the Employer. The format may be modified any number of times by the Employer and the revised formats shall be followed by the contractor from the date of advice of the same by the Employer. This Report shall be submitted by the end of each calendar month and shall account for all work actually performed from 26th day of the last month and up to and including the twenty-fifth (25th) day of the month of the submission. The above days (i.e., 26th and 25th) may be modified by the Employer. It shall be submitted in a format to which the Employer shall have given his consent and shall contain sections / sub-sections for, but not be limited to, the topics listed in clauses below.

2.2 Physical Process

- a) It shall describe the status of work performed, significant accomplishments, including critical items and problem areas, corrective actions taken or planned and other pertinent activities, and shall, in particular, address interface issues, problems and resolutions.
- b) It shall include a simplified representation of progress measured in percentage terms compared with percentage planned as derived from the Works Program.

2.3 Programme Update (For Entire Project)

Programme updating shall include

- (a) The monthly Program Update which shall be prepared by recording actual activity completion dates and percentage of activities completed up to the twenty-fifth (25th) of the month together with estimates of remaining duration and expected activity completion based on current progress. The above day (i.e., 25th) may be modified by the Employer. The Program Update shall be accompanied by an Activity Report and a Narrative Statement. The Narrative Statement shall explain the basis of the contractor's submittal:
- (i) Early Work and Baseline Submittals – explains determination of activity duration and describes the contractor's approach for meeting required Key Dates as specified in the Contract.
 - (ii) Updated Detail Program Submittals – state in narrative the Works actually completed and reflected along Critical Path in terms of days ahead or behind allowable dates. Specific requirements of narrative are:
 - 1. If the Updated Detailed Work Programme indicates an actual or potential delay to Contract Completion date or Key Dates, identify causes of delays and provide explanation of Work affected and proposed corrective action to meet Key Dates or mitigate potential delays. Identify deviation from previous month's critical path.
 - 2. Identify by activity number and description, activities in progress and activities scheduled to be completed.
 - 3. Discuss Variation Order Work Items, if any.
- (b) The Program Status which shall: -
- (i) Show Works Program status up to and including the current report period, display Cumulative progress to date and a forecast of remaining work.
 - (ii) Be presented as a bar-chart of size A3 or A4 and as a time-related logic network diagram on an A1 media, including activity listings.
- (c) The Activity Variance Analysis which shall analyze activities planned to start prior to or during the report period but not started at the end of the report period as well as activities started and / or completed in advance of the Works Program.

2.4 Three Month Rolling Program

The monthly issue of the Three-Month Rolling Program.

2.5 Financial Status

It should include following

- a) A narrative review of all significant financial matters, and actions proposed or taken in respect to any outstanding matters.
- b) A spread sheet indicating the status of all payments due and made.
- c) A status report on status of extra items, if any

2.6 Status of Claims

A report on of the status on any claims outstanding. The report shall in particular provide interim updated accounts of continuing claims.

2.7 Milestones / Key Dates Status

A report on the status of all milestones / key dates due to have been achieved during the month and forecasts of achievement of any non-achieved key dates and those due in the next month, with explanatory remarks for not achieving them.

2.8 Resources Status

- 2.8.1 The contractor shall submit to the Employer each month a detailed list by trade classification, of manpower employed during the report period, stock of all major construction materials as also a list of all serviceable major items of construction plant and equipment on site including those which are proposed to be mobilized during the next month.
- 2.8.2 A report on the status of deployment of all key personnel and other manpower by trade Vis – a - Vis their deployment schedule and explaining constraints if any.
- 2.8.3 Status of stock of all the major construction material vis -a- vis its requirements for next month.
- 2.8.4 Status of all serviceable major construction plant and equipment at site.

2.9 Procurement Report

- 2.9.1 A summary of all significant procurement activities during the month, including reasons of delay (if any) and action taken to overcome problems.
- 2.9.2 A report listing major items of plant and materials which will be incorporated into the Works. The items shall be segregated by type as listed in the Specifications and the report should show as a minimum the following activities:
- (a) purchase Order Date – Scheduled / Actual,
 - (b) manufacturer / Supplier and Origin,
 - (c) letter of Credit Issued Date,
 - (d) manufacturer / Supplier Ship Date – Scheduled / Actual,
 - (e) method of Shipment,
 - (f) Arrival Date in India – Scheduled / Actual.
 - (g) Arrival date at site and commissioning date

The report should also explain the delays (if any) in arrivals of the major equipment at site and the actions taken by the contractor to expedite the same and the measures proposed to makeup the time loss.

2.10 Production and testing

It should include following:

- (a) A review of all production and manufacturing activities during the month.
- (b) Summaries of all production and manufacturing outputs during the month together with forecasts for the next month.
- (c) Review of all testing activities (both at site and at the manufacturer's premises) during the month.

2.11 Safety

A review of all safety aspects during the month including safety inspections / audits, reports on all accidents and actions proposed to prevent further occurrence.

2.12 Environment

A review of all environmental issues during past month shall include all monitoring reports, mitigation measures undertaken, and activities to control environmental impacts.

- 2.13 In case of failure of the contractor to make submissions as per section 1.4 herein above, the Employer will retain 5% of the due progress payment till the submissions. For non-submission of Monthly Update and Progress Reports as per Clause 2 herein above, the Employer will retain 5% of the due progress payment in each case, which shall be released upon submission of the same. In case the submissions are not made in the month it is due, the retained payment would be released only in the next Monthly Running Bill.

APPENDIX-02
METHOD OF MEASUREMENTS FOR PERMANENT WORKS

1. INTRODUCTION

1.1 The detailed procedure to be followed for the recording of measurements and for the preparation and passing of contractors Bills for permanent works is set out in the following paragraphs.

2. MEASUREMENT OF WORKS

2.1 General

- 2.1.1 Measurements shall be taken at such intervals as are found necessary or convenient. Generally, one bill will be preferred in a month or as specified in the contract.
- 2.1.2 Entries should be made only in ink, and no entry should be erased or defaced so as to make it illegible. Correction of mistake, if any, shall be made by neatly crossing out the incorrect entry and rewriting and correct words or figures. All such corrections should be initialed by the contractor's Employer as well as by the Employer's Representative at site.
- 2.1.3 Format of Record of Measurements sheets and procedure for issue of these measurement sheets will be as decided by Employer.
- 2.1.4 Before starting the earth work for embankment, cutting, excavations etc., the initial ground levels shall be taken jointly along with Employer.

2.2 Items for which Good-for-Construction GFC Drawing is issued

- 2.2.1 As soon as the Good-For-Construction GFC drawing for a work is issued, the contractor will calculate the details of quantities of various items of PRICE SCHEDULE involved, in a format approved by Employer, and submit the calculations and schedule of quantities to the Employer's Representative and get them approved for the drawing.
- 2.2.2 Once the schedule of quantities is thus approved, the contractor will submit five copies of the approved schedule to Employer's Representative in an approved format.
- 2.2.3 The contractor will submit his payment claims based on the approved schedule of quantities along with certification of actual work done as per specifications, drawings and contract conditions and within the tolerances as specified. Measurement will be entered in Record of Measurement Sheet duly signed jointly on each page by contractor's authorized qualified Engineer and Employer's Representative.
- 2.2.4 Abstract of measurement will be prepared by the contractor in the approved form based upon these measurements.

2.3 Items for which Good-For-Construction GFC Drawing is not issued

- 2.3.1 For all such works, whose measurement cannot be calculated from any Good-For-Construction (GFC) drawing, all measurements will be taken by the contractor's authorized qualified Employer in the presence of the Employer's Representative at site. These measurements will be recorded on approved form of Record Measurement Sheet and signed jointly by contractor and Employer's Representative.
- 2.3.2 Contractor will ensure that a properly qualified Engineer is deputed for taking measurements and also that all the measurements taken are witnessed and signed by the Employer's Representative.
- 2.3.3 All measurements should be recorded at site on the Record of Measurement Sheet in the presence of the Employer's Representative.

- 2.3.4 Each Measurement Sheet should be signed by the contractor's Employer as well as by the witnessing Employer's Representative.
- 2.3.5 Based on the recorded measurement, the contractor shall prepare abstract of quantities in the approved format.

APPENDIX-03

QUALITY ASSURANCE

1. General

The contractor shall implement a Project Quality Management Plan specific to this work must be submitted within one month of award of contract.

APPENDIX-04

ORGANISATION CHART AND KEY POSITIONS

The contractor shall provide the following Manpower:

Sl. No	DESIGNATION	QUALIFICATION	EXPERIENCE LEVEL (FOR SIMILAR WORKS)	MIN. NO. REQUIRED
1	Site Engineer	Bachelor's Degree / Diploma in Civil Engineering	Minimum 3 years total experience	3
2	Data Entry Operator	Any Degree with experience in computers	Minimum 1 year of experience in typing with the desired typing speed, computers, MS Office etc.	2
3	Site Attendant/Assistant	Physically Fit to assist in site work/measurements	-	2

NOTES:

- The above are the minimum required for successful completion of the work, which shall be deployed as per requirement and as directed by the Employer and the decision of Employer in this regard shall be final and binding.
- The contractor shall submit the CVs of the above key positions to ED/Civil/KRIDE for approval within 15 days of issue of letter of Acceptance (LOA).
- The contractor shall deploy resources as per the above-mentioned minimum requirement and also confirm to deploy manpower over and above the minimum numbers indicated above, if the work requires so.
- The performance of project personnel deployed will be evaluated periodically by the Employer during the contract period. In case the performance of any of the project personnel is not satisfactory, the contractor shall replace them with better or equivalent personnel immediately as per the directions of the Employer.
- Non-deployment of the personnel or absence from duty may lead to imposition of Penalty as decided by the Employer.
- The proposed personnel shall not be changed till the completion of the work, unless proposed by the Employer. Under emergent circumstances, in case they are required to be changed, the new incumbent

should have similar or better experience and qualification than as required above. These changes are permitted only with the approval of the Employer. Change in key personnel for one time without penalty is permitted. However, for subsequent changes there will be Penalty at the discretion of the Employer, unless the change is desired by the Employer.

APPENDIX-05

PLANT AND EQUIPMENT

1. All the plant and equipment required for execution of the work shall be provided by the contractor. The Contractor shall submit the details of plant & equipment to be deployed within 28 days of issue of LOA to the Employer for approval.
2. Depending on the requirement to complete the work in the stipulated completion period, the tenderer should deploy additional machinery as circumstances warrant at no extra cost.
3. Plant and equipment to be mobilized for the work shall be in good serviceable condition.
4. The contractor will be penalized as deemed fit by the Employer, in case of any shortage.

APPENDIX-06

OFFICE ACCOMMODATION, EQUIPMENT AND PERSONNEL

1.0 Accommodations for the Employer (earmarked separately) with sufficient natural light & ventilation with the layouts, designs, materials, appliances, personnel etc. approved by ED (Civil)/K-RIDE

1.1 The contractor shall provide the office within the time limit specified:

1.1.1 Project office accommodation of at least 150 sqm (with at least 30% of specific area decided by the Employer, air-conditioned) with two air-conditioned cabins for senior officials of Employer (as decided by the Employer) and one conference hall, as per the approved drawings. Distribution and periodical redistribution of the above area in office will be done by the Employer as per the need.

1.2 In addition to the above area, covered parking facility shall be provided exclusively for the cars of Employer for at least 3 Cars at Project Office. There shall be a portico or a basement (basically, a covered area from the location of getting off the car to the entrance of the office), so that officials do not get drenched during heavy rain, while entering the offices.

1.3 Additional area, if required, shall be provided as directed by the Employer. Small or eensy-weensy, cramped, grungy, shabby, dribbling, shoddy sheds/cabins with temporary/inferior materials/furnishings will not be allowed as project office, even temporarily.

1.4 The following specifications shall be followed for various items of the Project office earmarked for Employer. All the requirements mentioned above and below are minimum requirements and shall be complied with. These are not exhaustive and any associated specification for any other relevant item can be specified by the Employer. Superior specifications / materials than those specified can be used with the approval of ED (Civil) / K-RIDE.

i. False Ceiling:

- a. GI-powder coated (T & L) grid system and high-density fiber reinforced Cement board of approved brand, texture, colour & quality of size (1200 x 1200) mm, 6mm thick are having density of 1250 Kg / m³ conforming to ASTM-E84, ISI 14862-2004, respectively

ii. Doors:

- a. Doors of approved material shall be provided for the cabins of various senior officials of Employer & Employer and for the conference hall.

iii. Windows:

- a. UPVC/Aluminum windows 3 track Sliding windows with M.S grill; frames with metal mosquito nets (gap-less) in one track

iv. Tiles:

- a. Vitrified tiles (Scratch Proof) / Wooden flooring of approved brand & quality for office cabins & common rooms; Antiskid tiles of approved brand & quality for the floors of bath rooms

v. Toilets, Plumbing & Sanitaryware:

CPVC pipes for internal work and PVC pipes for outer walls (2.5" PVC pipes)

All Fittings shall be of ISI standard. Ceramic Fittings of approved brand & quality shall be provided for all sanitaryware of washrooms & washbasins. All plumbing fittings, doors, handles etc., shall be of approved brand & quality.

Attached washrooms with one wash basin with pedestal (or wall mounted) and a platform and one wall mounted EWC shall be provided for the cabins and for conference hall in Project Office. The Employer may redistribute the above as per the requirement. In addition, at least one common toilet shall be provided near the common area in each Project Office. In addition, one separate toilet (outside the building) with one washbasin and at least one IWC shall be provided in Project Office for assistants, office boys/site attendants, drivers, mechanics, cleaning staff etc. By all means, uninterrupted clean water supply shall be ensured in all these toilets for all the 24 hours till the end of DLP. Handwash of approved quality shall be available on all wash basins and it shall be recouped as and when required. Hand towels of approved quality and colour shall be available on a towel rod / hanger near all wash basins and the same shall be got washed once in every 2-3 days, depending on the need. They shall be replaced as and when necessary.

Project office and their premises and all the toilets (attached, common and outside) shall be maintained in a clean and hygienic condition by deploying dedicated staff for this purpose. The cleaning of all the toilets shall be done frequently. The exact frequency of cleaning of each toilet will be specified by the Employer based on the need in each Project office and the same shall be meticulously followed.

All the toilets shall be provided with mosquito nets and efficient & noise-less exhaust fans. The nets shall be periodically checked for any gaps, holes etc., through which mosquitoes can enter and the nets shall be always maintained hole-free and gap-free. The exhaust fans shall be always maintained in proper working condition.

The dimensions of toilets and disposition of openings and fittings shall be at least in accordance with the anthropometric data as per the relevant IS code(s).

vi. Electrical Wiring:

- a. Concealed wiring with fire proof cables of IS standard, as directed, with approved materials

vii. Electrical Fittings & Appliances:

- b. Switches, fans, Split type air conditioners of required tonnage (to suit the cabin concerned or the conference hall) and fluorescent ceiling lamps (LED / CFL) of sufficient lumen of approved brand, lumen & quality.
- c. The outer units of split type air conditioners shall be sufficiently away from the cabins or conference halls, as approved by the Employer, so that the noise is not audible to the officials

viii. Painting:

Inside: primer one coat +2 coats of emulsion paint of approved brand and colour.

Outside: 1coat primer+2 coats of weather proof paint of approved brand and colour.

ix. Others:

- a. Overhead water tanks with sufficient Head of water to ensure the required velocity for water supply; Septic tanks/ authorised connection to public sewerage system

1.6 The contractor shall provide at least the following furniture / facilities in project office for the use of Employer:

- a. Manager's Premium tables of approved brand, colour, texture, height & quality: size at least 5'x3' L-table with side cadenza complete with laminate finish - 2 nos. in each project office
- b. Executive Tables of approved brand, colour, texture, height & quality: size at least 4'x3' table with side cadenza complete with laminate finish - 3 nos. at each project office
- c. Conference Table (20' x 6' approx.) of approved brand, colour, texture, height & quality with conference chairs: for 20 - person seating - 01 no.
- d. High back High quality revolving Executive chairs of approved brand, colour, texture & quality with tiltable neck rest and adjustable hand rests (adjustable in 3 dimensions) and with fabric finish - at least 5 nos. in project office (one for each cabin and one for each conference hall)
- e. Medium back revolving chairs with hand rests of approved brand, colour & texture and quality with FRP finish- at least 5 nos. in project office
- f. Low back revolving chairs of approved brand and quality with FRP finish - 5 nos.
- g. White magnetic boards and pin boards in each room / work stations, white board with stand & 4 white board markers of approved colours (to be recouped as and when needed)
- h. Racks & shelves as per the requirement in all chambers and common area, as approved.
- i. Supplying, erection, testing and commissioning of Off-Line UPS system suitable for operation with all accessories on sufficient power back up (with minimum backup time of 2 hours) including 12 V DC, AH Batteries in polypropylene container for UPS low maintenance tubular batteries, to meet the power load in case of power disruption. The system should be able to feed the power to all the desktop computers, printers etc. for at least 4 hours continuously.
- j. Split type air-conditioners of approved make and quality - 1.0 Tonne capacity – at least 02 nos., 1.5 Tonne or required capacity for each Conference hall in project office.

In addition, the contractor shall provide the following for each Project/Site Office:

- a. High-speed Broad band Connection - 2 Land line connections + 10-line intercom with instruments & Broad Band Connection.
- b. Digital color Photocopy Machine cum printer 01 no. of approved brand & quality
- c. Refrigerator (290 Litre capacity) - 01 no. of approved brand & quality
- d. Drinking Water Dispenser (Hot, Cold & Normal) - 01 no. of approved brand & quality
- e. Tea / Coffee Dispenser - 01 no. of approved brand & quality
- f. Standby DG Power - As required, to run and maintain the office for at least 3 hours.
- g. Safety Helmets, Boots, and any other safety device to all the manpower - as per Requirement to be specified by the Employer

NOTES: Though the above requirement of furniture and others is mentioned for office, ED (Civil) / K-RIDE may redistribute the total requirement as per the need of each quarter or earlier. The sizes of a few tables, side racks etc. may be more or a little different from the sizes mentioned above, to suit the layout. The decision of the Employer is final in this regard.

In addition to the above, the following furniture, appliances, equipment, and tools are required combinedly for all the project offices (This is additional requirement for all the offices. Distribution and periodical redistribution of these to various Project offices will be done by the Employer, as per the need). ED (Civil)/K RIDE may alter the specifications depending on market availability, requirement and other site considerations etc.

- i. Side units with table - 2 sets
- ii. Lockers cabinet (8 lockers unit) – 1 no.

- iii. Steel Cupboard - 1 no.
- iv. Digital Camera – 01 No.
- v. Crockery including cups and saucers – 1 set.

1.6 The contractor is required to maintain the offices till the end of DLP and to provide the following (but not limited to):

- i. Timely pay all electricity/phone/water/high-speed Broad band charges (A nominated staff member of the contractor shall take care of timely payment without being reminded.)
- ii. Timely provide all stationery items and consumables for office use and keep a reserve, as approved (A nominated staff member of the contractor shall take care of them and ensure reserve supplies.)
- iii. Carry out all necessary repairs to office, equipment, appliances, toilet fittings immediately, as and when required, without any delay (A nominated staff member of the contractor shall daily inspect all of them and identify any problem and undertake repairs, even without being told.)
- iv. Provide mineral water bottles as per the daily consumption of the staff (A nominated staff member of the contractor shall take care of them and ensure reserve supplies.)
- v. Provide tea, coffee, snacks, sanitizers, tissue papers etc., as per the requirement and advice, during meetings/discussions and during late evening/early morning/night working etc. (A nominated staff member of the contractor shall take care of them, without any delay.)
- vi. Arrange proper and safe conveyance (through four wheelers engaged for this purpose) to female staff working for Employer, whenever the work gets delayed and whenever the situation warrants (as decided by the Employer) - (A nominated staff member of the contractor shall take care of them.)

1.7 Fire extinguishers shall be provided as per the recommendations of the Bengaluru City Fire Brigade.

1.8 To facilitate coordination for site activities, testing, inspections, facilitating visits of higher officials, liaison with other concerned agencies etc., the contractor shall provide vehicles (two vehicles till the end of the contract period and one vehicle till the end of DLP) of approved make, model, quality and roadworthiness (one Etios or similar and one Innova Crysta or similar), not more than three years old and a total run of less than fifty thousand km for each vehicle, along with professional drivers for the dedicated use of the Employer during the entire period of contract during all the days of the month to run a monthly average of three thousand km and a daily average of twelve hours (plus four additional hours per day as per the requirement on specific days for about 8 days in a month).

1.9 The contractor shall provide, erect, and maintain appropriate name boards, as specified, with approved materials, for each of the offices and cabins. The material of each name board, font size, font type, spellings etc. on each name board and their locations shall be as approved by the Employer before they are erected.

1.10 The contractor shall supply the personnel mentioned in Annexure-04, till the end of DLP. The candidature of all the above personnel shall be as personally approved by the ED (Civil) /K-RIDE. Any inefficient / problematic personnel shall be replaced forthwith. The qualifications, expertise, allotment of work, working time, shifts, overlap time, grouping, seating arrangement and any other related matter will be as decided by the Employer. The decision of the ED (Civil) /K-RIDE is final in all these regards. Proper approved safety equipment shall be provided to the site attendants.

2 Equipment for the use of Employer:

The contractor shall provide the following new equipment and software at Project as listed and maintain them for the exclusive use of the Employer till the end of DLP (The distribution will be done by the Employer):

- (a) Lap Top Computers with carry cases – 5 nos. of approved brand & quality (Intel core i7 or its latest generic descendent or higher, running at the specified and approved clock rate (Hyper technology) with no wait state) – with at least 15.6" display, as approved by the Employer.

The laptop computers shall at least have the following specifications:

1. Processor: Intel core i7 or higher, 5.0 GHz (hyper technology) with in-built LAN, Modem, AGP card, Audio Card, and Wi-Fi Internet Card.
 - i. Cache Memory: 512 KB L2 cache
 - ii. Memory: 8GB DDR RAM Expandable up to 16GB
 - iii. Hard Disk: 1 TB or at least 500 GB - preferably SSD
2. At least 1920 X 1080 resolution, S3 VIRGE MX 3D Graphics Controller Chip, 64 Bit Graphics Accelerator, Bit BLT hardware
3. Pointing Device: 102 multimedia Keyboard Acupoint Point Device
4. Ports: 1 Parallel, 1 Serial, at least 2 USB Ports, PS / 2 Mouse / Keyboard, SVGA Video Port, Line in Jack, Headphone & External Microphone Jack, 1 Serial Infrared Port, USB port with Wi-Fi LAN.
5. Card Bus: 2 x PCMC1A Slots (Type II) or 1 x PCMC1A Slot (Type III) Card Bus ready.
6. Battery / Power: AC Adaptor / Li-Lon rechargeable battery with built in battery charger & Software Power Management.
7. OS / Software: Pre-installed Windows 11 professional or Mac OS as approved, latest version of MS office, Windows Utilities, Mediamatics Arcade Pak, Diagnostic Utilities, Ring Central, MS Internet Explorer, Norton Anti-Virus, Speech activated typing software, latest version of MS Project / Primavera (as approved).
8. Communication: 56 Kbps Integrated Fix / data Modem with V.90 support; Speakers
9. Carrying Case: Laptop carrying cases (for all the Lap top computers) of approved brand and quality.

NOTE: Recoupment of batteries of cordless keyboards and mice, as per the requirement, are included in the scope.

- (b) Printers – 03 nos. (A4 size – 02 nos. and A3 size – 01 nos.)

At least one printer of A3 & two printers of A4 size shall be Colour; Two printers of A4 size shall be Laser Colour; Timely replacement of Toners/Cartridges with original ones, as per the consumption pattern

- (e) Application Software:

- (i) Microsoft Office, latest release
- (ii) A database management package as approved by the Employer
- (iii) Latest licensed version of AUTOCAD Civil 3-D, for 01 users.

Project Management Package (Microsoft Project) / Primavera V. P6-2 licenses (1 Core Module and 1 Web based Module), as approved

Multimedia, as approved

- (f) UPS system with sufficient power backup (with minimum backup time of 2 hrs.) to meet the power load in case of power disruption.
- (h) Surge Protection Devices (one for each computer and printer as given above) Power supply for the systems is to be AC 240 volts, 50 Hz from normal building wiring circuit mains, Power regulator, stabilizer or transformer should be supplied by the contractor for the computer systems such that the systems can function efficiently.
- (i) Four mice with cord (not cordless) for standby purpose.

NOTE: Though the above requirement of computers and others is mentioned for each project office, ED (Civil) /K-RIDE may redistribute the total requirement as per the need and this forms a part of the scope of the work.

NOTES:

23.1. The items above can be retained by contractor (except 2.0 (e)-Application Software) after the completion of the project/DLP, as specified.

23.2. The tenderer is supposed to take all the above requirements and the above retention clause into account while quoting the price. The above requirements are for effective execution and close monitoring of the progress and quality of work and the all the conditions and provisions will be enforced in letter and spirit.

3 Documentation

3.1 A complete set of documentation will be supplied with each System. The documentation should be self-tutorial in nature and be readily understood by non-computer personnel.

The following manuals shall be supplied with the system:

- a. Manual on how to operate the equipment; and
- b. Manual on how to use the facilities and software provided by the supplier. (Including languages and utilities)

4 Auto CAD Operator:

The contractor shall provide one sufficiently experienced Auto CAD operator with a separate desk top computer, 22" monitor, computer table, computer chair, keyboard, mouse and all other relevant items and software including licensed version of latest Auto CAD software exclusively for the Employer till the end of DLP. This is in addition to the requirement of Manpower specified in Appendix-04. The candidature of the above personnel shall be as approved by the Employer.

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SECTION - 8A

EMPLOYER'S REQUIREMENT

GENERAL INFORMATION

AND

SCOPE OF WORK

PART-2

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K-RIDE

SECTION 8A - PART-2

WORKS/EMPLOYER'S REQUIREMENTS

NAME OF WORK:

Construction of Boundary wall, Watch tower and other miscellaneous and associated works in Airforce Station at Jalahalli in connection with BSRP

EMPLOYERS REQUIREMENT - SCOPE OF WORK

1. INTRODUCTION

These Employer's Requirements are divided into four sections as follows:

- (a) General: these apply throughout the Contract.
- (b) Functional: these include the specific core requirements for the design and performance of the Works.
- (c) Design: these apply in respect of requirements relating to the design of the Permanent Works.
- (d) Construction: these apply in respect of other requirements relating to the construction of the Works.

2. DEFINITIONS AND INTERPRETATIONS

In addition to the words and expressions defined in the General Conditions of Contract (GCC), further following words and expressions shall have the meaning assigned to them except where the context otherwise requires:

"As-Built Drawings": means those drawings produced by the Contractor and endorsed by him as true records of construction of the Permanent Works and which have been agreed with the Engineer.

"Combined Services Drawings" (CSD): means drawings showing the locations, layouts and sizes of all services including those of other contractors coordinated so as to eliminate all clashes.

"Construction Phase": has the meaning identified in Clause 4 of the Employer's Requirements - General.

"Good for Construction Drawings (GFC)": means those drawings referred to in Clause 2(8) of the Employer's Requirements - Design in respect of which a Notice has been issued.

"Construction Specification": means those parts of the Standard Outline Specification which relate to construction.

"Definitive Design Submission": means the submission of documents which comprise the whole or parts of the proposed Definitive Design and for which the Contractor seeks a Notice.

"Design Manual": means the manual to be prepared and submitted by The Contractor as part of the Definitive Design and as described in the Employer's Requirements Design.

"Design Package": has the meaning identified in Clause 2(5) of the Employer's Requirements - Design.

"Design Phase": has the meaning identified in Clause 4 of the Employer's Requirements - General.

"Design Criteria": means those parts of the Standard Outline Specification which relate to design.

"Final Design": has the meaning identified in Clause 3(5) of Employer's Requirements - Design.

"Notice": means a Notice of No Objection.

"Particular Specification": means the combined specifications prepared by the Contractor in CSI format which combines the Employers Design Criteria, the Employer's Outline Construction Specifications and those parts of the Contractor's Technical Proposals which specify standards for design and construction which are developed during the Design Phase.

"Preliminary Design": means the submission of documents which comprise the initial stage of the design phase.

"Services, Electrical, Mechanical Drawings"(SEM): means those drawings produced by the contractor executing

the service works showing the locations, sizes and details for openings in structural elements for mechanical and electrical facilities and other related contracts.

"Standard Outline Specification": means the Design Criteria and the Outline Construction Specifications that specify standards issued by the Employer for development by the Contractor for design and construction.

"Specification": has the meaning identified in Clause 5 of the Employer's Requirements -General. "Structure Gauge": means the profile related to the designed normal coordinated axis of the track into which no part of any structures or fixed equipment may penetrate.

"Working Drawings": comprise the GFC Drawings and such other drawings and documents, such as bar bending schedules and manufacturing drawings, as are necessary to amplify the GFC Drawings for construction purposes and endorsed as required by the Engineer.

3. RELEVANT DOCUMENTS

The Design Criteria shall be read in conjunction with the General Conditions of Contract (GCC), the Special Conditions of Contract (SCC), the Employer's Requirements, the Drawings and any other document forming part of the Contract.

In the event of a conflict between the Employer's Requirements and any Design Criteria, the Design criteria shall prevail.

In the event of a conflict between any Design Criteria and any other standards or specifications quoted, the requirement of the Design Criteria shall prevail.

Notwithstanding the precedence specified above the Contractor shall always immediately seek advice from the Engineer in the event of conflicts in Specifications among various standards.

The order of precedence is:

- i. Design Criteria
- ii. Employer's Requirements
- iii. Indian and other Standards referenced herein.

4. PHASES (DESIGN AND CONSTRUCTION)

(1) The Contractor shall execute the Works in two phases, the Design Phase and the ConstructionPhase.

(2) The Design Phase shall commence upon the date of issue of Letter of Acceptance. This phase shall include the preparation and submission of:

- (a) The Preliminary Design
- (b) The Definitive Design; and
- (c) The GFC Drawings.

The Design Phase will be complete upon the issue of a Notice in respect of the comprehensive and complete GFC Drawings Submission for the whole of the Permanent Works.

(3) The requirements for the Preliminary Design, Definitive Design and GFC Drawings are stated in Employer's Requirements-Design.

(4) The Construction Phase for the whole or a part of the Permanent Works shall commence immediately upon the issue of a Notice by the Employer in respect of the relevant GFC Drawings Submission. Such Notice may be issued by the Employer in respect of a GFC Drawing Submission covering a major and distinctive part of the Permanent Works. However, construction shall not be commenced until the original negatives of the appropriate Working Drawings have been endorsed:

- (a) by the Contractor as "Good for Construction"; and
- (b) by the Employer that he has no objections to the drawing with the approval of Authority.

The Construction Phase shall include the completion and submission of the Final Design and the preparation and submission of the As Built Drawings and other records as specified.

- (5) Notwithstanding Clause 4(4) above, for those elements identified under Clause 2(6) of the Employer's Requirements - Design, the Construction Phase may commence immediately upon the issue of the Notice in respect of the Definitive Design Submission in respect of each such element subject to availability of the site in accordance with agreed programme.

5. SPECIFICATIONS

In accordance with the provisions of these Employer's Requirements, the Contract Specification contained in the Contract shall be developed during the design stage and submitted as part of the Definitive Design Submission. When the Specification has received a Notice of No Objection from the Engineer it shall become the Particular Specifications and shall take precedence over the other Specifications for construction purposes.

6. SPECIFICATIONS IN METRIC AND IMPERIAL UNITS

- (1) The Contract shall utilize the SI system of units. Codes and Standards in imperial units shall not be used unless the Engineer has given his consent.
(2) Conversion between metric units and imperial units shall be in accordance with the relevant Indian Standards.

7. WORKS PROGRAMME

- (1) The Key Dates are defined in Annexure-I to these Employer's Requirements Part-1.
(2) The Contractor shall prepare and submit Works Programme

8. MONITORING OF PROGRESS

- (1) The contractor shall submit to the site Engineer three copies of a Monthly-Progress Report (MPR). The MPR shall address the matters set out in the Works Programme.
(2) The MPR shall be submitted by the end of each calendar month. It shall account for all works actually performed from twenty sixth day of the last month and up to twenty fifth day of the current month.
(3) The MPR shall be divided into two sections. The first section shall cover progress and current status relating to design and the second section shall cover progress and current status relating to construction.
(4) A monthly meeting to monitor & review the progress of the project shall be convened by the Engineer and chaired by the Employer's nominated official(s). Contractor's site Representative & Designer Representative of Contractor and site agent of all interfacing contractors shall also attend the meeting. The Employer's representative may also be present in the meeting.
(5) The Employer may conduct progress review meetings on alternate day/periodical/weekly /bi-weekly/monthly intervals depending upon the requirements or urgency of works. In these review meetings Contractor's Supplier/Sub-Contractor/Designer etc. also may be called as per the requirements.

9. QUALITY ASSURANCE

The Contractor shall establish and maintain a Quality Assurance System in accordance with Appendix-3 to these Employer's Requirements Part-1 for design and construction procedures and the interfaces between them. This Quality Assurance system shall be applied without prejudice to, or without in any way limiting, any Quality Assurance Systems that the Contractor already maintains.

10. DESIGN & CONSTRUCTION INTERFACE

- (1) The Contractor shall immediately upon award of the Contract gather all necessary information and develop his design to a level where meaningful interaction can take place as soon as the Interfacing Contracts are available. The Contractor shall submit together with each of his Design Submissions a joint statement from the Contractor and the relevant Interfacing Contractor confirming that design co-ordination has been completed and that they have jointly reviewed the appropriate document to ensure that a consistent design is being presented.

11. CONSTRUCTION INTERFACE

- (1) Construction interface will be necessary throughout the duration of the Works commencing from the time the Contractor mobilizes to the Site to the completion of the Works.

12. CONTRACTOR'S PROJECT ORGANISATION

- (1) The Contractor shall have a competent team of Managers, Engineers, Technical staff etc. so as to complete the work satisfactory as per various requirements of the contract.
- (2) A competent Engineer with round the clock telephone communication shall be available. Resident Engineer's office, testing labs etc. shall be maintained and manned round the clock. Residences of all senior project team members shall also be linked with the control room. Vehicles for emergency use should be on stand-by at the site around the clock.
- (3) The designations of the various project organizations team members shall be got approved by the Engineer before adoption so as to avoid any duplication of the designations with those of the Employer or the Engineer.

13. TECHNOLOGY TRANSFER

- (1) The Contractor shall ensure that all local contractors and sub-contractors engaged in the works are given training, guidance and the necessary opportunity for transfer of technology in various areas of construction such as safety, quality assurance etc.

14. MAINTENANCE REPORT

- (1) The Maintenance Report shall be submitted as part of the work and shall include full details of the long-term inspection and maintenance.

SECTION B

EMPLOYER'S REQUIREMENTS – FUNCTIONAL

OBJECTIVE

The objective of the contract is, construction, completion, testing and commissioning of the permanent works by the Contractor (including without limitation, construction and removal of the Temporary Works) and the rectification of defects appearing in Permanent Works in the manner and to the standards and within the time stipulated by the Contract. In full recognition of this objective, and with full acceptance of the obligations, liabilities and risks which may be involved, the Contractor shall undertake the execution of the Work.

1. GENERAL

1. The design and performance of the Works shall comply with the specific core requirements contained in these Employer's Requirements-Functional.
2. The Contractor will be responsible for obtaining all necessary approvals from the relevant Public/Government/Local/Statutory authorities or any agencies involved in the construction of the works.

2. TRAFFIC MANAGEMENT

The Contractor shall make the detailed traffic diversion plans in consultation with Bangalore Traffic Police, wherever required. Necessary assistance will be given by K-RIDE.

3. STRUCTURES

The construction of structures will have to be planned in such a manner that they do not obstruct or interfere with the existing roads/structures and other utilities. Where work is required to be carried out at locations adjacent to such roads, utilities, structures, monuments etc. suitable safety and protection arrangements will have to be ensured for which nothing extra will be payable. It should be ensured that no damage is caused to any such elements and employer shall be indemnified against such damage at no extra cost.

Any other item of work as may be required to be carried out for completing the construction structure of specified length including all necessary interfaces works. Contractors in all respects in accordance with the provisions of the Contract and/or to ensure the structural stability and safety during and after construction are included in the scope

DESIGN CRITERIA

Design shall be carried out as per latest IS codes. Indicative parameters for designing are given below:

3.1 REFERENCE TO THE STANDARD CODES OF PRACTICE

All Standards, Technical Specifications and Codes of practice referred to shall be latest editions including all applicable official amendments and revisions. The Contractor shall make available at site all relevant Indian Standard Codes of practice as applicable.

3.2 DIMENSIONS

- 3.2.1 As regards errors, omissions and discrepancies in Specifications and Drawings, relevant clause of Particular Conditions of Contract will apply.
- 3.2.2 The levels, measurements and other information concerning the existing site as shown on the conceptual / layout drawings are believed to be correct, but the Contractor should verify them for himself and also examine the nature of the ground as no claim or allowance whatsoever will be entertained on account of any errors or omissions in the levels or strata turning out different from what is shown on the drawings.

3.3 ASSOCIATED WORKS

Works to be performed shall also include all general works preparatory to the construction and works of any kind necessary for the due and satisfactory construction, completion and maintenance of the works to the intent and meaning of the drawings adopted and technical specifications, to best Engineering standards and orders that may be issued by the Employer from time to time, compliance by the agency with all Conditions of Contract, supply of all materials, apparatus, plants, equipment, tools, fuel, water, strutting, timbering, transport, offices, stores, workshop, staff, labour and the provision of proper and sufficient protective works, diversion, temporary fencing, lighting and watching required for the safety of the public and protection of works on adjoining land; first -aid equipment, sanitary accommodation for the staff and workmen, effecting and maintenance of all insurances, the payment of all wages, salaries, fees, royalties, duties or the other charges arising out of the erection of works and the regular clearance of rubbish, clearing up, leaving the site perfect and tidy on completion.

3.4 LAND FOR CASTING

No land for casting any precast elements/laboratories etc. will be provided by the employer. However, the employer will give the necessary assistance required for seeking permissions but without any responsibility for the same. Contractor should make his arrangements at his own cost which is deemed to be included in the quoted rates.

Satisfactory tyre-washing arrangements of each and every vehicle shall be made by the contractor for the vehicles leaving the depot to avoid the spillage on the connecting roads.

3.5 TIME SCHEDULE & MONITORING OF PROGRESS

- (i) The agency shall submit with the tender "Time Schedule" for completion of various portions of works. This schedule is to be within the overall completion period of months. The detailed programme in the form of a quantified bar chart or CPM network shall include all activities starting design to completion.
- (ii) In compiling its Works Programme and in all subsequent updating and reporting, the contractor shall make provision for the time required for co-coordinating- and completing the design, testing, commissioning and integrated testing of the Works, including, inter alia, design co- ordination periods during which the Contractor shall co-ordinate its design with those of Designated Contractors, the

review procedures, determining and complying with the requirements of all Government Departments and all others whose consent, permissions, authority or license is required prior to the execution of any work.

- (iii) The Contractor shall submit to the Employer Four copies of a Monthly Progress Report (MPR), describing the progress and current status of the Works. The MPR shall address the matters set out in the Works Programme.
- (iv) The MPR shall be submitted by the end of each calendar month. It shall account for all works actually performed from twenty sixth day of the last month and up to twenty fifth day of the current month.
- (v) A monthly / biweekly meeting to monitor the progress of the project shall be convened by the Employer, Contractor's site agent and site agent of all interfacing contractors shall attend the meeting.

3.6 UTILITIES

Utility identification at foundation locations will be done by the contractor and in case utility (ies) is encountered or obligatory requirement is to be met out; the contractor shall modify the span configuration at such location to save the utility (ies) or to meet obligatory requirements within the accepted price. No payment shall however be made for supporting the utilities during course of work. Any other utilities shifted by the contractor as directed by Employer, will be paid separately under Schedule-L/SOR items.

The utilities are to be diverted with proper liaison and approval of the utility owning agencies. The utilities which are not be diverted but require supporting, proper supporting is be done so that they are not damaged along their branches. Precautions to be taken while handling the utilities are mentioned as under;

- (i) Utilities must not be damaged at any cost. If due to some reason or the other, mishap occurs, it should be rectified immediately by the Contractor at his own cost under intimation of K-RIDE.
- (ii) Till rectification of the damaged trunk sewers, the Contractor shall arrange substitute arrangement for sewage pumping and its disposal as per directions of Employer. Similar arrangement is to be done for other utilities.
- (iii) The manholes of Trunk/Sewers should not be covered under the foundation as these may create hindrances to the annual de-silting/cleaning of sewer lines.
- (iv) Sufficient distance of foundation from outer edge of Trunk / Sewers is kept in view of further maintenance/Safety of Trunk/Sewers.
- (v) The covers of manholes be saved from heavy machinery movement to avoid any accident/Slippage of malaba in manholes etc. into the Trunk /Sewers which may cause blockage of lines. In case of damage of manhole cover & frame the same shall be replaced immediately by the Contractor at his own cost.
- (vi) Manholes of the trunk sewer should be kept freely accessible for cleaning and removal of blockages and malaba should not be dumped over these manholes.
- (vii) Branch sewer connections which are connected with the trunk sewers should also be taken care of. If the same are damaged, the same should be restored immediately on priority.
- (viii) NOC & Approval of schemes of Diversion of Utilities from the concerned regulatory / statutory / Local Authority will be got done by contractor. However, necessary assistance will be provided by K-RIDE.

These are only indicative for one of the utilities only. Similarly, necessary precautions which are specified from time to time by the utility owning agencies shall also be followed. The Central verge/footpath furnishings which are to be dismantled be handed over to the concerned department in their stores at contractor's own cost

3.7 INSPECTION

K-RIDE may appoint an independent agency to ensure the quality checking of design, supply, fabrication, erection and construction of all the work under 'scope of work'. The contractor shall ensure complete co-operation with the agencies to perform their work satisfactorily. In addition, K-RIDE also reserves the right to undertake quality check and inspection directly by itself.

4 DESIGN LIFE

The design life of all Permanent Works shall be 100 Years

5 DURABILITY AND MAINTENANCE

- (1) The Permanent Works shall be designed and constructed such that, if maintained reasonably and in accordance with the Contractor's statement of maintainability contained in the Contract, they shall endure in a serviceable condition throughout their minimum lives
- (2) The permanent Works shall be designed and constructed so as to minimize the cost of tenancy whilst not compromising the performance characteristics and ride quality of the railway.
- (3) Restoration of roads, utilities and other services dislocated during construction is the responsibility of the contractor.
- (4) Survey, instrumentation, ground treatment, ground and building monitoring, risk analysis, settlement prediction, preventive and corrective actions is the responsibility of the contractor.
- (5) Traffic management along the worksite including works connected with traffic management is the responsibility of the contractor.
- (6) Reinstatement of services (such as street lighting, signaling system, bus stand, footpath including kerb stone, boundary wall, horticulture work and any other work to bring the site to original position) within barricading area as per current standards with new materials (except electrical/signal post which may be reused if they are usable).
- (7) The contractor shall be responsible for obtaining relevant certificates or clearance from local civic authorities.
- (8) The contractor shall be responsible for obtaining approval by all relevant civic authorities having jurisdictional authority wherever required.

6 ENVIRONMENTAL CONSIDERATIONS

All provisions and conditions contained in the conditions of contract on safety, health & environment and section-5 & 8c of the tender document shall be strictly complied with. Bidders should note that any stipulations specified by the funding agency in relation to environment, social, health and safety (eshs) shall be complied in all respect. Such stipulations will be uploaded along with as addendum in due course of bid process.

7 URBAN PLANNING FUNCTIONAL REQUIREMENTS

1. Requests for temporary power supplies for the construction of the works must be submitted by the contractor to the concerned authorities. Alternatively separate power supplies may be arranged by the Contractor independent of concerned electricity distribution/ transmission authority subject to compliance with all necessary statutes.
2. In addition, a number of agencies are involved in the reinstatement works, permanent road accesses, temporary road accesses, refuse collection accesses, street lighting, traffic management and fire hydrant positions. The Contractor is responsible for obtaining the approvals for these other works
3. The Contractor is responsible for obtaining the approval of applications from the above authorities for the design and construction of works. The Employer may provide assistance in order to obtain any permission on clearances.

8 TRAFFIC MANAGEMENT

The Contractor shall carry out the Works so as to minimize disruption to road and pedestrian traffic. The Contractor shall prepare his traffic management plan based on his proposed construction methodology in coordination with Employer and in conjunction with Bangalore Traffic Police. He shall comply strictly with the approved plan during construction of his works. The design shall provide for temporary road decking wherever necessary to provide minimum no. of traffic lanes as agreed with Bangalore Traffic Police.

9 MISCELLANEOUS

The Contractor shall note that the Military Engineering Services Department / Indian Airforce Department officials will inspect the Works from time to time for the purpose of determining whether the Project complies in terms of operational and infrastructural safety in accordance with the Laws of India. The contractor shall note that their approval is mandatory. Notwithstanding other provisions of the Contract, the Contractor shall ensure that the Works comply with the requirements in terms of construction to the drawings, and shall assist the representatives of Military Engineering Services Department / Indian Airforce Department in carrying out their inspection duties and also comply with their instructions regarding rectifying any defects and making good any deficiencies.

10 STANDARDS

- (1) Equipment, materials and systems shall be designed, manufactured and tested in accordance with the latest issue of International and/or National codes and standards. The Contractor shall submit hard copies in original to the Employer of all codes and standards used for the work.
- (2) Reference to standards or to materials and equipment of a particular manufacturer shall be regarded as followed by the words "or equivalent". The Contractor may propose alternative standard materials, or equipment that shall be equal to or better than those specified. If the Contractor for any reason proposes alternatives to or deviations from the specified standards or desires to use materials or equipment not covered by the specified standards, the Contractor shall apply for the consent of the Employer. The Contractor shall state the exact nature of the change, the reason for making the change and relevant specifications of the materials and equipment in the English language. The decision of the Employer in the matter of quality will be final. No compensation or extra money shall be paid.

SECTION C

EMPLOYER'S REQUIREMENTS –DESIGN

1. INTRODUCTION

- (1) The Employer's Requirements - Design, specifies the procedural requirements for the preparation of the design of the Permanent Works. These requirements are subdivided into those that are to occur during the Design Phase, those that are to occur during the Construction Phase, and those that are of general application.
- (2) Obligations prior to commencement of Works relating to Design and Construction.

Within 20 (twenty) days of the LOA, the Contractor shall:

- (a) appoint its representative, duly authorized to deal with the Authority in respect of all matters under or arising out of or relating to this Agreement;
- (b) appoint a Design Manager who will head the Contractor's design unit and shall be responsible for surveys, investigations, collection of data, and preparation of preliminary and detailed designs;
- (c) undertake and perform all such acts, deeds and things as may be necessary or required before commencement of Works under and in accordance with this Agreement, Applicable Laws and Applicable Permits; and
- (d) make its own arrangements for quarrying and procurement of materials needed for the Project

under and in accordance with Applicable Laws and Applicable Permits.

(3) DESIGN AND DRAWINGS

Design and Drawings shall be developed in conformity with the Specifications and Standards set forth in Schedules and Employers Requirement and scope of work. In the event, the Contractor requires any relaxation in design standards due to restricted Right of Access in any section, the alternative design criteria for such section shall be provided for review of the Authority's Engineer.

The Contractor shall appoint a proof check consulting agency (the "Proof Consultant") after proposing to the Authority a panel of 3 (three) names of qualified and experienced firms and Authority will select 1 Proof Consultant from panel. The Parties agree that no firm or person having any conflict of interest shall be engaged hereunder.

The Proof Consultant shall:

- a) evolve a systems approach with the Design Manager so as to minimise the time required for final designs and construction drawings; and
- b) proof check the detailed calculations, drawings and designs, which have been approved by the Design Manager.

No review and/or observation of the Authority's Engineer and/or its failure to review and/or convey its observations on any Drawings shall relieve the Contractor of its obligations and liabilities under this Agreement in any manner nor shall the Authority's Engineer or the Authority be liable for the same in any manner; and if errors, omissions, ambiguities, inconsistencies, inadequacies or other Defects are found in the Drawings, they shall, along with the affected Works, be corrected at the Contractor's cost.

The Contractor shall be responsible for delays in submitting the Drawings, caused by reason of delays in surveys and field investigations, and shall not be entitled to seek any relief in respect thereof from the Authority; and

the Contractor warrants that its designers, including any third parties engaged by it, shall have the required experience and capability in accordance with Good Industry Practice and it shall indemnify the Authority against any damage, expense, liability, loss or claim, which the Authority might incur, sustain or be subject to arising from any breach of the Contractor's design responsibility and/or warranty as set out in this Clause.

Any cost or delay in construction arising from review by the Authority's Engineer shall be borne by the Contractor.

2. REQUIREMENTS DURING DESIGN PHASE

- (1) The principal requirements of the Design Phase are the production of the Preliminary Design, the Definitive Design and Good for Construction Drawings (GFC).

(2) Preliminary Design

The Preliminary Design shall incorporate guidelines provided in tender documents and conceptual arrangements submitted. In addition, general construction methods and documentation needed to develop the Definitive Design shall be submitted.

- (3) Definitive Design shall accord with and incorporate the Contractor's Technical Proposals and shall be the design developed to the stage at which all elements of the structures are fully defined and specified and in particular:

- (a) Calculation and analysis are complete;
- (b) All main and all other significant elements are delineated;
- (c) All tests and trials and all selection of materials and equipment are complete;
- (d) Shall take full account of the effect on the Permanent Works of the proposed methods of construction

and of the Temporary Works.

- (4) During the preparation of the Definitive Design, the Contractor shall complete all surveys investigations and testing necessary to complete the design of the Permanent Works.
- (5) The Contractor shall sub-divide the proposed Definitive Design into Design Packages to be submitted in advance of the Definitive Design Submission and to be identified in the Design submission Programme. The Design Packages are to relate to the significant and clearly identifiable parts of the proposed Definitive Design and shall address the design requirements as described herein. The Design Packages shall facilitate the review and understanding of the definitive Design as a whole and shall be produced and submitted in an orderly sequential and progressive manner.
- (6) Separate Definitive Design Submissions may be prepared for those major elements to be procured by sub-contract and which sub-contracts include design. Where such work is to be procured by the Contractor on the basis of outline design, design briefs and performance specifications, such documents may be submitted as Definitive Design Submissions.
- (7) Upon issue of the Notice in respect of the Definitive Design Submission, the Contractor shall complete the design in all respects and produce the GFC Drawings, the purpose of which is to illustrate all the Permanent Works and to be the drawings governing construction.
- (8) GFC Drawings shall fully detail for the construction of the elements covered by the Definitive Design and shall show in full the works to be constructed.

3. REQUIREMENTS DURING CONSTRUCTION PHASE

- (1) The principal requirements relating to design during the Construction Phase are the production of Working Drawings, the preparation of technical submissions as required under the Contract, the compilation of the Final Design and the production of the As-Built Drawings.
- (2) Working Drawings shall be prepared as required under the Contract. They shall be endorsed by the Contractor as being in accordance with the GFC Drawings.
- (3) The Contractor shall endorse the submissions required under the contract that "all effects of the design comprising the submission on the design of adjacent or other parts of the works have been fully taken into account in the design of these parts"
- (4) At least 2 months but not more than 4 months prior to the anticipated date of substantial completion of the Works, the Contractor shall submit the Final Design to the Employer.
- (5) The Final Design is the design of the Permanent Works embodied in:
 - (a) The latest revisions of the documents comprised in the Definitive Design, taking account of comments in the schedules appended to Notices of No Objection
 - (b) The latest revisions of the GFC Drawings;
 - (c) The calculations (see Clause 11 herein); and
 - (d) Such other documents as may be submitted by the Contractor at the request of the Employer to illustrate and describe the Permanent Works and for which a Notice has been issued.
- (6) The Contractor shall maintain all records necessary for the preparation of the As-Built Drawings. Upon completion of the Works or at such time as agreed to or required by the Employer, the Contractor shall prepare drawings which, subject to the Employer's agreement, shall become the As-Built Drawings. All such drawings shall be endorsed by the Contractor as true records of the construction of the Permanent Works and of all temporary works that are to remain on the site. The Contractor shall also show the locations of utilities exposed and retained as directed.

4. DESIGN SUBMISSIONS

4.1 PRELIMINARY DESIGN SUBMISSION

GENERAL

The preliminary design shall provide initial design documents for review and shall be sufficiently detailed to show the design of main elements and documents required for preparation of the definitive design. It shall also include:

- a) The quality assurance plan for design
- b) A review of the outline design criteria
- c) The submission of design manuals
- d) The submission of proposed software
- e) The preliminary equipment layouts and details
- f) The preliminary maintenance analysis
- g) The preliminary off-site testing recommendation
- h) The submission of specifications proposed for the work
- i) The identification of design codes and standards
- j) The CAD procedures
- k) The preliminary construction methodology
- l) The design submission programme (update)
- m) The utility diversion plan
- n) Proposed site surveys and other field surveys
- o) A review of permanent land requirement
- p) The preliminary ground treatment and building protection proposal.
- q) The preliminary reinstatement drawings.

4.2 DEFINITIVE DESIGN SUBMISSION

1. GENERAL

The Definitive Design Submission shall be a coherent and complete set of documents properly consolidated and indexed and shall fully describe the proposed Definitive Design. In particular, and where appropriate, it shall define:

- (a) The dimensions of all major features, structural elements and members;
- (b) All materials;
- (c) Potential forces and movements due to all possible loadings and actions on the structures, and their accommodation;
- (d) All second order effects;
- (e) The layout and typical details of reinforcement in structural concrete members;
- (f) The locations and nature of all relevant joints and connections and details thereof;
- (g) Standard details;
- (h) Location, geometry and setting-out of all main elements and features;
- (i) Electrical and mechanical services and equipment and their interaction with the structures;
- (j) Provisions and proposals for construction interfacing with the Designated Contractors;
- (k) Utilities to be diverted/supported;
- (m) Traffic or other civic service affected.

2. DRAWINGS

The Definitive Design Submission shall include drawings that shall illustrate the proposed Definitive Design and in particular shall include, without limitation:

- (i) General arrangements;

- (ii) Layouts and details of structural elements;
- (iii) Associated fittings;
- (iv) Structural and surface drainage
- (vii) Existing and proposed utilities;
- (viii) Road works and works related to traffic management including decking.

3. CONTRACT SPECIFICATION

The Specification included in the tender documents together with the Outline Design Specification and Outline Construction Specifications shall be amplified so as to specify comprehensively the design and construction of the Permanent Works.

DESIGN MANUAL

The Design Manual shall incorporate all design requirements, standards, codes, loading cases, permissible movements and deflections, limit states, design-stresses and strains, material properties and all other documents or matters which are relevant to and govern the design. The Design Manual shall refer to all materials, codes and standards used, making clear their specific applications. The Design Manual shall be produced so that it can be used by those involved in the preparation or review of the design of the Permanent Works as a comprehensive reference text and efficient working document.

INTERFACE REPORT ON DESIGNATED CONTRACTS

This will include the following:

Details of the design and construction of the Works adjacent to other contracts. Details of provisions for the Designated Contractors, indicating arrangements for accesses, fixings, casting- in, openings, supports, decks, manholes, trenches and the like; updated interface management plan relating to design integration and co-ordination.

TESTING AND COMMISSIONING REPORT

Details of proposals for testing and commissioning procedures for all relevant elements and equipment contained in the Permanent Works.

MAINTENANCE REPORT

A report updating the Statement of Maintainability in the tender documents and Detailing maintenance routines necessary for the achievement of the required life of the various elements of the Works.

SPECIFICATION FOR FORMWORK

1.0 FORMWORK FOR EXPOSED CONCRETE SURFACES

The facing formwork shall be specifically approved by the Employer in writing, shall generally be made with materials not less than the thickness mentioned below for different elements of the structure:

- 1.1 Plain slab soffit, and sides of beams, girders, joists and ribs and side of walls, fins, parapets, pardis (Roofing Material), sun-breakers, etc shall be made with Steel plates not less than 4mm thick of specified sizes stiffened with a suitable structural framework and fabricated true to plane.
- 1.2 Bottoms of beams, girders and ribs, sides of columns shall be made with steel plates not less than 5mm thick of specified sizes stiffened with a suitable structural framework, and fabricated true to plane.
- 1.3 For Precast segments, piers, pier heads, portals etc. suitable steel form work is to be used unless otherwise specified by Engineer.

2.0 FORMWORK FOR SLOPED SURFACES

- 2.1 Forms for sloped surfaces shall be built so that the formwork can be placed board-by-board immediately ahead of concrete placement so as to enable ready access for placement, vibration, inspection and finishing of the concrete, as approved by Engineer In-Charge.
- 2.2 The formwork shall be built in such a way so that the boards can be removed one by one from the bottom up as soon as the concrete has attained sufficient stiffness to prevent sagging. Surfaces of construction joints and finished surfaces with slopes steeper than 2 horizontals: 1 vertical shall be formed as required herein.
- 2.3 All construction joints shall be harmoniously treated, as per the directions of Engineer In-Charge, at no extra cost

3.0 FORMWORK FOR CURVED SURFACES

- 3.1 The contractor shall interpolate intermediate sections as necessary and shall construct the forms so that the curvature will be continuous between sections. Where necessary to meet requirements for curvature, the form lumber shall be built up of laminated splices cut to make tight, smooth form surfaces.
- 3.2 After the forms have been constructed, all surface imperfections shall be corrected and all surface irregularities at matching faces of form material shall be dressed to the specified curvature, as directed by the Engineer In-Charge.

4.0 AESTHETIC FINISHES

Special approved aesthetic finishes like grooves, logos, engravings/projections in inset and out set as per the approved design shall be provided by fixing monolithic rubber forms or any other approved material fixed on the entire surface of the form work. The shore hardness of the rubber shall ensure strength, flexibility and elasticity. The rubber shall be cold cured (preferably polyurethane based) and fixed to the formwork under controlled conditions in shade and air temperature.

The form liners should be shrinkage free, solvent free and should be impervious to abrasion by Concrete, resistant to concrete pressure and heat resistant upto 700 degree centigrade dry heat. Formwork liner fixation should be factory made under close tolerances and stage inspections.

If proprietary system of formwork is used, detailed information as given below herein shall be furnished to Employer for approval before use.

4.1.GENERAL

- a. The information, which the manufacturer is required to supply, shall be in such detail as to obviate unsafe erection and use of equipment due to the intention of the manufacturer not having been made clear or due to wrong assumptions on the part of the Contractor.
- b. The Contractor shall refer unusual problems of erection/assembly not in keeping with intended use of equipment, to the manufacturer of the equipment.

4.2. THE MANUFACTURERS OF PROPRIETARY SYSTEMS SHALL SUPPLY THE FOLLOWING INFORMATION;

- a. Description of basic functions of equipment.
- b. List of items of equipment available, giving range of sizes, spans and such like, with manufacturer's identification number or other references.
- c. The basis on which safe working loads have been determined and whether the factor of safety given applies to collapse or yield.

- d. Whether the supplier's data are based on calculations or tests. This shall be clearly stated as there may be wide variations between results obtained by either method.
- e. Instructions for use and maintenance, including any points which require special attention during erection, especially where safety is concerned.
- f. Detailed dimensional information, as follows:
 - i. Overall dimensions, depths and widths of members.
 - ii. Line drawings including perspectives and photographs showing normal uses.
 - iii. Self-weight.
 - iv. Full dimensions of connections and any special positioning and supporting arrangements.
 - v. Sizes of members, including tube diameters and thicknesses of material.
 - vi. Any permanent camber built into the equipment.
 - vii. Sizes of holes and dimensions giving their positions.
 - viii. Manner of fixing including arrangements for sealing joints.
 - ix. Method of de-stripping, storing & shifting.
- g. Data relating to strength of equipment as follows:
 - i. Average failure loads as determined by tests.
 - ii. Recommended maximum working loads for various conditions of use.
 - iii. Working resistance moments derived from tests.
 - iv. Working shear capacities derived from tests.
 - v. Recommended factors of safety used in assessing recommended loads and deflections based on test results.
 - vi. Deflections under load together with recommended pre-camber and limiting deflections.
 - vii. If working loads depend on calculations, working stresses should be tested. If deflections depend on theoretical moments of inertia or equivalent moments of inertia rather than tests, this should be noted.
 - viii. Information on the design of sway bracing against wind and other horizontal loadings.
 - ix. Allowable loading relating maximum extension of bases and/or heads.
 - x. Any restrictions regarding usage of any component or full assembly with regard to spans, heights and loading conditions.

5.0 SUPPORTING DOCUMENTS

The Definitive Design Submission shall be accompanied by the following documents, which will be considered by the Employer in his review of the Definitive Design Submission. Where relevant or required, these documents shall be accompanied by a design note stating clearly how information has been used in the design of the Permanent Works.

GEOTECHNICAL INTERPRETATIVE REPORT

A report including site investigation results and covering the geotechnical interpretation of site investigation work including that undertaken by the Contractor in sufficient detail to confirm and justify parameters used in the foundation and geotechnical designs. The report shall include the full logs and descriptions of confirmatory boreholes drilled by the Contractor.

SURVEY REPORT

A report on all survey work undertaken by the Contractor, including checks on mapping, survey stations, coordinates and setting-out. Updated topographical and survey drawings shall also be included.

UTILITIES REPORT

A report giving details of arrangements and working methods in respect of the existing utilities, including

protection measures, diversions, reinstatements and programme allowances.

TEMPORARY WORKS DESIGN REPORT

A report which provides sufficient information on the design of the Temporary Works to allow the Employer to assess their effects on the Permanent Works and to enable these to be taken into account in the review of the Definitive Design.

CONSTRUCTION / INSTALLATION ANALYSIS REPORT

A report containing a stage-by-stage construction / installation sequence for all structures / equipment.

CONSTRUCTION METHOD STATEMENT

A report which provides sufficient information on the methods of construction, execution and launching systems proposed and Contractor's Equipment to allow the Employer to assess their effects on the Permanent Works and to enable these to be taken into account in the review of the Definitive Design.

PROJECT SCHEDULE REVIEW

- (i) The Contractor shall, prior to submitting the Definitive Design Submission, review the Project Schedule against the current version of the Design Submission Programme.
- (ii) In the event that the Contractor considers that there are any discrepancies or inconsistencies between the Design Submission Programme and the Project Schedule, the Contractor shall submit with the Definitive Design Submission its proposed revisions to the Project Schedule such that the discrepancies or inconsistencies are removed.
- (iii) The Contractor shall provide details of submissions of the proposed Working Drawings and their anticipated timing during the Construction Phase and shall identify information required from or actions to be undertaken by the Employer or others which are necessary to permit the completion of the design of the Permanent Works and the Working Drawings. Desired Dates for the receipt required by the Contractor of such information or for the completion of such actions shall be included with appropriate justification.

REPORT ON THE USE OF WORKS AREAS

A report updating the proposals from those contained in the Contractor's Technical Proposals for the use of Works Areas and their reinstatement and accesses facilities.

6.0 NOTICES ON DEFINITIVE DESIGN SUBMISSION

The Contractor may make Definitive Design Submissions and seek separate Notices in respect of:

- (a) The temporary works for construction of the works (Wherever required).
- (b) Major elements identified in this document.

The issue of such separate Notices under (a) and (b) above shall be conditional upon the Contractor having demonstrated, to the satisfaction of the Employer, that the effect of each structure on other structures, utilities, etc., has been fully accommodated in the design.

6.1 Submission of Design Data

In the case of submissions subsequent to the Definitive Design, the Design Data shall be in accordance with Employer's Requirements and the Definitive Design.

The Contractor shall submit to the Employer all Design Data, together with the relevant Design Certificates certified by the Contractor, on or before the respective dates for submission shown on the Design Submission Programme or, as the case may be, the Works Programme. In the event that a re-submission of Design Data is required, such re-submission shall be made as soon as practicable after the receipt of the relevant statement of objections. All submissions of Design Data shall include the copies as stipulated in the

Employer's Requirements.

Following receipt of a submission of Design Data the Engineer shall, within 28 days, return one copy of the Design Data to the Contractor, together with either a Notice of No-Objection, or a statement of objections which shall identify the aspects of the Design Data which do not conform to the above requirements. If the Engineer returns any Design Data with a Notice of No Objection, the Contractor shall proceed with the Works in accordance with the Contract.

If the Employer provides that revisions to a submission of Design Data/ are appropriate but that such revisions are of minor design significance, the Employer may issue a Notice of No Objection subject to an appended schedule of comments identifying the relevant revisions. The Contractor shall revise such Design Data in accordance with such comments but shall not be obliged to re- submit such Design Data solely on account of such revisions.

If the Employer returns any Design Data with a statement of objections the Contractor shall revise the Design Data to take account of the stated objections and re-submit such Design Data to the Employer, together with new Design Certificates signed by the Designer and the Contractor.

The issue of a Notice of No Objection in relation to any submission of Design Data shall be entirely without prejudice to the review of subsequent submissions of Design Data or to any subsequent request for a Contractor's Variation, and shall not bind or fetter the Employer in any manner whatsoever when deciding whether or not to raise objections in relation to any subsequent submission of Design Data or when dealing with a subsequent request for a Contractor's Variation.

Neither an objection raised to the Design Data nor revisions of minor design significance under this Clause will, under any circumstances, constitute an Employer's Variation.

7.0 DESIGN SUBMISSIONS - GFC DRAWINGS SUBMISSIONS

- (i) The GFC Drawings shall be derived directly from the Definitive Design and shall detail and illustrate in full the Permanent Works. The Construction Reference Drawings shall form part of the Working Drawings to be used for construction purposes.
- (ii) Prior to any GFC Drawings Submission, the Contractor shall prepare a full list of GFC Drawings in order to demonstrate, to the satisfaction of the Employer, that such GFC Drawings will be sufficient in extent to cover the construction of the whole of the Permanent Works.
- (iii) Unless otherwise required by the Employer, the GFC Drawings need not include bar bending schedules, bar reference drawings, fabrication or shop drawings as well as other schedules or erection drawings which are to be provided by the Contractor during the Construction Phase.

8.0 DESIGN SUBMISSIONS – CONSTRUCTION PHASE

- (1) On the issue of a Notice in respect of the GFC Drawings the Contractor shall produce the proposed Working Drawings. These shall either be identical to the GFC Drawings or shall be further drawings developed in accordance with the GFC Drawings such as site sketches, bar bending schedules, bar reference drawings, fabrication and shop drawings, construction erection sequences and the like. All such drawings shall comply with the requirements of the Contract.
- (2) Prior to submission of the proposed Working Drawings, the Contractor shall endorse the appropriate original paper drawings as "Good for Construction". If the Employer so requires, the endorsed original shall be submitted to the Employer who shall, if he has no objection to the contents of the submission, further endorse the original by stating that he has no objection to the proposed Working Drawings. On the endorsement by the Employer, the original forthwith be returned to the Contractor as the

Working Drawings.

- (3) Only the Working Drawings endorsed or those that the Employer has expressly stated as not requiring his endorsement shall be issued to the Site. The construction of the Works shall be strictly in accordance with these Working Drawings.
- (4) The contractor shall finalize details of the proposed method of construction and submit such finalised details to the Employer for review. The proposed method shall have no adverse effects on the partially completed Permanent Works and shall ensure the Works are statically and, if appropriate, aerodynamically stable.
- (5) The Contractor shall undertake and submit a stage by stage construction sequence and the effect of any Temporary Works and the Contractor's Equipment on the Permanent Works. This analysis shall be in sufficient detail to demonstrate that the Contractor's proposals are safe and have no adverse effects upon any parts of the Permanent Works.
- (6) As-Built Drawings, endorsed by the Contractor shall be submitted to the Employer for agreement.

9.0 DESIGN SUBMISSIONS - REVIEW PROCEDURES

- (1) Submissions of Design Data shall be made and reviewed by the Employer. The form and detail of the review shall be as determined by the Employer and will not release or remove the contractor's responsibility for the design under the contract.
- (2) The issue of a Notice shall be without prejudice to the issue of any future Notices.
- (3) The Contractor shall, prior to the submission of the Design Data, obtain all required and/or statutory approvals that relate to that submission including, where appropriate, the approval of the Concerned Government Authorities and utility undertakings, and demonstrate that all required approvals have been obtained.
- (4) All submissions shall be accompanied by two original copies of a 'Design Certificate' as set out in Attachment - D1 hereto and signed by the Contractor and the Designer.

10.0 DESIGN SUBMISSION PROGRAMME

- (1) The Contractor shall prepare the Design Submission Programme which is to set out fully the Contractor's anticipated programme for the preparation, submission and review of the Design Packages, the Definitive Design Submission and the GFC Drawings Submissions and for the issue of Notices in relation thereto.
- (2) The Design Submission Programme shall:
 - (a) Be consistent with and its principal features integrated into the Works Programme, and show all relevant Key Dates;
 - (b) Identify dates and subjects by which the Employer 's decisions should be made;
 - (c) Make adequate allowance for periods of time for review by the Employer and other review bodies;
 - (d) Make adequate allowance for the design and development of specialist works;
 - (e) Include a schedule identifying, describing, cross-referencing and explaining the Design Packages into which the Contractor intends to divide the Definitive Design and GFC Drawings; and
 - (f) Indicate the Design Interface and Co-ordination periods for each Designated Contractor.
- (3) The Contractor shall submit the Design Submission Programme to the Employer within thirty (30) days of the date of Notice to Proceed, and thereafter up-dated versions thereof at intervals of not more than one (1) month throughout the Design Phase.

11.0 PROGRAMME FOR SUBMISSIONS DURING CONSTRUCTION PHASE

In accordance with the employer requirements – General, the contractor shall identify submissions required during the construction phase.

12.0 CALCULATIONS

- (1) Unless otherwise required by the Employer, calculations relevant to the Definitive Design and GFC Drawings shall be submitted for review with the respective Design Packages or Submissions. The Employer may require the submission of applicable software including in house software programmes/ worksheets developed by the Contractor, computer input and programme logic for its review prior to the acceptance of the computer output.
- (2) The Contractor shall prepare and submit a comprehensive set of calculations for the Definitive Design in a form acceptable to the Employer. Should the design of the Permanent Works be revised thereafter and such revision renders the calculations as submitted obsolete or inaccurate, the Contractor shall prepare and submit the revised calculations
- (3) Similarly, the Contractor shall submit such further calculations as have been prepared in connection with the GFC Drawings.
- (4) Calculations to be included as part of the submission herein shall comprise the up-to-date calculations in respect of the Definitive Design, the GFC Drawings and such further calculations which the Contractor has prepared during the production of Working Drawings.
- (5) The Contractor shall submit all calculations necessary to support proposals relating to the construction methods.

13.0 DOCUMENTS REQUIREMENTS

- (1) Drawings shall be prepared generally to A1 size, but to ISO AO size where appropriate. Appendix-7 defines the Drawings and CAD Standards required for drawing preparation and submittal.
- (2) The Contractor shall submit 6 copies of his design and/or drawings for review by the Employer. After receipt of "No Objection" from the Employer 's Representative, the Contractor shall submit 6 copies of design and/or drawing for the use of the Engineer.
- (3) The submission of drawings may be by CAD Media files and Appendix-7 specifies the drawing submission requirements for CAD Media files.

14.0 LIABILITY FOR REVIEW OF DOCUMENTS AND DRAWINGS

Except to the extent expressly provided in this Agreement:

- (a) no review, comment or approval by the Authority or the Authority's Engineer of any Document or Drawing submitted by the Contractor nor any observation or inspection of the construction of the Project nor the failure to review, approve, comment, observe or inspect hereunder shall relieve or absolve the Contractor from its obligations, duties and liabilities under this Agreement, Applicable Laws and Applicable Permits; and
- (b) the Authority shall not be liable to the Contractor by reason of any review, comment, approval, observation or inspection referred to in Sub-clause (a) above.

ATTACHMENT D 1
DESIGN CERTIFICATE

This design Certificate refers to design submission no..... which comprises of Definitive Design submission / GFC Drawings submission, working drawing submission scheduled in the attached transmittal, in respect of:

(Description of Permanent Works to which the submission refers)

DESIGNER'S STATEMENT:

We certify that:

- a) The outline designs, design briefs and performance specifications of those elements of the Permanent works as illustrated and described in the documents scheduled in the attached transmittal, complies with the design basis criteria and other contract provisions.
- b) An in-house check has been undertaken and completed to confirm the completeness, adequacy and validity of the design of the Permanent Works as illustrated and described in the documents scheduled in the attached transmittal.
- c) All necessary and required approval relating to the design of the Permanent Works, as illustrated and described in the documents listed in the attached transmittal, have been obtained.
- d) All effects of the design comprising the submission on the design of adjacent or other parts of the works have been fully taken into account in the design of those parts.

Signed by Designer's Authorized Representative Name :

Position :

Date :

CONTRACTOR'S CERTIFICATE:

The Certifies that all design has been performed utilizing the skill and care to be expected of a professionally qualified and competent designer, experienced in work of similar nature and scope. This further certifies that all works relating to the preparation, review, checking and certification of design has been verified by us and the design proposed by the designer has been accepted by us

Signed by Contractor's authorized representative

Name :

Position :

Date :

Note 1

The Contractor shall insert one of the following, as applicable:

- (i) The Contractor's Technical Proposals
- (ii) The Contractor's Technical Proposals and Design Packages Nos for which a Notice of No Objection has been issued.
- (iii) Design Packages Nos for which a Notice of No Objection has been issued if such Design Packages develop and amplify the Contractor's Technical Proposals.
- (iv) The Definitive Design.

SAMPLE DRAWING TEMPLATE

(a) Design Quality Assurance' by designer & contractor:

DESIGN QUALITY ASSURANCE			
The responsibility of control, Check and verification of accuracy, correctness, completeness, integration and full compliance of contract provisions in respect of design analysis and drawings rests with the design consultants and the contractor.			
By Designer		By Contractor	
Sig:	Sig:	Sig:	Sig:
<u>Date:</u>	<u>Date:</u>	<u>Date:</u>	<u>Date:</u>
<u>Name:</u>	<u>Name:</u>	<u>Name:</u>	<u>Name:</u>
<u>Designed By</u>	<u>Checked by</u>	<u>Approved by</u>	<u>Accepted by</u>

(b) Notice of 'No Objection' from Employer's representatives:

Notice of 'No Objections' from Employer's			
	Remarks	Date	Signature
HoD	Reviewed		
Deputy HoD	Reviewed & comments as marked on drawing		
Manager (Civil)	Reviewed & No objection issued with comments as marked on Drawing		

Section C

[Contractor to attach copies of necessary and required approvals]

SECTION D

EMPLOYER'S REQUIREMENTS - CONSTRUCTION

1. CONTRACTORS SUPERINTENDENCE

- (1) The Contractor shall submit a Staff Organization Plan in accordance with the ITT/Employer's Requirement. This plan shall be updated and resubmitted whenever there are changes to the staff. The plan shall show the management structure and state clearly the duties, responsibilities and authority of each staff member.
- (2) The site agent and his associates/supervisors shall have experience and qualification appropriate to the type and magnitude of the Works. Full details shall be submitted of the qualifications and experience of all proposed staff to the Engineer for his approval.

2. CHECKING OF THE CONTRACTOR'S TEMPORARY WORKS DESIGN

The Contractor shall, prior to commencing the construction of the Temporary Works, submit a certificate to the Employer signed by him certifying that the Temporary Works have been properly and safely designed and checked and that the Contractor has checked the effect of the Temporary Works on the Permanent Works and has found this to be satisfactory.

3. THE SITE

- (1) Works Areas are those areas identified in Employer's Requirements and on the Drawings.

No land shall be made available by the employer for casting, site offices, and site laboratories. Contractor shall make his own arrangements at his own cost. In case the Railway land/Defence land is arranged adjacent to near to railway track, the necessary land rent /lease charges shall be levied as per guidelines /K-RIDE norms and the same will deducted from RA bills of the Contractor.

USE OF THE SITE

- (2) The Site or Contractor's Equipment shall not be used by the Contractor for any purpose other than for carrying out the Works in the scope of this contract, except that, with the consent in writing of the Employer, the Site or Contractor's Equipment such as batching and mixing plants for concrete and bituminous materials may be used for the work in connection with other contracts under the Employer.
- (3) Rock crushing plant shall not be used on the Site.
- (4) Entry to and exit from the Site shall be controlled and shall be only available at the locations for which the Employer has given his consent.

ACCESS TO THE SITE

- (5) The Contractor shall make its own arrangements, subject to the consent of the Employer, for any further access required to the Site.
- (6) In addition, the Contractor shall ensure that access to every portion of the Site is continually available to the Employer.

ACCESS TO OUTSIDE THE SITE

- (7) The Contractor shall be responsible for ensuring that any access or egress through the Site boundaries are controlled such that no disturbance to residents or damage to public or private property occur as a result of the use of such access or egress by its employees and sub-contractors.

SURVEY OF THE SITE

- (8) A survey shall be carried out of the Site to establish its precise boundaries and the existing groundlevels within it. This survey shall include a photographic survey sufficient to provide a full record of the state of the Site before commencing the work with particular attention paid to those areas where reinstatement will be carried out later on. The survey shall be carried out before the site clearance wherever possible and in any case prior to the commencement of work in any Works Area. The survey shall be carried out by the Contractor and agreed with the Employer.

BARRICADES AND SIGN BOARDS

- (9) The Contractor shall erect barricades and gates around its areas of operations to prevent entry by unauthorized persons to his Works Areas and necessary identity cards /permits should be issued to workers and staff by the contractor. The Contractor shall submit proposal for barricades of the complete perimeter of all works areas to the Employer to prevent unauthorised entry. No work shall be commenced in any Works Area until the Employer has been satisfied that the barricades installed by the Contractor are sufficient to prevent unauthorized entry.
- (10) Project signboards shall be erected within two (2) weeks, or such other period as the Employer has given his consent, after the date of commencement of the Works. The types, sizes and locations of project signboards shall be agreed with the Employer before manufacture and erection. Other advertising signs shall not be erected on the Site. The cost of these signboards is included in quoted price.
- (11) The consent of the Employer shall be obtained before hoardings, fences, gates or signs are removed. Hoardings, fences, gates and signs which are to be left in positions after the completion of the Works shall be repaired and repainted as instructed by the Employer.
- (12) Hoardings, barricades, gates and signs shall be maintained in clean and good order by the Contractor until the completion of the Works, whether such hoardings, fences, gates and signs have been installed by the Contractor or by others and transferred to the Contractor during the period of the Works. All the fencing, hoardings, gates and signs etc. shall be mopped minimum once in a week and washed monthly.
- (13) All hoardings, barricades, gates and signs installed by the Contractor shall be removed by the Contractor upon the completion of the Works, unless otherwise directed by the Employer.
- (14) Hoarding/ barricades can be reused after removing from one place to other locations / sites provided they are in good condition and approved by Employer.
- (15) Damage/worn-out barricades /hoarding shall be replaced by contractor within 24 hours. Employer's decision regarding need for replacement shall be final and binding and if no action is taken by contractor, the Employer may get it repaired through other agency and the cost of any repairs will be deducted by the Employer from any payment due to the contractor.

CLEARANCE OF THE SITE

- (16) All Temporary Works which are not to remain on the Site after the completion of the Works shall be removed prior to completion of the Works or at other times instructed by the Employer. The Site shall be cleared and reinstated to the lines and levels and to the same condition as existed before the Works started except as otherwise stated in the Contract.

4. SURVEY

- (1) The Contractor to fix alignment reference points at regular intervals. The contractor along with the Employer should verify the details of these alignment pillars. If any mistakes are detected in these details, the same should be indicated to the Employer before starting any work. These detected mistakes should be corrected by the Contractor in consultation with the Employer. These corrections should be got approved from the Employer.
- (2) The Contractor shall relate the construction of the Works to the Site Grid. To facilitate this, survey reference points have to be established by the contractor and benchmarks in the vicinity of the Site.
- (3) Before the Contractor commences the setting out of the Works, the Contractor shall satisfy itself that there are no conflicts and shall establish and provide all subsidiary setting out points, monuments, towers and the like which may be necessary for the proper and accurate setting out and checking of the Works.
- (4) The Contractor shall carefully protect all the survey reference points, bench marks, setting out points, monuments, towers and the like from any damages and shall maintain them and promptly repair or replace any points damaged from any causes whatsoever. The Contractor shall regularly recheck the position of all setting out points, bench marks and the like to the satisfaction of the Employer.
- (5) The survey reference points will become the responsibility of the Contractor. The Contractor shall, by annual or more frequent review, ensure that these survey points continue to remain consistent with the benchmarks.

5. SAFETY, HEALTH AND ENVIRONMENTAL REQUIREMENTS

The Contractor shall comply with in the conditions stipulated in the Conditions of contracts on Safety, Health & Environment (SHE) including ESMP plan attached with SHE manual.

5.1 TRAINING OF CONTRACTOR'S EMPLOYEES/STAFF/WORKERS: -

Contractor shall provide a training/workshop on safety, Health & Environment (SHE) to all its workers/staff/employees/subcontractors of at least 2 weeks (96hrs.) at the time of induction. Before postings of any his workers/staff/employees/subcontractors, the contractor shall give a certificate that the said person had undergone the requisite SHE training. Non-compliance of the above will invoke penalties as per condition of contract on SHE, Section-8C of Tender document.

In case of any mishap/ accident causing death/injury to public or damage to public/private property or damage to public/private vehicles or damage to railway property, the employer, will impose a penalty to the contractor as deemed fit and appropriate in addition to the cost of damage caused due to the mishap/accident.

6. OTHER SAFETY MEASURES

SITE SAFETY, HEALTH & ENVIRONMENT PLAN

- (1) The Contractor shall, within 20 days of the date of Notice to Proceed, prepare and submit to the Employer for review his proposed safety, Health and Environment plan which shall contain as a minimum those items set out in Conditions of Contract on Safety, Health & Environment Plan.

FIRE REGULATIONS AND SAFETY

- (2) The Contractor shall provide and maintain all necessary temporary fire protection and firefighting facilities on the Site during the construction of the Works, and shall comply with all requirements of the Bangalore Fire Services Department. These facilities may include, without limitation, sprinkler systems and fire hose reels in temporary site buildings, raw water storage tanks and portable fire extinguishers suitable for the conditions on the Site and potential hazards.
- (3) The Contractor shall submit details of these facilities to the Employer for review prior to commencement of work on the Site.
- (4) If, in the Employer's opinion, the use of naked lights may cause a fire hazard, the Contractor shall take such additional precautions and provide such additional firefighting equipment (including breathing apparatus) as the Employer considers necessary. The term "naked light" shall be deemed to include electric arcs and oxyacetylene or other flames used in welding or cutting metals.
- (5) Oxyacetylene burning equipment will not be permitted in any confined space; Burning equipment of the oxpropane type shall be used.

HAZARD AND RISK ASSESSMENTS

- (6) The Contractor shall, prior to the commencement of any operation carry out a detailed hazard and risk assessment. The results of such assessments shall be recorded and the records kept for inspection by the Engineer.
- (7) The Contractor shall produce detailed method statements for all medium and high risk operations and shall submit them to the Engineer for his consent prior to commencement of any task to which they relate.
- (8) The Contractor shall produce and implement a Permit to Work system for all high-risk operations. The Permit to Work system shall be submitted to the Engineer for consent before application.

EXPLOSIVES

- (9) Explosives shall not be used without prior written consent of the Employer. Before consent to blasting is granted, the Contractor shall prepare a Specification as to the size of charge, the method of firing and any other restrictions that may be imposed from time to time.

STANDBY EQUIPMENT

- (10) The Contractor shall provide adequate stand-by equipment to ensure the safety of personnel, the Works and the public. These measures shall include as a minimum the following: -
- (a) stand-by pumping and generating equipment for the control of water;
 - (b) stand-by equipment and spares for illumination of the Works; and
 - (c) Stand-by generating equipment and equipment for the lighting for the works.

CO-OPERATION

- (11) The Contractor shall provide full co-operation and assistance in all safety surveillance carried out by the Employer. Any breaches of the Site Safety Plan or the statutory regulations or others disregard for the safety of any persons may be the reason for the Employer to exercise his authority to require the site agent's removal from the Site.

7. CARE OF THE WORKS

- (1) Any error in the execution of work leading to redesign work shall be duly compensated by the contractor as per the decision of Employer. Any error attributable to the construction including failure to locate underground utilities shall attract penalties.
- (2) Unless otherwise permitted by the Employer all works shall be carried out in dry conditions.
- (3) The works, including materials for using in the works, shall be protected from damage due to water. Water on the site and water entering the site shall be promptly by temporary drainage or pumping system or by other methods capable of keeping the works free of water. Silt and debris shall be removed by traps before the water is discharged and shall be disposed of at a location or locations to which the engineer has given his consent.
- (4) The discharge points of the temporary systems shall be as per the consent of the engineer. He contractor shall make all arrangements with and obtain the necessary approval from the relevant authorities for discharging water to drains, watercourses etc. The relevant work shall not be commenced until the approved arrangements for disposal of the water have been implemented.
- (5) The methods used for keeping the works free of water shall be such that settlement of, or damage to, new and existing structure does not occur. Measures shall be taken to prevent flotation of new and existing structures.

PROTECTION OF THE WORKS FROM WEATHER

- (6) Work shall not be carried out in weather conditions that may adversely affect the Works unless proper protection is provided to the satisfaction of the Employer.
- (7) Permanent Works, including materials for such Works, shall be protected from exposures of weather conditions that may adversely affect such Permanent Works or materials.
- (8) During construction of the Works storm restraint systems shall be provided where appropriate. These systems shall ensure the security of the partially completed and ongoing stages of construction and in all weather conditions. Such storm restraint systems shall be installed as soon as practicable and shall be compatible with the Right of Access or other access around or through- out the Site.
- (9) The contractor shall at all-time programme and order progress of the work and make all protective arrangements such that the works can be made safe in the event of storms.

PROTECTION OF THE FINISHED WORKS

- (10) The finished works shall be protected from any damage that could arise from any activities on the adjacent site/ works.

8. DAMAGE AND INTERFERENCE

- (1) Work shall be carried out in such a manner that there is no damage to or interference with:
 - (a) watercourses or drainage systems; (b) utilities; (c) structures (including foundations), roads, including street furniture, or other properties; (d) public or private vehicular or pedestrian access; (e) monuments trees, graves or burial grounds other than to the extent that is necessary for them to be

removed or diverted to permit the execution of the Works. Heritage structures shall not be damaged or disfigured on any account. The Contractor shall inform the Employer as soon as practicable of any items which are not stated in the Contract to be removed or diverted but which the Contractor considers need to be removed or diverted to enable the Works to be carried out. Such items shall not be removed or diverted until the consent of the Employer to such removal or diversion has been obtained.

- (2) Items which are damaged or interfered with as a result of the Works and items which are removed to enable work to be carried out shall be reinstated to the satisfaction of the Employer and to at least the same condition as existed before the work started. Any claims by Utility Agencies due to damage of utilities by the Contractor shall be borne by the Contractor.

UTILITIES

- (3) Please refer Employer's Requirement –Functional

STRUCTURES, ROADS AND OTHER PROPERTIES

- (4) The Contractor shall immediately inform the Employer of any damage to structures, roads or other properties.

PROTECTION OF THE ADJACENT STRUCTURES AND WORKS

- (5) The Contractor shall take all necessary precautions to protect the structures or works being carried out by others adjacent to and, for the time being, within the Site from the effects of vibrations, undermining and any other earth movements or the diversion of water flow arising from its work.

9. WORK ON ROADS

TRAFFIC MANAGEMENT PLAN

The Contractor shall develop a detailed Traffic Management Plan for the work under the contract. The purpose is to develop a Traffic Management Plan to cope with the traffic disruption as a result of construction activities by identifying strategies for traffic management on the roads and neighborhoods impacted by the construction activities. The Contractor shall implement the Traffic Management Plan throughout the whole period of the Contract.

PRINCIPLES FOR TRAFFIC MANAGEMENT

The basis for the Plan shall take into consideration four principles:

- a. to minimize the inconvenience of road users and the interruption to surface traffic through the area impacted by the construction activities;
- b. to ensure the safety of road users in the impacted area;
- c. to facilitate access to the construction site, and to maintain reasonable construction progress.
- d. to ensure traffic safety at each construction site.

USE OF ROADS AND FOOTPATHS

Public roads and footpaths on the Site in which the work is not being carried out shall be maintained in a clean and passable condition.

1. Measures shall be taken to prevent the excavated materials, silt or debris from entering gullies on roads and footpaths, entry of water to the gullies shall not be obstructed.
2. Surfaced roads on the Site and leading to the Site shall not be used by tracked vehicles unless protection against damage is provided.
3. Contractor's Equipment and other vehicles leaving the Site shall be loaded in such a manner that the excavated material, mud or debris will not be deposited on roads. All such loads shall be covered or protected to prevent dust being emitted. The wheels of all vehicles shall be washed when necessary, before leaving the Site to avoid the deposition of mud and debris on the roads.

REINSTATEMENT OF PUBLIC ROADS AND FOOTPATHS

1. Temporary diversions, pedestrian access and lighting, signing, guarding and traffic control equipment shall be removed immediately when they are no longer required. Roads, footpaths and other items affected by temporary traffic arrangements and control shall be reinstated to the same condition as existed before the work started or as permitted by the Engineer immediately after the relevant work is complete or at other times permitted by the Engineer.
2. The contractor shall submit his design for the reinstatement to the relevant authorities and obtain their prior approval to carrying out the work. Reinstatement works shall include:
 - i. Parking bays
 - ii. Footpath and kerbs
 - iii. Road Signage
 - iv. Street Lighting
 - v. Landscaping
 - vi. Traffic Lights and Control Cable
 - vii. Road painting

10. SITE ESTABLISHMENT: SITE LABORATORIES

- (1) The Contractor shall provide, erect and maintain in a clean, stable and secure condition a laboratory, equipped for the routine testing of concrete, soil and rock samples and for the storage and curing of concrete cubes or cylinders only. This laboratory shall be located at the Contractor's principal work site or at a location agreed to by the Employer.

(2) CONTRACTOR'S SITE ACCOMMODATION

The Contractor shall provide and maintain its own site accommodation at locations consented to by the Employer. Offices, sheds, stores, mess rooms, garages, workshops, latrines and other accommodation on the Site shall be maintained in a clean, stable and secure condition. Living accommodation shall not be provided on the Site. The Contractor shall comply with the requirements of Appendix-6 to the Employer's Requirements.

(3) LATRINES AND WASH PLACES

The Contractor shall provide latrines and wash places for the use of its personnel and all persons who will be on the Site: The size and disposition of latrines and wash places shall accord with the numbers and dispositions of persons entitled to be on the Site, which may necessitate their location on structures and, where necessary there shall be separate facilities for males and females. The capacities and layout shall be subject to approval of the Employer. The Contractor shall arrange regular disposal of effluent and sludge in a manner that shall be in accordance with local laws/ regulations.

- (4) The Contractor shall be responsible for maintaining all latrines and wash places on the Site in a clean and sanitary condition and for ensuring that they do not pose a nuisance or a health threat. The Contractor shall also take such steps and make such provisions as may be necessary or directed by the Employer to ensure that vermin, mosquito breeding etc. are at all times controlled.

SITE UTILITIES AND ACCESS

- (5) (a) The Contractor shall be responsible for providing water, electricity, telephone, sewerage and drainage facilities for contractor's site offices, structures and buildings and for all site laboratories in accordance with **Appendix-12** to these Employer's Requirements and all such services that are necessary for satisfactory performance of the Works. The Contractor shall make all arrangements with and obtain the necessary approval from the relevant civil and utility authorities for the facilities.
(b) The contractor shall be responsible for provision of power supply for his works including for launching girder and the like. The Employer cannot guarantee provision of adequate, continuous power supply however assistance will be given in obtaining the necessary permissions for site generators and the like.
- (6) Access roads and parking areas shall be provided within the Site as required and shall be maintained in a clean, acceptable and stable condition. For lengths of roadway longer than 100 m and heavy commercial vehicle are to ply the Contractor shall provide paved surfacing of adequate thickness

and quality to the satisfaction the Employer.

SUBMISSION OF PARTICULARS

- (7) The following particulars shall be submitted to the Employer for his consent not more than thirty (30) days after the date of commencement of the Works:
 - (a) drawings showing the formation works and the layout within earmarked area for the Contractor's offices, project signboards, principal access and other major facilities required early in the Contract, together with all service utilities;
 - (b) drawings showing the details to be included on the project signboards and diversion boards.
- (8) Drawings showing location of stores, storage areas, concrete batching plants and other major facilities and their access roads/paths shall be submitted to the Employer for his consent as early as possible but in any case, not less than twenty-eight (28) days prior to when such facilities are intended to be constructed on the Site.

11. SECURITY

- (1) The Contractor shall be responsible for the security of the site for the full time the site is in its possession. It shall set up and operate a system whereby only those persons entitled to be on the Site can enter the Site. To this end, the Contractor shall with the consent of Employer provide the specific points only at which entry through the security fence can be affected, and shall provide gates and barriers at such points of entry and whereby maintain a twenty four (24) hours security guard, and such other security personnel and patrols elsewhere as may be necessary to maintain security.
- (2) The Contractor shall maintain all site boundary fences in first class condition, and shall so arrange site boundary fences at all access drainage points of work areas that it's use of such access points etc., are not restricted by the system or method of achieving the required security measures. Notices shall be displayed at intervals around the Site to warn the public of the dangers of entering the Site.
- (3) During the progress of the Works the Contractor shall maintain such additional security patrols over the areas of the Works as may be necessary to protect its own and its subcontractor's work and equipment.
- (4) In order to operate such a security system, it will be necessary to institute the issue of unique passes to personnel and vehicles entitled to be on the Site, and which may need to be separately identifiable according to the shifts being worked on Site. The Contractor shall at the outset determine, together with the Engineer, a system and the design of passes to suit the requirements of the foregoing and to suit the methods of work to be adopted by the Contractor. The Contractor shall at all times ensure that the Engineer has an up-to-date list of all persons entitled to be on the Site at any time The contractor shall also introduce a system of issue passes to any outsider or person/vehicles belonging to agencies other than employer/ Engineers who may have to visit the site in connection with work
- (5) The Contractor shall liaise with the Designated Contractors and the contractors responsible for the adjacent and other interfacing contracts and ensure that coordinated security procedures are operated, in particular in respect of vehicles permitted to pass through the Site and/or the adjacent sites.
- (6) Security and checking arrangements as felt necessary shall be provided with advice and help of Police.
- (7) Contractor's as well as his Sub Contractor's employees and representative shall wear Identification Badges (cards), uniforms, helmets, safety shoes/gum boots & other safety/protection wear as directed by Employer, and to be provided by the Contractor. Badges shall identify the Contractor/ Sub Contractor and show the employee's name and number and shall be worn at all times while at site.
- (8) All vehicles used by the Contractor/ Sub Contractor shall be clearly marked with the Contractor's / Sub Contractors name or identification mark.
- (9) The Contractor shall co-ordinate and plants the security of both the works under this Contract and the works of other encaged in adjacent and interfacing contractor's and requiring access to the site. In order to operate such a security system, it will be necessary to institute the issue of unique passes to personnel and vehicles entitled to be on the Site, system of separately identifiable according to the

shifts being worked on Site. The Contractor shall at the outset determine, together with the Employer, a system including the design of passes to suit the requirements of the foregoing and to suit the methods of works to be adopted by the Contractor. The Contractor shall at all times ensure that the Engineer has an up-to-date list of all persons entitled to be on the Site at any time. The Contractor shall also introduce a system for issue of passes to any outsider or persons/ vehicles belonging to agencies other than Employer who may have to visit the site in connection with work.

12. TESTING - GENERAL

- (1) The Contractor shall provide and perform all forms of testing procedures applicable to the Works and various components and the interfacing of the Works with the other Contract works and shall conduct all necessary factory, site and acceptance tests.
- (2) All testing procedures shall be submitted at least thirty (30) days prior to conducting any Test. The Testing procedures shall show unambiguously the extent of testing covered by each submission, the method of testing, the Acceptance Criteria, the relevant drawing (or modification) status and the location.
- (3) The testing Procedures shall be submitted as required, by the contractor during the duration of the contract to reflect the changes in system design or the identification of additional testing requirements.
- (4) The Employer shall have the facilities for monitoring all tests and have access to all testing records. Ample time shall be allowed within the testing programmes for necessary alterations to equipment, systems and designs to be undertaken, together with re-testing prior to final commissioning.
- (5) All costs associated with the Testing shall be borne by the Contractor, unless otherwise specified, including the services of any specialized personnel or independent assessors. The Contractor shall also bear any expenses incurred due to resetting caused by defects or failure of equipment to meet the requirements of the Contract in the first instance.
- (6) Unless agreed in writing by the Employer, the personnel engaged on testing shall be independent of those directly engaged in the design or installation of the same equipment.
- (7) All testing equipment shall carry an appropriate and valid calibration label.

BATCHES SAMPLES AND SPECIMENS

- (8) A batch of material is a specified quantity of the material that satisfies the specified conditions. If one of the specified conditions is that the material is delivered to the Site at the same time, then material delivered to the Site over a period of a few days may be considered as part of the same batch if in the opinion of the Employer there is sufficient proof that the other specified conditions applying to the batch apply to all of the material delivered over the period.
- (9) A sample is a specified quantity of material that is taken from a batch for testing and which consists of a specified amount, or a specified number of pieces or units, of the material.
- (10) A specimen is the portion of a sample that is to be tested.

SAMPLES FOR TESTING

- (11) Samples shall be of sufficient size and in accordance with relevant Standards to carry out all specified tests.
- (12) Samples taken on the Site shall be selected by, and taken in the presence of, the Employer and shall be suitably marked for their identification. An identification marking system should be evolved at the start of works in consultation with the Employer.
- (13) Samples shall be protected, handled and stored in such a manner that they are not damaged or contaminated and such that the properties of the sample do not change.
- (14) Samples shall be delivered by the Contractor, under the supervision of the Employer, to the specified place of testing. Samples on which non-destructive tests have been carried out shall be collected from the place of testing after testing and delivered to the Site or other locations instructed

by the Employer. '

(15) Samples which have been tested may be incorporated in the Permanent Works provided that:

- (a) the sample complies with the specified requirements;
- (b) the sample is not damaged; and
- (c) the sample is not required to be retained under any other provision of the Contract.

(16) Additional samples shall be provided for testing if in the opinion of the employer:

- (a) material previously tested no longer complies with the specified requirements; or
- (b) material has been handled or stored in such a manner that it may not comply with the specified requirements.

TESTING

The Contractor shall be responsible for all on-site and off-site testing and for all in-situ testing. All appropriate laboratory tests shall be carried out in the Contractor's laboratory, unless otherwise permitted or required by the Employer. Where the laboratory is not appropriately equipped and/or staffed for some tests, or if agreed to by the Engineer, tests may be carried out in other laboratories. All materials required approval of Employer after 3rd party test at approved or reputed laboratory at the discretion of employer.

Authority & Engineer in charge may recommend any test pertain to work or material to any laboratory of repute if they are accredited for the relevant work to a standard acceptable to the Employer. The cost of such tests shall be borne by contractor.

(17) In-situ tests shall be done in the presence of the Employer.

(18) Equipment, apparatus and materials for in-situ tests and laboratory compliance tests carried out by the Contractor shall be provided by the Contractor. The equipment and apparatus shall be maintained by the Contractor and shall be calibrated before the testing starts and at regular intervals as permitted by the Employer. The equipment, apparatus and materials for in situ tests shall be removed by the Contractor as soon as practicable after the testing incomplete.

(19) The Contractor shall be entitled in all cases to attend the testing carried out in the Employer's or other laboratories, to inspect the calibration certificates of the testing machines and to undertake the testing on counterpart samples. Testing of such samples shall be undertaken in laboratories complying with Clause 12 above and particulars of the laboratory proposed shall be submitted to the Engineer for consent prior to the testing.

(20) Attendance on tests, including that by the Employer, Contractor and Designer, shall be as laid down in the Quality Assurance procedures.

COMPLIANCE OF BATCH

(21) The results of tests on samples or specimens shall be considered to represent the whole batch from which the sample was taken.

(22) A batch shall be considered as complying with the specified requirements for a material if the <2 results of specific tests for of the specified properties comply with the specified requirements for the properties.

(23) If additional tests are permitted or required by the Employer but separate compliance criteria for the additional tests are not stated in the Contract, the Employer shall determine if the batch complies with the specified requirements for the material on the basis of the results of all tests, including the additional tests, for every property.

RECORDS OF TESTS

(24) Records of in-situ tests and laboratory compliance tests carried out by the Contractor shall be kept by the Contractor on the Site and a report shall be submitted to the Employer within seven (7) days, or

such other time stated in the Contract or in the Quality Assurance Programme, after completion of each test. In addition to any other requirements, the report shall contain the following details:

- (a) material or part of the works checked
- (b) location of the batch from which samples were taken or location of the part of the works.
- (c) place of testing;
- (d) date and time of tests;
- (e) weather conditions in the case of in-situ tests;
- (f) technical personnel supervising or carrying out the tests;
- (g) size and description of samples and specimens;
- (h) method of sampling;
- (i) properties tested;
- (j) method of testing;
- (k) readings and measurements taken during the tests;
- (l) test results, including any calculations and graphs;
- (m) specified acceptance criteria; and
- (n) other details stated in the Contract.

(25) Reports of tests shall be signed by the site agent or his assistant, or by another representative authorized by the Contractor.

(26) If requested, records of tests carried out by the Employer's staff shall be given to the Contractor.

13. RECORDS

DRAWINGS PRODUCED BY THE CONTRACTOR

- (1) Drawings produced by the Contractor including drawings of site layouts, Temporary Works, etc. for submission to the Employer shall generally be to ISO A1 size. They shall display a title block to these Employer's Requirements. The number of copies to be submitted to the Employer shall be as stated in the Contract, or as required by the Employer.

PROGRESS PHOTOGRAPHS

- (2) The Contractor shall provide monthly progress photographs which have been properly recorded to show the progress of the works to the Employer. The photographs, of not less than 72 in number, shall be taken on locations agreed with the Employer to record the exact progress of the Works. Two sets of photographs shall be provided on Memory Device with two sets of color prints of 175 mm x 125 mm size.
- (3) The Contractor shall mount each set of each month's progress photographs in a separate album of a type to which the Employer has given his consent, and shall provide for each photograph two typed self-adhesive labels, one of which shall be mounted immediately below the photograph and one on the back of the photograph. Each label shall record the location, a brief description of the progress recorded and the date on which the photograph was taken.
- (4) All photographs shall be taken by a skilled photographer whose name and experience shall be submitted to the Employer for consent and approval received. Processing shall be carried out by a competent processing firm to the satisfaction of the Employer.
- (5) The Contractor shall ensure that no photography is permitted on the Site without the agreement of the Employer. Contractor should be aware of the legal regulations and conditions with regard to Photography in 'RESTRICTED AREA' in Bangalore.

RECORDS OF WAGE RATES

- (6) The Contractor shall keep monthly records of the average, high and low wage rates for each trade/tradesman employed on the Site and records shall be made available to the Employer during inspection.

14. MATERIALS

- (1) Materials and goods for inclusion in the Permanent Works shall be new unless the Employer has consented otherwise. Preference shall be given to local materials where available. Approved Manufacturers/Suppliers of few important items have been given in Section-8B of Technical Specifications. These materials shall be procured only from these manufacturers/Suppliers. Under special circumstances provision of sub para 4 below may be invoked.
- (2) Certificates of tests by manufacturers which are to be submitted to the Employer shall be current and shall relate to the batch of material delivered to the Site. Certified true copies of certificates may be submitted if the original certificates could not be obtained from the manufacturer.
- (3) Parts of materials which are to be assembled on the Site shall be marked to identify the different parts.
- (4) Materials which are specified by means of trade or proprietary names may be substituted by materials from a different manufacturer which has received the consent of the Employer provided that the materials are of the same or better quality and comply with the specified requirements.
- (5) Samples of materials submitted to the Employer for information or consent shall be kept on the Site and shall not be returned to the Contractor or used in the Permanent Works unless permitted by the Employer. The samples shall be used as a mean of comparison which the Employer shall use to determine the quality of the materials subsequently delivered. Materials delivered to the Site for use in the Permanent Works shall be of the same or better quality as the samples which have received consent

PROVISION AND DISPOSAL OF EARTHWORKS MATERIALS

- (6) The Contractor shall be responsible for the provision of all classes of earthworks material required for the Works, whether sourced from the excavations within the Contract or obtained from any other sources, which are located outside the Site, for which the Employer has given the consent.
- (7) For fill or dumping sites, the Contractor shall prepare a land plan with details of surface drainage requirements, final formation levels, spreading and compaction of the fill during dumping acceptable to the Employer. The Contractor shall also provide security for such sites.
- (8) All excavated material, excluding waste material, bentonite/polymer fluid and bentonite/polymer contaminated material shall be disposed of at the appointed site only. This material shall be placed and compacted in accordance with the Construction Specification for Earth Works or as otherwise directed by the Employer 's Representative. The disposal of waste material shall be the full responsibility of the Contractor and these materials shall be disposed of by the Contractor at an approved location. No dumping sites will be provided by the Employer.
- (9) Rock deposited as fill material at the dumpsites shall be capable of compaction with single pieces no larger than 300mm.

15. RESTORATION OF AREAS DISTURBED BY CONSTRUCTION.

Unless otherwise directed by the Employer, any area disturbed by the construction activity, either inside or outside the project Right of Access, shall be reinstated as follows:

All areas affected by the construction work shall be reinstated to their original condition, with new materials, including but not necessarily limited to, sidewalks, parking lots, access roads, and adjacent roads, properties and landscaping. Grass cover shall be provided for any bare earth surface areas, along with proper provisions for surface drainage.

16. CONTRACTORS LABOUR CAMPS

- (1) The employer will not provide living accommodation for use of the contractor or any of his staff or labour employed on the works. Living accommodation shall not be established on any land provided to the contractor by the employer for the works.
- (2) Provisions of Labour Camps.

The contractor, shall, at his own expense make adequate arrangements for the housing, supply of drinking water and provisions for bathrooms, latrines and urinals, with adequate water supply for his staff as well as for workman employed on the works directly or through subcontractors at the locations

authorized by engineers. No labour camp shall be allowed at work site/ inside Defence area or any unauthorized place.

The contractor at his own cost shall maintain all camp site in a clean and sanitary conditions, the contractor shall obey all health and sanitary rules and regulations and carry out at his cost all health and sanitary measures, that may from time to time be prescribed by the local/medical authorities and permit inspection of all health and sanitary arrangements at all times by the employer, the employer and the staff of the local municipality or the other authority concerned. Should the contractor failed to provide adequate health and sanitary arrangement these shall be provided by the Employer and the cost will be recovered from the contractor.

The contractor shall, at his own cost, provide first-aid and medical facilities at the labour camp and at work sites on the advice of the medical authority consistent with the strength of the contractor's staff and workman, employed directly or through subcontractors.

The contractor shall at his own cost, provide the following minimum requirements for meeting the fire hazards.

- i. Portable fire extinguishers
- ii. Manual fire alarms
- iii. Water supply for use by the fire service.

The contractor at his own cost shall provide necessary arrangements for keeping the camp area sufficiently lighted to avoid accidents to the workers. He should also ensure that electrical installations done by trained electricians. These installations shall be maintained and daily maintenance record must be made available for inspection by the engineer.

(3) CAMP DISCIPLINE

The contractor shall take requisite precautions, use his best endeavors to prevent any riotous or unlawful behavior by or amongst his workmen, others, employed directly or through sub- contractors. These precautions shall be for the preservation of the peace and protection of the inhabitants and the security of the property in the neighborhood of the Works. In the event of the Employer requiring the maintaining of a Special Police Force at or in the vicinity of the site, during the tenure of the work, the expenses thereof shall be borne by the contractor and if paid by the Employer, shall be recoverable from the contractor.

The sale of alcoholic drinks or other intoxicating drugs or beverages upon the work, in any labour camp, or in any of the buildings, encampments or tenements, own or occupied by, or with the control of, the contractor or any of his personnel employed on the work directly or through sub-contractors shall be forbidden, and the contractor shall exercise his influence and authority to secure strict compliance with this condition. The contractor shall also ensure that no labour or employees are permitted to work at the site in an intoxicated state or under the influence of drugs.

The contractor shall remove from his camp such labour and their families, as refuse protective inoculation and vaccination when called upon to do so by the Engineer on the advice of his Medical Authority. Should Cholera, Plague or any other infectious disease break out, the Contractor shall at his own cost burn the huts, bedding, cloths and other belongings of or used by the infected parties. The contractor shall promptly erect new heads on healthy sides as required by the Employer. Within the time specified by the Employer, failing which the work may be done by the Employer and the cost recovered from the Contractor.

(4) LABOUR ACCOMODATION

The contractor shall provide living accommodation that is equal to or exceeds the minimum criteria established in the following sub-sections, needed to house his staff as well as workers employed directly or through sub-contractor. The buildings shall be constructed so as to have a minimum life of not less than the length of contract.

- (a) The roof shall be watertight and laid with suitable non-flammable materials permissible for residential use under local regulation and for which the consent of the

Engineer has been obtained.

- (b) Each hut shall have suitable ventilation. All doors, windows, and ventilators shall be provided with security leaves and fasteners. Back-to-back units may be avoided.
- (c) The minimum height of each unit shall be 2.1m and shall have separate cooking place.
- (d) Suitable number of common toilets / bathrooms shall be provided.

(5) WATER SUPPLY

The contractor shall provide an adequate supply of water for the use of labours in the camp. The provisions shall not be less than two gallons of pure and wholesome water per head per day for drinking purposes and three gallons of clean water per head per day for bathing and washing purposes. Where piped water supply is available, supply shall be at stand post and where the supply is from wells or river, tanks that may be of metal or masonry shall be provided. The contractor shall also at his expense make arrangements for the provision and laying of water pipe lines from the existing mains wherever available and shall pay for all the fees and charges thereof.

(6) DRAINAGE

The contractor shall provide efficient arrangements for draining away sullage water so as to keep the camp neat and tidy. Surface water shall be drained away from the paths and roads and shall not be allowed to accumulate into ditches or ponds where mosquitoes can breed.

(7) SANITATION

The contractor shall make arrangements for conservancy and sanitation in the labour camps according to the rules and regulations of the Local Public Health and Medical Authorities.

The contractor shall provide a sewerage system that is adequate for the number of the residents in the camp and which meets the requirements of the Municipal Authorities.

SECTION E

GENERAL PLANNING CRITERIA

PURPOSE AND SCOPE

The purpose of this Appendix is to include other criteria and requirements not included elsewhere that are necessary for the full development and for Detailed Design.

OUTLINE DESIGN CRITERIA

1. GENERAL

- 1.1 This Outline Design Criteria and the Appendices hereto provide minimum standards which are to govern the design of the Permanent Works.
- 1.2 The Outline Design Criteria shall be read in conjunction with the other contract documents including the Outline Construction Specifications.
- 1.3 The Design of the Permanent Works shall comply with codes of practice and standards current at the time of submission of Tender Documents, Regulations made and requirements issued by the Indian Government and by relevant utility companies shall be followed and specified.
- 1.4 Alternative or additional codes, standards and specifications proposed by the Contractor shall be internationally recognized codes and shall be equivalent to or better than, Indian Standards subject to being, in the opinion of the Employer, suitable for incorporation into the Specifications.

2. CODES AND STANDARDS

Design and loading requirements for the structures shall be not less than the following Indian Standards and Codes of Practice, together with all applicable amendments.

Where other standards and codes of practice are referred to in the text of other Appendices then the designer is expected to apply those Standards and Codes of Practice unless the designer can show

that an economic case exists for use of an Indian Standard. However, preferences of codes will be as follows: -

- i. IS
- ii. IRC
- iii. AASHTO

IS: CODES: NATIONAL BUILDING CODE		
SP 7:	2015	Bureau of Indian Standards
IS 73:	1992	Paving Bitumen
IS 215:	1995	Road Tar
IS 217:	1988	Cutback Bitumen
IS 226:	1975	Structural steel (standard quality)
IS 269:	2013	Spec s for Ordinary and low heat Portland Cement
IS 278:	1978	Galvanized steel barbed wire for fencing
IS 280:	1978	Mild Steel wire for general engineering purposes
IS 281:	2009	Mild Steel siding door bolts for use with Padlocks
IS 383:	1970	Coarse and fine aggregates
IS 432:	1982	Mild steel and medium tensile steel bars and hard-drawn steel wire for concrete reinforcement
	(Part 1)	Mild steel and medium tensile steel bars
	(Part 2)	Hard-drawn steel wire
IS 455:	1989	Portland slag cement
IS 456:	2000	Code of practice for plain and reinforced concrete
IS 457:	1957	Code of practice for general construction of plain and reinforced concrete for dams and other massive structures
IS 460:	1985	Test sieves
IS 515:	1959	Natural and manufactured aggregates for use in mass concrete
IS 516:	1959	Method of test for strength of concrete
IS 650:	1991	Standard sand for testing cement
IS 800:	2007	Code of practice for general construction in steel structures
IS 814:	1991	Covered electrodes for manual metal arc welding of carbon and carbon manganese steel
IS 815:	1974	Classification coding of covered electrodes for metal arc welding of structural steel
IS 823:	1964	Code of procedure for manual metal arc welding of mild steel
IS 875:	1987	Code of practice for design loads (other than earthquake) for buildings and structures (Parts I, II, IV & V)
IS 875:	2015	Code of practice for design loads (other than earthquake) for buildings and structures (Parts III)
IS 1077:	1992	Common burnt, clay building bricks
IS 1080:	1986	Design and construction of shallow foundation in soil (other than rafting and shell)
IS 1161:	1998	Steel tubes for structural purposes
IS 1239:	1990	Mild steel tubes, tubular and other wrought steel fittings
	(Part 1) 2004	Mild steel tubes
	(Part 2) 1992	Mild steel tubular and other wrought steel pipe fittings

IS 1322:	1993	Bitumen felts for water proofing and damp-proofing
IS 1343:	2012	Code of practice for Pre-stressed Concrete
IS 1364	1992	Hexagon Head bolts, screws & nuts of product grades A & B (Part I)
IS 1489:	1991	Portland Pozzolana Cement
IS 1732:	1989	Dimensions for round and square steel bars for structural and general engineering purposes
IS 1785:	1983	Plain hard-drawn steel wire for pre-stressed concrete
	(Part 1)	Cold-drawn stress – relieved wire
	(Part 2)	As drawn wire
IS 1786:	2008	High strength deformed steel bars and wire for concrete reinforcement
IS 1791:	1985	Batch type concrete mixers
IS 1834:	1984	Hot applied sealing compound for joint in concrete
IS 1838:	1983	Pre-formed fillers for expansion joint in concrete pavements and structures (non extruding and resilient type)
	(Part 1)	Bitumen impregnated fiber
IS 1888:	1982	Method of load tests on soils
IS 1892:	1979	Code of practice for sub surface investigations for foundations
IS 1893	Part I	Criteria for earthquake resistant design of structures
IS 1893	Part II	Criteria for earthquake resistant design of structures
IS 1893	Part III	Criteria for earthquake resistant design of structures
IS 1893	Part IV	Criteria for earthquake resistant design of structures
IS 1904:	1986	Design and construction of foundations in soils General Requirements
IS 1905:	1987	Code of practice for Structural use of unreinforced Masonry
IS 1977:	1976	Low Tensile Structural steel
IS 2062:	2006	Steel for general structural purposes
IS 2090:	1983	High tensile steel bars used in pre-stressed concrete
IS 2116:	1980	Sand for masonry mortars (first revision)
IS 2119:	1980	Code of practice for construction of brick-cum-concrete composite
IS 2386:	1963	Methods of test for aggregate for concrete
	(Part 1)	Particle size and shape
	(Part 2)	Estimation of deleterious materials and organic impurities
	(Part 3)	Specific gravity, density, voids, absorption and bulking
	(Part 4)	Mechanical properties
	(Part 5)	Soundness
	(Part 6)	Measuring mortar properties of fine aggregates
	(Part 7)	Alkali aggregate reactivity
	(Part 8)	Petrography examination
IS 2430:	1986	Methods of sampling of aggregate for Concrete
IS 2502	1963	Code of Practice for Bending and Fixing of Bars for Concrete Reinforcement
IS 2751:	1979	Recommended practices for welding of mild steel plain and deformed bars used for reinforced construction
IS 2911:	2010	Code of practice for design and construction of pile foundations
	(Part 1)	Concrete piles 3
	Section 1	Driven cast-in-situ concrete piles
	Section 2	Bored cast-in-situ concrete piles
	Section 3	Driven precast concrete piles
	Section 4	Bored precast concrete piles
	(Part 3)	Under-reamed piles
	(Part 4)	Load test on piles

	(2013)	
IS 2950:	1981	Code of practice for design and construction of raft foundations.
IS 3812:	2003	Fly ash for use as pozzolona and admixture
IS 4082:	1996	Recommendations on stacking and storage of construction materials at site
IS 4138:	1977	Safety code for working in compressed air
IS 4326:	1993	Earthquake resistant design and construction of buildings – code of practice
IS 4656:	1968	Form vibrators for concrete
IS 4736:	1986	Hot-dip zinc coating on mild steel tubes
IS 4826:	1979	Hot-dipped galvanized coatings – round steel wires
IS 4925:	1968	Concrete batching and mixing plant
IS 4926:	1976	Ready mixed concrete
IS 4923:	1997	Hollow steel sections for structural use -specification
IS 4968:	1976	Method for sub surface sounding for soils
IS 5525:	1969	Recommendations for detailing of reinforcement in reinforced concreteworks
IS 5529:	1985	Code of practice for in-situ permeability tests
IS 5640:	1970	Method of test for determining aggregate impact value of soft coarse aggregate
IS 5816:	1970	Method of test for splitting tensile strength of concrete cylinders
IS 5889:	1994	Vibratory plate compactor
IS 5892:	1970	Concrete transit mixers and agitators
IS 6003:	1983	Specification for indented wire for pre-stressed concrete
IS 6006:	1983	Specification for uncoated stress relieved strands for pre- stressed concrete
IS 6403:	1981	Code of practice for determination of bearing capacity of shallow foundations
IS 6603:	1972	Stainless steel bars and flats
IS 6911:	1992	Stainless steel plate, sheet and strip
IS 7205:	1974	Safety codes for erection of structural steel work
IS 7293:	1974	Safety code for working with construction machinery
IS 7320:	1974	Concrete slump test apparatus
IS 7861:	1975	Code of practice for extreme weather concreting
	(Part 1)	For Hot Weather
	(Part 2) 1981	For Cold Weather
IS 7969:	1975	Safety code for handling and storage of building materials
IS 8009	1976	Calculation of settlement of shallow foundations
IS 8041:	1990	Rapid - hardening Portland cement
IS 8112:	1989	43 grade ordinary Portland cement
IS 8142:	1994	Method of test for determining setting time of concrete by penetration resistance
IS 8500:	1991	Structural steel-micro alloyed (medium and high strength qualities)
IS 9013:	1978	Method of making, curing and determining compressive strength of accelerated cured concrete test specimens
IS 9103:	1979	Admixtures of concrete
IS 9284:	1979	Method of test for abrasion resistance of concrete
IS 9417:	1989	Recommendations for welding cold worked bars for reinforced concrete construction
IS 9595:	1996	Recommendations for metal arc welding of carbon and carbon manganese steels

IS 10262:	1982	Recommended guidelines for concrete mix design
IS 10379:	1982	Code of practice for field control of moisture and compaction of soils for embankment and sub-grade
IS 12070:	1987	Code of Practice for Design and Construction of Shallow Foundations on Rocks
IS 12269:	2013	53 grade ordinary Portland cement
IS 12894:	2002	Fly ash line bricks
IS 13920:	2016	Ductile detailing of Reinforced Concrete Structures subjected to Seismic Forces
IS 14268:	1995	Uncoated Stress Relieved Low relaxation Seven-ply Strands for Prestressed Concrete
IS 14593:	1998	Design And Construction of Bored Cast-In-Situ Piles Founded on Rocks- Guidelines. IS 15658 : Precast Blocks

3. STRUCTURAL DESIGN CRITERIA

3.1 DESIGN LIFE

3.2 The design life of a structure is that period for which it is designed to fulfill its intended function when inspected and maintained in accordance with agreed procedures. The assumption of a design life for a structure or component does not necessarily mean that the structure will no longer be fit for its purpose at the end of that period. Neither will it necessarily continue to be serviceable for that length of time without adequate and regular inspection and routine maintenance.

3.3 All Design Life criteria shall be confirmed during detailed design by the Employer's Representative.

3.4 CIVIL ENGINEERING STRUCTURES

All components of Permanent Works including viaduct structures shall be designed for a design life of 100 years.

4. SERVICEABILITY

- 4.1 Paint systems for steelwork shall ensure a minimum life of 15 years before full maintenance painting is required.
- 4.2 The corrosion protection of non-structural steel items shall be appropriate to the accessibility of the item for inspection and maintenance.
- 4.3 Serviceability of electrical and mechanical equipment included in this Contract shall be 5 to 25 years, depending on the various items.

5. NOISE ABATEMENT

Allowable Range of Noise Levels:

Generally, the allowable range of noise levels for different land uses is:

- | | | |
|------|-----------------------|-------------|
| i. | Residential | 50 - 70 dbA |
| ii. | Business & Commercial | 75 dbA |
| iii. | Hospitals | 60 dbA |
| iv. | Rural | 45 - 50 dbA |

Provision of Noise Barriers:

Structures shall be designed to reduce noise to locally acceptable levels by provision of low vibration track forms, resilient base plates and also design of parapet walls and treatment of their track side surfaces. They can be supplemented by providing sound elimination material on sides of the viaduct superstructures. But in many locations, existing noise level itself may be much higher at 1.0 to 1.2 meters above walkway level. Noise barriers may be required in some lengths of viaducts and bridges passing through sensitive residential or hospital zones. The choice of type and their disposition along the parapet railing is also closely related to aesthetics of the structure.

5.1 DESIGN PROCEDURES

Reinforced concrete members shall be designed in conformity with the provisions of IS Codes.

5.2 SUBSTRUCTURE AND FOUNDATIONS

Substructure and Foundations: As per IS.

5.3 METHOD OF CONSTRUCTION

Stresses in partially completed structures shall be analyzed for appropriate critical conditions at various stages of the construction. Any restriction on the construction operations resulting from the design assumptions shall be clearly specified on the contract drawings and specifications. Conversely, advantage may be taken by the designer of specified construction procedures or sequences to effect a more favorable distribution of loads or stresses.

5.4 MOVEMENT/EXPANSION JOINTS

Movement/expansion joints and other necessary measures to control shrinkage and thermal effects shall be incorporated in the structural design so that the performance of architectural finishes or of any services are not adversely affected during normal working conditions.

Movement/expansion joints shall be designed to be easily maintained and replaceable.

5.5 DESIGN SURFACE CRACK WIDTH

Design Surface Crack Width: As per IS.

5.6 TEMPERATURE EFFECTS

Temperature effects: As per IS.

6. FOUNDATIONS AND GEOTECHNICAL WORKS

GEOTECHNICAL DATA

- 6.1 "Geotechnical works" shall mean foundations, earthworks, deep excavations, slopes, embankments and earth retaining structures. It shall also include dewatering and any ground related activities in soil and rock.
- 6.2 The Contractor shall be responsible for determining for his design purposes the Geology and the Geotechnical parameters of the sub-surface strata along the route.
The geo-technical investigations are to be carried out by the Contractor on which the design should be based. GT Investigation shall be carried out as directed by Employer.
- 6.3 In his design the Contractor shall take adequate measures to minimize the amount of local differential settlement of road surfaces around underground works
- 6.4 Minimum No. of piles in a pile group is generally four.
- 6.5 The type of foundation shall depend on soil and site condition.

6.6 EARTH WORKS

Earth Works For Formation. IS Codes shall be followed.

**TENDER DOCUMENTS
APPENDICES**

EMPLOYER'S REQUIREMENTS

APPENDIX-1

DRAWING LIST

Following drawings are enclosed with tender for guidance and general information: -

EMPLOYER'S REQUIREMENTS

APPENDIX-2A

WORK AREAS

WORK AREAS

No land shall be made available by the employer for casting yard, site offices, and site laboratories. Contractor shall make his own arrangements at his own cost. In case the Railway land/ Defence land/ Govt. land is arranged, necessary land rent /lease charges shall be levied as advised by concerned/ Govt. authority norms /K-RIDE norms and the same will deducted from RA bills of the Contractor.

EMPLOYER'S REQUIREMENTS

APPENDIX-3

PROJECT CALENDAR

- (1) The Project Weeks shall be commenced on a Monday. A day shall be deemed to commence at 00:01 hour on the morning of the day in question. Where reference is made to the completion of an activity or Milestone by a particular week, this shall mean by midnight on the Sunday of that week.
- (2) Requirements for the computation of Key Dates are given in Annexure-1 of Employer's Requirements.
- (3) A 7-day week calendar shall be adopted for various (Work) programme schedules for scheduling purposes.
- (4) For Project purposes, the presentation shall be in "Week" units.

EMPLOYERS REQUIREMENTS

APPENDIX-5

MONTHLY PROGRESS REPORT

GENERAL

The Contractor shall submit to the Employer, a Monthly Progress Report. This Report shall be submitted by the end of each calendar month and shall account for all work actually performed from 26th day of the last month and up to and including the twenty-fifth (25th) day of the month of the submission. It shall be submitted in a format to which the Employer shall have given his consent and shall contain sections /sub-sections.

1. FINANCIALSTATUS

- (1) A narrative review of all significant financial matters, and actions proposed or taken in respect to any outstanding matters.
- (2) A spread sheet summarizing each activity, the budget, costs incurred during the period, costs to date, costs to go, cost forecast (total of costs to date and costs to go) and cost variance (difference between cost forecast and budget).
- (3) A spread sheet indicating the status of all payments due and made.
- (4) A report on of the status of any outstanding claims. The report shall in particular provide interim updated accounts of continuing claims.

2. PHYSICAL PROGRESS

- (1) It shall describe the status of work performed, significant accomplishments, including critical items and problem areas, corrective actions taken or planned and other pertinent activities, and shall, in particular, address interface issues, problems and resolutions.
- (2) It shall include a simplified representation of progress measured in percentage terms compared with percentage planned as derived from the Works Programme.

3. PROGRAMME UPDATE (For Entire Project)

Programme updating shall include:

- (a) the monthly Programme Update which shall be prepared by recording actual activity completion dates and percentage of activities completed up to the twenty-fifth (25th) of the month together with estimates of remaining duration and expected activity completion based on current progress. The Programme Update shall be accompanied by an Activity Report and a Narrative Statement. The Narrative Statement shall explain the basis of the Contractor's submittal:
 - (i) Early Work and Baseline Submittals - explains determination of activity duration and describes the Contractor's approach for meeting required Key Dates as specified in the Contract.
 - (ii) Updated Detail Programme Submittals - state in narrative the Works actually completed and reflected along critical path in terms of days ahead or behind allowable date. The requirements of the narrative are
 - i. If the Updated Detailed Work Programme indicates an actual or potential delay to Contract Completion date or Key Dates, identify causes of delays and provide explanation of Work affected and proposed corrective action to meet Key Dates or mitigate potential delays. Identify deviation from previous month's critical path.
 - ii. Identify by activity number and description, activities in progress and activities scheduled to be completed.
 - iii. Discuss Variation Order Work Items, if any.
- (b) The Programme Status which shall:
 - (i) Show Works Programme status up to and including the current report period, display Cumulative progress to date and a forecast of remaining work.
 - (ii) Be presented as a bar-chart size A3 or A4 and as a time-related logic network diagram on an A1 media, including activity listings;
 - (iii) The Activity Variance Analysis- which shall analyse activities planned to start prior to 01 during the report period but not started at the end of the report period as well as activities started and/or completed in advance of the Works

EMPLOYER'S REQUIREMENTS

APPENDIX-6

QUALITY ASSURANCE

1. GENERAL

The Contractor shall implement a Quality Management Plan. This plan shall apply to all activities related to the quality of items, including designing, testing, storing, and shipping of materials and different elements of construction work.

EMPLOYER'S REQUIREMENTS
APPENDIX-7
DRAFTING AND CAD STANDARDS

1. INTRODUCTION

- (1) The purpose of this document is to define the minimum Drafting and CAD standard to be achieved by the Contractor for all drawings produced by the Contractor for the purpose of the Works.
- (2) By defining a common format for the presentations of drawings and CAD files, the exchange of drawn information is improved and will maximize the use of CAD in the co-ordination process.
- (3) All submissions shall be made to the Employer's Requirement in a format reviewed without objection by the Employer's Requirement and in accordance with the requirements in and as approved by the Employer:
 - (a) the Contract;
 - (b) the Document Submittal Instructions to Consultants and Contractors.
- (4) Paper and drawing sizes shall be "A" series sheets as specified in BS3429.
- (5) The following software latest and update version compatible for use with Mac / Intel-Windows based computers shall be used, unless otherwise stated, for the various electronic submissions required:

Document	Type	Electronic Document Format
Text	Documents	MS Word,
Spread	Sheets	MS Excel,
Data Base	Files	MS Access,
Presentation	Files	MS PowerPoint or Keynote (Mac) or any other approved by the Employer,
Programmes	Ver2.0a	Primavera for Windows or any other approved PIMS, Sure track AutoCAD Graphics CorelDraw / AutoCAD
Photographic		Adobe Photoshop,
Desktop	Publishing	Page Maker
CADD	Drawings	AutoCAD

- (6) Media for Electronic File Submission

One copy shall be submitted unless otherwise stated in Memory Device.

- (7) Internet File Formats/Standards

- (a) The following guidelines shall be followed when the Contractor uses the Internet browser as the communication media to share information with the Employer.
- (b) All the data formats or standards must be supported by Microsoft Internet Explorer version 3 or above running on Windows NT and Windows 10 or the latest.
- (c) The following lists the file types and the corresponding data formats to be used on Internet.

The Contractor shall comply with them unless prior consent is obtained from the Employer's Requirement for a different Data format:

File Type	Data Format
Photo Image	Joint Photographic Experts Group (JPEG)
Image other than Photo	GIF or JPEG
Computer Aid Design files(CAD)	Computer Graphics Metafile (CGM)
Video	Window video (.avi)

Sound	Wave file (.wav)
-------	------------------

- (8) The following states the standards to be used on Internet when connecting to database(s). The Contractor shall comply with them unless prior consent is obtained from the Employer's Requirement for a different standard:

Function to be Implemented	Standard to be Complied With
Database connectivity	Open Database Connectivity (ODBC)
Publishing hypertext language on the World Wide Web	Hypertext Markup Language (HTML)

The hard copy of all documents shall be the contractual copy.

2. GENERAL REQUIREMENTS

1. GENERAL

- (1) The Contractor shall adopt a title block similar to that used in the Drawings for all drawings prepared under the Contract. It shall be approved by the Employer.
- (2) Each drawing shall be uniquely referenced by a drawing number and shall define both the current status and revision of the drawing.
- (3) The current status of each drawing shall be clearly defined by the use of a single letter code as follows:
 - P - Preliminary Design Drawing
 - D - Definitive Design Drawing
 - C - Construction Reference Drawing
 - W - Working Drawing
 - B - As-Built Drawing
 - M - As Manufactured Drawing
 - E - Employer's Drawing

2. TYPES OF DRAWING

- 1) 'Design drawings' mean all drawings except shop drawings and as-built drawings.
- 2) Working drawings are design drawing of sufficient detail to fully describe the works and adequate to use for construction or installation.
- 3) Site drawings and sketches are drawings, often in sketch form, prepared on site to describe modifications of the Working drawings where site conditions warrant changes that do not invalidate the design.
- 4) 'Shop drawings' are special drawings prepared by the manufacturer or fabricator of various items within the Works to facilitate manufacture or fabrication.
- 5) 'As-built drawings' show the Works exactly as constructed or installed. They are usually prepared by amending the working drawings to take into account changes necessitated by site conditions and described in Site drawings. These drawings shall be completed on a regular basis as the works progress, and shall not be left until completion of the entire works.

3. COMPUTER AIDED DESIGN & DRAFTING (CAD) STANDARDS

3.1 INTRODUCTION

SCOPE OF USE

Data input procedures between the Employer and contractors must be coordinated, and the key parameters used to form CAD data files must be standardised. The production of all CAD data files shall comply with the following requirements.

3.2 OBJECTIVES

The main objectives of the CAD standards are as follows:

- (a) To ensure that the CAD data files produced for Project are co-ordinated and referenced in a consistent manner.
- (b) To provide the information and procedures necessary for a CAD user from one discipline or external organisation to access (and use as background reference), information from a CAD data file prepared by another discipline or external organisation.
- (c) To standardise the information contained within CAD data files which may be common to more than one discipline such as drawing borders, title boxes, grid lines etc.
- (d) To establish procedures necessary for the management of CAD datafiles.
- (e) To ensure all contractors use 'Model space' and 'Paper space' in the production of their CAD files.

3.3 GENERAL

- (1) To facilitate co-ordination between contractors, it is a requirement that all drawings issued by contractors for co-ordination or record purposes shall be produced using CAD methods. Drawings shall be issued in digital format in addition to the paper copies.
- (2) The intent of the issue of digital information is to aid the related design by others. The definitive version of all drawings shall always be the paper or polyester film copies which have been issued by the contractor or organisation originating the drawing.
- (3) Drawings and drawing packages issued for co-ordination, record purposes or for acceptance shall be accompanied by a complete set of the corresponding CAD datafiles.
- (4) Any contractor or organization making use of the CAD data from others shall be responsible for satisfying him that such data is producing an accurate representation of the information on the corresponding paper drawing which is satisfactory for the purpose for which he is using it. Provided the general principles of this section have been achieved by the originator of the CAD data, contractors making use of the CAD data from others shall not be entitled to require alterations in the manner in which such CAD data is being presented to them.
- (5) In particular, automatic determination of physical dimensions from the data file shall always be verified against the figured dimensions on the paper or polyester drawings. Figured dimensions shall always be taken as correct where discrepancies occur.

3.4 PAPER DRAWINGS

- (1) For the Project "Paper" drawings are considered to be the main vehicle for the receipt and transmittal of design and production information, typically plans, elevations and sections.
- (2) The Project wide accepted media for the receipt and transmittal of "Paper" drawings will be paper and polyester film of various standard ISO 'A' sizes. The composition of this information shall be derived from a CAD "Model".
- (3) The CAD derived "Paper" drawing composition will reflect a window of information contained within a CAD "Model Space" file together with a selection of information contained within the associated CAD "Paper Space" file.

3.5 CAD DATA CREATION, CONTENT & PRESENTATION

A consistent method of CAD data creation, together with content and presentation is essential. The method of CAD "Model Space and Paper Space" creation is as follows:

- (1) Model Space Files
 - (a) Typically, CAD "Model Space" files are required for general arrangement and location plans and will consist of a series of other "Model Space" referenced CAD files covering the total design extents at a defined building level (the number of referenced files should be kept to an absolute minimum). Data contained within a CAD "Model Space" file is drawn at full size (1:1) and located at the correct global

position and orientation on the Project Grid / or defined reference points.

- (b) Each CAD "Model Space" file will relate to an individual discipline. Drawing border / text, match / section lines or detailed notation shall NOT be included within a CAD "Model Space" file. Dimensions shall be included within a CAD "Model Space" but located on a dedicated layer. Elevations, Long Sections and Cross Sections shall also be presented in CAD "Model Space" as defined above, but do not need to be positioned and orientated on the Project Grid.
- (2) Paper Space CAD Files
- (a) Paper Space CAD files are utilized to aid the process of plotting "Paper" drawings and are primarily a window of the CAD "Model Space" file. A "Paper Space" CAD file will typically contain drawing borders, text, match or section lines & detailed notation. Once these files are initially set up and positioned the majority of "Paper Drawing" plots at various approved scales are efficiently and consistently generated by displaying different combinations of element verse and symbology contained within the "Paper Space" file and the referenced "Model Space" files.
 - (b) The purpose is to ensure that total co-ordination is achieved between the CAD "Model Space" file and the "Paper Drawing" output during the revision cycle of the design and production process. Duplicated data in "Model and paper Space" files will not be acceptable unless an automatic update link exists between the two data sets. "Paper Space" files are not typically required as part of the CAD Media Receipt from contractors, unless specifically requested.

3.6 CAD QUALITY CONTROL CHECKS

- (1) Random CAD Quality Control Audits will be carried out by Employer on all CAD media received and transmitted.
- (2) These checks DO NOT verify the technical content of the CAD data received or transmitted (as this is the responsibility of the originating organization), however compliance with Project CAD and Droughting Standards shall be checked.
- (3) In addition, all contractors who transmit and receive CAD data from the Project shall have CAD quality control procedures in place. A typical quality control procedure shall contain CAD data quality checking routines coupled with standards for CAD data transmittal and archiving.

3.7 CAD DATA TRANSFER MEDIA AND FORMAT

When CAD data is received & transmittal between Engineer and the Contractor, the media shall be as follows:

- (a) Data Exchange Format - AutoCAD Release 14 (.DWG) or latest version
- (b) Operating System - windows Latest version
- (c) Data Transfer Media: Memory Stick/ RW of adequate capacity
- (d) All CDs must be labeled on the data shield with:
 - (i) Name of Company
 - (ii) Project Title
 - (iii) Drawing Filenames (for diskettes only)
 - (iv) CD no.
- (e) All media shall be submitted with a completed Form
- (f) The Contractor must ensure the supplied media is free from virus. SUB-directories on tapes or disks are not permitted. If CAD Data is created using UNIX, archive commands must be unrooted.

3.8 CAD MEDIA RECEIPT & TRANSMITTAL

- (1) CAD Media Transmittal (from the Contractor to Employer) - this will consist of the following:
 - (a) CAD Digital Media
 - (b) CAD data sheet
 - (c) CAD issue / revision sheet

- (d) CAD Quality Checklist confirming compliance.
- (e) Plot of each "Model Space" file issued on an A1 drawing sheet (to best fit).
- (2) The above CAD media will be collectively known as "CAD Media Transmittal Set". The CAD data file transmittal format required by Employer 's Representative from all contractors shall be in AutoCAD (Latest version)
- (3) All CAD media received from contractors will be retained by Employer except for SCSDisk (if used) as an audit trail / archive of a specific contractor's design evolution.
- (4) CAD Media Receipt (from Employer to the Contractor)
 - (a) CAD media should normally be obtained from the respective interfacing contractor(s), but should Employer issue CAD media it will consist of the following:
 - (i) CAD Digital Media typically contain only CAD "Model Space" files.
 - (ii) CAD data sheet.
 - (iii) CAD issue / revision sheet
 - (b) The above CAD media will be collectively known as the "CAD Media Receipt Set". The CAD data file transmittal format used by Employer to all contractors will be in AutoCAD (version 14)
 - (c) Each CAD transmittal CD will be labeled with proper disk label as approved by the Employer/ Any CAD data transmitted without this label is assumed to be provisional information not to have been quality checked and therefore not formally issued.

3.9 REVISIONS

- (1) All 'Revisions', 'In Abeyance' and 'Deletions' shall be located on a common layer. This layer can be turned on or off for plotting purposes.
- (2) The following example text indicates the current CAD file revision, i.e., 'Revision [A]'. This shall be allocated to a defined layer on all CAD "Model Space" files, in text of a size that will be readable when the CAD "Model Space" file is fitted to the screen, with all levels on.

3.10 CAD DIMENSIONING

Automatic CAD Dimensioning will be used at all times. Any dimensional change must involve the necessary revision to the model space file. If the CAD Quality Control Checks find that the revisions have not been correctly carried out, the rejection of the entire CAD submission will result.

3.11 LINE THICKNESS AND COLOUR

To assist plotting by other users, the following colour codes will be assigned to the following linethickness / pen sizes.

Colour	Code No	Line Thickness
Red	10	0.18
White	7	0.25
Yellow	2	0.35
Brown	34	0.5
Blue	130	0.7
Orange	30	1.0
Green	3	1.4

Grey	253	2.0
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3.12 CAD UTILIZATION OF 2D & 3D FILES

Although the project standard is 2D CAD files, certain disciplines and contractors may use 3D CAD files for specific applications or where the isolated use of 3D aids the design and visualization process (i.e., Architecture, Survey and Utilities). In these specific instances 3D CAD data will only be transmitted if all other users can use this data. If this is not the case, 3D to 2D translation shall be processed by the creator prior to issue.

3.13 CAD FILE NUMBERING

- (1) Contractors CAD File Numbering shall be described in 2.2 above.
- (2) Employer CAD File numbering unlike most of the contractors, Employer will not be required to produce numerous CAD files. This will follow the numbering system Except that the status of the drawing in 2.1(3) shall be "E".

3.14 CAD FILE NAMING CONVENTION - GENERAL

CAD "Model Space" files shall be named in accordance with general drawing conventions. Note: The CAD standards shall be compatible with BIM platform of K-RIDE.

EMPLOYER'S REQUIREMENTS

APPENDIX-8

WORKS AREAS & TEMPORARY POWERSUPPLY

1. INTRODUCTION

- (1) The Contractor shall provide within the designated principal Works Areas, at locations agreed with the Employer, the compounds and facilities for the Employer
- (2) The standard conditions applying to the use of any Works Area by the Contractor for its site facilities are given under Clause 2 of this Appendix.
- (3) The Conditions for supply of electricity by the Contractor to Designated Contractors are given under Clause 3 of this Appendix.

2. STANDARD ENGINEERING CONDITIONS

The following standard engineering conditions apply to all Works Areas:

- (1) Formation
 - (a) The Works Areas shall be formed to the levels that the Employer has given his consent. No levels shall be amended without prior consent of the Employer.
 - (b) The Works Areas shall be surfaced in a manner agreed with the Employer, compatible with their intended use, and, in particular, footpaths and roadways connecting facilities shall be clearly defined. Measures shall be taken to the satisfaction of the Employer to ensure all areas are properly drained and kept free of static water.
 - (c) The removal, diversion or reinstatement elsewhere as may be required of any existing works or installation whatsoever within the Works Areas shall be carried out to the satisfaction of the Employer.
- (2) Roads & Parking
 - (a) Space shall be provided within the Works Areas for parking, loading/unloading and maneuvering of motor vehicles.
 - (b) Any damage done to the adjoining public roads and fixtures and properties (public or private) shall be made good to the satisfaction of the Employer.
- (3) Drainage & Sewerage
 - (a) All storm or rainwater from the Work Areas including any access roads thereto shall be conveyed to

the nearest stream course, catch-pit, channel or storm water drain as required by the Employer. All temporary and permanent works shall be carried out in such a manner that no damage or nuisance are caused by storm water or rain water to the adjacent property.

- (b) No drain or watercourse shall be used without consent of the Employer.
 - (c) Damages or obstructions caused to any watercourse, drain, water-main or other installation within or adjoining the Works areas shall be made good to the satisfaction of the Employer.
 - (d) Treatment and disposal of sewage and waste water from the works areas shall be provided to the satisfaction of the Employer.
- (4) Buildings
- (a) No permanent structures other than those required for the Permanent Works shall be Temporary permitted on the Works Areas.
 - (b) Electricity, water, telephone and sewerage shall be provided by the Contractor, as required, for all temporary buildings.
 - (c) No potable water obtained from the Govt. sources shall be used for heating, cooling and humidification purposes, or vehicle washing without the written consent of the Employer.

(5) Pedestrian Access

Every existing pedestrian access throughout the Works Areas shall be maintained in a usable condition at all times to the satisfaction of the Employer including lighting, signing and guarding.

(6) Fencing

The Works Areas shall be secured against unauthorised access at all times. In particular fencing or the like shall be maintained, removed and re-erected in the new location wherever and whenever a Works Area is relinquished in stages.

3. APPLICABILITY

- (1) Where the Contractor is required to provide temporary electrical supplies, or to use, extend or expand on temporary supplies installed by others, all such activity shall be executed in accordance with Paragraphs of this Appendix.
- (2) When the Contractor makes use of temporary electrical supplies provided by others he will observe and comply with the requirements of this Appendix.

4. WORK ON SITE

- (1) The contractor shall nominate a representative whose name and qualifications shall be submitted in writing to the Employer for review not later than 4 weeks before the appointment and who shall be solely responsible for ensuring all the necessary equipment on site. The contractor shall not install or operate any temporary site electrical systems until his representative is appointed and has commenced duties.
- (2) The name and contact telephone number of the representative having been reviewed without objection by the Employer shall be displayed at the main distribution board for the temporary electrical supply so that he can be contacted in case of an emergency.
- (3) Schematic diagrams and the details of the equipment for all temporary electrical installations shall be submitted by the Contractor, and these diagrams together with the temporary electrical equipment shall be submitted to the Engineer for his consent.
- (4) All electrical installation work on Site shall be carried out in accordance with the requirements laid down in BS 7375 and the Specification. All work shall be supervised or executed by qualified and suitably categorized electricians, who are registered as such under the Electricity Ordinance 1990/Electricity (Registration) Regulations 1990.

5. ELECTRICAL GENERAL

Temporary electrical Site installations and distribution systems shall be in accordance with: -

- (1) The Power Companies' Supply Rules;
- (2) Electricity and its subsidiary Regulations;
- (3) IEE Wiring Regulations (16th Edition);
- (4) BS 7375 Distribution of Electricity on Construction and Building Sites;
- (5) BS 4363 Distribution Assemblies for Electricity Supplies for Construction and Building Sites; and
- (6) BS 6164 Safety in Tunneling in the Construction Industry.
- (7) Any other applicable national standards

6. MATERIALS, APPLIANCES AND COMPONENTS

All materials, appliances and components used within the distribution system shall comply with BS 4363 and BS 7375 Appendix A.

7. DESIGN CONSIDERATIONS

- (1) Distribution equipment utilized within the temporary electrical distribution system shall incorporate the following features:-
 - (a) Flexibility in application for repeated use;
 - (b) Suitability for transport and storage;
 - (c) Robust construction to resist moisture and damage; and
 - (d) Safety in use.
- (2) All cabling shall be run at high level whenever possible and firmly secured to ensure they do not present a hazard or obstruction to people and equipment.
- (3) The installation on Site shall allow convenient access to authorized and competent operators to work on the apparatus contained within.

EMPLOYER'S REQUIREMENTS
APPENDIX-10
APPROVED MANUFACTURERS /SUPPLIERS
Refer Annexure to Technical Specification

EMPLOYER'S REQUIREMENTS
APPENDIX-11
UTILITIES

UTILITIES

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DEFINITIONS

1. UTILITIES:

Utilities are defined as public utilities above or below ground and include all live water mains, sewer mains, water wells, power cables, streetlights, transformers, pillar boxes, telephone posts, telecommunication cables, gravity sewers, storm water drains, gas lines which are either shown on the Employer's Drawings or identified on site by the Contractor

1.3 Responsibility of the Contractor.

- 1.3.1 The Contractor shall make his own enquiries and investigations, including excavating trial holes/pits, to ascertain the existence, nature, location, and size of utilities. A schedule of utility diversions and utilities to remain but to be supported / protected (the utility diversion plan) shall be prepared by the Contractor and submitted.
- The schedule will list out utilities that:
- i. will be diverted by the Contractor during the course of the Works, and
 - ii. will remain in place and require the use of specific construction protection methods to complete the underground structures around and below the utilities including support of the utilities during construction by the Contractor.
- 1.3.2 The Contractor shall take into consideration the time required for utility diversions into the overall Works Programme for the Contract. However, efforts shall be made to avoid diverting/disturbance of any utility and continue the Works by supporting the same but the required services being provided by these utilities shall be maintained at all the times by the Contractor. Any delay to construction works due to delay in Utility diversion work will be responsibility of contractor, no claims shall be entertained in this regard.
- 1.3.3 The diversion work shall be undertaken by the Contractor as per the approval of the Utility owning Agencies and a notice from the Employer. Temporary supports and protection by methods proposed by the Contractor and agreed by the Utility Agency shall be provided to the utilities. Permanent supports and protection shall be provided wherever required for the safety and security of the utility service.
- 1.3.4 The Contractor shall immediately inform the Employer and the Utility Agencies of any
- (a) damage to utilities.
 - (b) leakage of utilities.
 - (c) discovery of utilities not previously identified.
- 1.3.5 When diverting and/or protecting sewerage and storm water lines the Contractor shall ensure that drainage to the site and adjacent areas is maintained at all times and that at no times flooding/overflow or other nuisance occurs.
- 1.3.6 The Contractor shall inform the Employer of the programme of all works of utility diversion/ protection works and shall take all steps to enable the utility diversions to proceed in accordance with the programme. The Contractor shall maintain close liaison with the Utility Agencies. The Contractor shall set up and manage a Utility Liaison Group of experienced personnel for the duration of the Contract.
- 1.3.7 Records of the existing utilities encountered shall be kept by the Contractor on the Site and a copy provided for the Employer. The records shall contain the following details:
- (a) location of utility.
 - (b) date on which the utilities were encountered.
 - (c) nature and sizes of the utilities.
 - (d) condition of utility.
 - (e) temporary or permanent supports provided, and
 - (f) Diversions made –Temporary or permanent
- 1.3.8 The Contractor shall include the details (plan, location, ownership, size, and material) of all such utilities on the As Built Drawings.
- 1.3.9 The diversion/protection of utilities shall be covered under the provisional sum given in the Pricing Summary under schedule-L. The Contractor shall be paid as per the current Schedule of Rates of the respective departments (KPWD, BWSSB, BESCO, BSNL, or any other Govt agency etc.) plus 10% for overhead and profit. The priority of reference for deriving rate shall be in the same order as stated above. Until such time as such rate(s) are agreed or fixed, the Employer, shall determine the provisional rate(s) to enable IPC to be issued by the Employer.
- 1.3.10 Temporary diversion of each utility is allowed for one time. If the utility is to be restored, permanent restoration shall be considered in addition to the temporary diversion.

1.3.11 NOC & Approval of schemes for Diversion of Utilities from the concerned regulatory /statutory/Local Authority is the responsibility of the Contractor in coordination with Employer, Employer will only assist in getting permission and nothing extra is payable on this account. Similarly, necessary precautions which are specified from time to time by the utility owning agencies shall be followed. Contractor should make his own survey for identification of underground/above ground utilities.

2. DIVERSION AND PROTECTION OF UNDERGROUND/OVERHEAD UTILITY LINES

- 2.1 The work comprises of replacement, relocation, diversion and protection of existing subsurface, surface and overhead public utilities viz. sewer mains, water lines, water wells, storm water drains, gully pits including connection pipes, house drains, gas pipe lines, electric and telephone cables, optical fibre cables including their appurtenance structure, O.H. electrical transmission line, electric poles, traffic signals, etc. which will be disturbed due to construction of the metro stations, where applicable.
- 2.2 The Contractor shall effectively protect all public utilities falling within the stations, station entry & exit locations and their immediate adjoining areas or which are likely to be exposed, disturbed or damaged during the execution of the work or in consequence thereof, in such a manner and using such materials as required or specified by the concerned public Utility Agencies and as per instruction of the Employer, and hold them in proper position without any damage being caused to them during execution of work. Where adequate spaces are not available adjacent and outside the stations, the utilities may have to be hanged within the station-box itself to facilitate the construction work.
- 2.3 The contractor shall provide and lay pipes, water wells, gas mains/gully pit connections/house drains and other electric, telephones, copper telecom cable, optical fibre cables and other cables or any other underground structures or services falling within the station and their immediate adjoining areas which may be found to have been disturbed or damaged due to the Contractor's fault and/or defective and careless workmanship. The decision of the Employer in this respect shall be binding and final and all costs of rebuilding or repairing of such damaged services or structures as foresaid shall be deducted from the Contractor, if the same is not taken care of within a reasonable time frame, mutually agreed between the Employer and the Contractor. The claim or penalty imposed by the concerned utility department for the damage of utilities done by the contractor shall be recovered from the Contractor.
- 2.4 The Contractor shall enquire of and collect information from all concerned public Utility agencies, owners, Government Departments and local bodies in connection with the sewer lines, water mains, water wells, cables, wires and any other obstruction either overhead or on ground or underground which may be encountered in the course of execution of the work and which are likely to affect the progress of the work, at his own cost and risk. No idle labour charge will be admissible on account of delay in collecting the above-mentioned information.
- 2.5 The Contractor shall have to excavate trial trenches of suitable sizes for satisfactorily exploring all the underground utilities as required and as instructed by the Employer before commencement of any permanent work below ground level. All works related to utility identification and preparation of drawings obtaining stake holders approval shall be included in the Contractors quoted price. The time of completion for the project is inclusive of diverting and/or protection (temporary as well permanent) of utilities.

3. ADDITIONAL CONDITIONS FOR DIVERSION/PROTECTION OF BWSSB UTILITIES

- 3.1 It is the responsibility of the Contractor to get the approval of the proposed water/sewer/storm water/ pipeline etc., diversion/shifting from the concerned Agency/Authority. However, Employer may facilitate the co-ordination work with concerned agency for getting the necessary approval.
- 3.2 In case the concerned utility agency/authority maintains a list of registered/approved contractors for undertaking such works and desires such shifting/diversion of pipeline/utility etc. work to be undertaken by such registered/approved contractors, then such shifting/diversion of pipeline/utility etc., shall be carried out by engaging the registered/approved contractors.
- 3.3 In case the Engineers of concerned utility agency intend to supervise the work, the Contractor (or sub-contractors engaged by the Contractor) have to carry out the work as per the instruction of the utility agency during diversion work by the Contractor.
- 3.4 In case of permanent diversion of water/sewer/storm water/pipelines etc., it is the responsibility of the

Contractor to carry out such work without affecting water supply/without affecting sewage disposal etc. If required alternative temporary arrangement shall be made by the Contractor without any additional cost.

- 3.5 In case of temporary water pipe/sewer pumping mains (without manholes) diversion (which means divert the pipeline temporary away from station box and brought back to the original position after completion of station work), it is the responsibility of the Contractor either to use the retrieved diverted pipes or new pipes to restore back the original place without affecting the water supply/utility service.
- 3.6 In case of temporary diversion of gravity sewer pipelines with manholes are required, the Contractor, initially before taking up the station work has to ensure that the flow is diverted by laying sewer pipeline and constructing manholes away from the station box and then only divert the flow. After completion of station work, the Contractor shall have to lay again another sewer pipelines and again construct new manholes for restoring back to the original place.
- 3.7 In case of temporary supporting of water/sewer pipelines, if any damages occur during construction period it is the responsibility of the Contractor to rectify the damages to the satisfaction of concerned agency. The cost of the rectification works shall be borne by the Contractor.
- 3.8 It is the responsibility of the Contractor to obtain completion certificate from concerned utility agency for each diversion work. The payment for such diversion work will be made to the Contractor after obtaining completion certificate from concerned utility agency.
- 3.9 The Contractor shall handover all the retrieved material to the stores of the concerned utility agency/concerned department at the Contractor's cost and submit the proof of handing over.

4. ELECTRICAL UTILITIES (BESCOM/KPTCL)

- 4.1 The Contractor shall submit the utility diversion programme to Employer with diversion justification based on trial pit information.
- 4.2 The Contractor shall submit the diversion plan to Employer at least 60 (sixty) days in advance of work commencing to obtain approval from Electrical utility agencies. For utility diversion proposals of BESCOM / KPTCL, the Contractor shall submit diversion justification with trial pit information and drawing(s) with the proposed diversion route(s).
- 4.3 The Contractor would submit application of diversion works to electrical utility agencies with diversion plans. The Contractor shall render necessary assistance.
- 4.4 The Contractor shall coordinate with the local officials to assess quantities and specifications of materials required for diversion works. Necessary assistance would be provided by the Employer.
- 4.5 The Contractor shall obtain necessary permission from the concerned departments/agencies to carry out the diversion/shifting works and get necessary permission from Traffic Police Department.
- 4.6 Wherever possible, horizontal directional drilling method shall be adopted at location where utility diversion works crosses roadways and require lane closures for excavation to avoid inconvenience to the traffic.
- 4.7 The electrical utilities diversion/ shifting should be carried out by the Contractors/agencies registered with the electrical utility agencies / KPWD and have the required grade license from the Chief Electrical Inspector to Government. The Contractor should be well acquainted with electrical works so as to maintain the standard. The Contractor shall inform the same to Employer for getting consent from the concerned electrical utility agency.
- 4.8 The Contractor shall identify the quantity of materials required for the contract such that the material can be procured by the Contractor in bulk and in advance to the implementation of the utility diversion works. The quality of materials to be procured shall be approved by the concerned utility agency. Materials used for diversion/ shifting shall be of quality conforming to the applicable standard of the electrical utility agency and as per relevant BIS.
- 4.9 The source of materials and the guarantee for the materials to be used shall be submitted to Employer for obtaining approval from the concerned utility agency. Any failure of the material within the guarantee period shall be replaced and installed free of cost by the Contractor.
- 4.10 Contractor shall inform the local officers/officials of the concerned utility agency about the diversion works at

least 15 (fifteen) days before the execution of diversion.

- 4.11 The diversion / shifting utility work shall be carried out under the direct supervision of officials and the utility agency decision shall be final in this regard. The Contractor shall provide free access to officers/ officials / workman for the purpose of inspection/supervision.
- 4.12 After restoration of regular service completion certificate shall be obtained from the concerned departments/agencies. The regulations for working with utility agencies shall be as follows.
- a. The diversion/shifting utility work should be carried out without causing any inconvenience to the operation and maintenance of Sub-Station and other departmental works of the concerned utility agency.
 - b. The Contractor shall execute and complete the work strictly in adherence to the time schedule and to the satisfaction of the engineers and adhere strictly the direction of the utility agency in any matter.
 - c. The Contractor shall be responsible to protect the public and the employees of the utility agency against any accident that may arise during the execution of diversion/shifting utility works. The Contractor shall indemnify the Employer for any claims for damages/injuries to the person/property resulting from any such accident. The Contractor shall Compensation Act by the way of obtaining an accident risk type insurance to meet all purpose of relief, failing which or otherwise the Contractor shall be solely responsible for meeting the compensation awarded under the said Act.
 - d. The Contractor shall undertake to ensure free flow of traffic during execution of the diversion/shifting works and shall be responsible for any accident/loss of lives/property. Damage to the other existing utilities during diversion shall be rectified by the Contractor at his own cost.
 - e. The Contractor shall employ qualified technical personnel to carry out the diversion/shifting of utility works.
 - f. The Contractor shall apply well in advance for Line Clearance (LC) for carrying out the joint works/shifting works. Employer would authorise the Contractor to take LC from the concerned utility agency. If needed, Employer would provide assistance to the Contractor to get the LC. LC will be given by the concerned utility agency depending upon exigencies, which have to be strictly adhered to.
 - g. The Contractor shall handover all the retrieved / unused material to the stores of the concerned utility agency /concerned department at the Contractor's cost.
 - h. Contractor to pay the penalty/charges imposed by the utility agency for damage to the utilities on their own.
 - i. The Contractor shall undertake not to revoke the above conditions until the completion of diversion/shifting works.

5. BBMP UTILITIES DIVERSION

- 5.1 Diversion of Storm water drain shall be carried out as per the design, standard and general specifications of BBMP /PWD/concerned Highways Department.
- 5.2 The diversion route for storm water drain shall be approved by BBMP /concerned PWD/ Highways Department.
- 5.3 The invert level of diverting drain shall be maintained on par with upstream/downstream of connecting drains.
- 5.4 The Contractor shall make alternate arrangements to divert and ensure smooth flow of water from upstream side during construction.
- 5.5 The Contractor shall provide the adequate sizes of drain or follow the existing sizes as agreed by the concerned agency.
- 5.6 Diversion of storm water drain shall be carried out through the registered Contractors of BBMP/PWD/Highways Department (if such a list of approved/registered contractors is maintained by the utility agency).
- 5.7 Streetlights shifting shall be carried out as per the specification of BBMP.

6. BSNL UTILITIES DIVERSION:

BSNL utilities such as copper cable and OFC cables which are likely to be affected to be identified based on trial pit

information. Contractor to prepare the diversion plan in coordination with the BSNL utilities agencies and get approval for the diversion plan. Employer may provide assistance in this regard. Contractor to assess the required quantities based on the diversion plan. Cables procured to be Quality control checked by the concern wing of BSNL. Contractor to coordinate and arrange for the Quality control check by BSNL. Diversion of BSNL utilities to be done by the BSNL approved subcontractors and the completion certificate to be obtained from BSNL for the utility's diversion done.

7. Private Telecom/OFC/Other cable Contractor to manage the existing private telecom and OFC cables.

8. ADD NEW ADDITIONS – GAIL etc.

General:

The Contractor shall provide 6 months rolling programme every 3 month.

EMPLOYER'S REQUIREMENTS APPENDIX - 12 CONTRACTOR'S SITE LABORATORY

1. SITE LABORATORY

(1) The Site Laboratory shall consist of the following:

- i. concrete laboratory
- ii. Soil laboratory
- iii. Store room
- iv. Kitchen

Male toilets, changing room & shower sufficient for 3 persons

(2) The remainder area of the laboratory shall consist of storage area for concrete cube curing tanks. The laboratory, office etc. shall be in one building;

2. STANDARD OF CONSTRUCTION

(1) The laboratory shall be constructed to the best Engineering practice and as approved by the Employer / Engineer.

(2) A water tank with adequate capacity shall be installed. Constant water pressure of 15 KPa minimum shall be ensured in each laboratory.

(3) In the case of sinks used for washing samples, adequate trapping and/or separating devices shall be provided to ensure the proper functioning of the facility.

3. FURNISHINGS AND FIXTURES

The contractor's site laboratory shall be provided with all required furnishings and fixtures.

4. LABORATORY EQUIPMENT

(1) The laboratory equipment, as listed below, shall be approved by the Engineer. The Contractor shall submit for the Engineer's approval within 2 weeks of the order to commence work the name of the supplier it intends to use for each piece of apparatus together with the relevant catalogue number.

(2) The layout of the equipment in the testing laboratory shall be as instructed by the Employer / Engineer. The equipment shall be maintained to accuracy appropriate to the required testing methods with routine calibration by an accredited organisation as recommended by the appropriate Authority. Equipment shall also be calibrated after maintenance or relocation.

(3) The Contractor's site laboratory shall be equipped with the following material testing equipment as a minimum. The nature and quality of equipment required for pre-stressing may be varied by the Engineer depending on the detail of the Contractor's Design and Construction methods or for any other reason which he deems to be valid and necessary for the proper control of quality:

Liquid limit device (Casagrande type)	1 set
Grooving tools	1 No
Evaporating dish	1 No
Spatula 100mm blade	1 No
Laboratory balance, capacity 500 gm, (Sensitivity 0.01 gms.)	1 No
Wash bottle, capacity 500 ml.	1 No
Moisture cans capacity 50 ml.	24 No
Determining Plastic Limit (1 complete set)	
Evaporating dish	1 No
Spatula 100mm blade	1 No
Glass plate 250mmx250mmx12mm	2 No
Moisture cans capacity 50 ml.	12 No
Stainless steel rods, 3 mm dia.	2 No
Specific gravity and absorption of coarse aggregate	
Wire basket, 200mm dia Heavy duty suspension balance, 20kg X 1gm with accessory for weight in water	1set
Suitable water container	1 No.
Unit wt. of aggregate	
Balance, 100Kg cap. With 10gm precision	1No
Tamping rod 16mm diaX600mm long	1No
Measuring containers (3, 10,15,30 ltrs)	1 each
Flakiness & Elongation	
Flakiness gauge, Elongation Index	1 set
Soundness Test	
Sodium Sulphate	25 Kg
Soaking Tank	1 no
Balance, Cap. 3Kg, sensitivity 0.1gm	1 set
Sieves: coarse, Fine	1 set
Concrete	
Bickets for concrete sampling	12 Nos.
Slump Cone	12 Nos.
Tampingrod	12 Nos.
Base plate	12 Nos.
Mixing pan for concrete	2 Nos.
Scoop for general purpose	2 Nos.
Concrete thermometer	2 Nos.
Concrete cylinder mould, 150 mm * 300mm; 100 mm* 300 mm	10 each
Concrete cube mould, 100 mm cube & 150 mm cube	10 each
Adjustable spanners for Dismantling cube moulds	6 Nos.
Capping set	2 Nos.
Capping compound	
Concrete curing tank with capacity for 270 cubes, temperature controlled, with circulation system drain and lockable cover	5 Nos.
Schmidt test hammer	1 No.
Compression testing machine (simple hand operated)	1 No.
Mould oil Temperature chart recorder	1 No.
Miscellaneous	
Vernier callipers to measure up to 200mm, with elongated jaws	5 Nos.
Steel rule, 300 mm long graduated	2 Nos.
Rubber gloves	10 Pair
Cotton working gloves	20 Pair
First aid kit	1 set

Wire brush	6 Nos.
Steel tape, 3m, 5m, 30m	3 each
Ball peen hammer, 1 kg	2 Nos.
Paint scraper. Approx. 100mm wide	8 Nos.
Float, steel Approx.280 x 120 mm	8 Nos.
Sack barrow	1 No
Shovel: Square Mouthed	2 Nos.
Round Mouthed	2 Nos.
24-wheel trolley, heavy duty, approx. 0.7m X 1.0m long Pneumatic tyred type	1 No
Wheel barrow, rubber tyred	
Comprehensive tool kit	1 No
claw hammer, multi-grips, spanners (adjustable)	1 No
Type NR Schmidt Hammer and tester with recording device	1 No
Testing Anvil for Schmidt Hammer test (SHT)	1 No
Chart recording paper for SHT	10 Pkts
Cover meter for detecting metal objects to depth of 100 mm below the surface of non-magnetic objects	3 Nos.
Noise meter	1 No
RCPT Testing Machine	1 No
Permeability Testing Machine	1 No

ANNEXURE- I

SITE

1. SITE

The proposed work is in Airforce Station Jalahalli.

ANNEXURE - 2
RIGHT OF ACCESS TO THE SITE

Complete land for the execution of works is available. The contractor shall take additional land on lease / rent basis temporarily for installation of his facilities like batching plant / Casting / Site Work Shops / Project offices / Site offices etc. The tenderers are advised to conduct a detailed study and cater for all such expenditure in the bid.

ANNEXURE – 3

DELETED

ANNEXURE – 4

DELETED

ANNEXURE – 5

DELETED

ANNEXURE - 6
APPLICABLE PERMITS

1 APPLICABLE PERMITS

- 1.1 The Contractor shall obtain, as required under Applicable Laws, the following Applicable Permits:
- (a) Permission of the State Government for extraction of boulders from quarry;
 - (b) Permission of Village Panchayats and Pollution Control Board for installation of crushers;
 - (c) Licence for use of explosives;
 - (d) Permission of the State Government for drawing water from river/reservoir;
 - (e) Licence from inspector of factories or other competent Authority for setting up batching plant;
 - (f) Clearance of Pollution Control Board for setting up batching plant;
 - (g) Clearance of Village Panchayats and Pollution Control Board for setting up asphalt plant;
 - (h) Permission of Village Panchayats and State Government for borrow earth; and
 - (i) Any other permits or clearances required under Applicable Laws.

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SECTION - 8B

TECHNICAL SPECIFICATIONS

SECTION-8B

TECHNICAL SPECIFICATIONS

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K-RIDE

SECTION - 01

GENERAL

K-RIDE

1. GENERAL

1.1 GENERAL

- 1.1.1 These Specifications contained herein shall be read in conjunction with other tender documents.
- 1.1.2 The Work shall be carried out in accordance with the "Good for Construction" drawings and designs as would be submitted by the contractor and approved by the Employer duly signed and stamped or issued

to the Contractor by the Employer duly signed and stamped by him as the case may be. The Contractor shall not take cognizance of any drawings, designs, specifications, etc. not bearing Employer's signature and stamp. Similarly, the Contractor shall not take cognizance of instructions given by any other Authority except the instructions given by the Employer in writing.

- 1.1.3** The work shall be executed and measured as per metric units given in the Schedule of Quantities, drawings etc. (FPS units where indicated are for guidance only).
- 1.1.4** Absence of terms such as providing, supplying, laying, installing, fixing etc. in the descriptions does not even remotely suggest that the Contractor is absolved of such providing, supplying etc. unless an explicit stipulation is made in this contract.
- 1.1.5** The specifications have been divided into different sections / sub-heads for convenience only. They do not restrict any cross-references. The Contractor shall take into account inter-relations between various parts of works/trades. No claim shall be entertained on the basis of compartmental interpretations.
- 1.1.6** The classification of various items of works for purposes of measurements and payments shall be as per Price Schedule. Except where distinguished by Price Schedule, the Lumpsum Price apply to all heights, depths, leads, lifts, sizes, shapes and locations. They also cater for all cuts and wastes. No height wise / floor wise separation. Likewise, all heights of centering, shuttering, staging, formwork and scaffolding, are covered by the quoted Lumpsum Price
- 1.1.7** Reference to the Standard Codes of Practice.
1. The contractor shall make available at site all relevant Codes of practice as applicable.
 2. Legend:

ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing Materials
BS	British Standard
CPWD	Central Public Works Department
DIN	Deutsches Institut für Normung e.V.
IRC	Indian Road Congress
IS	Indian Standards
MORTH	Ministry of Road Transport and Highways

1.1.8 OTHER PUBLICATIONS:

1. RDSO Guidelines for certification of metro 2015 with amendment upto date.
2. Indian Railway SOD 2022 with latest amendment for the works wherever needs to work adjacent to Railway track below or above Railway track with relevant safety manuals etc.
3. KRIDE DBR
4. MoHUA Guidelines
5. Indian Standard Hand Book on steel sections Part-I
6. Indian Railway Manual on Design and Construction of well and pile foundations
7. CIRIA Report 80 A review of instruments for gas and dust monitoring underground
8. Indian Railways Construction Hand Book

Alternative or additional codes and standards proposed by the contractor shall be internationally recognised codes and shall be equivalent to or better than, Indian Standards issued by the Bureau of Indian Standards or any other Indian professional body or organisation, subject to being, in the opinion of the Employer's Representative, suitable for incorporation or reference into the specifications

1.1.9 Items / Facilities to be provided by the Contractor

The Contractor shall provide and maintain at site throughout the period of works the following at his own cost and without extra charge, except for the items specified in the Price Schedule.

1. General works such as setting out, site clearance before setting out and on completion of works. All weather approach roads to the site office should also be constructed and maintained in good condition.
2. All labour, materials, plant, equipment and temporary works, overhead charges as well as general liabilities, obligations, insurance, and risks arising out of GCC, required completing and maintaining the works to the satisfaction of the Employer.
3. Adequate lighting for night works, and also at other times whenever and wherever required by the Employer.
4. Temporary fences, barricades, guards, lights and protective work necessary for protection of workmen, supervisors, engineers, General public and any other persons permitted access to the site. Contractor shall provide proper signages as directed.

All fences, barricade shall be painted with colour shades as specified by the Employer. The barricading should be of adequate height to ensure visual obstruction of work from public view.

5. All equipment, instruments, labour and materials required by the Employer for checking alignment, levels, slopes and evenness of surfaces measurements and quality etc.
6. Design mixes and testing them as per relevant clauses of specifications giving proportion of ingredients, sources of aggregates and binder along with accompanying trial mixes. Test results shall be submitted to the Employer for his approval before adoption on works.
7. Cost of Preparation and compliance with provision of a quality assurance control program.
8. Cost of safe guarding the environment as per SCC.
9. Contractor has to provide Method statements i.e., detailed work procedure for all the works
10. A testing laboratory as specified by the Employer equipped with not limited to the following apparatus, materials and competent trained staff required for carrying out tests, as specified in the relevant sections of the specifications in adequate quantity.

- (i) 1 Set of standard sieves for testing grading of sand with mechanical sieve shaker.
- (ii) Sieves with openings respectively of 4.75mm, 10mm, 20mm, 25mm, and 30mm for testing and grading of aggregates.
- (iii) Digital Weighing Balance of capacity up to 10 Kg. reading up to 1 gm.
- (iv) Electric controlled oven and pans for drying of sand and aggregates.
- (v) Glass measuring flasks /2, 1 liter & 2-liter capacities.
- (vi) Flask for determining moisture content of sand.
- (vii) Slump cone with rod and V B Apparatus, flow table to measure slump or DIN Specifications (separate sets for laboratory and at Site).
- (viii) Sufficient Nos. steel moulds for 150mm x 150mm x 150mm concrete test cubes. It may be necessary to provide more steel cube moulds depending upon concreting programme.
- (ix) Sufficient number of 25mm dia vibrator for compaction of concrete in test cubes, vibrating table.
- (x) Digital Concrete cube testing machine of 200 tones Minimum capacity with direct print out facility.
- (xi) Work benches, shelves, desks, sinks and any other furniture and lighting as required by the Employer.
- (xii) Abrasion, Flakiness & Impact testing Equipment for testing coarse aggregates.
- (xiii) Silt Testing Equipment.

(xiv) Any other equipment specified by Employer.

Note: All the above equipment and apparatus shall be calibrated at the time of setting up and at specified intervals by NABL accredited agency.

1.1.10 Quality Assurance & Quality Control

1. The work shall conform to high standards of design and workmanship, shall be structurally sound and aesthetically pleasing. The Contractor shall conform to the Quality standards prescribed, which shall form the backbone for the Quality Assurance and Quality Control system.
2. At the site, the Contractor shall arrange the materials, their stacking/storage in as per MORTH standards manner to ensure the quality. The Contractor shall provide all the necessary equipment and qualified manpower to test the quality of materials, assemblies etc., as directed by the Employer. The tests shall be conducted at specified intervals and the results of tests properly documented.
3.
 - a. The Employer shall be free to carry out such tests as may be decided by him at his sole discretion, from time to time, in addition to those specified in this document as per provisions of General Conditions of Contract. The Contractor shall provide the samples and labour for collecting the samples. Nothing extra shall be payable to the Contractor for samples, or for the collection of the samples. The test shall be conducted at the Site laboratory that may be established by the Contractor or at any other Standard Laboratory having NABL certification.
 - b. The test shall be conducted at the Site laboratory that may (to) be established by the Contractor at his cost or at any other NABL accredited Laboratory selected by the Employer.
 - c. The Contractor shall transport the samples to the laboratory for which nothing extra shall be payable. In the event of the Contractor failing to arrange transportation of the samples in proper time the Employer shall have them transported and recover two times the actual cost from the Contractor's bills.
 - d. All testing shall be performed in the presence of Employer or his authorized representative. Testing may be witnessed by the Contractor or his authorized representative if permitted by the Test House. Whether witnessed by the Contractor or not, the test results shall be binding on the Contractor.
4. The Employer shall have the right at all times to inspect all operations including the sources of materials, procurement, its transportation, layout and storage of materials, all equipment including the concrete batching and mixing equipment, and the quality control system. Such an inspection shall be arranged and the Employer's approval obtained prior to starting of the particular item of work. This shall however, not relieve the Contractor of his responsibilities.
5. All materials which do not conform to these specifications shall be rejected. In the event of contractor not being able to arrange the material conforming to these specifications or in the event of failure of the contractor to get the sources approved within the agreed schedule submitted by contractor, the Employer shall have the powers to cause the Contractors to purchase and use such materials from any particular source, as may, in the Employer's opinion, be necessary for the proper execution of work.

1.1.11 Dimensions

1. Figured dimensions on drawings shall only be followed and drawings to a large scale shall take precedence over those to a smaller scale. Special dimensions or directions in the specifications shall supersede all others. All dimensions shall be checked on site prior to execution.
2. The dimensions where stated do not allow for waste, laps, joints, etc. but the Contractor shall provide at his own cost sufficient labour and materials to cover such waste, laps, joints, etc.

3. The levels, measurements and other information concerning the existing site as shown on the drawings are believed to be correct, but the Contractor should verify them for himself and also examine the nature of the ground as no claim or allowance whatsoever will be entertained on account of any errors or omissions in the levels or the description of the ground levels or strata turning out different from what was expected or shown on the drawings.

1.1.12 Setting out of Works

The Contractor shall set out the Works indicated in the Conditions of Contract. The Contractor shall provide suitable stones with flat tops and build the same in concrete for temporary bench marks. All the pegs for setting out the Works and fixing the levels required for the execution thereof shall, as desired by the Employer, likewise be built in masonry at such places and in such a manner as the Employer may direct. The Contractor shall carefully protect and preserve all bench marks and other marks used in setting out the works. The contractor will make and maintain overall layout of complete work and get it checked from employer periodically. All the survey work except leveling shall work shall be carried out using total stations with one second accuracy. The leveling work shall be carried out using Auto level.

- (a) The triangulation points given by Employer before start of work shall be maintained during execution and handed over back to Employer after completion of work.

1.1.13 Materials

1. Source of Materials

It shall be the responsibility of the contractor to procure all the materials required for construction and completion of the contract. The contractor shall indicate in writing the source of materials well in advance to the Employer, after the award of the work and get it approved from the Employer before commencing the work. If the material from any source is found to be unacceptable at any time, it shall be rejected by the Employer.

2. Quality

All materials used in the works shall be of the best quality of their respective kinds as specified herein, obtained from sources and suppliers approved by the Employer and shall comply strictly with the tests prescribed hereafter, or where tests are not laid down in the specifications, with the requirements of the latest issues of the relevant Indian & other Standards.

3. Sampling and Testing

All materials used in the works shall be subjected to inspection and test in addition to test certificates. Samples of all materials proposed to be employed in the permanent works shall be submitted to the Employer at least 45 days in advance for approval before they are brought to the site.

Samples provided to the Employer for their retention are to be labeled in boxes suitable for storage. A sample room will be made at casting yard and maintained at no cost. Materials or workmanship not corresponding in character and quality with approved samples will be rejected by the Employer. If the material's testing conducted at third party laboratory, it shall be communicated directly to Employer's office for obtaining the approval and the same.

Samples required for approval and testing must be supplied sufficiently in advance in required quantity and number to allow for testing and approval, due allowance being made for the fact that if the first samples are rejected further samples may be required. Delay to the works arising from the late submission of samples will not be acceptable as a reason for delay in completion of the works.

Materials shall be tested before leaving the manufacturer's premises, quarry or source, Materials shall also be tested at site and they may be rejected if not found suitable or in accordance with the specifications, notwithstanding the results of the tests at the manufacturer's works or elsewhere or test certificates or any approval given earlier.

The contractor will bear all expenses for sampling and testing, whether at the manufacturer's premises at source, at site or at any testing laboratory or institution as directed by the Employer subject to the provisions of No extra payment shall be made on this account.

4. Dispatch of materials

Materials shall not be dispatched from the manufacturer's works to the site without written authority from the Employer.

5. Test certificates

All manufacturer's certificates of test, proof sheets, etc showing that the materials have been tested in accordance with the requirement of these specifications and of the appropriate Indian Standards are to be supplied free of charge to the Employer.

6. Rejection

Any materials that have not been found to conform to the specifications or otherwise not acceptable to the Employer will be rejected forthwith and shall be removed from the site by the Contractor at his own cost within three days or as instructed by the Employer.

1.1.14 Storing of Materials at site

All materials used in the works shall be stored on racks, supports, in bins, silos, go-downs, under cover etc. as appropriate to prevent deterioration or damage from any cause whatsoever to the entire satisfaction of the Employer.

The storage of materials shall be in accordance with IS 4082 "Recommendation on stacking and storage or construction materials on site" and as per IS 7969 "Safety code for handling and storage of building materials".

The materials shall be stored in a proper manner at places at site approved by the Employer. Should the place, where material is stored by the Contractor, be required by the Employer for any other purpose, the Contractor shall forthwith remove the material from that place at his own cost and clear the place for the use of the Employer within the time as communicated by the Employer and at no extra cost to the Employer.

1.1.15 Water

1. Water from approved source:

Potable water only shall be used for the works. Contractor shall have his own source of water duly tested and approved by Employer. The water shall be free from any deleterious matter in solution or in suspension and be obtained from an approved source. The quality of water shall conform to IS 456.

2. Storage:

The Contractor shall make his own arrangements for storing water, if necessary, in drums or tanks or cisterns, to the approval of the Employer. Care shall be exercised to see that water is not contaminated in any way.

3. Testing:

Before starting any concreting work and wherever the source of water changes, the water shall be tested for its chemical and other impurities to ascertain its suitability for use in concrete for approval of the Employer. No water shall be used until tested and found satisfactory. Cost of all such Tests shall be borne by the contractor.

1.1.16 Workmanship

1. All works shall be true to level, plumb and square and the corners, edges and rises in all cases shall be unbroken and neat.
2. Any work not to the satisfaction of the Employer or his representative will be rejected and the same shall be rectified, or removed and replaced with work of the required standard of workmanship at no extra cost.

1.1.17 Testing On Completed Structures

1.1.17.1 During the period of construction or within the defect liability period the Employer may at his discretion order the for testing of any completed structure or any part thereof if he has reasonable doubts about the adequacy of the strength of such structure for any of the following reasons or otherwise:

- (i) Results of compressive strength on concrete test cubes falling below the specified strength.
- (ii) Premature removal of formwork.
- (iii) Inadequate curing of concrete.
- (iv) Over loading during the construction of the structure or part thereof.
- (v) Carrying out concreting of any portion without prior approval of the Engineer.
- (vi) Honey combed or damaged concrete which in the opinion of the Employer is particularly weak and will affect the stability of the structure to carry the design load, more so in important or critical areas of the structure.
- (vii) Any other circumstances attributable to alleged negligence of the contractor which in the opinion of the Employer may result in the structure or any part thereof being of less than the expected strength.

1.1.17.2 In such cases the portion of the work concerned shall be taken down or cut out and reconstructed to comply with the specifications. Other remedial measures may be taken to make the structure secure at the discretion of the Employer. However, such remedial measures shall be carried out to the complete satisfaction of the Employer.

1.2 STRUCTURAL WORK

- (a) Unless otherwise specified, only controlled concrete with design mix and weigh batching is to be used for the work.
- (b) Minimum cement content specified in IS CBC latest/CPWD specification latest is purely from durability point of view. Larger content of cement shall have to be provided if demanded by mix design.
- (c) Provision of cement slurry to create bond between plain / reinforced concrete surface and subsequent applied finishes shall not be paid extra.
- (d) Mix design using smaller aggregates of 10mm down shall also be done in advance for the use in the junction having congested reinforcement.
- (e) Procedure of mixing the admixtures shall be strictly as per the manufacturer's recommendations or as directed by the Employer.
- (f) All the water tanks and other liquid retaining concrete structures shall undergo hydro-testing.
- (g) Special benches shall be provided at site for stacking reinforcement bars of different sizes.
- (h) Formwork for beams of RCC works shall be designed in such a way that the formwork of the adjacent slabs can be removed without disturbing the props / supports of the beams.
- (i) Wherever there is tension or suspended concrete members which are suspended from upper-level structural members, the shuttering / scaffolding of such members at lower level shall have to be kept in place till the time the upper level supporting members gain minimum required strength. Cost of such larger duration of keeping in place the shuttering / scaffolding shall be deemed to be included in the price quoted for respective structural members.

- (j) Formwork shall be provided for full height at all locations. Special precautions for such tall formwork shall be taken to ensure its safety. Extra costs for providing such formwork shall be deemed to have been included in the prices quoted in Lumpsum price schedule.
- (k) In the mobilization period the contractor shall carry out expeditiously and without delay the following works
 - i. Material testing and mix designs of concrete as contemplated in the specifications.
 - ii. Setting up of fully fledged site laboratory as per the requirements of these specifications.
 - iii. Any other pre-requisite items required for final execution.
 - iv. Site office for the use of the Engineer staff
 - v. Casting yard with complete facilities
 - vi. Identify and get approved the source of various major construction materials.
 - vii. Setting up concrete batching and mixing plant.
 - viii. Construction of site office set up.
 - ix. Construction of labour houses etc.
- (l) Casting yard shall have following minimum facilities:
 - i. Casting beds as required.
 - ii. All handling facilities for precast elements like over gantry, etc.
 - iii. Curing arrangements as required.
 - iv. Stacking arrangements for material and precast elements.
 - v. Storing arrangement of materials.
 - vi. Proper drainage and all weather approach roads.
 - vii. All handling elements of pre cast elements.

1.2.1 Supply of Monthly Progress Photographs and Album

- a) The work covers the supply of digital color photographs (Hard copy duly annotated) along with soft copy in an album to serve as a permanent record of various stages/facets of work needed for an authentic documentation as approved by the Employer.
- b) The photographs shall be of acceptable quality and they shall be taken by a professionally competent photographer with camera having the facility to record the date of the photographs taken in the prints and negative. The Digital camera, type and quality of photo paper shall be of standard make approved by the Employer. Each photograph in the album shall be suitably captioned and dated.
- c) The photographs and materials including soft copy shall form a part of the records of concerned organization and prints of the same cannot be supplied to anybody else or published without the written permission.

1.2.2 Supply of Monthly Progress Video CD's

The work consists of taking video films of important activities of the works as directed by the Employer during the currency of the Project and editing them to a video film of playing time not less than 60 minutes. It shall contain narration of the activities in English by a competent narrator. The edition of the film and script of the narration shall be approved by the Employer

1.2.3 Survey Work

The said work involves at the very start of work taking-over of reference point from the Employer, establishment of control points by using DGPS double frequency and the accuracy of 1 in 50,000, triangulation points, bench marks, grid layout for all the piers and other structures maintaining horizontal and

vertical control within the permissible limits, incorporating changes (if any), submission of full data in the tabulation form and survey drawings. The survey shall be including setting and layout of various works during the progress of work and matching of the station area track alignment with the alignment of the approaches at station ends and incorporating the changes (if any).

1.2.4 Barricading

The work covers barricading for the work done along the Defence area, median and areas affecting road or building. The detailed scope of work is:

- (i) Providing and installing the barricade of the design and type as shown in the typical sketch furnished as per the approved plan firmly to the ground and maintaining it during the progress of work.
- (ii) Providing adequate road safety devices.
- (iii) Dismantling of barricade, other temporary installation from the site and cleaning the site shall be as per direction of Employer upon completion and acceptance of work.

Tentative Road Safety Devices are mentioned below or any other safety devices as per site requirement

1. Supply of Red portable traffic cones of 750mm height with white reflective tape bands on 100mm width all around.
2. Hazard warning light flashes with rechargeable. Maintenance free battery & charging system.
3. Safety light island post with 11 nos. parallel reflective.
4. Red reflective arrow fitted on enabled mild steel board of 360 x 220mm size.
5. Traffic Triangular Tripod made of fluorescent cloth fitted on steel frame.
6. Retro-reflective tape (I) 50mm width.
7. Fluorescent Jackets with reflective tape all around.
8. Yellow reflective cat eyes of size 115 x 11 x 22 mm made of ABS material having 19 glass beads on each side.
9. Metal Tabular Delineator of 610mm height with reflective tapes.
10. Retro-reflective arrows diversion board 450 x 900mm with crystal clear protective transparent coat to avoid damage on 14-gauge Mild Steel sheet with and without pole.
11. Retro-reflective "Men at Work" triangular board of size 900mm with crystal protective transparent coat to avoid damage on 14-gauge Mild Steel board with and without poles.
12. Retro-reflective board for "Go Slow Work in Progress" of size 1200 x 750mm with crystal clear protective transparent coat to avoid damage to the Mild Steel board with and without pole.
13. Retro-reflective advance direction signs cum Diversion Boards of size 1200 x 900mm with crystal clear protective transparent coat to avoid damage to the 14-gauge Mild Steel sheet with and without pole.
14. Retro-reflective speed limit circular sign Boards of 600mm Diameter with crystal clear protective transparent coat to avoid damage on 14-gauge sheet (without pole).
15. 'SORRY FOR INCONVENIENCE' Retro-reflective Boards of size 900 x 300mm size with crystal clear protective transparent coat to avoid damage on 14 gauge Mild Steel sheet (without pole).
16. HAZARD MARKERS (Yellow & Black) must be put all over the construction sites. This Retro-reflective board is of size 300 x 900mm with crystal clear protective coat to avoid damage and the 14-gauge Mild Steel with or without pole.
17. 'CAUTION' tape which is normally yellow tape of special Polyether Material having 75mm width 'CAUTION' is written all over with Black colour is rolls of 300 meters.

1.2.5 Transplantation of Trees

The item shall be carried out as per the approved plan by the Employer after the identification of the trees to be transplanted. The actual number of trees shall be finalized after the necessary clearances by the concerned departments. The item is complete and including all expenditures for carrying out all operations i.e., excavation, watering, feeding of chemicals, back filling, lifting of trees by crane and transporting to the designated site where it is to be transplanted and all necessary care to be taken for the specified initial period till the tree gets settled at new site and up to the full satisfaction of the Employer.

1.2.5.1 Measurement

The item shall be measured in numbers according to size of the tree as specified in the item and the full payment shall be released only when the item is executed fully as per the Scope of Work detailed out in the approved plan for transplantation of trees.

The rate shall include all required operations during the transplantation and specified duration afterwards, clearances from the concerned authorities.

Sub-Contractor

Works as listed below and those dealing with proprietary materials/ products may be carried out by the Contractor through the Sub-Contractors as may be approved by the Employer in writing. The Sub-Contractors must be firms of repute and long standing, having adequate experience and complete facilities to carry out all items of work required for completion as per Specifications and expected quality to the satisfaction of the Employer. The Sub-Contractor must also have personnel experienced in preparing shop drawings. All such works shall be carried out under the direct supervision of the manufacturers of the proprietary materials/ products or their trained and accredited licensee.

- i. Waterproofing
- ii. Caulking & Sealants
- iii. Seismic Joints
- iv. Expansion joints
- v. Application of Silicone water repellent solution where specified.
- vi. Bearings
- vii. Painting and polishing works.

1.3 Guarantees and Maintenance:

- (i) The Contractor shall guarantee and undertake to maintain and rectify the various components of the Civil Works for their successful performance for the periods as specified in other documents. The Contractor shall indemnify the Employer for a similar period against any damage to property and injury to persons on account of any defective work or maintenance carried out by the Contractor. The format and text of the Guarantee and the Indemnity Bond shall be as followed in CPWD or as approved by the Employer.

1.3.1 Cleaning

Surfaces on which finishes are to be provided shall be cleaned with water jets or oil free compressed air or power tools with wire brushes and detergents all as approved by the Employer.

1.4 Applicable Codes, Standards & Publications for Structural work

The important Codes, Standards and Publications to Contract are listed here under:

IS Code no.	Description of code
IS:875 (Part 3)	Code of practice for design loads (other than earthquake) for buildings and structures

IS:1322	Bitumen felts for water proofing and damp-proofing
IS:1893	Criteria for earthquake resistant design of structures
IS:2572	Code of Practice for construction of hollow concrete block masonry
IS:3414	Code of practice for design and installation of joints in buildings
IS:6408 (Parts 1,2)	Recommendations For Modular Co-Ordination in Building Industry – Tolerances
IS:10958	General check list of functions of joints in building
IS:11817	Classification of joints in buildings for accommodation of dimensional deviations during construction
IS:11818	Method of test for laboratory determination of air permeability of joints in buildings
IS:12440	Precast concrete stone masonry blocks
CPWD	Specifications latest Vol 1 & Vol 2.
BS:476 (Part 7)	Method for classification of the surface spread of flame of products
BS:476 (Part 20)	Method of determination of the fire resistance of elements of construction (general principles)
BS:476 (Part 22)	Methods for determination of the fire resistance of non-load bearing elements of construction
BS:5215	Specification for one-part gun grade polysulphide-based sealants
BS:5606	Guide to accuracy in building
BS:6093	Code of practice for the design of joints and jointing in building construction
BS:8200	Code of practice for the design of non-load bearing external vertical enclosure of building
ASTM C 332	Specification for light weight aggregate for insulating concrete
SP 7	National Building Code of India
SP 23 (S&T)	Hand Book on Concrete Mixes
B	Bitumen
IS:702	Industrial Bitumen
IS:3384	Specification for bitumen primer for use in waterproofing and damp-proofing
C	Building Construction Practices
IS:1838 Parts I and II.	Specifications for preformed fillers for expansion joint in concrete pavements and structures.
IS:1946	Code of Practice for use of fixing devices in walls, ceilings, and floors of solid construction.
IS:6509	Code of Practice for installation of joints in concrete pavements.
IS:11134	Code of Practice for setting out of buildings.
IS:11433	Parts I and II. Specifications for one part Gun grade polysulphide based joint sealant.
IS:12200	Code of Practice for provision of water stops at transverse contraction joints in masonry and concrete dams
D	Cement
IS:269-2015	Ordinary Portland cement
IS:455	Portland Slag Cement
IS:650	Specification for standard sand for testing cement.
IS:1489 (Part 1)	Portland pozzolana cement: Fly ash based
IS:1489 (Part 2)	Portland pozzolana cement: Calcined clay based
IS:3535	Method of Sampling Hydraulic Cements
IS:4031	(Parts 1 to 15) Methods of physical tests for hydraulic cement.

IS:4032	Method of chemical analysis of hydraulic cement.
IS:6925	Methods of test for determination of water soluble chlorides in concrete admixtures.
IS:8042	White Portland Cement
IS:8112	Specification for 43 grade ordinary Portland cement.
IS:12269	Specification for 53 grade ordinary Portland cement.
IS:12330	Specification for sulphate resistant Portland cement.
E	Concrete
IS:456	Code of practice for plain and reinforced concrete.
IS:457	Code of practice for general construction of plain and reinforced concrete for dams and other massive structures.
IS:460 (Parts I to III)	Specification for Test Sieves
IS:516	Methods of test for strength of concrete.
IS:1199	Methods of sampling & analysis of concrete.
IS:1200	Method of measurement of building and civil engineering works (Parts 1 to 15)
IS:1343	Code of practice for prestressed concrete
IS:1607	Method of Test Sieving
IS:2386	Parts I-VIII. Methods of tests for aggregates for concrete.
IS:2430	Methods of Sampling of Aggregates of Concrete
IS:2438	Specification for roller pan mixer
IS:2514	Specification for concrete vibrating tables
IS:2571	Code of practice for laying in-situ cement concrete flooring
IS:2645	Specifications for integral water proofing compounds for cement mortar and concrete
IS:2722	Specifications for portable swing weigh batchers for concrete (single and double bucket type)
IS:2770	Methods of testing bond in reinforced concrete part I pull out test
IS:3025	Methods of sampling and tests (physical and chemical) for water & waste water (Parts 1 to 14)
IS:3370	Code of practice for concrete structures for storage of liquids
IS:3935.	Code of practice for composite construction
IS:4326	Code of practice for earthquake resistant construction of building
IS:6925.	Methods of test for determination of water-soluble chlorides in concrete Admixtures
IS:7242	Specifications for concrete spreaders
IS:7251	Specifications for concrete finishers
IS:7861	Parts I & II. Code of practice for extreme weather concreting.
IS:7969	Safety code for handling and storage of building materials
IS:8989	Safety code for erection of concrete framed structures
IS:8142	Methods of test for determining setting time of concrete by penetration resistance
IS:9103	Specifications for admixtures for concrete
IS:9013	Method of making, curing and determining compressive strengths of accelerated cured concrete test specimens
IS:9284	Method of test for abrasion resistance of concrete
IS:10262	Recommended guidelines for concrete mix design.

MORTH	Specifications for Road and Bridge Works, Ministry of Road Transport and Highways (Roads Wing) latest
IRS	Concrete Bridge Codes
IRC -112-2011	Concrete Bridge Codes
ASTM - C - 94	Ready Mix Concrete
IS 4926:2003	Ready Mixed Concrete – Code of Practice
ASTM – C - 1240	Specifications for Silica Fume for use in Hydraulic Cement and Mortar
F	Construction Plant and Machinery.
IS:1791	Specification for batch type concrete mixers.
IS:2505	General requirements for concrete vibrators: Immersion type.
IS:2506	General requirements for screed board concrete vibrators.
IS:3558	Code of Practice for use of immersion vibrators for consolidating concrete.
IS:4925	Specification for concrete batching and mixing plant.
IS:11993	Code of Practice for use of screed board concrete vibrators.
IS-3366	Specification for Pan vibrations
IS-4656	Specification for form vibrations
G	Formwork
IS:4990	Specifications for plywood for concrete shuttering work.
IRC:87	Guidelines for the design and erection of false work for road bridges.
IS:806	Code of practice for use of steel tubes in general building construction.
IS:1161	Specification of steel tubes for structural purposes.
IS:1239	Specification for mild steel tubes. Tubulars and other wrought steel fittings.
H	Gypsum and Gypsum Board
IS:2095	Gypsum plaster boards
IS:2542 (Part 1/Sec 1 to 12)	Methods of test for gypsum plaster, concrete and products: plaster and concrete
IS:2542 (Part 2/Sec 1 to 8)	Methods of test for gypsum plaster, concrete and products: Gypsum products
IS:2547 (Part 1)	Gypsum building plaster: Excluding premixed lightweight plaster
IS:2547 (Part 2)	Gypsum building plaster: Premixed lightweight plaster
I	Handling and Storage
IS:4082	Recommendation of Stacking and Storage of construction materials
IS:8348	Code of practice for stacking and packing of stone slabs for transportation
J	Instruments For Testing Cement and Concrete
IS:5513	Specification for vicat apparatus.
IS:5514	Specification for apparatus used in Le-Chaterlier test.
IS:5515	Specification for compaction factor apparatus.
IS:7320	Specification for concrete slump test apparatus.
IS:7325	Specification for apparatus to determine constituents of fresh concrete.
IS:10080	Specification for vibration machine.
IS:10086	Specification for moulds for use in tests of cement and concrete.
IS:10510	Specification for vee-bee consistometer.
K	Joint Fillers
IS:1838 (Part 1)	Preformed fillers for expansion joint in concrete pavements and structures (non-extruding and resilient type): Bitumen impregnated fiber

L	Paints and Coatings
IS:109	Ready mixed paint, brushing, priming, plaster, to Indian Standard Colour No. 361 and 631 white and off white.
IS:347	Varnish, shellac, for general purpose.
IS:2074	Ready mixed paint, air drying, red oxide-zinc chrome, priming
BS:6496	Specification for powder organic coatings for application and stoving to aluminium alloy extrusions, sheet and preformed sections for external architectural purposes, and for the finish on aluminium alloy extrusions, sheet and preformed sections coated with powder organic coatings
BS:EN:10152	Specification for electrolytically zinc coated cold rolled steel flat products. Technical delivery conditions
ASTM A 164-71	Specification for electrodeposited coatings of zinc on steel
IS 102	Ready mix paint, brushing red lead non sealing
M	Pigment for Cement
BS:1014	Specification for pigments for Portland cement and Portland cement products
N	Re-inforcement
IS:280	Mild steel wire for general engineering purposes
IS:432	Part I. Mild steel and medium tensile steel bars. Part II Hard drawn steel wire.
IS:815	Parts I & II. Electrodes for metal arc welding of structural steel.
IS:816	Code of Practice for use of metal arc welding for general construction in mild steel.
IS:1566	(Part I) Specifications for hard-drawn steel wire fabric for concrete reinforcement.
IS:1786	Specification for high strength deformed steel bars and wires for concrete reinforcement.
IS:2502	Code of Practice for bending and fixing of bars for concrete reinforcement.
IS:2629	Recommended practice for hot-dip galvanising of iron and steel.
IS:2751	Code of Practice for welding of mild steel plain and deformed bars for reinforced concrete construction.
IS:4759	Hot-dip zinc coating on structural steel and other allied products.
IS:5525	Recommendations for detailing of reinforcement in reinforced concrete works
IS:9417	Recommendations for welding cold-worked steel bars for reinforced concrete construction.
IS:14268	Uncoated stress relieved low relaxation steel class 2 for Pre-stressed concrete
IS:226	Structural steel (Standard Quality)
IS:800	Code of practice for use of structural steel in general building construction.
IS:813	Scheme of symbols for welding.
IS:814	Covered electrodes for metal arc welding of structural steel. (Part I & Part II)
IS:816	Code of practice for use of metal arc welding for general construction in mild steel.
IS:822	Code of practice for inspection of welds.
IS:1024	Code of practice for use of welding in bridges and structures subject to dynamic loading.
IS:1161	Steel tubes for structural purposes.
IS:1182	Recommended practice for radiographic examination of fusion welded butt joints in steel plates.
IS:2062	Structural steel
IS:3757	Specification for high strength structural bolts.
IS:5624	Specification for foundation bolts.

IS:3600	Code of practice for testing of fusion welded (Part I) joints and weld metal in steel.
IS:4923	Hollow steel sections for structural use.
IS:801	Code of practice for use of cold formed light gauge steel structural members in general building construction.
IS:811 IS:8910 IS:9595 IS:7205	Specifications for cold formed light gauge structural steel sections. General requirements steel products Recommendations for metal arc welding of carbon & Carbon-Manganese steels Safety Code for erection of Structural Steel Works
O	Aggregates
IS:383	Coarse and fine aggregates from natural sources for concrete.
ASTM C117	ASTM C117 Standard test method for materials finer than 75 μ (No.200) sieve in mineral aggregates by washing
P	Scaffolding
IS:2750	Specification for steel scaffoldings
IS:3696 (Part 1)	Safety Code of scaffolds and ladders: Scaffolds
IS:3696 (Part 2)	Safety Code of scaffolds and ladders: Ladders
IS:4014 (Part 1)	Code of practice for steel tubular scaffolding: Definition and materials
IS:4014 (Part 2)	Code of practice for steel tubular scaffolding: Safety regulations for scaffolding
IRC:87	Guidelines for the design and erection of falsework for road bridges
Q	Sealants
IS:10959	Glossary of terms for sealants for building purposes
IS:11433 (Part 1)	One part gun- grade polysulphide based joints sealants: General requirements
IS:11433 (Part 2)	One part gun- grade polysulphide based joint sealants: Methods of test
IS:13055	Methods of sampling and test for anaerobic adhesives and sealants
BS:5889	Specification for one part gun grade silicone-based sealants.
R	Wood
IS:303	Plywood for General Purposes
IS:848	Synthetic resin adhesives for plywood (phenolic and aminoplastic)
IS:1141	Seasoning of Timber - Code of Practice
IS:1328	Veneered decorative plywood
IS:1659	Block Boards
IS:2046	Decorative thermosetting synthetic resin bonded laminated sheets
IS:2202 (Part 1)	Wooden flush door shutters (solid core type): Plywood face panels
IS:2202 (Part 2)	Wooden flush door shutters (solid core (type): Particle face panels and hardboard face panels
T	UPVC Pipe for Drainage
IS 4985	Unplasticized PVC Pipes for portable water supplies
IS: 3764	Code of safety for excavation work
W	MORT&H Specifications for Road and Bridge works (latest Revision)
X	CPWD Specifications & KPWD Specifications (Latest Revisions)

SECTION – 02

STRUCTURAL CONCRETE

K-RIDE

SECTION- S.02

STRUCTURAL CONCRETE:

1. PLAIN, REINFORCED

These specifications shall be read in conjunction with the IS 456, MORTH and CPWD specifications 2013/2009 with correction slips / amendments upto date, and other relevant specifications described in the Section 1 of these Specifications.

2. MATERIALS

Before bringing to the site, all materials for concrete including their source shall be approved by the Employer. All approved samples shall be deposited in the office of the Employer before placing orders for the materials with suppliers. The materials brought on to the works shall conform in every respect to the approved samples.

Fresh samples shall be deposited with Employer whenever type or source of any material changes. The contractor shall check fresh consignment of materials as it is brought on to the works to ensure that they conform to the specifications and/or approved samples

The Employer shall have the option to have any of the materials tested at any time to find out whether they are in accordance with specifications at the contractor's expense. All bills vouchers and test certificates which in the opinion of the Employer are necessary to convince him as to the quality of materials or their suitability shall be produced for his inspection when required.

If fly ash is used in concrete, the contractor shall demonstrate the quality control procedure including source of fly ash, its properties, handling as per the relevant IS & international codes etc. and shall use in slabs and walls only after "no objection" to the same has been obtained from the Employer.

Any material which has not been found to conform to the specifications and not approved by the Employer shall be rejected forthwith and shall be removed from the site by the contractor at his own cost within the time stipulated by the Employer. In the event of contractor not being able to arrange the material conforming to specifications or in the event of failure of the contractor to get the sources approved within the agreed schedule submitted by contractor, the Employer shall have the powers to cause the Contractors to purchase and use such materials from any particular source, as may, in the Employer's opinion, be necessary for the proper execution of work. Nothing extra shall be payable to the contractor on this account.

Contractor shall also ensure that all constituents of exposed concrete shall be taken from same sources to achieve a uniform color and texture.

3.1.1 CEMENT

3.1.1.1 The cement used shall be of the following types

43 grade Ordinary Portland Cement conforming to IS:-269 for RCC.

53 grade Ordinary Portland Cement conforming to IS: 269 for RCC works.

'Cement' means Ordinary Portland Cement conforming to IS 269 or slag cement conforming to IS 455 excluding mineral admixture/ additions as mentioned in para 5.2 of IS 456

3.1.1.2 Whenever possible all cements of each type shall be obtained from one constant source throughout the contract. Cement of different types shall not be mixed together. Different brands of cement, or the same brand of cement from different sources, shall not be used without prior approval of the Employer

3.1.1.3 Packaged cement shall be delivered to the site in original sealed bags which shall be labeled with the weight, name of manufacturer, brand, date of Manufacture and type. Cement received in tor bags shall not be used. Cement shall be used in the order in which it is received. Cement in bags in storage for more than 3 months shall be retested before use. A sample taken once for every 1000 bags shall be tested.

Contractor may obtain cement in bulk and store it in suitable silos of adequate capacity. Each type of cement shall be stored in a separate silo and it shall be ensured, that cements of different quality are not mixed up. Contractor should submit MILL test reports to the Employer.

- 3.1.1.4 All cement shall be fresh when delivered and at ambient atmospheric temperature.
- 3.1.1.5 In fair faced elements, the cement used in the concrete for any complete element shall be from a single consignment. All cement for exposed concrete shall be from the same approved source and uniform in colour.
- 3.1.1.6 With each and every delivery of cement consignment, the contractor shall provide manufacturer's certificate that the cement conforms to the relevant Indian standard. The contractor shall provide complete facilities at site for carrying out the following tests:
 - (a) Setting time by Vicat's apparatus as per IS: 4031 and IS: 5513.
 - (b) Compressive strength of cement as per IS: 4031, IS: 650, IS: 10080.
- 3.1.1.7 Total chloride content in cement shall in no case exceed 0.05 percent by mass of cement. Also, total sulphur content calculated as sulphuric anhydride (SO₃), shall in no case exceed 2.5 percent and 3.0 percent when tri-calcium aluminate per cent by mass is upto 5% or greater than 5% respectively.

3.1.2 AGGREGATES

Aggregates from natural sources shall be in accordance with IS: 383. The contractor shall submit to the Engineer certificates of grading and compliance for all consignments of aggregate. In addition, at site from time to time, the contractor shall allow for carrying out such tests and for supplying test records to the Employer. The aggregates shall be procured from approved sources only as directed by the Employer from time to time.

For fair faced concrete, the contractor shall ensure that aggregates are free from iron pyrites and impurities, which may cause discoloration. Aggregates shall be stored on paved areas in different compartments according to their nominal size.

3.1.2.1 FINE AGGREGATES

The contractor shall provide complete facilities at site for determining grading of aggregates by sieves as per IS: 383, IS: 460, IS: 1607, and IS: 2386. The fine aggregate shall be river sand pit sand, stone dust or other approved sand. It shall be free from clay, loam, earth or vegetable matter, salt or other harmful chemical impurities.

It shall be clean, sharp, strong, angular and composed of hard siliceous material. If considered by the Employer as necessary, the sand shall be washed in screw type mechanical washers

in potable water to remove silt, clay and chlorides. This shall be done at least one day before using it in concrete. The washed sand shall be stored on a sloping concrete platform and in such a manner as to avoid contamination. Such sand washing, storing, etc. shall be at the Contractor's cost. The grading of fine aggregate when determined as described in IS: 2386 (part I), shall be within the grading zones I, II, III.

Water absorption shall be less than 3% by weight (ASTM C 117)

The contractor shall provide complete facilities at site for carrying out the following tests:

- A) Proportion of clay, silt and fine dust by sedimentation method as per IS:2386 part II.
- B) Moisture content in fine aggregate as per IS: 2386 Part III.
- C) Bulk density/ Bulkage

3.1.2.2 Coarse Aggregates

The coarse aggregate shall be crushed stone. Coarse aggregate obtained from crushed or broken stone shall be angular, hard, strong, dense, non-porous, durable, clean and free from soft, friable, thin plate, elongated or flaky pieces and any deleterious material.

River gravel or pit gravel shall be sound, hard, clean, non porous, suitably graded in size with or without broken fragments and free from flat particles of shale, clay, silt, loam, and other impurities

Except where it can be shown to the satisfaction of the Employer that a supply of properly graded aggregates of uniform quality can be maintained over the said period of the works, the grading of aggregates shall be controlled by obtaining the coarse aggregates in different sizes and blending them in correct proportions as and when required.

All coarse aggregates shall conform to IS: 383 and tests for conformity shall be carried out as per IS: 2386, Parts I to VIII.

The maximum size of coarse aggregates shall be such that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and fill the corners of formwork. Unless otherwise permitted by the Engineer the nominal maximum size shall not exceed 20 mm.

Water absorption shall be less than 3% by weight (ASTM C 117)

3.1.2.3 Chloride Content

The chloride content of aggregates shall be within the recommended limits stated in IS: 383 or BS 882 and the chloride content of the concrete mix shall be within the recommended limit of IS: 456 or BS 8110. Chloride levels shall be determined daily in accordance with the methods described in BS 812.

3.1.2.4 Alkali-Silica Reactivity

If aggregates contain any materials which are reactive with alkalis in any of the constituents of the concrete, or in water which will be in contact with the finished work, then the Contractor shall take samples of these materials every week. The Contractor shall ensure that the concrete mix complies with the requirements of this Specification regarding "Minimising risk of alkali-silica reaction in concrete", vide clause 3.4. The results of the Contractor's weekly monitoring tests shall be submitted in writing to the Engineer.

3.1.2.5 Sulphate Content

The total acid soluble sulphate content of the concrete mix, expressed as SO₃, shall not exceed the recommended limit in IS: 456 or BS 8110.

3.1.3 Water

Water used in the works shall be potable water and free from deleterious materials. Water used for mixing and curing concrete as well as for cooling and/or washing aggregate shall be fresh, clean and free from injurious amounts of oil, salts, acids, alkali, other chemicals and organic matter.

Water shall be from the source approved by the Employer and shall be in accordance with clause 5.4 of IS: 456 However, chloride content in water shall not exceed 500 mg/liter.

Before starting any concreting work and wherever the source of water changes, the water shall be tested in accordance with IS: 3025 for its chemical and other impurities to ascertain its suitability for use in concrete for approval of the Employer. No water shall be used until tested and found satisfactory. Cost of all such Tests shall be borne by the contractor.

3.2 Blending of Aggregates

In order to obtain optimum workability, individual aggregates of nominal size 20 mm, 10 mm, 4.75 mm and 2.36 mm will be blended in such a way that the grading curve for all in aggregates will be a smooth curve from size 0.15 mm to 20 mm falling within the established envelope grading curve. Contractor shall establish envelope grading curve for each grade of concrete for given maximum size of aggregates and get it approved by Employer before finalizing the mix design.

3.3 Admixtures

3.3.1 Chemical admixtures are not to be used until permitted by the Employer. In case their use is permitted, the type, quantity/dosage and method of use of any admixture proposed by the Contractor shall be submitted to the Employer for approval. The minimum cement content specified shall not be reduced on account of the use of the Admixtures.

3.3.2 The contractor shall further provide the following information concerning each admixture to the Employer.

- a. Normal dosage and detrimental effects if any of under dosage and over dosage.
 - b. The chemical names of the main ingredients in the admixtures.
 - c. The chloride content, if any, expressed as a percentage by weight of admixture.
 - d. Whether or not the admixture leads to the entrainment of air when used in the manufacturer's recommended dosage.
 - e. Where two or more admixtures are proposed to be used in any one mix, the manufacturer's written confirmation of their compatibility
- 3.3.3 In reinforced concrete works, the chloride content of any admixture used shall not exceed 2 percent by weight of the admixture as determined in accordance with IS:6925 and the total chloride and sulphate contents in concrete mix shall not exceed 0.15 and 4.0 percent respectively by weight of cement.
- 3.3.4 The admixtures when used shall conform to IS:9103. The suitability of all admixtures shall be verified by trial mixes.
- 3.3.5 The addition of calcium chloride to concrete containing embedded metal will not be permitted under any circumstances.
- 3.3.6 Retarding admixtures when used shall be based on ligneous-Phonates with due consideration to clause 5.2 and 5.3 of IS: 7861.
- 3.3.7 Fibre reinforcement will be Propex (Fibermesh 300-e3 / Fibermesh 150-e3) or equivalent make polypropylene fibres, shall be added to ready-mixed concrete wherever the material is to be used for parapet, box girder. Bar reinforcement is still considered primary reinforcement. Under normal condition, add to the ready-mix at the plant in the quantity recommended by the manufacturer subjected to the approval of engineer-in-charge. If job conditions warrant, fiber reinforcement may be added at the jobsite provided that fibers are evenly distributed mix.
- 3.3.8 Micro silica (Silica fume) when used as mineral admixture in to concrete shall be conforming to ASTM C 1240 latest standards, silica fume shall comply with requirements given in IS:15388, IS :456-2000, IRS-CBC to establish specified strengths, durability and to meet special design objectives.
- 3.3.9 Fly ash according to IS:456 conforming to grade I of IS:381 may be used as part replacement provided uniform blending with cement is ensured.

3.4 Minimising the Risk by Using Selected Aggregates

Fine and coarse aggregate material shall comply with the requirements of IS:383 (and/or AASHTO Standard Specifications M60 and M80 respectively) to be taken out to conform to 512(2).

1. Water

Water for use in the manufacture of concrete shall be obtained from a public utility undertaking supply or from a source approved by Employer and shall be of potable quality, and comply with the requirement of IS:456 and or BS 3148.

2. Where a potable mains supply is not available the Contractor shall obtain confirmation of the quality and reliability of the proposed source from the appropriate water authority and shall there after seek consent from the Employer to use the proposed source.
3. Water other than from a public utility undertaking supply shall be sampled at a frequency to be determined by the Employer and tested in accordance with the relevant provisions of IS:3025 or BS 3148. The sodium oxide and potassium oxide content shall be declared and expressed as equivalent Na₂O and shall be taken into account when calculating the total reactive alkali content of the concrete mix.

4. Admixtures and Pigments

Admixtures and pigments shall comply with the requirements of IS 9103 and IS:6925 or BS 5075 and BS 1014. The manufacturer's declared equivalent acid soluble alkali content and the dosage rate of any admixture or pigment to be incorporated shall be included with details of all concrete mixes submitted for consent.

5. The alkali content of admixtures shall be taken into account when determining the total equivalent alkali content of the concrete mix.
6. Microsilica (silica fume) shall be used in 5% by the weight of cement and shall not exceed 15% by the weight of cement.

3.5 Batching Plants, Mixers and Vibrators

- 3.5.1 Unless otherwise specified in the schedule of items, for all structural concreting work the Contractor shall provide automatic weigh-batching plant of suitable capacity. The plant used shall conform to IS: 4925.
- 3.5.2 The Contractor shall provide Concrete mixers (IS: 1791 – Batch type concrete mixers, IS:2438 - Roller Pan Mixer) and Vibrators (IS:2505 - Concrete Vibrators Immersion Type, IS:2506 - Screed board concrete vibrators supplied by recognized manufacturers.

3.6 Grade of Concrete

The concrete is designated as follows:

Concrete M 25 / 20

The letter M refers to the mix

The number 25 represents the characteristic compressive strength of 15cm cubes at 28 days in MPa (Mega Pascal's: 1 MPa: 10 kg/cm² approximately). M25 concrete thus has a characteristic strength of 250 kg/cm². Other mix design will also be denoted in same way.

The number 20 represents the nominal size of the coarse aggregates in mm.

3.7 Mix Design

It is the complete responsibility of the Contractor to design the concrete mixes by approved standard methods as per IS 10262 and to produce the required concrete conforming to the specifications and the strength, workability requirements approved by the Employer.

Mix Design once approved must not be altered without prior approval of Employer. However, should the contractor anticipate any change in quality and/or change in source of future supply of materials than that used for preliminary mix design, he should inform the Employer quite in advance and bring fresh samples sufficiently in advance, to carry out fresh trial mixes. Design mix will indicate by means of graphs and curves etc., the extent of variation in the grading of aggregates which can be allowed.

Notwithstanding to the stipulations in any code, limits of Cement content, Water/Cement ratio & mineral admixture shall be followed as per the Table 3.7.1.

Table 3.7.1 Limits of Water/ Cement ratio, Cement content & mineral admixtures in concrete mixes

Sl. No.	Description of Structural items/ elements	Applicable code	Grade of Concrete	Max. W/C ratio	Min. cement content (kg/m ³)	Type/ Grade of Cement	Use of mineral admixture
	PCC works	IS 456	M20	0.50	240	OPC 43(IS8112) or OPC 53 grade conforming to IS:12269	Not permitted.
	Foundation/ underground structures	IS 456	RCC M35	0.45	340	Slag Cement conforming to IS 455 or site blending OPC53+GGBS	In case slag cement not used, GGBS is permitted to be used for part replacement of

Sl. No.	Description of Structural items/elements	Applicable code	Grade of Concrete	Max. W/C ratio	Min. cement content (kg/m ³)	Type/ Grade of Cement	Use of mineral admixture
							OPC to max. 50% by weight.
	RCC Columns		M35	0.45	340	OPC 53 grade conforming to IS:12269	Permitted to use micro silica/ silica fumes or Flyash as per IS 456 over and above minimum cement content as per mix design requirement.
	Slabs & beams		M35	0.45	340		

Maximum cementitious content in a mix which includes cement and mineral admixtures shall not exceed 500 Kg/m³. Where ever code/standards permits, the micro silica, fly ash and GGBS shall be allowed.

Limits of Water and Cement Contents

Maximum water/cement ratio

- For RCC members - 0.40

3.8 Cement Content

Ordinary Portland cement (OPC) of 53 grade conforming to IS: 269 shall be used.

As regards trial mixes, acceptance criteria, acceptance specification, lot size, sampling and testing and sampling size, the requirement of the relevant codes, standards and directions of the Employer shall be followed.

3.9 Additional Tests for Concrete

As frequently as the Employer may require, additional tests shall be carried out of concrete in addition to mandatory test specified in relevant IS Code, MORTH Specifications-2013(fifth revision) and CPWD specifications -2009.

3.10 Batching of Concrete Ingredients

Unless permitted by the Employer, all concreting shall be produced in computerized automatic weigh batching plant having printing facilities to print out records of each batch and installed at site. Under exceptional circumstances Ready Mixed Concrete (RMC) manufactured in computerized automatic weigh batching plant (as per specifications described above) by the approved agencies using the constituent materials from approved sources and approved mix design may also be used with prior approval from Employer. Nothing extra shall be paid for such RMC used in the work including transportation, placing in position etc. However, in such cases the RMC production & transportation will have to be directly supervised by the qualified personnel of the contractor. (Contractor has to setup his own batching plant(s). RMC from market will be permitted only in exceptional circumstances and to be decided by the Employer.)

3.11 Placing Temperatures

During extreme hot or cold weather, the concreting shall be done as per procedures set out in IS:7861, Parts I & II.

In hot weather with temperature exceeding 40 degree C, the stock piles of fine and coarse aggregates for concreting shall be kept shaded from direct rays of sun and the concrete aggregates sprinkled with water for a sufficient time before concreting in order to ensure that the temperature of these ingredients is as low as possible prior to batching. The mixer and batching equipment shall be also shaded and if necessary painted white in order to keep their temperatures as low as possible. The placing temperature of concrete shall be as low as

possible in warm weather and care shall be taken to protect freshly placed concrete from overheating by sunlight in the first few hours of its laying. The time of day selected for concreting shall also be chosen so as to minimise placing temperatures. In case of concreting in exceptionally hot weather the Employer may in his discretion specify the use of ice either flaked and used directly in the mix or blocks used for chilling the mixing water. In either case, the Contractor shall not be paid extra for cost of ice, additional labour involved in weighing and mixing etc. All salt and saw dust shall be removed from ice before use. Quality of water used for making ice shall conform to IS: 456.

3.12 Transporting, Placing, Compacting and Curing

Transporting, placing, compacting and curing of concrete shall be in accordance with IS: 456.

3.12.1 Transporting

The mix after discharging from the mixer shall be transported by transit mixers, buckets, pumps etc. or as approved by the Employer without causing segregation and loss of cement slurry and without altering its desired properties with regard to water cement ratio, slump, air content, cohesion and homogeneity. It should be ensured that the concrete is moved to its final destination before it attains an initial set.

The transportation is to be done by agitating transit mixers, pumps or other approved methods.

3.12.2 Placing:

(i) Placing General

Concrete shall be placed in the position and sequence indicated on the Drawings, or as directed. Placing shall not be commenced until the fixing and condition of reinforcement and items to be embedded and the condition of the containing surfaces or formwork has been approved. 24 hours written notification shall be given of the intention to place concrete.

Concrete shall be transported by means which prevent contamination (by dust, rain etc.) segregation or loss of ingredients, and shall be transported and placed without delay.

Concrete shall be placed directly in its final position without segregation or displacement of the reinforcement, embedded items and formwork. Concrete shall not be placed in water, except as specified. Concrete shall not be dropped through a height greater than 1.5 meters.

(ii) Extent of Pours

The limit of individual pours and the height of lifts shall be as approved.

For walls, the length of panel placed at one time shall not exceed 6m; adjacent panels shall not be placed within 2 days, but shall be placed as soon as practicable thereafter. Subsequent vertical lifts shall not be poured within 2 days.

Floors, roofs and ground slabs shall be placed in a sequence of pours to the approval of the Designer and the consent of the Employer's Representative.

(iii) Placing Equipment

Concrete shall generally be placed without segregation by pumping or bottom-opening skips. If chutes are used their slopes shall not cause segregation and spouts or baffles shall be provided.

(iv) Time for Placing

Concrete and mortar must be placed and compacted within 30 minutes of water being added to the mix or otherwise included via damp aggregates, unless admixtures are in use. Partially-set concrete shall not be used in the Works.

(v) **Continuity of Placing**

Placing in each section of work shall be continuous between construction joints. The Contractor shall make provision for standby equipment. If the placing of concrete is delayed due to breakdown then the Contractor shall erect vertical stop-ends and form a construction joint or remove the concrete already placed and restart after repair of the breakdown, as directed.

(vi) **Placing in Inclement Weather**

Placing shall not take place in the open during storms or heavy rains. If such conditions are likely to occur the Contractor shall provide protection for the materials, plant and formwork so that work may proceed. If strong winds are prevalent protection from driving rain and dust shall be provided.

(vii) **Placing in High Temperature and Low Temperature**

The temperature of concrete shall not exceed 32° nor below 50°C or the temperature stated in the table of Mixes whichever is the lower at the time of placing concrete. Also the maximum concrete temperature after placing shall not exceed temperature 50 ° C or 30 ° C above the concrete temperature at the time of placing whichever is the lower.

The Contractor shall supply suitable maximum/minimum thermometers and record the shade and sun temperatures at locations where concrete is being placed. Recommendations for cold weather concrete can be had from IS: 7861 (Part 2).

(viii) **Placing at Night**

If consent has been given for placing at night or in dark interiors, adequate lighting shall be provided where mixing, transportation and placing are in progress.

(ix) **Preparation Before Placing**

Before placing concrete for reinforced work on the ground, the formation shall be compacted as specified and a screed of blinding concrete shall be applied to form a surface for construction.

Before placing concrete on or against rock, masonry, brickwork or old concrete, loose material shall be removed and the surface washed down; water seepage shall be stopped or channeled away from the work.

For mass concrete placed against masonry or brickwork the following shall apply:-

- a. The mortar joints in the facework shall have fully hardened.
- b. The water-cement ratio of the concrete shall be increased to compensate for the absorption of moisture by the existing work.
- c. The surface shall be soaked prior to placing.
- d. The concrete shall be worked around ties and bond stones and into open joints.

3.12.3 **Compaction**

Internal (needle) and surface (screed board) vibrators of approved make shall be used for compaction of concrete.

Internal vibrators shall be used for compaction of concrete in foundations, columns, buttresses arch section, slabs etc, and if required surface vibrators shall also be used. Depending on the thickness of layer to be compacted, 25 mm, 40 mm, 60 mm and 75 mm dia. internal vibrators will be used. The concrete shall be compacted by use of appropriate diameter vibrator by holding the vibrator in position until:

- i. Air bubbles cease to come to surface.
- ii. Resumption of steady frequency of vibrator after the initial short period of drop in the frequency, when the vibrator is first inserted.
- iii. The tone of the vibrated concrete becomes uniform.
- iv. Flattened, glistening surface, with coarse aggregates particles blended into it appears on the surface.
- v. Use of curing compounds may be permitted with specific approval of Engineer

- vi. After the compaction is completed, the vibrator should be withdrawn slowly from the concrete so that concrete can flow in to the space previously occupied by the vibrator. To avoid segregation during vibration the vibrator shall not be dragged through the concrete nor used to spread the concrete. The vibrator shall be made to penetrate, into the layer of fresh concrete below if any for a depth of about 150 mm. The vibrator shall be made to operate at a regular pattern of spacing. The effective radii of action will overlap approximately half a radius to ensure complete compaction
- vii. To secure even and dense surfaces free from aggregate pockets, vibration shall be supplemented by tamping or rodding by hand in the corners of forms and along the form surfaces while the concrete is plastic.
- viii. A sufficient number of standby vibrators shall be kept readily accessible to the place of deposition of concrete to assure adequate vibration in case of breakdown of those in use.
- ix. Form vibrators whenever used shall be clamped to the sides of formwork and shall not be fixed more than 450 mm above the base of the new formwork and concrete shall be filled not higher than 230mm above the vibrator. The formwork must be made specially strong and watertight where this type of vibrator is used.
- x. Care must be taken to guard against over vibration especially where the workability of the concrete mix is high since this will encourage segregation of the concrete.
- xi. Plain concrete in foundations shall be placed in direct contact with the bottom of the excavation, the concrete being deposited in such a manner as not to be mixed with the earth. Plain concrete also shall be vibrated to achieve full compaction.
- xii. Concrete placed below the ground shall be protected from falling earth during and after placing. Concrete placed on ground containing deleterious substances shall be kept free from contact with such ground and with water draining there from during placing and for a period of seven days or as otherwise instructed thereafter. Approved means shall be taken to protect immature concrete from damage by debris, excessive loading, abrasion, vibrations, deleterious ground water, mixing with earth or other materials, and other influences that may impair the strength and durability of the concrete.

3.12.4 **Field Control**

Sampling at both, truck discharge and point of final placement shall be employed to determine the quality of concrete.

3.12.5 **Curing**

Curing of concrete shall be complete and continuous using potable water free from chlorides and sulphates water that is free of harmful amounts of deleterious materials that may attach, stain or discolor the concrete as per IS 456. Minimum wet curing will be for seven days by ponding water followed by moist curing by spraying water which shall be maintained up to a total period of at-least 14 days from the date of casting.

Immediately after compaction and completion of any surface finishes the concrete shall be protected from the evaporation of moisture by means of polythene sheathing, wet hessian or other material kept soaked by spraying. As soon as the concrete has attained a degree of hardening sufficient to withstand surface damage moist curing shall be implemented and maintained for a period of at least 14 days after casting.

- i. Method of curing and their duration shall be such that the concrete will have satisfactory durability and strength and members will suffer a minimum distortion, be free from excessive efflorescence and will not cause undue cracking in the works by shrinkage.
- ii. Steam curing with approved methodology can be adopted if required, for precast components. No extra payment will be made for adopting steam curing. Before concrete products are subjected to any accelerated method of curing, the cement to be used shall be tested in accordance with accepted standards (relevant IS codes) especially for soundness, setting time and suitability for steam curing. In the case of elements manufactured by accelerated curing methods, concrete admixtures to reduce the water content may be allowed to be as permitted by applicable codes of practice subject to the approval

of the Engineer. The normal aeration agents used to increase the workability of concrete shall not be allowed. The steam curing of concrete products shall take place under hoods, under chambers or in tunnels. Use of insulated tarpaulin may be permitted. The steam shall have a uniform quality throughout the length of the member. The precast elements shall be stacked with sufficient clearance between each other and the bounding enclosure, so as to allow proper circulation of steam. The surrounding walls, the top cover and the floor of steam curing chamber or tunnel or hood shall be so designed as not to allow more than 1 kcal/m²/h/ deg C. The inside face of the steam curing chamber, tunnel or hood shall have a damp-proof layer to maintain the humidity of steam. Moreover, proper slope shall be given to the floor and the roof to allow the condensed water to be easily drained away. At first, when steam is let into the curing chambers, the air inside shall be allowed to go out through openings provided in the hoods or side walls which shall be closed soon after moist steam is seen jetting out. Preferably, steam should be let in at the top of the chamber through perforated pipelines to allow uniform entry of steam throughout the chamber. In no case shall steam impinge directly on concrete products. The fresh concrete in the moulds shall be allowed to get the initial set before allowing the concrete to come into contact with steam. The regular heating up of fresh concrete product from 20 °C to 35 °C shall start only after a waiting period ranging from 2 to 5 hours depending on the setting time of cement used. The second stage in steam curing process shall be to heat up the concrete elements, moulds and the surroundings in the chamber. The airspace around the member shall be heated up to a temperature of 75°C to 80°C at a gradual rate, not faster than 30° per hour. This process shall continue 1 1/2 to 2 1/2 hours depending upon the outside temperature. The third stage of steam curing shall be to maintain the uniform temperature and pressure for a duration depending upon thickness of the section. This may vary from 3 to 5 1/2 hours. The fourth stage of steam curing shall be the gradual cooling down of concrete products and surroundings in the chamber and normalization of the pressure to bring it at par with the outside air. The maximum cooling rate, which is dependent on the thickness of the member, shall not exceed 30° per hour. In all these cases, the difference between the temperature of the concrete product and the outside temperature shall not be more than 60°C for concrete up to M 30 and 75°C for concrete greater than M 45. In the case of light weight concrete, the difference in temperature shall not be more than 60°C for concrete less than M 25. For concrete greater than M 50, the temperature differences may go up to 75°C. After the steam curing is completed, the elements shall be further water cured for about 3 to 7 days

- iii. Curing Compound shall be used with prior approval of Employer. Clear, water based, nontoxic, non-film forming, reactive silicate treatment with indefinite shelf life suitable as complete replacement to any water curing procedures such as water soak ponding, blankets and plastic sheets for all horizontal and vertical surfaces Manufacturer shall supply written proof of completed, successful projects for upto 30 years. After completion of curing process, there should not be a requirement of removal or special preparation for surface applied adhesives flooring, coatings, patching, concrete stains, etc. Curing compound should have been successfully tested by CRRI as a replacement for water curing an accredited by IS also.

3.13 Joints

I. Construction Joints

Construction joints shall be located and the sequence of placing arranged as approved, to minimise shrinkage and thermal strains in the concrete.

Concrete placing shall not be interrupted except where joints occur, and shall continue after normal hours if necessary to achieve this.

Joints shall be formed square to the work with keyways included.

Before placing is resumed at a joint the set surface shall be roughened to remove laitance and expose the aggregate; the aggregate shall not be damaged. If damaging materials have come into contact with the surface of the joint the concrete shall be cut back and the roughened surface cleaned by compressed air or water jets and brushed and watered immediately before placing. If required the surface shall be coated with a layer of stiff cement-grout prior to placing the new concrete.

Chemical surface-retarders shall not be used.

Construction joints shall be sealed with an approved sealant at external and liquid-contact faces.

Construction joints in water-retaining structures shall incorporate an approved water stop with approved methodology.

II. Expansion and Movement Joints

Expansion, contraction and other movement joints shall be incorporated in the works as shown on the Drawings.

Where shown on the Drawings approved, expansion joint fillers shall be supplied and installed. Filler material shall be stored flat on a dry surface adequately protected from rain or moisture in such a way that the material does not deteriorate. Filler material which has been damaged or has started to deteriorate shall not be incorporated in the works.

Movement joints shall be sealed with an approved sealant applied in strict accordance with the manufacturer's instructions to the dimensions shown on the Drawings. The surface of the concrete to which the sealant is to adhere shall be straight and cleaned of all filler material, dirt, oil, grease and other matter. The sealant shall be applied by methods recommended by the manufacturer so that the sealant is brought flush to the surface of structure and a smooth surface is achieved. Excess material and spillage shall be properly cleaned off and removed.

Dowel bars shall be installed and cast in across the movement joint where shown on the Drawings. The bars shall be straight with clean cut ends of the diameters and lengths as shown on the Drawings or in the Schedules. Cutting and cleaning of the dowel bars shall comply with the requirements of this Specification.

The bars shall be firmly supported in the positions shown on the Drawings so that they remain accurately parallel and are not displaced during the casting of the concrete in the first part of the structure. After the concrete has hardened and the formwork removed, the projecting ends shall be cleaned of all concrete spillage and painted with two coats of an approved bituminous paint and caps shall be fitted to the free ends of the bars. Dowel bar end caps shall be of cardboard or other material, of correct diameter for the dowel bar and of sufficient length to allow the specified movement of the two adjacent concrete structures. They shall be manufactured expressly for this purpose by an approved manufacturer.

The Contractor shall take care to protect the projecting ends of dowel bars from bending or other damage prior to concreting the succeeding bay. The bituminous paint shall be applied as soon as practicable, but end caps shall not be fitted until immediately prior to the succeeding concreting operations.

III. Water-stops

The layout and installation of the water-stops shall be in accordance with the manufacturer's recommendation and shall be subject to the approval of Designer and consent of Employer.

IV. Bolts, Inserts and Openings

All fixing blocks, brackets, built in bolts, holes, chases, etc., shall be accurately set out and formed and carefully sealed prior to the concrete being placed. No cutting away of concrete for any of these items shall be done without the permission of the Employer.

Bolts and other inserts to be cast into the concrete shall be securely fixed to the formwork in such a way that they are not displaced during the concreting operations, and that there is no loss of materials from the wet concrete through holes in the formwork.

Unless shown otherwise on the Drawings or the Employer has given consent reinforcement shall be locally moved so that the minimum specified cover is maintained at the locations of inserts, holes, chases, etc

Temporary plugs shall be removed and the threads of cast in bolts shall be proved to be free and shall be greased before handing over any part of the Works. Construction joints in all concrete work shall be made as directed by the Employer. Where vertical joints are required, these shall be shuttered as directed and not allowed to take the natural slope of the concrete.

3.14 Cracks

If cracks, which in the opinion of the Employer may be detrimental to the strength construction, develop in concrete construction.

If under such test loads the cracks develop further, the Contractor shall dismantle the construction, carry away the debris, replace the construction and carry out all consequential work thereto

External Shrinkage crack width shall be restricted to 0.25mm on all viaduct structures and 0.30 mm on Station structures. If it is more than the above and in the opinion of Employer may be detrimental to concrete construction, the contractor should test and make good the structure at his own expense with prior approval.

3.15 Defective Concrete

Should any concrete be found honeycombed or in any way defective, such concrete shall be rectified as per approved methodology by the contractor at his expense. If Employer feels that repaired structure will not be having same strength or shape or uniformity with other exposed surface as original desired structure / original structure, the same shall be rejected by Employer and required to be dismantled and disposed off by contractor at his own cost, as instructed by Employer. Decision of the Employer shall be final binding in this regard.

3.16 Exposed Faces, Holes and Fixtures

On no account shall concrete surfaces be patched or covered up or damaged concrete rectified or replaced until the Employer or his representative has inspected the works and issued written instructions for rectification. Failure to observe this procedure will render that portion of the works liable to rejection.

Holes for foundation or other bolts or for any other purposes shall be moulded and steel angles, holdfasts or other fixtures shall be embedded, according to the drawing or as instructed by the Employer.

3.17 Finishes

Unless otherwise instructed, the face of exposed concrete placed against formwork shall be rubbed down immediately on removal of the formwork to remove irregularities. The face of concrete for which formwork is not provided other than slabs shall be smoothed with a float to give a finish equal to that of the rubbed down face, where formwork is provided. The top face of a slab which is not intended to be covered with other materials shall be leveled and floated to a smooth finish at the levels or falls shown on the drawings or as directed. The floating shall be done so as not to bring an excess of mortar to the surface of the concrete. The top face of a slab intended to be surfaced with other material shall be left with a spaded finish. Faces of concrete intended to be plastered shall be roughened by approved means to form of a key.

3.18 Concrete for Flooring on Grade

Concrete for flooring on grade shall be placed in alternate bays not exceeding more than 4 m x 4m or as specified in the drawings including forming the joints or adjacent bays. The stiff mix shall be thoroughly vibrated and finished to receive the floor finish.

3.19 Pre-Cast Concrete

3.19.1 Forms

1. The design and engineering of the forms and false work as well as their construction shall be the responsibility of the Contractor. All exposed surfaces of each element of the structure shall be formed with similar material to produce similar concrete surface textures, colour, and appearance. Forms shall be inspected and approved by the Employer prior to authorizing casting operations. Details shown on the Drawings shall be built into the forms. Worn, damaged, or otherwise unacceptable forms shall be repaired before casting of any member will be authorised.
2. The forms may be made either of steel or of plywood. If the Contractor selects to use plywood forms, it shall be a high quality plywood, 19mm minimum thickness, marine grade and it shall not be reused and shall be removed from site subject to the consent of the Employer.
3. Forms shall be structurally adequate to support the members within permissible tolerances. The form design shall incorporate the method and the necessary hardware to adjust and maintain grade and alignment. Details of the hardware and adjustment procedure shall be included in the required plans.

4. Forms shall be coated with form release agent prior to use. Form release agent shall be a commercial quality form oil or other equivalent coating which will permit the ready release of forms and will not discolour the concrete. Excess form release agent shall not be allowed to stand in puddles in the forms nor shall coating be allowed to come in contact with reinforcing steel or hardened concrete.
5. Anchor devices may be cast into the concrete for later use in supporting forms, provided the arrangement is approved by the designer and consented by Employer. The use of driven or drilled types of anchorages for fastening forms or form supports to concrete will not be permitted.

3.19.2 Curing

The steam curing shall be at 100% relative humidity to prevent loss of moisture and to provide moisture for proper hydration of the cement. Application of the steam shall not be directly on the concrete. During application of the steam, the ambient air temperature shall increase at a rate not to exceed 22°C per hour until the maximum temperature Curing shall comply with the requirements of specification.

Steam curing process may be used as an optional alternative to water curing at no extra cost to the employer. The casting bed for any unit cured with steam shall be completely enclosed to prevent steam escaping and exclude outside atmosphere. 2 to 4 hours after placing concrete and after the concrete has undergone initial set, the first application of steam shall be made, unless retarders are used, in which case the waiting period before application of the steam shall be increased to from 4 to 6 hours. Water curing methods shall be used from the time concrete is placed until steam is first applied.

Where the steam has been raised the maximum temperature shall be held until the concrete has reached the desired strength. In discontinuing the steam application, the ambient air temperature shall not decrease at a rate to exceed 22°C per hour until a temperature has been reached 10°C above the temperature of the air to which the concrete shall be exposed. The maximum curing temperature shall be from 60°C to 67°C. If the Contractor elects to cure by any other special method, the method and its details shall be subject to the approval of the designer and consent by Employer.

3.19.3 Storage

When members are stored, they shall be firmly supported only at the points specified by the Designer. The accumulation of trapped water and deleterious matter in the units shall be prevented. Care shall be taken to avoid rust staining and efflorescence.

3.19.4 Handling and Transport

1. Members shall be lifted or supported only at points specified by the Designer or otherwise agreed by the Employer and shall be handled and placed without impact.
2. The method of lifting, the type of equipment and transport to be used, and the minimum age of the members to be handled shall be subject to the Designer's requirements.

3.19.5 Forming Structural Connections

- I. No structural connections shall be made until the Employer's consent has been given.
- II. Unless otherwise agreed by the Employer, the composition and water/cement ratio of the in situ concrete or mortar used in any connection and the packing of joints shall be in accordance with the assembly instructions.
- III. Levelling devices shall only be released or removed with the consent of Employer.

3.19.6 Epoxy Grout for Structural Connections (if required)

1. Description

Epoxy shall be furnished as 2 components which shall be mixed together at the Site.

2. Sampling and Testing

All tests will be conducted in accordance with the latest test methods of the American Society for Testing and Materials, Federal Test Method Standard No. 141 or equivalent British Standard.

3. Packaging, Labelling and Storing

Each component shall be packaged in steel containers not larger than 20 liters in volume. When the components are to be mixed at a ratio of 2 parts A to one part B, by volume, the container containing component B shall be one half the volume of the container containing component A. The containers shall have lug type crimp lids with ring seals, shall be new, not less than 0.6 mm nominal thickness, and shall be of such character as to resist any action by the components. Each container shall be clearly labeled with the designation (Component A or B), type (Standard or Rapid) if applicable, manufacturer's name, date of manufacture, batch number (a batch shall consist of a single charge of all components in a mixing chamber), lot number, all directions for use specified elsewhere and the following warning "CAUTION"

"This material will cause severe dermatitis if it is allowed to come in contact with the skin or eyes. Use gloves and protective creams on the hands. Should this material contact the skin, wash thoroughly with soap and water. **Backfill to Structures**

Do not attempt to remove this material from the skin with solvents. If any gets in the eyes, flush for 10 minutes with water and secure immediate medical attention." Attention is directed to the characteristic of some epoxy components to crystallize or thicken excessively prior to use when stored at temperatures below 2°C. Any material which shows evidence of crystallization or a permanent increase in viscosity or settling of pigments which cannot be readily redispersed with a paddle shall not be used.

4. Directions for Use

At the time of mixing, components A and B shall be at a temperature between 16°C and 29°C, unless otherwise specified. Any heating of the adhesive components shall be done by application of indirect heat. Immediately prior to mixing, each component shall be thoroughly mixed with a paddle. Separate paddles shall be used to stir each component. Immediately prior to use, the 2 components shall be thoroughly mixed together in the specified ratios. When mixed, all adhesives shall have a uniformly gray colour without black or white streaks. No solvent shall be added to any epoxy. After mixing, all epoxies shall be placed in the work and any overlaying or inserted be cleaned and it shall have moisture content of not more than 0.50% when tested. The maximum size of the aggregate shall not exceed that of material which is to be bonded to the work by the epoxy. It shall also be placed before thickening of the epoxy has begun. Surfaces upon which epoxy is to be placed shall be free of rust, paint, grease, asphalt, moisture and loose and deleterious material. When epoxy is used as a binder to make epoxy concrete or grout, the 2 components of epoxy shall be thoroughly mixed together before the aggregate is added and, unless otherwise specified, the mix proportions shall consist of one part of binder to approximately 4 parts of aggregate, by volume. Aggregate for use in epoxy concrete and grout shall one-fourth of the thickness of the joint to be grouted. All surfaces against which epoxy concrete and grout are to be placed shall be primed with a coat of the epoxy used just prior to placing the grout. No more material shall be mixed than can be used within 20 minutes from the time mixing operations are started. Pot life of the epoxy mixture shall be 45 minutes.

5. Epoxy Grout Strength Requirements

The compressive strength of 38 mm cubes of epoxy grout tested in accordance with ASTM C39 after 10 hours of curing at 20°C shall be not less than the design strength of the precast number.

3.19.7 Temporary Supports and Connections

Temporary supports provided during erection should take into account all construction loads likely to be encountered during the completion of joints between any combination of precast and in-situ concrete structural elements. The supports should be arranged in a manner that will permit the proper finishing and curing of any in-situ concreting and grouting associated with the precast member being supported when the gaps of joints have to be filled with concrete or mortar. They should first be cleaned and faces of the joints should be wetted. The mixing, placing and compacting of cement and mortar should be done with special care. Mortar of a dry consistency should be in the proportion of 1:1½ (1 part of cement to 1½ parts of sand) and should be placed in stages and packed hard from both sides of the joint.

3.19.8 Tolerances

The following tolerances apply to finished precast products at the time of placement in the structure. The forms must be fabricated / constructed to give a casting well within these limits:

1. Overall dimensions of members should not vary by more than + 6 mm per 3 m length with a maximum variation of + 20 mm.
2. Cross-sectional dimensions should not vary by more than the following:
 - + 3 mm for sections less than 150 mm thick
 - + 4 mm for sections over 150 mm & less than 450 mm
 - + 6 mm for sections over 450 mm to 1000 mm
 - + 10 mm for sections over 1000 mm
3. Deviation from straight line in long sections should not be more than + 6 mm up to 3 m, + 10 mm for 3 m to 6 m, + 12 mm for 6 m to 12 m.

(i) For tolerances on precast components, standard documents shall be followed

Square rods with internal threading and base plate/stiffener, shall be firmly fixed in the mould to the true line, level and alignment as shown in drawings. If required by engineer MS template may use for above purpose. The threaded hole/pipe shall be properly protected so as to prevent ingress of mortar etc (by providing dummy bolts, PVC cover, cotton waste etc). For connection of parapet with segmental box girder bolts of required length having threads at both ends shall be provided as shown in drawings. Grade of steel will be in accordance with the values specified in the drawing. Welding to bolts is not permitted. Grade of nuts will be same as grade of respective bolts. It is imperative to verify that that bolts can be threaded smoothly at all times. Dummy bolts shall be used in the stacking yard as a protection measure to keep the threads clean free of dust / rust. Threading, bolts materials, tests etc shall be as per IS: 1367part 1 to 16,18, IS: 1821-1987, IS: 4206.

Levelling bolts as shown in tender drawings are for facilitating alignment of the precast parapet.

3.20 Ready Mix Concrete and Pumping:

Ready-mixed concrete may be manufactured in a central automatic weigh Batching plant and transported to the place of work in agitating transit mixers.

The maximum size of coarse aggregate shall be limited to one-third of the smallest inside diameter of the hose or pipe used for pumping. Provision shall be made for elimination of over-sized particles by screening or by careful selection of aggregates. To obtain proper gradation it may be necessary to combine and blend certain fractional sizes of aggregates. Uniformity of gradation throughout the entire job shall be maintained.

The quantity of coarse aggregate shall be such that the concrete can be pumped, compacted and finished without difficulty.

Fine aggregates:

The gradation of fine aggregate shall be such that 15 to 30 percent should pass the 0.30 mm screen and 5 to 10 percent should pass 0.15 mm screen so as to obtain pumpable concrete. Sands, which are deficient in either of these two sizes, should be blended with selected finer sands to produce these desired percentages. With this gradation, sands having a fineness modulus between 2.4 and 2.8 are generally satisfactory. However, for uniformity, the fineness modulus of the sand should not vary more than 0.2 from the average value used in proportioning.

Water, Admixtures and Slump:

The amount of water required for proper concrete consistency shall take into account the rate of mixing, length of haul, time of unloading, and ambient temperature conditions.

Additions of water to compensate for slump loss should not be resorted to nor should the design maximum water-cement ratio be exceeded. Additional dose of retarder be used to compensate the loss of slump at contractor's cost, when permitted by Engineer. Retempering water shall not be allowed to be added to mixed batches to obtain desired slump.

Transportation:

The method of transportation used should efficiently deliver the concrete to the point of placement without significantly altering its desired properties with regard to water-cement ratio, slump, and homogeneity.

The revolving-drum truck bodies of approved make shall be used for transporting the concrete. The numbers of revolutions at mixing speed, during transportation, and prior to discharge shall be specified and agreed upon. Reliable counters shall be used on revolving-drum truck units. Standard mixer uniformity tests, conforming to ASTM standards C 94-69 "Standard Specifications for Ready Mix Concrete", shall be carried out to determine whether mixing is being accomplished satisfactorily.

Pumping of concrete:

Only approved pumping equipment, in good working condition, shall be used for pumping of concrete. Concrete shall be pumped through a combination of rigid pipe and heavy-duty flexible hose of approved size and make. The couplings used to connect both rigid and flexible pipe sections shall be adequate in strength to withstand handling loads during erection of pipe system, misalignment, and poor support along the lines. They should be nominally rated for at least 3.5 MPa pressure and greater for rising runs over 30 m. Couplings should be designed to allow replacement of any section without moving other pipe sections, and should provide full cross section with no construction or crevices to disrupt the smooth flow of concrete.

All necessary accessories such as curved sections of rigid pipe, swivel joints and rotary distributors, pin and gate valves to prevent backflow in the pipe line, switch valves to direct the flow into another pipe line, connection devices to fill forms from the bottom up, extra strong couplings for vertical runs, transitions for connecting different sizes of pipe, air vents for downhill pumping, clean-out equipment etc, shall be provided as and where required. Suitable power controlled booms or specialized crane shall be used for supporting the pipe line.

Field control: Sampling at both truck discharge and point of final placement shall be employed to determine if any changes in the slump and other significant mix characteristics occur. However, for determining strength of concrete, cubes shall be taken from the placement end of line.

Planning:

Proper planning of concrete supply, pump locations, line layout, placing sequence, and the entire pumping operation shall be made and got approved. The pump should be as near the placing area as practicable, and the entire surrounding area shall have adequate bearing strength to support concrete delivery pipes. Lines from pump to the placing area should be laid out with a minimum of bends. For large placing areas, alternate lines should be installed for rapid connection when required. Standby power and pumping equipment should be provided to replace initial equipment, should breakdown occur. The placing rate should be estimated so that concrete can be ordered at an appropriate delivery rate. As a final check, the pump should be started and operated without concrete to be certain that all moving parts are operating properly. A grout mortar should be pumped into the lines to provide lubrication for the concrete, but this mortar shall not be used in the placement. When the form is nearly full, and there is enough concrete in the line to complete the placement the pump shall be stopped and a go-devil inserted and shall be forced through the line by water under pressure to clean it out. The go-devil should be stopped at a safe distance from the end of the line so that the water in the line will not spill into the placement area. At the end of placing operation, the line shall be cleaned in the reverse direction.

3.21 Testing Concrete Structures for Water Tightness & Acceptance Criteria

Underground Structures, Pump Rooms and Sumps

In the case of structures whose external faces are submerged and are not accessible for inspection, such as underground structures, the structures shall be filled with water and after the expiry of seven days after the filling, the level of the surface of the water shall be recorded. The level of water shall be recorded again at subsequent intervals of 24 hours over a period of seven days. Backfilling shall be withheld till the tanks are

tested. The total drop in surface level over a period for seven days shall be taken as an indication of the water tightness of the structure.

A structure shall be deemed to be water tight if the total drop in the surface level over a period of seven days does not exceed 40 mm.

Roofs

The roofs of liquid-retaining structures shall be water-tight and shall be tested on completion by flooding the roof with water to a minimum depth of 25 mm for 24 hrs. Where it is impracticable, because of roof falls or otherwise, to contain a 25 mm depth of water, the roof shall have water applied by a continuous hose or sprinkler system to provide a sheet flow of water over the entire area of the roof for not less than 6 hrs. In either case the roof shall be considered satisfactory if no leaks or damp patches show on the soffit. Should the structure not satisfy either of these tests, then after completion of the remedial work it should be retested in accordance with this clause. The roof insulation and covering should be completed as soon as possible after satisfactory testing. Contractor shall give warranty for leak tightness of joints for 10 years.

Measurement:

The volume of concrete measured shall include that occupied by:

1. Reinforcement and other metal sections.
2. Cast in components each less than 0.01 m³ in volume.
3. Rebates fillets or internal splays each less than 0.005 m² in cross sectional area.
4. Pockets and holes not exceeding 0.01 m³ in volume.
5. For M-10 concrete no payment shall be made for any shuttering used.

3.22 Concrete Cube Tests:

The quality of hardened concrete will be verified by the following procedure:

1. The Employer shall select random batches of concrete for examination without warning the Contractor and sampling will generally be done at the point of discharge from the mixer.
2. From the batches thus selected 6 concrete cubes shall be made in accordance with Indian Standards. However not more than 2 cubes may be made from any single batch. Of these 6 cubes thus made 3 cubes (each cube representing concrete of different batches) shall be tested at 7 days and the remaining 3 cubes shall be tested at 28 days.
3. All cubes shall be made, cured, stored, transported and tested in accordance with Indian Standards. The tests shall be carried out in a laboratory approved by the Employer.
4. At least 6 cubes shall be made on each day's concreting until 60 cubes have been made for each grade of concrete. This is the initial period.
5. After the initial period, subject to the acceptance of the Employer, the frequency at which the cubes shall be made may be reduced as follows:

(1 set = 6 cubes, each pair of cubes representing concrete from a different batch.) At least 1 set for each day's concreting consisting of:

 - a) 1 set for every 10m³ or part thereof of concrete for critical structural elements like columns, parapet, segments, larger cantilever, plus.
 - b) 1 set for every 40m³ or part thereof for all other elements.

If concrete is batched at more than one point simultaneously the above frequency of making cubes shall be followed at each point of batching. 3 of the cubes of each set shall be tested at

6. 6 days and the remaining 3 cubes shall be tested at 28 days from the day of casting the cubes.

3.23 Failure to meet specified Requirements:

1. If from the cube test results it appears that some portion of the Works has not attained the required strength, the Employer may order that portion of the structure be subjected to further testing of any kind whatsoever as desired by the Employer, including, if so desired by him, full load testing of the suspected as well as adjacent portions; of the structure as specified in the Conditions of Contract. Such testing shall be at the Contractor's cost. The Employer may also reject the work and order its demolition and reconstruction at the Contractor's cost.
2. If the strength of concrete in any portion of the structure is lower than the required strength, but is considered nevertheless adequate by the Employer so that demolition is not necessary, the Contractor shall be paid a lower rate for such lower strength concrete as determined by the Employer.

K-RIDE

SECTION - 03

FORM WORK

SECTION- S.03

1. FORM WORK

1.1 General

These specifications shall be read in conjunction with the MORTH specifications-2013 (fifth revision) and CPWD specifications - 2009 with correction slips / amendments upto date, and other relevant specifications described in the section 1 of these specifications.

1.2 Materials

Formwork shall be of timber, plywood (including marine plywood), steel or any other suitable material capable of resisting damage to the contact faces under normal conditions of erecting forms, fixing steel and placing concrete. The selection of materials suitable for formwork shall be made by the Contractor based on the quality consistent with the specified finishes and safety. For designated areas prominently in public view like piers, piers caps, portals, viaduct (cast-in-situ or pre-cast), parapet etc., only steel shuttering shall be used. Steel material shall be in good condition. It should not be corroded. Condition of material shall be decided by engineer and If find not as per Indian standards or not as per requirement it shall be replaced. Number of uses for steel shuttering shall be between 50 and 100. Uses shall be decided by engineer as per the condition of steel shuttering. Special finishes like grooves, logos, floral designs, engraving in inset and outset shall be provided by fixing monolithic rubber forms fixed on entire surface of the formwork. The minimum shore hardness of rubber shall be A-55 to ensure strength, flexibility & elasticity. The contours, design and edges of rubber form should be smooth to ensure minimal deposition of grime or dust. The material shall be approved by the Employer before erected at site. However, the entire responsibility of planning, designing, erection, dismantling, shifting and safety of false work lies with the contractor.

All formwork and formwork supports (centering, props, scaffolds, ladders etc.) shall be in structural steel only and preferably of pipes conforming to IS: 806, IS:1161, IS:1239, IS:2750. Wooden ballies shall not be permitted as props/formwork supports. All props shall be properly braced using x & k bracings. Ladders to be used at site should have treads and shall be fabricated from structural steel. Wooden / bamboo / aluminum / pipe ladders shall not be permitted.

1.2.1 Timber

Timber used for formwork shall be easily workable with nails without splitting. It shall be stable and **not** liable to warp when exposed to sun and rain or wetted during concreting.

1.2.2 Plywood

Plywood used for formwork shall be minimum 12 mm thick. Shuttering quality plywood complying with IS:4990 and of make approved by the Engineer. Suitable stiffeners and walers shall be provided depending on the shuttering design.

1.2.3 Steel

Steel formwork shall be made of minimum 4 mm thick black sheets stiffened with angle iron frame made out of M.S. angles 40 mm x 6 mm supported at suitable spacing.

1.2.4 Design & Drawings

All temporary works such as formwork, false work, staging, launching girder, cantilever form traveler scheme etc. shall be designed by the Contractor. The permissible stresses in materials of formwork, false work, staging, launching girder & cantilever form traveler shall be same as for permanent structure. All calculations and drawings of the same including construction sequence shall be checked and verified by independent agency appointed by contractor. Only after the checking of the same, the calculations and drawings (along with soft copy in CD ROM) shall be submitted to Employer for approval well in advance of work.

All temporary works shall be also inspected by the independent agency and independent report shall be submitted to Employer. All temporary works shall be robust, safe and constructed such a way that the concrete can be properly placed and thoroughly compacted to obtain the required shape, position and level subject to specified tolerances. It is the responsibility of the Contractor to obtain the results required by the Employer,

whether or not some of the work is sub-contracted. Approval of the temporary works by the Employer shall not diminish the Contractor's responsibility for the satisfactory performance of the same, nor for the safety and co-ordination of all operations.

For pier formwork, it shall be ensured that total deflection (taking account of combined deflection of plate, stiffeners, walers or any other supporting arrangement) shall not be more than 3mm. All the formwork, launching truss and cantilever form traveler and other selected temporary works shall be tested for the load including factor of safety for which the truss/formwork is designed before use in works.

The design of false work should be such as to facilitate easy and safe access to all parts for proper inspection. Methodology for removal of form should be planned as a part of total form work design process. In case of pre-stressed concrete work, careful consideration shall be given to re-distribution of loads due to pre-stressing.

1.3 Formwork for Exposed Concrete Surfaces

The facing formwork, unless indicated otherwise in drawings, or specifically approved by the Employer in writing, shall generally be made with materials not less than the thickness mentioned below for different elements of the structure:

- 1.3.1 Plain slab soffit, and sides of beams, girders, joists and ribs and side of walls, fins, parapets, pardis, sun-breakers, etc shall be made with:
 - a. Steel plates not less than 4mm thick of specified sizes stiffened with a suitable structural framework and fabricated true to plane
 - b. Timber planks of 20mm actual thickness and of specified surface finish, width and reasonable length,
 - c. Plywood not less than 12mm thick (IS:4990 - Specification for Plywood for Concrete Shuttering Work) stiffened with a suitable timber frame work or 3mm thick plywood with a 20mm timber plank backing, of specified sizes stiffened with a suitable timber framework and bracing. At joints 6mm/10mm sponge to be provided.
- 1.3.2 Bottoms of beams, girders and ribs, sides of columns shall be made with
 - a. Steel plates not less than 5mm thick of specified sizes stiffened with a suitable structural framework, and fabricated true to plane
 - b. Timber planks of 35mm actual thickness and of specified surface finish, width and reasonable length,
 - c. Plywood not less than 12mm thick (IS: 4990), of specified sizes stiffened with a suitable timber framework.

1.4 Formwork for Sloped Surfaces

- 1.4.1 Forms for sloped surfaces shall be built so that the formwork can be placed board-by-board immediately ahead of concrete placement so as to enable ready access for placement, vibration, inspection and finishing of the concrete.
- 1.4.2 The formwork shall be built in such a way so that the boards can be removed one by one from the bottom up as soon as the concrete has attained sufficient stiffness to prevent sagging. Surfaces of construction joints and finished surfaces with slopes steeper than 2 horizontal:1 vertical shall be formed as required herein.

1.5 Formwork for Curved Surfaces

- 1.5.1 The contractor shall interpolate intermediate sections as necessary and shall construct the forms so that the curvature will be continuous between sections. Where necessary to meet requirements for curvature, the form lumber shall be built up of laminated splices cut to make tight, smooth form surfaces.
- 1.5.2 After the forms have been constructed, all surface imperfections shall be corrected and all surface irregularities at matching faces of form material shall be dressed to the specified curvature.

1.6 Erection of Formwork

The following shall apply to all formwork:

- 1.6.1 To avoid delay and unnecessary rejection, the Contractor shall obtain the approval of the Employer for the design of forms and the type of material used before fabricating the forms. (Ref. ACI 347 Formwork for Concrete or equivalent I.S. Code).
- 1.6.2 All shuttering planks and plates shall be adequately backed to the satisfaction of the Employer by a sufficient number and size of walers or framework to ensure rigidity during concreting. All shutters shall be adequately strutted, braced and propped to the satisfaction of the Employer to prevent deflection under deadweight of concrete and superimposed live load of workmen, materials and plant, and to withstand pouring rate and vibration.
- 1.6.3 Vertical props shall be supported on wedges or other measures shall be taken so that the props can be gently lowered vertically during removal of the formwork. Props for an upper level shall be placed directly over those in the level immediately below, and the lowest props shall bear on a sufficiently strong area. Care shall be taken that all formwork is set plumb and true to line and level or camber or batter where required and as specified by the Employer.
- 1.6.4 Provision shall be made for adjustment of supporting struts where necessary. When reinforcement passes through the formwork care should be taken to ensure close fitting joints against the steel bars so as to avoid loss of fines during the compaction of concrete.
- 1.6.5 If the formwork is held together by bolts, these shall be so fixed that no iron will be exposed on surfaces against which concrete is to be laid and within the concrete cover to the steel reinforcement. In any case wires shall not be used with exposed concrete formwork. The Employer may at his discretion allow the Contractor to use tie-bolts running through the concrete and the Contractor shall decide the location and size of such tie-bolts in consultation with the Engineer. The tie bolts shall be so designed that their removal on de-shuttering does not leave any embedment with in the concrete cover to steel reinforcement. Holes left in the concrete by these tie-bolts shall be filled by the concrete repair material and the methodology as approved by the Employer at no extra cost.
- 1.6.6 Provision shall be made in the shuttering for beams, columns, and walls for a port hole of convenient size so that all extraneous materials that may be collected could be removed just prior to concreting.
- 1.6.7 Formwork shall be so arranged as to permit removal of forms without jarring the concrete. Wedges, clamps and bolts shall be used wherever practicable instead of nails.
- 1.6.8 The formwork for beams and slabs shall be so erected that forms on the sides of the beams and the soffit of slabs can be removed without disturbing the beam bottoms or props under beams.
- 1.6.9 Surfaces of forms in contact with concrete shall be oiled with a mould oil of approved quality form releasing agent. If required by the Employer the contractor shall execute different parts of the work with different mould oils to enable the Employer to select the MoRTH suitable. The use of mould oil which results in blemishes of the surface of the concrete including diesel, burnt oil and any other lubricating oil shall not be allowed. Mould oil shall be applied before reinforcement has been placed and care shall be taken that no oil comes in contact with the reinforcement while it is being placed in position. The formwork shall be kept thoroughly wet during concreting and the whole time that is left in place. Nothing extra shall be paid to contractor for oiling the moulds.
- 1.6.10 Immediately before concreting is commenced, the formwork and other related arrangements shall be carefully examined to ensure the following:
 - a. Removal of all dirt, shavings, sawdust and other refuse by brushing, washing and compressed air / vaccume cleaning.
 - b. The tightness of joints between panels of sheathing and between these and any hardened core.
 - c. The correct location of tie bars, bracing and spacers, and especially connections of bracing.
 - d. Adequate cover blocks are in place
 - e. Straightness and plumbness of the form work
 - f. Side supports / restraints for the form work are enough and robust
 - g. Construction joint (wherever applicable) is properly prepared

- h. That all wedges are secured and firm in position.
 - i. That provision is made for traffic on formwork not to bear directly on reinforcing steel.
 - j. Pouring platform along with its approach from ground is robust and safe for workers movement.
 - k. Arrangement for vibrators for compaction of concrete.
 - l. Sequence of concrete pouring is well defined and is agreed upon by the Engineer and is explained to concrete pouring team
 - m. The Pouring area is well lit.
 - n. Curing arrangements are well planned and agreed upon by the Engineer.
 - o. The green concrete protection measures from sun & rain etc. are in place.
- 1.6.11 The Contractor shall obtain the Employer's approval for dimensional accuracies of the work and for the general arrangement of propping and bracing. (IS:3696 - Safety Code of Scaffolds and Ladders, IS:4014 Steel Tubular Scaffolding I & II). All scaffolding and staging shall be either of steel tubes or built up section of rolled steel with adequate bracing at several levels in each perpendicular direction connecting each prop. In addition to this diagonal bracing should be provided in elevation ideally at 45 degrees or between 30 and 60 degrees. The Contractor shall be entirely responsible for the adequacy of propping, and for keeping the wedges and other locking arrangements undisturbed through the de-centering period. (IS:8989 Safety code for erection of concrete framed structures).
- 1.6.12 Formwork shall be continuously watched during the process of concreting. If during concreting any weakness develops and formwork shows any distress the work shall be stopped and remedial action as directed by the engineer shall be taken.
- 1.6.13 Staging for portal girder and cross girder (in station zone) shall be in the form of portal frame. It shall be ensured that minimum two lanes of traffic with a restricted height of 4.5m can ply underneath it with adequate protection to portal legs from moving traffic.
- 1.6.14 For concourse floor over road, the contractor shall design and fabricate prefabricated type of staging and shuttering which can be erected in very short duration. Such erection will be only permitted in the night. In such case staging has to span the full width of the road in a portal shaped profile as shown in tender drawings. The portal frame shall have 4.5m (min) traffic clearance from the road for allowing safe movement of traffic below. In case no road runs beneath the concourse zone of station, the bidder may decide whether to use the above form of staging or any normal staging arrangement from the ground itself.

1.7 Concrete Finishes

This section deals with the surface of concrete on which forms had been fixed while concreting.

1.7.1 Formed Surface

Allowable deviation from plumb or level and from the alignment profile, grades and dimensions shown on the drawings is defined as "tolerance" and is to be distinguished from irregularities in finishes as described herein. Tolerances in concrete construction are specified elsewhere.

The classes of finish and requirements for finishing of concrete surface shall be as shown on the drawings or as hereinafter specified. In the event of finishing not being definitely specified herein or in the drawings, finishes to be adopted shall be as directed by the Employer.

Completed concrete surface shall be tested, where necessary to determine whether surface irregularities are within the limits specified hereinafter.

Surface irregularities are classified as "Abrupt" or "Gradual". Offsets caused by displaced or misplaced form sheathing, or form sections or by loose knots or otherwise defective timber form will be considered as abrupt irregularities, and shall be tested by direct measurements. All other irregularities shall be considered as gradual irregularities and will be tested by use of template, consisting of a straight edge or the equivalent thereof for curved surfaces. The length of the template shall be 150 cm for testing of formed surfaces and 300 cm for testing of unformed surfaces.

The classes of finish for formed concrete surfaces are designated by one of the symbols F1, F2, F3 and F4. Unless otherwise specified or indicated on drawings, these classes of finish shall apply as follows:

Finish F1: This finish applies to surfaces where roughness is not objectionable, or surface that will otherwise be permanently concealed. Surface treatment shall be the repair of defective concrete, correction of surface depressions deeper than 25 mm and filling of tie rod holes. Form sheathing will not leak mortar when concrete is vibrated. Forms may be manufactured with a minimum of refinement.

Finish F2: This finish is required on surfaces permanently but not prominently exposed to public view for which other finishes are not specified except F1. Forms shall be manufactured in a workmanlike manner to the required offsets or bulges. Surface irregularities shall not exceed 5mm for abrupt and 8mm for gradual irregularities measured with a 1.5 m template.

Finish F3: This finish is required for coarse textured concrete surfaces intended to receive plaster, stucco or wainscoting. Surface irregularities shall not exceed 5mm for both abrupt and gradual irregularities.

Finish F4: This finish is designated for surfaces prominently exposed to public view where appearance is also of special importance. This shall include piers of bridges, viaducts, beams, parapets, railings and decorative features on the structure and on the bridges. To meet with requirements for F4 finish, forms shall be manufactured in a skillful, workmanlike manner, accurately to dimensions. There should be no visible offsets, bulges or misalignment of concrete. At construction joints, the forms shall be rightly set and securely anchored close to the joint. Abrupt and gradual irregularities shall not exceed 3mm. Irregularities exceeding this limit shall be reduced by grinding to a level of 1:20 ratio of height to length. Jute bag subbing or sand blasting shall not be used.

1.7.2 Unformed Surfaces

The classes of finish for unformed surfaces are designated by symbols U1, U2, U3 and U4. Unless otherwise specified or indicated on drawings, these classes of finish shall apply as follows:

Finish U1: This finish applies to unformed surfaces that will be concealed permanently or otherwise where a screeded surface finish meets the functional requirements. Finish U1 is also used as the stage of finishes for U2 and U3. Finishing operations shall consist of sufficient leveling and screening to produce an even uniform surface. Surface irregularities shall not exceed 10mm.

Finish U2: This is floated finish, and used on all outdoor, unformed surfaces. Finish U2 is also used as the second stage of finish for U3. Floating to be performed manually or mechanically on stiffened screed surface shall be minimum to produce textured surface. If finish U3 is to be applied, floating shall be continued till a small amount of mortar without excess water is brought to the surfaces so as to permit effective trowelling. Surface irregularities shall be removed as directed by the Employer.

Finish U3: This is a trowelled finish and shall be used for tops of parapets, etc prominently exposed to view. When the floated surface has hardened sufficiently, steel trowelling shall be started. Steel trowelling on hardened, floated surface shall be performed with firm pressure to produce a dense uniform surface free from blemishes and trowel marks and having slightly glossy appearance. Surface irregularities shall not exceed 5mm.

Finish U4: This is a steel-trowelled finish, similar to finish U3, except that light surface pitting and light trowel marks such as obtained from the use of machine trowelling will be acceptable, provided that surface irregularities do not exceed the limits specified for finish U3.

Unformed surfaces which are nominally level shall be sloped for drainage as shown on drawings or as directed by Engineer unless the use of other slopes or level surface is indicated on drawings. Narrow surface such as tops of parapets, walls and kerbs shall be sloped approximately 1cm per 30cm of width. Broader surface such as roadways, platform and decks, shall be sloped approximately half centimeter per 30cm of width. Finishes of floor and roof slabs shall be sloped, if required, by the Employer.

1.8 Exposed Concrete Work

Exposed concrete surfaces shall be smooth and even, originally as stripped without any finishing or rendering. Where directed by the Employer, the surface shall be rubbed with carborundum stone immediately on striking the forms. The Contractor shall exercise special care and supervision of formwork and concreting to ensure that the cast members are made true to their sizes, shapes and positions and to produce the surface patterns desired. No honeycombing shall be allowed. Honeycombed parts of the concrete including the other surface

defects in the concrete shall be removed by the Contractor as per the methods, which do not affect the strength of adjoining Concrete and as approved by the Employer.

Part of defective concrete thus removed shall be re-cast using fresh concrete of same grade or approved quality concrete repair material depending upon the size, location, thickness of the defective concrete and structural behavior of the member having defective concrete as instructed by the Employer without extra cost, For the purpose the Contractor shall prepare a comprehensive work procedure and get it approved from the Employer. Nothing extra shall be paid for repair of the concrete. Contractor shall ensure that no air bubbles are formed on the exposed surface. Concrete pouring sequence, vibration methodology etc shall be planned to avoid air bubbles. All materials, sizes and layouts of formwork including the locations for their joints shall have prior approval of the Employer.

1.9 Age of Concrete at Removal of Formwork

In accordance with CPWD Specifications 1996 / 2009 or IS:456. The Employer may vary the periods specified if he considers it necessary. Immediately after the forms are removed, they shall be cleaned with a jet of water and a soft brush.

1.10 Stripping of Formwork

The work of form work removal should be planned and a definite scheme of operation worked out. Formwork shall be removed carefully without jarring the concrete, and curing of the concrete shall be commenced immediately. Concrete surfaces to be exposed shall, where required by the Employer, be rubbed down with carborundum stone or bush-hammer to obtain a smooth and even finish. Where the concrete requires plastering or other finish later the concrete surface shall be immediately hacked lightly all over using approved methods and as directed by the Employer. No extra charge will be allowed to the Contractor for such work on concrete surfaces after removal of forms.

1.11 Reuse of Forms

The Contractor shall not be permitted reuse of timber facing formwork brought new on the works for more than 5 times for exposed concrete formwork and 8 times for ordinary formwork. 5 or 8 uses shall be permitted only if forms are properly cared for, stored and repaired after each use. The Employer may at his absolute discretion order rejection of any forms he considers unfit for use for a particular item irrespective of no of times the shuttering has been used and order removal from the site of any forms he considers unfit for use in the Works. Used forms brought on the site will be allowed proportionately fewer uses depending upon its condition and as decided by the Employer. Use of different quality boards or the use of old and new boards in the same formwork shall not be allowed. If any other type of special or proprietary form work is used, the number. of times they can be used will be determined by the Employer.

SECTION - 04

REINFORCEMENT

SECTION- S.04

1. REINFORCEMENT

1.1 General

These specifications shall be read in conjunction with the MORTH specifications -2013 (fifth revision) and CPWD specifications -2009 with correction slips / amendments upto date, and other relevant specifications described in the section 1 of these specifications.

Any steel specified for reinforcement shall conform in every respect to the latest relevant Indian Standard Specifications and shall be of tested quality under the ISI Certification Scheme.

All reinforcement work shall be executed in conformity with the drawings supplied and instructions given by the Employer and shall generally be carried out in accordance with the relevant Indian Standard Specifications IS: 2502- Bending and Fixing of Bars for Concrete Reinforcement.

The reinforcement steel shall be from primary producers and no re-rolled steel shall be supplied and used.

1.2 Couplers Specifications

Only cold-forged, parallel threaded mechanical coupler system are recommended. All mechanical couplers shall be of Type 2 (or Class H as specified in IS-16172) and should be simple to install and which can be confirmed by quick visual inspection to have been correctly installed and to have achieved the required full strength connection.

The couplers shall be of standard parallel thread type. Ends of the reinforcement bars, which are to be joined, shall be enlarged by cold forging/upsetting, threaded in such a way that root thread diameter is not lesser than the parent bar to be joined. The coupler shall be of TYPE – II and qualified/Certified as per UK CARES, IS code 16172:2014, ACI 318, ASME, Section III, and Div.2, Caltrans.

Couplers installed shall be strictly in accordance with the manufacturer's recommendations.

All the couplers shall undergo quality checks on uniformity of threads, dimensional accuracy etc. Each coupler shall be clearly stamped indicating batch number and diameter. This number shall be traceable to the original cast. The relevant material mill certificate shall be submitted with supply of a particular lot. The certificate shall give salient material properties. The coupler manufacturer shall operate at least an ISO 9000 approved quality assurance programme or equivalent for the manufacture of couplers.

Threading of ends of the reinforcing bars:

This threading activity shall preferably be done at Site. The various stages involved in threading are as given below:

a) Cutting (Rebar End Preparation):

The ends of reinforcement bars shall be cut by mechanical means to get a perfect plain and surface perpendicular to the axis of the bar.

b) Cold forging & threading:

After cutting the ends of the bar shall be enlarged by cold forging such that the area of cross section after threading shall not be less than the area of cross section of the parent bar. The length of cold forging shall be adequate for proposed thread length as per manufacturer's design. Threading shall be done preferably on threading machine. The threads shall be square parallel type to suit the couplers. The thread length and depth shall be as per manufacturer's design. After threading is completed, the threaded length of the bars shall be protected by providing plastic end caps before taking the bars out of the shop.

c) Quality control in making of threads:

Double forging of bars is not permitted. In case of improper cold forging the forged of the bar shall be square cut and fresh cold forging shall be undertaken. The threading shall be checked with 'go' and "no go' gauges for the correctness of the thread profile on the rebar.

d) Qualification tests

The coupler shall be qualified as per IS code 16172:2014, ACI 318, ASME - Section III, and Div.2, Caltrans and must have conducted & qualified for the following tests :

i) Static tensile test

Mechanical connections shall be tested for all reinforcing rebar sizes. For each rebar size, a minimum of three connections (3 joints + 1 Parent bar) in each load direction shall be tested in accordance with ASTM A370 test method to meet code requirement. A tensile test on an unsliced specimen from the same bar used for the spliced specimens shall be performed to establish actual tensile strength. The tensile strength of an individual splice system shall not be less than the 125% of the specified minimum yield strength (f_y of rebar) of the spliced bar.

ii) Cyclic tension and compression test

Mechanical connections shall be tested in all reinforcing rebar sizes. For each rebar size, a minimum of three connections shall be tested for cyclic tension & compression test. Each specimen shall withstand cycles of stress variation of the specified minimum yield strength of the reinforcing bar. The test should be carried out as per the table mentioned below:

Loading Stages and Cycles per stage for cyclic load test Stage	Tension	Compression	Cycles
1	0.95 f_y	0.5 f_y	20cycles
2	2 ϵ_y	0.5 f_y	4cycles
3	5 ϵ_y	0.5 f_y	4cycles

Note:

f_y is specified yield strength of the reinforcing bar.

ϵ_y is the strength of reinforcing bar at actual yield stress.

iii) Cyclic tensile test

Mechanical connections shall be tested in all reinforcing rebar sizes. For each rebar size, a minimum of three connections shall be tested for low cyclic tensile test. Each specimen shall withstand 100 cycles of stress variation from 5% to 90% of the specified minimum yield strength (f_y) of the reinforcing bar. One cycle is defined as an increase from the lower load to the higher load & return.

iv) Low cycle fatigue test (for 10,000 cycles)

Fatigue test shall be conducted on splice sample from +173 Mpa to -173 Mpa for 10,000 cycles. A sine wave form @ 0.5 Hz shall be followed for bar dia 36 mm & above and 0.35 Hz shall be followed for bar dia less than 36 mm. Test shall be conducted confirming to IS 16172:2014 & Caltrans specifications. Past certificates for low cycle fatigue test shall be accepted, however these should not be more than 3 years old.

v) High cycle fatigue test (for 2,000,000 cycles)

In high cycle fatigue test, the test specimen is subjected to an axial tensile load which varies cyclically according to the sinusoidal wave form of constant frequency in the elastic range, as accordance with IS-16172. Past certificates for high cycle fatigue test shall be accepted, however these should not be more than 10 years old.

vi) Slip test

Slip Test Shall be performed on each diameter coupler specimen as per ASTM A 370 section 10. Test shall be conducted confirming to IS 16172:2014 & Caltrans specifications. Total slip shall not exceed the max value of 0.1 mm. Refer table below for more details:

Bar diameter	Total Slip (μ m)
8 mm to 20 mm	250
25 mm to 28 mm	350
32 mm to 40 mm	450
45 mm	600

vii) Proof loading test

Every cold-forged, threaded bar end shall undergo a proof load test prior to leaving system supplier's workshop. Every threaded bar must be subjected to proof load testing to a minimum test loading of 75% of the characteristic strength (theoretical f_y). The system supplier shall essentially install a proof load tester equipment within its threading workshop premises and ensure to test each and every threaded bar. A positive indication shall be marked on the rebar to indicate that this operation has been carried out.

INSTALLATION OF COUPLERS IN THE FIELD:

The installation of couplers in the field, for joining reinforcing bars shall be undertaken by trained manpower and as per manufacturer's instructions. Threads of both the couplers and the bars shall be thoroughly cleaned just before installation. Where couplers are cast-in the concrete, but connection is not to be completed immediately, the couplers shall be internally greased and plastic capped to a protection detail acceptable to the employer. This cap shall be removed only when next bar is to be attached, then the same to be cleaned before joining the next bar.

The contractor shall arrange for a suitably qualified manufacturer's representative experienced in mechanically connecting reinforcement to be present at site before the start of work for initial training of personnel, and also to demonstrate the equipment and techniques as necessary. The threading workshop is to be fully supervised by the manufacturer's representative.

The contractor shall submit to the Employer, for his acceptance a method statement for mechanically connecting the reinforcement and for the installation and verification in the field. This shall take into account any special requirements for horizontal, vertical and inclined couplers and shall include a rectification procedure, if the connection is incorrectly made. It shall also cover the correct methodology for handling of tools and equipment for mechanical connection on site. The following information shall also be included:

- a. Requirements for cleanliness
- b. Equipment for threading bars
- c. Method of locking the connections on both rebars
- d. Method of verification of final rebars alignment and coupler integrity

Each coupler shall be visually examined prior to use to ensure the absence of rust and of any foreign material on the inside surface. All completed couplers shall be inspected and verified in accordance with the approved QAP. The Contractor shall ensure the acceptance of the Employer for a procedure for documenting the inspection of the couplers. The contractor shall retain inspection records and shall submit copies to the engineer within 7 days. The Couplers that do not meet the acceptance shall be completely removed and the bars re-connected as required.

1.3 Bar Bending and Bar Bending Schedule

All bars will be carefully and accurately bent by approved means in accordance with IS: 2502, and relevant drawings. It shall be ensured that depth of crank is correct as per the bar cutting and bending schedule. Bent bars are not straightened for use in any manner that will injure the material.

Prior to starting bar bending work, the Contractor shall prepare bar bending schedule from the structural drawings supplied to him and get the same approved by Employer. Any discrepancies and inaccuracies found by the Contractor in the drawings shall be immediately reported to the Employer whose interpretation and decision there to, shall be final.

1.4 Splicing (Laps, couplers, welds, etc)

Couplers:

These specifications cover threaded couplers to be used for joining reinforcement bars, in lieu of laps/welding/mechanical splicing.

SPECIFICATIONS

GENERAL

The couplers shall be of standard parallel square thread type. Ends of the reinforcement bars, which are to be joined, shall be enlarged by cold forging, threaded in such a way that thread diameter is not lesser than the parent bar to be joined. The material of the coupler shall be of same quality or of superior quality than the quality of material of the parent bars (i.e. reinforcement bars to be joined). The joint shall have guaranteed bar break i.e. when the joint is tested in universal tensile testing machine, the bar shall fail away from the coupler i.e. not within the coupler as well as within 2 times the diameter of bar from the ends of the coupler, which can be considered as affected zone. The Guaranteed Bar break condition is not mandatory, if the failure load of coupled specimen is higher than 1.15 times of its minimum specified yield stress. The coupler shall be qualified as per ASME, Section III, and Div.2. Additionally, it shall meet all the requirements of "Class H" coupler as specified in IS 16172. The safety margin in coupler design shall be such that guaranteed bar break is ensured even if 15% of the total threads length are out of coupler during installation.

The hand tightening of coupler shall be sufficient in the field and no mechanical means shall be essential for tightening. During testing, the coupler should only be hand tightened.

The process of manufacturing of the coupler, cold forging and threading including testing shall be carried out as per ASME approved quality assurance programme. The manufacturer of coupler shall hold a valid Quality System Certificate (QSC) from ASME. Installation of the coupler and supervision shall be done by the qualified personnel.

MANUFACTURING OF COUPLERS

All the couplers shall undergo quality checks on uniformity of threads, dimensional accuracy etc. Each coupler shall be clearly stamped indicating batch number, heat number and diameter. This number shall be traceable to the original cast. The relevant material mill certificate shall be submitted with supply of a particular lot. The certificate shall give salient material properties.

THREADING OF ENDS OF THE REINFORCING BARS

This threading activity shall preferably be done at site. The various stages involved in threading are as given below

CUTTING

The ends of reinforcement bars shall be cut by mechanical means to get a perfect plain end surface, perpendicular to the axis of the bar.

COLD FORGING & THREADING

After cutting, the ends of the bar shall be enlarged by cold forging such that the area of cross section after threading shall not be less than the area of cross section of the parent bar. The length of cold forging shall be adequate for proposed on lathe machine. The thread shall be square parallel type, to suit the couplers. The thread length and depth shall as per manufacturer's design. After threading is completed, the threaded length of the bars shall be protected by providing plastic caps, before taking the bars out of the shop.

QUALITY CONTROL IN MAKING OF THREADS

The work in shop shall be fully supervised by the Manufacturer representative. Double forging of bars is not permitted. In case of improper cold forging, the forged end of the bar shall be square cut and fresh cold forging shall be undertaken. The threading shall be checked with 'go' and 'no go' gauges.

For threaded coupler systems, every prepared bar end shall undergo a load test prior to actual use. The minimum test loading shall be equivalent to 80% of specified yield strength of bar. For this purpose contractor shall deploy the machine having facility of integrated load testing. The "Integrated" means the testing operation is performed automatically by the same machine used to prepare the bar ends. A positive indication shall be punched on the rebar to indicate that this operation has been carried out and bar end has qualified for specified strength.

INSTALLATION OF COUPLERS IN THE FIELD

The installation of couplers in the field, for joining reinforcing bars, shall be undertaken by trained manpower and as per manufacturer's instructions. Threads of both the couplers and the bars shall be thoroughly cleaned with acetone or any other solvent, just before installation.

Where couplers are cast-in the concrete, but connection is not to be completed immediately, the couplers shall be internally greased and plastic capped to a protection detail acceptable to the employer. This cap shall be removed only when next bar is to be attached & then cleaned before joining the next bar.

The contractor shall arrange for a suitably qualified manufacturer's representative, experienced in mechanically connecting reinforcement, to be present at site before the start of work for initial training of personnel, and also to demonstrate the equipment and techniques as necessary.

The contractor shall submit to the Employer, for his acceptance, a method statement for mechanically connecting the reinforcement and for the installation and verification in the field. This shall take into account any special requirements for horizontal, vertical and inclined couplers and shall include a rectification procedure, if the connection is incorrectly made. It shall also cover the correct methodology for handling of tools and equipment for mechanical connection on site. The following information shall also be included:

- (a) requirements for cleanliness
- (b) equipment for threading bars
- (c) method of locking the connections on both rebars
- (d) method of verification of final rebar alignment and coupler integrity.

Each coupler shall be visually examined prior to use to ensure the absence of rust and of any foreign material on the inside surface. All completed couplers shall be inspected and verified in accordance with the approved QAP. The Contractor shall ensure the acceptance of the Engineer for a procedure for documenting the inspection of the couplers. The contractor shall retain inspection records and shall submit copies to the engineer within 7 days. The Couplers that do not meet the acceptance standards shall be completely removed and the bars re-connected, as required.

QUALIFICATION TESTS

The splices shall be qualified as per ASME Section III Div-2, IS 16172 and by conducting following tests:

STATIC TENSILE TEST

Mechanical connections shall be tested in all reinforcing rebar sizes. All rebar transition connectors shall also be tested. For each rebar size, a minimum of six connections in each load direction shall be tested in accordance with ASTM A370. A tensile test on an unspliced specimen from the same bar used for the spliced specimens shall be performed to establish actual tensile strength.

The average tensile strength of the splices shall not be less than the followings:

- (a) 90% of the actual tensile strength of the reinforcing bar being tested.
- (b) 100% of the specified minimum tensile strength

The tensile strength of an individual splice system shall not be less than the 115% of the specified minimum yield strength of the spliced bar.

CYCLIC TENSILE AND COMPRESSIVE TEST

Cyclic tensile and compressive test: Mechanical connections shall be tested in all reinforcing rebar sizes. For each rebar size, a minimum of three connections shall be tested for low cyclic tensile test. Each specimen shall withstand 100 cycles of stress variation from 5% to 90% of the specified minimum yield strength of the reinforcing bar. One cycle is defined as an increase from the lower load to the higher load & return. The test shall be performed as per Annexure D of IS 16172.

PERCENTAGE ELONGATION

The minimum uniform elongation (Elongation at maximum force) in the reinforcement bar outside the length of mechanical splice as measured as per Annexure B of IS 16172 shall be 3 % before failure of test piece.

SLIP TEST

The total slip value when measured in accordance to test procedure described in Annexure C of IS 16172 shall not exceed 0.10 mm.

TEST FOR AVOIDANCE OF STAGGERING

The strain measured over the full length of the splice at 90% of the specified minimum yield strength of the bar shall not exceed that of a bar that is not mechanically-spliced by more than 50%. The test shall be performed for all diameter of couplers.

LOW CYCLE FATIGUE TEST

The mechanical splice shall withstand 10000 cycles of alternating tension & compression load, when tested as per Annexure E of IS 16172.

HIGH CYCLE FATIGUE TEST

The mechanical splice when tested accordance to Annexure E of IS 16172 shall withstand 2 million cycles (2000000 Nos)of varying axial tensile load with a stress range of 60 MPa with upper stress in the test equal to 0.6fy.

PRODUCTION TESTS & ACCEPTANCE CRITERIA FOR A LOT

Static Tensile tests, as per ASTM A370, shall be conducted on each bar size & grade for each lot as follows. The criteria mentioned below are in variance with the above referred codes.

Sl. No.	No of Coupler in the Lot	No of Sample to be Tested	Acceptable Defective Couplers
1	Upto 500	14	NIL
2	501 - 1200	20	NIL
3	1201-3200	32	1
4	3201-10000	50	2
5	10001 and above	50+ 2 for each 1000 Nos beyond 10000	Not more than 4% of the samples tested

The lot is defined as the group of couplers which are of same size, type, class, material traceable to same cast and manufactured under similar conditions of production. All the tests shall ensure guaranteed bar break at a load not lower than the specified tensile strength of the bar. The quoted rate shall be inclusive of carrying out above tests and no separate payment shall be made for these tests.

The Contractor shall submit to the engineer for acceptance a report on these Proving Tests, within seven working days of the tests. The report shall provide full details including:

- (a) Results of all tests
- (b) Details of dimensions, geometry.
- (c) Details of test procedures
- (d) Description of test rig/load cell
- (e) Description of load monitoring, strain measurements
- (f) Calibration certificates.

From each test on the coupler and control bar specimens, the following information shall be provided:

- (a) Stress-Strain (or Load Displacement) curves
- (b) Yield Load & Yield Strength
- (c) Elongation of the mechanical connection
- (d) Ultimate load & Ultimate Tensile Strength
- (e) Mode of failure
- (e) Gauge length used for strain measurement and statement of how gauge length was determined.

Lapping will not be permitted anywhere other than piles for bar dia of 20 mm and above.

1.5 Spacing, Supporting and Cleaning

All reinforcement shall be placed and maintained in the positions shown on the drawings

The Contractor shall provide approved types of supports for maintaining the bars in position and ensuring required spacing and correct cover of concrete to the reinforcement as specified on the drawings. Cover blocks of required shape, size and strength M.S. Chairs and spacer bars shall be used to ensure accurate positioning of reinforcement. Cover blocks shall be cast well in advance and shall consist of approved proprietary pre-packaged free flowing mortars having the strength same as that of concrete for the member for which they are to be used. They shall be circular in shape for side cover and square for bottom cover. Cover blocks shall be cast and compacted using plate vibrator or any other approved method and shall be cured so as to achieve the desired strength. The cost of cover blocks and chairs/spacers shall be deemed to have been included in the Lumpsum Price.

Bars must be cleaned, before concreting commences, of all scale, rust or partially set concrete which may have been deposited there during placing of previous lift of concrete.

Cleaning of HYSD Bars

Only TMT bars complying to IS:1786 shall be provided

18 gauge 2 ply G.I. wire shall be used for binding reinforcement and as well as for typing cover blocks.

1.6 Welding

1. Wherever specified all lap and butt welding of bars shall be carried in accordance with IS: 2571. Only qualified welders duly tested and certified by the contractor shall be permitted to carry out such welding.
2. For cold twisted reinforcement welding operations must be controlled to prevent supply of large amounts of heat larger than that can be dissipated. The extreme non twisted end portion shall be cut off before welding. Electrodes with rutile coating should be used.
3. Bars shall be free from rust at the joints to be welded.
4. Slag produced in welding after each run should be chipped and removed by brush.
5. Electrode should not be lighted by touching the hot bar.
6. The welding procedure shall be approved by the Engineer and tests shall be conducted to prove the soundness of the welded connection.
7. E7018 electrode shall be used for Fe415 grade and E8018 electrode shall be used for Fe500 above as per AWS (American Welding Society) standards.

- | | | |
|-----|---|--|
| 6. | Waterproofing system | CICO, FOSROC, MBT, SIKA, SUPREME, SILTECH chemicals, Krypton Build mat Co., Pidilite. |
| 7. | Pile Integrity Test | BRI, FUGRO-KND, Pile Dynamic, AIMIL, Geotech, Geo Dynamic Struct Geotech Research Laboratories Pvt Ltd., Bangalore. |
| 8. | Anchor Fastener | HILTI, BOSCH, Tyrolite. |
| 9. | Structural Steel | TATA, SAIL, JSW, Jindal, RINL. |
| 10. | Pre- stressing Strand | TATA SSL Ltd, Indore Wire (LRPC), Usha Martin, Sumitomo Wire Corporation. |
| 11. | Pot/Elastomeric Bearings | a) Prequalified Manufacturers as per Ministry of Road Transport & Highways Letter No. RW/NH-34057/1/95- S&R dated 2 Nov 2002 & any amendments to the same
b) RDSO, Lucknow Prequalified/approved manufacturers. |
| 12. | Horizontal Tie bars / Shear key system & Hold-down devices. | BB Bars System, ETIC system, Macalloy System |
| 13. | Formwork Release Agent | FOSROC, MBT, MC Baucheme |
| 14. | Prestressing System | Freyssinet, BBR, VSL, Dynamic, Killick, Nixon, Tensacciai (Italy), Macalloy, Dwyidag, Ushamartin. |
| 15. | Reinforcement Couplers | Usha Ismal, Dextra, BBR, Moment. |
| 16. | Form work suppliers | Pranav, L&T, Maruthy Fab (Pune), Dywidag (Grips India), Ideb India Ltd., Bangalore, Giri Engineering, (Yelahanka, Bangalore) |
| 17. | Micro silica | Elkem, Fosroc, 20 Microns India Ltd. |
| 18. | Non-Shrink Compound | Fosroc, Roff, Sika |
| 19. | Testing labs | Civil AIDS, Karnataka test house and any other engineering College |
| 20. | Pile Testing | Civil Aid, Geo Dynamics |
| 21. | Curing Compound | Fosroc, Sika. |

Materials are to be supplied from Approved suppliers list only. In exceptional circumstances suitable alternatives can be permitted by K RIDE at its discretion on sufficient reason and details to be furnished by the contractor for such change. Employer's decision is final in this regard and binding to the contractor.

SECTION – 05

OTHER WORKS

1. EXPANSION JOINTS

1.1 Scope of Work

The scope of work will include:

- 1.1.1 Preparation of detailed engineering and installation drawings, supply and supervision during fixing of strip seal/compression seal expansion joints conforming to specifications. The expected expansion/contraction of the superstructure at the location of expansion joints are shown in relevant drawings.
- 1.1.2 Design, manufacture, providing and seating of expansion joints by the specialized agency and approved by the Employer.
- 1.1.3 Necessary technical supervision for installation of each and every expansion joint during different stages of installation including rectification of any deficiency or defect attributable to fixing and installation will be provided by the manufacturer/supplier.
- 1.1.4 The expansion joint shall be provided for the full width of viaduct including the railing.
- 1.1.5 Leak tightness of all joints shall be ensured which shall also carry a warranty of 10 years from the contractor.

The expansion joints provided over elevated structure decks should be so designed as to be compatible with the bearings wherever provided where the structure passes through stations, specially designed completely waterproof expansion joints should be provided.

The contractor shall submit design and drawing of expansion joints based on design criteria mentioned under "scope of Work" to the Employer for approval. The design of expansion joint shall be done as per Revised Highways "Interim Specification for expansion joint" issued by MOST circular No. RW/NH – 34059/1/96 – S & R dated 30th

November 2000 and 20th february 2001, IRC Codes and MORTH Specification for Roads and Bridges and Sound Engineering practices.

Any modification to the design and drawings submitted by the Contractor, if suggested by the Employer, shall be incorporated without any reservations. The design and drawings including changes approved by the Employer shall form basis of execution and the Contractor shall undertake all necessary action for ensuring execution of work on that basis.

For design, manufacture, testing and supply of strip seal/modular strip seal expansion joints, following will be followed in order of preferences.

- a. Details in this chapter and elsewhere in tender documents.
- b. "Revised Interim Specifications for expansion joints" issued by MOST circular v No. RW/NH – 34059/1/96/ S & R dated. 30.11.2000 and 20th february 2001
- c. IRC Codes and MORTH specifications for Roads and bridges published by Indian Road Congress.
- d. Sound Engineering Practice (Decision of Employer will be final in this case) which shall include specialized literature as decided by Engineer-in-Charge.

Building Expansion Joints

Specialised expansion joints consisting of extruded aluminium frame assemblies of suitable profile to receive free floating cover plate of required shape and profile / or elastomer suited to building applications shall be used. These will be provided for covering the structural gap at expansion joints along the horizontal faces of slabs and beams, vertical faces of retaining walls, etc. Necessary block-outs as per the manufacturer's

recommendations shall be provided in the structure which shall be filled in the approved manner after placing the expansion joints.

The base of the expansion joint assembly shall be fixed onto the concrete base using anchor fasteners (not exposed to top surface) as per manufacturer's specifications. The joint shall have an anti-skid serrated top plate with a free-floating central plate. All aluminium in contact with concrete shall have zinc chromate finish. The joint assembly shall be capable of accommodating the specified movement without loss of cover and shall include all the necessary accessories, sealant etc as per manufacturer's drawings. The joint fixing shall be carried out either by the main contractor under the supervision of supplier/manufacturing agency of approved expansion joint. The expansion joint cover assemblies shall withstand a minimum 500lb point load without damage or permanent deformation. The joint should be water tight and test on same if required on direction of Employer shall be conducted without any extra payment for same.

SPECIFICATION FOR STRIP SEAL EXPANSION JOINT

Expansion joint type described here-after is the "strip seal" type, but alternate designs can be proposed for concerned organisation approval.

1.1.6 Components:

Strip seal expansion joint shall comprise the following items:

a. Edge beam:

This shall be either extruded or hot rolled steel section or cold rolled cellular steel section with suitable profile to mechanically lock the sealing element in place throughout the normal movement cycle. Further the configuration shall be such that the section has a minimum thickness of 10mm all along its cross section (flanges and web). The minimum height of the edge beam section shall be 80mm. The minimum cross sectional area of the edge beam shall be 1500mm².

b. Anchorage:

Edge beams shall be anchored to the deck by reinforcing bars or bolts or anchor plates cast in concrete or a combination of anchor plate and reinforcing bars. Anchor bars studs or bolts shall engage the main structural reinforcement of the deck and in case of anchor plates or loops, this shall be achieved by passing transverse bars through the loops or plates. The minimum thickness of anchor plate shall be 12mm. Total cross sectional area of bar on each side of the joint shall not be less than 1600mm² per meter length of the joint and the center to center spacing shall not exceed 250mm. The ultimate resistance of anchorage shall not be less than 600 kN/m in any direction.

Material

- a. The steel for edge beams shall conform to any of the steel grade corresponding to RST 37-2 or 37-3 (DIN), ASTM A36 or A588, CAN/CSA Standard G40.21 Grade 300W or equivalent.
- b. Anchorage steel shall conform to IS:2062 or equivalent.
- c. All steel sections shall be protected against corrosion by hot dip galvanizing or any other approved anticorrosive coating with a minimum thickness of 100 micron.
- d. Chloroprene of strip seal element shall conform to Clause 915.1 of IRC:83 (Part-II).

The properties of chloroprene shall be as specified in Table-1.

Fabrication (Pre-installation)

- a. The strip seal joint system and all its component parts including anchorages shall be supplied by the manufacturer /system supplier.
- b. The width of the gap to cater for movement due to thermal effect, prestress shrinkage and creep, superstructure deformations (if any) and sub-structure deformations (if any) shall be determined and intimated to the manufacturer. Depending upon the temperature at which the joint is to be installed, the gap dimension shall be preset.
- c. Each strip seal expansion joint system shall be fabricated as a single entity unless stage construction or excessive length prohibits monolithic fabrication. It shall fit the full width of the

structure as indicated on the approved drawing. The system shall be pre-set by the manufacturer prior to transportation. Presetting shall be done in accordance with the joint opening indicated on the drawing.

(Instead of expansion joint : strip seal , Compression seal expansion joint is to be used.)

Include vertical bearing including steel frame in Price Schedule. Also add in structural steel nomenclature and qty.

TABLE-1 STRIP SEAL ELEMENT SPECIFICATION

Sealing element is made of chloroprene and must be extruded section. The working movement range of the sealing element shall be at 70mm

Property	Specified Value
Hardness*	63+ /-5 Shore A
DIN 53505	+/- 5 Shore A
ASTM D 2240 (Modified)	.
Tensile Strength*	Min 11 MPa Min 13 .8Mpa
DIN 53504	Min 350 per cent
ASTM D 412	Min 250 per cent
Elongation at fracture*	Min 10 N/mm
DIN 53504	Min 10 N/mm
ASTM D 412	Min 25 per cent
Tear Propagation Strength	Min 220 Cu.mm
Longitudinal	Max 28 per cent
Transverse	
Shock elasticity	
Abrasion	
Residual Compressive Strain (22h/70 deg C/30 per cent Strain)) Aging in hot air	
(14days/70 deg C) Change in hardness Change in tensile strength Change in elongation at fracture	Max + 7 Shore A
Ageing in Ozone	
(24 h/50 pphm/25 deg	
C/20 per cent elongation)	Max -20 per cent
Swelling behaviour in Oil (168h/25 deg. C)	-20 per cent
ASTM Oil No. 1	
Volume Change	No cracks
Change in hardness	Max + 5 per cent
ASTM Oil No. 3	Max -10 Shore A
Volume Change	Max + 25 per cent
Change in hardness	Max -20 Shore A

Cold Hardening Point	Max -35 deg C
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Only one set of specification viz. ASTM or DIN shall be followed depending on the source of supply.

- d. Each strip seal expansion joint system shall be fabricated as a single entity unless stage construction or excessive length prohibits monolithic fabrication. It shall fit the full width of the structure as indicated on the approved drawing. The system shall be pre-set by the manufacturer prior to transportation. Presetting shall be done in accordance with the joint opening indicated on the drawing.
- e. The finally assembled joint shall then be clamped and transported to the work site.
- f. The finally assembled joint shall then be clamped and transported to the work site

Handling and Storage

- a. For transportation and storage, auxiliary brackets shall be provided to hold the joint assembly together.
- b. The manufacturer/supplier shall supply either directly to the Engineer or to the Bridge Contractor all the materials of strip seal joints including sealants and all other accessories for the effective installation of the jointing.
- c. Expansion joint material shall be handled with care. It shall be stored under cover on suitable lumber padding.

Supply/Installation

Components of expansion joint such as edge beam and strip seal shall be imported from the specified foreign manufacturer / collaborator to ensure quality and performance. The joint shall be supplied and installed only by the MOST approved manufacturer. Contractor shall furnish a warranty of trouble-free performance for at least ten years and free rectification of defects / replacement, if any, during this period.

The joints shall be installed by the manufacturer/supplier (only MOST Approved) or their authorised representative who will ensure compliance to the manufacturer's instructions for installation.

Taking the width of gap for movement of the joint into account, the dimensions of the recess in the decking shall be established in accordance with the drawings or design data of the manufacturer. The surfaces of the recess shall be thoroughly cleaned and all dirt and debris removed. The exposed reinforcement shall be suitably adjusted to permit unobstructed lowering of the joint into the recess.

The recess shall be shuttered in such a way that dimensions in the joint drawing are maintained. The formwork shall be rigid and firm.

Immediately prior to placing the joint, the presetting shall be inspected. Should the actual temperature of the structure be different from the temperature provided for presetting, correction of the presetting shall be done. After adjustment, the brackets shall be tightened again.

The joint shall be lowered in a pre-determined position. Following placement of the joint in the prepared recess, the joint shall levelled and finally aligned and the anchorage steel on one side of the joint welded to the exposed reinforcement bars of the structure. Upon completion, the same procedure shall be followed for the other side of the joint. With the expansion joint finally held at both sides, the auxiliary brackets shall be released, allowing the joint to take up the movement of the structure.

High quality concrete shall then be filled into the recess. The packing concrete must feature low shrinkage and have the same strength as that of the superstructure, but in any case not less than M40 grade. Good compaction and careful curing of concrete is particularly important. After the concrete has cured, the movable installation brackets and shuttering still in place shall be removed.

The neoprene seal shall be field installed in continuous length spanning the entire roadway width. To ensure proper fit of seal and enhance the ease of installation dirt, spatter or standing water shall be removed from the steel cavity using a brush, scrapper or compressed air. The seal shall be installed without any damage to the seal by suitable hand method or machine tools.

The deck surfacing shall be finished flush with the top of the steel sections. The horizontal leg of the edge beam shall be cleaned beforehand. It is particularly important to ensure thorough and careful compaction of the surfacing in order to prevent any premature depression forming in it.

Acceptance Criteria:

- i. All steel elements shall be finished with corrosion protection system
- ii. For neoprene seal, the acceptance test shall conform to the requirements stipulated in Table-1. The manufacturer/supplier shall produce a test certificate accordingly, conducted in a recognized laboratory, in India or abroad.
- iii. The manufacturer shall produce test certificates indicating that anchorage system had been tested in recognized laboratory to determine optimum configuration of anchorage assembly under dynamic loading.
- iv. Prior to acceptance 25 percent of the completed and installed joints, subject to a minimum of one joint, shall be subjected to water tightness test. Water shall be continuously pounded along the entire length for a minimum period of 4 hours for a depth of 25mm above the highest point of deck. The width of ponding shall be at least 50mm beyond the anchorage block of the joint on either side. The depth of water shall not fall below 25mm anytime during the test. A close inspection of the underside of the joint shall not reveal any leakage.
- v. As strip seal type of joint is specialized in nature, generally of the proprietary type, the manufacturer shall be required to produce evidence of satisfactory performance of this type of joint

Test and Standards of Acceptance:

The materials shall be tested in accordance with these specifications and shall meet the prescribed criteria. The manufacturer/supplier shall furnish the requisite certificates from the recognized testing laboratory of India or abroad.

WEARING COAT

ASPHALTIC WEARING COAT

Wearing coat shall be provided as indicated on drawings. It shall consist of the following:

A coat of mastic asphalt 6mm thick with prime coat over the top of deck before the wearing coat is laid. The prime coat of mastic asphalt shall be 30% straight run 30/40 penetration grade bitumen and 50% light solvent (benzol) to be laid over the deck slab. The insulation layer of 6 mm thick mastic asphalt with 75% limestone dust filler and 25% of 30/40 penetration grade bitumen shall be laid at 375 degree F with broom over the prime coat.

A layer of asphaltic concrete wearing coat of thickness varying from 25 mm to 60 mm to be laid in single layer.

1.2 CONCRETE WEARING COAT

1.2.1 Scope

The work shall consist of laying cement concrete layer of required thickness as indicated on the drawings, It shall not be laid monolithic with the slab

1.2.2 Materials

Materials shall conform to ISI and / or IRC specifications.

1.2.3 Construction Operation

- a. For Weather and seasonal limitations shall be as per IRC Standards.
- b. All carriageway and footpath surfaces shall have non-skid characteristics
- c. The surface shall be thoroughly swept and scraped clean and made free of dust and other foreign matter. It shall be conditioned to the specified levels, grade and cross fall (camber) as directed by Engineer.
- d. Construction operations such as preparation of mix, laying of concrete, steel reinforcement shall conform to respective specifications in the relevant Chapters.
- e. Curing of wearing coat earlier than what is generally specified may be resorted to, so as to avoid formation of shrinkage cracks in hot weather.

1.3 Railings

1.3.1 General

Railing are not contemplated for the project but these specifications are provisional in case railings are finally provided for the full length of viaduct or for small parts.

Prefabricated railing as per approved details shall be erected at site Fixing arrangements with deck shall be carefully designed and incorporated.

Railing on bridge shall not be constructed until the centering or form work for the span has been released and the span is self supporting. For concrete and steel, specifications of the items of controlled concrete and reinforcement mentioned under relevant specifications shall be applicable.

Railing shall be carefully erected true to line and grade. Posts shall be vertical with a tolerance not exceeding 6 mm in 3 m. The pockets left for posts shall be filled up with non-shrinkable mortar

All edges and corners shall be straight and finished to true line and level. Forms shall either be of single width boards / plates or shall be lined with suitable materials duly approved by Employer. Form joints in plain surface will not be permitted. All mouldings, panel work and level strips shall be constructed according to the details shown in the drawings.

1.3.2 Metal Railings

a. General

All complete steel / aluminium railing elements, terminal sections, posts, and other fittings shall be of shape, size and designation of approved material and make as given in the item of work or as directed by Employer. In case of steel railing all these elements shall be galvanised or painted with an approved paint. If galvanised, all elements of the railings shall be free from abrasions, rough or sharp edges, and shall not be kinked, twisted or bent. If straightening is necessary, it shall be done by methods approved by Employer.

Aluminium sections shall be of approved quality and make and free from scratches, stains and discoloration.

The Contractor shall take every precaution against damage of the components during fixing in position.

Damaged galvanized surfaces shall be cleaned and re galvanised. Special care shall be taken to prevent staining of all products, rust, mortar, etc. before it is put into use.

Prefabricated railing as per approved details shall be erected at site Fixing arrangements with deck shall be carefully designed and incorporated.

b. Fixing

The railing shall be carefully adjusted prior to fixing in place to ensure proper matching at abutting joints, correct alignment and camber throughout their length.

Fixing shall be strictly as per fixing details shown in the drawings or as directed by Employer.

If sections are not galvanised, railing shall be given one shop coat of paint, and three coats of paint after erection.

All necessary holes, chases, etc., required in fixing shall be made by the contractor and made good after installation, without any extra charge.

1.4 DRAINAGE SPOUTS AND DRAINAGE PIPE

1.4.1 GENERAL

This work shall consist of supply and fixing in position of drainage spouts and drainage pipes for bridge decks and piers true to lines, levels and position in accordance with details shown on drawings and to the requirements of these specifications and drainage plan for structure. Where details are not given on drawings, contractor should prepare and submit his own drawings for approval of Employer before commencement of work. Underground / Surface drainage works are to be designed by Contractor and carried as per CPWD specifications.

All drainage pipe to be embedded in superstructure diaphragm and pier shall be HDPE.corrugated double wall.

1.4.2 FABRICATION

Drainage assembly shall be fabricated to dimensions shown in drawings. All materials shall be corrosion resistant; steel components shall be of mild steel conforming to IS:226. The drainage assembly shall be seam welded for water tightness and then hot dip galvanised.

1.4.3 PLACEMENT

1.4.4 The galvanised assembly shall be given two coats of bituminous paint before placement. The whole assembly shall be placed in true position, lines and level as shown in drawing with necessary cut-out in the shuttering for deck slab and held in position firmly. Where reinforcement of the deck is required to be cut, equivalent reinforcement shall be placed at the corners of the assembly.

1.4.5 FINISHING

1.4.6 After setting of deck slab concrete, shrinkage cracks around the assembly shall be totally sealed with polysulphide sealant or bituminous sealant as per IS:1834 and excess sealant trimmed to receive the wearing coat. After the wearing coat is completed, similar sealant, finished to cover the wearing coat surface all-around the drainage assembly, shall be provided at least 50 mm.

1.5 CINDER

1.5.1 General

Cinder to be used for filling in floors shall be obtained from furnace of steam boilers using coal fuel only. It shall be clean and free from clay dirt, wood ashes or other deleterious matter. It shall pass through IS Sieve designation 3.35 mm with at least 50% of it passing through IS Sieve designation 1.70 mm. Cinder obtained from brick kilns shall not be used. At site of work, the cinder shall be protected from dirt collecting on it and could be used for filling in drops only.

1.6 SEALANTS

1.6.1 General

Joint sealing compounds shall seal joints in concrete against the passage of water, prevent the ingress of grit or other foreign material and protect the joint filler. The compound shall have good extensibility and adhesion to concrete surfaces and shall be resistant to flow and weathering.

Approved Sealant where specified on the drawings shall be provided strictly in accordance with the manufacturer's written instructions, such joints shall be formed to the correct dimensions ,thoroughly cleaned and treated with recommended primer strictly in accordance with the manufacturers written instructions prior to sealing. Wherever width of gap to be sealed is wide enough to necessitate the use of backer rod, the same

shall be provided at no extra cost. The contractor shall use only competent personnel experienced in the application of sealant for such work.

Where specified in the drawings, silicon/polyurethane/ polysulphide based sealants shall be of an approved manufacture. The treatment of the joint and the use of sealing compound shall be strictly in accordance with the manufacturer's written instructions. The entire work shall be carried out as per IS:3414, IS:6509, IS:11433.

Sealants shall be as follows:

Silicon sealant shall be one part gungrade type with minimum movement capability of 25% and elongation at break of 450% confirming to BS 5889 or TTS 001543A. This Sealant shall be of approved color and shall be nonstinging to the parent concrete surface

1.6.2 Ancillary Materials

The Contractor shall provide all ancillary materials such as cleaning solutions, epoxy mortar, primer, tool cleaner, bond breaker type, filler boards, back up material, backing rods, polyethylene foam, masking tapes, sealant slot former etc.

1.6.3 Primer

Primer for sealants shall only be as recommended by the sealant manufacturer, Primer shall have been tested for compatibility and durability with the sealant to be used and on samples of the surfaces to be selected.

1.6.4 Backdrop Material

Backdrop material shall be an expanded polyethylene of nominal density 35 kg/cum as recommended by the sealant manufacturer. It shall be of non-absorbent and non-staining material compatible with the sealant used. Tube or rod stock shall be rolled into the joint cavity.

1.6.5 Bond-preventive Materials

Bond-preventive materials shall be pressure-sensitive adhesive polyethylene tape or aluminum foil.

1.6.6 Equipment

The Contractor shall inter alia provide the following plant and equipment for the work. T-paddle, follower plate, solid barrel gun, plastic nozzle, wire brush, heavy duty 500 rpm electric drill, palette knife, masking tape and paint brush for priming etc.

1.6.7 Working Life

Care shall be taken to ensure that material with adequate shell life is provided. Material whose shell life is over shall not be used in the works and shall be removed from the site forthwith. Depending on the storage, temperature and humidity, only one unit shall be drawn from the storage

1.6.8 Curing Period

No portion of the work where sealant has been applied shall be allowed to be submerged or be wetted by any liquid for a period of 7 days after application of the sealant. This period may be modified depending on the temperature and humidity prevalent at the time.

1.6.9 Environmental Requirements

The ambient temperature shall be within the limits as given by the manufacturer, when the sealants are applied. The work shall not be carried out in a dusty atmosphere or when it is raining or when the humidity is high.

Sealants shall not be applied when the ambient temperature is below 4 degree C. When the ambient temperature is below 10 degree C but greater than 4 degree C, the sealant containers shall be stored for some hours at 21 degree C, to ease mixing and application.

1.6.10 Delivery and Storage

Materials shall be delivered to the job site in the manufacturer's original unopened containers.

The containers shall include the following information on the label.:

- a. Name of supplier,
- b. Name of material,

- c. Formula,
- d. Lot number,
- e. Colour
- f. Date of manufacture,
- g. Mixing instructions
- h. Shell life and
- i. Curing time

Materials shall be carefully handled and stored to prevent contamination of foreign materials to exposure to temperatures exceeding 35 degree C.

1.6.11 Joints

The effective width to depth ratio shall be as per the table given below unless directed otherwise by the Engineer.

Table Surfaces	Joint Width	Joint Depth	
		Maximum	Minimum
For concrete masonry	6 mm	6 mm	6 mm
Over 6 mm upto 12 mm	6 mm	-	equal to width
Over 12 mm	½ of width	-	½ of width

1.6.12 Surface Preparation

a. General

The surface of joints to be sealed shall be clean, dry, sound and free of all release agents, water repellents, laitance, oil, grease, dirt, chalk, particles of mortar, dust, loose rust, loose mill scale and other foreign substances. Oil and grease shall be removed with solvent and the surfaces shall be wiped with clean clothes.

b. Concrete and Masonry Surfaces

Where surfaces have been treated with curing compounds, oil or other such materials, the materials shall be removed by sandblasting or wire brushing, Laitance, efflorescence and loose mortar shall be removed from the joint cavity. The surfaces/edges shall be repaired with epoxy mortar to give smooth and even surfaces to correct lines and levels with a uniform gap for the length to be sealed.

c. Application

Masking tape shall be placed on the finished surface on one or both sides of a joint cavity to protect adjacent finished surfaces from primer or compound smears. The masking tape shall be removed within 10 minutes after the joint shall be filled and tolled.

d. Bond-preventive materials

Bond-preventive materials shall be installed on the bottom of the joint cavity and other surfaces to prevent the sealant from adhering to the surfaces covered by the bond-preventive materials. The materials shall be carefully applied to avoid contamination of adjoining surfaces or breaking bond with surfaces other than those covered by the bond-preventive materials.

e. Backstops

The back or bottom of joints constructed deeper than specified shall be packed tightly with an approved backstop material to provide a joint of the depth specified.

f. Primer

The primer shall be used in accordance with the manufacturer's instructions. The primer shall be applied to the joint surfaces to be sealed only and not spill over or be applied to surfaces adjacent to the joints.

g. Application of Sealant

The sealant shall be gun-applied with a nozzle of proper size to fit the width of the joint indicated and shall be forced into grooves with sufficient pressure to expel air and fill the groove solidly. The sealant shall be uniformly smooth and free of wrinkles.

The plastic nozzles shall be inserted on the gun and cut to appropriate size. The sealant shall be gunned into joints using an even trigger pressure. The nozzle shall be cleaned occasionally.

The sealant shall be pressed into joints with a wet spatula and tooled within five minutes of application. The joint shall be tooled slightly concave after the sealant is installed. The tooled joint shall present a smooth and professional joint giving the desired finish and shape. The masking tape shall be removed immediately after tooling.

Application equipment shall be cleaned with a tool cleaner, recommended by the manufacturer, after wearing PVC or rubber gloves and whilst the sealant is still in an uncured state.

h. Cleaning

The surfaces adjoining the sealed joints shall be cleaned of smears and other soiling resulting from the sealing application as the work progresses. Sealant adhering to, porous surfaces shall be left until is just cured and then removed by abrasion or other mechanical means.

1.6.13 FIRE PROOFING OF STEEL STRUCTURES

a. SCOPE

This specification covers the general requirements of materials and the method of application for internal protection of platform structural steel girder (in a limited length) and steel door where high voltage cable are crossing from track girder to off- road station building, against fire by vermiculite cementitious coating.

b. Materials

All materials to be used shall conform to the requirements of respective UL codes / IS codes. Sample and test results for all the materials shall be submitted to the Employer and got approved by him in writing before execution of work. Acceptance criteria of commonly used materials is given below.

c. Vermiculite Cementitious Coating

Branded product with base as Vermiculite mixed with ordinary portland cement shall have a max loose dry density of 400kg/m³ while in moulded condition, density shall not exceed 800kg/m³. Sulphate content in the branded product shall not exceed 1%, when the sulphate content is expressed as sulphur trioxide.

d. Reinforcement

Welded wire fabric to be used as reinforcement shall conform to IS:1566 and shall be of approved type. Mesh size shall be 50mm x 50mm and thickness of wire shall be 3mm.

Attachments

i. Tie wire

Tie wire shall be of mild steel not thinner than 16SWG.

ii. Nuts

Nuts shall be made of mild steel and shall conform to IS:1367 and IS:2585 of required size as recommended by manufacturer.

1.6.14 Surface Preparation

Surface cleaning, Welding nuts and application of primer

All steel surface to be in contact with the fire proofing coating materials shall be cleaned of all oil/grease, loose rust/scales/dust by using detergent and wire brushing. M-16 or of required size as recommended by manufacturer nuts shall be welded with all the steel members to be fire proofed. Maximum spacing of nuts shall be 400mm centre to centre in both directions. Nuts shall be welded to

the steel surface in shop. Epoxy zinc phosphate primer polyamid as specified in table of painting specification or as recommended by manufacturer's shall be also applied to the MS nuts and effected surfaces of the members due to welding after cleaning.

Placement of reinforcement

Reinforcement shall be placed in the middle of coated material thickness. It shall be bent confirming with outlines of finished encasement and rigidly secured in place by tie wire with all the nuts. Minimum lap at ends and sides shall be 100mm and lapped wire fabric shall be tied firmly.

Application

Application of fire proofing material coating shall be carried out by skilled and experienced operators.

Before start of application, zone which is not to be fireproofed shall be covered with polythene/ tarpaulin to protect them against damage.

For vertical webs of steel girder, the coating materials shall be applied in horizontal bands working upwards from the bottom. All outside edges of the fire proofing shall be chamfered by 20mm.

Thickness of fire proof coating shall be established by measuring it with electrometer.

The fire proofing material, after application shall be cured by keeping it in moist condition for a period of at least 14 days or else the surface shall be coated with a membrane of approved curing compound. Brand name, name of manufacturers, test results and method of application shall be submitted to and got approved from the Employer prior to procurement of curing compound.

Approach Working Platform & Scaffolding

The contractor shall arrange all approaches, scaffoldings, stairways, ladder, working platform etc. for carrying out the entire works safely. The working area shall be neatly maintained and all the facilities required by Employer for proper supervision of the work shall be provided. In case, any special precaution is needed for the safety of the structure till the completion of application, the contractor shall make and provide all such arrangement to the complete satisfaction of the Employer and shall remove the same after completion of works.

SECTION – 6

ROADWORK

SECTION – S.6

ROADWORK

1. Control of Traffic

The contractor shall take all necessary precautions in co-ordination with and to the requirements of all the competent authorities concerned to protect the work from damage until such time as the seal coat or surface treatment has developed sufficient strength to carry normal traffic without any damage to it.

The new work shall be opened to traffic only after it is authorised by the Engineer. The contractor shall submit a detailed traffic diversion/or control and regulation plan taking all safety measures during the course of work permitted by the concerned authorities to the Engineer for his consent before start of work.

The contractor shall take all precautions to avoid or minimise delays and inconvenience to road users during the course of the work. Where adequate detours or side tracks are available, traffic shall be temporarily diverted while the work is in progress depending on volume of traffic and subject to approval by Traffic Police. Adequate signs, signals, barriers and lamps for the warning and guidance of traffic shall be provided at all times during the course of the work till it is opened to traffic.

The Contractor shall take all reasonable precautions to protect traffic against accident, damage or disfigurement by construction equipment, tools, and materials, splashes and smirches of bitumen/ bituminous material or any other construction materials and shall be responsible for any claims arising from such damage or disfigurement. Traffic signs erected shall be in accordance with the IRC Standards and/or as prescribed and approved by the Traffic Police Department.

2. Granular Sub-Base (Non-Bituminous)

This work shall consist of laying and compacting well-graded material on prepared subgrade in accordance with the requirements of these specifications or as per MORTH standards, as acceptable to Highway authorities & road owing agency. The material shall be laid in one or more layers according to lines, grades and cross-sections shown on the drawings.

2.1 Material

The Material to be used for the work shall be natural sand, moorum, gravel, crushed stone, or combination thereof depending upon the grading specified in MORTH specifications for Roads and Bridges. The material shall be free from organic or other deleterious constituents.

2.2 Physical requirements

The material shall have a 10 percent fines value of 50 KN or more (for sample in soaked condition) when tested in compliance with BS:812 (Part III). The water absorption value of the coarse aggregate shall be determined by IS:2386 (Part 3); if this value is greater than 2 percent, the soundness test shall be carried out on the material delivered to site as per IS: 383. CBR Value shall be determined at the density and moisture content likely to be developed in equilibrium conditions which shall be taken as being the density relating to a uniform air voids content of 5 percent.

2.3 Strength of sub-base

It shall be ensured prior to actual execution that the material to be used in the sub-base satisfies the requirements of CBR and other physical requirements when compacted and finished.

2.4 Construction Operations

2.4.1 Preparation of sub-grade

Immediately prior to the laying of sub-base, the sub-grade already finished or existing surface shall be prepared by removing all vegetation and other extraneous matter, lightly sprinkled with water if necessary and rolled with two passes of 80 – 100 KN smooth wheeled roller. Damage to the subgrade shall be made good before sub base is laid.

2.4.2 Spreading and compacting

The approved sub-base material shall be spread on the prepared sub-grade by a grader of suitable type and adequate capacity.

When the sub-base material consists of combination of materials, mixing shall be done mechanically by the mix-in-place method.

The equipment used for mix-in-place construction shall be approved equipment capable of mixing the material to the desired degree.

Moisture contents of the loose material at the time of compaction shall be checked in accordance with IS: 2720 (Part 7) and suitably adjusted. Rolling procedure shall be as described under relevant Subsection except stated herein.

Rolling shall be continued till the density achieved is at least 98% of the maximum dry density for the material determined as per IS:2720 (Part 8).

2.4.3 Control of Traffic

Control of traffic shall be as described under Subsection 12.1.

3. Water-bound Macadam Sub-base/ Base (Non-Bituminous)

3.1 Description

The work shall consist of furnishing, placing, watering and compacting sub-base material mechanically interlocked by rolling and bounded together with screening and/ or binding material to the required degree on a prepared sub-grade/ sub-base or the existing surface as the case may be in accordance with these Specifications, and to the lines, levels, grades, dimensions and cross sections as shown on Drawings and/ or required by the Engineer.

3.2 Materials

1. Coarse aggregate

The coarse aggregates shall be hard and durable crushed stones, free from deleterious matter conforming to one of the gradings as set forth in Table 12.3.1, the physical requirements given in Table 12.3.2 subject to the Engineer's consent.

2. Screenings

Screenings to fill voids in the coarse aggregate shall generally consist of the same material as the coarse aggregate or of gravel (other than round material) or moorum as approved by Engineer. However, where permitted non-plastic material such as moorum may be used for this purpose provided liquid limit and plasticity index of such material are below 20 and 6 respectively and fraction passing through 75 micron sieve does not exceed 10 percent.

3. Binding material

Binding material to be used for water-bound macadam as a filler material meant for preventing ravelling, shall be a suitable material and having a Plasticity Index (PI) value of less than 6 as determined in accordance with IS : 2720 (Part-5).

Table 13.3.1

Grading requirements of coarse aggregates

Grading	Size Range	IS Sieve Designation	Percent Passing by weight
1	90 mm to 45 mm	125 mm	100
		90 mm	90-100
		63 mm	25-60
		45 mm	0-15
		22.4 mm	0-5
2	63 mm to 45 mm	90 mm	100
		63 mm	90-100
		53 mm	25-75

		45 mm	0-15
		22.4 mm	0-5
3	53 mm to 22.4 mm	63 mm	100
		53 mm	95-100
		45 mm	65-90
		22.4 mm	0-10
		11.2 mm	0-5

Note: The compacted thickness for a layer with Grade 1 shall be 100 mm while for a layer with Grade 2, it shall be 75 mm.

Table 12.3.2 Physical requirements of coarse aggregates or water-bound macadam sub-base and base courses

Sl.No.	Test	Test Method	Requirement (Maximum)
	*Los Angeles Abrasion value	IS :2386 (Part-4)	50 per cent
	* Aggregate Impact value	IS :2386 (Part-4)	40 per cent
	*Flakiness Index	IS :2386 (Part-1)	15 per cent

Aggregate may satisfy requirements of either of the two tests

Construction Method

1. Preparation of Sub-grade/ sub-base

- The surface of the sub-grade/ sub-base or existing surface shall be shaped and prepared to the lines, levels, grades, dimensions and cross sections as shown on the Drawings. Damage to or deterioration of sub-grade/ sub-base shall be made good before sub-base/ base is overlaid.

• Inverted Choke

- 1.1.2 If water bound macadam is to be laid directly over the sub grade, without any intervening pavement or soling course, a 25 mm course of screenings or coarse sand shall be spread and compacted on the prepared subgrade before application of the coarse aggregate. In case of fine sand or silty or clayey sub grade, a 100 mm insulating layer of screenings or coarse sand shall be laid, the gradation of which will depend on drainage requirements. Alternatively, appropriate geosynthetics performing functions of separation and drainage layer may be used over the prepared sub-grade subject to the satisfaction of the Engineer.

2. Spreading coarse aggregates

- 1.1 The coarse aggregates of specified size and grading shall be spread uniformly in layers with each compacted layer thickness not more than 100mm for Grading 1 and 75 mm for Grading 2 and in a manner that prevents segregation into fine and coarse materials.
- 2.1 Sub-base/ or base material shall contain moisture nearly equalising the optimum moisture content at the time of compaction.
- 3.1 Immediately after each layer has been spread and shaped satisfactorily, each layer shall be thoroughly compacted with suitable and adequate compaction equipment. Rolling operations shall begin from the outer edge of roadbed towards the centre, gradually in a longitudinal direction; except on super-elevated curves, where rolling shall begin

at the lower edge and progress towards the upper edge. The rolling shall be continued until the aggregates are thoroughly keyed, well-bounded and firmly set in its full depth.

3. Tolerance

The finished sub-base/ base at any point shall not vary more than 15mm below and 12mm above the planned grade or adjusted grade with 3m straight edge applied to the surface parallel to the centreline of the road. With the template laid transversely the maximum permissible variation from specified profile shall be 12mm and 8mm respectively.

The sub-base/ base course completed in each day's work shall have an average thickness not less than the required thickness. Sub-base/ base course which does not conform to the above requirements shall be reworked.

4. Bituminous Materials

4.1 Materials

Materials shall meet the requirements of the relevant IS Codes. These shall be of the following types.

1. Cut back Bitumen

1.1 Cut back bitumen shall be Rapid Curing (RC), Medium Curing (MC) or Slow Curing (SC) conforming to IS : 217.

2. Cationic Emulsion

Bitumen emulsions of the cationic type for roads shall conform to IS: 8887. Emulsified bitumen shall be Rapid Setting (RS), Medium Setting (MS), or Slow Setting (SS). The physical and chemical requirements of the three types emulsions shall comply with the requirements specified in Table 1 of IS: 8887.

3. Paving Bitumen

Paving bitumen shall be conforming to IS: 73 and of the following two types:

Type 1 Paving bitumen from non-waxy crude shall satisfy the requirements given in Table 1 of IS: 73.

Type 2 Paving bitumen from waxy crude shall satisfy the requirements given in Table 2 of IS: 73. The temperature at application of bituminous materials shall be maintained as per manufacturer's instructions and/or as directed by the Engineer's Representative.

An anti-stripping and Bonding agent should be used in all final restoration road works. It should conform to IS: 14982-2001 Specifications. The percentage can be from 0.5% to 1.25% by weight of bitumen content. The optimum dose can be ascertained using M.O.S.T. / BIS guidelines.;

4.2 Methods of Storage and Handling

Asphaltic material shall be handled and stored with due regard for safety and in such a way that at the time of use in the work the material conforms to the Specifications. Following precautions shall be taken while using these materials:

- a) Work with these materials shall be carried out in good weather conditions and it shall be carried out in warm and dry weather, and not in wet or extremely cold weather.
- b) Emulsified asphalt shall be handled with care and not subjected to mechanical shocks or extremes of temperature likely to cause separation of the asphalt. Emulsified asphalt showing sign of separation shall not be used.
- c) During heating, no water or moisture shall be allowed to enter the boiler.
- d) Heating of bitumen shall be done to the correct temperature range, as prescribed by the manufacturer for the grade used. The temperature shall be controlled with the use of a suitable thermometer, and the material shall be drawn and used while still at such temperature as is prescribed by manufacturer or in accordance with MOST specifications.
- e) It shall be ensured that mixing of ingredients is thorough and all particles of aggregates are coated uniformly and fully.

5. Prime Coat

5.1 Description

This work shall consist of the cleaning and preparing of the surface to be primed to specified lines, grade, and cross-section, booming and clearing thoroughly and applying bituminous material in accordance with these Specifications.

5.2 Materials

The choice of the primer shall depend upon the porosity characteristics of the surface to be primed. The primer shall be Medium Curing Cutback (MC) and the particular grade to be used for the work shall have the consent of the Engineer. Slow setting Cationic emulsion conforming to IS : 8887 may also be used. Sampling and testing of bituminous primer shall be as per IS : 217, IS : 454 and IS : 8887.

5.3 Construction Methods

1. Weather Limitations

Prime coat shall not be applied at a time when the surface is wet or when the weather is foggy, rainy or windy.

2. Equipment

The equipment used for the work shall include a power broom and primer material distributor spraying it uniformly at specified rates and temperatures. It shall be equipped with self-heating arrangement, suitable pump, adequate capacity compressor and spraying bar with nozzles having constant volume or pressure system. Spraying by manual methods may be allowed for inaccessible or small areas with the consent of the Engineer.

3. Cleaning Surface

Immediately prior to applying the prime coat the surface to be primed shall be swept clean from all loose dirt and other objectionable material and shall be shaped to the required lines, grades, cross section.

4. Application of bituminous primer

The primer material shall be applied by means of a distributor at rates usually from 0.8 to 1.4 liters per square meter and at a temperature within the allowable range corresponding to the material used and porosity condition of surface over which it is laid. The temperature of primer at time of application may vary from 400 C to 600 C for cutback bitumen and 400 C to 600 C for bitumen emulsion

Prime coat shall be allowed to penetrate for at least 48 hours to allow penetration into the base course and aeration of volatile from the primer material, then covered with clean dry sand or stone screening. Areas containing an excess or deficiency of priming material shall be corrected by the addition of sand or primer.

6. Tack Coat

6.1 Description

This work shall consist of furnishing and applying bituminous material to an existing road surface or to an existing bituminous prime coat surface which has dried out or preparatory to laying another bituminous layer over it.

6.2 Materials

The material for tack coat shall be a bituminous or cut back emulsion of suitable type and grade.

6.3 Construction Methods

1. Cleaning Surface

The whole surface on which the tack coat is to be applied shall be cleaned of dust and any extraneous material before the start of application of tack coat by using a power broom or any other equipment/ method.

2. Application of tack coat material

The tack coat material shall be applied uniformly by means of a distributor at controlled rates as per MORTH specifications and at the temperature within the allowable range corresponding to the material used. It shall be done with self propelled or towelled bitumen. Surfaces of structures and trees adjacent to the areas being treated shall be protected in such a way as to prevent their being spattered or marred

7. Bituminous Macadam

7.1 Description

The work shall consist of one or more applications of compacted crushed aggregates premixed with bituminous binder (suitable grade) to a primed non-bituminous surface or previously constructed bituminous surface and in conformity with the lines, grades, dimensions and cross-sections shown on the Drawings This shall comprise of a single course of 50mm to 75mm thickness as specified in the approve or as Directed by Engineer.

7.2 Materials

1. Bitumen

The bitumen shall be paving bitumen of suitable grade approved by the Engineer and conforming to IS :73.

2. Additives

Adhesion and Ant-stripping agent shall be added to the bitumen subject to Engineer's consent at the required percentage of additive. The additive shall be thoroughly mixed with the bituminous material in accordance with the manufacturer's instructions.

3. Aggregates

Aggregates shall consist of clean and hard crushed stone free from dust, clay, dirt and any other deleterious matter. The physical requirements shall be as given in Table 12.7.1. Aggregates shall conform to one of the two gradings given in Table 12.7.2 depending on the compacted thickness; the actual grading shall have the consent of the Engineer.

4. Table 7

Physical requirements of aggregates for bituminous macadam

Test	Test Method	Requirement (maximum)
Los Angeles Abrasion value	IS :2386 (Part-4)	40 per cent
* Aggregate Impact value	IS :2386 (Part-4)	30 per cent
Flakiness Index and Elongation Indices (Total)	IS : 2386(Part-1)	30 per cent
Coating and Stripping of Bitumen aggregate mixtures	AASHTO T-182	Minimum retained coating 95%
Soundness :		12 per cent
Loss with Sodium Sulphate 5 cycles		18 per cent
(ii) Loss with Magnesium Sulphate 5 cycles		
Water absorption IS :	2386(Part-3)	2 per cent

Aggregates may satisfy requirements for either of the two tests.

IS Sieve Designation	Per cent by weight passing the sieve	
	Grading 1	Grading 2
45.0mm	100	-
26.5mm	75-100	100
22.4mm	60-95	75-100
11.2mm	30-55	50-85
5.6mm	15-35	20-40
2.8mm	5-20	5-20
90.0 micron		

Bitumen content for pre mixing shall be 4% by weight of total mix unless otherwise approved by Engineer.

7.3 Construction Method

1. Weather and Control of Work

The work of laying shall not be undertaken during rainy or foggy weather or when the base course is damp or wet, or during dust storm or when the atmospheric temperature in shade is 15°C or less. The Engineer may order work to cease temporarily on account of adverse weather, unsatisfactory condition of materials, equipment or any conditions which he considers may affect the work adversely.

2. Cleaning and Preparation of Surface

Prior to the application of binder, loose dirt and other objectionable material shall be removed from the surface to be treated by means of the power broom or blower or both. If this does not provide a uniformly clean surface, additional sweeping shall be done by hand, using stiff brushes or similar brooms. The areas inaccessible to the cleaning means shall be cleaned manually. The sweeping shall extend 200mm beyond each edge of the area to be treated.

Adherent patches of objectionable material shall be removed from the surface by steel scraper or other approved method and where the Engineer so directs the scraped area shall be washed down with water and hand brooms.

No application of bituminous material shall be undertaken until the surface has been cleaned to the satisfaction of the Engineer.

Before application of the bituminous material any necessary preliminary patching of the surface of the road (To fill in potholes.) shall be done to the complete satisfaction of the Engineer.

Tack coat shall be applied in accordance with these Specifications. Prime coat if required, shall conform to Subsection 12.5.

3. Plant and Equipment

All plant used by the Contractor for the preparation, hauling and placing of asphalt mixtures shall be subject to the consent of the Engineer and shall minimise smock, dust and noxious emission and odours. These shall generally meet the following requirements:

- a) The mixing plant shall be a batching plant and shall have adequate capacity sufficient to supply the finisher on the road continuously when spreading the asphaltic mix at normal speed and required thickness.
- b) Scale for any weigh box shall be designed to be accurate to within 1% of the maximum load required and shall be fully automatically controlled. The Contractor shall provide and have at hand not less than ten 25 kilograms weights for frequent testing of all scales.
- c) Weigh box or hopper shall include a means for accurately weighing each bin size of aggregate in a weight box or hopper, suspended on scales, ample in size to hold a full batch without running over.

- d) The asphaltic materials shall be stored in storage tanks designed to keep the temperature of the asphaltic material at maximum temperature of 1100 C. The properties of the asphaltic material kept in that storage tanks shall be in good condition before mixing. The plant shall be provided with a circulating system to ensure continuous circulation between the storage tank and the mixer.
- e) The plant shall be provided with a cold bin for feeding the aggregates. Bin shall have a calibration gate and a mechanical means to insure uniform feeding of the aggregates into the drier as required by the Engineer.
- f) The rotary drier shall be capable of drying and heating the aggregates to the specified temperature
- g) The plant shall be provided with plant screens capable of screening all aggregates to the specified sizes
- h) The plant shall include at least 3 hot bins for storing the aggregates fed from the drier after passing through the screen. Each bin shall be provided with an overflow pipe to prevent any backing up of material into other bins.
- i) The plant shall be provided with asphaltic control unit by weighing to obtain the proper amount of asphaltic material in the mix within the tolerance specified for the job-mix.
- j) The batch mixer shall be an approved twin pugmill type and capable of producing a continuous uniform mixture within the job-mix tolerances. The mixer capacity shall not be less than 1,000 kilogram batch.
- k) An armoured thermometer reading from 500 C to 2000 C shall be fixed in the asphaltic feed line at a suitable location near the discharge valve at the mixer unit. The plant shall be further equipped with an electric pyrometer, or other approved thermometric instrument so placed at the discharge chute of the drier as to register automatically or indicate the temperature of the heated aggregate.
- l) The plant shall be equipped with a dust collector.
- m) The plant shall be equipped with accurate positive means to govern the time of mixing and to maintain it constant. The time of mixing shall be divided into two steps, dry mixing and wet mixing. For dry mixing, the aggregate from hot bins shall be mixed for a period of 5-15 seconds. For wet mixing, the mixing time shall begin with the start of the asphalt spray after dry mixing. The wet mixing shall take about 30-45 seconds. The mixing time shall be extended if in the consideration of the Engineer the material obtained is not homogeneous.

4. Equipment for Hauling and placing

- a) Trucks for hauling asphaltic mixtures shall have tight, clean, and smooth metal beds that have been sprayed with soapy water, thinned fuel oil, or lime solution to prevent the mixing from adhering to the beds (The amount of sprayed fluid shall however be kept to the practical minimum. Each load shall be covered with a canvas or other suitable material of such size as to protect the mixture from the weather). Any truck causing excessive segregation of material by its spring suspension or other contributing factors, or that shows oil leaks in detrimental amounts, or that causes undue delays, shall upon direction of the Engineer be removed from the work until such conditions are corrected.
- b) The equipment for spreading and finishing shall be mechanical, self powered pavers, capable of spreading and finishing the mixture true to the lines, grades, dimensions and cross sections. The pavers shall be equipped with hoppers and distributing screws of the reversing type to place the mixture evenly.
- c) The pavers shall maintain trueness of grade and confine the edges of the pavement to true lines without the use of stationary side forms. The equipment shall include blending or joint leveling devices for smoothing and adjusting longitudinal joints between lanes. The assembly shall be adjustable to give the cross-section shape prescribed and shall be so designed and operated as to place the thickness or weight per square metre of material required.
- d) Pavers shall be equipped with activated screeds and devices for heating the screeds to the temperature required for the laying of the mixture without pulling or marring.
- e) The term "screed" includes any cutting, crowing, or other practical action that is effective in producing a finished surface of the evenness and texture specified, without tearing, shoving, or gouging.

- f) If, during construction, it is found that the spreading and finishing equipment in operation leaves in the pavement surface tracks or indented areas or other objectionable irregularities, the use of such equipment shall be discontinued and other satisfactory spreading and finishing shall be provided by the Contractor forthwith.

5. Preparation and transport of mix

Bituminous macadam mix shall be prepared in a hot-mix plant either owned by the Contractor or it may be taken from an approved hot mix plant before supply of mix for the work, consent for the use of the mix shall be taken from the Engineer. The hot-mix plant should be of adequate capacity of batch mix type with the features as described under Subsection 15.7.3(3) or otherwise approved by Engineer unless some work specific features are required and capable of yielding a mix of proper and uniform quality with thoroughly coated aggregates. The plant shall meet the overall requirements through stringent quality control practices.

The mineral aggregates shall be dried and heated to a temperature between 1500 C and 1630 C. The contractor shall submit for consent the exact temperature to the Engineer. Surfaces of aggregates shall be clean and free of carbon and unburnt fuel oil. The aggregates, immediately after heating, shall be screened into three or more fractions and conveyed into separate bins ready for combining and mixing with asphaltic material.

The dried mineral aggregates prepared as prescribed above, shall be combined in the plant in the amount of each fraction of aggregate required to meet the job-mix formula for the particular mixture. The proper amount of asphaltic material shall be distributed over the mineral aggregate and the whole thoroughly mixed for a period of at least 30 seconds, or longer if necessary to produce a homogeneous mixture in which all particles of the mineral aggregates are coated uniformly. The total mixing time shall be regulated by a suitable locking means.

The mixture shall when emptied from the mixer be at a temperature between 1500 C and 1630 C even for tolerances.

The mixture shall be transported from the mixing plant to the point of use in vehicles conforming to the requirements of Subsection 15.7.3 (4)(a) unless otherwise approved by the Engineer.

6. Application of the Pre-mix

The application of the mix shall proceed immediately after application of tack coat. The mix shall be spread immediately by means of self-propelled mechanical paver with suitable screeds capable of spreading, tamping, and finishing the mix true to lines, levels, dimensions and cross-sections specified. Any bare or insufficiently filled areas shall be re-treated by the mechanical spreader or covered by hand as necessary to give uniform and complete coverage. Any aggregate spread in excess of the agreed rate shall be scattered and evenly distributed on the road or otherwise removed and stockpiled. The temperature of the mix at the time of laying shall be in the range of 120 or 1600 C.

7. Rolling

After the spreading of the mix, the rolling shall be done by road roller of suitable type and capacity. Rolling shall start as soon as possible after the material has been spread and it shall be completed within limited time frame, and to meet this, the Contractor shall deploy a set of rollers. Rolling shall be done with care to avoid unduly roughening of the pavement surface. It shall commence at the edges and progress towards the centre longitudinally except that on super-elevated and unidirectional cambered portions, it shall progress from the lower to the upper edge parallel to the centre line of the pavement.

The speed of the rollers shall not exceed 5 kilometre per hour for steel wheeled rollers and 7 kilometre per hour for pneumatic tired rollers and shall be at all times slow enough to avoid displacement of the hot mixture. Any displacements occurring as a result of reversing the direction of the roller or from any other cause shall at once be corrected with rakes and fresh mixture where required. Care shall be exercised in rolling not to displace the line and grade of the edges.

Rolling shall progress continuously as may be necessary to obtain uniform compaction while the mixture is in a workable condition and until all roller marks are eliminated.

Heavy equipment or rollers shall not be permitted to stand on the finished surface until it has thoroughly cooled or set.

Any petroleum products dropped or spilled from the vehicles or equipment employed by the Contractor upon any portion of the pavement under construction is cause for the removal and replacement of the contaminated pavement by the Contractor.

When the roller has passed over the whole area once, any high spots or depressions which become apparent shall be corrected by removing or adding premixed material. Rolling shall then be continued until the entire surface has been rolled to 95 % of the average laboratory density, and there is no crushing of aggregates. and all roller marks are eliminated. In each pass of the roller, preceding track shall be overlapped uniformly by at least 1/3rd width. The roller wheels shall be kept damp to prevent premix from adhering to the wheels and being picked up. In no case shall fuel/ lubricating oil be used for this purpose.

Along kerbs, man-holes etc., and at any other locations where proper consolidation by rollers is not practicable, alternative means such as steel rammers shall simultaneously be used to secure adequate consolidation.

7.4 Surface Control

1. Surface Regularity

Maximum permissible undulation in longitudinal profile with 3m straight edge shall be as 12mm. Maximum permissible variation from specified cross profile under camber template shall be as 8mm. Surface evenness requirements in respect of both longitudinal and cross profiles should be simultaneously satisfied.

Tests for conformity with the specified crown and grade shall be made immediately after initial compaction, and variations shall be corrected by removing or adding materials as may be necessary. Rolling shall then be continued as specified. After final rolling, the smoothness of the course shall be checked again and any irregularity of the surface exceeding the permissible limits corrected as agreed by the Engineer's Representative, including removal and replacement.

2. Surface Finish

The bituminous macadam shall be covered with either the next pavement course or wearing course, as the case may be, without any delay. If there is to be any delay, the course shall be covered with the seal coat. The seal coat in such cases shall be considered incidental to the work and shall not be paid separately.

7.5 Control of Traffic

This shall be as described under Subsection 12.1 above.

8. Open-graded Pre-mix Carpet

8.1 Description

This work shall consist of laying and compacting an open-graded carpet generally of 20mm thickness or as otherwise specified in a single course composed of suitable small sized aggregates premixed with a bituminous binder on a previously prepared base to serve as a wearing course.

8.2 Materials

1. Binder

Binder shall be bitumen of suitable grade meeting the requirements of the work and other environmental conditions. This shall be conforming to the requirements of IS : 73, IS : 217 and IS : 454 or other approved cut back bitumen as applicable.

2. Coarse aggregates

Coarse aggregates consist of crushed stones and shall be clean, strong, durable, and free from organic or other deleterious materials. The aggregates shall be hydrophobic and of low porosity. If hydrophilic aggregates are to be used, bitumen shall preferably be treated with anti-stripping agents of approved quality in suitable doses.

The aggregates shall meet the requirements given in Table 12.7.1 except that the water absorption shall be limited to 1 per cent. The Stone Polishing Value as measured by BS : 812-(Part-114) shall not be less than 55.

3. Proportioning of Materials They shall comprise of a mix of stone chipping 13.2mm size (passing 22.4 mm sieve and retained on 11.2 mm size) and 11.2 mm size (passing 13.2 mm sieve and retained on 5.6 mm sieve.)

The contractor shall propose material proportions to the Engineer for his consent.

8.3 Construction Methods

1. Weather and Control of Work This shall be as carried out per Subsection 12.7.3(1).
2. Cleaning and Preparation of Surface This shall be as carried out per Subsection 12.7.3(3).
3. Tack Coat This shall be applied as per Subsection 12.6.
4. Preparation and transport of Premix The binder shall be heated to a temperature appropriate to the grade of bitumen in boilers of suitable design avoiding local overheating and ensuring a continuous supply.

The aggregates shall be dry and suitably pre-heated to the required temperature before they are placed in a mixer. After about 15 seconds of dry mixing, the heated binder shall be distributed over the aggregates at the rate specified. Mixing shall be continuous and thorough to ensure a homogeneous mixture in which all particles are coated uniformly and the discharge temperature shall be within the specified range.

The mixing of binder with chippings shall be continued until the chippings are thoroughly coated with binder. The mix shall be discharged and immediately transported from mixer to the point of use in suitable vehicles or wheel barrows. The vehicles employed for transport shall be clean and the mix being transported should be covered in transit and protected from any kind of damage.

5. Spreading and Rolling

Immediately after the application of tack coat, premixed material shall be spread by means of mechanical paver finisher truly to lines, levels, dimensions and cross section as specified. The areas not covered by the mechanical means shall be treated with manual means for which the Engineer has given his consent.

6. Rolling

This shall be carried out as per Subsection 12.7.3(7)

8.4 Control of Traffic

Subsection 12.1 shall be followed.

9. Bituminous Concrete

9.1 Description

This work shall consist of a surfacing of single-layer bituminous concrete of specified thickness on previously prepared bituminous surface to the lines, grades, dimensions and cross section as shown on Drawings. It shall be 25mm/40mm thick as required by Engineer.

Materials

1. Bitumen

The bitumen shall be paving bitumen of suitable penetration grade within the range S 35 to S 90 or A 90 to IS: 73. The actual grade of bitumen to be used shall be appropriate to the requirements of the work and environmental conditions.

2. Coarse aggregates

The aggregates shall satisfy the physical requirements given in Table 15.7.1. Flakiness index shall not exceed 30% and water absorbed not more than 1%

3. Fine aggregates

Fine aggregates shall be the fraction passing 2.36 mm sieve and retained on 75 micron sieve, consisting of crushed run screenings, natural sand or a mixture of both. These shall be clean, hard, durable, uncoated, dry and free from any injurious, soft or flaky pieces and organic or other deleterious substances.

4. Filler

Filter shall consist of finely divided mineral matter such as rock dust, hydrated lime or cement. The filter shall be graded within following limits:

IS Sieve	Per cent passing by weight
600 micron	100
300 micron	95 – 100
75 micron	85 – 100

The filter shall be free from organic impurities and have a Plasticity Index not greater than 4. The Plasticity Index requirement shall not apply if filter is cement or lime. When coarse aggregate is gravel, 2 per cent of mass of total aggregate of Portland cement or hydrated lime shall be added and percentage of fine aggregate reduced accordingly. Cement or lime is not required when the gravel is lime stone.

5. Aggregate gradation

Mineral aggregates, including filler shall be so graded or combined as to conform to grading set forth in Table 15.9.1 below

2. Table 9.1

Sieve Designation	Per cent by weight passing through sieve for		
	25mm thick Grade 1	25-40mm thick Grade 2	>40mm thick Grade 1
26.5mm			100
22.4mm		100	75-100
13.2mm	100	80-100	--
11.2mm	90-100	75-95	50-85
5.6mm	60-80	55-75	20-40
2.8mm	40-55	40-55	5-20
710micron	20-30	20-30	--
300micron	15-25	15-25	--
180micron	10-20	10-20	--
90micron	5-11	5-11	0.5

9.2 Mix Design

1. Requirement of Mix

Apart from conformity with grading and quality requirements of individual ingredients, the mix shall also meet the requirements set forth in Table 15.9.2.

3. Table 13.9.2

	Description	Requirements
	Marshall stability (ASTM Designation : D-1559) determined on Marshall specimens compacted by 75 compaction blows on each end	820 Kg (1800 pounds)
	Marshall flow (mm)	Minimum 2-4
	Per cent air voids in mix	3-5
	Per cent voids in mineral aggregate (VMA)	Minimum 11-13
	Percent voids in mineral aggregates filled by bitumen (VFB)	65-75
	Binder content, per cent by weight of mix	Minimum 4.5
	Water sensitivity (ASTM : D-1075) loss of Stability on immersion in water at 60 deg. C	Minimum 75% Retained strength
	Swell Test (Asphalt Instt. MS-2, No. 2)	Maximum 1.5%

2. Binder content

Binder content shall be so determined as to achieve the requirements of the mix set forth in Table 12.9.2. Marshall method for arriving at binder content shall be adopted.

3. Job Mix Formula

Before starting work the Contractor shall submit to the Engineer for his consent. The job mix formula for the mixture shall fix a single percentage of aggregate passing each required sieve size, a single percentage of asphalt to be added to the aggregate, and a single temperature at which the mixture is to be delivered on the road, all of which shall fall within the ranges of the composition and the temperature limits. The formula shall give the following details:

- I. Source and location of all materials
- II. Proportions of all materials as described under :
 - Binder - as percentage by weight of total mix
 - Coarse aggregate/ Fine aggregate/ Mineral Filler - as percentage by weight of total aggregate including Minera Filler
- III. A single definite percentage passing each sieve for the mixed aggregate (VideTable 12.9.1)
- IV. The results of test as per specifications obtained by the contractor
- V. Test results of physical characteristics of aggregates to be used
- VI. Mixing temperature and compacting temperature

4. Application of job-mix formula and Allowable Tolerances

The approved job mix formula shall remain effective unless and until modified. Each day as many samples of the materials and mixtures shall be taken and tested considers necessary for checking the required uniformity of the mixture.

All mixture furnished shall conform to the job-mix formula within the range of tolerances set in forth in Table 9.3

5. Table .9.3

Permissible variations from the job-mix formula

Sl.No.	Description of Ingredients	Permissible Variation by Weight of Total mix in Percentage
1	Aggregate passing 13.2mm sieve and larger	+/- 8
2	Aggregate passing 9.5mm sieve and 4.75mm sieve	+/- 7
3	Aggregate passing 2.36mm sieve & 1.18mm sieve	+/- 6
4	Aggregate passing 600 micron sieve & 300 micron sieve	+/-5
5	Aggregate passing 150 micron sieve	+/-4
6	Aggregate passing 75 micron sieve	+/-3
7	Binder	+/-0.3
8	Mixing Temperature (Centigrade)	+/-10

When unsatisfactory results or changed conditions make it necessary, a new job mix shall be submitted to the Engineer.

Should a change in a material be encountered or should a change in a source of material be made, a new job mix formula shall be submitted before the mixture containing the new material is delivered.

9.3 Construction Methods

1. Weather Limitation

The control over the weather conditions shall be as described under Subsection 12.7.3 (1) above.

2. Progress of Work

No work shall be performed when there is insufficient hauling, spreading or finishing equipment, or labour to ensure progress at a rate not less than 75% of the capacity of the mixing plant.

3. Preparation of Existing Surface

The surface on which the mix is to be laid shall be swept thoroughly and cleaned of all loose dirt and other objectionable material using mechanical broom immediately before start of work. In portions where mechanical means cannot reach, the surface shall be prepared, shaped and conditioned to specified levels, grade and cross-fall (camber).

4. Preparation of Mix

A Hot-mix plant of adequate capacity and capable of producing a proper and uniform quality mix shall be used for preparing the mix. The plant may be either a weigh batch type or volumetric proportioning continuous or drum mix type. The plant shall have co-ordinated set of essential units capable of producing uniform mix as per the job-mix formula.

The temperature of the binder at the time of mixing shall be in the range of 150 to 163 degree C and of aggregates in the range of 155 to 163 degree C, provided also that at no time shall the difference in temperature between the aggregates and binder exceed 14 degree C. The Contractor shall submit the exact temperatures and total mixing time for the consent of the Engineer. Mixing shall be thorough to ensure that a homogeneous mixture is obtained in which all particle of mineral aggregates are coated uniformly.

5. Transportation and Delivery of Mix.

The mix shall be transported from the mixing plant to the point of use in suitable tipper vehicles. The vehicles employed for the transport shall be clean and be covered in transit.

6. Spreading and Finishing

The mix transported from the hot mix plant to the site and shall be spread by means of a self-propelled mechanical paver with suitable screeds capable of spreading, tamping and finishing the mix to specified grade, elevation, and cross-section. However, in restricted locations and narrow widths, where available equipment cannot be operated, other suitable means shall be employed subject to the consent of the Engineer. The mixture shall be laid upon an approved surface and only when weather conditions are considered suitable. The temperature of the mix, at the time of laying, shall be in the range of 120 degree C to 160 degree C.

The prime coat and tack coat to be applied shall be as per Subsections 12.5 and 12.6 respectively.

Spreading, finishing and compacting of the mix shall be carried out during daylight hours only, unless satisfactory illumination is provided by the Contractor.

7. Compaction of Mixture

Immediately after spreading of mix by paver, it shall be thoroughly and uniformly compacted by rolling with a set of self-propelled rollers moving at a speed not more than 5 km per hour, **immediately** following close to the paver. Generally with each paver, two steel wheeled tandem rollers and one pneumatic tired roller will be required. The initial or breakdown rolling shall be with 8 to 10 ton static weight smooth three wheeled steel roller and finish rolling with 6 to 8 ton tandem roller. The breakdown mrolling shall preferably be followed by an intermediate rolling with a smooth wheel pneumatic roller of 10 to 25 ton having a tire pressure of 7kg/sqcm moving with a speed not more than 7 km per hour and shall be at all times slow enough to avoid displacement of the hot mixture. Means shall be provided for checking and adjusting the tire pressure on the job at all times. All compaction operations, i.e., breakdown rolling can be accomplished by using vibratory roller of 8 to 10 ton static weight. During initial or breakdown rolling and finished rolling, the vibratory shall be switched off. The joints and edges shall be rolled with an 8 to 10 ton three wheeled static roller. No delays in rolling the paved surface shall be tolerated, the breakdown roller must be right up to the paver at all times and the intermediate pneumatic roller right up to the breakdown roller. The compaction of the asphaltic concrete shall be controlled by temperature as follows:

Roller	Temperature
Breakdown	120° C - 135° C
Pneumatic	95° C - 115° C
Finishing	< 65° C

Rolling procedure shall be as specified under Subsection 12.7.3 (7).

Rolling shall be continued till the density achieved is at least 98% of that of laboratory Marshall specimen. Rolling operations shall be completed in all respects before the temperature of the mix falls below 100 degree C.

8. Joints

Both longitudinal and lateral joints in successive courses shall be staggered so as not to be one above the other. Longitudinal joints and edges shall be constructed true to delineating lines parallel to the centre line of the road.

Longitudinal joints shall be offset by at least 150mm from those in the lower course.

Longitudinal and transverse joints shall be made in a careful manner so that well bonded and sealed joints are provided for the full depth of the course.

Surface regularity

Surface shall be tested for undulations in longitudinal and cross profiles with 3 m straight edge and crown template respectively. Crown template shall conform to the typical cross section.

Maximum permissible undulation in longitudinal profile with 3m straight edge shall be as 8mm.

Maximum permissible variation from specified cross profile under camber template shall be as 4mm.

Surface evenness requirements in respect of both longitudinal and cross profiles should be simultaneously satisfied.

Protection of the pavement from traffic

Subsection 12.7.5 shall apply except as stated below.

Section of the newly finished works shall be protected from traffic of any kind until the mixture has cooled to approximately ambient air temperature and well set.

10. Seal Coat

10.1 Description

This work shall consist of application of a seal coat for sealing the voids in a bituminous surface laid to the specified levels, grade, and cross fall. Seal coat used shall be of premix type unless otherwise approved by the Engineer.

10.2 Materials

1. Binder

The binder shall be bitumen of a suitable grade appropriate to the requirements of the work and other environmental conditions as directed by the Engineer and satisfying the requirements of IS : 73, 217, 454 or other cut back as applicable.

2. Aggregates

The aggregates shall be sand or grit and shall consist of clean, hard, durable, dry particles and shall be free from dust, soft or flaky/ elongated material, organic matter or other deleterious substances. The aggregates shall pass 2.36mm sieve and be retained on 180 micron sieve. The quantity used for premixing shall be 0.06 cum per 10 sq m area.

10.3 Construction Methods

1. Preparation of base

The seal coat shall be applied immediately after laying of bituminous course which is required to be sealed. Before application of seal coat materials, the surface shall be cleaned free of any dust or other objectionable matter.

2. Preparation and Application of Mix

Mixtures of approved type shall be employed for mixing aggregates with suitable bituminous binder. The binder shall be heated in boilers of suitable design, to a temperature appropriate to the grade of bitumen. The aggregates shall be clean, dry and suitably heated to a temperature before the same are placed in the mixture. Mixing of binder with aggregates to specified proportions shall be continued till the latter are thoroughly coated with the former.

The mix shall be immediately transported from the mixing plant to the point of use and spread uniformly on the bituminous surface to be sealed.

3. Rolling

As soon as sufficient length has been covered with pre-mixed material, the surface shall be rolled with 8-10 ton smooth wheeled steel, suitable vibratory or other equipment. As regards procedure for rolling it shall be as specified under Subsection 12.7.3 (7).

4. Control of Traffic

Subsection 12.1 shall apply.

11. Cement Concrete Pavements

11.1 General

This work shall consist of constructing Plain/ or Reinforced Cement Concrete Pavements as required in accordance with these Specification and in conformity with the lines, levels, grades and dimension in accordance with the design.

11.2 Materials

1. General

The concrete materials viz. cement, aggregates, water, steel reinforcement, admixtures shall be in accordance with Section 5 on concrete except as specified herein.

2. Dowel and Tie bars Dowel bars shall be plain round bars

They shall be free from burring or other deformation restricting slippage in the concrete. Before delivery to the Works, one half of the length of each dowel bar shall be painted with one coat of bituminous material.

Tie bars shall be deformed bars free from oil, dirt, loose rust and scale.

These shall conform to the requirements of IS : 432, IS : 1139 and IS : 1786 as relevant.

3. Sleeves

The sleeves for dowel bars of expansion joints shall be of plastic material. This shall be designed to cover the dowels specified by the Designer, with a closed end, and with a suitable stop to hold the end of the sleeve a distance equal to the thickness of joint filler or at least 30mm from the end of the dowel bar. These shall be of such design that they do not deflect or collapse during construction, and the arrangement of sleeves shall be in accordance with these Specifications.

4. Waterproof Membrane

Where Waterproof membrane is to be provided, it shall be an impermeable polythene plastic sheeting. Where an overlap of underlay material is necessary this shall be at least 300mm. Water shall not be allowed to pond on the membrane which shall be completely dry when the concrete is laid.

5. Jointing Materials

5.1 Joint Filler

The expansion joint fillers shall conform to the requirements of IS: 1838. They shall be punched to admit the dowels where called for as specified by the Designer. The filler for each joint shall be furnished in a single piece for the full depth and width required for the joint. When the use of more than one piece is authorized for a joint, the abutting ends shall be fastened closely together securely and accurately to shape by stapling or other satisfactory positive fastening.

5.2 Joint Primer

Joint primer shall be fully compatible with the joint sealant and shall be applied strictly in accordance with the manufacturer's instructions.

5.3 Joint Sealing Compound

The Sealing Compound of hot poured, elastomeric type shall conform to AASHTO M282 and cold applied sealant shall be in accordance with BS 5212 (Part 2).

11.3 Equipment and Tools

1. General

The concrete paving shall be carried out by use of mechanised method. Equipment and tools necessary for handling materials and performing the work shall have the consent of the Engineer as to design, type, capacity and mechanical, condition shall be at the site of the work before work is started. In special cases like a very short length of road to be laid at a location, other methods may be approved by Engineer.

2. Batching and Mixing Plant

This shall be of suitable type, capacity and make meeting the requirements of work.

3. Paving Equipment

The concrete shall be placed with an approved fixed form or slip form paver with independent units designed to (i) spread, (ii) consolidate, screed and float finish, (iii) texture and cure the freshly placed concrete in one complete pass of the machine in such a manner that a minimum of hand finishing will be necessary and so as to provide a dense and homogeneous pavement in conformity with the plans and Specifications.

Vibrators for full width vibration of concrete paving slabs may be either the surface pan type or the internal type. They may be attached to the spread finisher. They shall not come in contact with the joint, sub base or side forms.

The frequency of the surface vibrators shall not be less than 3500 impulses per minute and for the internal type not less than 5000 impulses per minute. The variable vibration setting shall be provided in the machine.

At least two spare vibrators and one generating unit shall be on hand in case of any breakdown of the vibrating equipment being used.

4. Concrete Saw for joint cutting

The mechanical saw for cutting concrete shall be adequately powered to cut rapidly with a water-cooled diamond edge saw blade to the depth required. A water tank with flexible hoses and pump shall be made available in this activity on priority basis. The Contractor shall have at least one standby saw in good working condition.

5. Forms

Straight side forms shall be metal forms having a thickness of at least 5mm and have a depth equal to the prescribed edge thickness of the pavement slab.

Curved forms shall be of the radius called for as specified by the Designer and acceptable flexible forms shall be installed with that radius. Built-up forms with horizontal joints shall not be used. Forms shall be free from kinks, bend or wraps. Forms shall not deflect more than 6 mm when tested as a simple beam with a span of three metres under a load equal to that which the finishers or other construction equipment will exert on them. The top of the form shall not vary from a three metre straight edge by more than 3mm at any point and the side by more than 6mm at any point.

The forms shall contain provision for locking together tightly the ends of abutting form sections and for secure setting.

11.4 Construction Methods

1. Preparation of Sub-base

- 1.1 The sub-base, which shall generally be of water-bound macadam (WBM) conforming to Subsection 3.3. The sub base shall be wetted adequately or provided with a water proof membrane so that it does not absorb any water from the concrete to be laid over it. Concrete shall not be placed on any portion of the sub-base until the consent of the Engineer is given.

2. Setting Forms

The sub-base under the forms shall be compacted and cut to grade so that forms, when set to the position are within + 3mm of a straight line formed by the top of the forms. If the sub-base is found to be below the required grade at the form line, the grade line shall be lifted by placing lean concrete mix 1:4:8 beneath the form and setting the form when it is set. Imperfections and variations above grade shall be corrected by tamping or cutting to the degree required.

The alignment and grade elevations of the forms shall be checked and the necessary corrections made by the Contractor immediately before and after placing the concrete. When any form has been disturbed or any roadbed has become unstable, the form shall be reset and rechecked. On final setting of the forms, these shall be checked for at least half the length of pavement to be concreted in a particular day before concreting commences on that day. While concreting long lengths, the setting up of forms to the exact grade and alignment shall be in advance of the concreting operation by at least 60 m.

Forms shall be cleaned and oiled prior to the placing of concrete. The forms shall be removed not earlier than 24 hours after the concrete has been laid.

3. Preparation of Concrete

1. Trial Mix / Mix Design

Subsection 2.1 shall be followed Minimum grade of concrete to be used is M25.

2. Batching, Mixing and Transporting Materials

Subsection 2.4 shall apply.

The Ready-Mixed Concrete (RMC) shall conform to Subsection 2.4 (5).

4. Placing Concrete

Concrete shall be placed only on a prepared sub-base as specified in Subsection 3.12.2. No concrete shall be placed around structures until they have been brought to the required grade and alignment nor until expansion joint material has been placed around them.

The concrete shall be spread, compacted and finished by a mechanical paver and in accordance with Subsection 12.11.3 (3). The mixing and placing of concrete shall progress only at such a rate as to permit proper finishing, protecting and curing of the pavement.

The truck mixers, truck agitators and other approved hauling equipment shall be equipped with means for discharge of concrete into the hopper of the paver without segregation of the materials. In all cases, the temperature of the concrete shall be measured at the point of discharge from the delivery vehicle.

The acceptance criteria regarding level, thickness, surface regularity, texture, finish, strength of concrete and all other quality control measures for hand laid concrete shall be the same as in the case of machine laid work.

The concrete shall be thoroughly consolidated against and along the faces of all forms by means of vibrators inserted in the concrete. Vibrators shall not be permitted to come in contact with a joint assembly, the sub-base or a side form. In no case shall the vibrator be operated longer than 30 seconds in any location. The vibrator shall be inserted in the concrete and worked along the full length and both sides of a joint.

Concrete shall be deposited as near to expansion and contraction joints as possible without disturbing them, but shall not be dumped from the discharge bucket on to a joint assembly.

Except at construction joints, concrete shall be shovelled against both sides of the joint simultaneously, maintaining equal pressure on both sides. It shall be deposited to a height of approximately 5 cm more than the depth of the joint, and shall be vibrated avoiding honeycombing/voids . The vibrator shall be inserted in the concrete and worked along the full length and both sides of the joints Subsection 12.2.6 shall also apply.

5. Initial strike-off and Placement of Reinforcement

Where the concrete is laid in two layers, the bottom layer of concrete shall be struck off for the full width between longitudinal construction joint true to crown at the required distance below the finished surface elevation, for placement of reinforcement or for placement of a top layer of the required thickness.

The striking-off shall be accomplished by use of the finishing machine, unless some other approved device is allowed. The reinforcement shall be placed as called for by the Designer and pouring of concrete over it shall only be allowed after placement of reinforcement is proper in all respects and approved by the Engineer.

6. Joints

1. General

Joints shall comply with the design approved for the construction.

A strip of the preformed expansion joint filler shall be placed around each structure which extends into or through the pavement before concrete is placed.

2. Transverse Expansion Joints

These shall be formed at the design spacings. The material for a transverse joint shall be assembled at the roadbed, and placed into position as a unit.

3. Transverse Contraction Joints

Transverse Contraction joints shall consist of planes of weakness created by forming or cutting grooves in the surface of the pavement. Transverse contraction joints shall also include load transfer dowel-bars where these are specified by the Designer.

The contraction joints shall be cut as soon as the concrete has undergone initial hardening and is hard enough to take up the load of joint sawing machine without causing damage to the slab.

Grooves shall be at right angles to the centreline of the pavement and shall be true to line, subject to a tolerance of 5 mm in the width of the slab.

Any procedure for sawing joints that results in premature and uncontrolled cracking shall be revised immediately by adjusting the sequence of cutting the joints or the time interval involved between the placing of the concrete and cutting of the joints.

Load transfer assemblies for transverse contraction joints shall consist of dowel bars without sleeves and an approved auxiliary spacing and supporting element.

The assembly shall be placed into position so that the dowels are parallel to the centreline and shall be staked into position in such a way as to hold the assembly securely in position throughout construction.

4. Longitudinal Joints

Longitudinal joints shall be constructed in conformity with the design. Planes of weakness shall be created by forming or cutting grooves in the surface of the pavement in accordance with the applicable provisions of this Section. When adjacent lanes of pavement are constructed separately, steel side forms shall be used which will form a keyway along the construction joint. The bars may be bent at angles against the form of the first lane constructed and straightened into final position before the concrete of the adjacent lane is poured.

5. Transverse Construction Joint

Transverse construction joints shall be placed whenever concreting is completed after a day's work or is suspended for more than duration permissible for continuous pouring of concrete. Joints shall be formed by placing installing bars or suitable bulkhead material so that a vertical face with approved key is formed or shall be butt joints formed with suitable material so that a vertical face is formed with no key. No tie bars shall be necessary when key joints are formed but dowel bars of the same dimensions and at the same spacing as for contraction joints shall be necessary at all butt joints.

7. Finishing

1. Machine Finishing

As soon as the concrete has been placed, it shall be struck off and screeded by an approved finishing machine or tools to the grades and cross sections specified by the Designer and to a level slightly above grade so that when properly consolidated and finished the surface of the pavement will be at the exact level and grade. The machine or tool shall go over each area of pavement as many times and at such intervals as necessary to give the proper compaction and to leave a surface of uniform texture, true to grade and cross section.

Excessive operation over a given area shall be avoided. The tops of the forms shall be kept clean by an effective device attached to the machine and the travel of the machine on the forms shall be maintained true without lift, wobble or other variation tending to effect the precision finish.

After concrete has been placed on both sides of the joint and struck off, the installing bar or channel cap shall be slowly and carefully withdrawn, the concrete shall be carefully spaded and additional freshly mixed concrete worked into any depression left by the removal of the installing bar. A diagonal finishing machine shall be used if available.

2. Hand Finishing

A portable screed shall be provided for use. The screed shall be at least 60 cm longer than the width of the slab to be struck off and consolidated. It shall be of approved shape, sufficiently rigid to retain its shape and constructed either of metal or of other material shod with metal. (If necessary, a second screed shall be provided for striking off the bottom layer of concrete).

The screed shall then be placed on the forms and slip along them, without lifting, in a combined longitudinal and transverse shearing motion moving always in the direction in which the work is progressing. If necessary this shall be repeated until the surface is of uniform texture, true to grade and contour, and free from porous areas.

3. Edging at Forms and Joints

After the concrete's initial set, the edges of the pavement along each side of each slab, and on each side of transverse expansion joints, planes of weakness except when sawed transverse construction joints, and emergency construction joints shall be worked with an approved tool and rounded to a radius of 5 mm. A well defined and continuous radius shall be produced and a smooth, dense mortar finish obtained. The surface of the slab shall not be unduly disturbed by tilting of the tool during use.

All joints shall be tested with a straight edge before the concrete has set, and correction shall be made if one side of the joint is higher than the other or if they are higher or lower than the adjacent slabs.

4. Surface Texture

The surface of the carriage-way shall be textured by wire brushing in a direction at right angles to the longitudinal axis of the carriage-way. The pavement shall be given this broomed texturing as soon as surplus water has risen to the surface.

The wire brushes shall be either mechanically operated or manual methods may be allowed depending upon the type of paver being used on the Work. In either case the wire broom shall be not less than 450 mm wide with two rows of spring steel. At least two brooms in working order shall be on the site at all times.

The surface texturing shall be completed before the concrete is in such condition that the surface is torn or unduly roughened by the brooming. The broomed surface shall be free from rough areas, porous areas, irregularities, or depressions.

5. Surface Requirements

After the concrete has hardened sufficiently, the surface shall be given a further test for tureens, using an approved 3 m straight edge laid on the surface. Any portion of the surface, when tested in the longitudinal direction, which shows a variation or departure from the testing edge of more than 3.5mm but not exceeding 7mm shall be marked and immediately ground down with an approved grinding tool until the variation does not exceed 3.5mm.

Whenever the variation or departure from the testing edge is more than 7.0mm the pavement shall be removed and replaced. Such removal shall be of the full depth and width of the slab and at least 3m long.

6. Curing

Immediately after the surface texturing, the surface and sides of the slab shall be cured by approved curing method for not less than 7 days. During this period measures shall be taken to prevent the loss of moisture.

The concrete shall not be left exposed between stages of curing.

The surface shall be inspected regularly to ascertain the earliest time at which it is able to withstand the spreading of moisture retaining material. This shall be by ponding of water or spreading and wetting either two layers of burlap or two mats of cotton / jute or a layer of sand or other approved

highly absorbent material. Whatever material is used it shall be kept continuously moist for not less than 7 days and to a degree which will ensure that 100% humidity is maintained adjacent to the concrete surface. A membrane curing compound meeting the requirements of BS 7542 may be used subject to the consent of the Engineer.

Concrete surfaces which are subjected to heavy rainfall within three hours after the curing compound has been applied shall be resprayed by the method and the coverage specified above.

Concrete surfaces to which membrane curing compounds have been applied shall be adequately protected for the duration of the entire curing period from the pedestrian and vehicular traffic, except as required for joint sawing operations and surfaces tests, and from only other cause which will disrupt the continuity of the membrane. The curing membrane so formed shall be maintained intact for a period of not less than 14 days. The entire surface shall be protected from the effects of solar radiation and in addition by the use of frames covered with material with heat and light reflecting properties.

Concrete liable to be affected by running water shall be adequately protected from the damage during the setting period.

7. Removing Forms

Forms shall be removed only after stipulated period and carefully so as to avoid damage to the pavement.

8. Protection of Pavement

The Contractor shall erect and maintain suitable barricades and shall employ watchmen to exclude public traffic and that of his employees and agents from the newly constructed pavement until opened for use. These barriers shall be arranged as not to interfere with public traffic on any lane intended to be kept open and necessary signs and lights shall be maintained by the Contractor clearly indicating any lanes open to the public. Where any stipulated public traffic lane is contiguous to the slab or lane being placed, the Contractor shall provide, erect, and subsequently remove a substantial temporary guard fence along the prescribed dividing line, which shall be maintained there and protected by signages until the slab is opened to traffic. The Contractor's plan of operation shall be such as to obviate any need for encroachment on the public traffic lane or lanes under use .

The same shall be approved by the local competent authority.

Any part of the pavement damaged by traffic or other cause prior to its final acceptance shall be repaired or replaced by the Contractor.

9. Sealing Joints

Before the pavement is opened to traffic, and as soon after the curing period as is feasible, all joints both longitudinal and transverse, shall be filled with the material approved for use as seal.

Both primer and sealing compound shall be treated and applied strictly in accordance with the manufacturer's specifications/ instruction and by use of approved equipment.

The sealing material shall be poured into each joint opening as directed by the Engineer. The pouring shall be done in such a manner that the material will not be spilled on the exposed surfaces of the concrete. Any excess material on the surface of the concrete pavement shall be removed immediately and the pavement surface cleaned.

9.1 --00--00--00--00--

SECTION - 8C

**SAFETY, HEALTH AND ENVIRONMENT
(SHE) MANUAL**

SAFETY HEALTH & ENVIRONMENT (SHE) MANUAL INDEX

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PART – I SHE MANAGEMENT

1.0 GENERAL

1.1 SCOPE

1.1.1 This document defines the principal requirements of the Employer on Safety, Health and Environment (SHE) associated with the contractor / sub-contractor and any other agency to be practiced at construction worksites at all time.

1.2 DEFINITION / LANGUAGES

1.3 DEFINITIONS AND ABBREVIATIONS

- a) Environment- The total surroundings of an organism including water, air and land and other living creatures.
- b) Environmental Pollutant means any solid, liquid or gaseous substance present in such concentration as may be or tend to be injurious to environment.
- c) Environmental Pollution means the presence in the environment of any environmental pollutant.
- d) Nuisance is annoyance, which results from any construction activity that affects the material comfort and quality of life of the inhabitants of the area surrounding the construction site.
- e) Monitoring is the use of direct or indirect reading field instrumentation to provide information regarding the levels of pollutants released during construction.
- f) Construction Site is the contract limits for construction. It shall be all the area within the limits of the work as shown on the Plans. Construction site shall also include staging, and debris disposal areas and transportation routes to and from these areas.
- g) Noise is any unwanted sound disturbance of the environment around the area of construction operations.
- h) Decibel is a measure on a logarithmic scale of the magnitude of a particular quantity (such as sound pressure, sound power) with respect to a standardized reference quantity.
- i) A - weighted Noise levels in Decibels (referenced to 20 micro-pascal) as measured with A-weighting network of standard sound level meter, abbreviated dB (A).
- j) Energy Equivalent Level (Leq) is the level of a steady noise which has the same energy as the fluctuating noise level integrated over the period of measurement. L max is the maximum Noise Level during the period of measurement.
- k) L₁₀ and L₉₀ is the percentile exceeding levels of sound which is exceeded 10% and 90% of the time of measurement.
- l) Waste is unwanted surplus substances arising from the application of all construction operations and any substance or article which is required to be disposed.
- m) Suspended Particulate Matter is abbreviated as SPM and measured in µg/m³.
- n) Environmental Quality Management Manual is abbreviated as EQM.
- o) Air Monitoring and Control Plan is abbreviated as AMCP.
- p) Noise Monitoring and Control Plan is abbreviated as NMCP.
- q) Ministry of Environment and Forests, Government of India is abbreviated as MOEF.
- r) Central Pollution Control Board, New Delhi is abbreviated as CPCB.

s) Karnataka State Pollution Control Board as KSPCB:

1.3.1 In this document

- i) The use of 'shall' indicates a mandatory requirement.
- ii) The use of 'should' indicates a guideline that is strongly recommended.
- iii) The use of 'may' indicates a guideline that is to be considered.
- iv) 'SHE' means Safety, Health and Environment.
- v) Employer means Karnataka Rail Infrastructure Development Ltd., (K-RIDE).
- vi) Chief Safety Officer means an officer nominated by who is overall responsible for monitoring all SHE functions prescribed in this document.
- vii) BOCWA means Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996
- viii) BOCWR means Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Central Rules, 1998
- ix) DG means Director General of Ministry of Labour, Govt. of India.
- x) BOCWWCA means Building and Other Construction Workers' Welfare Cess Act, 1996
- xi) BOCWWCR means Building and Other Construction workers welfare Cess rules 1998
- xii) Building and other construction workers' (Regulation of Employment and Condition of service) Karnataka rules, 2006.
- xiii) Notifications (Central and state) – collection of cess.
- xiv) The Factories Act, 1948.

1.4 APPLICATION OF THIS DOCUMENT

1.4.1 This document applies to all aspects of the contractor's scope of work, including all aspects conducted by sub-contractors and all other agencies. There shall be no activity associated to the contract, which is exempted from the purview of this document.

1.5 PURPOSE OF THIS DOCUMENT

1.5.1 The objective of these guidelines is to ensure that adequate precautions are taken to avoid accidents, occupational illness and harmful effects on the environment during construction.

1.5.2 This document:

- i) Describes the SHE interfaces between Employer and the Contractor.
- ii) Details the processes by which the contractor shall manage SHE issues while carrying out the work under the contract.
- iii) Describes by reference, the practices and procedures as given in the K-RIDE Project Safety, Health & Environment manual for best SHE performance.

1.5.3 These requirements shall be read together with K-RIDE Project SHE Manual, OHSAS 18001-1999 Occupational Health and Safety Management System and ISO 14001: 2004 Environmental Management Systems. Definition of key terms used in these requirements related to OHSAS 18001 and ISO 14001 standards are found in K-RIDE's Project SHE Manual.

2.0 'SHE' TARGETS AND GOALS

2.1 The SHE targets, goals and aim for the Works are to achieve:

- i) Zero total recordable injuries.

- ii) Zero reportable environmental incidents
- iii) All personnel inducted in accordance with the approved contractor SHE plan
- iv) Total compliance of conducting inspections and audits as per approved SHE plan
- v) 100% incident recording and reporting
- vi) 100% adherence of usage of appropriate PPEs at work.
- vii) Executing construction work with least disturbance to the environment, adjoining road users and traffic.

3.0 COMPLIANCE

3.1 MEMORANDUM OF UNDERSTANDING (MOU)

- 3.1.1 A Memorandum of Understanding placed at **Appendix No 1** shall be executed after the award of contract before commencement of work by the contractor with regard to various provisions on Safety, Health and Environment to be practiced during the construction work.

3.2 K-RIDE'S SHE POLICY AND MANAGEMENT SYSTEMS

- 3.2.1 The construction works shall be undertaken in accordance with K-RIDE's SHE Policy and Management Systems as amended from time to time provided in Project SHE Manual.

3.3 Indian statutory requirements

3.3.1 Primary statutory regulations

- 3.3.1.1 Contractor shall develop thorough understanding about Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996, Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Central Rules 1998, the building & other construction workers welfare cess act 1996 and Building and Other Construction Workers welfare Cess rules 1998, Building and Other Construction Workers [Regulation of Employment & Conditions of Service] (Karnataka) Rules, 2006, Notification [Central & State] – Collection of Cess, not only to satisfy the Inspectors' perspective but the use of legislation as the strong tool for effective SHE management at construction worksites. Contractor is strongly advised to practice the principle of voluntary compliance.

- 3.3.1.2 In order to facilitate the contractor for better understanding on the various provisions of the above Act and Rules, a tabulated information highlighting the Sections/Rules referring to the corresponding registration of contractors, maintenance of registers and records, hours of work and wages, cess & welfare, medical facilities and safety requirements are given in **Appendix No. 2**. It is an indicative one and not a limiting list.

- 3.3.2 In addition, the construction works shall be undertaken in accordance with all applicable legislation and Indian statutory requirements as amended from time to time listed below but not limiting to:

- i. Electricity Act 2003 and Rules therein
- ii. National Building Code of India, 2016
- iii. Factories Act, 1948.
- iv. Motor Vehicles Act 1988 and The Central Motor Vehicles Rules, 1989.
- v. Indian Road Congress Code IRC: SP: 55-2001 'Guidelines on Safety In Road Construction Zones.
- vi. The Petroleum Act, 1934 and Rules therein
- vii. Gas Cylinder Rules, 2016
- viii. Indian Explosives Act. 1884, along with the Explosives substance Act 1908 and the Explosives Rules 1983
- ix. The (Indian) Boilers Act, 1923
- x. The Public Liability Insurance Act 1991 and Rules therein
- xi. Minimum Wages Act, 1948 and Rules therein
- xii. Contract Labor Act, 1970 and Rules therein
- xiii. Child and Adolescent Labour (Prohibitions & Regulations) Act, 1986 and Rules therein
- xiv. Environment Protection Act, 1986 and Rules therein
- xv. Environmental Impact Assessment Notification- 2006
- xvi. Notification for use of fly ash, 2017.

- xvii. National Green Tribunal Act, 2010
 - xviii. Air (Prevention and control of Pollution) Act, 1981
 - xix. Water (Prevention and Control of Pollution) Act, 1974
 - xx. The Noise Pollution (Regulation & Control) Rules, 2000
 - xxi. Notification on Control of Noise from Diesel Generator (DG) sets, 2002
 - xxii. Recycled Plastic Usage Rules, 1998
 - xxiii. Notification, Central Ground Water Board, Act January 1997
 - xxiv. Manufacture, Storage & Import of Hazardous Chemicals Rules, 1989
 - xxv. The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act 2013 along with the Rules and Regulations therein.
 - xxvi. The Hazardous Waste (Management & Handling) Rules, 1989
 - xxvii. Karnataka Preservation of Trees Act, 1976 & Rules therein, Batteries (Management and Handling) Rules, 2001
 - xxviii. Fly ash utilization notification, Sept 1999 as amended in August 2003
 - xxix. Guidelines of Karnataka Urban Arts Commission
 - xxx. Mysore Tramway Act.
 - xxxi. Workman Compensation Act, 1923 along with allied Rules
 - xxxii. Indian Railway Manual of AC Traction Maintenance and Operation
 - xxxiii. IRP Way Manual
 - xxxiv. Code on Wages 2019, as and when notified by the Government.
 - xxxv. Code on Social Security 2020, as and when notified by the Government.
 - xxxvi. Industrial Relations Code, 2020, as and when notified by the Government.
 - xxxvii. Occupational Health, Safety and Working conditions code, 2020, as and when notified by the Government.
- 3.3.3 Employees Compensation Act, 1923 along with allied Rules
- 3.3.3.1 The Contractor shall ensure that all his Employees / Workmen are covered under 'Employees Compensation Act' and shall pay compensation to his workmen as and when the eventuality for the same arises.
- 3.3.4 Notwithstanding the above Act/Rules, there is nothing in those to exempt the contractor from the purview of any other Act or Rule in Republic of India for the safety of men and materials.
- 3.3.5 If the requirements stated in this document are less stringent than or in conflict with the country's applicable legislation, the latter shall apply.
- 3.4 International Standards, Guidelines & ISO Certifications
- 3.4.1 The works should be undertaken in accordance with the applicable international guidelines, standards and specifications on SHE and every contract shall aim to achieve ISO certifications listed below during the currency of the contract:
- OHSAS 18001-1999 : Occupational Health and Safety Management System.
- ISO 14001-2004: Environmental Management Systems.
- 3.4.2 The process of certification shall start immediately after the award of the work and complete within reasonable time. Towards this, the contractor shall undertake the required steps including appointment of ISO consultant for obtaining the certification on Occupational Health and Safety Management System and Environment Management System.
- 3.4.3 In case of failure on the part of the contractor, the Employer at the cost of the contractor shall do the same.
- 4.0 CONTRACTOR SHE POLICY AND PLAN**
- 4.1 The contractor as per Section 39 of the BOCW Act shall formulate a SHE policy and get it approved by DG respectively and display it at conspicuous places at work sites in Kannada, Hindi and other languages understood by the majority of construction workers.

- 4.2 Within 4 weeks of the notification of acceptance of the tender, the Contractor shall submit a detailed and comprehensive Contract specific SHE Plan. The SHE Plan shall include detailed policies, procedures and regulations which, when implemented, will ensure compliance of the contract provisions. The SHE Plan shall include the following but not be restricted to:
- i) A statement of the Contractor's policy, organisation and arrangements for SHE
 - ii) The name(s) and experience of person(s) within the Contractor's proposed management who shall be responsible for coordinating and monitoring the Contractor's SHE performance;
 - iii) The number of SHE staff who shall be employed on the Works, their responsibilities, authority and line of communication with the proposed Contractor's agent;
 - iv) A statement of the Contractor's policy and procedures for identifying and estimating hazards, and the measures for addressing the same;
 - v) A list of SHE hazards anticipated for this Contract and sufficient information to demonstrate the Contractor's proposals for achieving effective and efficient health and safety procedures;
 - vi) A description of the SHE training courses and emergency drills which shall be provided by the Contractor, with an outline of the syllabus to be followed;
 - vii) Details of the safety equipment which shall be provided by the Contractor, including personal protective equipment;
 - viii) A statement of the Contractor's policy and procedures for ensuring that Contractor's Equipment used on the Project Site are maintained in a safe condition and are operated in a safe manner;
 - ix) A statement of the Contractor's policy and procedures for ensuring that sub-contractors comply with the Contractor's safety plan;
 - x) A statement of the Contractor's disciplinary procedures with respect to SHE related matters, and
 - xi) A statement of the Contractor's procedure for reporting and investigating accidents, dangerous occurrences or occupational illnesses
- 4.3 The Contractor shall, from time to time and as necessary are required by the Employer to produce supplements to the SHE Plan such that it is at all times a detailed, comprehensive and contemporaneous statement by the Contractor of his site safety, industrial health and environment obligations, responsibilities, policies and procedures relating to work on Site. Any and all submissions of supplements to the SHE Plan shall be made to the Employer in accordance with the agreed procedures.
- 4.4 If at any time the SHE plan is, in the Employer's opinion, insufficient or requires revision or modification to ensure the security of the Works and the safety of all workmen upon and visitors to the Site, the Employer may instruct the Contractor to revise the SHE plan and the Contractor shall within 7 days submit the revised plan to the Employer for review.
- 4.5 Any omissions, inconsistencies and errors in the SHE Plan or the Employer's acceptance or rejection of the SHE Plan and/or supplements thereto shall be without prejudice to the Contractor's obligations with respect to site safety, industrial health and environment and shall not excuse any failure by the contractor to adopt proper and recognized safety practices throughout the execution of the Work.
- 4.6 The Contractor shall adhere to the SHE Plan and shall ensure, as far as practically possible, that all sub-contractors of all tiers require that contracting parties each have a copy of the Site SHE Plan and comply with its provisions.
- 4.7 The details of contents to be covered in the site SHE plans are given in **Appendix No 3**.

5.0 DESIGNER'S ROLE

DESIGNER'S ROLE IN SAFETY, HEALTH AND ENVIRONMENT

- 5.1 Designer's primary role includes to minimize the risk to health and safety of those who are going to construct, maintain, clean, repair, dismantle or demolish the structures and anyone else like adjoining road users/general public, who might be affected by the work.

5.2 General philosophy

5.2.1 When considering health and safety in designer's work, they shall be expected to do what is reasonable at the time the design is prepared. It may be possible for hazards, which cannot be addressed at the feasibility stage to be looked at during detailed design. In deciding what is reasonably practicable, the risk to health and safety produced by a feature of the design has to be weighed against the cost of excluding the feature. The overall design process does not need to be dominated by a concern to avoid all risks during the construction phase and maintenance. However, a judgement has to be made by weighing up one consideration against another so the cost is counted not just in financial terms, but also those of fitness for purpose, aesthetics, buildability or environmental impact. By applying these principles, it may be possible to make decisions at the design stage, which will avoid or reduce risks during construction work. In many cases, the large number of design considerations will allow a number of equally valid design solutions. What is important is the approach to the solutions of design problems. This should involve a proper exercise of judgement, which takes account of health and safety issues.

5.3 Hierarchy of Risk Control

5.3.1 Designers shall need, so far as reasonably practicable, to avoid or reduce risks by applying a series of steps known as the hierarchy of risk control or principles of prevention and protection. The steps to be adopted shall include the following:

- i) consider if the hazard can be prevented from arising so that the risk can be avoided (e.g., alter the design to avoid the risk);
- ii) if this cannot be achieved, the risk should be combated at source (e.g., ensure the design details of items to be lifted include attachment points for lifting);
- iii) failing this, priority should be given to measures to control the risk that will protect all people;
- iv) only as a last resort should measures to control risk by means of personal protection be assumed (e.g., use of safety harnesses).

5.4 Duty to provide health and safety risks in the drawing itself

5.4.1 In case of situations where the designers have carried out the design work and concluded that there are risks, which are not reasonably practicable to avoid, detailed information shall be given about the health and safety risks, which remain. This information needs to be included with the design to alert others to the risks, which they cannot reasonably be expected to know. This is essential for the parties who have to use the design information.

5.4.2 If the designers' basic design assumptions affect health or safety, or health and safety risks are not obvious from the standard design document, the designer shall provide additional information. The information shall include a broad indication of the assumptions about the precautions for dealing with the risks. The information will need to be conveyed in a clear manner; it shall be included on drawings, in written specifications or outline method statements. The level of detail to be recorded will be determined by the nature of the hazards involved and the associated level of risk.

5.5 Employer's approval

5.5.1 Every structure like scaffold, false work, launching girder, earth retaining structures etc. shall have its design calculations included in the method statements in addition to health and safety risks. Employers' designer or his approved proof check consultants as applicable as per the contract conditions shall approve all these designs.

5.6 Any non-standard structures like trestles made up of re-bars or structures which are very old, corroded, repaired for many times etc. for which no design calculations can be made accurately from any national standards, shall not be allowed to be used at sites even for short duration.

5.7 If any of the above-mentioned clauses are not adhered penalty shall be imposed depending upon the gravity of the unsafe act and or condition

6.0 CONTRACTOR SHE ORGANIZATION

- 6.1 Education and Experience
 - 6.1.1 The contractor shall appoint the required SHE personnel as prescribed in General Instruction **K-RIDE/SHE/CEO/001** (enclosed at the end) based upon the statutory requirement and establish the safety organization based upon the contract value. The minimum educational qualification and the work experience are given in General Instruction **K-RIDE/SHE/CEO/002**
 - 6.1.2 In order to effectively interact on labour welfare matters with the Employer and the statutory authorities enforcing the labour welfare legislations every contractor shall employ a full time Labour Welfare Officer duly qualified and experienced as per clause 6.1.1.
- 6.2 Conduct and Competency
 - 6.2.1 The conduct and functioning of the contractor SHE personnel shall be monitored by the Employer. Any default or deficiency shall attract penalty as per details given under penalty clause 56.0 of this document.
 - 6.2.2 The Contractor shall ensure that all personnel are competent to perform the job assigned to them. In the event that the Contractor is unable to demonstrate the competency of any person whose activities can directly impact on the Works' SHE performance, the Employer shall remove that person from the site without any procedural formalities.
- 6.3 Approval from Employer
 - 6.3.1 The name, address, educational qualification, work experience and health condition of each personnel deployed for SHE jobs shall be submitted to the Employer in the format prescribed for the purpose for comments and approval well before the start of the work. Only on approval by the Employer these personnel are authorized to work. In case any of the SHE personnel leaves the contractor the same shall be intimated to the Employer. The contractor shall recruit new personnel and fill up the vacancy.
- 6.4 Responsibility of SHE personnel
 - 6.4.1 For all works carried out by the contractor and his sub-contractors, the responsibility of ensuring the required SHE manpower lies with the main contractor only. The minimum required manpower indicated by the Employer includes the sub-contractors' work also. It shall be the responsibility of the main contractor to provide required SHE manpower for all the works executed by all contractors. Necessary conditions shall be included in all sub-contract documents executed by the main contractor.
- 6.5 Employment status of SHE personnel
 - 6.5.1 No contractor shall engage SHE manpower from any outsourcing agencies in which case the effectiveness would be lost. All SHE manpower shall be on the payroll of the main contractor only and not on the payroll of any subcontractor or outsourcing manpower agencies etc. This condition does not apply to positions like traffic marshals who are engaged almost on a daily requirement basis.
- 6.6 Reporting of SHE personnel
 - 6.6.1 All SHE personnel are to report to the Chief SHE Manager who shall report directly to the Chief Project Manager. The Employer shall monitor adherence to this procedure at all times. In case of non-adherence penalty shall be levied as indicated in the penalty clause.
- 6.7 Inadequate SHE personnel
 - 6.7.1 In case if the contractor fails to provide the minimum required manpower as illustrated in General Instruction K-RIDE/SHE/CEO/001 or fail to fill up vacancies created within 14 days, the same shall be provided by the Employer at contractor's cost. Any administrative expenses involved, providing the same like paper advertisement or manpower consultant charges, etc. shall also be at the cost of contractor.
- 6.8 Prohibition of performance of other duties
 - 6.8.1 As per Schedule VIII of BOCWR no SHE personnel shall be required or permitted to do any work which is unconnected to, inconsistent with or detrimental to the performance of the SHE duties for respective category mentioned in General Information **K-RIDE/SHE/CEO/001**.
- 6.9 Facilities to be provided to SHE personnel

- 6.9.1 As per schedule VIII of BOCWR, the contractor shall provide all SHE personnel with such facilities, equipment and information that are necessary to enable him to dispatch his duties effectively
- 6.9.2 The minimum Employer's requirements of such facilities / equipment's to be provided for SHE personnel are given in the General Instruction **K-RIDE/SHE/CEO/003**

7.0 CONTRACTOR SHE COMMITTEE

7.1 All employees should be able to participate in the making and monitoring of arrangements for safety, industrial health and environment at their place of work. The establishment of site SHE committees in which employees and Contractor and sub-contractor management are represented can increase the involvement and commitment of employees. The contractor shall ensure the formation and monitor the functioning of contractor SHE committees.

7.2 Terms of Reference

7.2.1 The Terms of Reference for the committee shall be as follows;

- i) To establish company safety policies and practices
- ii) To monitor the adequacy of the contractor's site SHE plan and ensure its implementation
- iii) To review SHE training
- iv) To review the contractor's monthly SHE report.
- v) To identify probable causes of accident and unsafe practices in building or other construction work and to suggest remedial measures.
- vi) To stimulate interest of Employer and building workers in safety by organizing safety week, safety competition, talks and film-shows on safety, preparing posters or taking similar other measures as and when required or as necessary.
- vii) To go round the construction site with a view to check unsafe practices and detect unsafe conditions and to recommend remedial measures for their rectifications including first-aid medical and welfare facilities.
- viii) Committee team members should perform a site inspection before every committee meeting and to monitor SHE inspection reports.
- ix) To bring to the notice of the Employer the hazards associated with use, handling and maintenance of the equipment used during the course of building and other construction work
- x) To suggest measures for improving welfare amenities in the construction site and other miscellaneous aspect of safety, health and welfare in building or other construction work.
- xi) To look into the health hazards associated with handling different types of explosives, chemicals and other construction materials and to suggest remedial measures including personal protective equipment.
- xii) To review the last safety committee meeting minutes and to take action against persons/sub-contractors for non-compliance if any.

7.3 Within 14 days of award of contract, the SHE committee shall be constituted and notification regarding the same shall be communicated to the members and employees as per the format provided in **Form No SF 001**

7.4 Site SHE Committee meeting shall be conducted at least once in a **month** with the minimum members listed below:

Chairman	Project Manager
Secretary	SHE Manager (In-charge)
Members	i) Labour Welfare Officer ii) In charge of plant and machinery

	<ul style="list-style-type: none"> iii) In charge of site electricians iv) In charge of stores. v) Senior Managers/ Engineers heading different sub functions. vi) Sub – contractor’s representative vii) Labour Contractor’s representative viii) Workers’ representative ix) Co-contractor representative. x) SHE staffs
Employer’s Representatives	K-RIDE SHE in charge and other representatives

7.5 Construction SHE Committee meeting shall be conducted at least once in a **week** with the minimum members listed below:

7.6	Chairman	Project Manager
7.6.1	Secretary	SHE Manager (In-charge)
	Members	<ul style="list-style-type: none"> i) Labour Welfare Officer ii) In charge of plant and machinery iii) In-charge of site electricity iv) Senior Managers / Engineers heading different sub functions v) Sub- Contractor’s representative vi) Labour contractor’s representative vii) Workers’ representatives viii) All SHE Staffs

common provision of security, lighting, toilet, drinking water etc. and sharing the maintenance cost of the same etc.

7.6.2 The general principle for sharing the cost shall be either based on the contract value of works executed at the contiguous area or the daily average number of workmen employed by each contractor in the contiguous area.

7.7 Minimum time between two monthly SHE Committee meetings

7.7.1 A minimum period of **21** days shall be maintained between any two SHE monthly committee meetings.

7.8 Agenda

7.8.1 The Secretary shall circulate the agenda of the meeting at least seven working days in advance of the scheduled date of the meeting to all members.

7.8.2 The agenda should broadly cover the following:

- i) Confirmation of minutes
- ii) Chairman’s review/overview of site SHE performance / condition
- iii) Previous month SHE statistics
- iv) Incident and Accident Investigation / dangerous occurrence / near miss report
- v) Site SHE inspection
- vi) Sub-contractors’ SHE issues
- vii) Safety presentation by Members
- viii) Report from Employer
- ix) Matters arising
- x) Any other business

7.9 Minutes of the meeting

7.9.1 The Minutes of the meeting shall be prepared as per the format provided at **Form No SF 002** and sent to all members within 2 working days preferably by mail/fax followed by hardcopy. Safety Committee meeting minutes shall also be displayed in the notice board for wider publicity to all concerned.

7.10 Disciplinary Action

7.10.1 The chairman shall inform the members of any outstanding issues in the meeting and in case of repeated offence/ non-compliance by some members or other co/sub-contractors and propose suitable disciplinary action including provisions of monetary penalty as per the relevant contract clauses, the Employer shall ensure that the same is implemented.

8.0 ID CARD AND FIRST DAY AT WORK, SHE ORIENTATION TRAINING

8.1 The Contractor shall ensure that all personnel working at the site receive an induction SHE training explaining the nature of the work, the hazards that may be encountered during the site work and the particular hazards attached to their own function within the operation. The training shall cover the contents as given in the General Instruction **K-RIDE/SHE/CEO/004**.

8.2 All personnel shall be issued a photo identity card of size 85mm x 55mm duly signed by the authorized representative of the contractor before they are engaged for any work as per the format given in the General Instruction **K-RIDE/SHE/CEO/005**

8.3 Contractor shall also issue personnel SHE handbook in a language known to the workers, which provides information on SHE and emergency procedures that all personnel working on contract are required to know and the need to follow. Contractor shall ensure that this is distributed and its content introduced to all personnel working at the site.

9.0 SHE TRAINING

9.1 The behavior of people at all levels of the contractor is critical for SHE performance.

9.2 The contractor shall organize quality SHE training to engage Managers, supervisors and other personnel in behavioral change and improve safety performance.

9.3 The Contractor shall analyze the training requirements for all the employees and initiate a training program to demonstrate that all persons employed, including subcontractors, are suitably qualified, competent and fit. This will include:

- i) Detailed Job descriptions for all personnel, to include their specific SHE responsibilities
- ii) Specification of qualifications, competency and training requirements for all personnel
- iii) Assessment and recording of training needs for all personnel, including subcontractors' employees in the workforce, vendor representatives and site visitors
- iv) A system for assessing new hirers e.g. previous training
- v) A means of confirming that the system is effective
- vi) A matrix and schedule of training requirements, covering general, task-specific and SHE-related training, showing the training frequency and interval between refresher courses
- vii) Timely, competent delivery of training courses

9.4 The contractor shall arrange behavioral-based training programs for all the executives to identify recognize and eliminate unsafe act and unsafe conditions.

9.5 The minimum Employer's requirement of training needs for various categories of employees are given in general instruction **K-RIDE/SHE/CEO/006**

9.6 The contents of SHE training to Managers/Supervisors as given in general instruction **K-RIDE/SHE/CEO/007** shall be conducted.

9.7 The refresher-training program to all employees shall be conducted once in six months.

- 9.8 Toolbox talk as given in the Employer's Project SHE manual shall be conducted to all high-risk workmen every day.
- 9.9 On-the spot practical skill development training on height safety including scaffold safety, crane safety, welding safety, electrical safety, traffic safety for marshals shall also be conducted to all foremen/workmen who were associated to the concerned jobs.
- 9.10 Every employee including workman shall take safety Oath daily without fail.
- 9.11 All vehicle drivers including heavy vehicle operators shall be trained on defensive driving at Central Training Institute KSRTC, Shanthinagar Bangalore, or any other driving institute registered under Motor Vehicles Act.
- 9.12 All the above listed training programs except at clause 9.11 shall be organized by the contractor only after taking approval from the Employer for the training faculty / organization, content and durations.
- 9.13 In case of failure on the part of the contractor to provide all the above-mentioned training programs to all employees in time, the same shall be provided by the Employer through accredited agencies if required by formulating a common scheme to all contractors. Any administrative expenses and training fee towards the same shall be at the cost of the contractor.

10.0 SHE INSPECTION

- 10.1 The contractor shall evolve and administer a system of conducting SHE inspections and other risk management analysis on a periodical basis.
- 10.2 The purpose of SHE inspection is to identify any variation in construction activities and operations, machineries, plant and equipment and processes against the SHE Plan and its supplementary procedures and programs.
- 10.3 Following SHE inspections program shall be adopted.
- i. Planned General Inspection
 - ii. Routine Inspection
 - iii. Specific Inspection
 - iv. Other Inspection
- 10.3.1 Planned General Inspection
- 10.3.1.1 Planned general inspections are performed at predetermined intervals and it usually involves the representation from both Contractor and the Employer.
- 10.3.1.2 Inspections that will be classified under this inspection program are:
- i) Monthly contractor and sub-contractors site safety committee Inspection.
 - ii) Weekly safety inspection by construction supervisors (Contractors and Sub-contractors).
 - iii) Daily safety inspection by contractor site SHE team.
- 10.3.2 Routine Inspection
- 10.3.2.1 Routine inspections are often referring to the inspection of work site, equipment and temporary structures performed by site and equipment operators and temporary structure erectors.
- Inspections that will be classified under this inspection program are:
- i) Daily Inspection of plant and equipment by operator
 - ii) Weekly Inspection of scaffold by scaffolding supervisor
 - iii) Monthly Inspection of electrical hand tools by competent electrical supervisor
 - iv) Quarterly Inspection of temporary electrical systems by competent electrical supervisor

- v) Half-yearly inspection of lifting machinery, lifting appliances, equipment and gears by Govt. approved competent person.

10.3.2.2 The list mentioned above is not exhaustive. Contractor may add additional categories. Contractors' Site SHE Manager will ensure that a system of routine inspections are carried out periodically to all plants, equipment, powered tools and any other temporary structures that will pose a hazard to operators and workmen.

10.3.3 Specific Inspection

10.3.3.1 Specific inspections are performed on activities without a predetermined date. Competent supervisors usually perform inspections for ensuring an activity whether it is executed in accordance to a general set of rules; method statement submitted or developed procedures.

The following are examples that will be commonly performed as required on the construction site:

- i) Inspection performed before a heavy lifting operation.
- ii) Inspection performed *before and after the entry of person into a confined space*.
- iii) Inspection performed before and after a welding and gas cutting operation.
- iv) Inspection of formwork before concreting by formwork erector.

The list mentioned above is not exhaustive. The contractor shall ensure that a competent supervisor inspects all high-risk processes and activities.

10.3.4 Other Inspection

Other inspections include the following:

- i) Mandatory Inspections by Labour Department of Government.
- ii) K-RIDE site SHE management team

10.3.5 The contractor shall prepare all required safety inspection checklist for all activity operations and equipment. Checklists will be prepared based on the Indian standards, rules and regulations and Employer's requirements. The formats provided in the Project SHE manual may be referred.

10.3.6 All inspection records and reports will be properly kept and filed for audit purpose. Inspection reports of Planned General Inspection and Routine Inspection will be used for discussion during Safety Committee Meetings.

11.0 SHE AUDIT

11.1 GENERAL

11.1.1 The purpose and scope of SHE audit is to assess potential risk, liabilities and the degree of compliance of construction Safety, Health and Environmental plan and its supplementary procedures and programs against applicable and current SHE legalisation regulations and requirements of the employer.

11.1.2 Project Manager holds the ultimate responsibility in ensuring implementation of SHE audit program during the construction work.

11.2 Monthly Audit Rating Score (MARS)

11.2.1 Monthly Audit Rating Score (MARS) will be performed once in a month. A team consisting of Project manager and Employer representative based on the pre-designed score-rating format will conduct it. The details of the pre-designed monthly audit score rating formats are given in the Project SHE manual.

11.2.2 This Monthly SHE Audit Rating Score (MARS) report will enable the Employer to evaluate the general compliance by the Contractor with the Conditions of Contract, the Employer's Project SHE Manual and the Contractor's site specific SHE Plan.

11.2.3 Monthly Audits will be conducted in accordance with K-RIDE Guidelines. The Project Manager accompanied by the Employer's representatives shall carry out the Audit. The Contractor's senior manager and SHE in-charge should also be invited to attend.

11.2.4 Timing

The Monthly Audit Rating Score (MARS) should be conducted at least 7 days prior to the scheduled date of Monthly SHE Committee meeting.

11.2.5 Evaluation

11.2.5.1 The numerical scoring has been weighed on a 1-10 scale. The audit team will use their observations noted in evaluating the points to be awarded against each of the elements of the audited section. Wherever some topics and sub-topics are not applicable the score rating need not be given. The overall audit ratings shall be achieved by:

$$\text{Overall Audit rating} = \frac{\text{Actual Score Achieved}}{\text{Maximum Possible Score}} \times 100$$

Maximum Possible Score

11.2.5.2 The criticality of the required actions for the respective sections of the Audit will be classified as:

Sl. No.	Score	Description	Action
1	< 60%	Immediate	Require Contractor to rectify within 24 hours
2	< 75%	Improvement Necessary	Contractor rectification within 7 days and confirmed in writing to Employer
3	< 90%	Improvement Desirable	Contractor rectification within one month and confirmed in writing to Employer

11.2.6 Report

A copy of each Audit Report will be sent to Employer and to all subcontractors, with whom it will then be discussed in detail at the Monthly SHE Committee Meeting in order to ensure that any corrective actions are agreed upon.

11.3 Monthly Electrical Safety Audit

11.3.1 A team comprising of contractor's senior SHE (Electrical) engineer and Employer's representative shall conduct monthly electrical safety audit covering the following and submit the report to Employer.

- i) Electrical accidents investigation findings and remedy
- ii) Adequacy of power generation and power requirements
- iii) Power distribution and transmission system in place
- iv) Updated electrical single line diagram showing the current condition of power source and distribution including the IP44 DBs arrangement.
- v) Electrical protection devices – selection, installation and maintenance.
- vi) Earth or ground connection and earth pit maintenance details
- vii) Education and training of electrical personnel undertaken
- viii) Routine electrical inspection details
- ix) Electrical maintenance system and register.
- x) Name plate details of major electrical equipment
- xi) Classified zones in the site, if any.

11.4 External SHE audits

11.4.1 External SHE audits are to be conducted by external agencies that are competent with ISO qualified auditors with the prior approval of the Employer.

11.4.2 Areas of competence of Audit team

- 11.4.2.1 Practical understanding of BOCW Act and Rules, statutory requirements on health/medical and welfare of workmen, construction hazards and its prevention and control, traffic management, electrical safety, rigging, safety of construction equipment and environment management.
- 11.4.2.2 Audit shall be conducted as per the guidelines of ISO, ILO, and national standards. Audit report shall also be presented as per the above formats.
- 11.4.3** External SHE audit shall be conducted on a quarterly basis throughout the currency of the contract.
- 11.4.4** Targets of SHE Audit:
 The contents and coverage of the external audit shall include the following items
- 11.4.4.1 SHE management
- i) Organization
 - ii) Communication and Motivation
 - iii) Time office
 - iv) Inspection
 - v) Emergency preparedness
 - vi) Budget allocation
 - vii) Education and Training
 - viii) Work permit system
- 11.4.4.2 Technical
- i) Building and Structure
 - ii) Construction operational safety
 - iii) Material safety
 - iv) Hand tools and Power tools
 - v) Electrical system
 - vi) Safety Appliances
 - vii) Fire prevention and control
 - viii) Housekeeping
 - ix) Maintenance and Machinery safety
 - x) First-aid and Medical Facilities
 - xi) Welfare measures
 - xii) Environmental Management
- 11.4.5 Audit Documents
- 11.4.5.1 Contractor shall make the below listed documents available for the review by the Audit team.
- i) SHE policy
 - ii) SHE manual
 - iii) SHE Rules and Regulation
 - iv) SHE organization chart
 - v) Annual SHE objectives / programs
 - vi) Accident / near miss statistics and analysis
 - vii) SHE Training program / records for all personnel
 - viii) Operating manuals and maintenance manual of all equipment's
 - ix) Safe worthiness certificates of all lifting appliances and gears
 - x) Medical fitness record for all personnel
 - xi) Risk identification, assessment and control details
 - xii) Environmental management reports
 - xiii) Emergency management records including mock drill
- 11.4.6 Audit Preparation
- i) Audit team members are required to gather information by observations through interviews and by checks of hardware and documentation.

- ii) Audit team shall prepare checklist to cover all parts based on SHE legislations rules and regulations and K-RIDE requirements.
- iii) Audit team members shall verify the facts and findings leading to the identified gaps and weakness.
- iv) Audit leader has overall responsibility for reaching a conclusion.

11.4.7 Reporting

11.4.7.1 Audit report shall be prepared and directly sent to the Employer within 7 days of conducting the audit with a copy to the contractor.

11.4.8 Report contents

- i) Executing summary - based on the finalized checklists as written the findings to the Employer by the audit team members, the audit leader will compile a concise and accurate summary of observations and findings.
- ii) Introduction - this will contain basic information regarding the facilities or organization audited, the specific audit dates (inclusion of those for preparation and post-audit activities).
- iii) Principal positive findings - This will contain the summary of positive aspects as observed by the auditors. It will also contain highlights of those issue, which may warrant dissemination as best practice regarding methodology used or achievement.
- iv) Audit Findings - All audit findings as detailed in the audit checklists shall be grouped together as priority 1 and 2 as detailed below in a separate listing.
 - a) Priority 1: Actions to rectify gaps or weakness should generally be implemented within 2 – weeks, if risk potential is high or unacceptable.
 - b) Priority 2: Actions should be generally implemented or rectified with a maximum of 3 – 4 weeks, if not rectified would create a likelihood of minor injury or business loss.

11.4.9 Conformity Report & Action by Employer

11.4.9.1 The auditor shall inspect the site after 14 days of conducting initial audit for checking the adequacy of implementation of items maintained under priority 1 by the contractor and shall submit a conformity / non-conformity report to the Employer with a copy to the contractor.

11.4.9.2 The auditor shall again inspect after 28 days of conducting initial audit for checking the adequacy of implementation of items mentioned under priority 2 by the contractor and shall submit a conformity / non-conformity report to the Employer with a copy to the contractor.

11.4.9.3 In case of non-conformity of items mentioned by auditor, the Employer shall take necessary steps including stoppage of work and or imposing any penalty for getting the item implemented.

11.4.10 Failure of contractor to conduct External SHE Audit

11.4.10.1 If the contractor fails to conduct the external SHE audit in time, the Employer at the cost of contractor shall get it done.

12.0 SHE COMMUNICATION

12.1 The contractor shall take every effort to communicate the Safety, Occupational health and Environment management measures through posters campaigns / billboards / banners / glow signs being displayed around the work site as part of the effort to rise safety awareness amongst to the work force. Posters should be in Hindi, English and other suitable language deemed appropriate. Posters / billboards / banners/ glow signs should be changed at least once in a month to maintain the impact.

12.2 The list indicated are the minimum requirements of the Employer and the contractor is encouraged to further the SHE communication activities by formulating suitable reward schemes for safety performers and any other activities, which deem fit for the purpose.

13.0 SHE SUBMITTALS TO THE EMPLOYER

- 13.1 The contractor's SHE management should send the following reports to the Employer periodically:
- i) Daily Reporting of total no of workmen (as given in Clause 13.2)
 - ii) Monthly SHE Report (as given in Clause 13.3)
 - iii) SHE Committee Meeting Minutes (as given in Clause 7.9.1)
 - iv) SHE Inspection Reports
 - v) SHE Audit Reports
 - a) Monthly Audit Rating Score (MARS) report
 - b) External SHE Audit
 - c) Electrical Safety Audit
 - vi) Air and Noise Quality monitoring report
- 13.2 Daily Reporting of total number of workmen
- 13.2.1 The contractor shall report to the Employer the total number of workmen engaged by all including any subcontractor within 2 hours of starting of any shift in any day. This reporting shall be the primary duty of the Chief SHE Manager of the contractor and reporting shall be through tele-fax / email. The onus of checking the receipt of the same by the Employer lies with the contractor. If the information is not received or received more than 2 hours after starting of the shift, penalty shall be levied as per relevant clause.
- 13.3 Monthly SHE Report
- 13.3.1 The contractor shall prepare a monthly SHE report consisting of the following and submit 3 copies within 7th of next month to the Employer as specified in the Project SHE manual.
- i) Monthly man-hour details as specified in the Project SHE manual
 - ii) Monthly accident / incident details as specified in the Project SHE manual
 - iii) SHE committee details
 - iv) Details of SHE training conducted in the month
 - v) SHE Inspection
 - vi) SHE internal audit details like electrical audit etc.
 - vii) SHE Communication activities under taken in the month indicating the number of posters displayed and balance availability in stock.
 - viii) Air quality / Noise monitoring details
 - ix) Toolbox talks details
 - x) PPE details: Quantity purchased, issued to the workmen and stock available.
 - xi) Details on IP 44 panel boards, lighting poles, welding and cutting equipments, Ladders, Hoists, tools & tackles.
 - xii) Monthly Lux meter study results
 - xiii) Housekeeping
 - xiv) Barricade maintenance details
 - xv) No of critical excavations
 - xvi) Health & Welfare activities
 - xvii) Safety walk conducted by Contractors' Project Manager in the month
 - xviii) SHE Activities Planned for next month

14.0 ACCIDENT REPORTING AND INVESTIGATION

- 14.1 Reporting to Employer
- 14.1.1 All accidents and dangerous occurrences shall immediately be informed verbally to the Employer. This will enable the Employer to reach to the scene of accident / dangerous occurrences to monitor/assist any rescue work and/or start conducting the investigation process so that the evidences are not lost.
- 14.1.2 Reports of all accidents (fatal / injury) and dangerous occurrences shall also be sent within 24 hours as per format provided in the Employer's Project SHE manual.
- 14.1.3 No accident / dangerous occurrences is exempted from reporting to the Employer.
- 14.1.4 Any willful delay in verbal and written reporting to the Employer shall be penalized as per relevant clause.
- 14.2 Reporting to Govt. organizations
- 14.2.1 In addition to the above verbal and written reporting to the Employer, as per Rule 210 of BOCWR, notice of any accident to a worker at the building or construction site that:
- a) causes loss of life; or
 - b) disables a worker from working for a period of 48 hours or more immediately following the accident;
 - c) shall forthwith be sent by telegram, telephone, fax, or similar other means including special messenger within four hours in case of fatal accidents and 72 hours in case of other accidents, to:
 - i) the Regional Labor Commissioner, wherein the contractor has registered the firm/work
 - ii) the board with which the worker involved was registered as a beneficiary;
 - iii) Director General and
 - iv) the next of kin or other relative of the worker involved in the accident;
- 14.2.2 Further, notice of accident shall be sent in respect of an accident which
- a) causes loss of life; or
 - b) disables the injured worker from work for more than 10 days to
 - i) the officer-in-charge of the nearest police station;
 - ii) the District Magistrate or, if the District Magistrate by order so desires, to
 - iii) the Sub-Divisional Magistrate
- 14.2.3 In case of an accident-causing minor injury, first-aid shall be administered and the injured worker shall be immediately transferred to a hospital or other place for medical treatment.
- 14.2.4 Where any accident-causing disablement that subsequently results in death, notice in writing of such death, shall be sent to the authorities mentioned in clause 14.2.1 and 14.2.2 above within 72 hours of such death.
- 14.2.5 Reporting of dangerous occurrences:
- 14.2.5.1 The following classes of dangerous occurrences shall be reported to the Inspector having jurisdiction, whether or not any disablement or death caused to the worker, namely:
- a) collapse or failure of lifting appliances, or hoist, or conveyors, or similar equipment for handling of building or construction material or breakage or failure of rope, chain or loose gears; or overturning of cranes used in construction work;
 - b) falling of objects from height;
 - c) collapse or subsidence of soil, tunnel, pipe lines, any wall, floor, gallery, roof or any other part of any structure, launching girder, platform, staging, scaffolding or means of access including formwork;

- d) explosion of receiver or vessel used for storage of pressure greater than atmospheric pressure, of any gas or gases or any liquid or solid used as building material;
- e) fire and explosion causing damage to any place on construction site where building workers are employed;
- f) spillage or leakage of any hazardous substance and damage to their container;
- g) collapse, capsizing, toppling or collision of transport equipment;
- h) leakage or release of harmful toxic gases at the construction site;

14.2.6 In case of failure of launching girder, lifting appliance, loose gear, hoist or building and other construction work, machinery and transport equipment at a construction site, such appliances, gear, hoist, machinery or equipment and the site of such occurrence shall, as far as practicable, be kept undisturbed until inspected by the Authorities;

14.2.7 Every notice given for fatal accidents or dangerous occurrences shall be followed by a written report to the concerned Authorities under Section 39 of BOCWA and the Director General in the specified Form XIV of BOCWR.

14.3 Accident investigation

14.3.1.1 Investigations should be conducted in an open and positive atmosphere that encourages the witnesses to talk freely. The primary objective is to ascertain the facts with a view to prevent future and possibly more serious occurrences

14.3.1.2 Accidents and Dangerous Occurrences which result in death, serious injury or serious damage must be investigated by the Contractor immediately to find out the cause of the accident/occurrence so that measures can be formulated to prevent any recurrence.

14.3.1.3 Near misses and minor accidents should also be investigated by the Contractor as soon as possible as they are signals that there are inadequacies in the safety management system.

14.3.2.1 It is important after any accident or dangerous occurrence that information relating to the incident is gathered in an organized way. The following steps shall be followed;

- a) Take photographs and make sketches
- b) Examine involved equipment, workplace or material and the environmental conditions
- c) Interview the injured, eye-witnesses and other involved parties
- d) Consult expert opinion where necessary
- e) Identify the specific contractor or sub-contractor involved.

14.3.2.2 Having gathered information; it is then necessary to make an analysis of incident

- a) Establish the chain of events leading to the accident or incident
- b) Find out at what stage the accident took place
- c) Consider all possible causes and the interaction of different factors that led up to the accident and identify the most probable cause. The cause of an accident should never be classified as carelessness. The specific act or omission that caused the accident must be identified.

14.3.2.3 The next stage is to proceed with the follow-up action

- a) Report on the findings and conclusions
- b) Formulate preventive measures to avoid recurrence
- c) Publicise the findings and the remedial actions taken

14.4.1 In case of fatal / dangerous occurrence the Employer shall also

14.4 Employers' independent incident investigation

conduct independent investigation. Contractor and his staff shall extend necessary co-operation and testify about the accident.

14.4.2 The contractor shall take every effort to preserve the scene of accident till the Employer completes the investigation.

14.4.3 All persons summoned by the Employer in connection to witness recording shall obey the instructions without delay. Any willful suppression of information by any person shall be removed from the site immediately and / or punishable as per relevant penalty clause.

15.0 EMERGENCY PREPAREDNESS PLAN

15.1 The Contractor shall prepare as required under Rule 36 of BOCWR, an Emergency Response Plan for all work sites as a part of the Contractor SHE Plan. The plan shall integrate the emergency response plans of the Contractor and all other subcontractors. The Emergency Response Plan shall be submitted for approval to the Director General. It shall detail the Contractor's procedures, including detailed communications arrangements, for dealing with all emergencies that could affect the Site. This includes where applicable, injury, sickness, evacuation, fire, chemical spillage, severe weather and rescue.

15.2 The contractor shall ensure that an Emergency Response Plan is prepared to deal with emergencies arising out of:

- i) Fire and explosion
- ii) Collapse of lifting appliances and transport equipment
- iii) Collapse of building, sheds or structure etc.
- iv) Gas leakage or spillage of dangerous goods or chemicals
- v) Bomb threatening, Criminal or Terrorist attack
- vi) Drowning of workers
- vii) Landslides getting workers buried floods, Earthquake, storms and other natural calamities.

15.3 Arrangements shall be made for emergency medical treatment and evacuation of the victim in the event of an accident or dangerous incident occurring, the chain of command and the responsible persons of the contractor with their telephone numbers and addresses for quick communication shall be adequately publicized and conspicuously displayed in the workplace.

15.4 Contractors shall require to tie-up with the hospitals and fire stations located in the neighborhood for attending to the casualties promptly and emergency vehicle kept on standby duty during the working hours for the purpose.

15.5 Contractor shall conduct an onsite emergency mock drill once in every month for all his workers and his subcontractor's workers.

15.6 It shall be the responsibility of the contractor to keep the Local Law & Order Authorities informed and seek urgent help, as the case may be, so as to mitigate the consequences of an emergency. Prompt communication to K-RIDE, telephonically initially and followed by a written report, shall be made by the contractor.

16.0 EXPERTS/AGENCIES FOR SHE SERVICES

16.1 Contractors may utilise the services of experts/agencies empanelled under Rule 250 of BOCWR for the purpose of training, internal audit and any other SHE services with prior approval of the Employer.

16.2 As an aide to contractors, a list of experts/agencies and the offered service are given in General Instruction **K-RIDE/SHE/CEO/010** for ready reference. In addition to it if the contractor would like to use any expert/agencies' services for any SHE activities the same can also be allowed provided that they are competent and meet to the general requirements of Employer. In every case prior approval of the Employer is mandatory.

PART – II SAFETY

17.0 HOUSEKEEPING

- 17.1 Housekeeping is the act of keeping the working environment cleared of all unnecessary waste, thereby providing a first-line of defense against accidents and injuries.
- 17.2 Contractor shall understand and accept that improper housekeeping is the primary hazard in any construction site and ensure that a high degree of housekeeping is always maintained. Indeed "Cleanliness is indeed next to Godliness"
- 17.3 Housekeeping is the responsibility of all site personnel, and line management commitment shall be demonstrated by the continued efforts of supervising staff towards this activity.
- 17.4 General Housekeeping shall be carried out by the contractor and ensured at all times at Work Site, Construction Depot, Batching Plant, Labour Camp, Stores, Offices and toilets/urinals. Towards this the Contractor shall constitute a special group of housekeeping personnel as per General Instruction **K-RIDE/SHE/CEO/001**. This group shall ensure daily cleaning at work sites and surrounding areas and maintain a register as per the approved format by the Employer.
- 17.5 Adequate time shall be assigned to ensure that good housekeeping is maintained. Team of housekeeping squad shall carry out this.
- 17.6 The contractor shall be responsible to provide segregated containers for disposal of debris at required places and regular cleaning of the same.
- 17.7 Full height fence, barriers, barricades etc. shall be erected around the site in order to prevent the surrounding area from excavated soil, rubbish etc., which may cause inconvenience to and endanger the public. The barricade especially those exposed to public shall be aesthetically maintained by regular cleaning and painting as directed by the Employer. These shall be maintained in one line and level.
- 17.8 The structure dimension of the barricade, material and composition, its colour scheme, K-RIDE logo and other details shall be in accordance with specifications laid down in tender document.
- 17.9 All stairways, passageways and gangways shall be maintained without any blockages or obstructions. All emergency exits passageways, exits fire doors, break-glass alarm points, fire fighting equipment, first aid stations, and other emergency stations shall be kept clean, unobstructed and in good working order.
- 17.10 Lumber with protruding nails shall be bent or removed and properly stacked.
- 17.11 All surplus earth and debris are removed/disposed of from the working areas to officially designated dumpsites. Trucks carrying sand, earth and any pulverized materials etc. in order to avoid dust or odour impact shall be covered while moving.
- The tyres of the trucks leaving the site shall be cleaned with water, wherever the possibility of spillage on carriageways meant for regular road traffic exists.**
- 17.12 No parking of trucks/trolleys, cranes and trailers etc. shall be allowed on roads, which may obstruct the traffic movement.
- 17.13 Roads shall be kept clear and materials like: pipes, steel, sand boulders, concrete, chips and brick etc. shall not be allowed on the roads to obstruct free movement of road traffic.
- 17.14 Water logging or bentonite spillage on roads shall not be allowed. If bentonite spillage is observed on road endangering the safety of road users, the contractor shall be penalized as per relevant clause.
- 17.15 Proper and safe stacking of material are of paramount importance at yards, stores and such locations where material would be unloaded for future use. The storage area shall be well laid out with easy access and material stored / stacked in an orderly and safe manner.
- 17.16 Flammable chemicals / compressed gas cylinders shall be safely stored.
- 17.17 Unused/surplus cables, steel items and steel scrap lying scattered at different places within the working areas shall be removed to identified locations(s).
- 17.18 All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from work place to identified location(s).
- 17.19 Empty cement bags and other packaging material shall be properly stacked and removed.

17.20 The Contractor shall ensure that all his sub-contractors maintain the site reasonably clean through provisions related to house keeping

18.0 WORKING AT HEIGHT

18.1 Definitions

18.1.1 "Access" and "egress" include ascent and descent.

18.1.2 "Fragile surface" means a surface, which would be able to fail if any reasonably foreseeable loading were to be applied to it.

18.1.3 "Line" includes rope, chain or webbing

18.1.4 "Personal fall protection" means -

- a) a fall prevention, work restraint, work positioning, fall arrest or rescue system, other than a system in which the only safeguards are collective safeguards; or
- b) Rope access and positioning techniques;

18.1.5 "Work at height" means -

- a) Work in any place, including a place at or below ground level;
- b) Obtaining access to or egress from such place while at work, except by a staircase in a permanent workplace,
Where, if protective measures were not taken, a person could fall a distance liable to cause personal injury;

18.1.6 "Work equipment" means any machinery, appliance, apparatus, tool or installation for use at work (whether exclusively or not) and includes

- a) A guard-rail, toe-board, barrier or similar collective means of protection
- b) A working platform
- c) A net, airbag or other collective safe guard for arresting falls.
- d) Personal fall protection system
- e) Ladders

18.1.7 "Working platform"

- a) means any platform used as a place of work or as a means of access to or egress from a place of work;
- b) Includes any scaffold, suspended scaffold, cradle, mobile platforms, trestle, gangway, gantry and stairway which is so used

18.2 Organisation and planning

The contractor shall ensure that work at height is

- i) properly planned for any emergencies and rescue
- ii) appropriately supervised; and
- iii) Carried out in a manner, which is reasonably practicable safe.

18.3 The contractor shall ensure that work at height is carried out only when the weather conditions do not jeopardize the health or safety of persons involved in the work.

18.4 Competence

The contractor shall ensure that no person engages in any activity, including organization, planning and supervision, in relation to work at height or work equipment for use in such work unless he is competent to do so or, if being trained, is being supervised by a competent person.

18.5 Avoidance of risks from work at height

The contractor shall ensure that work is not carried out at height where it is reasonably practicable to carry out the work safely otherwise than at height.

18.6 Where work is carried out at height, the contractor shall take suitable and sufficient measures as given below to prevent, so far as is reasonably practicable, any person **falling a distance liable to cause personal injury**.

- a) His ensuring that the work is carried out
 - i) from an existing place of work; or
 - ii) (in the case of obtaining access or egress) using an existing means, complying to the requirements as given in clause **18.15**.

Where it is reasonably practicable to carry it out safely and under appropriate ergonomic conditions; and

- b) where it is not reasonably practicable for the work to be carried out in accordance with subparagraph (a), his providing sufficient work equipment for preventing, so far as is reasonably practicable, a fall occurring.

18.7 Where the measures taken under clause **18.6** do not eliminate the risk of a fall occurring, every contractor shall

- a) so far as is reasonably practicable, provide sufficient work equipment to minimize -
 - i) the distance and consequences; or
 - ii) where it is not reasonably practicable to minimize the distance, the consequences, of a fall; and
- b) Without prejudice to the generality of clause **18.4** provide such additional training and instruction or take other additional suitable and sufficient measures to prevent, so far as is reasonably practicable, any person falling a distance liable to cause personal injury.

18.8 Selection of 'work equipment' for work at height

- 1) The contractor, in selecting work equipment for use in work at height, shall
 - a) give collective protection measures priority over personal protection measures; and
 - b) take account of
 - i) the working conditions and the risks to the safety of persons at the place where the work equipment is to be used;
 - ii) in the case of work equipment for access and egress, the distance to be negotiated;
 - iii) the distance and consequences of a potential fall;
 - iv) the duration and frequency of use;
 - v) the need for easy and timely evacuation and rescue in an emergency; and
 - vi) any additional risk posed by the use, installation or removal of that work equipment or by evacuation and rescue from it;
- 2) The contractor shall select work equipment for work at height which:
 - a) Has characteristics including dimensions which:
 - i) are appropriate to the nature of the work to be performed and the foreseeable loadings; and
 - ii) allow passage without risk; and
 - b) Is in other respects the most suitable work equipment, having regard in particular to the purposes specified in **18.5** and **18.6**.

- 18.9 Fragile surfaces
- 18.9.1 The contractor shall ensure that no person at work passes across or near, or working on, from or near, a fragile surface where it is reasonably practicable to carry out work safely and under appropriate ergonomic conditions without his doing so.
- 18.9.2 Where it is not reasonably practicable to carry out work safely and under appropriate ergonomic conditions without passing across or near, or working on, from or near, a fragile surface, every contractor shall,
- a) ensure, so far as is reasonably practicable, that suitable and sufficient platforms, coverings, guard rails or similar means of support or protection are provided and used so that any foreseeable loading is supported by such supports or borne by such protection;
 - b) Where a risk of a person at work falling remains despite the measures taken under the preceding provisions of this regulation, take suitable and sufficient measures to minimize the distances and consequences of his fall.
- 18.9.3 Where any person at work may pass across or near, or work on, from or near, a fragile surface, every contractor shall ensure that
- a) prominent warning notices are so far as is reasonably practicable affixed at the approach to the place where the fragile surface is situated; or
 - b) Where that is not reasonably practicable, such persons are made aware of it by other means.
- 18.10 Falling objects
- 18.10.1 The contractor shall, where necessary to prevent injury to any person, take suitable and sufficient steps to prevent, so far as is reasonably practicable, the fall of any material or object.
- 18.10.2 Where it is not reasonably practicable to comply with the requirements of **18.9**, every contractor shall take suitable and sufficient steps to prevent any person being struck by any falling material or object which is liable to cause personal injury.
- 18.10.3 The contractor shall ensure that no material or object is thrown or tipped from height in circumstances where it is liable to cause injury to any person.
- 18.10.4 Every employer shall ensure that materials and objects are stored in such a way as to prevent risk to any person arising from the collapse, overturning or unintended movement of such materials or objects.
- 18.11 Danger areas
- 18.11.1 Without prejudice to the preceding requirements of these Regulations, every contractor shall ensure that
- a) Where a workplace contains an area in which, owing to the nature of the work, there is a risk of any person at work
 - i) Falling a distance; or
 - ii) Being struck by a falling object,which is liable to cause personal injury, the workplace is so far as is reasonably practicable equipped with devices preventing unauthorised persons from entering such area; and
 - b) Such area is clearly indicated.
- 18.12 Inspection of work equipment
- 18.12.1 The contractor shall ensure that, where the safety of work equipment depends on how it is installed or assembled, it is not used after installation or assembly in any position unless it has been inspected in that position.
- 18.12.2 The contractor shall ensure that work equipment exposed to conditions causing deterioration which is liable to result in dangerous situations is inspected
- a) At suitable intervals; and

- b) Each time that exceptional circumstances which are liable to jeopardize the safety of the work equipment have occurred, to ensure that health and safety conditions are maintained and that any deterioration can be detected and remedied in good time.
- 18.12.3 Without prejudice to paragraph **18.12.1**, the contractor shall ensure that a working platform
- a) Used for construction work; and
 - b) From which a person could fall 2 meters or more,
- Is not used in any position unless it has been inspected in that position or, in the case of a mobile working platform, inspected on the site, within the previous 7 days.
- 18.12.4 The contractor shall ensure that the reports of all inspections are properly maintained and shown to the Employer as and when required.
- 18.12.5 In this clause "inspection",
- a) Means such visual or more rigorous inspection by a competent person as is appropriate for safety purposes;
 - b) Includes any testing appropriate for those purposes,
- 18.13 Inspection of places of work at height
- 18.13.1 The contractor shall so far as is reasonably practicable ensure that the surface and every parapet, permanent rail or other such fall protection measure of every place of work at height are checked on each occasion before the place is used.
- 18.14 Duties of persons at work
- 18.14.1 Any workmen employed by the contractor shall report to the supervisor about any defect relating to work at height which he knows is likely to endanger the safety of himself or another person.
- 18.14.2 Every workman shall use any work equipment or safety device provided to him for work at height by the contractor, in accordance with
- a) any training in the use of the work equipment or device concerned which have been received by him; and
 - b) the instructions respecting that use which have been provided to him by the contractor as per the requirements of the Employer
- 18.15 Requirements for existing places of work and means of access or egress at height Every existing place of work or means of access or egress at height shall
- a) be stable and of sufficient strength and rigidity for the purpose for which it is intended to be or is being used;
 - b) where applicable, rest on a stable, sufficiently strong surface;
 - c) be of sufficient dimensions to permit the safe passage of persons and the safe use of any plant or materials required to be used and to provide a safe working area having regard to the work to be carried out there;
 - d) possess suitable and sufficient means for preventing a fall;
 - e) possess a surface which has no gap
 - i) through which a person could fall;
 - ii) through which any material or object could fall and injure a person; or
 - iii) giving rise to other risk of injury to any person, unless measures have been taken to protect persons against such risk;
 - f) be so constructed and used, and maintained in such condition, as to prevent, so far as is reasonably practicable -

- i) the risk of slipping or tripping; or
- ii) any person being caught between it and any adjacent structure;
- g) where it has moving parts, be prevented by appropriate devices from moving inadvertently during work at height.

18.16 Requirements for guardrails, toe-boards, barriers and similar collective means of protection

- i) Unless the context otherwise requires, any reference in this section to means of protection is to a guardrail, toe-board, barrier or similar collective means of protection.
- ii) Means of protection shall
 - a) be of sufficient dimensions, of sufficient strength and rigidity for the purposes for which they are being used, and otherwise suitable;
 - b) be so placed, secured and used as to ensure, so far as is reasonably practicable, that they do not become accidentally displaced; and
 - c) be so placed as to prevent, so far as is practicable, the fall of any person, or of any material or object, from any place of work.
- iii) In relation to work at height involved in construction work
 - a) the top guard-rail or other similar means of protection shall be at least 950 millimeters above the edge from which any person is liable to fall;
 - b) toe-boards shall be suitable and sufficient to prevent the fall of any person, or any material or object, from any place of work; and
 - c) any intermediate guardrail or similar means of protection shall be positioned so that any gap between it and other means of protection does not exceed 470 millimeters.
- iv) Any structure or part of a structure which supports means of protection or to which means of protection are attached shall be of sufficient strength and suitable for the purpose of such support or attachment.

18.17 REQUIREMENTS FOR ALL WORKING PLATFORMS

- i) Every working platform requires a supporting structure for holding it
- ii) Any surface upon which any supporting structure rests shall be stable, of sufficient strength and of suitable composition safely to support the supporting structure, the working platform and any loading intended to be placed on the working platform.
- iii). Stability of supporting structure
Any supporting structure shall
 - a) be suitable and of sufficient strength and rigidity for the purpose for which it is being used;
 - b) in the case of a wheeled structure, be prevented by appropriate devices from moving inadvertently during work at height;
 - c) in other cases, be prevented from slipping by secure attachment to the bearing surface or to another structure, provision of an effective anti-slip device or by other means of equivalent effectiveness;
 - d) be stable while being erected, used and dismantled; and
 - e) when altered or modified, be so altered or modified as to ensure that it remains stable.
 - f) Have suitable base plates and properly footed thereby.
- iv). Stability of working platforms
A working platform shall

- a) be suitable and of sufficient strength and rigidity for the purpose or purposes for which it is intended to be used or is being used;
- b) be so erected and used as to ensure that its components do not become accidentally displaced so as to endanger any person;
- c) when altered or modified, be so altered or modified as to ensure that it remains stable; and
- d) be dismantled in such a way as to prevent accidental displacement.

v) Safety on working platforms

A working platform shall

- a) be of sufficient dimensions to permit the safe passage of persons and the safe use of any plant or materials required to be used and to provide a safe working area having regard to the work being carried out there;
- b) possess a suitable surface and, in particular, be so constructed that the surface of the working platform has no gap
 - i) through which a person could fall;
 - ii) through which any material or object could fall and injure a person; or
 - iii) giving rise to other risk of injury to any person, unless measures have been taken to protect persons against such risk; and
- c) be so erected and used, and maintained in such condition, as to prevent, so far as is reasonably practicable
 - i) the risk of slipping or tripping; or
 - ii) any person being caught between the working platform and any adjacent structure.

vi) Loading

A working platform and any supporting structure shall not be loaded so as to give rise to a risk of collapse or to any deformation, which could affect its safe use.

vii) Additional requirements for scaffolding

Strength and stability calculations for scaffolding shall be carried out unless

- a) a note of the calculations, covering the structural arrangements contemplated, is available; or
 - b) it is assembled in conformity with a generally recognized standard configuration.
- viii) Depending on the complexity of the scaffolding selected, a competent person shall draw up an assembly, use and dismantling plan. This may be in the form of a standard plan, supplemented by items relating to specific details of the scaffolding in question.
- ix) A copy of the plan, including any instructions it may contain, shall be kept available for the use of persons concerned in the assembly, use, dismantling or alteration of scaffolding until it has been dismantled.
- x) The dimensions form and layout of scaffolding decks shall be appropriate to the nature of the work to be performed and suitable for the loads to be carried and permit work and passage in safety.
- xi) While a scaffold is not available for use, including during its assembly, dismantling or alteration, it shall be marked with general warning signs in accordance with and be suitably delineated by physical means preventing access to the danger zone.

- xii) Scaffolding may be assembled, dismantled or significantly altered only under the supervision of a competent person and by persons who have received appropriate and specific training in the operations envisaged which addresses specific risks which the operations may entail and precautions to be taken, and more particularly in
- a) understanding of the plan for the assembly, dismantling or alteration of the scaffolding concerned;
 - b) safety during the assembly, dismantling or alteration of the scaffolding concerned;
 - c) measures to prevent the risk of persons, materials or objects falling;
 - d) safety measures in the event of changing weather conditions which could adversely affect the safety of the scaffolding concerned;
 - e) permissible loadings;
 - f) any other risks which the assembly, dismantling or alteration of the scaffolding may entail.

18.18 REQUIREMENTS FOR COLLECTIVE SAFEGUARDS FOR ARRESTING FALLS

- i) Collective safeguard area by safety net, airbag or other collective safeguard for arresting falls
- ii) A safeguard shall be used only if
 - a) a risk assessment has demonstrated that the work activity can so far as is reasonably practicable be performed safely while using it and without affecting its effectiveness;
 - b) the use of other, safer work equipment is not reasonably practicable; and
 - c) a sufficient number of available persons have received adequate training specific to the safeguard, including rescue procedures.
- iii) A safeguard shall be suitable and of sufficient strength to arrest safely the fall of any person who is liable to fall.
- iv) A safeguard shall
 - a) in the case of a safeguard which is designed to be attached, be securely attached to all the required anchors, and the anchors and the means of attachment thereto shall be suitable and of sufficient strength and stability for the purpose of safely supporting the foreseeable loading in arresting any fall and during any subsequent rescue;
 - b) in the case of an airbag, landing mat or similar safeguard, be stable; and
 - c) in the case of a safeguard, which distorts in arresting a fall, afford sufficient clearance.
- (v) Suitable and sufficient steps shall be taken to ensure, so far as practicable, that in the event of a fall by any person the safeguard does not itself cause injury to that person.

18.19 Requirements for personal fall protection systems

- i) A personal fall protection system shall be used only if
 - a) a risk assessment has demonstrated that
 - i) the work can so far as is reasonably practicable be performed safely while using that system; and
 - ii) the use of other safer work equipment is not reasonably practicable; and
 - b) the user and a sufficient number of available persons have received adequate training specific to the operations envisaged, including rescue procedures.
- ii) A personal fall protection system shall
 - a) be suitable and of sufficient strength for the purposes for which it is being used having regard to the work being carried out and any foreseeable loading;

- b) where necessary, fit the user;
 - c) be correctly fitted;
 - d) be designed to minimise injury to the user and, where necessary, be adjusted to prevent the user falling or slipping from it, should a fall occur; and
 - e) be so designed, installed and used as to prevent unplanned or uncontrolled movement of the user.
- iii) A personal fall protection system designed for use with an anchor shall be securely attached to at least one anchor, and each anchor and the means of attachment thereto shall be suitable and of sufficient strength and stability for the purpose of supporting any foreseeable loading.
 - iv) Suitable and sufficient steps shall be taken to prevent any person falling or slipping from a personal fall protection system.

18.20 Requirements for Ladders

- 1) Every contractor shall ensure that a ladder is used for work at height only if a risk assessment has demonstrated that the use of more suitable work equipment is not justified because of the low risk and
 - i) The short duration of use; or
 - ii) Existing features on site, which he cannot alter.
- 2) Only metal ladders shall be allowed. Bamboo ladders are prohibited.
- 3) Any surface upon which a ladder rests shall be stable, firm, of sufficient strength and of suitable composition safely to support the ladder so that its rungs or steps remain horizontal, and any loading intended to be placed on it.
- 4) A ladder shall be so positioned as to ensure its stability during use
- 5) A suspended ladder shall be attached in a secure manner and so that, with the exception of a flexible ladder, it cannot be displaced and swinging is prevented.
- 6) A portable ladder shall be prevented from slipping during use by -
 - i) securing the stiles at or near their upper or lower ends;
 - ii) an effective anti-slip or other effective stability device; or
 - iii) any other arrangement of equivalent effectiveness.
- 7) A ladder used for access shall be long enough to protrude sufficiently above the place of landing to which it provides access, unless other measures have been taken to ensure a firm handhold.
- 8) No interlocking or extension ladder shall be used unless its sections are prevented from moving relative to each other while in use.
- 9) A mobile ladder shall be prevented from moving before it is stepped on.
- 10) Where a ladder or run of ladders raises a vertical distance of 9 metres or more above its base, there shall, where reasonably practicable, be provided at suitable intervals sufficient safe landing areas or rest platforms.
- 11) Every ladder shall be used in such a way that
 - a) A secure handhold and secure support are always available to the user; and
 - b) The user can maintain a safe handhold when carrying a load unless, in the case of a step ladder, the maintenance of a handhold is not practicable when a load is carried, and a risk assessment has demonstrated that the use of a stepladder is justified because of

- i) the low risk; and
- ii) the short duration of use.

19.0 OVERHEAD PROTECTION

All contractors shall provide overhead protections as per Rule 41 of BOCWR

- i) Overhead protection should be erected along the periphery of every building which is under construction and the building height shall be 15m or above after construction.
- ii) Overhead protection shall be minimum 2m wide and the outer edge shall be 150mm higher than the inner edge and an angle not more than 20° to its horizontal sloping into the building.
- iii) Overhead protection shall not be erected more than a height of 5m from the base of the building.
- iv) Areas of inadvertent hazard of falling of material shall be guarded or barricaded or roped-off thereby by the contractor.

20.0 SLIPPING, TRIPPING, CUTTING, DROWNING AND FALLING HAZARDS

As per Rule 42 of BOCWR,

- i) All places should be free from dust, debris or similar materials.
- ii) Sharp projections or any protruding nails or similar objects shall be suitably guarded or shall even be avoided to make the place safe to work.
- iii) Contractor shall not allow workmen to work or use platforms, scaffolds/passageways or any walkways, which has water, or oil or similar substances spilt and has a slipping hazard, unless it is cleaned off or covered or sanded or saw dusted or make it safe with any suitable material.
- iv) When workers are exposed to areas where fall into water is possible, the contractor shall provide suitable and adequate equipment for saving the workers from drowning and rescuing from such hazard. If the Employer considers, the contractor shall provide well-equipped boat or launch, manned with trained personnel at the work place.
- v) Open side or opening where worker, equipment, vehicle or lifting appliance may fall at a building or outside shall be guarded suitably except in places of free access by reasons of nature of work.
- vi) Suitable safety net shall be provided at places of material / man falling is possible in accordance with national standards.

21.0 LIFTING APPLIANCES AND GEAR

21.1 Lifting appliances means a crane, hoist machinery, derrick, winch, gin pole, sheer legs, jack, hoist drum, slewing machinery, slewing bearing fasteners, luffing machinery sheaves, pulley blocks, hooks or other equipment used for lifting materials, objects or building workers and lifting gears means ropes, chain slings, shackles, hooks, lifting lugs, wire ropes, lifting eyebolts and eyenuts and other accessories of a lifting appliance.

21.2 No machine shall be selected to do any lifting on a specific job until its size and characteristics are considered against:

- i) the weights, dimensions and lift radii of the heaviest and largest loads
- ii) the maximum lift height, the maximum lift radius and the weight of the loads that must be handled at each
- iii) the number and frequency of lifts to be made
- iv) how long the crane will be required on site
- v) the type of lifting to be done (for example, is precision placement of loads important?)

- vi) the type of carrier required (this depends on ground conditions and machine capacity in its operating quadrants) capacity is normally greatest over the rear, less over the side, and non-existent over the front
 - vii) whether loads will have to be walked or carried
 - viii) whether loads will have to be suspended for lengthy periods
 - ix) the site conditions, including the ground where the machine will be set up, access roads and ramps it must travel, space for erection and any obstacles that might impede access or operation
- 21.3 The contractor shall ensure that a valid certificate of fitness issued as per clause **21.5** is available for all lifting appliances including synchronized mobile jacks, pre-stressing hydraulic jacks, jacks fitted with launching girders etc. and Employers approval before inducting to the site. **Only after obtaining the approval from the Employer any lifting appliances and gear shall be used.**
- 21.4 The laminated photocopies of fitness certificate issued by competent person, the Employers' approval letter, the operators' photo, manufacturer's load chart and competency certificate shall always be either kept in the operator cabin or pasted on the visible surface of the lifting appliances.
- 21.5 All lifting appliances and loose gears shall be clearly marked for its safe working load and identification by stamping or other suitable means.
- 21.6 The contractor shall also maintain a register containing a system of identification of all tools and tackles, its date of purchase, safe working load, competent person date of examination etc.
- 21.7 Test and periodical examination of lifting appliances and gears
- 21.7.1 All lifting appliances including all parts and gears thereof, whether fixed or movable shall be thoroughly tested and examined by a competent person once at least in every six months or after it has undergone any alterations or repairs liable to affect its strength or stability. Within the validity, if the lifting appliances are shifted to a new site, re-examination by the same competent person for ensuring its safety shall also be done.
- 21.7.2 Contractors can utilize the services of any competent person as defined in Factories Act, 1948 and approved by Chief Inspector of Factories with the permission of the Employer.
- 21.7.3 All alarms and signals like automatic safe load indicators (SLI), boom angle indicators, boom extension indicators, over lift boom alarm, swing alarm, hydraulic safety valves, mechanical radius indicators, load moment indicators etc. shall be periodically examined and maintained always in working condition
- 21.8 Automatic safe load indicators
- 21.8.1 As stipulated in Rule 78 of BOCWKR 2006, no lifting appliances gear or any other material handling appliance is used, if:
- i) the Inspector having jurisdiction is not satisfied with reference to a certification of test or examination or to an authenticated record maintain as provided under these rules; and
 - ii) in the view of such Inspector, the lifting appliance, lifting gear or any other material handling appliance is not safe for use in building or other construction work; and
 - iii) no pulley block is used in building or other construction work unless the safe working load and its identification are clearly marked on such block.
- 21.9 Qualification of operator of lifting appliances and of signaler etc.
- 21.9.1 The contractor shall not employ any person to drive or operate a lifting machine like crane, hydra etc. whether driven by mechanical power or otherwise or to give signals to work as an operator of a rigger or derricks unless he
- i) is above twenty-one years of age and possesses a valid heavy transport vehicle driving licence as per Motor Vehicles Act, 1988 and Rules therein.

- ii) is absolutely competent and reliable
 - iii) possesses the knowledge of the inherent risks involved in the operation of lifting appliances by undergoing a formal training at any institution of national importance acceptable to Employer
 - iv) is medically examined periodically as specified in schedule VII of BOCWR.
- 21.10 General requirements of appliances
- 21.10.1 Out-of level
- 21.10.1.1 One of the most severe effects of being out-of fit level is that side loads develop in the boom. Because of side loads all mobile cranes lose capacity rapidly as the degree of out-of-level increases and therefore
- 21.10.2 Boom
- i) The boom is one of the more critical elements of the crane and must be in perfect condition at all time. No boom section with a bent lattice member shall be allowed
 - ii) All welds shall be crack and corrosion free
 - iii) No member of the boom shall be bent
 - iv) All telescopic boom shall be free from cracks, rust, flaking or cracked paint, bulges, greases or varnishes
- 21.10.3 The sweep area (work area) of the construction machinery shall be always free from obstructions.
- 21.10.4 All hydraulic piping and fittings shall be maintained leak proof.
- 21.10.5 The operator cab shall possess good and safe:
- i) structure, windows and windshield wipers
 - ii) Drivers chair and foot rest
 - iii) Control handles
 - iv) Cab instrumentation
 - v) Telecommunication
 - vi) Cab out fitting
 - vii) wind indicator with an adjustable set point shall be in a position representative for the wind on the crane. The indicator shall give continuous information regarding constant speeds and gusts.
- 21.11 Mandatory rigging requirements
- 21.11.1 Rigging shall be done under experienced and qualified rigger only.
- 21.11.2 The primary requirement in rigging shall be to assess the weight of load before attempting any lift.
- 21.11.3 All hooks shall be fitted with Master Rings having certificate of fitness from the competent person, so that the hooks are subjected to balanced vertical loading only.
- 21.11.4 Only four legged slings shall be allowed which includes master link (ring), intermediate master link (ring) if necessary, chain / wire rope sling, sling hook or other terminal fitting.
- 21.11.5 Hand spliced slings up to 32mm diameter shall not be used at site for any lifting purpose.
- 21.11.6 No load shall be slewed over public areas without stopping the pedestrians and road traffic first.
- 21.11.7 Requirements of outriggers
- i) All outriggers shall be fully extended and all tyres are clear of the ground
 - ii) Heavy duty blocking having large bearing area shall be necessary to prevent sinking of floats
- 21.11.8 All loads shall have tag-lines attached in order to ensure that the load can be controlled at all times.

- 21.11.9 No close working to any live overhead power line is permitted without the operation of a strict Permit to Work.
- 21.11.10 Minimum lighting is to be ensured at all lifting operations.
- 21.12 Failure to do any of the above shall attract penalty from the Employer as per relevant clause

22.0 LAUNCHING OPERATION

22.1 As launching operation is one of the riskiest job, the contractor shall take utmost precaution at all stages like; planning, establishing casing yard, casting segments, transporting segments, fabrication and erection of launching girders, launching of segments, pre-stressing, auto launching of girders and dismantling of launching girders.

22.2 The contractor shall prepare a comprehensive Method Statement for the launching operation, adhering to the SHE conditions laid down in conditions of contract on SHE and project SHE manual. Particular reference shall be made to the provisions on working at height. As the entire process of launching has to be undertaken at an elevated level, the safety of workers and the girder is paramount important. The following general guidelines shall be adhered throughout the launching operation.

- i) Necessary 'working platforms' and fall protection anchorage arrangement shall be provided in the launching girder itself.
- ii) Provisions for mounting light fittings shall also be made available in the launching girder.
- iii) The casting yard shall be established ensuring the provision given in clause **38.0**
- iv) The workmen engaged in fabrication of reinforcement, concreting the segment shall be provided with necessary PPEs including compulsory hand protection gloves.
- v) Casting and curing of segment shall be undertaken under the direct supervision of the responsible engineer of the contractor.
- vi) Trucks with valid registration, license, safe worthiness certificate, Employer's approval certificate, and pollution under check certificate shall only be used for transport of segments
- vii) Drivers engaged for driving these trucks, shall be trained once in 6 months at specified locations as directed by the employer on defensive driving.
- viii) Drivers shall also have undergone proper medical examination as per relevant clause mentioned under 'Medical Facilities'.
- ix) The segments shall rigidly be secured to the truck with necessary wooden wedges and necessary red indicators/safety tapes provided so that the vehicle is clearly seen by other road users both in day / night time.
- x) Every launching girder shall have a responsible engineer on duty all the time.
- xi) All the time from erection to dismantling the area between the two piers wherein launching is in progress shall always be barricaded.
- xii) Unloading of segments from trucks, lifting of segments, shifting of segments, gluing shall be done under the direct supervision of the approved engineer of the contractor.
- xiii) Auto launching shall be done only after approval from the Employer. After every auto launching the stability of launching girder shall be ensured.
- xiv) The vertical deflection of launching girder shall be monitored at all critical stages like with/without loads and after every auto launching.
- xv) A register containing all important operational details from erection to dismantling of launching girders shall be maintained and made available to Employer whenever called for.
- xvi) Test certificate for all lifting gears including Mac-alloy bars shall be maintained at a location closer to the launching girder itself so that it can be referred during all inspections.
- xvii) Adequate lighting at all-time shall be ensured in the entire area of operation.

- xviii) Access to drinking water & toilet shall be ensured to all workmen engaged for launching process.
- xix) Proper access ladders/stairways shall be maintained for safe ascending / descending of workmen / engineers.

22.3 Non-adherence to any of the clauses mentioned above shall be viewed seriously by the Employer and penalty levied as per relevant clause.

23.0 CONSTRUCTION MACHINERY

A large number of men and machinery are deployed by the contractors for Construction work, bridge rebuilding etc. It is therefore essential that adequate Safety measures are taken for safety of trains as well the workforce.

The following Measures should invariably adopt:

- (i) The contractor shall not start any work without the presence of K-RIDE Supervisor or his representative and contractor's supervisor at site.
- (ii) Wherever the road vehicles and/or machinery are required to work in the close vicinity of railway line, the work shall be so carried out that there is no infringement to the railway's schedule of dimensions. For this purpose, the area where road vehicles and/or machinery are required to ply, shall be demarcated and acknowledged by the contractor.

Special care shall be taken for turning / reversal of vehicles / machinery without infringing the Running track. Barricading shall be provided wherever justified and feasible as per site conditions.
- (iii) The look out and whistle caution orders shall be issued to the trains and speed restriction imposed where considered necessary. Suitable flagmen/ Detonators shall be provided where necessary for protection of trains.
- (iv) The supervisor / workmen should be counselled about safety measures.

A competency certificate to the contractor's supervisor as per proforma Annexed shall be issued by APM which will be valid only for the work which it has been issued.
- (v) The unloaded ballast / rails / sleepers / other P.Way materials after unloading Along track should be kept clear off moving dimensions and stacked as per the specified heights and distance from the running track.
- (vi) Supplementary site instructions, wherever considered necessary, shall be issued by the Engineer in Charge of K-RIDE.

The Engineer in-charge shall approve the methodology proposed to be adopted by the contractor, with a view to ensure safety of trains, passengers and workers and he shall also ensure that the methods and arrangements are actually available at site before start of the work and the contractor's supervisors and the workers have clearly understood the safety aspect and requirements to be adopted / followed while executing the work. There shall be an assurance register kept at each site, which will have to be signed by both i.e., K-RIDE Supervisor or his representative as well as contractor's supervisor as a token of their having understood the safety precautions to be observed at site."

23.1 Construction machineries may include dumpers and dump trucks, lift trucks and telescopic handlers piling rigs, vibro hammers, rail welding equipment's, mobile elevating work platforms, cranes, tipper lorries, lorry loaders, skip wagons, 360° excavators, 180° backhoe loaders, crawler tractors, scrapers, graders, loading shovels, trenchers, side booms, pavers, planers, chippers, road rollers, locomotives, tankers and bowsers, trailers, hydraulic and mechanical breakers etc.

23.2 Safe worthiness certificate

23.2.1 Every construction equipment shall be in sound mechanical working condition and certified by either competent person under Factories Act or manufacturers' warranty in case of brand-new equipment's or authorized persons / firms approved by Employer before induction to any site.

- 23.2.2 Every such certificate shall have the date of purchase, main overhauling undertaken in the past, any accident to the equipment, visual examination details, critical components safety check, list of safety devices and its working condition, manufacturer's maintenance checklist, past projects wherein the equipment's were used etc. as its minimum content.
- 23.3 Reverse Horns
- 23.3.1 All Vehicles shall be fitted with audible reverse alarms and maintained in good working condition. Reversing shall be done only when there is adequate rear-view visibility or under the directions of a banks man.
- 23.4 General operating procedures
- i) Drivers entering site shall be instructed to follow the safe system of work adopted on site. These shall be verbal instructions or, preferably, written instructions showing the relevant site rules, the site layout, delivery areas, speed limits, etc.
 - ii) No passengers shall be carried, unless specific seating has been provided in accordance with the manufacturers' recommendations.
 - iii) Working on gradients beyond any equipment's capability shall not be allowed.
 - iv) Prevention of dumper and dump truck accidents should be managed by providing wheel stops at a sufficient distance from the edges of excavations, spoil heaps, pits, etc.
 - v) The manufacturer's recommended bucket size must not be exceeded in excavators.
 - vi) If excavators operating on a gradient which cannot be avoided, it must be ensured that the working cycle is slowed down, that the bucket is not extended too far in the downhill direction, and that travel is undertaken with extreme caution. A large excavator must never be permitted to travel in a confined area, or around people, without a banksman to guide the driver, who should have the excavator attachment close in to the machine, with the bucket just clear of the ground. On wheeled excavators, it is essential that the tyres are in good condition and correctly inflated. If stabilizing devices are fitted, they should be employed when the machine is excavating.
 - vii) When the front shovel of the 180° backhoe loaders is being employed, the backhoe attachment shall be in its "travel" position, with the safety locking device in place.
 - viii) When operating the backhoe in poor ground conditions, the stabilizers tend to sink into the surface of the ground, reducing stability. Therefore, frequent checks shall be made for the stability of the machine. The loading shovel should always be lowered to the ground to stabilize the machine when the backhoe is employed.
 - ix) The netting operation of the skip wagons should be carried out prior to lifting the skip to reduce the risks of working on the rear platform
 - x) If a tractor dozer is employed on clearing scrub or felling trees, it shall be provided with adequate driver protection.
 - xi) When two or more scrapers are working on the same job, a minimum distance of at least 25m shall be kept between them.
 - xii) In case of hydraulic breakers, hydraulic rams and hoses shall be in good working condition
- 23.5 All wood working machines shall be fitted with suitable guards and devices such as top guard, riving knife, push stick, guards for drive belts and chains, and emergency stop switch easily accessible by the operator.
- 23.6 **Penalty**
- 23.6.1 **If any of the above clauses are not adhered, penalty shall be imposed as per relevant clause depending upon the gravity of the unsafe act and or condition.**
- 24.0 **MACHINE AND GENERAL AREA GUIDING**

- 24.1** The contractor shall ensure at the construction site all motors, cogwheels, chains and friction gearing, flywheels, shafting, dangerous and moving parts of machinery are securely fenced or legged. The fencing of dangerous part of machinery is not removed while such machinery is in motion or in use.

25.0 MANUAL LIFTING AND CARRYING OF EXCESSIVE WEIGHT

- 25.1** The contractor shall ensure at his construction site of a building or other construction work that no building worker lifts by hand or carries overhead or over his back or shoulders any material, article, tool or appliances exceeding in weight as said below as per Rule 38 of BOCWR, Unless aided by another building worker or device.

Person	Maximum weight in kg.
Adult man	55
Adult woman	30

- 25.2** No building worker aided by other building worker shall lift or carry weight higher than or exceeding the sum of total of maximum limits set out for each building worker separately as mentioned in the table above.

26.0 SITE ELECTRICITY

- 26.1** Competency of Electrical personnel:

- 26.1.1** The contractor shall employ qualified and competent electrical personnel as specified in general instruction **K-RIDE/SHE/CEO/001**.

- 26.2** Assessment of power

- 26.2.1** The contractor shall assess the size and location of the electrical loads and the manner in which they vary with time during the currency of the contract.

- 26.2.2** The contractor shall elaborate as to how the total supply is to be obtained / generated. The details of the source of electricity, earthing requirement, substation / panel boards, distribution system shall be prepared and necessary approval from Employer obtained before proceeding of the execution of the job.

- 26.2.3** The main contractor shall take consideration, the requirements of the sub / petty contractors' electric power supply and arrive at the capacity of main source of power supply from diesel generators.

- 26.2.4** As the sub / petty contractors' small capacity generators create more noise and safety hazard, no small capacity diesel generators shall be allowed for whatsoever the type of job to be executed under this contract.

- 26.2.5** If any unsafe noise making small capacity diesel generators are found used by sub / petty contractors the main contractor shall only be penalized.

- 26.3** Work on site

- 26.3.1** The contractor shall also submit electrical single line diagram, schematic diagram and the details of the equipment for all temporary electrical installation and these diagrams together with the temporary electrical equipment shall be submitted to the Employer's for necessary approval. Failure to do so shall invite penalty as per relevant clause.

- 26.4** Strength and capability of electrical equipment

- 26.4.1** No electrical equipment shall be put into use where its strength and capability may be exceeded in such a way as may give rise to danger.

- 26.5** Adverse or hazardous environments

- 26.5.1 Electrical equipment, which may reasonably foreseeably be exposed to-
- (a) Mechanical damage;
 - (b) The effects of the weather, natural hazards, temperature or pressure;
 - (c) The effects of wet, dirty, dusty or corrosive conditions; or
 - (d) any flammable or explosive substance, including dusts, vapors or gases, shall be of such construction or as necessary protected as to prevent, so far as is reasonably practicable, danger arising from such exposure.
- 26.6 Distribution system:
- 26.6.1 The contractor shall provide distribution system for control and distribution of electricity from a main AC supply of 50Hz for typical appliances,
- i) Fixed plant – 400V 3 phase
 - ii) Movable plant fed via trailing cable over 3.75 kW – 400 3 phase
 - iii) Installation in site buildings – 230V single phase
 - iv) Fixed flood lighting – 230V single phase
 - v) Portable and hand tools – 115V single phase
 - vi) Site lighting - 115V single phase
 - vii) Portable hand lamps – 115V single phase
- 26.7 Electrical protection circuits
- 26.7.1 Precautions shall be taken, either by earthing or by other suitable means, to prevent danger arising when any conductor (other than a circuit conductor) which may reasonably foreseeable become charged as a result of either the use of a system, or a fault in a system, becomes so charged. A conductor shall be regarded as earthed when conductors of sufficient strength and current-carrying capability to discharge electrical energy to earth connect it to the general mass of earth.
- If a circuit conductor is connected to earth or to any other reference point, nothing which might reasonably be expected to give rise to danger by breaking the electrical continuity or introducing high impedance shall be placed in that conductor unless suitable precautions are taken to prevent that danger.
- 26.7.2 Appropriate electrical protection shall be provided for all circuits, against over load, short circuit and earth fault current.
- 26.7.3 The contractor shall provide sufficient ELCBs (maintain sensitivity 30 mA) / RCCBs for all the equipment's (including Potable equipment's), electrical switchboards, distribution panels etc. to prevent electrical shocks to the workers.
- 26.7.4 All protection devices shall be capable of interrupting the circuit without damage to any equipment's and circuits in case of any fault may occur.
- 26.7.5 Rating of fuses and circuit breakers used for the protection of circuits should be coordinate with equipment power ratings.
- 26.7.6 Protection against lightning shall be ensured to all equipment kept in open at sites.
- 26.7.7 Cables:
- Before starting any excavation work adjacent to existing track, the contractor shall ensure that necessary permissions has been obtained and required precautions have been taken for doing such work in terms Joint Procedure Order (JPO). The penalties mentioned in the following JPO shall be levied on the contractor if such event occurs. The JPO is reproduced below:
- “JOINT PROCEDURE ORDER FOR UNDERTAKING DIGGING WORK IN THE VICINITY OF UNDERGROUND SIGNALING, ELECTRICAL AND TELECOMMUNICATION CABLES”

- a) A number of Engineering works in connection with gauge conversion/doubling/third line are in progress on various railways, which require extensive digging work near the running track, in close vicinity of the working S&T cables carrying vital safety circuits as well as electrical cables feeding the power supply to cabins. ASM room, RRI Cabin, Intermediate Block Huts (IBH) etc. Similarly, S&T organization under open line or construction units under CAO/C, are executing various Signaling and Telecom works requiring digging of earth for laying of cables or casting of foundations for the erection of signal posts etc. RailTel is also executing the work of lying of quad cable and OFC on various Railways as a part of sanctioned works for exclusive use of Railways for carrying voice and data i.e., administrative and control communication, PRS, FOIS etc. or shared by RailTel Corporation of India Ltd. On certain sections, digging is also required for lying of electrical cable and casting of foundation for the erection of OHE masts by Electrical Dept. Generally, contractors employed by these organizations execute these works.
- b) However, while carrying out these works near working signaling, telecommunication and electrical cables, at times, cable cuts take place due to JCB machines working along the track or during the digging work being done by contractors carrying out the Civil Engineering Works. Similarly, such cable cuts are also resulting due to works undertaken by S&T or Electrical departments. Such cable faults result in the failure of vital signaling and telecommunication circuits & electrical installations.
- c) Henceforth, the following joint procedure shall be followed by Engineering, Electrical and S&T (and RailTel organization, wherever such works are being done by them) officers of the respective divisions and by the construction organization, while carrying out any digging work near to existing signaling & telecommunication and electrical cables, so that the instances of cable cut due to execution of works, can be controlled and minimized.
1. S&T Department (and RailTel, where they have laid the cables) and Electrical department shall provide a detailed cable route plan showing exact location of cable at an interval of 200m or wherever there is change in alignment so that the same is located easily by the Engineering official/contractor. In addition, S&T department and Electrical department shall also provide cable markers along the alignment of the cable. Sr. DSTE/DSTE or Sr. DEE/DEE of the divisions or Dy.CSTE/C or Dy.CEE/C shall make these cable route plans available to the Sr.DEN/DEN or Dy.CE/C, as the case may be, within 15 days in duplicate. Sr.DEN/DEN or Dy.CE/C will send copies to their field unit i.e. AEN/SE/P.Way & Works.
 2. Before taking up any digging activity on a particular work by any agency, Sr.DSTE/DSTE or Sr.DEE/DEE of the section shall be approached in writing by the concerned Engg. or S&T or Electrical officer for permitting to undertake the work. 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 permit the work in writing within 7 days of the request by concerned department.
 3. After getting the permission from S&T or Electrical department as the case may be, the relevant portion of the cable route plan shall be attached to the letter through which concerned Engineering issues permission to the contractor. Official for commencement of work and ensuring that the contractors have fully understood the cable route plan and precautions to be taken to prevent damage to the underground cables. The contractor shall be asked to study the cable plan and follow it meticulously to ensure that the safety of the cable is not endangered. Such a provision, including any penalty for default, should form part of agreement also. It is advisable that a suitable post of SE/Sig or SE/Tele or SE/Electrical (TRD or G) shall be created chargeable to the estimates of doubling/gauge conversion, which can help Engineering. Agencies in the execution of the work. However, basic responsibility will be of the department executing the work and the Contractor. Creation of posts is not mandatory.
 4. The SE/P.Way or SE/Works shall pass on the information to the concerned SE/Sig SE/Tele or SE/Electrical(TRD or G) about the works being taken up by the contractors in their sections at least 3 days in advance of the day of the Work. In addition Engineering control shall also be informed by SE/P.Way or SE/Works, who in turn shall pass on the information to the test room/network operation Centre of RailTel/TPC/Electrical control.
 5. On receiving the above information, SE/Sig or SE/Tele or SE/Electrical (TRD or G) shall visit the site on or before the date of taking up the work and issue permission to the contractor to commence the

work after checking that adequate precautions have been taken to avoid the damage to the cables. The permission shall be granted within 3 days of submission of such requests.

6. The name of the contractor, his contact telephone number, the nature of the work shall be notified in the Engineering control as soon as the concerned Engineering officials issue the letter authorizing commencement of work to the contractor. Test room shall be given copies. Test room shall collect any further details from the Engineering Control and shall pass it on to S&T/RailTel & Electrical officials regularly. In case the supervisors of concerned departments do not turn up on the day as advised in terms of para 4 and 5 above, the works of contractor should not be stopped on this account.
7. In case of works being taken up by the State Government, National Highway Authority etc., the details of the permission given i.e., the nature the work, kilometer etc. be given to the Engineering control including the contact person's number so that the work can be done in a planned manner. The permission letter shall indicate the contact numbers of Test room/network Operating Centre of RailTel/TPC/Elect. Control.
8. Where the nature of the work taken up by the Engineering department is such that the OFC or other S&T cables or Electrical cables is to be shifted and relocated, notice of minimum one week shall be given so that the Division/RailTel/Construction can plan the works properly for shifting. Such shifting works shall in addition, for security and integrity of the cables, be supervised by S&T supervisors/RailTel supervisors/Electrical Supervisors.
9. The concerned SE/P.Way/SE/Works/SE/Sig/SE/Tele/SE/Electrical (TRD or G) or RailTel supervisors supervising the work of the contractor shall ensure that the existing emergency sockets are not damaged in view of their importance in providing communication during accident/emergency.
10. In case of minor nature of works where shifting of cable is not required, in order to prevent damage to the cable, the Engineering contractor shall take out the S&T or optical fiber cable or Electrical cable carefully from the trench and place it properly alongside at a safe location before starting the earthwork under the supervision of SE/Sig or SE/Tele or SE/Electrical (TRD or G). The cable shall be reburied soon after completion of excavation with proper care including placement of the brick over the cable under the supervision of S&T or Electrical supervisors. However, the work will be charged to the concerned Engineering works. The responsibility for ensuring availability of SE (Signal), SE (Electrical) as per para 4 and 5 above lies with the respective department. The contractor will go ahead with the shifting of cables as per the program decided and he will not be held responsible for any cable cut.
11. In all the sections where major project are to be taken up/going on RailTel/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.
12. 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 (doubling etc.). It shall be ensured in the new works of cable laying that the cable route is properly identified with electronic or concrete markers. 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.
13. The works of excavating the trench and lying of the cable should proceed in quick succession, leaving a minimum time between the two activities.
14. 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
 - a) Detailed cable route plan as per clause C-1 not provided by concerned department or cable is not protected as per laid down procedures.

- b) The alignment of the cable does not tally with the information provided to the contractor.
- c) The cable depth is found to be less than 800 mm from normal ground level.
- d) No representative of S&T department/RailTel was available at site guarding the cables on the fixed pre-determined date and time.

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

Cable damaged	Penalty per location
Only Quad cable or Signaling cable	Rs.1.00 Lakh
Only OFC	Rs.1.25 Lakh
Both OFC & Quad	Rs.1.50 Lakh
Electrical Cable	Rs.1.00 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 Signaling cable and Electrical department shall raise the debits in case of damage to Electrical cable.

15. 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 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.
 16. 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 earth work is very less.
 17. Railways shall make necessary correction in their future contract so that this JPO can also be enforced contractually.
 18. In case of damages to OFC, RailTel should be paid 5/6th of the penalty recovered. RailTel shall raise demands on the S&T department in this regard.
 19. All types of signaling & 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.
 20. Above joint circular shall be applicable for construction as well as open line organization of Engineering, S&T and Electrical.
 21. 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 in para C-12 before undertaking the work. The completion cable route plan should be finalized block section by block section as soon as the work is completed.
 22. All cable laying works shall be executed as per laid down technical specifications, such as protection measures/protective cover, compaction of refilled material etc.
- 26.8.1 Cables shall be selected after full consideration of the condition to which they shall be exposed and the duties for which they are required. Supply cable up to 3.3 kV shall be in accordance with BS 6346.
- 26.8.2 For supplies to mobile or transportable equipment where operating of the equipment subjects the cable to flexing, the cable shall conform to any of these codes BS 6007 / BS 6500 / BS 7375.
- 26.8.3 Flexible cords with a conductor cross sectional area smaller than 1.5 mm² shall not be used and insulated flexible cable shall conform to BS 6500 and BS 7375.

- 26.8.4 Where low voltage cables are to be used, reference shall be made to BS 7375. The following standards shall also be referred to particularly for underground cables BS 6346 and BS 6708
- 26.8.5 Cables buried directly in the ground shall be of a type incorporating armour or metal sheath or both. Such cables shall be marked by cable covers or a suitable marking tape and be buried at a sufficient depth to avoid their being damaged by any disturbance of the ground. Cable routes shall be marked on the plans kept in the site electrical register.
- 26.8.6 Cabling passing under the walk way and across way for transport and mobile equipment shall be laid in ducts at a minimum depth of 0.6 meters.
- 26.8.7 Cables that need to cross open areas, or where span of 3m or more are involved, a catenary wire on poles or other supports shall be provided for convenient means of suspension. Minimum height shall be 6 m above ground.
- 26.8.8 Cables carrying a voltage to earth in excess of 65V other than supply for welding process shall have metal armor or sheath, which has been effectively earthed and monitored by the contractor. In case of flexible and trailing cables such earthed metal sheath and/or armor should be in addition to the earth core in the cable and shall not be used as the protective conductor.
- 26.8.9 Armoured cables having an over-sheath of polyvinyl chloride (PVC) or oil resisting and flame retardant compound shall be used whenever there is a risk of mechanical damage occurring
- 26.9 Plugs, socket-outlets and couplers:
- 26.9.1 The contractor shall ensure plugs, socket-outlets, and couplers available in the construction site as “splash proof” type. The minimum degree of Ingress Protection should be of IP44 in accordance with BS EN 60529.
- 26.9.2 Only plugs and fittings of the weatherproof type shall be used and they should be colour coded in accordance with the internationally recognized standards for example as detailed as follows:
- (a) 110 volts: Yellow.
 - (b) 240 volts: Blue.
 - (c) 415 volts: Red.
- 26.10 Connections
- 26.10.1 Every joint and connection in a system shall be mechanically and electrically suitable for use to prevent danger. Proper cable connectors as per national/international standards shall only be used to connect cables.
- 26.10.2 No loose connections or tapped joints shall be allowed anywhere in the work site, office area, stores and other areas. Penalty as per relevant clause shall be put in case of observation of any tapped joints.
- 26.11 Portable and hand-held equipments:
- 26.11.1 The contractor shall ensure the use of double insulated or all-insulated portable electrical hand equipment may be used without earthing (i.e., two core cables), but they shall still be used only on 110V because of the risk of damage to trailing leads.
- 26.12 Other equipment's:
- 26.12.1 All equipment shall have the provision for major switch/cut-off switch in the equipment itself.
- 26.12.2 All non-current carrying metal parts of electrical equipment shall be earthed through insulated cable
- 26.12.3 Isolate exposed high-voltage (over 415 Volts) equipment, such as transformer banks, open switches, and similar equipment with exposed energized parts and prevent unauthorised access.
- 26.12.4 Approved perimeter markings shall be used to isolate restricted areas from designated work areas and entryways and shall be erected before work begins and maintained for entire duration of work. Approved perimeter marking shall be installed with either red barrier tape printed with the words "DANGER—HIGH

VOLTAGE" or a barrier of yellow or orange synthetic rope, approximately 1 to 1.5 meter above the floor or work surface.

26.13 Work on or near live conductors

26.13.1 No person shall be engaged in any work activity on or so near any live conductor (other than one suitably covered with insulating material so as to prevent danger) that danger may arise unless-

- a) it is unreasonable in all the circumstances for it to be dead; and
- b) it is reasonable in all the circumstances for him to be at work on or near it while it is live; and
- c) Suitable precautions (including where necessary the provision of suitable protective equipment) are taken to prevent injury.

26.14 Inspection and Maintenance

26.14.1 All electrical equipment should be permanently numbered and a record kept of the date of issue, date of last inspection and recommended inspection period.

26.14.2 Fixed installations shall be inspected at least at three monthly intervals; routine maintenance being carried out in accordance with equipment manufactures recommendations.

26.14.3 25 KV AC 50 Hz single phase Traction:

a) Induction effect of 25 KV AC 50 Hz single phase Traction

I. The attention of all staff is drawn to the fact that under 25 kv ac 50 Hz single phase traction, there is heavy induction on all metallic structures and conductors in the vicinity of the track. The induction is two – fold.

Electro- static, which results from the high potential of 25 kv on the OHE system.

Electro- magnetic, which is proportional to the currents passing from the sub – station to the OHE to the locomotives /EMUs and back partly through the earth.

II. The voltage induced is quite appreciable on overhead conductors running parallel to the tracks depending on the length of parallelism.

This explains why most of the overhead telecommunication's lines are replaced by underground cables. Special protective measures are required to reduce the adverse effects of induction.

III. In a railway yard, voltage of the order of 200 volts may be induced on yard lighting mains situated 8 m away from the centre of a double line track, of it runs parallel to the 25 KV lines for a distance of about 270 m; it could be several thousand volts when parallelism is much longer. In such a case, a dangerous voltage due to induction will exist even after power supply to the line has been switched off. No one shall therefore attempt to work on any overhead line running alongside the electrified tracks without taking special precautions of earthing on both sides of the work. Before a section is electrified, the necessary modifications to distribution lines in all stations and yards should be carried out, so as to limit the induced voltage within permissible values, but this by no means limits the need for earthing the lines on both the sides of the working party. Earthing should be done individually by each working party as close to the work spot as possible. The distance between the two earths shall not exceed 1 km.

IV. Such inductive effects occur on large metallic structures such as fencings, structural steelwork of platforms running parallel to the track. They will therefore, have to be earthed suitably to afford safety.

V. Inductive effects also show themselves on any metallic conductor, such as metallic clothes- lines, power lines and lines belonging to private parties running parallel and close to the electrified tracks.

Wide publicity should be given to the effects of induction so that special precautions are taken by the private parties.

b) General Precautions

The precautions laid down below must be followed under all circumstances in sections equipped for 25 kv as single phase, 50 Hz traction.

- i. No work shall be done above or within a distance of 2 m from the live OHE without a “permit-to-work.”
- ii. No part of a tree shall be nearer than 4 m from the nearest live conductor. Any tree or branches likely to fall on live conductor should be cut or trimmed periodically to maintain this clearance. Cutting or trimming should be done by the OHE staff themselves or through an agency manage and supervised by them
- iii. Work for trimming of trees should also be done in the presence of authorized OHE staff or supervisor to maintain the safe clearance of 4mt. Any dispute regarding cutting of trees may be done on contract basis or departmentally of the terms & conditions of concerning department.
- iv. No fallen wire or wires shall be touched unless power is switched off and the wire or wires suitably earthed. In case the wires drop at a level crossing, the Gate-keeper shall immediately make arrangements to stop all road traffic and keep the public away.
- v. As far as possible closed wagons shall be used for material trains. In case open or hopper wagons are used, loading and unloading or such wagons in electrified tracks shall be done under the supervision of an Engineering Official not below the rank of a APM who shall personally ensure that no tool or any part of the body of the worker comes within the ‘danger zone’ i.e., within 2 m of the OHE.
- vi. Permanent Way staff should keep clear of the tracks and avoid contact with the rails either when approaching or reaching the work-spot when an electrically hauled train is within 250m.
- vii. When unloading rails alongside the tracks, it should be ensured that rails do not touch each other to form a continuous metallic mass of length greater than 300m.
- c) Safety precautions on Electrified Sections (Chapter-IV), Electrical Accidents (Chapter-V) Fire Pre cautions (Chapter-VI) of Indian Railways AC Traction Manual Volume – I, as applicable may be followed.
- d) The Training and Competency Certificates (Chapter XII) of Volume-II, part-I of Indian Railway AC Traction Manual may be followed.
- e) Power Blocks and Permit to Work are required to be taken in case of construction work going on in the vicinity of electrified line as per applicable Para of Chapter –VI of volume-II, part – I of Indian Railway AC Traction Manual

27.0 LIGHTING

27.1 The contractor shall provide sufficient site lighting, of the right type and at the right place for it to be properly effective. Lighting ought not to introduce the risk of electric shock. Therefore, 230V supplies should be used for those fittings, which are robustly installed, and well out of reach e.g. flood lighting or high-pressure discharge lamps.

27.2 Selection of Luminaries:

The contractor shall select the luminaries as per the area requirement indicated below:

	Type of Lighting	Area of Requirement	Luminaries
1.	Area Lighting	Workmen and vehicles to move about in safely.	Shovel type: non-symmetrical Symmetrical or non-symmetrical tungsten halogen
2.	Beam flood lighting	Concentrated light over an area from a relatively great distance.	Portable flood light (Conical beam) Wide angle flood (fan

			shaped beam) Medium or narrow angle flood (Conical beam)
3.	Dispersive lighting	Lighting for indoor	Dispersive (Mercury florescent) Cargo cluster Florescent trough
4.	Walkway lighting	Lighting for stairways, ladder ways, corridors, scaffold access routes, etc.	Well glass unit Bulkhead unit (tungsten filament) Bulk head unit (Floresce
5.	Local lighting	Lighting on sites and fittings are generally accessible to operatives	PAR (Parabolic Aluminis Reflector) lamp cluster Festoons (with or without shades) Adjustable florescent wo lamp Portable flood lamp (mounted on own cable drum)

27.3 The contractor shall ensure that luminaries should always be placed so that no person is required to work in their own shadow and so that the local light for one person is not a source of glare for the others. Strongly made clamps should be available for attaching luminaries to poles and other convenient supports.

27.4 Luminaries should be robust, resistant to corrosion and rain proof especially at the point of the cable entry.

27.5 The correct type of lamp for each luminary should always be used and when lamps need to be replaced it shall be in accordance with the supply voltage.

27.6 Lamp holders not fitted with a lamp should be capped off.

28.0 HAND TOOLS AND POWER TOOLS

28.1 General

28.1.1 The contractor is wholly responsible for the safe condition of tools and equipment used by his employees and that of his sub-contractors.

28.1.2 Use of short / damaged hand tools shall be avoided and the contractor shall ensure all his hand tools used at his worksite are safe to work with or stored and shall also train his employees (including his sub-contractors) for proper use thereby.

28.1.3 All hand tools and power tools shall be duly inspected before use for safe operation.

28.1.4 All hand tools and power tools shall have sufficient grip and the design specification on par with national/international standards on anthropometrics.

28.2 Hand tools

28.2.1 Hand tools shall include saws, chisels, axes and hatches, hammers, hand planes, screw drivers, crow bars, and nail pullers.

28.2.2 The contractor shall ensure that,

- i) For crosscutting of hardwood, saws with larger teeth points (no. of points per inch) shall be preferred to avoid the saw jumping out of the job.
 - ii) Mushroom headed chisels shall not be used in the worksite where the fragments of the head may cause injury.
 - iii) Unless hatchet has a striking face, it shall be used as a hammer.
 - iv) Only knives of retractable blades shall be used in the worksite.
 - v) No screwdrivers shall be used for scraping, chiselling or punching holes.
 - vi) A pilot hole shall always be driven before driving a screw.
 - vii) Wherever necessary, usage of proper PPEs shall be used by his employees.
- 28.3 Power tools
- 28.3.1 Power tools include drills, planes, routers, saws, jackhammers, grinders, sprayers, chipping hammers, air nozzles and drills.
- 28.3.2 The contractor shall ensure that
- i) Electric tools are properly grounded or / and double insulated.
 - ii) GFCIs/ RCCBs shall be used with all portable electric tool operated especially outdoors or in wet condition.
 - iii) Before making any adjustments or changing attachments, his workers shall disconnect the tool from the power source.
 - iv) When operating in confined spaces or for prolonged periods, hearing protection shall be required. The same shall also apply to working with equipment's, which gives out more noise as mentioned in clause **43.0** of this contract document.
 - v) Tool is held firmly and the material is properly secured before turning on the tool.
 - vi) All drills shall have suitable attachments respective of the operations and powerful for ease of operation.
 - vii) When any work / operation needs to be performed repeatedly or continuously, tools specifically designed for that work shall be used. The same is applicable to detachable tool bit also.
 - viii) Size of the drill shall be determined by the maximum opening of the chuck n case of drill bit.
 - ix) Attachments such as speed reducing screwdrivers and buffers shall be provided to prevent fatigue and undue muscle strain to his workers.
 - x) Stock should be clamped or otherwise secured firmly to prevent it from moving.
 - xi) Workers shall never stand on the top of the ladder to drill holes in walls / ceilings, which can be hazardous, instead standing on the fourth or fifth rung shall be recommended.
 - xii) Electric plane shall not be operated with loose clothing or long scarf or open jacket.
 - xiii) Safety guards used on right angle head or vertical portable grinders must cover a minimum of 180° of the wheel and the spindle / wheel specifications shall be checked.
 - xiv) All power tools / hand tools shall have guards at their nip points.
 - xv) Low profile safety chain shall be used in case of wood working machines and the saw shall run at high rpm when cutting and also correct chain tension shall be ensured to avoid "kickback".
 - xvi) Leather aprons and gloves shall be used as an additional personal protection auxiliary to withstand kickback.
 - xvii) Push sticks shall be provided and properly used to hold the job down on the table while the heels moves the stock forward and thus preventing kickbacks.

- xviii) Air pressure is set at a suitable level for air actuated tool or equipment being used. Before changing or adjusting pneumatic tools, air pressure shall be turned off.
- xix) Only trained employees shall use explosive actuated tools and the tool shall also be unloaded when not in use.
- xx) Usage of such explosive actuated tools shall be avoided in case of places where explosive/flammable vapours or gases may be present.
- xxi) Explosive actuated tools and their explosives shall be stored separately and be taken out and loaded only before the time of immediate use.
- xxii) Misfired cartridges of explosive actuated tools must be placed in a container of water and be removed safely from the project.
- xxiii) No worker shall point any power operated / hand tool to any other person especially during loading / unloading.

29.0 WELDING, GOUGING AND CUTTING

- 29.1 Gas cylinders in use shall be kept upright on a custom-built stand or trolley fitted with a bracket to accommodate the hoses and equipment or otherwise secured. The metal cap shall be kept in place to protect the valve when the cylinder is not connected for use.
- 29.2 Hose clamp or clip shall be used to connect hoses firmly in both sides of cylinders and torches.
- 29.3 All gas cylinders shall be fixed with pressure regulator and dial gauges
- 29.4 Non-return valve and Flashback arrester shall be fixed at both end of cylinder and torch.
- 29.5 Domestic LPG cylinders shall not be used for Gas welding and Cutting purpose.
- 29.6 DCP or CO₂ type Fire Extinguisher not less than 5 kg shall be fixed at or near to welding process zone in an easily accessible location. Fire Extinguisher should confirm to IS 2190: 1992.
- 29.7 Use firewatchers if there is a possibility of ignition unobserved by the operator (e.g. on the other side of bulkheads).
- 29.8 Oxygen cylinders and flammable gas cylinders shall be stored separately, at least 6.6 meters (20 feet) apart or separated by a fire proof, 1.5 meters (5 feet) high partition. Flammable substances shall not be stored within 15 meters of cylinder storage areas.
- 29.9 Transformer used for electrical arc welding shall be fixed with Ammeter and Voltmeter and also fixed with separate main power switch.
- 29.10 Welding grounds and returns should be securely attached to the work by cable lugs, by clamps in the case of stranded conductors, or by bolts for strip conductors. The ground cable will not be attached to equipment or existing installations or apparatus.
- 29.11 Use a low voltage open circuit relay device if welding with alternating current in constricted or damp places.
- 29.12 Take precautions against the risk of increased fume hazards when welding with chrome containing fluxed consumables or high current metal inert gas (MIG) or tungsten inert gas (TIG) processes.
- 29.13 Avoid being in contact with water or wet floors when welding. Use duckboards or rubber protection.
- 29.14 All electrical installations shall meet the IS: 5571: 1997 and NFPA 70 for gas cylinder storage area and other hazardous areas.
- 29.15 The current for Electric arc welding shall not exceed 300 A on a hand welding operation.

30.0 DANGEROUS AND HARMFUL ENVIRONMENT

As per Rule 40 of BOCWR,

- a) When internal combustion engines are to be used into a confined space or excavation or tunnel or any other workplace where neither natural or artificial ventilation system is inadequate to keep carbon

monoxide below 50ppm, exposure of building workers shall be avoided unless suitable measures are taken and provided by the contractor.

- b) No worker shall be allowed into any confined space or tank or trench or excavation wherein there is given off any dust, fumes / vapours or other impurities which is likely to be injurious or offensive to the worker, or in which explosive or poisonous or noxious or gaseous material or other harmful articles have been carried or stored or in which dry ice has been used as a refrigerant, which has been fumigated or in which there is a possibility of oxygen deficiency, unless all practical steps have been taken to remove such dust, fumes, other impurities and dangers which may be present and to prevent any further ingress thereof, and such work place or tank or trench or excavation shall be certified by the responsible person to be safe and fit for the entry of such workers.

31.0 FIRE PREVENTION, PROTECTION AND FIGHTING SYSTEM

- 31.1 The contractor shall ensure that construction site is provided with fire extinguishing equipment sufficient to extinguish any probable fire at construction site. An adequate water supply is provided at ample pressure as per national standard.
- 31.2 Recharging of fire extinguishers and their proper maintenance should be ensured and as a minimum should meet Indian National Standards
- 31.3 All drivers of vehicles, foreman, supervisors and managers shall be trained on operating the fire extinguishers and firefighting equipment.
- 31.4 The contractor shall also give consideration to the provision of adequate firefighting arrangements within the underground and tunneling operations including the provision of Fire Service compatible hose connections and emergency lighting
- 31.5 As per Rule 79 (A (7) of The Building and Other Contract Workers (Regulation of Employment and conditions of service) (Karnataka) Rules 2006, all lifting appliances operators shall be provided a cabin which shall be equipped a suitable portable fire extinguisher.
- 31.6 Combustible scrap and other construction debris should be disposed off site on a regular basis. If scrap is to be burnt on site, the burning site should be specified and located at a distance no less than 12 metres from any construction work or any other combustible material.
- 31.7 Every fire, including those extinguished by contractor personnel, shall be reported to the Employer representatives.
- 31.8 Emergency plans and Fire Evacuation plans shall be prepared and issued. Mock drills should be held on a regular basis to ensure the effectiveness of the arrangements and as a part of the programme, the Telephone Number of the local fire brigade should be prominently displayed near each telephone on site.

32.0 CORROSIVE SUBSTANCES

- 32.1 As per Rule 44 of BOCWR, corrosive substances including alkalis and acids shall be stored and used by a person dealing with such substances at a building / construction site in a manner that it does not endanger the building worker and suitable PPE shall be provided by the contractor to the worker during such handling and work. In case of spillage of such substances on building worker, the contractor shall take immediate remedial measures.

33.0 DEMOLITION

- 33.1 The Contractor shall ensure that
- i) All demolition works be carried out in a controlled manner under the management of experienced and competent supervision.
 - ii) The concerned department of the Government or local authority is informed and permission obtained wherever required. Media shall also be informed regarding this concern.
 - iii) All glass or similar materials or articles in exterior openings are removed before commencing any demolition work and all water, steam, electric, gas and other similar supply lines are put-off and

such lines so located or capped with substantial coverings so as to protect it from damage and to afford safety to the building workers and public.

- iv) Examine the walls of all structures adjacent to the structure to be demolished to determine thickness, method of support to such adjacent structures.
- v) No demolishing work be performed if the adjacent structure seems to be unsafe unless and until remedial measures like sheet piling, shoring, bracing or similar means be ensured for safety and stability for adjacent structure from collapsing.
- vi) Debris / bricks and other materials or articles shall be removed by means of
 - a) chutes
 - b) buckets or hoists
 - c) through openings through floors or
 - d) any other safe means
- vii) No person other than building workers or other persons essential to the operation of demolition work shall be permitted to enter a zone of demolition and the area be provided with substantial barricades.

34.0 EXCAVATION AND TUNNELLING

34.1 Excavation

34.1.1 The contractor shall ensure

- i) Where any construction building worker engaged in excavation is exposed to hazard of falling or sliding material or article from any bank or side of such excavation which is more than one 1.5 m above his footing, such worker is protected by adequate piling and bracing against such bank or side.
- ii) Where banks of an excavation are undercut, adequate shoring is provided to support the material or article overhanging such bank.
- iii) excavated material is not stored at least 0.65 m from the edge of an open excavation or trench and banks of such excavation or trench are stripped of loose rocks and the banks of such excavation or trench are stripped of loose rocks and other materials which may slide, roll or fall upon a construction building worker working below such bank
- iv) metal ladders and staircases or ramps are provided, as the case may be, for safe access to and egress from excavation where, the depth of such excavation exceeds 1.5 m and such ladders, staircases or ramps comply with the IS 3696 Part 1&2 and other relevant national standards.
- v) Trench and excavation is protected against falling of a person by suitable measures if the depth of such trench or excavation exceeds 1.5 m and such protection is an improved protection in accordance with the design and drawing of a professional engineer, where such depth exceeds 4m.

34.2 Tunneling

34.2.1 The contractor shall inform in writing to the Director General within 30 days, prior to the commencement of any tunneling work.

34.2.2 The contractor shall appoint a responsible person for safe operation for tunneling work as per Rule 121 & 125 of BOCWR.

34.2.3 The contractor shall ensure

- i) every compressed air system in a tunnel is provided with emergency power supply for maintained continued supply of compressed air as per Rule 155 of BOCWR
- ii) Watertight bulkhead doors are installed at the entrance of a tunnel to prevent flooding.

- iii) Reliable and effective means of communication such as telephone or walkie-talkie are provided and maintained for arranging better effective communication at an excavation or tunneling work as per Rule 136 of BOCWR.
- iv) All portable electrical hand tools and inspection lamp used in underground and confined space at an excavation or tunneling work is operated at a voltage not exceeding 24V.
- v) only flame proof equipment of appropriate type as per IS:5571:2000 and or other relevant national standard is used inside the tunnel
- vi) petrol or LPG of any other flammable substances are not used, stored inside the tunnel except with prior approval from Employer, and also no oxy-acetylene gas is used in a compressed air environment in excavation or tunneling
- vii) Adequate number of water outlets provided for firefighting purpose, an audible fire alarm and adequate number and types of fire extinguishers are provided and maintained.
- viii) Temperature in any working chamber in an excavation or tunneling work where workers employed does not exceed 29°C as per Rule 165 of BOCWR.
- ix) All working areas in a free air tunnel are provided with ventilation system as approved by the Director General and the fresh air supplied in such tunnel is not less than 6 m³/ min for each worker employed in tunnel as per Rule 153 of BOCWR.

34.3 Warning signs and notices:

34.3.1 The contractor shall ensure that

- i) suitable warning signs or notices, required for the safety of building workers carrying out the work of an excavation or tunneling, shall be displayed or erected at conspicuous places in Hindi and in a language understood by majority of such building workers at such building such excavation or tunneling work
- ii) such warning signs and notices with regard to compressed air working shall include
 - a) the danger involved in such compressed air work
 - b) fire and explosion hazard
 - c) The emergency procedures for rescue from such danger or hazards.

35.0 WORK PERMIT SYSTEM

35.1 The Contractor shall develop a Work Permit system, which is a formal written system used to control certain types of work that are potentially hazardous. A work permit is a document, which specifies the work to be done, and the precautions to be taken. Work Permits form an essential part of safe systems of work for many construction activities. They allow work to start only after safe procedures have been defined and they provide a clear record that all foreseeable hazards have been considered. Permits to Work are usually required in high-risk areas as identified by the Risk Assessments.

35.2 A permit is needed when construction work can only be carried out if normal safeguards are dropped or when new hazards are introduced by the work. Examples of high-risk activities include but are not limited to

- i) Entry into confined spaces
- ii) Work in close proximity to overhead power lines and telecommunication cables.
- iii) Hot work.
- iv) To dig—where underground services may be located.
- v) Work with heavy moving machinery.
- vi) Working on electrical equipment

- vii) Work with radioactive isotopes.
 - viii) Heavy lifting operations and lifting operations closer to live power line
- 35.3 The permit-to-work system should be fully documented, laying down:
- i. How the system works;
 - ii. The jobs it is to be used for;
 - iii. The responsibilities and training of those involved; and
 - iv. How to check its operation;
- 35.4 A Work Permit authorisation form shall be completed with the maximum duration period not exceeding 12 hours.
- 35.5 A copy of each Permit to Work shall be displayed, during its validity, in a conspicuous location in close proximity to the actual works location to which it applies.
- 35.6 Format of Work Permits i.e., Cold Permit (for all works other than Hot or Excavation/ tunneling and Electrical Isolation), Hot Work, Electrical Isolation are given at the end of this document as **Form No SF 003, SF 004 & SF 005** respectively. These are indicative and can be suitably modified depending upon site condition.
- 36.0 **TRAFFIC MANAGEMENT**
- 36.1 The basic objective of the following guidelines is to lay down procedures to be adopted by contractor to ensure the safe and efficient movement of traffic and also to ensure the safety of workmen at construction sites.
- 36.2 All construction workers should be provided with high visibility jackets with reflective tapes as most of viaduct /tunnelling and station works or either above or under right-of-way. The conspicuity of workmen at all times shall be increased so as to protect from speeding vehicular traffic.
- 36.3 The guiding principles to be adopted for safety in construction zone are to
- i) Warn the road user clearly and sufficiently in advance.
 - ii) Provide safe and clearly marked lanes for guiding road users.
 - iii) Provide safe and clearly marked buffer and work zones
 - iv) Provide adequate measures that control driver behaviour through construction zones.
- 36.4 Legal permission
- 36.4.1 In all cases, the contractor shall employ proper precautions. Wherever operations undertaken are likely to interfere with public traffic, specific traffic management plans shall be drawn up and implemented by the contractor in consultation with the approval of local police authorities and/or the concerned metropolitan/civil authorities as the case may be.
- 36.4.2 Such traffic management plans shall include provision for traffic diversion and selection of alternative routes for transport of equipment. If necessary, the contractor shall carry out road widening before commencement of works to accommodate the extra load
- 36.5 The primary traffic control devices used in work zones shall include signs, delineators, barricades, cones, pylons, pavement markings and flashing lights.
- 36.6 The road construction and maintenance signs which fall into the same three major categories as do other traffic signs, that are Regulatory Signs, Warning Signs and Direction (or guidelines) Signs shall only be used. The IRC: 67 (Code of Practice for Road Signs) provide a list of traffic signs. The size, colours and placement of sign shall confirm to IRC: 67.
- 36.7 Regulatory signs
- 36.7.1 Regulatory signs impose legal restriction on all traffic. It is essential, therefore, that they are used only after consulting the local police and traffic authorities.

- 36.8 Warning signs
- 36.8.1 Warning signs in the traffic control zone shall be utilised to warn the drivers of specific hazards that may be encountered.
- 36.8.2 The contractor shall place detour signage at strategic locations and install appropriate warning signs. In order to minimize disruption of access to residences and business, the contractor shall maintain at least one entrance to a property where multiple entrances exist.
- 36.8.3 Materials hanging over / protruded from the chassis / body of any vehicle especially during material handling shall be indicated by red indicator (red light/flag) to indicate the caution to the road users.
- 36.9 Delineators
- The delineators are the elements of a total system of traffic control and have two distinct purposes:
- To delineate and guide the driver to and along a safe path
 - As a taper to move traffic from one lane to another.
- 36.9.1 These channelizing devices such as cones, traffic cylinders, tapes and drums shall be placed in or adjacent to the roadway to control the flow of traffic. These should normally be retro-reflectors complying with IRC: 79 - Recommended Practice for Road Delineators.
- 36.9.2 Traffic cones and cylinders
- 36.9.2.1 Traffic cones of 500mm, 750mm and 1000mm high and 300mm to 500mm in diameter or in square shape at base and are often made of plastic or rubber and normally have retro-reflectorised red and white band shall be used wherever required.
- 36.9.3 Drums
- 36.9.3.1 Drums about 800mm to 1000mm high and 300mm in diameter can be used either as channelising or warning devices. These are highly visible, give the appearance of being formidable objects and therefore command the respect of drivers.
- 36.9.4 Barricades
- 36.9.4.1 Full height fence, barriers, barricades etc. shall be erected around the site in order to prevent the working area from the risk of accidents due to speedy vehicular movement. Same the way barricades protect the road users from the danger due to construction equipment and other temporary structures.
- 36.9.4.2 The structure dimension of the barricade, material and composition, its colour scheme, K-RIDE logo and other details shall be in accordance with specifications laid down in tender document.
- 36.9.4.3 All barricades shall be erected as per the design requirements of the Employer, numbered, painted and maintained in good condition and also Barricade in-charge maintains a barricade register in site.
- 36.9.4.4 All barricades shall be conspicuously seen in the dark/night time by the road users so that no vehicle hits the barricade. Conspicuity. Shall be ensured by affixing retro reflective stripes of required size and shape at appropriate angle at the bottom and middle portion of the barricade at a minimum gap of 1000mm. In addition, minimum one red light or red light blinker should be placed at the top of each barricade.
- 36.9.5 The contractor shall ensure that all his construction vehicles plying on public roads (like dump trucks, trailers, etc.) have proper license to ply on public roads from the State Transport Authority. Drivers holding proper valid license as per the requirements of Motor Vehicles Act shall drive these vehicles
- 36.9.6 The contractor shall not undertake loading and unloading at carriageways obstructing the free flow of vehicular traffic and encroachment of existing roads by the contractor applying the excuse of work execution.
- 36.9.7 Safety Fencing:
- Before commencing any work close to the running track, the Contractor shall provide safety fencing and obtain the specific permission of Engineer to commence the work in that stretch. The fencing shall be for a as per relevant scheduled item. The Contractor shall maintain the safety fencing in good working

condition throughout the period until the work in a given stretch is completed. The Contractor will be paid for providing safety fencing along the track as per the relevant scheduled item.

36.9.8 Tow away vehicle

36.9.8.1 The contractor shall make arrangements keeping tow away van / manpower to tow away any breakdown vehicle in the traffic flow without losing any time at his cost.

36.9.9 Cleaning of road

36.9.9.1 The contractor shall ensure the cleanliness of roads and footpaths by deploying proper manpower for the same. The contractor shall have to ensure proper brooming, cleaning washing of roads and footpaths on all the time throughout the entire stretch till the currency of the contract including disposal of seepage.

37.0 WORK TO ADJACENT RAILWAYS

37.1 Whenever work is to be conducted in close proximity to the live railways then the following measures shall need to be addressed:

Provision of IRPWM (Indian Railways Permanent Way Manual) related to block protection; safety precaution for protection of track must be followed.

- a. Works which is executed within 3.5 mtr from center line of existing Indian Railway track should be executed under block protection and with permit to work from concerned railway
- b. For works to be executed between 3.5 mtr to 6 mtr. from center line of existing Indian Railway track work to be executed after erection of fencing as per approved plan.
- c. For works to be executed beyond 6 mtr from center line of existing Indian Railway track, it must be ensured that no vehicle / construction equipment infringes demarcation line marked at 3.5 mtr from center of existing railway track.
- d. All utilities, signaling cables, signaling equipment, pipelines, gate lodges, staff quarters etc., coming in the alignment must be shifted / relocated as per approved plan before undertaking earth-work Program .
- e. During earth-work if any signaling cable not identified earlier got damaged it should be immediately reported to Railway and immediate action should be taken for repair of the same to avoid interruption to traffic.
- f. Any material unloaded along the track should be kept clear of moving dimensions and stacked at minimum 3.5 mtr from track center of running track.
- g. Movement of vehicle / working of machineries should not be permitted during night. In case night working is to be adopted proper fencing at 3.5 mtr from track center of running track should be erected to ensure that no infringement of moving dimension takes place. Suitable lighting arrangements should also be done.
- h. Working in existing railway station area for modification of existing siding / line must be done after approval of plan and with permit to work from Railway.
- i. Modification to road surface at existing level crossings which may cause interruption to road traffic should be executed as per approved plan with the approval of concerned local authorities.
- j. Launching of girders for construction of ROB / rail flyover / modification to existing ROBs should be done as per approved plan and scheme with permission to work from Railway / road authorities.
- k. For construction of new bridge over major drain/drain / nallaha / rajakaluve / extension of existing bridge over canal approval of respective authorities should be taken before undertaking work.

37.2 The work of formation in banks and cuttings throughout the length of doubling is adjacent to track under running traffic. Many of the bridges on the proposed double line are to be constructed either as extensions or just adjacent to the existing bridges under running traffic. The work of Installation of Track throughout the

length of doubling is adjacent to track under running traffic. The work of Installation of Track and Signals in the Station yards including alterations to the existing Track and Signals has to be done adjacent to or in replacement of the existing Track and Signals which are under running traffic. The contractor shall ensure that the safety of the running lines and running traffic is not endangered, because of his work.

37.2.1 Any traffic/traction blocks, temporary speed restrictions and caution orders required in this connection shall also be got sanctioned from the Railway authorities well in advance, through the Engineer. The Railways may sanction the same for specific sites within the overall recovery time available in the Railway's time table. The contractor shall have to schedule his programme according to the convenience of the Railways. No claim from the contractor for any delay/inconvenience/loss on this account shall be entertained by the Employer.

37.2.2 The contractor shall provide at site at his own cost, all protection measures including exhibition and lighting of all Temporary Engineering Signals as per Railway rules, instructions and norms. All lights provided by the contractor shall be screened so as not to interfere with any signal light on the Railways or with any traffic or signal lights of any local or other authority.

37.3 Ancillary and Temporary works

The Contractor's proposals for erection of all ancillary and temporary works shall be in conformity with the proposals submitted along with the tender and modifications thereto as approved by the Engineer.

The Contractor shall submit drawings, supporting design calculations where called for by the Engineer and other relevant details of all such works to the Engineer for approval at least one month before he desires to commence such works. Approval by the Engineer of any such proposal shall not relieve the contractor of his responsibility for the sufficiency of such works.

The contractor shall, at his own cost, design and provide any temporary arrangements including relieving/service girders required in connection with the above said works and remove the same, when no longer required. These arrangements shall conform to Railway norms. The contractor shall obtain all necessary approvals and sanctions of the concerned Railway authorities including Commissioner of Railway Safety through the Engineer/ Employer in advance and well in time.

The contractor shall ensure and be entirely responsible for proper design, fabrication, provision and upkeep of all temporary arrangements and all associated activities so as not to endanger safety of any assets, running track, traffic and traveling public and for following all extent instructions, norms, practice and procedures laid down by Railway authorities in this respect, which may be ascertained from the Railways through the Engineer.

If required, Railways may, in order to ensure the safety of the running track, post at site Regular Railway staff to watch the efficacy and safety of temporary arrangements and protection measures round the clock for the period the same exist in the running line and till the running line is restored back to normal. Railways may also supervise the insertion, maintenance and removal of the temporary arrangements. The cost of such staff shall be borne by the Employer.

Notwithstanding the above, the contractor shall not, however, be relieved of his responsibility and obligation as aforesaid.

Save as provided in (e) above, the contractor shall bear the cost of complying with all safety requirements. No extra payment will be made for complying with the safety provisions under this chapter and the cost of all such elements to meet the safety requirements shall be deemed to be included in the Bill of Quantities.

37.3.1 The contractor remains fully responsible for ensuring safety. In case of any accident, the Contractor shall bear cost of all damages to his equipment and men and also damages to Railway and its passengers.

Suitable barricading to forewarn road vehicle driver shall be provided by the contractor. The luminous tape, strung on bamboo or steel poles can be considered for such barricading. Barricading arrangement should be got approved by the Engineer.

37.4 Indemnity by Contractor

The Contractor shall indemnify and save harmless the Railway/Employer/Engineer from and against all actions, suit proceedings, losses, costs, damages, claims, and demands of every nature and description

brought or recovered against the Railways/ Employer/Engineer by reason of any act or omission of the contractor, his agents or employees, in the execution of the works or in his guarding the same. All sums payable by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied to the actual loss or damage sustained, and whether or not any damage shall have been sustained.

38.0 BATCHING PLANT AND CASTING YARD LAYOUT

- i) The batching plant / casting yard shall be effectively planned for smooth flow of unloading and stacking the aggregates reinforcements and cement, batching plant, transport of concrete, casting the segment, stacking the segment and loading the segments to the trucks. As far as possible the conflicts should be avoided.
- ii) The batching plant / casting yard shall be barricaded and made as a compulsory PPE zone
- iii) If in case of material unloading area is not maintainable as PPE zone, the same shall be segregated properly and made as a non-PPE zone with appropriate barrications.
- iv) Electrical system shall also be suitably planned so that location of diesel generator, if any, location of DBs, routing of cables and positioning of area lighting poles/masts does not infringe on any other utility and pose danger.
- v) Drainage shall be effectively provided and waste water shall be disposed after proper treatment
- vi) Time office, canteen, drinking water, toilet and rest place shall be suitably located for the easy access to workers. All the facilities shall be properly cleaned and maintained during the entire period of operation.
- vii) Manual handling of cement shall be avoided to a larger extent. Whenever it is absolutely necessary the workmen shall be given full body protection, hand protection and respiratory protection as a basic measure of ensuring better health.
- viii) The PPEs provided to cement handling workmen shall conform to international standards.
- ix) Access roads and internal circulation roads shall be well laid and maintained properly at all time.
- x) Non-adherence to any of the above provision shall be penalised as per relevant penalty clause.

39.0 PERSONAL PROTECTIVE EQUIPMENTS (PPEs)

- 39.1 The contractor shall provide required PPEs to workmen to protect against safety and / or health hazards. Primarily PPEs are required for the following protection
- a) Head Protection (Safety helmets)
 - b) Foot Protection (Safety footwear, Gumboot, etc)
 - c) Body Protection (High visibility clothing (waistcoat/jacket), Apron, etc)
 - d) Personal fall protection (Full body harness, Rope-grap fall arrester, etc)
 - e) Eye Protection (Goggles, Welders glasses, etc)
 - f) Hand Protection (Gloves, Finger coats, etc)
 - g) Respiratory Protection. (Nose mask, SCBAs, etc)
 - h) Hearing Protection (Ear plugs, Ear muffs, etc)
- 39.2 The PPEs and safety appliances provided by the contractor shall be of the standard as prescribed by Bureau of Indian Standards (BIS). If materials conforming to BIS standards are not available, the contractor as approved by the Employer shall procure PPE and safety appliances.
- 39.3 All construction workers should be provided with high visibility jackets with reflective tapes conforming to the requirement specified under BS EN 471: 1994 as most of viaduct / tunneling and station works are executed either above or under right-of-way. The conspicuity of workmen at all times shall be increased so as to protect them from speeding vehicular traffic.

39.4 The contractor shall provide **safety helmet, safety shoe and high visibility clothing** for all employees including workmen, traffic marshal and other employees who are engaged for any work under this contract as per the following requirement.

All employees of the Contractor including workmen	Traffic marshals
<ul style="list-style-type: none"> i) Hard hat with company Logo ii) Safety boots iii) Hi-visibility waistcoat covering upper body and meeting the following requirement as per BS EN 471:1994: <ul style="list-style-type: none"> a. Background in fluorescent orange-red in colour b. Two vertical green strips of 5cm wide on front side, covering the torso at least 500 cm² c. Two diagonal strips of 5 cm wide on back in an 'X' pattern covering at least 570cm² d. Horizontal strips not less than 5cm wide running around the bottom of the vertical Strip in front and 'X' pattern at back. e. The bottom strip shall be at a distance of 5cm From the bottom of the vest. f. Strips must be retro reflective and fluorescent g. Waistcoat shall have a side adjustable fit and a side and front tear-away feature on Vests made of nylon. 	<ul style="list-style-type: none"> i) Hard hat with reflective tape ii) Safety boots iii) Hi-visibility jacket covering upper body and meeting the following requirements as per BS EN 471:1994: <ul style="list-style-type: none"> a. Background in fluorescent orange-red in colour b. Jackets with full-length sleeves with two bands of retro reflective material, which shall be placed at the same height on the garment as those of the torso. The upper band shall encircle the upper part of the sleeves between the elbow and the shoulder; the bottom of the lower band shall not be less than 5cm from the bottom of the sleeve. c. Two vertical green strips of 5cm wide on front side, covering the torso at least 500 cm² d. Two diagonal strips of 5 cm wide on back in an 'X' pattern covering at least 570cm² e. Horizontal strips not less than 5cm wide running around the bottom of the vertical strip in front and 'X' pattern at back. f. The bottom strip shall be at a distance of 5cm from the bottom of the vest. g. Strips must be retro reflective and Fluorescent.

39.4.1 Color coding for helmets

Safety Helmet Colour Code (Every Helmet should have the LOGO* affixed /painted)	Person to use
White	K-RIDE staffs
Grey	All Designers, Architect, Consultants, etc.
Violet	Main Contractors (Engineers / Supervisors)
Blue	All Sub-contractors (Engineers / Supervisors)
Red	Electricians (Both Contractor and Sub-contractor)
Green	Safety Professionals (Both Contractor and

	Sub-contractor)
Orange	Security Guards / Traffic marshals
Yellow	All workmen
White (with "VISITOR" sticker)	Visitors

Notes: LOGO

- 1) Logo shall have its outer dimension 2"X2" and shall be conspicuous
- 2) Logo shall be either painted or affixed
- 3) No words shall come either on Top / Bottom of Logo

Logo of the corresponding main contracting company for their employees and sub-contracting company for their employees shall only be used.

- 39.5 In addition to the above any other PPE required for any specific jobs like, welding and cutting, working at height, tunnelling etc shall also be provided to all workmen and also ensure that all workmen use the PPEs properly while on the job.
- 39.6 The contractor shall not pay any cash amount in lieu of PPE to the workers/sub-contractors and expect them to buy and use during work.
- 39.7 The contractor shall at all time maintain a minimum of 10% spare PPEs and safety appliances and properly record and show to the Employer during the inspections. Failing to do so shall invite appropriate penalty as per the provisions of the contract.
- 39.8 It is always the duty of the contractor to provide required PPEs for all visitors. Towards this required quantity of PPEs shall be kept always at the security post.
- 39.9 Damage to Railway Property or Life or Private Property
- 39.9.1 The contractor shall be responsible for all risks to the works and for the trespass and shall make good at his own expense all loss or damage whether to the works themselves or to any other property of the Railway or the lives of persons or property of others from whatsoever cause in connection with the works until they are taken over by the Employer and this although all reasonable and proper precautions may have been taken by the Contractor, and in case the Railway/Employer/Engineer shall be called upon to make good any costs, loss or damages, or to pay any compensation, including that payable under the provisions of Workmen's compensation act or any statutory amendments thereof to any person or persons sustaining damages as aforesaid, by reason of any act, or any negligence or any omissions on the part of the contractor, the amount of any costs or charges including costs and charges in connection with legal proceedings, which the Railway/Employer/Engineer may incur in reference thereto, shall be charged to the contractor. The Railway/Employer/Engineer shall have the power and right to pay or to defend or compromise any claim of threatened legal proceedings or in anticipation of legal proceedings being instituted consequent on the action or default of the contractor, to take such steps as may be considered necessary or desirable to ward off or mitigate the effect of such proceedings, charging to Contractor, as aforesaid, any sum or sums of money which may be paid and any expenses whether for reinstatement or otherwise which may be incurred and the propriety of any such payment, defence or compromise, and the incurring of any such expense shall not be called in question by the Contractor.
- 39.9.2 Safety of Public
- i. The Contractor shall be responsible to take all precautions to ensure the safety of the Public whether on Public or Railway property and shall post such look out men as may in the opinion of the Engineer be required to comply with regulations pertaining to the work.
 - ii. The Contractor shall provide effective barricading using G.I. corrugated sheets around foundation pits, trenches, erection sites, demolition sites etc., to prevent accidents and injuries to the public. He shall erect barricading duly leaving safe passage for the movement of the public as per the directions of Engineer.

- iii. No payment will be made for providing such barricading and the rates quoted by the Contractor shall be inclusive of such safety measures.

39.9.3 Reporting of Accidents

The Contractor shall report to the Engineer details of any accidents as soon as possible after its occurrence. In the case of any fatality or serious accident, the Contractor shall, in addition, notify the Engineer and the Employer immediately by the quickest available means.

39.9.4 Life-saving Appliances and First-aid Equipment

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

39.9.5 Security Measure

- i. Security arrangements for the work shall be in accordance with general requirements and the contractor shall conform to such requirements and shall be held responsible for the action or inaction on the part of his staff, employees and the staff and employees of his subcontractors.
- ii. Contractor's as well as Sub Contractor's employees and representatives shall wear identification Badges (cards), uniforms, helmets, gum boots and other safety/protection gadgets/accessories provided by the Contractor. Badges shall identify the Contractor and show the employee's name and number and shall be worn at all times while at site.
- iii. All vehicles used by the contractor shall be clearly marked with the Contractor's name or identification mark.
- iv. The contractor shall be responsible for security of works for the duration of the contract and shall provide and maintain continuously adequate security personnel to fulfill these obligations. The requirements of security measures shall include, but not be limited to, maintenance of Law and Order at site, provision of all lighting, guard, flagmen, and all other measures necessary for protection of works within the colonies, camps and elsewhere at site, all materials delivered to the site and all persons employed in connection with the works continuously throughout working and non-working periods including nights, Sundays and holidays, for the duration of the contract. However, at work sites in close proximity of traffic corridors where public and traffic are likely to come close to the work area, suitable barricading as proposed by contractor and approved by Engineer shall be provided.
- v. No separate payment will be made for providing security measures and will be deemed included in the quoted lumpsum price.

39.9.6 Contractor will have to comply the instructions circulated for Safety on Worksites Specially Doubling Works being implemented on Indian Railways as per relevant letters and any subsequent instructions on this issue.

It is presumed that bidders have gone through the Indian Railway's policies including any subsequent instructions on this issue if any, before quoting the rates.

39.9.7 Ensuring Safety at work site

Ensuring safety at work site while carrying out of doubling works is of paramount importance.

39.9.8 Following measures must be ensured:

1. Fencing as per specification lay down along the track at specified distance from centerline of existing track. The fencing should be maintained until the track is handed over to Railways. Accordingly, at locations where it has been broken/stolen away, the same should be restored expeditiously.
2. Contractors to ensure patrolling by Cycle/ Motor Cycle to prevent damage to fencing and to rectify as soon as it is detected.
3. In the stretch where new formation is likely to be used by unauthorized vehicles and likely to create potential unsafe condition, lifting barriers under lock & key at points where contractor's vehicles are required to enter should be provided and the same should be manned to allow entry to only contractor's vehicles and prevent entry of unauthorized vehicles.
4. Other likely entry points on the new formation must be suitably blocked by providing physical obstructions by stacking sleepers or by cross trenches or by erecting fence to prevent entry of unauthorized vehicles. Frequent check exercised to ensure that unauthorized vehicles do not ply.
5. Reducing number and length of such stretches by providing cross-barricades should be done.
6. PMC should be advised to educate his supervisor for each stretch to ensure Safety who should be well conversant safety instructions and should see that the same are not violated. PMC has to be made accountable for lapses on the safety aspects.
7. Periodical formal counseling of all contractor's staff and PMC officials regarding safety instructions and review violations coming to light and taking appropriate action.
8. Counseling of drivers and operators of machinery regarding safety aspect during routine inspection of PMC official's contractors Engineers.
9. All the drivers/machine operators should have competency certificate issued by PMC after examining their knowledge about safety. Only authorized drivers can ply within 6.6 m of the existing track will have to be proposed as found necessary.
10. Necessary caution orders to Drivers of trains wherever required in terms of Railway Board's instructions/PCE circulars.
11. In case work is required to be carried out within 3.5 M of existing running line, K-RIDE should be advised well in time and requested to provide look out men and Railway Supervisors for the site. At such locations, close supervision must be ensured.

In terms of contract conditions, preventing entry of outsiders at the worksites is the responsibility of contractor and this has to be ensured.

40.0 VISITORS TO THE SITE

- 40.1 No visitor is allowed to enter the site without the permission of the Employer. All authorised visitors should report at the site office. Contractor shall provide visitor's helmet (White helmet with visitor sticker) and other PPEs like Safety Shoe, reflective jacket, respiratory protection etc. as per requirement of the site.
- 40.2 All Visitors shall be accompanied at all times by a responsible member of the site personnel.
- 40.3 The contractor shall be fully responsible for all visitors' safety and health within the site.
- 40.4 As indicated earlier in this Manual, the Engineer shall undertake regular audits at quarterly intervals, of the Contractor's onsite practices and procedures as a means of assessing the ongoing performance of the Contractor.
- 40.5 The criteria against which the audits will be undertaken shall be derived from the clauses within the Environment Protection Requirements (Appendix III herein above), contract-specific Site Environmental Plan and previous site inspection results.
- 40.6 In addition to the quarterly audits by the Engineer, site inspection shall be undertaken by the Contractor's staff to inspect the construction activities in order to ensure that appropriate environmental protection and pollution control measures are properly followed and implemented.

- 40.7 The frequency of site inspection shall be at least once a week.
- 40.8 The Contractor shall prepare an 'Environmental Inspection and Action Reporting System' and submit to the Engineer for approval and make amendments as suggested. It shall contain a contract specific comprehensive Environment Inspection checklist as requirement of Site Environmental Plan.
- 40.9 The area of inspection shall not be limited to environmental compliance within the site but areas outside the site which are likely to be affected, directly or indirectly by activities at site.
- 40.10 Results of inspection shall be discussed with Engineer and his recommendations on better environmental protection shall be notified to the Contractor for taking immediate action and rapid resolution of identified non-compliance.
- 40.11 If significant environmental problems are identified or if there is an environmental complaint or as a part of investigation work, then the Engineer shall also carry out Ad hoc site inspection which shall be attended by Contractor's Representative.
- 40.12 Reporting system
- 40.12.1 Reporting under the Environmental Management System will contain results of monitoring and inspection programs.
- 40.12.2 In Site Environmental Plan, the Contractor shall prepare and submit monthly Environmental Quality Management Reports in accordance with Requirements as per Contract.
- 40.12.3 The monthly report shall include (but not limited to) the following:
- i) Executive Summary
 - ii) Brief mention of construction activities
 - iii) Monitoring results under AMCP, and NMCP
 - iv) Interpretation of monitoring results, significance and influencing factors
 - v) Graphical representation of monitored results over past four reporting periods.
 - vi) Measures to control spill under SPCP.
 - vii) Action taken on recommendations under site inspection programme or specific directions.
 - viii) Summary of complaints, results of investigations and follow-up action
 - ix) Future key issues.
- 40.13 Complaint Response Process
- 40.13.1 Inquiries, complaints and requests for information can be expected from a wide range of individuals and organizations both private and government. The majority of complaints is likely to be received by K-RIDE, although the site offices are also likely to be contacted.
- 40.13.2 The objective of complaint process is to ensure that public and agency complaints are addressed and resolved consistently and expeditiously.
- 40.13.3 The Contractor's Site Manager will be notified immediately on receipt of complaint that may relate to environmental impacts. The Site Manager will immediately inform the Engineer and through him the K-RIDE.
- 40.13.4 Field investigation should determine whether the complaint has merit, and if so, action should be taken to address the impact.
- 40.13.5 The outcome of the investigation and the action taken shall be documented on a complaint Performa prepared by the Contractor and approved by the Engineer in advance of the works.
- 40.13.6 Where possible, a formal response to each complaint received shall be prepared by the Contractor within seven days in order to notify the concerned person(s) that action has been taken.
- 40.14 Completion of the EQM Programme

- 40.14.1 The construction of Bangalore Suburban rail project will be undertaken as a series of individual construction contracts with necessarily different construction program and completion dates.
- 40.14.2 The Engineer shall maintain an overview of the 'impact causing potential' of each site or contract and monitoring parameter with a view to maintaining the most cost-effective use of the environmental resources dedicated to the Project.
- 40.14.3 Termination of EQM should focus on the percentage contract completion status and on the basis of a history of environmental impact arising from the site over a representative period of monitoring.
- 40.14.4 Justifiable application for termination of EQM shall be put forward by the Contractor to the Engineer, as necessary throughout the construction period.
- 40.15 Working near running line
- 40.15.1 The contractor shall not allow any road vehicle belonging to him or his suppliers etc. to ply in railway land next to the running line. If for execution of certain works viz. earth work 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 for permission giving the type & no. of individual vehicles, names & license particulars of the drivers, location, duration & timings for such work/movement. The Railways/Employer/ Engineer or his authorized representative will personally counsel, examine & certify, the road vehicle drivers, contractor's flag men & supervisor and will give written permission giving names of road vehicle drivers, contractor's flag men 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:
- 40.15.2 Road vehicles can ply along the track after suitable cordoning off track with minimum distance of 6 meters from the centre of the nearest track. For working of machinery close to the running tracks or plying of road vehicles during night hours, the contractor shall apply to the Engineer in writing for permission, duly indicating the site details in a neat sketch and safety measures proposed to be taken. Subject to the approval of concerned Railway authorities, the Engineer or his authorized representative will communicate permission to the contractor/contractor's representative. The contractor and his men shall strictly adhere to the instructions given along with such permissions.
- 40.15.3 Nominated vehicles and drivers shall be utilized for work in the presence of at least one flag man and one supervisor certified for such work. In order to monitor the activities during night hours, additional staff may have to be posted based on the need of the individual site.
- 40.15.4 The Contractor' machinery, equipment and vehicles shall normally operate 6 m clear of track. Any movement/work at less than 6m and upto a minimum of 3.5m clear of track centre, shall be carried out only in the presence of a person (including any railway employee) authorized by the Engineer. No part of the road vehicle shall be allowed at less than 3.5m from track centre. Cost of such railway employee shall be borne by the Employer.
- 40.15.5 The Contractor's machinery and equipment like Cranes, Flash Butt Welders, Ballasting machinery, Compactors, Track Laying Systems etc. are required to operate close to the existing line carrying traffic. Contractor is fully responsible for operating these machineries without endangering the safety of the running line and traffic.
- 40.15.6 Safety Fencing:
- i) Before commencing any work close to the running track, the Contractor shall provide safety fencing and obtain the specific permission of Engineer to commence the work in that stretch.
 - ii) The fencing shall be for a as per relevant scheduled item.
 - iii) The Contractor shall maintain the safety fencing in good working condition throughout the period till the work in a given stretch is completed.
 - iv) The Contractor will be paid for providing safety fencing along the track as per the relevant item in the Price schedule.

40.16 The contractor's special attention is drawn to Para 826 of Indian Railways Permanent Way Manual introduced under Advance Correction Slip no. 69 dated 23.05.2001, reproduced below which should invariably be complied with "826 Safe working of Contractors -- A large number of men and machinery are deployed by the contractors for track renewals, gauge conversions, doublings, bridge rebuilding etc. It is therefore essential that adequate safety measures are taken for safety of the trains as well as the work force.

The following measures should invariably be adopted:

- a) The contractor shall not start any work without the presence of Railway supervisor at site.
- b) Wherever the road vehicles and/or machinery are required to work in the close vicinity of railway line, the work shall be so carried out that there is no infringement to the railway's schedule of dimensions. For this purpose, the area where road vehicles and/or Machinery are required to ply, shall be demarcated and acknowledged by the contractor. Special care shall be taken for turning/reversal of road vehicles/machinery without infringing the running track. Barricading shall be provided wherever justified and feasible as per site conditions.
- c) The "look out and whistle" caution orders shall be issued to the trains and speed restrictions imposed where considered necessary. Suitable flag men/detonators shall be provided where necessary for protection of trains.
- d) The supervisors/workmen should be counseled about safety measures. A competency certificate to the contractor's supervisor as per proforma annexed shall be issued by AEN which will be valid only for the work for which it has been issued.
- e) The unloaded ballast/rails/sleepers/other P.Way materials after unloading along track should be kept clear off moving dimensions and stacked as per the specified heights and distance from the running track.
- f) Supplementary site-specific instructions, wherever considered necessary, shall be issued by the Engineer.

COMPETENCY CERTIFICATE

"Certified that Shri _____ P. Way supervisor of M/S _____ has been examined regarding P. Way working on _____ work. His knowledge has been found satisfactory and he is capable of supervising the work safely.

Authorized Representative / K-RIDE

40.17 The work of formation in banks and cuttings throughout the length of doubling is adjacent to track under running traffic. Many of the bridges on the proposed double line are to be constructed either as extensions or just adjacent to the existing bridges under running traffic. The work of Installation of Track throughout the length of doubling is adjacent to track under running traffic. The work of Installation of Track and Signals in the Station yards including alterations to the existing Track and Signals has to be done adjacent to or in replacement of the existing Track and Signals which are under running traffic. The contractor shall ensure that the safety of the running lines and running traffic is not endangered, because of his work.

40.18 Any traffic/traction blocks, temporary speed restrictions and caution orders required in this connection shall also be got sanctioned from the Railway authorities well in advance, through the Engineer. The Railways may sanction the same for specific sites within the overall recovery time available in the Railway's time table. The contractor shall have to schedule his programme according to the convenience of the Railways. No claim from the contractor for any delay/inconvenience/loss on this account shall be entertained by the Employer.

40.19 The contractor shall provide at site at his own cost, all protection measures including exhibition and lighting of all Temporary Engineering Signals as per Railway rules, instructions and norms. All lights provided by the contractor shall be screened so as not to interfere with any signal light on the Railways or with any traffic or signal lights of any local or other authority.

40.20 Ancillary and Temporary works

- (a) The Contractor's proposals for erection of all ancillary and temporary works shall be in conformity with the proposals submitted along with the tender and modifications thereto as approved by the Engineer.
- (b) The Contractor shall submit drawings, supporting design calculations where called for by the Engineer and other relevant details of all such works to the Engineer for approval at least one month before he desires to commence such works. Approval by the Engineer of any such proposal shall not relieve the contractor of his responsibility for the sufficiency of such works.
- (c) The contractor shall, at his own cost, design and provide any temporary arrangements including relieving/service girders required in connection with the above said works and remove the same, when no longer required. These arrangements shall conform to Railway norms. The contractor shall obtain all necessary approvals and sanctions of the concerned Railway authorities including Commissioner of Railway Safety through the Engineer/ Employer in advance and well in time.
- (d) The contractor shall ensure and be entirely responsible for proper design, fabrication, provision and upkeep of all temporary arrangements and all associated activities so as not to endanger safety of any assets, running track, traffic and traveling public and for following all extent instructions, norms, practice and procedures laid down by Railway authorities in this respect, which may be ascertained from the Railways through the Engineer.
- (e) If required, Railways may, in order to ensure the safety of the running track, post at site Regular Railway staff to watch the efficacy and safety of temporary arrangements and protection measures round the clock for the period the same exist in the running line and till the running line is restored back to normal. Railways may also supervise the insertion, maintenance and removal of the temporary arrangements. The cost of such staff shall be borne by the Employer.
- (f) Notwithstanding the above, the contractor shall not, however, be relieved of his responsibility and obligation as aforesaid.
- (g) Save as provided in Para 7 (e) above, the contractor shall bear the cost of complying with all safety requirements. No extra payment will be made for complying with the safety provisions under this chapter and the cost of all such elements to meet the safety requirements shall be deemed to be included in the Bill of Quantities.

40.21 The contractor remains fully responsible for ensuring safety. In case of any accident, the Contractor shall bear cost of all damages to his equipment and men and also damages to Railway and its passengers.

40.22 Suitable barricading to forewarn road vehicle driver shall be provided by the contractor. The luminous tape, strung on bamboo or steel poles can be considered for such barricading. Barricading arrangement should be got approved by the Engineer.

40.23 Indemnity by Contractor

The Contractor shall indemnify and save harmless the Railway/Employer/Engineer from and against all actions, suit proceedings, losses, costs, damages, claims, and demands of every nature and description brought or recovered against the Railways/ Employer/Engineer by reason of any act or omission of the contractor, his agents or employees, in the execution of the works or in his guarding the same. All sums payable by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied to the actual loss or damage sustained, and whether or not any damage shall have been sustained.

40.24 Damage to Railway Property or Life or Private Property

40.25 The contractor shall be responsible for all risks to the works and for the trespass and shall make good at his own expense all loss or damage whether to the works themselves or to any other property of the Railway or the lives of persons or property of others from whatsoever cause in connection with the works until they are taken over by the Employer and this although all reasonable and proper precautions may have been taken by the Contractor, and in case the Railway/Employer/Engineer shall be called upon to make good any costs, loss or damages, or to pay any compensation, including that payable under the provisions of Workmen's compensation act or any statutory amendments thereof to any person or persons sustaining damages as aforesaid, by reason of any act, or any negligence or any omissions on the part of the contractor, the amount of any costs or charges including costs and charges in connection with legal proceedings, which the Railway/Employer/Engineer may incur in reference thereto, shall be charged to the contractor. The Railway/Employer/Engineer shall have the power and right to pay or to defend or compromise any claim of threatened legal proceedings or in anticipation of legal proceedings being instituted consequent on the action or default of the contractor, to take such steps as may be considered necessary or desirable to ward off or mitigate the effect of such proceedings, charging to Contractor, as aforesaid, any sum or sums of money which may be paid and any expenses whether for reinstatement or otherwise which may be incurred and the propriety of any such payment, defence or compromise, and the incurring of any such expense shall not be called in question by the Contractor.

40.26 Safety of Public

- i. The Contractor shall be responsible to take all precautions to ensure the safety of the Public whether on Public or Railway property and shall post such look out men as may in the opinion of the Engineer be required to comply with regulations pertaining to the work.
- ii. The Contractor shall provide effective barricading using G.I. corrugated sheets around foundation pits, trenches, erection sites, demolition sites etc., to prevent accidents and injuries to the public. He shall erect barricading duly leaving safe passage for the movement of the public as per the directions of Engineer.
- iii. No payment will be made for providing such barricading and the rates quoted by the Contractor shall be inclusive of such safety measures. The quoted lumpsum price is inclusive for all the above items of work.

40.27 Reporting of Accidents

The Contractor shall report to the Engineer details of any accidents as soon as possible after its occurrence. In the case of any fatality or serious accident, the Contractor shall, in addition, notify the Engineer and the Employer immediately by the quickest available means

40.28 Life-saving Appliances and First-aid Equipment: The Contractor shall provide and maintain upon the Works sufficient, proper and efficient life-saving appliances and first-aid equipment to the approval of the Engineer and in accordance with the requirements of ILO Convention No. 62. The appliances and equipment shall be available for use at all time

40.29 Security Measure

- i. Security arrangements for the work shall be in accordance with general requirements and the contractor shall conform to such requirements and shall be held responsible for the action or inaction on the part of his staff, employees and the staff and employees of his subcontractors.
- ii. Contractor's as well as Sub Contractor's employees and representatives shall wear identification Badges (cards), uniforms, helmets, gum boots and other safety/protection gadgets/accessories provided by the Contractor. Badges shall identify the Contractor and show the employee's name and number and shall be worn at all times while at site.
- iii. All vehicles used by the contractor shall be clearly marked with the Contractor's name or identification mark.
- iv. The contractor shall be responsible for security of works for the duration of the contract and shall provide and maintain continuously adequate security personnel to fulfill these obligations. The requirements of security measures shall include, but not be limited to, maintenance of Law and

Order at site, provision of all lighting, guard, flagmen, and all other measures necessary for protection of works within the colonies, camps and elsewhere at site, all materials delivered to the site and all persons employed in connection with the works continuously throughout working and non-working periods including nights, Sundays and holidays, for the duration of the contract. However, at work sites in close proximity of traffic corridors where public and traffic are likely to come close to the work area, suitable barricading as proposed by contractor and approved by Engineer shall be provided.

- v. No separate payment will be made for providing security measures and will be deemed to be included in the quoted lumpsum price.

40.30 Contractor will have to comply the instructions circulated for Safety on Worksites Specially Doubling Works being implemented on Indian Railways as per relevant letters and any subsequent instructions on this issue.

It is presumed that bidders have gone through the Indian Railway's policies including any subsequent instructions on this issue if any, before quoting the rates

40.31 Ensuring Safety at work site

Ensuring safety at work site while carrying out of doubling works is of paramount importance.

Following measures must be ensured: -

1. Fencing as per specification laid down along the track at specified distance from centre line of existing track. The fencing should be maintained till the track is handed over to Railways. Accordingly, at locations where it has been broken/stolen away, the same should be restored expeditiously.
2. Contractors to ensure patrolling by Cycle/ Motor Cycle to prevent damage to fencing and to rectify as soon as it is detected.
3. In the stretch where new formation is likely to be used by unauthorized vehicles and likely to create potential unsafe condition, lifting barriers under lock & key at points where contractor's vehicles are required to enter should be provided and the same should be manned to allow entry to only contractor's vehicles and prevent entry of unauthorized vehicles.

Other likely entry points on the new formation must be suitably blocked by providing physical obstructions by stacking sleepers or by cross trenches or by erecting fence to prevent entry of unauthorized vehicles. Frequent check should be exercised to ensure that unauthorized vehicles do not ply.

4. Reducing number and length of such stretches by providing cross barricades should be done.
5. PMC should be advised to educate his supervisor for each stretch to ensure Safety who should be well conversant safety instructions and should see that the same are not violated. PMC has to be made accountable for lapses on the safety aspects.
6. Periodical formal counseling of all contractor's staff and PMC officials regarding safety instructions and review violations coming to light and taking appropriate action.
7. Counseling of drivers and operators of machinery regarding safety aspect during routine inspection of PMC officials contractors Engineers.
8. All the drivers/machine operators should have competency certificate issued by PMC after examining their knowledge about safety. Only authorized drivers can ply within 6.6 m of the existing track will have to be proposed as found necessary.
9. Necessary caution orders to Drivers of trains wherever required in terms of Railway Board's instructions/PCE circulars.
10. In case work is required to be carried out within 3.5 M of existing running line, K-RIDE should be advised well in time and requested to provide look out men and Railway Supervisors for the site. At such locations close supervision must be ensured.

In terms of contract conditions, preventing entry of outsiders at the worksites is the responsibility of contractor and this has to be ensured

40.32 **Additional Conditions to Safety at Work Spot**

To ensure safety at all the work sites all the time, a dedicated Safety officer duly trained as per the provisions of the contract shall be posted by the contractor for each project. Following works will in general be assigned to safety officer.

1. The Safety officer (in charge) shall be from the permanent rolls of the contractor. He will work under the administrative control of the Project Manager of the contractor.
2. The person from any sub-contractor deputed by the main contractor shall not be designated as Safety officer.
3. The Safety officer shall be overall in charge of the safety methods being undertaken at various work sites. He shall not be given any other task related to the project planning and execution.
4. The Safety officer should be well versed with the safety aspects related to worksites in the vicinity of running railway lines and should impart training to the officials assisting him.
5. The Safety officer shall be given suitable means of transport (depending on the requirement) by the contractor to approach all the work sites frequently and ensure that adequate precautions to ensure safety have been taken. Following items shall be specifically done by the Safety officer.
 - a) Ensuring the provision of the safety fencing. Any shortfall shall be made good immediately.
 - b) Availability of suitable lookout men at each working site. The lookout men shall be in possession of hooters, safety helmet and retro-reflective jacket to warn the site engineer/supervisor and operators/drivers of the equipments/vehicles working near the running track.
 - c) Arranging issuance of competency certificates by Employer/Engineer with the operator/driver of each equipment/vehicle before deputing for work.
 - d) Take assurance from the contractor officials at regular interval of complying with the safety instructions.
 - e) Any safety violation to be advised to all concerned and remedial action taken thereof.
6. The Safety officer will frequently counsel the contractor engineers/supervisors/operators/drivers/lookout men about safety provisions during his day to day inspections and keep a record of the same. The Safety officer will prepare a monthly report of the safety inspections carried out and remedial action taken thereof and send it to the Project Manager of the contractor and the employer/engineer.
7. The contractor should open new sites only after discussing the safety measures to be undertaken with his Safety officer and obtaining the permission from Employer/ Engineer.
8. It shall be the duty of the Project Manager and Safety officer of the contractor that the instructions contained in the agreement related to safety and the same issued by the Railway/Employer/Engineer from time to time are strictly complied with.

Based on the above, it is advised that a thorough review of the safety provisions may be undertaken and it should be ensured that competent safety officers are available at all the work spots

PART III : OCCUPATIONAL HEALTH AND WELFARE

41.0 PHYSICAL FITNESS OF WORKMEN

- 41.1 The contractor shall ensure that his employees/workmen subject themselves to such medical examination as required under the law or under the contract provision and keep a record of the same.
- 41.2 The contractor shall not permit any employee/workmen to enter the work area under the influence of alcohol or any drugs.

42.0 MEDICAL FACILITIES

42.1 Medical Examination

42.1.1 The contractor shall arrange a medical examination of all his employees including his sub-contractor employees employed as drivers, operators of lifting appliances and transport equipment before employing, after illness or injury, if it appears that the illness or injury might have affected his fitness and, thereafter, once in every two years up to the age of 40 and once in a year, thereafter.

- i) The Contractor shall maintain the confidential records of medical examination or the physician authorized by the Employer.
- ii) No building or other construction worker is charged for the medical examination and the cost of such examination is borne by contractor employing such building worker.
- iii) The medical examination shall include: -
 - a) Full medical and occupational history.
 - b) Clinical examination with particular reference to
 - i) General Physique;
 - ii) Vision:- Total visual performance using standard orthorator like Titmus Vision Tester should be estimated and suitability for placement ascertained in accordance with the prescribed job standards.
 - iii) Hearing: - Persons with normal must be able to hear a forced whisper at twenty-four feet. Persons using hearing aids must be able to hear a warning shout under noisy working conditions.
 - iv) Breathing:- Peak flow rate using standard peak flow meter and the average peak flow rate determined out of these readings of the test performed. The results recorded at pre-placement medical examination could be used as a standard for the same individual at the same altitude for reference during subsequent examination.
 - v) Upper Limbs: - Adequate arm function and grip
 - vi) Spine: - Adequately flexible for the job concerned.
 - vii) Lower Limbs: - Adequate leg and foot concerned.
 - viii) General: - Mental alertness and stability with good eye, hand and foot coordination.
 - c) Any other tests which the examining doctor considers necessary

42.1.2. If the contractor fails to get the medical examination conducted as mentioned above, the employer will have the right to get the same conducted by through an agency with intimation to the contractor and deduct the cost and overhead charges.

42.2 Occupational Health Centre

42.2.1 The contractor shall ensure at a construction site an occupational health centre, mobile or static is provided and maintained in good order. Services and facilities shall be provided in the manner laid down in Schedule X of BOCWR. A construction medical officer appointed in an occupational health centre, shall possess the qualification as laid down in Schedule XI of BOCWR.

42.3 Ambulance van and room

42.3.1 The Contractor shall ensure at a construction site of a building or other construction work that an ambulance van and room are provided at such construction site or an arrangement is made with a nearby hospital for providing such ambulance van for transportation of serious cases of accident or sickness of workers to hospital promptly and such ambulance room and van are maintained in good repair and is equipped with standard facilities specified in Schedule IV and Schedule V of BOCWR, respectively.

42.4 First-aid boxes

- 42.4.1 The contractor shall ensure at a construction site one First-aid box for 100 workers provided and maintained for providing First-aid to the building workers. Every First-aid box is distinctly marked "First-aid" and is equipped with the articles specified in Schedule III of BOCWR.
- 42.5 HIV/ AIDS prevention and control
- 42.5.1 The contractor shall adopt the Employer's Policy on "HIV / AIDS Prevention and Control for Workmen Engaged by Contractors" and the copy of the policy is given in **Appendix No: 4**.
- 42.5.2 The Employer will engage a professional agency for implementing the guidelines laid down in the policy and communicate to the contractor.
- 42.5.3 The Contractor shall extend necessary support to the appointed agency by deputing the workmen to attend the awareness creation programmes.
- 42.5.4 The contractor shall also extend necessary organizational support to the appointed agency for the effective implementation of the Employers' workplace policy on HIV/AIDS for workmen of the Contractors.
- 42.5.5 As laid down in the policy the contractor shall identify peer educators (1 for every 100 workers) and refer them for professional training to the Employers' appointed agency for the purpose.
- 42.5.6 The peer educators on completion of the training shall serve as the focal point for any information, education and awareness campaign among the workmen throughout the contract period.
- 42.5.7 The peer educators will be paid a monthly honorarium as fixed by the Employer for rendering his services in addition to his regular duty.
- 42.5.8 The total number of peer educators (1 for 100 workers) shall always be maintained by the contractor.
- 42.5.9 In case if these peer educators leave the contractor by creating vacancy, then the contractor at his own expense train the new replacement peer educator from the Employers' appointed agency for the purpose.
- 42.5.10 It is suggested to the contractor that due care should be taken to select the peer educators from among the group of workmen so that they remain with the contractor throughout the contract period.
- 42.6 Prevention of mosquito breeding
- 42.6.1 Measures shall be taken to prevent mosquito breeding at site. The measures to be taken shall include:
- i) Empty cans, oil drums, packing and other receptacles, which may retain water shall be deposited at a central collection point and shall be removed from the site regularly.
 - ii) Still waters shall be treated at least once every week with oil in order to prevent mosquito breeding.
 - iii) Contractor's equipment and other items on the site, which may retain water, shall be stored, covered or treated in such a manner that water could not be retained.
 - iv) Water storage tanks shall be provided.
- 42.6.2 Posters in both Hindi, English and local language which draw attention to the dangers of permitting mosquito breeding, shall be displayed prominently on the site.
- 42.6.3 The contractor at periodic interval shall arrange to prevent mosquito breeding by fumigation / spraying of insecticides. Most effective insecticides shall include SOLFAC WP 10 or Baytex, The Ideal Larvicide etc.
- 42.7 Alcohol and drugs
- 42.7.1 The contractor shall ensure at all times that no employee is working under the influence of alcohol / drugs which are punishable under Govt. regulations.
- 42.7.2 Smoking at public worksites by any employee is also prohibited as per Govt. regulations.
- 43.0 NOISE**
- 43.1 The Contractor shall consider noise as an environmental constraint in his design, planning and execution of the Works and provide demonstrable evidence of the same on Employer's request.

- The Contractor shall, at his own expense, take all appropriate measures to ensure that work carried out by the Contractor and by his sub-Contractors, whether on or off the Site, will not cause any unnecessary or excessive noise which may disturb the occupants of any nearby dwellings, schools, hospitals, or premises with similar sensitivity to noise.
- 43.1.1 Without prejudice to the generality of the foregoing, noise level reduction measures shall include the following:
- i) The Contractor shall ensure that all powered mechanical equipment used in the Works shall be effectively sound reduced using the most modern techniques available including but not limited to silencers and mufflers.
 - ii) The Contractor shall construct acoustic screens or enclosures around any parts of the Works from which excessive noise may be generated.
- 43.1.2 The Contractor shall ensure that noise generated by work carried out by the Contractor and his sub-Contractors during daytime and night time shall not exceed the maximum permissible noise limits, whether continuously or intermittently, as given in the project SHE Manual. The same may be varied from time to time by and at the sole discretion of the Employer, In the event of a breach of this requirement, the Contractor shall immediately re-deploy or adjust the relevant equipment or take other appropriate measures to reduce the noise levels and thereafter maintain them at levels which do not exceed the said limits. Such measures may include without limitation the temporary or permanent cessation of use of certain items of equipment.
- 43.1.3 The noise monitoring requirements including monitoring locations are given in the project SHE Manual.
- 43.2 Noise Monitoring
- 43.2.1 The activities which are expected to cause noise during the construction of Bangalore metro, include noise from construction equipment, construction activities such as portal construction, boring for piling, earthwork excavation, concreting, viaduct construction (including shifting of launching truss / girder) and removal of spoil and movement of construction vehicles and delivery vehicles, traveling to and from the construction and disposal sites.
- 43.2.2 The level of impact of these noise sources depends upon the noise characteristics of the equipment and activities involved the construction schedule, and the distance from noise sensitive receptors.
- 43.2.3 The Noise Monitoring and Control Plan (NMCP) in contract specific site Environmental Quality Management Plan prepared by the Contractor shall establish procedures to monitor construction noise and determine when to apply measures to control noise pollution due to construction activities at work sites.
- 43.2.4 The NMCP will provide site description, define acceptable noise monitoring equipment, provide siting and operating procedures for noise equipment, and indicate reports and record keeping on noise monitoring data.
- 43.2.5 The NMCP will provide guidance for construction activity. It shall also address noise performance criteria used in the selection of construction equipment.
- 43.2.6 The Noise Monitoring and Control Plan shall provide for:
- a) Definition of noise-sensitive uses in the zones affected by construction.
 - b) Calculation of future noise levels at the closest noise-sensitive receptors to the construction activity based on construction activity and ambient noise levels.
 - c) Evaluation and specification of the noise abatement measures that can be applied to meet the noise objectives.
 - d) Monitoring construction activity and providing adjustments to noise abatement controls that may be required to increase their effectiveness.
 - e) Regular reporting
 - f) Requirements of NMCP:
 - (i) It shall specify the nighttime and daytime construction activities, monitoring locations,

equipment, procedures, and schedule of measurements and reporting methods to be used.

- (ii) It shall contain a scaled plan indicating monitoring location, including measurements to be taken at construction site boundaries and at nearby residential zones.
- (iii) a record of the noise characteristics of powered mechanical equipment proposed to be used during day time and night time and of proposed working methods and of potential noise level reduction measures.
- (iv) Provisions for immediate notification when measured noise levels exceed allowable limits,
- (v) Provide a reporting procedure whereby noise-monitoring data is furnished to the Engineer on a weekly basis.

- 43.2.7 In defining the requirements of the NMCP, available measures for noise control, such as, the use of equipment with special exhaust silencers or enclosures, and the construction of temporary enclosures or noise barriers around specific construction site activity areas shall be considered. It should also specify the measures to be adopted to counter the impact of noise pollution for public and workers working at site during construction.
- 43.2.8 If the measured noise levels exceed the noise limits, the noise levels shall be reduced by appropriate abatement measures.
- 43.2.9 The NMCP will be reviewed on a regular basis and updated as necessary to assure current construction activities are addressed.
- 43.2.10 The Engineer shall monitor Contractor's performance of tasks specified, and will inspect necessary records, reports and procedures related to the control of noise.
- 43.2.11 Impact monitoring shall be carried out at noise sensitive receptor locations within 200 feet of the construction site once each week and after a change in construction activity. Construction noise measurements shall coincide with daytime and night time periods of maximum noise generating construction activities.
- 43.2.12 Noise Monitoring data will be submitted in a Noise Measurement Report Form. It will contain the type of measurement, duration of measurement, distance of monitoring from construction site, and construction equipment working during monitoring period.
- 43.2.13 appropriate parameter for measuring construction noise impacts shall be the equivalent A-weighted sound pressure level (L_{eq}) measured in decibels (dB). The two statistical sound levels L_{10} and L_{90} ; the level exceeded for 10 and 90 percent of the time respectively, shall also be recorded during monitoring. The L_{90} may be considered as the ambient level into which the L_{10} as average peak level intrudes. The L_{max} , L_{eq} , L_{10} and L_{90} values will be reported in the noise measurement form along with allowable noise limit. The duration of monitoring shall be for a minimum of 30 minutes.
- 43.2.14 In no case shall the Contractor expose the public to construction noise levels exceeding 90dBA (slow) or to impulsive noise levels with a peak sound pressure level exceeding 140dB as measured on an impulse sound level meter.
- 43.2.15 Limit for construction noise is based on the existing ambient noise levels in areas adjoining the construction sites.
- 43.2.16 The noise levels emanating from any source during construction, shall not exceed 5 dB(A) or more above existing ambient pre-construction noise levels when measured at a point outside the premises of the location of source. The same may be varied from time to time by and at the sole discretion of the Engineer.
- 43.2.17 Where there are no ambient noise measurements, the construction activities shall be limited to levels measured at a distance of 200 feet from the construction limits or at the nearest affected building, whichever is closer, as given in **Table-2**.

TABLE-2
ALLOWABLE CONSTRUCTION NOISE

LAND USE	MAXIMUM NOISE LEVELS- L _{max} dB (A)	
	Day Time	Night Time
Residential	75	65
Commercial		85
Industrial		90

43.2.18 At the surface of the construction site during night time hours, the Contractor shall use only equipment that operating under full load meets the noise limits specified in **Table-3**, if a sensitive receptor would be affected.

TABLE-3
NOISE EMISSION LIMITS FOR CONSTRUCTION EQUIPMENT USED DURING NIGHTTIME HOURS; MEASURED AT 50 FEET FROM CONSTRUCTION EQUIPMENT*

Equipment Category	L _{max} Level dB(A)
Backhoe	80
Bar Bender	75
Chain Saw	81
Compactor	80
Compressor	80
Concrete Mixer	85
Concrete Pump	82
Crane	85
Dozer	85
Front End Loader	80
Generator	82
Gradall	85
Grader	85
Paver	85
Pneumatic Tools	85
Scraper	85
Tractor	84

Noise emission limits apply to equipment used at surface of the construction site during Night time hours of 9 p.m. to 6 a.m.

43.2.19 The adjustments for close in equipment noise measurement shall be made in accordance with **Table-4**.

TABLE – 4
ADJUSTMENTS FOR CLOSE-IN EQUIPMENT NOISE MEASUREMENTS
(Measurement Values to be subtracted from Measured Sound)

<u>Distance (Feet)</u>	<u>Level to Estimate Sound Level at 50 Feet dB (A)</u>
19-21	8
22-23	7
24-26	6
27-29	5
30-33	4
34-37	3
38-42	2
43-47	1
48-50	0

TABLE- 5
CONSTRUCTION VIBRATION LIMITS
VIBRATION TYPE AND PERMISSIBLE

<u>AGGREGATE DURATION</u>	<u>LIMIT</u>
Sustained (1 hr/day)	0.01 in/sec (80 VdB re 10 ⁻⁶ in/sec)
Transient (<1 hr/day)	0.03 in/sec (90 VdB re 10 ⁻⁶ in/sec)
Transient (<10 min/day)	0.10 in/sec (100 VdB re 10 ⁻⁶ in/sec)

- 43.2.20 When Diesel Generator (DG) Sets are used for operation of equipment and machinery, then 'Standards and Guidelines for control of Noise Pollution from Stationary DG Sets', under Environment (Protection) Act, 1986 shall apply.
- 43.2.21 Should the impact monitoring record noise levels which are:
1. Indicative of a deteriorating situation such that closer monitoring is reasonably indicated, or
 2. When in the opinion of the Engineer additional measurements are required in view of deteriorating noise environment, then, the Engineer may require the Contractor to increase the frequency of impact monitoring at any one or more of the monitoring stations until the results indicate an improving and acceptable level of noise.
- 43.2.22 The Contractor shall submit a copy of monitoring results. The results should represent a statistical evaluation of data for evaluation of trends and comparison with noise emission standards.
- 43.2.23 Where the Engineer determines that the recorded Noise level is significantly greater than the acceptable levels, the Engineer may direct the Contractor to take effective remedial measures including, but not limited to, reviewing noise sources and modifying working procedures.
- 43.2.24 The Contractor shall inform the Engineer of all steps taken to investigate cause of exceedance and immediate action taken to avoid further exceedance through written reports and proposals for action under an Event Contingency Plan.
- 43.3 Control Requirements
- 43.3.1 Construction material should be operated and transported in such a manner as not to create unnecessary noise as outlined below:
- i) Perform Work within the procedures outlined herein and comply with applicable codes, regulations, and standards established by the Central and State Government and their agencies.

- ii) Keep noise to the lowest reasonably practicable level. Appropriate measures will be taken to ensure that construction works will not cause any unnecessary or excessive noise, which may disturb the occupants of any nearby dwellings, schools, hospitals, or premises with similar sensitivity to noise. Use equipment with effective noise-suppression devices and employ other noise control measures as to protect the public.
- iii) Schedule and conduct operations in a manner that will minimize, to the greatest extent feasible, the disturbance to the public in areas adjacent to the construction activities and to occupants of buildings in the vicinity of the construction activities.
- iv) The Contractor shall submit to the Employer a Noise Monitoring and Control Plan (NMCP) under contract specific Site Environmental Plan. It shall include full and comprehensive details of all powered mechanical equipment, which he proposes to use during daytime and night - time, and of his proposed working methods and noise level reduction measures. The NMCP shall include detailed noise calculations and vibration levels to demonstrate the anticipated noise generation and vibrations by the Contractor.
- v) The NMCP prepared by the Contractor shall guide the implementation of construction activity. The NMCP will be reviewed on a regular basis and updated as necessary to assure that current construction activities are addressed. It may appear as a regular agenda item in project coordination meetings, if noise is an issue at any location in the contract.

43.3.2 Dust Control and Silicosis Exposure Reduction Strategy:

The Contractor shall ensure proper dust handling at work site as described in the project specific Environment Management Plan and follow Silicosis Exposure Reduction Strategy as described at **Annexure-I** at the end of this document.

43.4 Occupational Noise

- i) Protection against the effects of occupational noise exposure should be provided when the sound level exceeds the threshold values as provided in Project SHE Manual.
- ii) When employees are subjected to sound levels exceeding those listed in the Table, feasible administrative or engineering controls should be utilized as given in this document and K-RIDE's Project SHE Manual.
- iii) If such controls fail to reduce sound levels within the levels of the table, personal protective equipment shall be provided and used to reduce sound levels within the levels of the table.
- iv) When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. Exposure to different levels for various periods of time shall be computed according to the formula and sample computations, as given in project SHE Manual.

43.4 Vibration Level

43.4.1 In locations where the alignment is close to historical / heritage structures, the contractor shall prepare a monitoring scheme prior to construction at such locations. This scheme for monitoring vibration level at such historical / heritage sites shall be submitted to Employer for his approval. This scheme shall include:

- i) Monitoring requirements for vibrations at regular intervals throughout the construction period.
- ii) Pre-construction structural integrity inspections of historic and sensitive structures in project activity.
- iii) Information dissemination about the construction method, probable effects, quality control measures and precautions to be used.
- iv) The vibration level limits at work sites adjacent to the alignment shall conform to the permitted values of peak p velocity as given in article project SHE Manual.

44.0 VENTILATION AND ILLUMINATION

44.1 Ventilation

- 44.1.1 The contractor shall ensure at a construction site of a building or other construction work that all working areas in a free tunnel are provided with ventilation system as approved by the DG and the fresh air supply in such tunnel is not less than 6m³/min for each building worker employed underground in such tunnel and the free air flow movement inside such tunnel is not less than 9m/min.
- 44.1.2 The oxygen level shall not be less than 19.5% in the working environment.
- 44.2 Illumination
- 44.2.1 The contractor shall take every effort to illuminate the work site as per the Employer's requirement illustrated in general instruction **K-RIDE/SHE/CEO/011**.
- 44.2.2 The contractor shall conduct a monthly illumination monitoring by lux meter for all the locations and the report shall be sent to the Employer within 7th of the next month and the same shall be reviewed during the monthly SHE committee meeting.

45.0 RADIATION

- 45.1 The use of radioactive substances and radiating apparatus shall comply with the Govt. regulatory requirements and all applicable legislations.
- 45.2 Operations involving ionizing radiation shall only be carried out after having been reviewed without objection by the Employers representative and shall be carried out in accordance with a method statement.
- 45.3 Each area containing irradiated apparatus shall have warning notices and barriers, as required by the Regulations, conspicuously posted at or near the area.
- 45.4 Radioactive substances will be stored, used or disposed shall be strictly in accordance with the Govt. Enactments.
- 45.5 The contractor shall ensure that all site personnel and members of the public are not exposed to radiation.

46.0 WELFARE MEASURES FOR WORKERS

- 46.1 Latrine and Urinal Accommodation
- 46.1.1 The contractor shall provide one latrine seat for every 20 workers up to 100 workers and thereafter one for every additional 50 workers. In addition one urinal accommodation shall be provided for every 100 workers.
- 46.1.2 When women are employed, separate latrine and urinals accommodation shall be provided on the same scale as mentioned above.
- 46.1.3 Latrine and urinals shall be provided as per Section 33 of BOCWA and maintained as per Rule 243 of BOCWR and shall also comply with the requirements of public health authorities
- 46.1.4 Moving sites
- 46.1.4.1 In case of works like track laying, the zone of work is constantly moving at elevated level or at underground level. In such cases mobile toilets with proper facility to drain the sullage shall be provided at reasonably accessible distance.
- 46.1.5 In case if the contractor fails to provide required number of urinals and latrines or fail to maintain it as per the requirements of Public Health laws, the Employer shall have the right to provide/maintain through renowned external agencies like "Sulabh" at the cost of the contractor.
- 46.2 Canteen
- 46.2.1 In every workplace wherein not less than 250 workers are ordinarily employed the contractor shall provide an adequate canteen conforming to Section 37 of BOCWA, read with Rule 244 of BOCWR and as stipulated in Rule 247 of BOCWR the charges for food stuff shall be based on 'no profit no loss' basis. The price list of all items shall be conspicuously displayed in such canteen.
- 46.3 Serving of tea and snacks at the workplace

- 46.3.1 As per Rule 246 of BOCWR, at a building or other construction work where a workplace is situated at a distance of more than 200 m from the canteen provided under Rule 244(1) of BOCWR, the contractor employing building works shall make suitable arrangement for serving tea and light refreshment to such building works at such place.
- 46.4 Drinking water
- 46.4.1 As per Section 32 of BOCWA the contractor shall make in every worksite, effective arrangements to provide sufficient supply of wholesome drinking water with minimum quantity of 5 litres per workman per day. Quality of the drinking water shall conform to the requirements of national standards on Public Health
- 46.4.2 While locating these drinking water facilities due care shall be taken so that these are easily accessible within a distance of 200m from the place of work for all workers at all location of work sites.
- 46.4.3 All such points shall be legible marked "Drinking Water" in a language understood by a majority of the workmen employed in such place and such point shall be situated within six metres of any washing places, urinals or latrines.
- 46.5 Labour Accommodation
- 46.5.1 The contractor shall provide free of charges as near as possible, temporary living accommodation to all workers conforming to provisions of Section 34 of BOCWA. These accommodations shall have cooking place, bathing, washing and lavatory facilities
- 46.6 Crèche
- 46.6.1 In every workplace where in more than 50 female workers are ordinarily employed, there shall be provided and maintained a suitable room for use of children under age of 6 yrs, conforming to the provisions of Section 35 of BOCWA.

PART IV : ENVIRONMENTAL MANAGEMENT

47.0 ENVIRONMENTAL MANAGEMENT

Environment Management during construction shall include implementation of Environment Management plan and compliance of pollution control measures at work sites.

Major Statutory Environmental Acts, Rules, Standards, for the time being enforce and as may be amended or substituted from time to time, are listed below:

- i. Environment (Protection) Act, 1986 and Rules therein
- ii. EIA Notification, 2020
- iii. Air (Prevention and Control of Pollution) Act, 1981
- iv. Water (Prevention and Control of Pollution) Act, 1974
- v. Wildlife (Protection) Act, 1972
- vi. Forests (Conservation) Act, 1980
- vii. Coastal Regulation Zone Notification, 2011
- viii. The Wetlands (Conservation and Management) Rules, 2010
- ix. Karnataka Preservation of tress Act 1976
- x. Noise Pollution (Regulation and Control) Rules, 2000
- xi. Public Liability Insurance Act, 1991
- xii. Explosive Act, 1884
- xiii. Hazardous and other Wastes (Management and Transboundary Movement) Rules, 2016
- xiv. Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989
- xv. The Petroleum Rules, 2002

- xvi. Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act, 2010 and National Monuments Authority (Condition of Service of Chairman and Members of the Authority and Conduct o Business) Rules, 2011
 - xvii. Mineral Concession Rules, 1960
 - xviii. National Green Tribunal Act, 2010 and National Green Tribunal (Prevention and Protection) Rules, 2011
- 47.1 Environmental Monitoring
- 47.1.1 The Contractor's Environmental Team shall carry out the monitoring of environmental impacts during construction. Representative sensitive receivers in the vicinity of the works shall be monitored for noise and air quality impacts.
- 47.1.2 For carrying out impact monitoring for noise and air, equipment shall be provided, operated and maintained by the Contractor. The equipment shall be kept in a good state of repair in accordance with the manufacturer's recommendations and maintained in proper working order with sufficient spare equipment available in the event of breakdown to maintain the planned monitoring program.
- 47.1.3 The calibration of monitoring instruments and their respective calibrators shall be carried out in accordance with the manufacturer's requirements to ensure they perform to the same level of accuracy as stated in the manufacturer's specifications.
- 47.1.4 Suspended Particulate Matter (SPM) levels shall be measured by following the standard high volume sampling method as set out in High Volume Method for Suspended Particulate, BIS: 5182-1981
- 47.1.5 24-hour average SPM concentration shall be measured by drawing air through a High Volume Sampler (HVS) fitted with pre-weighted Glass Fiber filter paper at an average flow rate not less than 1.1m³ per minute.
- 47.1.6 The minimum requirements to the specifications of sound level meter should be as given in IS: 9779-1981
- 47.1.7 Engineer will undertake baseline monitoring to establish background levels. Action Level of the Contractor shall be based on the results of baseline monitoring program, which will be made available to him prior to start of construction.
- 47.1.8 The Contractor's monitoring program is summarized in **Table -1**.

TABLE-1
SUMMARY OF CONTRACTOR'S MONITORING PROGRAMME

<i>Parameter</i>	<i>Noise</i>	<i>Air</i>
Sampling	Day Time (6 AM to 9 PM) L _{max} , L _{eq} , L ₁₀ , L ₉₀ , L ₅₀ Night Time (9 PM – 6AM): L _{max} , L _{eq} , L ₁₀ , L ₉₀ , L ₅₀ , L _{dn}	RSPM, SPM 24-hours of the day CO: 12 hrs from 8AM to 8PM.
Frequency At each location	Once a week (when noise generating activities are underway).	Two 24-hour Samples every fifteen days at uniform intervals.
Locations	To be determined by the Contractor based on noise sensitive receptors.	To be determined by the Contractor based on air sensitive receptors.
Number of Locations	4 Locations	2 Locations
Duration of Monitoring by	During Civil Construction	During Civil Construction

Contractor		
Additional Requirements	Adhoc monitoring as required.	Ad hoc monitoring as required

47.2 Event Contingency Plan

The Contractor shall prepare an Event Contingency Plan under his Site Environmental Plan. The purpose is to provide, in addition to monitoring activities, procedures for ensuring that if any environmental exceedance of limiting values (either accidental or through inadequate implementation of mitigation measures on part of the Contractor) does occur, the cause is quickly identified and remedied, and that the risk of a similar event recurring is reduced.

47.3 Air Quality

47.3.1 The Contractor shall take all necessary precautions to minimise fugitive dust emissions from operations involving excavation, grading, and clearing of land and disposal of waste. He shall not allow emissions of fugitive dust from any transport, handling, construction or storage activity to remain visible in atmosphere beyond the property line of emission source for any prolonged period of time without notification to the Employer.

47.3.2 The Contractor shall use construction equipment designed and equipped to minimise or control air pollution. He shall maintain evidence of such design and equipment and make these available for inspection by Employer.

47.3.3 If after commencement of construction activity, Employer believes that the Contractor's equipment or methods of working are causing unacceptable air pollution impacts then these shall be inspected and remedial proposals shall be drawn up by the Contractor, submitted for review to the Employer and implemented.

47.3.4 In developing these remedial measures, the Contractor shall inspect and review all dust sources that may be contributing to air pollution. Remedial measures include use of additional / alternative equipment by the Contractor or maintenance / modification of existing equipment of the Contractor.

In the event that approved remedial measures are not being implemented and serious impacts persist, the Employer may direct the Contractor to suspend work until the measures are implemented, as required under the Contract.

47.3.5 Contractor's transport vehicles and other equipment shall conform to emission standards fixed by Statutory Agencies of Government of India or the State Government from time to time. The Contractor shall carry out periodical checks and undertake remedial measures including replacement, if required, so as to operate within permissible norms.

47.3.6 The Contractor shall establish and maintain records of routine maintenance program for internal combustion engine powered vehicles and equipment used on this project. He shall keep records available for inspection by Employer.

47.3.7 The Contractor shall cover loads of dust generating materials like debris and soil being transported from construction sites. All trucks carrying loose material should be covered and loaded with sufficient free-board to avoid spills through the tailboard or sideboards.

47.3.8 The Contractor shall promptly transport all excavation disposal materials of whatever kind so as not to delay work on the project. Stockpiling of materials will only be allowed at sites designated by the Employer. The Contractor shall place excavation materials in the dumping/disposal areas designated in the plans as given in the specifications.

47.3.9 The temporary dumping areas shall be maintained by the Contractor at all times until the excavate is re-utilised for backfilling or as directed by Employer. Dust control activities shall continue even during any work stoppage.

47.3.10 The Contractor shall place material in a manner that will minimize dust production. Material shall be minimized each day and wetted, to minimize dust production. During dry weather, dust control methods

- must be used daily especially on windy, dry days to prevent any dust from blowing across the site perimeter.
- 47.3.11 The Contractor shall water down construction sites as required suppressing dust, during handling of excavation soil or debris or during demolition. The Contractor will make water sprinklers, water supply and water delivering equipment available at any time that it is required for dust control use. Dust screens will be used, as feasible when additional dust control measures are needed especially where the work is near sensitive receptors.
- 47.3.12 The Contractor shall provide a wash pit or a wheel washing and/or vehicle cleaning facility at the exits from work sites such as construction depots and batching plants. At such facility, high-pressure water jets will be directed at the wheels of vehicles to remove all spoil and dirt.
- 47.3.13 The Contractor shall design and implement his blasting techniques so as to minimise dust, noise, vibration generation and prevention fly rock.
- 47.3.14 Blasting technique should be consistent not only with nature and quantity of rock to be blasted but also the location of blasting.
- 47.3.15 The contractor shall give preference to explosives with better environmental characteristics.
- 47.3.16 The Contractor shall protect structures, utilities, pavements roads and other facilities from disfiguration and damage as a result of his activities. Where this is not possible, the contractor shall restore the structures, utilities, pavements, roads and other facilities to their original or better, failing which the rectification/restoration work shall be carried out at the risk and cost of the contractor.
- 47.3.17 The Contractor shall submit to the Employer an Air Monitoring and Control Plan (AMCP) under contract specific Site Environmental Plan to guide construction activity insofar as it relates to monitoring, controlling and mitigating air pollution.
- 47.4 Air Monitoring
- 47.4.1 Construction activities that will generate dust impacts include excavation (including related activities), material handling and stockpiling, vehicular movement, and wind erosion of unpaved work areas.
- 47.4.2 The impact of fugitive dust on ambient air pollution depends on the quantity generated, as well as the drift potential of the dust particles injected into the atmosphere. Large dust particles will settle out near the source and smaller particles are likely to undergo dispersal over greater distance from the sources and impeded settling. SPM levels will be monitored to evaluate the dust impact during the construction phase of the Project.
- 47.4.3 The Air Quality Monitoring and Control Plan (AMCP) in contract-specific Site Environmental Plan prepared by the Contractor shall establish procedures to monitor impact air quality and measures to control air pollution including dust suppression due to construction activities at work sites. This plan shall contain description of activities that will cause degradation in air quality, environmental procedures to manage pollutants to minimize the air pollution, monitoring program, record keeping and reporting.
- 47.4.4 The Engineer shall monitor Contractor's performance of tasks specified, and will inspect necessary records, reports and procedures related to the control of air quality given in AMCP.
- 47.4.5 Information gathered during the AMCP will be catalogued and maintained by the Contractor and shall be available for review by the Engineer.
- 47.4.6 The exact location of the air monitoring stations located near air sensitive receptors adjoining the construction sites, such as residences, schools, hotels and hospitals and placement of monitoring equipment thereat shall be agreed with the Engineer prior to commencement of air monitoring program.
- 47.4.7 Impact monitoring during the course of the Works shall be carried out at the monitoring stations for two days (continuous twenty-four hours) every fifteen days and where there is a perceived air quality problem.
- 47.4.8 The Contractor shall construct suitable fence, lockable gate, 220V AC power point and suitable access at each air monitoring station. Monitoring stations shall be free from local obstructions or sheltering.
- 47.4.9 Should impact monitoring record dust levels which are:

- i) Indicative of a deteriorating situation such that closer monitoring is reasonably indicated, or
- ii) When in the opinion of the Engineer additional measurements are required in view of deteriorating air quality,

Then the Engineer may require the Contractor to increase the frequency of impact monitoring at any one or more of the monitoring stations until the results indicate an improving and acceptable level of air quality.

- 47.4.10 The Contractor shall keep records of air quality monitoring (including location, date, time). The Contractor shall submit a copy of monitoring results to the Engineer. The results should represent a statistical evaluation of data by calculating maximum, minimum, mean, standard deviation, geometric mean and percentile calculations for evaluation of frequency distribution, trends, and comparison with emission standards.
- 47.4.11 The National Ambient Air Quality Standards given in Air (Prevention and Control of Pollution) Act, 1981 may be referred by the Contractor for Limit Levels of SPM in ambient air which may be followed in estimating the pollution level caused by Contractor's activities.
- 47.4.12 Where the Engineer determines that the recorded dust (TSP) level is significantly greater than the Limit levels, the Engineer may direct the Contractor to take effective remedial measures including, but not limited to, reviewing dust sources and modifying working procedures.
- 47.4.13 Where the recorded baseline levels exceed the ambient air quality standards, then at such locations the action level is the recorded base line. Contractor shall take all effective remedial measures to contain the levels to their baseline value as a result of his activities. The action level may be varied by and at the sole discretion of the Engineer.
- 47.4.14 The Contractor shall inform the Engineer of all steps taken to investigate cause of exceedance and immediate action taken to avoid further exceedance through written reports and proposals for action under an Event Contingency Plan.

48.0 WATER QUALITY

- 48.1 The Contractor shall comply with the Indian Government legislation and the State regulations in existence insofar as they relate to water pollution control and monitoring. A drainage system should be constructed at the commencement of the Works, to drain off all surface water from the work site into suitable drain outlet.
- 48.2 The Contractor shall provide adequate precautions to ensure that no spoil or debris of any kind is pushed, washed, falls or deposited on land adjacent to the site perimeter including public roads or existing stream courses and drains within or adjacent to the site. In the event of any spoil or debris from construction works being deposited or any silt washed down to any area, then all such spoil, debris or material and silt shall be immediately removed and the affected land and areas restored to their natural state by the Contractor to the satisfaction of the Employer.
- 48.3 Due to lowering of potable water supplies in Bangalore and subsequent contamination of ground water, the Contractor is not allowed to discharge water from the site without the approval of the Employer. The Contractor must comply with the requirements of the Local Ground Water Board for discharge of water arising from dewatering. Any water obtained from dewatering systems installed in the works must be either re-used for construction purposes and this water may subsequently be discharged to the drainage system or, if not re-used, recharged to the ground water at suitable aquifer levels. The Contractor must submit his proposals for approval of Employer, on his proposed locations of dewatering of excavation and collection of water for either construction re-use or recharge directly to aquifers.

The Contractor's recharge proposals must be sufficient for recharging of the quantity of water remaining after deduction of water re-used for construction. During dewatering, the contractor shall monitor ground water levels from wells to ensure that draw down levels do not exceed allowable limits. The Contractor will not be permitted to directly discharge, to the drainage system, unused ground water obtaining from the excavation without obtaining approval of Employer or the Agency controlling the system.

- 48.4 The Contractor shall ensure that earth, bentonite, chemicals and concrete agitator washings etc. are not deposited in the watercourses but are suitably collected and residue disposed of in a manner approved by local authorities.
- 48.5 All water and waste products (surface runoff and wastewater) arising on the site shall be collected and removed from the site via a suitable and properly designed temporary drainage system and disposed of at a location and in a manner that will cause neither pollution nor nuisance.
- 48.6 Any mud slurry from drilling, tunnelling, diaphragm wall construction or grouting etc. shall not be discharged into the drainage system unless treatment is carried out that will remove silt, mud particles, bentonite etc. The Contractor shall provide treatment facilities as necessary to prevent the discharge of contaminated ground water.
- 48.7 The Contractor shall discharge wastewater arising out of site office, canteen or toilet facilities constructed by him into sewers after obtaining prior approval of agency controlling the system. A wastewater drainage system shall be provided to drain wastewater into the sewerage system.
- 48.8 The bentonite mixing, treatment and handling system shall be established by the contractor giving due regard to its environmental impacts. The disposal of redundant bentonite shall be carefully considered whether in bulk or liquid form. The disposal location will be advised and agreed with the relevant authorities.
- 48.9 The Contractor shall take measures to prevent discharge of oil and grease during spillage from reaching drainage system or any water body. Oil removal / interceptors shall be provided to treat oil waste from workshop areas etc.
- 48.10 The Contractor shall apply to the appropriate authority for installing bore wells for water supply at site.

49.0 ARCHAEOLOGICAL AND HISTORICAL PREVENTION

- 49.1 The contractor shall seek to accommodate archaeological and historical preservation concerns that may arise due to the construction of the project especially in close vicinity of such areas where such monuments may be located.
- 49.2 The contractor shall consult the Archaeological Survey of India (ASI) and other parties, on the advice of the Employer, to identify and assess construction effects and seek ways to avoid, minimize or mitigate adverse effects on such monuments.
- 49.3 Adverse effects may include reasonably foreseeable effects caused by the construction that may occur later in time, be farther removed in distance or those that alter, howsoever temporarily, the significance of the structure.

50.0 LANDSCAPE AND GREENERY

- 50.1 As far as is reasonably practicable, the Contractor shall maintain ecological balance by preventing deforestation and defacing of natural landscape. In respect of ecological balance, the Contractor shall observe the following instructions.
- 50.2 The Contractor shall, so conduct his construction operations, as to prevent any avoidable destruction, scarring or defacing of natural surroundings in the vicinity of work.
- 50.3 Where destruction, scarring, damage or defacing may occur as a result of operations relating to Permanent or Temporary works, the same shall be repaired, replanted or otherwise corrected at Contractor's expense. All work areas shall be smoothed and graded in a manner to conform to natural appearance of the landscape as directed by the Employer.
- 50.4 A suggested list of trees / shrubs suitable for planting and landscaping is found in Employer's Project SHE Manual.

51.0 FEELING OF TREES

- 51.1 The contractor shall identify the number and type of trees that are require to be felled as a result of construction of works and facilities related to Bangalore Sub Urban Rail Project and inform the Employer.

- 51.2 All trees and shrubbery, which are not specifically require to be cleared or removed for construction purposes, shall be preserved and shall be protected from any damage that may be caused by Contractor's construction operations and equipment. The contractor shall not fell, remove or dispose of any tree or forest produce in any land handed over to him for the construction of works and facilities related to Bangalore Sub Urban Rail Project except with the previous permission obtained from the Forest Department.
- 51.3 The Employer shall arrange permission from the forest department for trees to be felled or translocated. The Employer will permit the removal of trees or shrubs only after prior approval.
- 51.4 Special care shall be exercised where trees or shrubs are exposed to injuries by construction equipment, blasting, excavating, dumping, chemical damage or other operation and the Contractor shall adequately protect such trees by used of protective barriers or other methods approved by the Employer. Trees shall not be used for anchorage.

52.0 FLY ASH

- 52.1 The Employer may require the contractor to use fly ash as a percentage substitution of cement, in concrete for certain structures and works.
- 52.2 In all such uses of Fly Ash, the contractor shall maintain a detailed record of usage of Fly Ash. The contractor shall also collect related details and provide to the Employer.
- 52.3 The reporting details on consumption of Fly Ash are found in Employer's SHE Manual.

53.0 WASTE

- 53.1 The contractor is required to develop, institute and maintain a Waste Management Programme (WMP) during the construction of the project for his works, which may include:
- i) Identification of disposal sites.
 - ii) Identification of quantities to be excavated and disposed of.
 - iii) Identification of split between waste and inert material
 - iv) Identification of amounts intended to be stored temporarily on site location of such storage.
 - v) Identification of intended transport means and route.
 - vi) Obtaining permission, where required, for disposal.
- 53.2 Such a mechanism is intended to ensure that the designation of areas for the segregation and temporary storage of reusable and recyclable materials are incorporate into the WMP. The WMP should be prepared and submitted to the Engineer for approval.
- 53.3 The Contractor shall handle waste in a manner that ensures they are held securely without loss or leakage thus minimizing potential for pollution. The Contractor shall maintain and clean waste storage areas regularly.
- 53.4 The Contractor shall remove waste in a timely manner and disposed of at landfill sites after obtaining approval of the competent authorities namely BBMP, BDA, BMRDA, BWSSB.
- 53.5 Burning of wastes is prohibited. The Contractor shall not burn debris or vegetation or construction waste on the site but remove it in accordance with 50.1 above.
- 53.6 The Contractor shall make arrangement to dispose of metal scrap and other saleable waste to authorized dealer and make available to the Employer on request, records of such sales.

54.0 HAZARDOUS WASTE MANAGEMENT

- 54.1 If encountered or generated as a result of Contractor's activity, then waste classified as hazardous under the "Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016, as amended from time to time shall be disposed of in a manner in compliance with the procedure given in the rules under the aforesaid act.

- 54.2 Chemicals classified as hazardous chemicals under "Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 incorporated under the provisions of Environment (Protection) Act, 1986 shall be disposed of in a manner in compliance with the procedure given in the rules under the aforesaid act.
- 54.3 The contractor shall identify the nature and quantity of hazardous waste generated as a result of his activities and shall file a 'Request for Authorisation' with Bangalore Pollution Control Board along with a map showing the location of storage area.
- 54.4 Outside the storage area, the contractor shall place a 'display board', which will display quantity and nature of hazardous waste, on date. Hazardous Waste needs to be stored in a secure place
- 54.5 It shall be the responsibility of the contractor to ensure that hazardous wastes are stored, based on the composition, in a manner suitable for handling, storage and transport. The labelling and packaging is required to be easily visible and be able to withstand physical conditions and climatic factors.
- 54.6 The contractor shall approach only Authorised Recyclers of Hazardous Waste for disposal of Hazardous Waste, under intimation to the Employer.
- 54.7 Submittal of all environment related documents and records pertaining to monitoring and trend analysis on key parameters such as but not limited to consumption/efficient use of resources such as energy, water, material such as cement, fly ash, iron and steel, recycle/reuse of waste etc that shall have demonstrated continual improvement in the implementation of Environmental management System. Failure to do so the employer shall impose appropriate penalty as indicated under penalty clause.

55.0 ENERGY MANAGEMENT

- 55.1 The contractor shall use and maintain equipment so as to conserve energy and shall be able to produce demonstrable evidence of the same upon Employer's request.
- 55.2 Measures to conserve energy include but not limited to the following:
- i) Use of energy efficient motors and pumps
 - ii) Use of energy efficient lighting, which uses energy efficient luminaries
 - iii) Adequate and uniform illumination level at construction sites suitable for the task
 - iv) Proper size and length of cables and wires to match the rating of equipment
 - v) Use of energy efficient air conditioners
- 55.3 The contractor shall design site offices maximum daylight and minimum heat gain. The rooms shall be well insulated to enhance the efficiency of air conditioners and the use of solar films on windows may be used where feasible.

PART –V: PENALTY AND AWARDS

56.0 CHARGES TO BE RECOVERED FROM CONTRACTOR FOR UNSAFE ACT OR CONDITION

- 56.1 K-RIDE is safety conscious organisation. Any reportable accident (fatality / injury) results in loss of life and/or property damage. These accidents not only result in loss of life but also damage the reputation of K-RIDE. Most of the accidents are avoidable and caused preliminary due to contractors' negligence. Hence K-RIDE shall recover the cost of damages from the contractors for every reportable incident (fatality / injury).
- 56.2 In addition every K-RIDE work site is exposed to public scrutiny as the work is executed just on the right-of-way. Any unsafe act / unsafe condition observed by public further damage our reputation. Because of the non-voluntary compliance of contractors to the condition of contract on SHE and project SHE manual, K-RIDE has been forced to establish safety-enforcing organisation. The cost of established such organisation is to be recovered from contractors for all observed safety violations at sites.
- 56.3 The following table indicates the Safety, Health and Environment violation (unsafe act / unsafe condition) and charges to be recovered from contractors.

SL. NO	TOPIC	UNSAFE ACT/UNSAFE CONDITION	DEDUCTIBLE AMOUNT
1	SHE Policy & Plan	i) SHE policy non-compliance of clause 4.1	Rs.5,000 per single violation, compounded to a maximum of Rs.25,000 at any single instance.
		SHE plan: I. Not as per Employers' content and coverage (clause 4.2, 4.7) II. Delay in submission (clause 4.2, 4.4) III. Not updated as per employer's instruction as per clause 4.4 IV. Copies not provided to all required supervisors / engineers (clause 4.6)	Rs.1,00,000 per single violation, compounded to a maximum of Rs.2,00,000 at any single instance.
2	SHE Organisation	I. Not complying to the minimum manpower requirements as mentioned in General Instruction K-RIDE /SHE/CEO/ 001(clause 6.1.1) II. Not filling up the vacancies created due to SHE personnel leaving the contractor within 14 days.(clause 6.7) III. SHE organization not provided with required Audio-visual and other equipment's as per General Instruction K-RIDE /SHE/CEO/03 (clause 6.9.2) IV. Employing through outsourcing agencies and SHE personal are not in the payroll of the main contractor (clause 6.5.1) V. Disobedience / Improper conduct of any SHE personnel. (clause 6.2) VI. Chief SHE Manager not reporting directly to CPM of contractor. (Clause 6.6)	Rs.1,00,000 per month for first month and Rs.2,00,000 for subsequent months Rs.50,000 per month for first month and Rs.1,00,000 for subsequent months For items iii), iv), v) and vi) Rs.50,000 for first violation and Rs.1,00,000 for subsequent violations
3	SHE committee	I. Failed to formulate or conduct SHE Committee meeting for any month (clause 7.4) II. Contractor and Sub-contractor representatives not attending SHE Committee meetings (clause 7.10) III. Failed to conduct Site inspection before conducting SHE Committee meeting (clause 7.2.1 (viii)) IV. Failed to send SHE Committee Meeting minutes or Agenda to Employer in time (clause 7.8.1, 7.9.1)	Rs.1,00,000 for the first violation and Rs.5,00,000 for the subsequent violations Rs.5,000 to the contractor of the member who had not attended the meeting for first violation and Rs.25,000 for subsequent violations. For item iii), iv), v) and vi) Rs.25,000 for first violation and Rs.50,000 for subsequent

		V. Non-adherence of clause 7.7.1 VI. Non-adherence of clause 7.9	violations
4	ID card	Non-adherence of clause 8.1, 8.2 and 8.3	Rs.1,00,000 for first violation and Rs.2,00,000 for subsequent violations
5	SHE Training	I. not complying to the requirements as mentioned in conditions of contract on SHE and project SHE manual with regard to: II. Induction training not given (clause 8.1) III. Supervisor/engineer/manager training not conducted as per clause 9.6 IV. Refresher training as per clause 9.7 and 9.11 not conducted V. Tool-box talk not conducted as per clause 9.8 VI. Skill development training not conducted as clause 9.9 VII. Daily Safety Oath not conducted as per clause 9.10 VIII. Top management behaviour based SHE training conducted (clause 9.4)	For item 1 a) to g) Rs.50,000 for first violation on and Rs.1,00,000 for subsequent violations
6	SHE Inspection	I. Not complying to the requirements as mentioned in conditions of contract on SHE and project SHE manual as per clause 10.0 II. Noncompliance of clause 10.3.6	Rs.50,000 for first violation and Rs.1,00,000 for subsequent violations
7	SHE audit	I. Internal Audit: MARS II. Not conducted as per SHE Plan (clause 11.2.1) III. Report not sent to Employer (clause 11.2.6) IV. Action not taken for any month (clause 11.2.4)	For item i) to iii) Rs.50,000 for first violation and Rs.1,00,000 for subsequent violations.
		I. External Audit II. Not conducted as per SHE Plan (clause 11.4.3) III. Report not sent to employer (clause 11.4.7) IV. Action not taken for any quarter (clause 11.4.9)	For item iv) to vi) Rs.1,00,000 for first violation and Rs.2,00,000 for subsequent violations.
8	SHE . Communication	Important days to be observed for SHE awareness as furnished by employer not observed (clause 12.2) Posters as furnished by Employer not printed and displayed (clause 12.2)	Rs.10,000 for first violation and Rs.50,000 for subsequent Violations 2,00,000 per contract

9	SHE Submittals	<ul style="list-style-type: none"> I. noncompliance of clause 13.1 II. Noncompliance of clause 13.2 III. Noncompliance of clause 13.3 	<p>For item i) Rs.50,000 for first violation and Rs. 1,00,000 for subsequent Violations For item ii) and iii) Rs. 1,00,000 for first violation and Rs.2,00,000 for subsequent violations</p>
10	Injury and Incidence reporting	<ul style="list-style-type: none"> I. Fatal accidents II. Injury accident III. Abnormal delay in reporting accidents or willful suppression of information about any accidents / dangerous occurrence as per clause 14.1.4 IV. Non-compliance of the clause 14.4 	<p>Rs.5,00,000 for first fatality and Rs. 10,00,000 for every subsequent fatality. Rs. 1,00,000 for first grievously injured person and Rs.2,00,000 for every subsequent grievously injured person (Grievous Injury as defined by Workmen Compensation Act) Rs. 1,00,000 for first violation and Rs.2,00,000 for subsequent violations For items iv) and v) Rs.50,000 for first violation and Rs.1,00,000 for subsequent violations</p>
11	Emergency preparedness Plan	Non-compliance of the clause 15.1,15.2, 15.3, 15.4, 15.5 and 15.6	Rs.1,00,000 for non-compliance of any of the clauses
12	Housekeeping	<ul style="list-style-type: none"> I. Housekeeping maintenance register not properly maintained up to date (clause 17.4) II. Surrounding areas of drinking water tanks / taps not hygienically cleaned / maintained (clause 17.4) III. Office, stores, toilet / urinals not properly cleaned and maintained. (Clause 17.4) IV. Required dustbins at appropriate places not provided / not cleaned. (Clause 17.6) V. Stairways, gangways, passageways blocked. (Clause 17.9) VI. Lumber with protruding nails left as such (clause 17.10) VII. Openings unprotected (clause 17.7) VIII. Excavated earth not removed within a reasonable time. (Clause 17.15, 	Rs.10,000 per single violation Compounded to a maximum of Rs.1,00,000 at any single instance

		<p>47.8)</p> <p>IX. Truck carrying excavated earth not covered / tyres not cleaned. (Clause 17.11)</p> <p>X. Vehicles / equipment's parked / placed on roads obstructing free flow of traffic (clause 17.13)</p> <p>XI. Unused surplus cables / steel scraps lying scattered (clause 17.17)</p> <p>XII. Wooden scraps, empty wooden cable drums lying scattered (clause 17.18)</p> <p>XIII. Water stagnation leading to mosquito breeding (clause 42.6.1)</p>	
13	Working at Height / Ladders and Scaffolds	<p>Not using or anchoring Safety Belt (clause 18.9)</p> <p>Not using Safety Net (clause 18.18)</p> <p>Absence of life line or anchorage point to anchor safety belt (clause 18.19)</p> <p>Non-compliance of clause 18.17</p> <p>Using Bamboo ladders (clause 18.20)</p> <p>Painting of ladders</p> <p>Improper usage (less than 1m extension above landing point, not maintaining 1:4 ratio) (clause 18.20)</p> <p>Aluminium ladders without base rubber bush (clause 18.20)</p> <p>Usage of broken / weak ladders (clause 18.20)</p> <p>Usage of re-bar welded ladders (clause 18.20)</p> <p>Improper guardrail, toe board, barriers and other means of collective protection (clause 18.16)</p> <p>Improper working platform (clause 18.17)</p> <p>Working at unprotected fragile surface (clause 18.9)</p> <p>Working at unprotected edges (clause 20.0)</p>	<p>Rs.10,000 per single violation Compounded to a maximum of Rs.1,00,000 at any single instance</p>
14	Lifting appliances and gear	<p>I. Non availability of fitness certificate as per clause 21.3</p> <p>II. Documents not displayed on the machine or not available with the operator as per clause 21.4</p> <p>III. Maximum Safe Working Load not written on the machine as per clause 21.5</p> <p>IV. Non-compliance of 21.6</p>	<p>Rs.50,000 per single violation Compounded to a maximum of Rs.5,00,000 at any single instance</p>

		<p>V. Non-compliance of 21.7</p> <p>VI. Automatic safe load indicator not provided or not in working condition as per clause 21.8</p> <p>VII. Age of the operator less than 21 years or without any licence and non-compliance of other item as per clause 21.9</p> <p>VIII. Non-compliance of 21.10</p> <p>IX. Non-compliance of any of the items mentioned regarding rigging requirements as per clause 21.11</p> <p>X. Failure to submit method statement in case of all critical lifting (clause 21.3)</p> <p>XI. Person riding on crane. (Clause 23.4)</p> <p>XII. Creating more noise and smoke (clause 43.1.1)</p> <p>XIII. Absence of portable fire extinguisher in driver cabin (clause 31.5)</p> <p>XIV. Fail to guard hoist platform (clause 24.0)</p> <p>XV. No fencing of hoist rope movement area (clause 24.0)</p> <p>XVI. Hoist platform not in the horizontal position (clause 21.2)</p>	
15	Launching Operation / Erection	Non-adherence of any of the provisions mentioned in clause 22.2	Rs. 50,000 for first violation and Rs.1,00,000 for subsequent violations
16	Site Electrical safety	<p>I. Non-compliance of clause 26.1.1</p> <p>II. Non-compliance of clause 26.2.3, 26.2.4 & 26.2.5</p> <p>III. Non-compliance of clause 26.3.1</p> <p>IV. Non-compliance of clause 26.7, 26.8 and 26.9.1</p> <p>V. Non-compliance of clause 26.10 and 26.13</p> <p>VI. Non-compliance of clause 28.3.2</p> <p>VII. Exposed electric lines (fermentative damage) and circuits in the workplace. (Clause 26.5.1)</p> <p>VIII. Inserting of wires directly into the socket</p> <p>IX. Improper grounding for the electrical appliances (clause 26.7.1)</p> <p>X. Electrical cables running on the ground (clause 26.8.5 & 26.8.6)</p> <p>XI. Non-compliance clause 27.0</p>	Rs.10,000 per single violation Compounded to a maximum of Rs.1,00,000 at any single instance

17	Hand tools and Power tools	Non-compliance of clause 28.0	Rs.10,000 per single violation Compounded to a maximum of Rs.1,00,000 at any single instance
18	Gas Cutting	<ol style="list-style-type: none"> I. Wrong colour coding of cylinder. II. Cylinders not stored in upright position. (clause 29.1) III. Flash back arrester, non-return valve and regulator not present or not in working condition. (Clause 29.3 & 29.4) IV. Fail to put cylinders in a cylinder trolley. (Clause 29.1) V. Damaged hose and fail to use hose clamps (clause 29.2) VI. Using domestic LPG cylinders (clause 29.5) VII. Fail to store cylinder 6.6m away from fire prone materials (clause 29.8) VIII. Fire extinguisher not placed in the vicinity during operation (clause 29.6) 	Rs.10,000 per single violation Compounded to a maximum of Rs.50,000 at any single instance
19	Welding	<ol style="list-style-type: none"> I. Voltmeter and Ammeter not working (clause 29.9) II. Non-availability of separate switch in the transformer (clause 29.9) III. Improper grounding and return path. (Clause 29.10) IV. Damaged and bare openings in the welding cable. (Clause 29.10) V. Damaged holder (clause 29.10) VI. Fire extinguisher not placed in the vicinity during operation (clause 29.6) 	Rs.10,000 per single violation Compounded to a maximum of Rs.50,000 at any single instance
20	Fire precaution	<ol style="list-style-type: none"> I. Smoking and open flames in fire prone area (clause 31.6) II. Using more than 24V portable electrical appliances in the fire prone area (clause 34.2.3) III. Not proper ventilation in cylinder storage area. (Clause 29.8) IV. Absence of fire extinguishers (clause 31.1) V. Fire extinguishers not refilled once in a year. (Clause 31.2) VI. Fire extinguisher placed in a not easily accessible location 	Rs.5,000 per single violation Compounded to a maximum of Rs.25,000 at any single instance.
21	Excavation, Tunneling and confined	<ol style="list-style-type: none"> I. Non-compliance of clause 34.1.1 II. Non-compliance of clause 34.2.3 III. Non-compliance of clause 34.3 	For any item from i) and ii) Rs.10,000 per single violation Compounded to a maximum of

	space		Rs.50,000 at any single instance. For item iii) Rs.10,000 per first violation and Rs.50,000 for subsequent violations
22	Work permit system	I. Non-compliance of clause 35.2 II. Non-compliance of clause 21.11.9	For item i) and ii) Rs.50,000 per first violation and Rs.1,00,000 for subsequent violations
23	Traffic Management	III. Non-compliance of clause 36.4.1 IV. Non-compliance of clause 36.8.3 V. Non-compliance of clause 36.9.2 VI. Non-compliance of clause 36.9.3 VII. Non-compliance of clause 36.9.7 VIII. Non-compliance of clause 36.9.8	Rs.1,00,000 per first violation and Rs.2,00,000 for subsequent violations
		a) Barricades (clause 36.9.4) I. Not Cleaned II. Not in alignment III. Not numbered IV. Not painted V. Red lights / reflectors not working VI. Damages not repaired VII. Not secured properly VIII. Barricade inspector not employed IX. Protruding parts / portions repaired X. Barricades maintaining register not properly maintained up to date	Rs.25,000 per single violation Compounded to a maximum of Rs.1,00,000 at any single instance
		b) Contractor Vehicles (clause 36.9.5 & 36.9.6) I. Over loading of vehicles II. Unfit drivers or operators III. Unlicensed vehicles IV. Absence of traffic marshals V. Absence of reversing alarm VI. Absence of fog light (at winter) VII. Power / hand brakes not in working VIII. Condition.	Rs.25,000 per single violation Compounded to a maximum of Rs.1,00,000 at any single instance
		I. Splashing of Bentonite on roads / non-cleaning of tyres of dumpers and transit mixers (clause 17.11 & 17.14) II. Mishandling of bentonite like splashing of bentonite outside specified width of barricading III. Non-cleaning of tyres of dumpers and transit mixers before leaving the site and thereby creating a traffic safety hazard to road users.	For item i) and ii) Rs.1,00,000 on first observation. Rs. 2,00,000 on second observation Rs. 3,00,000 on third and subsequent observations

24	Batching plant / Casting yard	Non-adherence of any of the provisions mentioned in clause 38.0.	Rs. 10,000 for single violation compounded to a maximum of Rs.1,00,000 at any single instant.
25	PPE	<ul style="list-style-type: none"> I. Not having (clause 39.1) II. Not wearing (or) using and kept it elsewhere (clause 39.1) III. Using damaged one (clause 39.2) IV. Using wrong type (clause 39.5) V. Using wrong colour helmet or helmet without logo (clause 39.4.1) VI. Using for other operation (e.g. Using safety helmet for storing materials or carrying water from one place to other) (clause 39.5) VII. Not conforming to BIS standard (clause 39.2) VIII. Non-compliance of clause 39.6, 39.7 and 39.8 	<p>From item i) to vi). Rs.200 per single violation</p> <p>For item vii) Rs.10,000 for first violation and Rs.50,000 for subsequent violations</p> <p>For item viii) Rs.50,000 for first violation and Rs.1,00,000 for subsequent violations</p>
26	Occupational Health	<ul style="list-style-type: none"> I. Fail to conduct medical examination to workers (clause 42.1) II. Absence of ambulance van & room (clause 42.3) III. Workers not having ID card (clause 8.2) IV. Absence of first-aid person in work site. (Clause 42.4) V. Absence or inadequacy of first-aid box. (Clause 42.4) VI. Misuse of first-aid box. (Clause 42.4) VII. First-aid box not satisfy the minimum Indian standard. (Clause 42.4) VIII. Smoking inside the construction site (clause 42.7.2) IX. Drink and drive or work (clause 42.7.1) X. Fumigation / insecticides not sprayed to prevent Mosquito breeding (clause 42.6.3) XI. Non-compliance of clause 44.1 and 44.2 	Rs.10,000 per single violation Compounded to a maximum of Rs.1,00,000 at any single instance
27	Labour Welfare measures	<ul style="list-style-type: none"> I. Inadequate number of toilets (clause 46.1.1) II. Toilets not cleaned properly (clause 46.1.3) III. Absence of water facilities for toilets and washing places (clause 46.1.3) IV. Toilet placed more than 500m from 	Rs.10,000 per single violation Compounded to a maximum of Rs.50,000 at any single instance

		<p>the work site (clause 46.1.3)</p> <p>V. Accommodation not provided as per BOCWA (clause 46.5.1)</p> <p>VI. Absence of drinking water (clause 46.4)</p> <p>VII. Excessive noise and vibration (clause 43.0)</p> <p>VIII. Canteen not provided (clause 46.2)</p> <p>IX. Food stuff not served on no loss no profit basis (clause 46.3)</p> <p>X. Creche not provided (clause 46.6)</p> <p>XI. Non adherence of Labour welfare provisions of BOCWA (clause 3.3.1.2)</p> <p>XII. Fail to register establishment and display the registration certificate at workplace (clause 3.3.1.2)</p> <p>XIII. Absence of workers register and records (clause 3.3.1.2)</p> <p>XIV. Absence of muster roll and wages register (clause 3.3.1.2)</p> <p>XV. Fail to display an abstract of BOCWA and BOCWR (clause 3.3.1.2)</p>	
28	Environmental Management	<p>I. Tyre wash facility not provided (clause 47.12)</p> <p>II. Spillage from vehicles not arrest (clause 48.9)</p> <p>III. Air monitoring not practiced (clause 47.17)</p> <p>IV. Noise monitoring not practiced (clause 43.2.1)</p> <p>V. The values of air monitoring and noise monitoring not within acceptable limits (clause 47.17, 43.2.1)</p> <p>VI. Dust control measures at sites not practiced (clause 47.13)</p> <p>VII. Improper disposal of debris / residues</p> <p>VIII. Noncompliance of clause 53.0 & 54.0</p>	<p>Rs.10,000 per single violation Compounded to a maximum of Rs.50,000 at any single instance</p>
29	Working near existing railway track	<p>I. To start work without erecting barricading as per requirement.</p> <p>II. To start work in station area without permit to work or without approved plan.</p> <p>III. To launch girder for RFO/ROB without approved plan and work permit.</p> <p>IV. Infringement of moving dimension by</p>	<p>Rs. 500000 for first violation and Rs. 1000000 for Subsequent violation.</p>

		any vehicle / construction equipment with running train causing disruption of traffic, injury to passenger / fatal incidence.	
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56.4 Without limiting to the unsafe acts and or conditions mentioned above in clause 56.3 the Employer shall have the right to deduct charges for any other unsafe act and or condition depending upon the gravity of the situation on a case-to-case basis. The charges shall be in comparison with that of the similar offence indicated in clause 56.3.

57.0 STOPPAGE OF WORK

57.1 The Employer shall have the right to stop the work at his sole discretion, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and / or property, and / or equipment's. In such cases, the contractor shall be informed in writing about the nature of hazards and possible injury / accident.

57.2 The contractor shall not proceed with the work until he has complied with each direction to the satisfaction of Employer.

57.3 The Contractor shall not be entitled for any damages / compensation for stoppage of work, due to safety reasons and the period of such stoppage of work shall not be taken as an extension of time for Completion of the Facilities and will not be the ground for waiver of levy of liquidated damages.

58.0 AWARDS

The following categories will be considered for awards as per the scheme in practice of Employer

- i) For every safe million-man hour working without any reportable incidents
- ii) Zero fatality contracts
- iii) 100% adherence to voluntary reporting of all accidents throughout the currency of contract
- iv) Safest project team of the year.
- v) Best SHE team of the year.
- vi) Safest Contractor of the year.

K-RIDE: Rail Infrastructure Development Company (Karnataka) Limited

APPENDIX NO 1

Memorandum of Understanding between Karnataka Rail Infrastructure Development Company Ltd. (K-RIDE) and the Contractor for safe execution of contract work

This Memorandum of Understanding is made and executed by and between Rail Infrastructure Development Company (Karnataka) Limited - "K-RIDE" a Company registered under the Companies Act 1956 and having its registered office at Rail Infrastructure Development Company(Karnataka) Limited – 'K-RIDE', 'Samparka Soudha', 1st Floor, (Opp. Orion Mall), Dr. Rajkumar Road, Rajajinagar 1st Block,

Bangalore - 560010 or their authorized representative(s), hereinafter referred to as "EMPLOYER" (which expression shall wherever the context so requires or admits be deemed to mean and include its successors in business and assigns) of the one party

AND

M/s _____ having its registered office at _____ hereinafter referred to as the "CONTRACTOR" (which expression shall wherever the context so requires or admits be deemed to mean and include its successors in business and assigns) of the other party

WITNESSETH THAT

WHEREAS the EMPLOYER gives highest importance to the occupational safety, health and environment during execution of work, seeks cooperation from the CONTRACTOR in this endeavour.

Thus, this Memorandum of Understanding is for promoting the safety, health and environment aspects required to be followed at workplace/site and will be applicable to any site job to be done by the CONTRACTOR

AND

WHEREAS the CONTRACTOR has read all the terms and conditions of the EMPLOYER and whereas the CONTRACTOR has studied the following documents:

- (a) Tender Documents, including Notice Inviting Tender, General Conditions, Special Conditions,
- (b) Conditions of Contract on Safety, Health and Environment and Project Safety, Health and Environment Manual.
- (c) Building and Other Construction Workers (Regulations of Employment and Conditions of Service) Act 1996, Central Rules 1998 and subsequent Karnataka Government Rules 2006, Building and Other Construction Workers Welfare Cess Act 1996 and Rules 1998 and notification [Central & State] Collection of cess.
- (d) Indian Electricity Act 2003 and Rules 1956.
- (e) Corresponding International / Bureau of Indian Standard Codes.

The amendments to any of the above rules and any other rules & regulations or procedures, circulars, notices & advices lay down by the EMPLOYER from time to time.

Now it is hereby AGREED AND DECLARED by and between the EMPLOYER and the CONTRACTOR as follows:

Clause - I The CONTRACTOR shall abide by the terms and conditions stipulated in Condition of Contract on Safety, Health & Environment and Project Safety, Health & Environment Manual.

Clause - II The CONTRACTOR shall undertake full responsibility for safe execution of job at work

place/site and safety of his personnel and adjoining road users during work.

- Clause - III Without giving any prior notice, the EMPLOYER shall from time to time be entitled to add/or amend any or all terms and conditions with a view to improving safety and occupational health of personnel and safety of work, with immediate effect and the same shall be binding on the CONTRACTOR. The contractor agrees to implement all such amendments, which shall be laid down by the EMPLOYER.
- Clause - IV Besides following the guidelines, safety rules and regulations, safety codes given in various safety procedures/documents mentioned above, the CONTRACTOR shall also prepare detailed method statement which includes job safety analysis wherever there are complicated and hazardous/high risk working involved and get it approved from Employer before execution of work.
- Clause - V Any negligence or violation in implementing any of the provision of the conditions of contract on Safety, Health & Environment and K-RIDE project Safety, Health & Environment Manual shall be viewed seriously and the contractor is liable to compensate the employer for the loss of reputation. The cost of damage shall be fixed on case-to-case basis.

In witness thereof the Parties hereto by representatives duly authorised have executed this Memorandum of Understanding on _____ day of _____ 20____.

Signed on

Signed on

For and on behalf of K-RIDE

For and on behalf of (Contractor)

Signature:

Signature:

Name:

Name:

Title:

Title:

K-RIDE: Rail Infrastructure Development Company (Karnataka) Limited

APPENDIX NO 2

Safety, Welfare and Occupational Health requirements as per BOCW Act 1996 and Rules 1998 and BOCWKR Rules 2006.

(This list has been prepared in chronological order with primary importance to Section of Act and secondary importance to Rules)

- S -** Refers relevant Sections in **BOCWA**
- R -** Refers relevant Rules in **BOCWR**
- C -** Refers relevant Chapter No. in **BOCWR**
- P -** Refers to relevant rules in **BOCWCR 1998**
- K -** Refers to relevant rules in **BOCWKR 2006**

1.	Registration of establishment	S - 7, R - 23 to 27
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2.	Display of registration certification at workplace	R – 26 (5)
3.	Hours of work	S – 28 R – 234 to 237
4.	Register of overtime	S – 28; S – 29 R – 241(1) Form XXII
5.	Weekly rest and payment at rest	R – 235
6.	Night shift	R – 236
7.	Maintenance of workers registers and records	S – 30 R – 238
8.	Notice of commencement and completion	S – 46 R – 239
9.	Register of persons employed as building workers	R – 240
10.	Muster roll and wages register	R – 241(1) (a); Form XVI and XVII
11.	Payment of wages	R – 248
12.	Display of notice of wages regarding	R – 249
13.	Register of damage or loss	R – 241(1)(a); Form XIX, XX, XXI
14.	Issue of wages book	R – 241(2)(a); Form XXIII
15.	Service certificate for each worker	R – 241(2)(b); Form XXIV
16.	Display an abstract of BOCWA and BOCWR	R – 241(5)
17.	Deduction of welfare cess by the government agencies	P – 4(3)
18.	Annual return	R – 242; Form XXV
19.	Drinking water	S – 32
20.	Latrines and Urinals	S – 33 R – 243
21.	Accommodation	S – 34
22.	Creches	S – 35
23.	First-aid boxes	S – 36 R – 231 and Schedule III
24.	Canteens	S – 37 R – 244
25.	Food stuff and other items served in the canteens	R – 245
26.	Supply of tea and snacks in work place	R – 246
27.	Food charges on no loss no profit basis	R – 247
28.	BOCWKR 2006 welfare Board Rules	K – 261 to 267
29.	Safety committee	S – 38 R – 208
30.	Safety officer	S – 38 R – 209 and Schedule VII
31.	Reporting of accidents and dangerous occurrences	S – 39

		R – 210
32.	Procedure for inquiry in to the causes of accidents	R – 211
33.	Responsibility of employer	S – 44 R – 5
34.	Responsibility of Architects, Project engineer and Designers	R – 6
35.	Responsibility of workmen	R – 8
36.	Responsibility for payment of wages and compensation	S – 45
37.	Penalties and Procedures	S – 47; S – 55
38.	Excessive noise, vibration etc.	R – 34
39.	Fire Protection	R – 35
40.	Emergency action plan	R – 36
41.	Fencing of motors	R – 37
42.	Lifting of carrying of excessive weight	R – 38
43.	Health, Safety and Environmental Policy	R – 39
44.	Dangerous and Harmful Environment	R – 40
45.	Overhead protection	R – 41
46.	Slipping, Tripping, Cutting, Drowning and Falling Hazards	R – 42
47.	Dust, Gases, Fumes, etc	R – 43
48.	Corrosive substance	R – 49
49.	Eye Protection	R – 45
50.	Head Protection and other protection apparel	R – 46; R – 54
51.	Electrical Hazards	R – 47
52.	Vehicular traffic	R – 48
53.	Stability of structure	R – 49
54.	Illumination	R – 50; R – 124
55.	Stacking of materials	R – 51
56.	Disposal of debris	R – 52
57.	Numbering and marking of floors	R – 53
58.	Lifting appliances and gears	C – VII; R – 55 to 81
59.	Runways and Ramps	C – VIII; R – 82 to 85
60.	Working on or adjacent to water	C – IX; R – 86 & 87
61.	Transport and earthmoving equipment's	C – X; R – 88 to 95
62.	Concrete work	C – XI; R – 96 to 107
63.	Demolition	C – XII; R – 108 to 118
64.	Excavation and Tunneling works	C – XIII; R – 119 to 168
65.	Ventilation	R – 153
66.	Construction, repair and maintenance of step roof	C – XIV; R – 169 to 171

67.	Ladders and Step ladders	C – XV; R – 172 to 174
68.	Catch platform and hoardings, chutes, safety belts and nets	C – XVI; R – 175 to 180
69.	Structural frame and formworks	C – XVII; R – 181 to 185
70.	Stacking and unstacking	C – XVIII; R – 186 & 187
71.	Scaffold	C – XIX; R – 188 to 205
72.	Cofferdams and Caissons	C – XX; R – 206 to 211
73.	Explosives	C – XXI; R – 212 & 213
74.	Piling	C – XXII; R – 214 to 222
75.	Medical Examination for building and other construction worker, Crane operator and Transport vehicle drivers	R – 81; R – 223(a)(iii) and Schedule XII
76.	Medical examination for occupational health hazards	R – 223(a)(iv)
77.	Charging of workers for Medical Examination	R – 223(b)
78.	Occupational health centers and Medical officers	R – 225 and Schedule X & XI
79.	Ambulance van & room	R – 226 & 227 and Schedule IV & V
80.	Stretchers	R – 228
81.	Occupational health service for building workers	R – 229
82.	Medical examination for occupational health hazards	R – 223(a)(iv)
83.	Emergency care services and emergency treatment	R – 232
84.	Panel of experts and agencies	Central Rule 250
85.	Power of inspectors	Central rule 251 Karnataka Rules 268

K-RIDE: RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED.

APPENDIX NO 3

SITE SHE PLAN

Contract No	
Contractor Name	
Project Name	
1	Project Highlights i) Title of the content ii) Contractor Number iii) Brief scope of work iv) Location map/ key plan v) Period of the project
2	SHE Policy

3	Site Organisation Chart Chart indicating reporting of SHE personnel
4	Roles & Responsibility Individual responsibility of the <ul style="list-style-type: none"> i) Project Manager ii) Construction Manager iii) Construction Supervisors iv) SHE Committee Members v) SHE In charge vi) Site Engineers vii) First Line Supervisors viii) Sub-contractors
5	SHE Committee <ul style="list-style-type: none"> i) Details - Chairman, Members, Secretary and Employer's representative, ii) Procedures for effective conduct of meeting
6	SHE Training
7	Subcontractor Evaluation, Selection and Control
8	SHE Inspection
9	SHE Audit
10	Accident Investigation And Reporting Procedures
11	Occupational Health Measures
12	Labour Welfare Measures
13	Risk assessment and mitigation procedures
14	Safe work procedures <ul style="list-style-type: none"> i) Work at Height ii) Structural Steel Erection iii) Launching of segments iv) Floor, Wall Openings and Stairways v) Welding, Cutting and Bracing vi) Lifting appliances vii) Work Permit Systems viii) Electrical Equipment's ix) Mechanical Equipment's x) Excavation xi) Fire Prevention xii) Hazardous Chemicals and Solvents xiii) Ionizing Radiation xiv) Lighting xv) Abrasive Blasting
15	Work Permit System

16	List of standard job specific PPEs to be used in the site
17	Maintenance of Regime for construction Equipment and Machinery
18	Traffic management
19	Housekeeping
20	Environmental Management
21	Emergency Management
22	Visitors and Security arrangement

**WORKPLAC
E POLICY
ON
HIV/AIDS**

K-RIDE: RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED.

APPENDIX NO 4

PREVENTION & CONTROL FOR WORKMEN ENGAGED BY CONTRACTORS

“Being mobile in and of itself is not a risk factor for HIV infection. It is the situations encountered and the behaviours possibly engaged in during mobility or migration that increase vulnerability and risk regarding HIV / AIDS.” *UNAIDS, Technical update on ‘Population, Mobility and AIDS’, February 2001, p.5*

K-RIDE: Rail Infrastructure Development Company (Karnataka) Limited recognizes HIV / AIDS as a developmental challenge and realizes the need to respond to it by implementing regular HIV / AIDS prevention programmes and creating a non-discriminatory work environment for HIV infected workmen engaged by contractors. For the purpose of making conscientious, sensitive and compassionate decision in addressing the realities of HIV / AIDS, K-RIDE has established these guidelines based on ILO code of practice on HIV / AIDS.

- ▶ Creating awareness through professional agency using IEC (Information, Education and Communication) package specially designed for migrant workers.
- ▶ Institutional capacity building by training the project implementation team, Safety, Health & Environment (SHE) Managers, establishing linkages for efficient diagnosis and treatment of the affected workers, effective monitoring of implementation and documentation for further learning.
- ▶ Establishing peer educators by selecting them in consultation with contractors and training them through professional agencies so that they become focal point for any information, education and awareness campaigns among the workmen throughout the contract period.
- ▶ Promotion of social marketing of condoms through State Aids Control Society.

K-RIDE : RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED.

GENERAL INSTRUCTION: K-RIDE/SHE/CEO/001

SUGGESTIVE MANPOWER REQUIREMENTS OF SHE ORGANIZATION BASED ON CONTRACT VALUE

	1	2	3	4	5	6
Awarded Contract value (in Cr.)	Chief SHE Manager	Senior SHE Manager	Junior SHE Manager	Safety Steward	Senior SHE (Electrical) Engineer	Junior SHE (Electrical) Engineer
Up to 2	-	-	1	Refer Note 1	-	1
Up to 10	-	1	Refer Note 1		1	Refer Note 2
Up to 25	1	Refer Note 1			1	
Up to 100	1				1	
Up to 250	1				1	
More than 250	1				1	

	7	8	9	10	11	12	13
Awarded Contract value (in Cr.)	*Junior SHE (Fire) Manager / **Senior SHE (Fire) Manager	Occupational Health officer with Necessary Nursing Assistants (Refer Note 3)	Environmental Manager	Senior SHE (Traffic) Engineer (Refer Note 4)	Barricade Maintenance Squad (Refer Note 4)	House Keeping Squad	Labour Welfare Officer
Up to 2	-	-	-	-	Refer Note 5	Refer Note 6	-
Up to 10	-	1 (PT)	1	1			1
Up to 25	1*	1 (PT)	1	1			1
Up to 100	1*	1 (FT)	1	1			1
Up to 250	1**	2(FT)	1	1			1 with support staff
More than 250	2**	2(FT)	1 with support staff	1			1 with support staff

Note 1: Adequate, qualified and trained SHE Professionals with required support staff to be deployed at each worksite at each shift.

Note 2: Adequate, qualified and trained Electrical Engineers / supervisors to be deployed at each worksite at each shift.

Note 3: (PT) means Part-Time and (FT) means Full-time.

Note 4: Senior SHE (Traffic) Engineer Post and Barricade Manager (including the staff) Posts are applicable to contracts where the work has to be executed either below or over the right-of-way like Viaduct, Tunnel Contracts wherein erection and maintenance of barricades are paramount important.

Note 5: One Barricade Manager supported by required supervisors and workmen

Note 6: One Housekeeping Manager supported by required supervisors and workmen

K-RIDE: RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED.

GENERAL INSTRUCTION: K-RIDE/SHE/CEO/002

MINIMUM QUALIFICATION AND EXPERIENCE FOR (SHE) SAFETY, ELECTRICAL, ENVIRONMENTAL TRAFFIC ENGG. AND OCCUPATIONAL HEALTH PROFESSIONAL

Sl. No	Designation	Qualification	Experience (in years)
1	Chief SHE Manager	<p>The Chief SHE Manager shall have qualified in any of the following degree/diploma:</p> <ul style="list-style-type: none"> i) Post Graduate Diploma in Industrial Safety & Environmental Management (PGDISEM) from National Institute of Industrial Engineering, Mumbai ii) M.E. in Industrial Safety from NIT, Trichy, Tamil Nadu iii) M.E. in Industrial Safety from Mepco Schlenk Engineering College, Sivakasi, Tamil Nadu iv) B.E. in Fire and Safety Engg. From Cochin University of Science and Engg. Cochin, Kerala v) B.E. with advanced Safety Management Diploma from CLI / RLI Mumbai / Chennai / Kolkata and Kanpur. vi) B.E / B.Arch., with one-year Full Time advanced Safety diploma from NICMAR, Hyderabad. vii) B.E / B.Tech with any other equivalent State and Central Govt. recognized full time Degree / Diploma in Safety. viii) International qualifications like CSP (Certified Safety Professional), NEBOSH, MIOSH, MSISO etc. 	2{for all category except (iv) and 5yrs for category (iv)}
2	Senior SHE Manager	<p>As stated in Sl. No:1 and in addition the following categories:</p> <ul style="list-style-type: none"> i) B.Sc.(Physics/Chemistry/Math) with one year Full Time advanced Safety diploma from NICMAR, Hyderabad ii) B.Sc. / Diploma in Engg. With 	2 {for category (i), (ii) and (iii) only}

		<p>advanced Safety Management Diploma from CLI / RLI / Mumbai / Chennai / Kolkata and Kanpur.</p> <p>iii) B.Sc. (Physics/Chemistry/Math) with One year Full Time diploma in Safety Engineering offered by West Bengal State Technical Education Departments and similar courses by other states.</p> <p>iv) Any Graduate or diploma holder with 7 years of work experience in full-fledged SHE department of any Public Sector / Leading Private Sector / MNC / with prior approval of employer on a case to case basis</p>	
3	Junior SHE Manager	<p>i) Degree in Science / Diploma in Engineering with Govt. Recognized safety diplomas from Correspondence course of NICMAR, Annamalai University, National and State Productivity Councils, Other State Technical Education Boards etc.</p> <p>ii) Any Graduate or diploma holder with 5 years of work experience in full-fledged SHE department of any Public Sector / Leading Private Sector / MNC / with prior approval of employer on a case to case basis</p>	2 (for category (i) only)
4	Safety Steward	Any basic qualification with any SHE related certificate courses.	2
5	Senior SHE (Electrical) Manager	Degree in Electrical Engineering + Govt. recognized Electrical Licence holder	2
6	Junior SHE (Electrical) Manager	Diploma in Electrical Engineering + Govt. recognized Electrical Licence holder	1
7	Senior SHE (Fire) Manager	<p>i) B.E. (Fire) from National Fire Service College, Nagpur</p> <p>ii) B.E (Fire & Safety) from Cochin University</p> <p>iii) Graduate with any Govt. recognized diploma in Fire Safety with 5 years of experience</p>	2 (for category (i) and (ii) only)
8	Junior SHE (Fire) Manager	Any Diploma holder with any Govt. recognized diploma in Industrial Fire Safety.	1
9	Occupational Health Officer	MBBS with Govt. recognized degree/diploma in Industrial/ occupational health	1

10	Environment Manager	Govt. recognized PG Degree / PG Diploma / Degree in Environmental Engineering / Science	2
11	Senior SHE (Traffic) Engineer	Govt. recognized PG Degree / Degree / Diploma in Traffic/Transportation Engineering or Planning	1
12	House Keeping Squad Manager	Any Diploma in Engineering	1
13	Barricade Manager	Any Diploma in Engineering	1
14	Labour Welfare Officer	Any Degree with Govt. Recognized Degree / Diploma / P G Diploma in Labour Welfare related fields like Law, Personnel / Industrial Relations etc.	2

Note 1: In some extraordinary cases where the candidate had earlier worked in K-RIDE or other MRTS Projects they can be considered for the following posts:

- i) Senior SHE Manager
- ii) Junior SHE Manager
- iii) Safety Steward

Depending upon the qualification and no. of years of experience on a case-to-case basis even if they do not possess the prescribed qualification as listed above.

Note 2: In all other cases other than listed under **Note 1** irrespective their earlier experience with MRTS projects the candidates shall qualify as specified above.

K-RIDE: RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED.

GENERAL INSTRUCTION: K-RIDE /SHE/CEO/003

SUGGESTIVE REQUIREMENTS OF SHE MONITORING AND AUDIO-VISUAL EQUIPMENTS											
1.	For the purpose of minimum requirements of Audio-visual and Other equipment the contracts are categorized into the following groups:										
	<table border="1"> <thead> <tr> <th>Contract Value (Initial awarded value of contract)</th> <th>Group</th> </tr> </thead> <tbody> <tr> <td>Upto 25 Cr</td> <td>A</td> </tr> <tr> <td>Upto 100 Cr</td> <td>B</td> </tr> <tr> <td>Upto 250 Cr</td> <td>C</td> </tr> <tr> <td>More than 250 Cr</td> <td>D</td> </tr> </tbody> </table>	Contract Value (Initial awarded value of contract)	Group	Upto 25 Cr	A	Upto 100 Cr	B	Upto 250 Cr	C	More than 250 Cr	D
Contract Value (Initial awarded value of contract)	Group										
Upto 25 Cr	A										
Upto 100 Cr	B										
Upto 250 Cr	C										
More than 250 Cr	D										
2.	Every contractor falling into the above groups shall provide the following minimum required audio visual aids for conducting weekly review, monthly safety committee and other post review meeting of all fatal and major incidences effectively. These audio-visual equipments are a must for conducting periodical in-house safety presentations in the training programmes.										
3.	In addition to the above portable hand held digital sound level meter (SLM) and portable hand held digital lux meter are also to be provided.										

Sl. No	SHE monitoring and Audio-Visual Equipment details	SHE monitoring and Audio-Visual equipment required for			
		Group A Contract	Group B Contract	Group C Contract	Group D Contract
1.	Portable hand held Digital Sound Level Meter (SLM)	1	1	1	1
2.	Portable hand held Digital Lux Meter	1	1	1	1
3.	Laptop Computer with standard configuration including multimedia facilities	1	1	1	1
4.	Colour Printer	1	1	1	1
5.	Computer projector with screen	-	1	1	1
6.	Overhead projector	1			
7.	35mm Camera (For taking accident investigation photos in which case the images cannot be easily altered)	1	1	1	1
8.	Digital camera with flash of minimum 4 mega pixel and video facility	1	1	1	2
9.	Digital still camera with flash of minimum 4 mega pixel	1	2	4	6
10.	Portable loudspeaker (for tool-box talk and emergency purpose)	1	1	2	6
11.	Communication facility like mobile phone, walky-talky etc	For all supervisors and managers/engineers working in Safety, Health & Environment			
12.	Accident investigation Kit containing the following:	1	1	1	2
a)	Chalk piece for marking				
b)	Measuring tape for measuring i) Flexible tape – 2m length ii) Metal Foot long scale and iii) Metal tape – 30m				
c)	Equipment tags				
d)	Multipurpose Flash light				
e)	Barrier tape of 20m length				
f)	Accident investigation Forms and checklists				

g)	Enough Paper for witness recording and other noting				
h)	Emergency Phone Numbers list				

K-RIDE: RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED.

GENERAL INSTRUCTION: K-RIDE/SHE/CEO/004

TOPICS FOR FIRST DAY AT WORK SHE ORIENTATION TRAINING OF WORKMEN

1. HAZARD IDENTIFICATION PROCEDURE

Hazards on site:

- i) Falls
- ii) Earthing work
- iii) Electricity
- iv) Machinery
- v) Handling materials
- vi) Transport
- vii) Site housekeeping
- viii) Fire

2. PERSONAL PROTECTIVE EQUIPMENT

- i) What is available?
- ii) How to obtain it?
- iii) Correct use and care

3. HEALTH

- i) Site welfare facilities
- ii) Potential health hazards
- iii) First Aid/CPR

4. DUTIES OF THE CONTRACTOR

- i) Brief outline of the responsibilities of the Contractor by law
- ii) Details of Contractor's accident prevention policy
- iii) K-RIDE's SHE manual
- iv) Building and other Constructions Welfare Law

5. EMPLOYEE'S DUTIES

- i. Brief outline of responsibilities of employee under law
- ii. Explanation of how new employees fit into the Contractor's plan for accident prevention. (Induction and orientation).

K-RIDE: RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED.

GENERAL INSTRUCTION: K-RIDE/SHE/CEO/005

ID CARD FORMAT
 (85 mm x 55mm)

FRONT SIDE OF ID CARD:

BACKSIDE OF ID CARD:

K-RIDE: RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED

GENERAL INSTRUCTION: K-RIDE/SHE/CEO/006

SHE TRAINING DETAILS FOR MANAGERS AND SUPERVISORS

1. The Law and Safety i) Statutory requirement ii) Appropriate regulations iii) Duties of employer and employee	2. Policy and Administration i) Effect of incentive on accident prevention ii) Human relations iii) Consultation iv) Safety Officer: duties, aims, objectives
3. Safety and the Supervisor i) Safety and efficient production go together ii) Accidents affect morale and public relations	4. Principles of Accident Prevention v) Attitudes of management, supervision & operation vi) Methods of achieving safe operations vii) Accident and injury causes
5. Site Inspection i) The role of management ii) Hazard Identification Procedure iii) Records results iv) Follow-up procedures v) Feedback	6. Human Behavior i) Motivating agencies ii) Individual behavior iii) Environmental effects iv) Techniques of persuasion
7. Site housekeeping i) Site organization ii) Relationship of site housekeeping to accident occurrence iii) Site access iv) Equipment storage v) Material stacking vi) Materials handling	8. Health i) Medical examination ii) Hazard to health on site iii) Sanitation and welfare iv) Protective clothing v) First Aid/CPR
9. Personal Protective Equipment i) Eye, face, hands, feet and legs ii) Respiratory protective equipment iii) Protection against ionizing radiation	10. Electricity i) Appreciation of electrical hazards ii) Power tools iii) Arc welding iv) Low voltage system v) Lighting and power system on sites vi) ELCB, RRCB, Grounding/Ground fault circuit interrupters (GFCIs)
11. Oxygen and Acetylene Equipment i) Cylinder storage and maintenance ii) Condition and maintenance of valves, regulators, gauges iii) Condition and maintenance of hoses and fittings iv) Pressures	12. Equipment i) Accidents related to moving parts of machinery ii) Appreciation of principles of guarding iii) Importance of regular maintenance

13. Transportation i) Transport to and from site ii) Hazard connected with site transport iii) Competent drivers iv) Dumpers v) Tipping trucks vi) Movement near excavations	14. Excavations i) Method of shoring ii) Precautions while shoring iii) Precautions at edge of excavations iv) Removal of shoring v) Sheet steel piling
15. Working platforms, Ladders & Scaffolding i) Hazards connected with the use of ladders ii) Maintenance and inspection iii) Type of scaffold iv) Overloading v) Work on roofs vi) Fragile material vii) Openings in walls and floors viii) Use of safety belts and nets	16. Cranes and other Lifting Machines i) Licensing, certification and training required for operation of cranes ii) Slinging methods iii) Signaling iv) Access to crane(s) v) Maintenance and examination vi) Ground conditions vii) Hazards and accident prevention methods connected with the use of different types of cranes/heavy equipment viii) Crane Lift Plan for all lifts
17. Lifting Tackle i) Slings - single and multi-legged ii) Safe working loads (SWLs) iii) Safety hooks and eyebolts iv) Cause of failure v) Maintenance and examination	18. Fire Prevention and Control i) Principle causes determining fire ii) Understanding fire chemistry iii) Firefighting equipment iv) Firefighting training
19. Communications i) Effective methods of communication (particular interest to non-English speaking workers) ii) Method and preparation of reports iii) Safety committees iv) Safety meeting	20. Manual Handling i) Body posture and procedure for lifting, pushing, pulling, dragging, sitting and walking ii) Ergonomics iii) Stretching exercises

K-RIDE : RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED

GENERAL INSTRUCTION: K-RIDE/SHE/CEO/008

DAYS TO BE OBSERVED FOR CREATING SHE AWARENESS

1 st Monday to Sunday of January	Road Safety Week (Subjected to confirmation from Ministry of Road Transport, Govt. of India every year.)
16 th February	Kyoto Protocol Day
March	Red Cross Month
4 th March	National Safety Day
7 th April	World Health Day
14 th April	Fire Safety Day
April 18 to 22	Earth Week
20 th April	Earth Day
20 th April	Noise Awareness Day
28 th April	ILO World Day for Safety and Health at Work
May 1 to 7	Emergency Preparedness Week
5 th June	World Environmental Day
12 th June	World Day against Child Labors
9 th July	Occupational Health Day
17 th October	World Trauma Day
1 st December	World AIDS Day

K-RIDE: RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED

GENERAL INSTRUCTION: K-RIDE/SHE/CEO/009

MINIMUM REQUIREMENTS OF SHE COMMUNICATION POSTERS / SIGNAGE'S / VIDEO

1. For the purpose of Minimum requirements of SHE Communication Posters / Signage's / Video the contracts are categorized into the following groups:

Contract Value (Initial awarded value of contract)	Group
Up to 25 Cr	A
Up to 100 Cr	B
Up to 250 Cr	C
More than 250 Cr	D

2. Every contractor falling into the above groups shall prepare a SHE Communication Plan as a part of site specific SHE Plan and shall include the following minimum requirement of Posters / Signage's / Video as applicable. In case readymade posters are available in any of the category from National Safety Council, Loss Prevention Association of India or any other safety related organizations they may procure the same and display it. In case the same is not available then the contractors' shall make necessary arrangements to get the posters designed and printed on their own.

All the above are to be detailed in the Site SHE Plan and get an approval from the Employer before displaying the posters.

TABLE NO 1 - MINIMUM NO. OF POSTERS

Sl. No	SHE Poster Title	Minimum No. of concepts in each title	No. of Posters / Signage / Video			
			Group A Contract	Group B Contract	Group C Contract	Group D Contract
1.	Safety Culture	5	Each 10	Each 50	Each 75	Each 100
2.	Daily Safety Oath	1 English & 1 Hindi	Each 100	Each 200	Each 500	Each 1000
3.	Mandatory PPE Usage					
a)	Signage's to display the messages like PPE ZONE, NO PPE ZONE, HARD HAT AREA etc.	2 types of sizes made up of metal sheet to be mounted at different locations	Each 25	Each 50	Each 75	Each 200
b)	Helmet	5	Each 25	Each 50	Each 75	Each 200
c)	Shoe	5	Each 25	Each 50	Each 75	Each 200
d)	Goggles & Ear Protection	5	Each 25	Each 50	Each 75	Each 200
e)	Full Body Harness	5	Each 25	Each 50	Each 75	Each 200
f)	Hi-Vi Jacket	5	Each 25	Each 50	Each 75	Each 200
4.	Emergency Management Plan	5	Each 25	Each 50	Each 75	Each 200
5.	Working at Heights	10	Each 25	Each 50	Each 75	Each 200
a)	Ladder, Stairway, Scaffold - Signage's to display the messages like SAFE, UNSAFE, FIT FOR USE,	5 types of sizes made up of metal	Each 25	Each 50	Each 75	Each 200

	AVOID USE etc.	sheet to be mounted at different locations				
6.	Site Electricity	5	Each 25	Each 50	Each 75	Each 200
7.	Fire and Explosion	5	Each 25	Each 50	Each 75	Each 200
8.	Crane Safety	5	Each 25	Each 50	Each 75	Each 200
9.	Slings	5	Each 25	Each 50	Each 75	Each 200
10.	Rigging Procedures	5	Each 25	Each 50	Each 75	Each 200
11.	Excavation	5	Each 25	Each 50	Each 75	Each 200
12.	Occupational Health (Mosquito Control, HIV/AIDS awareness, Dust Control, Noise Control, No Smoking/Spitting, etc.)	10	Each 25	Each 50	Each 75	Each 200
13.	First – Aid	3	Each 25	Each 50	Each 75	Each 200
14.	Labor Welfare Measures (Payment of Minimum Wages, Avoidance of Child labor, Signing in the Muster Roll, In case of accidents-what to do? etc.	5	Each 25	Each 50	Each 75	Each 200
15.	Importance of “Safety Handbook”	1	25	50	75	200
16.	Traffic Safety (Speed limit, safe crossing and working within barricaded area etc.)	5	Each 25	Each 50	Each 75	Each 200
17.	Environmental Monitoring (Spillage of Muck, hazardous material, Improper drainage, water spray for dust containment etc.)	5	Each 25	Each 50	Each 75	Each 200
18.	Video in Hindi on PPE usage – 15 minutes duration	1	-	-	-	1

Note 1: Items mentioned under 17 is video. Items under 3 (a) and 5 (a) are metal signage boards and all other items are posters.

Table No.: 2 – Size of Posters / Signage’s

Sl. No	Item	Size
1.	Posters – Standard	17”x22” –135 GSM 4 Color Printing
2.	Posters – Special (Wherever required)	17”x22” card laminated FA Poster
3.	Posters - Mega size (Wherever required)	32”x40” Flex FA Poster
4.	First-Aid Booklet	6”x4”
5.	Safety Handbook	6”x4”
6.	Signage’s	Small : 12”x6” Big : 24”x12”
7.	Road Traffic Sign Boards	Strictly as per Indian Road Congress (IRC) specifications

Table No.: 3 – Safety Signage Colour (as per IS 9457)

Sl. No	Type of signage	Color
1	Mandatory	Blue
2	Danger	Yellow
3	Prohibit	Red
4	Safe conditions	Green

K-RIDE: RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED

GENERAL INSTRUCTION: K-RIDE/SHE/CEO/010

EXPERTS / AGENCIES FOR SHE SERVICES

Sl. No.	Organization	Services
1.	Bureau Veritas Industrial Services (India) Pvt. Ltd., B-21 & 22, First Floor, Sector-16, NOIDA-201 301 (U.P.) Phone: 0120 - 2515055 Fax: 0120 - 2515248 E-mail: enp.delhi@in.bureauveritas.com	<ul style="list-style-type: none"> External SHE Audit SHE Management / Technical Training
2.	Central Labor Institute Post box no: 17851, N.S.Monkikar Marg Sion, Mumbai- 400 022 Tel: 022- 4092203 Fax: 022 – 4071986 E-mail: cli@dglasli.nic.in	<ul style="list-style-type: none"> SHE Management / Technical Training
3.	Construction Industry Development Council 801, 8 th Floor, Hemkunt Chambers, 89, Nehru Place, New Delhi – 110 019 E-mail: cidc@vsnl.com	<ul style="list-style-type: none"> SHE Management / Technical Training
4.	Delhi Productivity Council 1E/10, Swami Ramtirath Nagar New Delhi – 110 055 Tel.: 23522835	<ul style="list-style-type: none"> SHE Management / Technical Training
5.	Det Norske Veritas AS, 203, Savitri Sadan 1, 11 Preet Vihar Community Centre, New Delhi-110 092 Phone: 011-22531502/2253/1503, 22427688/22531278 Fax: 011-2253 0247 Website: www.dnv.com	<ul style="list-style-type: none"> External SHE Audit SHE Management / Technical Training
6.	Dr. A. V. Baliga Memorial trust Link House, Bagadur Shah Zafar Marg Press Area New Delhi – 110 002	<ul style="list-style-type: none"> HIV / AIDS awareness

	Phone: 011 – 23311119	
7.	Dr. Cris Research Centre For Occupational Health & Safety 306, Guru Arjuna Dev Bhawan, Ranjit Nagar Complex, New Delhi – 110 008 Phone: 9810040406 Fax: 011 – 25702929 E-mail: team@drcri.com Website: www.drcri.com	<ul style="list-style-type: none"> • Ambulance Room & Van • Communication Materials • First-aid box • First-aid Training • HIV / AIDS awareness • ID Card • Medical Facilities • SHE Orientation Training
8.	DuPont Safety Resources, E.I. DuPont India Private Limited, Arihant Nitco Park 6 th Floor, 90, Dr. Radhakrishnan Salai, Mylapore, Chennai-600 004 Phone: 044-2847 2800, 2847 3752 Fax: 044-2847 3800 Mobile: 9381201040 Website: in.dupont.com	<ul style="list-style-type: none"> • SHE Management Training
9.	EQMS INDIA PVT. LTD. 304 & 305, 3rd Floor, Rishabh Towers, Plot No. 16, Community Centre, Karkardooma, Delhi - 110092. Phone: 011 - 22374729 / 22374775 Fax: 011- 22374662 E-mail: eqms@eqmsindia.org Website: www.eqmsindia.com	<ul style="list-style-type: none"> • ISO Certification • SHE Management / Technical Training
10.	Green Cross Consultants 59, 7 th Cross, 1 st Floor, Jai Bharath Nagar, Banglore-560 033 Phone: 080-2549 6782 E-mail: etgrangan@yahoo.com	<ul style="list-style-type: none"> • SHE Management / Technical Training
11.	HSRTC, PENTASAFE, 201, 2 nd Floor, Town Centre, Andheri Kurla Road, Marol, Andheri (East), Mumbai-400 059 Phone: 022-2850 2210/20/50 Fax: 022-2850 2260 E-mail: training@penta-safe.com	<ul style="list-style-type: none"> • SHE Practical Field Training for Height Safety
12.	Institute of Driving Training & Research, Wazirabad Road, Adjoining Loni Road flyover. New Delhi – 110 094 Phone: 011 – 22813474, 22815833 Fax: 011 - 22811131	<ul style="list-style-type: none"> • SHE Technical Training for Vehicle Drivers.

13.	Institute for Research, Development & Training of Construction Trades & Management, An Educational Institute, Society and Trust, 1 st Floor, UVCE Alumni Association Building, K.R. Circle, Bangalore-560 001 Phone: 080-22294291/22243257 Fax: 080-22243257 E-mail: ubrco@vsnl.com Website: www.instructindia.org	<ul style="list-style-type: none"> • SHE Technical /Field Training
14.	International Engineering Company K – 10, South Extension, Part – 2, New Delhi – 110 049 Phone: 011 – 26254761, 26258130 Mobile: 9312260130 E-mail: ashok@intenco.net	<ul style="list-style-type: none"> • Crane and Lifting appliances and Gears Certification • SHE Practical Field Training for Crane Safety
15.	L & T Eutectic 32, Sivaji Marg, New Delhi – 110 015 Phone: 011 - 51419538, 51419539 Fax: 011 - 51419600 Website: www.lnteutecticwelding.com	<ul style="list-style-type: none"> • SHE Practical Field Training for Welding Safety
16.	Loss Prevention Association of India Ltd. Warden House, Sir P.M. Road, Mumbai – 400 001 Website: www.lpaindia.org	<ul style="list-style-type: none"> • SHE Management / Technical Training
17.	MFA Crucial Moments Healthcare Pvt. Ltd., 42, Okhla Industrial Estate, Phase – II New Delhi – 110 020 Phone: 011 – 55624000 Fax: 011 – 55624010 E-mail: contact@crucialmoments.net	<ul style="list-style-type: none"> • First-aid Training
18.	Modicare Foundation 4 Community Centre, New Friends Colony, New Delhi – 110 065 Phone: 011 – 5167235059 Fax: 011 – 26915469 E-mail: nivedita@modi.com nivedita@gmavil.com Website: www.modicarefoundation.org	<ul style="list-style-type: none"> • HIV / AIDS awareness
19.	National Safety Council HQ and Institute Building 98A, Sector 15, industrial Area C.B.D Belapur, Navi Mumbai – 400614 Phone: 27579924	<ul style="list-style-type: none"> • SHE Management / Technical Training
20.	NICMAR (National Institute of Construction Management	<ul style="list-style-type: none"> • SHE Management /

	and Research) 910,9 th Floor, Hemkunt Chambers, 89, Nehru Place, New Delhi – 110 019 Phone: 011 – 51618415, 51618417, 51618418 Fax: 011 – 51618416	Technical Training
21.	Quality Growth Services Pvt. Ltd. H-13, Kirti Nagar, New Delhi – 110 015 Fax: 011 – 25431737 / 25438598 / 25918332 E-mail: qgs@qgspl.com Website: www.qgspl.com	<ul style="list-style-type: none"> • ISO Certification
22.	Safety Engineers Association / Safety Educational Trust – India 2/257, First Floor, Dr. Ambedkar Nagar, Manapakkam, Chennai – 600 116 Phone: 044 – 22523461 E-mail: safetrustindia@rediffmail.com	<ul style="list-style-type: none"> • SHE Management / Technical Training
23.	SHE Management Consultancy & Support Services, 145 A, Pocket-VI, (DDA Flats), Kondli Gharoli, Mayur Vihar-II, Delhi-110 096 Fax: 011-2262 5015 Mobile: 9811153873 E-mail: r_k_p@vsnl.net	<ul style="list-style-type: none"> • SHE Management / Technical Training
24.	St. Johns' Ambulance Red Cross Road New Delhi – 110 001	<ul style="list-style-type: none"> • First-aid Training
25.	Vexil Business Process Services Pvt. Ltd. 208, A/4, Savitri Nagar, New Delhi – 110 017 Mobile: 9350232714, 98102832201, 9350232716 E-mail: info@vexilbps.com Website: www.vexilbps.com	<ul style="list-style-type: none"> • Emergency Preparedness Mock drill • SHE Management / Technical Training
26.	Welding Research Institute Bharat Heavy Electricals Ltd. (BHEL) Trichirappalli, Tamil Nadu – 620 014 Phone: 0431 – 2577029, 2577283 Fax: 0431 – 2520770 E-mail: wri@bheltry.co.in	<ul style="list-style-type: none"> • SHE Practical Field Training for Welding Safety

K-RIDE: RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED

GENERAL INSTRUCTION: K-RIDE/SHE/CEO/011

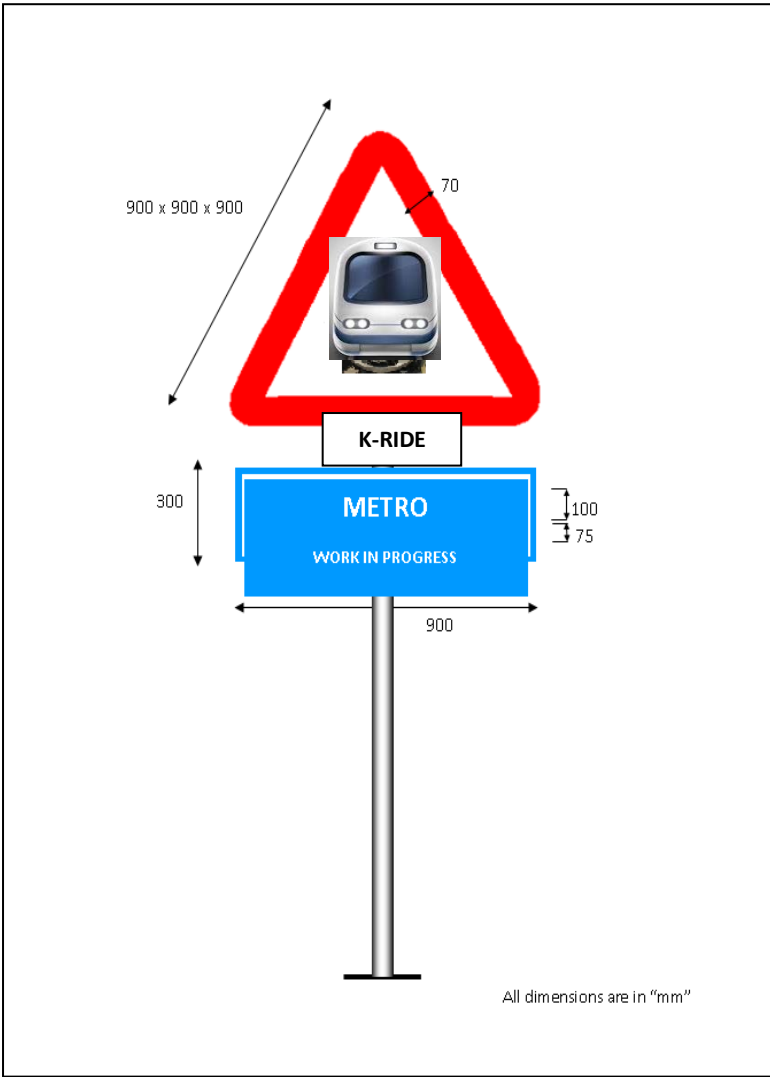
MINIMUM LIGHTING REQUIREMENTS

Sl. No.	Facility or Function	Luminance – lx (lm/ft ²)
1.	Administrative areas (offices, drafting and meeting rooms, etc.)	540 (50)
2.	Construction areas i) general indoor ii) general outdoor iii) tunnel and general underground work areas (minimum 110 lux required at tunnel and shaft heading during drilling, mucking and scaling)	55 (5) 33 (3) 55 (5)
3.	Access ways i) exit ways, walkways, ladders, stairs	110 (10)
4.	Maintenance / Operating areas / Shops i) vehicle maintenance shop ii) carpentry shop iii) outdoors field maintenance area iv) refueling area, outdoors v) shops, fine details work vi) shops, medium detail work vii) welding shop	325 (30) 110 (10) 55 (5) 55 (5) 540 (50) 325 (30) 325 (30)
5.	Mechanical/electrical equipment rooms	110 (10)
6.	Hoists, Elevators, freight and passenger	215 (20)
7.	Warehouses and storage rooms/area i) indoor stockroom, active/bulk storage ii) indoor rack storage iii) outdoor storage	110 (10) 270 (25) 33 (3)
8.	Health Centers and First aid stations and infirmaries	325 (30)
9.	Toilets, wash and dressing rooms	110 (10)
10.	Work areas – general (not listed above)	325 (30)
11.	Parking areas	33 (3)
12.	Visitor areas	215 (20)
13.	Laboratories	540 (50)

K-RIDE: RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED

GENERAL INSTRUCTION: K-RIDE/SHE/CEO/012

WARNING TRAFFIC SIGN



K-RIDE: RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED

FORM NO: SF/001

FORMATION OF SITE SHE COMMITTEE	
Contract No	
Contractor Name	
Contract Title	

CIRCULAR

Committee

The following SHE Committee is constituted with immediate effect:

Chairman:

Members:

- 1)
- 2)
- 3)

Secretary:

Periodicity

The committee will meet at least once in a month on the day (specify date)

Agenda

Secretary will circulate agenda of the meeting at least two days in advance of the schedule date of the meeting.

Circulation

Gist of the meeting will be in minutes in the standard format and circulated to the following under the signature of the secretary

1. Chairman
2. Members

Date:

Signed By: _____

CHAIRMAN

K-RIDE: RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED

FORM NO: SF/002

MINUTES OF SHE COMMITTEE MEETING	
Contract No.	
Contractor Name	
Contract Title	
Meeting No.	<i>Date of Meeting</i>
Location of Meeting	

MEMBERS PRESENT	INVITEES	MEMBERS ABSENT

REPORT SENT TO					
No. of Copies	Name / Dept.	No. of Copies	Name / Dept.	No. of Copies	Name / Dept.

Prepared by: _____ Location: _____ Date: _____

MINUTES OF SHE MEETING				
Item No.	Description of Discussion	Action By	Target	Remarks
1	Complaints received from Clients and corrective and preventive action			
2	Review of MOM of previous meeting			
3	NCR's / Observation from third party			
4	First - Aid cases / Reportable accident cases			
5	Future jobs and specific requirement			
6	Status of implementation of Safety plan			
7	Sub-contractor performance			
8	Analysis of first-aid cases			
9	Need for any specific system / training / PPE's / resources			
10	Observation of SHE committee during last walk down			

Next SHE Meeting is scheduled on:

Date:	Chief SHE Manager (Signature & Name)
Date:	Project Manager (Signature & Name)

K-RIDE: RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED

FORM NO: SF/003

**K-RIDE
COLD WORK PERMIT**

(to be used for works other than Hot, Confined Space Entry or Electrical)

S.No. _____

Work clearance from _____ hrs of date _____ To _____ hrs of date _____
(Valid for the shift unless renewed)

Issued to (Department / Section / Contractor) _____
Exact Location of work (Area / Unit / Equipment No. etc) _____
Description of work _____

THE FOLLOWING ITEMS SHALL BE CHECKED BEFORE ISSUING THE PERMIT
(Tick mark in the appropriate box. Checklist items marked with asterisk (*) shall be complied by receiver)

Sl No	Item	Done	Not Reqd.	S. No.	Item	Done	Not Reqd.
1	Equipment / Work Area inspected			1	Equipment water flushed		
2	Surrounding area checked, cleaned and covered			2	Equipment properly steamed/ purged		
3	Equipment blinded/ disconnected / closed / isolated / wedge opened			3	Proper ventilation and lighting provided		
4	Equipment properly drained and depressurized			4	Area cordoned off & caution boards / tags provided.		
5	Equipment electrically isolated and tagged vide Permit No. -----			5	Gas test: HCs / Toxic etc. HCs = % LEL Toxic gas= ppm		

Remarks:

- The activity has the following expected residual hazards (Tick the relevant items):
Lack of Oxygen / H₂S, Toxic Gases / Combustible gases / Pyrophoric Iron / Corrosive Chemicals / Steam – Condensate / Others _____
- Following additional PPE to be used in addition to standards PPE (Helmet, Safety Shoes, Hand gloves, Boiler suit) Face Shield/ Apron/ Goggles/ Dust Respirator/ Fresh Air Mask/ Lifeline/ Safety Belt/ Airline/ Earmuff etc.
- Additional precaution if any _____

Issuer Name & Designation	Issuer Signature	Receiver Name & Designation	Signature

Clearance renewal:

Date	Time		Additional precautions if any, otherwise mention "NIL"	Issuer's Name, Designation & Signature	Receiver's Name, Designation and Signature
	From	To			

Closing of the work permit:

Receiver: Certified that the subject work has been completed / stopped and area cleared			Issuer: Verified that the job has been completed and area cleared and is safe from any hazard.		
Date & Time	Name & Designation	Signature	Date & Time	Name & Designation	Signature

General Instructions:

1. The work permit shall be filled up carefully and accurately in clear handwriting ensuring that complete information is provided in all the sections / subsections. Sketches should be provided wherever possible to avoid miscommunication.
2. Appropriate safe guards and required personnel protective equipment (PPEs) shall be determined by a careful analysis of the potential hazards and the operations to be performed prior to starting the work.
3. Requirement of standby personnel from Contractor / SHE team if any shall be mentioned in the additional requirement.
4. In case of fire alarm / siren, all work must immediately be stopped.
5. For renewal of work clearance, the issuer shall ensure that the conditions are satisfactory for the work to continue. If the conditions have changed, it may be necessary to issue a new permit or amend the existing permit.
6. This clearance on the same permit can be renewed / extended up to a maximum of seven calendar days.
7. This permit must be available at work site at all times.
8. This permit shall remain valid for 12 hours of the day of issue/ renewal
9. On completion of the work, the permit shall be closed.

K-RIDE: RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED

FORM NO: SF/004

**K-RIDE
HOT WORK PERMIT
(HOT WORK / ENTRY TO CONFINED SPACE)**

Sl.No. _____

Work clearance from _____ hrs of date _____ To _____ hrs of date _____
(Valid for the shift unless renewed)

Issued to (Department / Section / Contractor) _____

Exact Location of work (Area / Unit / Equipment No. etc) _____

Description of work _____

THE FOLLOWING ITEMS SHALL BE CHECKED BEFORE ISSUING THE PERMIT

(Tick mark in the appropriate box. Checklist items marked with asterisk (*) shall be complied by receiver)

Sl. No.	Item	Done	Not Reqd.	S. No.	Item	Done	Not Reqd.
A	General points			B	For Hot work / Entry to confined Space		
1	Equipment / Work Area inspected			1	Proper ventilation and Lighting provided		
2	Surrounding area checked, cleaned and covered			2	Proper means of exit / escape provided		
3	Sewers, manholes, CBDetc. and hot surfaces nearby covered			3	Standby personnel provided from Process / Main / Contractor / Fire / Safety dept.		
4	Considered hazard from other operations and concerned persons Alerted.			4	Checked for oil and Gas trapped behind the lining in Equipment		
5	Equipment blinded/ disconnected / closed / isolated / wedge opened			5*	Shield provided against spark		
6	Equipment properly drained and depressurized			6*	Portable equipment / Nozzles properly grounded		
7	Equipment properly steamed / purged			7*	Standby persons provided for entry to confined space		
8	Equipment water flushed						

9	Iron sulfide removed / kept wet			C	For Vehicle Entry		
10	Equipment electrically isolated and tagged vide permit no.			1*	Spark Arrestor on the mobile equipment / vehicle Provided.		
11	Gas test : HCs = %LEL Toxic gas = ppm, O2 =						
12*	Running water hose / Fire extinguisher pro- vided. Fire water system available.			D	For Excavationworks		
13*	Area cordoned off and Precautionary tags / Boards provided.			1	Clearance obtained for excavation / roadcutting / Dyke cut- ting from concerned dept.		

REMARKS:

- The activity has the following expected residual hazards (Tick the relevant items): Lack of Oxygen / H2S, Toxic Gases / Combustible gases / Pyrophoric Iron / Corrosive Chemicals / Steam – Condensate / Others
- Following PPEs to be used in addition to standards PPEs (Helmet, Safety Shoes, Handgloves, Boiler suit): Face Shield / Apron / Goggles / Dust Respirator / Fresh Air Mask / Lifeline / Safety Belt / Airline / Earmuff etc.
- Additional precautions if any: _____

Issuer Name & Designation	Issuer Signature	Receiver Name and Designation	Receiver Signature

CLEARANCE RENEWAL:

Date	Time		Additional precautions if any, Otherwise mention "NIL"	Issuer's Name, Designation & Signature	Receiver's Name, Designation and Signature	Receiver's Name, Designation and Signature
	From	To				

CLOSING OF THE WORK PERMIT:

Receiver: Certified that the subject work has been completed / stopped and area cleared			Issuer: Verified that the job has been completed and area cleared and is safe from any hazard.		
Date & Time	Name & Designation	Signature	Date & Time	Name & Designation	Signature

GENERAL INSTRUCTIONS

1. The work permit shall be filled up carefully and accurately in clear handwriting ensuring that complete information is provided in all sections / subsections and none of column is left blank. Sketches should be provided wherever possible to avoid miscommunication.
2. Appropriate safe guards and required personnel protective equipment shall be determined by a careful analysis of the potential hazards and the operations to be performed prior to starting the work.
3. In case of fire alarm / siren, all work must immediately be stopped.
4. Only certified vehicle / engines and permitted type of electrical equipment and tools are allowed in operating areas.
5. Welding machines should be located in non-hazardous and ventilated areas.
6. No hot work should be permitted unless the explosive meter reading is Zero.
7. When a person is entering confined space, the receiver must keep minimum two standby-designated persons at the manhole or entry point.
8. Before box up of any vessel manhole cover, ensure that no men / materials are inside the vessel.
9. For renewal of work clearance, the issuer shall ensure that the conditions are satisfactory for the work to continue. If the conditions have changed, it may be necessary to issue a new permit or amend the existing permit.
10. This clearance shall remain valid for 12 hours on the date of issue/ renewal.
11. This permit must be available at work site at all times.
12. On completion of the work, the permit must be closed and kept as record.

K-RIDE: RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED

FORM NO: SF/005

**K-RIDE
ELECTRICAL ISOLATION / ENERGISATION PERMIT**

Section-A: Isolation Permit.

S.No. _____ Request for Isolation:

Date: _____ Time: _____

Department / Section / Area issuing the permit _____

Equipment number to be isolated: _____

Name of the equipment / circuit to be isolated: _____

The above-mentioned equipment / circuit shall be de-energized and isolated from all liveconductors to carry out the maintenance work by _____ s
_____ s
action/ for operational requirement.

_____	_____	_____
Issuer Name	Designation	signature

Certificate of Isolation: Date: _____ Time: _____
Certified that Equipment / Circuit no. _____ of _____ plant
has been electrically isolated by switches / isolators / links / fuses (tick as applicable) and the danger tag is put on the supply panel. Actions in respect of electrical isolation have been recorded in the electrical shift logbook.

_____	_____	_____
Name of Authorized Person	Designation	Signature

Section-B: Energisation Permit. Sl.No. _____

Request for Energisation: Date: _____ Time: _____

Department / Section / Area issuing the Permit _____

Equipment number to be energized: _____

Name of the equipment / circuit to be energized: _____

Work on the above mention equipment / circuit has been completed and all the applicable permits closed. This equipment / circuit may be energized.

K-RIDE: RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED

FORM NO: SF/006

COMPETENCY CERTIFICATE

"Certified that Shri_____ P. Way supervisor of M/S_____ has been examined regarding P. Way working on_____ work. His knowledge has been found satisfactory and he is capable of supervising the work safely.

Employer/Authorized Representative /K-RIDE

K-RIDE

Annexure-I

SILICA EXPOSURE REDUCTION STRATEGIES

PART 1 GENERAL APPLICATION

1.1 DESCRIPTION

- A. This addendum specifies minimum environmental health and safety equipment, practices and procedures to minimize exposures to airborne silica dust during quarry operations, stone crushing, transport, and site construction. The scope of this section is limited to dust controls and employee protection in these environments.
- B. This addendum shall take precedence over overlapping requirements in the Technical Specification unless otherwise stated.
- C. This document is an integral part of the contract and the contractor has the responsibility to fully implement it. Any request to deviate from any specified requirement shall be made in writing to the project sponsor.
- D. This addendum supplements all local, regional and national laws and regulations concerning the location, environmental emissions, and occupational safety in these operations. If regulatory requirements are more stringent, or require more frequent verification than outlined in this standard, then the regulatory provisions shall take precedence and become the de facto requirement in that jurisdiction.
- E. Contractor(s) shall provide a copy of the licensing documentation (NOC/ Consent to Establish) for each facility from where they purchase crushed stone including each quarry, stone crusher mill, and hot mix plant indicating they meet all applicable requirements.

1.2 GENERAL SITE REQUIREMENTS QUARRIES

- i) Operator must establish a reliable source of water with adequate capacity and pressure to run all dust suppression systems at the quarry site;
- ii) Operator must establish a reliable source of power for all mechanical equipment at the stone quarry site;
- iii) Residential areas and temporary employee housing must be located a minimum of 100 meters from any quarrying operations;
- iv) Stone drilling, cutting and conveying operations shall be equipped with either continuous wet suppression system or dry dust collectors designed and operated per minimum requirements below.
- v) Dust controls in quarries must include water fed compressed air drilling equipment, enclosed screens; enclosed transfer points, covered conveyors, and chutes.
- vi) Wet the surface of rock materials with a hose before blasting operations.

1.3 GENERAL SITE REQUIREMENTS STONE CRUSHER MILLS AND HOT MIX PLANTS

- A. Contractor shall submit a detailed plan for any temporary stone crusher or hot mix plant sites intended to be utilized for this project. The plan shall show adjacent areas within 100 meters and depict all structures and roadways. All temporary sites must meet all requirements specified in this addendum and must obtain a Consent to Establish/ (NOC) from the applicable authorities.
- B. Temporary or permanent stone crusher sites or hot mix plants must meet all of the following requirements
 - 1. Site must be at least 250 meters from National and State Highways and 500
 - 2. meters from schools, educational institutions and religious places.

3. Establish green belt zone as required by applicable local requirements;
4. Residential areas and temporary employee housing must be located a
5. minimum of 200 meters from any stone crushing equipment or operations;
6. Operator must establish a reliable source of water with adequate capacity and pressure to run all dust suppression systems installed at the stone crusher site;
7. Operator must establish a reliable source of electricity for powering all mechanical equipment and pollution controls installed at the stone crusher site;
8. Crushing, screening, and conveying operations shall be equipped with either continuous wet suppression system or dry dust collectors designed and operated per minimum requirements below.
9. Crushing, screening, and conveying operations must be enclosed with sheet
10. metal or other rigid material. Do not use cloth or plastic enclosures.
11. Roadways inside the crusher mill shall be metalled, paved or otherwise treated
12. with chemical suppressants for dust suppression.
13. Waste dust materials from stone crushing operations shall be stored in close
14. containers or closed structures.
15. Lorries exiting the site must be cleaned with shovel and broom to minimize
16. dust being tracked off site.
17. Minimize drop heights to storage piles;
18. Windbreak walls that are at least six times longer than its height shall be in
19. place.
20. Regularly remove and safely dispose of waste materials (rock dust) from the
21. plant site in covered lorries;
22. Fugitive emissions including emissions from stockpiles, conveyors and other areas shall be minimized as far as practicable. Emissions from these sources shall be substantially free from visible dust emission.

1.4 GENERAL SITE REQUIREMENTS CONSTRUCTION SITES

The following requirements shall be implemented during the following operations:

- a) Stockpiling;
 - b) Earth moving/ earth works, grading, and leveling;
 - c) Transfer from stock pile to work site;
 - d) Final placement; and
 - e) Laying the track.
- i) Operator must establish a reliable source of water with adequate capacity and for all dust suppression required at the construction site;
 - ii) Regularly remove and safely disposing of waste materials (rock dust) from the site in covered lorries;
 - iii) Waste dust materials from stone crushing operations if used for fill shall be covered within 4 hours;
 - iv) Minimize spillage of raw materials. Promptly clean up all spillage and accumulations of dust.
 - v) Fugitive emissions including emissions from stockpiles and other areas shall be minimized as far as practicable. Emissions from these sources shall be substantially free from visible dust emission.

1.5 GENERAL ENVIRONMENTAL PROTECTION

The Contractor shall take steps to protect the environment and surrounding populations from silica dust hazards. Ensure that the water required for dust suppression operations is sourced from a supply that will not impact the quality or availability of water in the surrounding environment. Follow all State requirements for siting criteria and obtain consent from applicable state pollution control board. Ensure that emissions, surface discharges and site closure practices shall comply with all applicable

laws including butnot limited to:

- i) The water (prevention and control of pollution) act 1974; no. 6 of 1974.
- ii) The air (prevention and control of pollution) act, 1981; no. 14 of 1981.

PART 2 - TECHNICAL REQUIREMENTS TO MINIMIZE AIRBORNE DUST EMISSIONS

2.1 GENERAL

The handling of raw materials, products, wastes or by-products should be carried out asto minimize the release of airborne dust. Use Table 1 below for guidance in employing dust suppression methods.

Table 1: Feasible Control Measures for Open Dust Sources Fugitive Emission Control Measure

Source	Enclosures	Wet uppression	Chemical tabilization	Green Belt	Surface Cleaning	Wind Break Walls
Unpaved roadways and stagingareas		X	X			
Storage piles	X	X	X			X
Stone crushing operations	X	X		X	X	X
Paved roadways and stagingareas					X	
Exposed areas	X	X	X	X	X	X
Batch drop operations	X	X				X
Continuous drop operations	X	X				X

2.2 Wet Methods: Water spray Dust Suppression Systems for Stone Crushing Mills

Details of system components for all stone crusher facilities:

A. Minimum number and locations of pressure spray nozzles:

- i) 1 nozzle on the top of the crusher
- ii) 2 nozzles at the delivery point of crushing material
- iii) 1 nozzle on the bottom of the vibrator screen or rotary screen
- iv) 2 nozzles within the storage hopper
- v) 1 nozzle at the delivery point of raw materials
- vi) 1 nozzle at the bottom of the dust hopper

B. A water pump with adequate motor horsepower and discharge pressure as requiredfor optimal performance of spray nozzles.

C. Minimum number and locations of pressure spray nozzles:

- i) 1 nozzle on the top of the crusher
 - ii) 2 nozzles at the delivery point of crushing material
 - iii) 1 nozzle on the bottom of the vibrator screen or rotary screen
 - iv) 2 nozzles within the storage hopper
 - v) 1 nozzle at the delivery point of raw materials
 - vi) 1 nozzle at the bottom of the dust hoppe
- D. A water pump with adequate motor horsepower and discharge pressure as required for optimal performance of spray nozzles.
- E. Covered water storage tank, with a manhole type maintenance provision. The cover should prevent atmospheric dust from entering the tank. The tank can be located at the ground level. Water from a bore well or other source could be pumped to fill the tank periodically.
- F. Centrifugal monoblock type self-priming pump capable of delivering 3 to 5 kg/cm² pressure and 72 liters per minute.
- G. 100 stainless steel mesh online water filter with two parallel cells. Parallel cells should be set up in order for to allow connections to be reversed such that one cell undergoes backwash cleaning while the other cell is in operation. Only filtered water should be supplied to the spray nozzles.
- H. Chemical surfactants or wetting agents may be added to water used in the spraying systems.
- I. All spraying systems used for dust suppression shall be maintained in good condition. The flow rate and operating pressure of the spraying liquid/solution shall be sufficient to suppress dust emissions from the corresponding sources. The spraying system shall be able to cover the areas of emission points concerned.
- J. All water spray equipment shall be operational during all stone crushing operations at the site.
- K. No domestic showers, sprinklers, or other general water spray devices may be substituted for pressure misting nozzles. Nozzles may be hollow cone, solid cone or fan type.
- 2.3 Dry Methods: Dust Extraction Systems for Stone Crusher Mills/ Hot Mix Plants Details of system components:
- A. Minimum requirements for dry dust capture and collection systems:
 - i) Hood or enclosure to capture emissions;
 - ii) Dust collector that separates particulates (e.g. centrifugal dust collectors);
 - And
 - iii) Duct to transport particulates in air stream from dust collector to air pollution Control device (e.g. baghouse).
 - B. Capture hoods shall be installed over all crusher units and screens. Enclosures shall surround all sources of dust to the extent possible.
 - C. Dust collector shall be connected in-line via an enclosed duct to a cyclone and baghouse for dust removal.
 - D. Air handling system shall be a suitable size to prevent the escape of untreated airborne dust. Maintain minimum airflow as per design. A minimum draft velocity of 1 meter/ second shall be maintained through all open hoods.
 - E. Inspect bag filters routinely and at least once per month for damage and clean, repair or replace as needed.
- 2.4 Dust Containment Enclosures for Stone Crusher Mills and Hot Mix Plants: Particulate emissions shall be controlled by installing dust containment enclosures at the following locations:

- A. Primary crusher discharge area
Enclosure shall cover discharge areas to all conveyor belts or secondary crusher.
- B. Vibratory screen
All vibratory screens shall be totally enclosed. Screen houses shall be rigid and reasonably dust tight with self-closing doors or close-fitted entrances and exits for access. Where conveyors pass through the screen house, flexible covers should be installed at entries and exits of the conveyors to the housing.
- C. Conveyor belts (optional) The enclosures should be complete from all the four sides and roof. There should not be any open windows/openings etc. Any opening should be kept closed during operation. The gaps should be sealed using gaskets or wool type packing etc. Crusher enclosures shall be rigid and be fitted with self-closing doors and close-fitting entrances and exits. Where conveyors pass through the crusher enclosures, flexible covers should be installed at entries and exits of the conveyors to the enclosure.
- D. Inlet hopper
The inlet hopper shall be enclosed on three sides.
- E. Inlet hopper
The inlet hopper shall be enclosed on three sides.
- F. Rotary dryer
The plant rotary dryer in a hot mix plant.
Malfunctioning or breakdown of equipment leading to abnormal emissions shall be dealt with promptly. In any case, the abnormal emission due to equipment failure shall be stopped as soon as practicable. The dust collection system shall be routinely inspected and maintained in good condition and shall be used as required. The owner shall conduct an inspection of the dust control system at least once per month.
- 2.5 Minimize Fugitive Dust From Roadways and Stock Piles
Minimize fugitive dust emissions from all sites where crushed rock is stored. Particulate emissions from unpaved roads and stock piles shall be controlled with the application of suitable compounds to minimize the control of dust. Petroleum-based products, waste oils or other waste products shall never be used for this purpose. Acceptable compounds for this purpose include
- i) Acrylic polymers;
 - ii) Solid recycled asphalt;
 - iii) Chloride compounds (calcium chloride and magnesium chloride);
 - iv) Lignin compounds (lignin sulfate and lignin sulfonate powders);
 - v) Natural oil resins (soybean oil); and
 - vi) Organic resin emulsions.
- Contractor shall provide a product information sheet prepared by the manufacturer or distributor indicating the chemical composition, application instructions, and other environmental, safety and health considerations 30 days in advance of its intended application to Engineer's Representative. The product information shall be reviewed and approved in writing before the contractor proceeds to apply it on the project site.
- 2.6 Minimize Fugitive Dust from Heavy Equipment and Road Transport Vehicles
Minimize fugitive dust emissions from all vehicles when loading, unloading and operating vehicles on project sites, staging areas, or stone crusher mills. Settled dust and particulate emissions from lorries used to transport stone or waste products generated in stone

crushing operations, and other heavy construction vehicles, shall be minimized in accordance with the following practices:

- a. Lorries shall be filled with the material using wet methods. Load waste fine materials and powders onto tankers or closed trucks through a lengthy sleeve attached to the spout to minimize drop height and dust release.
- b. Lorries once filled with stone or other waste materials shall be covered before leaving the site. A single layer impermeable tarp shall be placed over the entire load and secured with rope or other tension bar.
- c. Designate a decontamination area that is required to be used by all vehicles before exiting the site. This area shall be covered with an impervious tarp. Use wet methods to wipe all accessible exterior surfaces of vehicles and tires.
- d. Impose strict speed limits for all vehicles operating on service roads, loading areas, or staging areas.

2.7 Minimize Fugitive Dust During Rock Quarry Operations

Particulate emissions shall be controlled during drilling, blasting, loading, and hauling with wet methods using surfactants applied in either water or foam spray.

Dust controls for stone drilling shall use water fed into the compressed air to suppress the dust.

2.8 Work Practices for Reducing Employee Exposures

This section pertains to all activities with potential for dust exposure to workers employed in quarries, stone crusher units, hot mix plants, and construction sites.

Use wet methods where feasible to reduce dust emissions from working surface or equipment.

Use a gentle spray or mist to moisten settled dust particles. When washing large quantities of dust from a surface, increase the water force only after pre-wetting all the dust with a gentle spray.

Use only the minimum amount of water needed to get the job done without creating runoff.

Rewet surfaces as necessary to control dust.

PART 3 - TECHNICAL REQUIREMENTS FOR WORKER MEDICAL SURVEILLANCE

3.1 GENERAL

This section pertains to workers employed in quarries, stone crusher units, and hot mix plants.

3.2 MEDICAL MONITORING

Medical monitoring shall be conducted for each worker before the start of work and at least at annually thereafter. Examination shall as a minimum meet requirement as set forth below

Examination

1. The employer shall ensure that all medical examinations and procedures are performed by a licensed physician, and are provided at no cost to the employee and at a reasonable time and place.
2. Persons employed under the licensed physicians may administer the pulmonary function testing, chest x-ray or other testing procedures required by this section if adequately trained by an appropriate academic or professional institution.
3. A physical examination directed to the pulmonary system, including a chest x-ray to be administered and pulmonary function tests of forced vital capacity (FVC) and forced expiratory volume at one second (FEV(1)). Interpretation and classification of chest roentgenograms shall be conducted in accordance with ILO classification system. Interpretation of the chest x-ray shall be conducted under the ILO Classification of Radiographs of Pneumoconiosis by a reader trained under this protocol. Evaluate chest x-

ray for possible tuberculosis because people exposed to silica have increased susceptibility.

Report from Medical Examination: A report must be submitted from all medical examinations conducted within the last 12 months to document compliance with this medical surveillance requirement for each worker employed in quarries and stone crusher units. Submit, at a minimum, for each worker the following:

4. Name and Employee Identification Number

Physician's Written Opinion from examining physician including at a minimum the following:

- i) Whether worker has any detected medical conditions that would place the worker at an increased risk of material health impairment from exposure to silica.
- ii) A statement that the worker may wear a negative pressure respirator or any recommended limitations on the worker or on the use of personal protective equipment such as respirators.
- iii) Statement that the worker has been informed by the physician of the results of the medical examination and of any medical conditions that may result from dust exposure.

3.3 Record Keeping

1. The employer shall establish and maintain accurate records of medical surveillance to include the physician's written opinion on each employee's health status.
2. Records shall be maintained for at least the duration of the contract period.
3. A copy of each employee's records must be provided to the affected employee who has undergone the medical surveillance stipulated above within 30 days of the date of the examination.

PART 4 - REQUIREMENTS FOR EMPLOYEE TRAINING

4.1 GENERAL

- A. This section pertains to all workers employed in quarries, stone crusher units, hot mix plants, and any construction workers using powered tools or equipment to cut, grind, core, or drill concrete or masonry materials. The training provided under this section shall be provided to workers at no cost to these employees and in a language understood by workers at each training program. The course shall be taught by an environmental health and safety specialist with adequate education, experience and training.
- B. Incorporate general information about silica dust hazards in all orientation and site training sessions covering health or safety aspects.

4.2 TRAINING TOPICS

The employer shall provide training on the following topics to all employees prior to their assignment to jobs where the employer will be conducting these operations during this project

- A. The potential health hazards of exposure to airborne silica dust including silicosis, tuberculosis, lung cancer, chronic obstructive lung disease (COPD) and decreased lung function.
- B. Methods used by the employer to control employee exposures to airborne silica dust including wet or dry methods for stone crushing, drilling, cutting, local exhaust ventilation systems, and isolation of the process from employees by means of distance, enclosure, or other means, as applicable.
- C. Proper use and maintenance of dust reduction systems, including the safe handling and disposal of waste materials.
- D. The importance of good personal hygiene and housekeeping practices when working in proximity to silica dust including:

- i) Not smoking tobacco products; appropriate methods of cleaning up before eating, and appropriate methods of cleaning clothes.
- ii) Avoiding, to the extent practical, activities that would contribute significantly to exposure to airborne dusts.

PART 5 – WORKER PROTECTION

5.1 GENERAL

Contractors shall supply respirators and other specified safety equipment to all workers employed in quarries, stone crusher units, hot mix plants, and any construction workers using powered tools or equipment to cut, grind, core, or drill concrete or masonry materials as described below,

- A. Do not eat, drink, smoke, chew gum or smoke tobacco in the work area. To eat, drink, chew, or smoke, workers shall follow the procedures described below and leave the work area.
- B. Provide workers with a clean source of water for a facility to wash hands and face with soap and water. This should be done before eating, smoking or drinking and at the end of the day before going home. Hand washing facilities shall be set up adjacent to the work area.
- C. Engineering and work practice controls must be used whenever the possibility exists that employees may be exposed to silica including during stone crushing and construction operations.
- D. The use of compressed air, dry sweeping, or any cleaning method that would cause elevated silica dust air concentrations are prohibited.

5.2 RESPIRATORY PROTECTION

Minimum Respiratory Protection: Require that the minimum level of respiratory protection used be Respirator Class FFP3 under European standard EN 143 or N99 under the U.S. National Institute for Occupational Safety and Health (NIOSH) classification. Respirators shall be single use disposal respirators for dusts or reusable half-face air-purifying respirators with high efficiency particulate air filters.

Require that a respirator be worn by anyone in a Work Area at all times during any operation. Do not allow the use of surgical masks or other types of disposable respirators not specified above for any purpose.

Fit testing shall be conducted on any reusable air-purifying respirator assigned to the worker.

Only assign respirators to workers medically approved to wear negative pressure respirators as per the physicians written opinion following an annual medical examination as per the requirements in Part 3 of this addendum.

5.3 PROTECTIVE EQUIPMENT

Do not allow workers to leave the work place wearing any clothing or equipment worn during the work shift. Provide the following

- A. Eye Protection: Provide eye protection as needed for the type of work being performed.
- B. Shoes: Provide shoes to all workers and require that they be worn at all times in the Work Area.
- C. Hearing protection: Provide all workers at all quarries, stone crushing sites, and hot mix plants and all other workers exposed to loud noise with ear plugs or other suitable hearing protection.

PART 6 - EMISSION AND AMBIENT AIR LIMITS

6.1 GENERAL

Contractors shall conduct all required emissions monitoring as required to prove compliance

with all applicable State Pollution Control Board Regulations and the limits specified within this section. This section applies to all permanent and temporary stone crushing mills and hot mix plants.

6.2 **SUSPENDED PARTICULATE MATTER (SPM)**

The Suspended Particulate Matter (SPM) at a distance of 40 meters from a stone crusher unit in a cluster should be less than 600 micro-grams per cubic metre ($\mu\text{g}/\text{Nm}^3$).

The concentration of total particulate matter in any contained emissions to air, for example the bag filter exhaust air outlet, shall not exceed 150 micro-gram per cubic metre ($150 \mu\text{g}/\text{Nm}^3$). The introduction of dilution air to achieve the emission concentration limits shall not be permitted.

Monitoring of the 24-hour average concentration of the total suspended particulate and/or respirable suspended particulate in ambient air shall be conducted at the site boundary and/or any other locations to be agreed by the Authority. SPM sampling shall conform to the United State Environmental Protection Agency's Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere (High-volume Method) and shall be conducted at a frequency of not less than once every 6 months.

PART 7 – CHAIN-OF-CUSTODY FOR CRUSHED STONE

7.1 **GENERAL**

Contractor shall maintain records of suppliers for each load of crushed stone brought to the construction site with the procedures as outlined below. Such records shall be collected at a central location at least monthly during the duration of the project and be available for inspection by Engineer's Representative.

7.2 **SUPPLIER VALIDATION**

Contractor shall maintain records of all suppliers and all internally sourced supplies of crushed stone brought to the construction site to include:

- i) Name of supplier;
- ii) Location of stone crusher operation;
- iii) Location and name of the quarry;
- iv) Proof of registration and consent from the applicable Mining Department;
- v) Proof of registration and consent for operation from applicable Pollution Control Board;
- vi) The supplied material size and quantity (by weight or volume);
- vii) Date and specific location material was brought to site.

PART 8 – RESTORATION OF TEMPORARY STONE CRUSHER SITES

8.1 **GENERAL**

This section applies to the removal of any temporary stone crusher sites established and used during the duration of the project. During operation all temporary operations shall meet the requirements specified in Parts 1 and 2 above.

8.2 **Equipment removal**

8.3 Temporary equipment shall be cleaned before being taken down and prepared for off-site transport. Clear off all temporary structures and garbage.

8.4 **Site restoration**

8.5 Remove all debris and visible accumulations of dust from ground surfaces. Cover all bare soil surfaces with vegetation or pavement to reduce exposure to residual silica dust.

PART 9 - ANNEXURE-II

9.1 National Safety Day (4th March) – History & Background

The Labour Ministers' Conference in its 22nd Session held in 1962 recommended:

“A conference on ‘Safety in Factories’ should be convened and the question of setting up a National Safety Council for conducting a campaign on accident prevention should be considered”.

The President's first conference on Industrial Safety organized in Delhi from 11th to 13th December, 1965 by the Ministry of Labour and Employment, Government of India in cooperation with the State Governments, Employers' Organizations, Trade Unions and Institutions concerned had affirmed “There is a consensus of opinion in favour of setting up National and State Safety Councils”.

The 24th Session of the Standing Labour Committee accepted the proposal concerning the constitution of the National Safety Council (NSC) in February, 1966. Accordingly, National Safety Council (NSC) was set up by the Ministry of Labour, Government of India on 4th March, 1966 to generate, develop and sustain a voluntary movement on Safety, Health and Environment (S,H & E) at the National level.

It was registered as a society under Societies Registration Act, 1860 and subsequently as a Public Trust under Bombay Public Trust Act 1950. It is an apex non-profit making, tripartite body, registered under the Societies Registration Act 1860 and the Bombay Public Trust Act 1950.

The foundation day of the National Safety Council of India is observed as National Safety Day since 1972. Focus of the Day to have accident & incident free industrial activities and spread Safety & Occupational Health awareness among all citizens & workers across the country.

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SECTION – 9

**PRICE SCHEDULES
(FINANCIAL BID)**

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SECTION 9: PRICE SCHEDULES (FINANCIAL BID)

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PRICE SCHEDULES (FINANCIAL BID)

NAME OF WORK: Construction of Boundary wall, Watch tower and other Miscellaneous and associated works in Airforce station at Jalahalli in connection with BSRP

PREAMBLE

1. The Price Schedule shall be read in conjunction with the Instructions to Tenderers, Conditions of Contract & Special Conditions of Contract, Particular Conditions, Contract Data, Notice Inviting Tender, Employer's requirement PART-1 and 2, Scope of work, Technical Specifications, Tender Drawings, Schedule, Annexures and Addendums and any other related document in the Bid Document.
2. The amount (Lumpsum price) shall be quoted in all the Schedules, except Schedule L, as mentioned in the table below:

These items of Schedule L will be executed under schedule of rates 2021-22, published by KPWD. The cost under this Schedule stands fixed as ₹. 50,00,000/- and this amount is provided as fixed amount in the summary of Financial Bid/Price Schedule. Whenever KPWD rates are not available other department rates shall be considered with the approval of Employer.
3. The amount for various Schedules and Summary of Price Schedule shall be quoted in **Rupees**.
4. The whole cost of complying with all the provisions of the Contract is deemed to have been included in the quoted amount.
5. All columns in the "Summary of Price Schedule" and the total tender amount shown in the bottom shall be filled in figures and words or as per the procedure mentioned in e-procurement portal.
6. General directions and description of works and materials are neither repeated nor summarized in the Price Schedule. They are deemed to have been covered or described elsewhere in the Bid Document or implied as good Engineering & Construction Practices adopted for similar works.
7. The method of measurement of works regulating the interim payment, wherever applicable, shall be in accordance with the requirements as stated in the individual sections of the Technical Specifications and Conditions of Contract.
8. The Tenderer may please note that, to perform this contract, nothing extra will be payable on account of field constraints, availability of front (except for the provisions made elsewhere in the Bid Document), preparation of detailed scheme, for taking necessary clearances and approvals from all the concerned authorities/ local bodies etc. The quoted value shall include the cost of all these items/aspects.
9. The Tenderer's offer shall be inclusive of all taxes and duties payable by them, labour cess and any other cess, levies etc. GST, Income Tax, and any other statutory taxes to be deducted at source, if any, will be deducted by the Employer in accordance with the Income Tax Act and any other acts in force and in accordance with instructions issued by the Authorities on this behalf, from time to time.
10. The Employer may, in any payment certificate, make any correction or modification that should have been reflected in any previous Payment Certificate. A Payment Certificate shall not be deemed to indicate the Employer's acceptance, approval, consent or notice of no-objection to any of the documents of the contractor or to (any part of) the works.

Important Notes:

- A. The Tenderers should quote their amount (Lumpsum price) against Each Schedule of Price Schedule in e-Procurement Portal.
- B. The total value of the Tender quoted by the Tenderer shall be computed based on the total amount quoted in Each Schedule.

SUMMARY OF PRICE SCHEDULE.

Sl. No	Schedule	Estimated Value (including GST etc.)		Quoted by Tenderer	
				Quoted Amount in INR (Lumpsum Cost)	
		In Figures (in Rs.)	In Words (in Rupees)	In Figures (in Rs.)	In Words (in Rupees)
1	Schedule A	7,62,04,022.00	Seven Crore Sixty – Two Lakh Four Thousand and Twenty – Two only.		
2	Schedule B	68,63,747.00	Sixty - Eight Lakh Sixty - Three Thousand Seven Hundred Forty – Seven only.		
3	Schedule C	58,80,874.00	Fifty - Eight Lakh Eighty Thousand Eight Hundred and Seventy – Four only.		
4	Schedule D	4,02,978.00	Four Lakh Two Thousand Nine Hundred Seventy – Eight only.		
5	Schedule E	1,17,29,634.00	One Crore Seventeen Lakh Twenty – Nine Thousand Six Hundred and Thirty - Four only.		
6	Schedule F	12,54,331.00	Twelve Lakh Fifty – Four Thousand Three Hundred and Thirty – One only.		
7	Schedule G	7,70,633.00	Seven Lakh Seventy Thousand Six Hundred and Thirty - Three only.		
8	Schedule H	1,07,05,676.00	One Crore Seven Lakh Five Thousand Six Hundred and Seventy – Six only.		
9	Schedule I	20,44,78,338.00	Twenty Crore Forty – Four Lakh Seventy - Eight Thousand Three Hundred and Thirty –Eight only.		
10	Schedule J	42,48,565.00	Forty – Two Lakh Forty – Eight Thousand Five Hundred and Sixty – Five only.		
11	Schedule K	74,18,392.00	Seventy – Four Lakh Eighteen Thousand Three Hundred and Ninety – Two only.		
12	Schedule – L	50,00,000.00 (fixed)	Fifty Lakh only only(fixed)	50,00,000.00 (fixed)	Fifty Lakh only only(fixed)

Notes:

- A. The quoted value covers all items of the work as detailed in the “Employer’s Requirement” contained in Section 8A (Part 1 and Part 2) as well as conforming to all Particular Conditions of Contract in Section 7, Technical Specifications in Section 8B, SHE requirements in Section 8C and all other stipulations laid down in the Bid Document in every other Section including all addenda/corrigenda thereof till the date of submission of Bids.

- B. The quoted value is inclusive of all costs of Designs, Drawings, Reports, Surveys, Site Facilities, Construction, Equipment, Plants, Instruments, Labour, Supervision, Materials, Erection, Testing, Maintenance, Temporary Works, Site Office, Site Access, Safety, Security, Defect Rectification till the end of DLP, Insurance, Profit, Duties, GST, Taxes, Levies, Royalties as per applicable law together with all associated risks etc., and all other liabilities and obligations set out or implied in all the sections of the contract.
- C. Schedule-L consists of Lump sum provision to be operated for incidental and unforeseen items likely to be necessary while executing the work. These items will be executed under schedule of rates 2021-22, published by KPWD. The cost under this Schedule stands fixed at Rs 50,00,000/- and this amount is provided as fixed amount in the summary of Financial Bid/Price Schedule.

Signature of the Tenderer

K-RIDE

Construction of Boundary wall, Watch tower and other Miscellaneous and associated works in Airforce station at Jalahalli in connection with BSRP

SN	Description of items	Unit	Qty	Rate	Amount
Schedule-A					
1	Material & Labour for Plain cement concrete 1:4:8 type D2 (40mm graded agg) as in foundation filling mass and all as specified	Cum	450.00	6,146.56	27,65,949.80
2	M & L for Reinforced cement concrete M25 (design mix) using 120 mm graded stone aggregate for foundation rafts, footings foundation beams plinth beams, bases for columns etc. basement slabs and mass concrete all as specified	Cum	1,175.00	8,565.11	1,00,64,007.31
3	M & L for Reinforced cement concrete M25 (design mix) using 120 mm graded stone aggregate as in columns, pillars, piers, posts and struts all as specified.	Cum	450.00	9,696.87	43,63,593.39
4	Reinforced cement concrete M25 (design mix) using 20 mm graded stone aggregate as in Lintel/ Tie beams, cantilevers, bressummers all as specified.	Cum	700.00	9,129.65	63,90,753.74
5	Material & Labour for RCC type B 1:1:2:4 (20 mm graded aggregate) steps, seismic and other similar bonds, copings, kneelers, apex stones, bed plates, kerbs not provided for in as directed and including necessary form work completed.	Cum	25.00	10,379.79	2,59,494.69
6	TMT bars 10 mm dia. and over cut to length, bend to shape required including cranking bending spirally for hooping for columns hooking ends and binding with and including mild steel wire (annealed) not less than 0.9 mm dia. or securing with clips.	Kg	1,95,000.00	92.59	1,80,55,947.00
7	Formwork to sides of concrete foundations, footings, bases of columns, raft and raft beams, sides and soffits (if any) of foundation and plinth beams; and similar work; vertical or to batter for rough finished surfaces of concrete	Sqm	2,900.00	355.04	10,29,625.05
8	Form work to sides of pillars, posts, struts, piers, columns and stanchions for rough finished flat surfaces of concrete	Sqm	2,750.00	670.45	18,43,731.12

SN	Description of items	Unit	Qty	Rate	Amount
9	Form work to sides and soffits of floor or roof beams copings beam haunching etc. for fair finished flat concrete surfaces/ rough finished concrete flat surface	Sqm	8,000.00	518.80	41,50,390.40
10	Supply & Fix Mild Steel Work as in posts and struts in fencing including cutting tops to shape as directed, drilling holes, notching for wire, etc.; flat iron fillets (for securing wire mesh etc.) including all necessary drilling, bolting or riveting, etc., and similar work conforming to Fe-290 Gde E-165 complete all as specified	Kg	8,450.00	115.66	9,77,367.39
11	Preparation of new/ previously untreated steel and iron surfaces of any description over 10 cm width or girth not otherwise described and applying two coats of synthetic enamel paint over a coat of zinc chrome primer	Sqm	300.00	158.40	47,519.19
12	Material & Labour for applying two coats of cement base paint over a coat cement primer including necessary preparation of new plastered wall surfaces as specified and directed. (Make: Shalimar Shakthiman, Berger wall Masta & Asian paints)	Sqm	2,400.00	117.93	2,83,030.08
13	Galvanised. 2 strand, steel barbed wire 2.24mm dia barbed with 2mm dia barbs at 75mm spacings and straining and fixing to any type of standard rails strain-ing bolts, including, securing or tying at crossings with and provision of galvanised mild steel wire, staples or steel pins, etc. as directed (each line of horizontal or diagonal wire shall be measured separately)	100 RM	190.00	1,504.39	2,85,834.71
14	Supply on 25mm thick preformed bitumen filler for expansion joints	Sqm	100.00	621.71	62,170.66
15	Supply and fix 110mm dia uPVC (SWR) pipes single socketed, in any length with rubber ring joints, in wall complete all as specified and as directed.	RM	825.00	212.99	1,75,716.75
16	Material & Labour 20mm thick broken glass coping in cement mortar 1:3 on top of the walls	Sqm	1,000.00	618.83	6,18,825.63
17	Returning, filling in soils, including spreading, levelling, watering and well ramming in layers not exc. 25 cm thick with soil	Cum	4,275.00	155.93	6,66,605.45
18	Dismantling Structural steel work incl. doors, gates but excluding framed trusses etc.	Qtl.	14.50	699.06	10,136.31
19	Dismantling expanded metal, any thickness or mesh, fixed with steel or wood fillets, if any weight not less than 4.0 kg per sq.m.	Sqm	1,900.00	22.53	42,810.99
20	Dismantling posts or struts (wood, steel or R.C.C.) any section, including taking out embedded portion in concrete, brick work, masonry etc. and all as specified and directed	RM	725.00	45.96	33,321.73
21	Dismantling fencing wire mesh of any type	Sqm	85.00	10.88	925.22

SN	Description of items	Unit	Qty	Rate	Amount
22	Demolition of Concrete unreinforced Concrete of any description and in any position not otherwise specifically provided for	Cum	215.00	1,828.69	3,93,167.77
23	Demolition of Reinforced Cement Concrete of any description and in any position not otherwise specifically provided for (reinforcement cut as required to facilitate demolition)	Cum	15.00	2,111.63	31,674.42
24	Demolition of Brick work/ Stone Masonry/ PCC block built in cement mortar of any description	Cum	1,000.00	661.39	6,61,390.00
25	Taking of Broken Glass from Top of walls and removing the rubbish to a distance not less than 100m and deposited where directed	Sqm	300.00	88.55	26,564.34
26	Excavation over areas not excl. 1.50m in depth for foundation and getting out in hard/dense soil	Cum	3,850.00	504.45	19,42,132.50
27	Excavation over areas excl. 1.50m in depth and width in hard/dense soil	Cum	775.00	682.35	5,28,823.34
28	TMT bars 6mm to 8mm in stirrups, spacers and binders cut to length, bend to shape required including cranking bending spirally for hooping for columns hooking ends and binding with and including mild steel wire (annealed) not less than 0.9 mm dia or securing with clips.	Kg	54,300.00	94.78	51,46,583.87
29	Material & Labour for Walling of random rubble, uncoursed, well bonded, bedded and solidly hearted, built in C.M 1:4 as specified and directed	Cum	1,025.00	4,480.47	45,92,480.57
30	Material & Labour Walling of random rubble, uncoursed, well bonded, bedded and solidly hearted, built in C.M 1:4 as specified and directed, except stones	Cum	700.00	2,562.80	17,93,957.60
31	Material & Labour keyed pointed in C.M 1:4 for squared rubble masonry	Sqm	1,375.00	1,586.32	21,81,184.35
32	Material & Labour Rendering 15mm thick on fair faces of brick work or concrete surfaces finished even and smooth without using extra cement , complete all as specified and as directed	Sqm	6,900.00	341.05	23,53,265.98
33	Supply & Fix for rolled mild steel angles in Framed work as in doors or gates of angle or other section with gusset plates, rails, braces, etc., complete, drilled for fixing of steel sheeting or other covering. Doors, etc. to be prepared for hanging or sliding with and including either hooks and hinges or steel hanging door fittings (exclusive of steel sheeting or other covering, running rails and guides) and hanging; also fastening and fixing complete of Fe290 (Grade E - 165)	Kg	2,200.00	130.31	2,86,671.09

SN	Description of items	Unit	Qty	Rate	Amount
34	Supply & Fix repair concertina coil of 600mm dia in stretched position hot deep galvanised steel wire coated with CLR anti corrosive coating making diamond shape with the help of devo-tail clips (18 SWG) fixed over barbed with the angle iron the concertina coil is to be fixed with barbed wire at points where coil touched the bottom barbed wire with the help of hog rings (14 SWG) complete all as specified and directed	RM	475.00	840.75	3,99,356.25
35	Removing excavated material to a distance not exceeding 50m and depositing where directed at a level not exceeding 1.5m above the starting point complete all as specified	Cum	475.00	433.49	2,05,908.08
36	M&L for Surface excavation n.exc (not exceeding) 30 cm deep and averaging 15cm deep and getting out Soft/loose type of soil complete all as specified	sqm	75.00	59.53	4,464.38
37	M&L for cement concrete 1:4:8 type D-2, 100mm thick using 40mm graded stone aggregates as in sub base of flooring etc.	sqm	75.00	597.49	44,811.98
38	Chequered cement concrete-coloured tiles having hard glazed top finish with polymer admixtures in any pattern or design of min size 25cmX25cmX25mm thick set jointed and pointed in neat cement slurry in floors with grey pigment cement and pigments incl 20mm thick screed bed in cement mortar 1:4 all as specified and directed	sqm	275.00	1,545.48	4,25,006.41
39	M&L for pre-cast cement concrete 1:3:6 type C1 using 20mm graded stone aggregate block masonry with solid blocks, exc. 10 cm in width and setting in mortar, built in cement mortar 1:4	m ³	4.00	9,564.93	38,259.73
40	Concrete of concrete (reinforced) of any description and in any position not otherwise specifically provided for. (reinforcement cut as required to facilitate demolition)	Cum	70.00	2,111.63	1,47,813.94
41	S&F in repair concertina coil of 600mm dia (in stretched position) hot deep galvanised steel wire coated with CLR ante corrosive coating making diamond shape with the help of devo-tail clips (18 SWG) fixed over barbed with the angle iron the concertina coil is to be fixed with barbed wire at points where coil touched the bottom barbed wire with the help of hog rings (14 SWG) complete all as specified and directed	RM	1,775.00	840.75	14,92,331.25
42	M&L for construction of Hume Pipe Septic tank on site designed to carry sewage and sullage water, excavation in any type of soil, PCC 1:4:8 below foundation, Vent shaft, connection etc., complete for 10 users	Each	10.00	29,650.45	2,96,504.50

SN	Description of items	Unit	Qty	Rate	Amount
43	M&L for construction of Soakage wells excavation, in any type of soil, foundation in PCC 1:3:6, walls of honey combed masonry with top ring of M25 concrete including intercepting chamber and screen chamber made of Brick masonry in CM, RCC cover slab in M25/ SFRC cover, interconnecting pipes of RCC/DWC complete filled with brick bats of size 1.8 M dia X 3.0 M effective depth	Each	10.00	44,631.49	4,46,314.94
44	Excavation in trenches n. exc. 1.50 mtr wide and n. exc. 1.5 mtr deep in soft/loose soil complete all as specified and as directed by Engr-in-Charge	Cum	200.00	430.13	86,025.54
45	Removing excavated material n exc. 50 mtr and depositing where directed at a level n Exc 1.50 mtr above the starting point	Cum	56.00	359.17	20,113.43
46	Supply and fixing reinforced concrete pipes, class NP-2 laid and jointed complete with collars for 150 mm bore pipe complete all as specified	RM	375.00	408.04	1,53,016.50
47	M&L for cement concrete bed (1:3:6) type C-2 using 40 mm graded stone aggregate to drain pipe of 150 mm bore including packing under hunching against the site of pipe after they are laid and tested	RM	350.00	523.38	1,83,184.29
48	M&L pre-cast PCC 1:3:6 type C1 (20 mm graded agg) cement concrete block masonry with solid blocks exc. 10 cm in width and set in cement mortar 1:6	Cum	14.28	9,460.79	1,35,100.10
49	M&L for cement concrete type B-2 (using 40 mm graded stone aggregate), 1:2:4 as in surface channels and drains all as specified and directed.	Cum	1.13	7,383.02	8,342.81
50	M&L for rendering 10 mm thick in CM 1:3 on fair faces of brick work or concrete surfaces near finished even and smooth all as specified and directed.	Sqm	45.00	289.07	13,008.25
51	M&L for Pre-cast reinforced cement concrete 1:2:4 type B1 using 20 mm graded stone aggregate set in cement mortar 1:4 as in cover slab including all necessary form work. Exposed surfaces of concrete shall be finished even and smooth without using extra cement (Note: Reinforcement shall be measured and paid separately under relevant items of this schedule).	Cum	1.44	12,391.31	17,843.49
52	Extra for forming fair finished drain or channel 30 cm inner girth in cement concrete, using extra cement including forms, moulds, metered/stopped ends.	RM	16.50	48.60	801.82
53	Supply and fix in repairs 75 mm dia PVC (SWR) pipe single socket in any length with rubber ring joint fixed to wall complete all as specified and as directed.	RM	37.50	179.36	6,726.00

SN	Description of items	Unit	Qty	Rate	Amount
54	Supply and fix 110 mm dia PVC bend any radius complete all as specified and as directed.	Each	30.00	140.13	4,203.75
55	S & F PVC (SWR) junction single (single T) equal or unequal with access door bore of pipe 110 mm	Each	15.00	615.46	9,231.94
Total					7,62,04,021.79
Total Schedule-A					7,62,04,022.00
Schedule-B					
1	Sewage disposal- Material & Labour for RCC NP3 150 mm diameter Pipes laid on 150 mm thick bed with excavation in any type of soil including manholes/crop manhole of standard size made of Brick masonry/ RCC/Precast RCC with SFRC ventilating cover and frame. Includes all items. and activities to execute and make sewer line functional	RM	130.00	1,571.76	2,04,328.80
2	Septic tank- Material & Labour for RCC Septic tank designed to carry sewage and sullage water, excavation in any type of soil, PCC 1 4 8 below foundation RCC M-30 Design Mix in Wallis Base Slab, Baffle walls and Roof Slab including beams etc with Vent shaft, manhole openings with cover connection etc., complete with effective depth of 1.5 meter and overall depth of 3 meter for	Each	4.00	7,44,139.86	29,76,559.44
3	Soak well- Soak well 3.0 M dia and 3.00 mtr deep Soakage wells excavation, in any type of soil, foundation in PCC 1:3:6, walls of honey combed masonry with top ring of M25 concrete including intercepting chamber and screen chamber made of Brick masonry in CM, RCC cover slab in M25/ SFRC cover, interconnecting pipes of RCC/DWC complete filled with brick bats of Size	Each	4.00	94,585.26	3,78,341.04
4	Supply and installation of silent Diesel Engine driven generating set 415 volts, 3 phase 4 wire, engine as per IS: 10001/ 10002 and Alternator as per IS: 13364 complete with relay panel and switch gears for automatic starting on main failure, control panel having meter and sound proof canopy as per CPCB norms and foundation etc. of capacity 05 KVA (01 for WT 8, 01 for WT 9 and 01 for WT 10).	Each set	3.00	2,91,666.50	8,74,999.50

SN	Description of items	Unit	Qty	Rate	Amount
5	Supply and installation of silent Diesel Engine driven generating set 415 volts, 3 phase, 4 wire, engine as per IS: 10001/10002 and Alternator as per IS: 13364 complete with relay panel and switch gears for automatic starting on main failure, control panel having meter and sound proof canopy as per CPCB norms and foundation etc. of capacity 10 KVA (01 for WT 1 and 01 for WT 03).	Each set	2.00	5,83,333.00	11,66,666.00
6	Supply and installation of silent Diesel Engine driven generating set 415 volts, 3 phase, 4wire, engine as per IS: 10001/10002 and Alternator as per IS: 13364 complete with relay and sound proof canopy as per CPCB norms and foundation etc. of capacity up to 12.5 KVA (for WT 7).	Each set	1.00	5,37,652.25	5,37,652.25
7	Earthing of machinery/ equipment installed at power house/ substation using 32 x 6 mm galvanized MS strip and MS galvanized plate of size 600 x 600 x 6 mm, as earth electrode.	Set of 2 earths	6.00	16,870.46	1,01,222.76
Total					62,39,769.79
Total Schedule-B					62,39,770.00
Schedule-C					
1	Construction of Guard post, item includes RCC work, providing PCC block cost for providing APP roof, emulsion paint/weather coat in external surface finish, mosquito proofing, ceramic tile flooring, OBD in lieu of Dry distemper, PU roof treatment in lieu of App membrane complete as directions of Engineer in charge	sqm	306.00	19,218.54	58,80,874.03
Total					58,80,874.03
Total Schedule-C					58,80,874.00
Schedule-D					
1	Supply, laying and testing insulated, Screened, PVC bedded, Galvanised steel strip or wire armoured, electric power cables (heavy duty) 1100 volts grade with stranded aluminium conductor of size 2 coreX16sqmm cable all as specified and directed	RM	490.00	462.56	2,26,654.40
2	Supply and lay in repairs of GI tubing medium grade (ISI marked) laid on wall including all fittings such bend, tea, union, elbow etc. complete including testing for 25mm bore sizes all as specified and directed. Note Rate including cutting of wall where as required and as per site requirement.	RM	350.00	354.00	1,23,900.00

SN	Description of items	Unit	Qty	Rate	Amount
3	S&F of gate valve of size 25mm cast copper alloy, screw down alloy, screw down high pressure, with crutch or butterfly handle screwed both ends for iron pipe or union fixed all as specified and directed.	Each	14.00	1,688.58	23,640.12
4	Material & Labour for construction of brick masonry valve chamber of size 450mmX450mmX450mm (internal dimension) with foundation PCC 1:4:8 type D2 using 40mm grade stone aggregate, brick wall with sub class B old size built in cement mortar 1:6, PCC 1:2:4 type B1 using 20mm graded stone aggregate in coping, rendering in cement mortar 1:4, 10mm thick furnished including MS cover with locking arrangement all as specified and directed	Each Job	7.00	4,111.97	28,783.79
Total					4,02,978.31
Total Schedule-D					4,02,978.00
Schedule-E					
1	Construction of Parking Shed with permanent specification RCC Framed Structure, solid block masonry wall incl all internal B/R, E/M Services complete all as per drawings specified and as directed:	sqm	720.00	16,291.16	1,17,29,633.86
Total					1,17,29,633.86
Total Schedule-E					1,17,29,634.00
Schedule-F					
1	Surface excavation n exc. 30 cm deep and averaging 15 cm deep and getting out in hard/ dense soil	Sqm	350.00	111.08	38,876.52
2	Excavating in post holes (or similar holes) each n exc. 0.5 cu. M. getting out in hard/ dense soil, retuning, filling in and ramming earth or broken rubble mixed with earth around, in layers not exceeding 25 cm, all as specified	Each	60.00	454.55	27,273.15
3	Returning filling in including spreading, levelling, watering and well ramming in layers not exc. 25 cm	Cum	2.05	165.78	339.85
4	Removing excavated surplus material to a distance n exc. 50 m and depositing where directed at a level not exc. 1.5 m above the starting point	Cum	44.00	381.85	16,801.52
5	Material & Labour for PCC 1:4:8 type D2 (40 mm graded stone aggregate), 100 mm thick as in sub base of floor	Sqm	175.00	635.23	1,11,165.15
6	Material & Labour for plain cement concrete type 1:3:6 type C-2 (using 40 mm graded stone aggregate) in foundations, filling and mass concrete	Cum	14.04	6,986.33	98,088.10

SN	Description of items	Unit	Qty	Rate	Amount
7	Material & Labour 100 mm thick plain cement concrete 1:3:6 type C-1 using 20 mm graded and crushed stone aggregate as in floor and finished the surface even and smooth without using extra cement complete all as directed	Sqm	175.00	719.01	1,25,827.26
8	Material & Labour for 40 mm thick layer of sand filling under floors or in foundations including watering and consolidation all as directed	Cum	7.00	2,352.97	16,470.80
9	Material & Labour for machine pressed precast concrete interlocking paver block with grey cement and pigment any shape and size conforming to IS 15658-2006 of 60 mm thickness M-35 Grade	Sqm	175.00	922.93	1,61,512.74
10	S&F steel work in tubular posts including special shaped washers etc. complete using ERW or induction butt welded tubes conforming to relevant IS code grade st 240	Kg	1,371.30	147.91	2,02,834.88
11	Roof trusses (framed), trussed, purlins, crane gantries, rails and fastenings and heavy bracket framing (Beam, tee, angle channel or flat sections) including distance pieces, cleats etc Fe 410 -W (Gde- E. 250) quality - A	Kg	1,642.20	150.24	2,46,721.35
12	Material & Labour Pre painted galvalume, aluminium, zinc coating GI based corrugate steel sheet 0.50 mm thick of a colour having tensile strength 550 Mpa as in roof covering/ cladding to wall, fixed with self-tapping screws as specified	Sqm	203.13	914.12	1,85,685.71
13	Preparation of new or previously untreated steel surfaces of any description over 10 cm in width or girth not otherwise described and applying two coats of synthetic enamel paint over a coat of red oxide primer	Sqm	135.00	168.40	22,734.18
Total					12,54,331.19
Total Schedule-F					12,54,331.00
Schedule-G					
1	Surface dressing n exc 15 cm deep in soft/loose soil all as specified and directed	Sqm	600.00	31.74	19,045.20
2	Excavation in trenches not exceeding 1.5m wide and not exceeding 1.5m deep for foundation etc. and getting out in hard/dense soil	Cum	16.00	796.50	12,744.00
3	Material & Labour for murum filling in floors or paving, laid in layers n exc. 15 cm thick, spread, levelled and rammed including watering	Cum	45.00	1,463.32	65,849.31
4	Rolling and consolidating formation surfaces in cutting with hard roller of capacity of 0.2 to 0.5 tonne (Hand Roller)	Ten Sqm	30.00	95.11	2,853.24
5	Material & Labour Hardcore of gauge n exc. 63 mm, with broken stone boulders, deposited, spread and levelled in layers n exc. 15 cm thick, watered and rammed to a true surface	Cum	30.00	2,443.54	73,306.32

SN	Description of items	Unit	Qty	Rate	Amount
6	Material & Labour for 100mm thick cement concrete type C-2, 1:3:6 (Using 40mm graded stone aggregate) as in sub base all as specified and directed.	Sqm	300.00	674.25	2,02,275.60
7	Material & Labour for 40mm thick layer of sand filling under floors or in foundations including watering and consolidation all as directed	Cum	12.00	2,329.67	27,956.09
8	M&L Machine pressed precast concrete interlocking paver block with grey cement and pigment any shape and size confirming to IS 15658-2006 of 60 mm thickness, M-35 Grade	Sqm	300.00	913.79	2,74,137.60
9	Material & Labour for providing, cement concrete type B-0, 1:2:4 (using 12.5mm graded stone aggregate) as in kerbs stone, rounded or chamfered on edges	Cum	16.00	10,112.48	1,61,799.71
10	Returning, filling in, including spreading, levelling, watering and well ramming in layers not exc 25 cm of excavated hard/dense soil	Cum	5.00	164.14	820.69
11	Removal of excavated material not exc. 50m and depositing where directed at a level n exc. 1.5 m above the starting point complete all as specified	Cum	11.00	378.07	4,158.79
12	Material & Labour for 150mm dia PVC (SWR), pipes single socketed in any length with rubber ring joints, laid in trenches or in floors	RM	37.00	305.73	11,311.87
Total					8,56,258.42
Total Schedule-G					8,56,258.00
Schedule-H					
	Integrated watch tower (incl internal services). Item includes RCC, earthwork, PCC, PCC block masonry, PU WPT, ATT, Copper wiring	Sqm	12.78	22,240.78	2,84,237.19
	Integrated watch tower (incl internal services). Item includes RCC, earthwork, PCC, PCC block masonry, PU WPT, ATT, Copper wiring	Sqm	115.02	20,990.64	24,14,343.76
	Integrated watch tower with rest room (incl internal services). Item includes RCC, earthwork, PCC, PCC block masonry, PU WPT, ATT, Copper wiring	Sqm	294.48	27,190.63	80,07,095.25
Total					1,07,05,676.21
Total Schedule-H					1,07,05,676.00
Schedule-I					
1	Dismantling posts or struts (wood, steel or R.C.C.) any section, including taking out embedded portion and making good disturbed ground Posts embedded in Concrete, brick work, masonry, etc.	RM	756.00	48.26	36,483.84

SN	Description of items	Unit	Qty	Rate	Amount
2	Demolition of brick work, precast or stone masonry, built in lime mortar including all quoins, arches, pillars, etc, but excluding ashlar facings, dressed stonework and precast concrete articles and precast concrete block walling etc. and all as specified and directed	Cum	5,700.00	817.93	46,62,212.66
3	Dismantling wrought iron or mild steel work of any description not otherwise provided for and all as specified and directed	Qtl	45.00	676.69	30,450.87
4	Demolition of Reinforced Cement Concrete in any description and in any position not otherwise specifically provided for	Cum	22.00	2,217.21	48,778.60
5	Earthwork in excavation by mechanical means (Hydraulic excavator)/ in foundation trenches or drains (not exceeding 1.5 m width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift upon 1.5 m including getting out the excavated soil and disposal of surplus excavated soil as directed within a lead of 50 m	Cum	12,450.00	269.01	33,49,233.98
6	Earthwork in excavation by mechanical means (Hydraulic excavator)/ in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan) including dressing of sides and ramming of bottoms, lift up to 1.5-3 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50m	Cum	4,500.00	322.82	14,52,679.80
7	Material & Labour for Plain cement concrete 1:4:8 type D2 (40mm graded agg) as in foundation filling mass and all as specified	Cum	975.00	6,453.88	62,92,535.78
8	M & L for Reinforced cement concrete M25 (design mix) using 120 mm graded stone aggregate for foundation rafts, footings foundation beams plinth beams, bases for columns etc. basement slabs and mass concrete all as specified	Cum	3,800.00	8,993.37	3,41,74,799.27
9	M & L for Reinforced cement concrete M25 (design mix) using 120 mm graded stone aggregate as in columns, pillars, piers, posts and struts all as specified.	Cum	1,025.00	10,181.72	1,04,36,260.86
10	Reinforced cement concrete M25 (design mix) using 20 mm graded stone aggregate as in Lintel/ Tie beams, cantilevers, bressummers all as specified.	Cum	475.00	9,586.13	45,53,412.04
11	Material & Labour for RCC type B 1:1:2:4 (20 mm graded aggregate) steps, seismic and other similar bonds, copings, kneelers, apex stones, bed plates, kerbs not provided for in as directed and including necessary form work completed.	Cum	225.00	10,898.78	24,52,224.77
12	TMT bars 10 mm dia and over cut to length, bend to shape required including cranking bending spirally for hooping for columns hooking ends and binding with and including mild steel wire (annealed) not less than 0.9 mm dia or securing with clips.	Kg	4,91,000.00	97.22	4,77,37,146.03

SN	Description of items	Unit	Qty	Rate	Amount
13	TMT bars 5 mm dia and over upto and including 10 mm in stirrups, spacers and binders cut to length, bend to shape required including cranking bending spirally for hooping for columns hooking ends and binding with and including mild steel wire (annealed) not less than 0.9 mm dia or securing with clips.	Kg	2,51,500.00	100.26	2,52,15,671.43
14	Formwork to sides of concrete foundations, footings, bases of columns, raft and raft beams, sides and soffits (if any) of foundation and plinth beams; and similar work; vertical or to batter for rough finished surfaces of concrete	Sqm	13,650.00	372.80	50,88,655.52
15	Form work to sides of pillars, posts, struts, piers, columns and stanchions for rough finished flat surfaces of concrete	Sqm	12,400.00	703.97	87,29,228.79
16	Form work to sides and soffits of floor or roof beams copings beam haunching etc. for fair finished flat concrete surfaces/ rough finished concrete flat surface	Sqm	5,760.00	544.74	31,37,695.14
17	Supply & Fix Mild Steel Work as in posts and struts in fencing including cutting tops to shape as directed, drilling holes, notching for wire, etc.; flat iron fillets (for securing wire mesh etc.) including all necessary drilling, bolting or riveting, etc., and similar work conforming to Fe-290 Gde E-165 complete all as specified	Kg	18,310.00	121.45	22,23,713.23
18	Preparation of new/ previously untreated steel and iron surfaces of any description over 10 cm width or girth not otherwise described and applying two coats of synthetic enamel paint over a coat of zinc chrome primer	Sqm	664.00	166.32	1,10,434.60
19	Material & Labour for walling of random rubble regular coursed well bonded bedded solidly hearted built in CM 1:6 but except stone and all as specified and directed not brought up to course	Cum	2,300.00	3,502.22	80,55,101.66
20	Material & Labour for walling of random rubble regular coursed, well bonded, bedded and solidly hearted, built in CM 1:6 and all as specified and directed incl. brought up to surface	Cum	475.00	5,623.70	26,71,256.42
21	Extra over stone walling for hammer dressing to face stones and dressing of face beds and joints, as specified, of random rubble walling, uncoursed or brought up to courses with maximum depression on face from straight edge held against the dressed surface n exc 20mm over Lime/ Sand stone	Sqm	1,950.00	319.29	6,22,608.84
22	Material & Labour for rendering 15mm thick in CM 1:4 on fair faces stone masonry surfaces or surface other than fair face of brick - work or on one side of lathing	Sqm	24,500.00	406.07	99,48,726.75

SN	Description of items	Unit	Qty	Rate	Amount
23	Material & Labour 5mm thick rendering with cement mortar 1:4 on fair faces of brick work on concrete surfaces including finished even and fair without using extra cement	Sqm	9,250.00	220.81	20,42,534.87
24	Providing precast cement concrete in window or door cills, lintels, bressummers, steps, quoin blocks (for use with masonry), string courses, copings. kneelers, apex stones, pier caps, columns, posts, boundary pillars, bed plates, pintle blocks, anchorage blocks, bonders (for stone walling). corbels, brackets, etc. (of any section indicated), with plain fair faces, including chamfers, weathering, throating etc. and setting in mortar complete with joints to match; set in CM 1:6; Type C1 1:3:6 (20mm graded aggregate)	Cum	175.00	12,202.24	21,35,392.34
25	Material & Labour for applying two coats of cement base paint over a coat cement primer including necessary preparation of new plastered wall surfaces as specified and directed. (Make: Shalimar Shakthiman, Berger Wall Masta & Asian paints)	Sqm	34,000.00	123.83	42,10,072.44
26	S&F concertina coil of 600mm dia (in stretched position) hot deep galvanized MS steel wire centre to centre bard distance 48mm, thickness of strip 50mm length of barb 10.5mm diameter of spring wire 2.5mm, number of spiral (No of turns) 50/21 per coil, clips per spiral 15 approx. weight 8.25kg/ coil (recommended coil stretch length 6m), coated with CLR anti-corrosive coating making diamond shape with the help of devo-tail clips (18 SWG) fixed over barbed with the angle iron the concertina coil is to be fixed with barbed wire at points where cill touched the bottom barbed wire with the help of hog rings (14 SWG) confirming with IS as per manufacturer's instructions complete all as specified and directed	RM	4,600.00	706.23	32,48,658.00
27	Galvanised. 2 strand, steel barbed wire 2.24mm dia barbed with 2mm dia barbs at 75mm spacings and straining and fixing to any type of standard rails strain-ing bolts, including, securing or tying at crossings with and provision of galvanised mild steel wire, staples or steel pins, etc. as directed (each line of horizontal or diagonal wire shall be measured separately)	100 RM	325.00	1,579.61	5,13,374.18
28	Supply on 25mm thick preformed bitumen filler for expansion joints	Sqm	175.00	652.79	1,14,238.59
29	Supply and fix 110mm dia uPVC (SWR) pipes single socketed, in any length with rubber ring joints, in wall complete all as specified and as directed.	RM	575.00	223.64	1,28,592.71
30	Material & Labour 20mm thick broken glass coping in cement mortar 1:3 on top of the walls	Sqm	1,750.00	649.77	11,37,092.10

SN	Description of items	Unit	Qty	Rate	Amount
31	M&L for Sand filling under floors or in foundations including watering and consolidation complete all as specified and as directed	Cum	1,850.00	2,323.85	42,99,122.16
32	Supply & Fix Mild steel screw bolts (machine made) with hexagonal or square heads at one end and screwed the other, or screwed both ends, each screwed end to be fitted with washers and one hexagonal or square nut length of bolt exc 15cm and n exc 22.5cm long and all as specified and directed	Kg	45.00	107.57	4,840.68
33	Returning, filling in soils, including spreading, levelling, watering and well ramming in layers not exc 25 cm thick with soil	Cum	10,500.00	163.73	17,19,140.38
34	Removing excavated material n exc. 50m and depositing where directed at a level n exc. 1.5 m above the starting point	Sqm	6,300.00	377.13	23,75,898.97
35	Material & labour for providing precast cement concrete type B-0; 1:2:4 (using 12.5mm graded stone aggregate) as in louvers and jallies 50 to 60mm thick (measured solid) including all mouldings but excluding frames set in cement	Sqm	175.00	1,091.83	1,91,070.53
36	Excavating in trenches, n exc 1.5 m wide and n exc 1.5 m in depth; for foundation, etc. or for shafts, wells, cesspits, manholes, pier holes, etc. n exc 10 sq m on plan and n exc 1.5 m in depth and getting out Hard/dense type of soil complete all as specified	Cum	5.00	794.51	3,972.54
37	Material & Labour for Foundations, including rafts, footings, foundation beams; plinth beams; bases for columns, etc.; basement slabs, under-reamed piles and mass concrete complete. (type B1 1:2:4 (20mm aggregate))	Cum	2.00	7,643.89	15,287.78
38	Material & Labour for Reinforced Cement Concrete Type B1 1:2:4 (20mm aggregate) in Columns, pillars, piers, posts and struts complete	Cum	10.00	10,128.87	1,01,288.68
39	Mild steel bars 10mm dia and over, cut to length, bent to shape required, including cranking, bending spirally for hooping for columns, hooking ends and binding with and including mild steel wire (annealed) not less than 0.9mm dia or securing with clips complete	Kg	575.00	97.22	55,903.99
40	Mild steel bars 6mm to 8mm dia as in stirrups, cut to length, bent to shape required, including cranking, bending spirally for hooping for columns, hooking ends and binding with and including mild steel wire (annealed) not less than 0.9mm dia or securing with clips complete	Kg	250.00	99.52	24,879.89

SN	Description of items	Unit	Qty	Rate	Amount
41	Material & Labour for rolled mild steel angles in Framed work as in doors or gates of angle or other section with gusset plates, rails, braces, etc., complete, drilled for fixing of steel sheeting or other covering. Doors, etc. to be prepared for hanging or sliding with and including either hooks and hinges or steel hanging door fittings (exclusive of steel sheeting or other covering, running rails and guides) and hanging; also fastening and fixing complete of Fe 410 - W (Grade E - 250) quality A complete	Kg	1,900.00	138.54	2,63,223.69
42	Material & Labour for Formwork to sides of concrete foundations, footings, bases of columns, raft and raft beams, sides and soffits (if any) of foundation and plinth beams; and similar work; vertical or to batter complete all as specified and directed	Sqm	10.00	372.80	3,727.95
43	Material & Labour Formwork to sides of pillars, posts, struts, piers, columns and stanchions with rough finished surface of concrete, complete all as specified and directed	Sqm	80.00	703.97	56,317.61
44	Material & Labour Rendering 5mm thick on fair faces of brick work or concrete surfaces finished even and smooth without using extra cement , complete all as specified and as directed	Sqm	0.00	170.95	0.00
45	Material & Labour for preparation of new plastered or unplastered surfaces and walls including cornices, pilasters etc., and applying two coats of cement base paint complete all as specified.	Sqm	0.00	82.98	0.00
46	Material & labour for providing two coats of synthetic enamel paint over a coat of red oxide primer on new steel surfaces of any description over 10cm in width or girth not otherwise described and all as specified and directed	Sqm	75.00	166.32	12,473.79
47	Material & Labour Returning, filling in, including spreading, levelling, watering and well ramming in layers not exc 5 cm.	Cum	2.80	163.73	458.44
48	Material & Labour for Returning, filling in, including spreading, levelling, watering and well ramming in layers not exc 25 cm.	Cum	2.20	377.13	829.68
49	Material & Labour for 20mm thick Granite (of any type) work (table rubbed and polished) in steps, jambs, pillars, window-cills, cooking platforms and like in cement mortar (1:4) including pointing in white cement (1:2) using marble dust with admixture of pigment to match with shade of granite	Sqm	50.00	6,101.47	3,05,073.70
50	Material & labour for 20mm thick Granite (of any type) work (table rubbed and polished) for wall lining (veneering to wall) 12mm thick in cement mortar (1:3) and pointing with white cement (1:2) using marble dust with admixture of pigment to match with shade of granite	Sqm	90.00	5,395.13	4,85,561.37

SN	Description of items	Unit	Qty	Rate	Amount
Total					20,44,78,337.93
Total Schedule-I					20,44,78,338.00
Schedule-J					
1	Mild steel bars 10mm dia and over, cut to length, bent to shape required, including cranking, bending spirally for hooping for columns, hooking ends and binding with and including mild steel wire (annealed) not less than 0.9mm dia or securing with clips complete	Kg	14,000.00	94.54	13,23,615.44
2	Material & Labour for Formwork to faces of walls, retaining walls, abutments, parapets and staircase railings and similar work including attached pilasters, buttresses, etc.; vertical or to batter with fair finished surfaces	Sqm	1,600.00	656.93	10,51,090.76
3	Material & Labour for RCC M25 in Walls, retaining walls, basement walls, ballast walls and the like; any thickness; above top of footings; including attached pilasters and buttresses	Cum	80.00	9,189.54	7,35,162.84
4	Material & Labour for precast cement concrete Type 1:2:4 (20mm graded aggregate) as in landings, cover slabs and similar articles with plain faces set in cement mortar 1:4	Cum	90.00	12,652.18	11,38,696.15
Total					42,48,565.20
Total Schedule-J					42,48,565.00
Schedule-K					
1	Preparation and approval of preliminary and definitive design ,Construction Drawings and As built Drawings as per direction of the KRIDE and Engineer in charge along with necessary Soil Investigations and Sub Soil Investigations and submission of soil report required for the foundation design etc...	LS	1.00	64,79,864.00	76,46,239.52
Grand Total					76,46,239.52
Total Schedule-K					76,46,240.00
Schedule-L					
1	Miscellaneous Items for works, are to be executed under schedule of rates 2021-22, published by KPWD	LS (Fixed)			50,00,000.00
Total					50,00,000.00
Total Schedule-L					50,00,000.00

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SECTION-10

**FORMAT OF BANK GUARANTEE FOR
SECURITY DEPOSIT ETC.,**

INDEX**TABLE OF FORMS**

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Notes:

This Section contains forms which, once completed, will form part of the Contract. The forms for Performance Security and Advance Payment Security, when required, shall only be completed by the successful Bidder after contract award.

All italicized text is for guidance how to prepare the various forms and shall be deleted from the final documents.

FORMAT OF BANK GUARANTEE FOR SECURITY DEPOSIT

To, _____ (Name of the Employer)

(Address of the Employer)

Whereas _____ (Name and Address of the contractor) (herein after called the Contractor) has undertaken, in pursuance of contract no _____ Dated: _____ (Name of the contract and brief description of the work) (herein after called the Contract)

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of ₹. _____ [amount of guarantee] Rupees _____ [in words], and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____ [amount of guarantee] as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until 28 days from the date of expiry of the Defects Liability Period.

Signature and seal of the guarantor _____
Name of Bank _____
Address _____
Date _____

FORM OF BANK GUARANTEE FOR PERFORMANCE SECURITY

(On non-judicial stamp paper of the appropriate value in accordance with stamp Act. The stamp paper to be in the name of Executing Bank).

From:

Name and Address of the Bank

To:

The Managing Director,
Rail Infrastructure Development Company (Karnataka) Limited,
"Samparka Soudha", 1st Floor,
B.E.P Premises (Opp. Orion Mall),
Dr. Rajkumar Road,
Rajajinagar 1st Block,
Bangalore - 560 010

WHEREAS, Rail Infrastructure Development Company (Karnataka) Limited, hereinafter called the **Employer**, acting through **[Insert Designation and address of the Employer's Representative]**, has accepted the bid of **[Insert Name and address of the Contractor]**, hereinafter called the **Contractor**, for the work of **[Insert Name of Work]**, vide Notification of Award No **[Insert Notification of Award No]**

AND

WHEREAS, the contractor is required to furnish Performance Security for the sum of **[Insert Value of Performance Security required]**, in the form of bank guarantee, being a condition precedent to the signing of the contract agreement.

WHEREAS, **[Insert Name of the Bank]**, with its Branch **[Address]** having its Headquarters office at **[Address]**, hereinafter called the **Bank**, acting through **[Designation(s) of the authorised person of the Bank]**, have, at the request of the **[Insert name of the JV partner]**, a JV partner on behalf of the contractor, agreed to give guarantee for performance security and 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 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 the Employer the full amount in the sum of **[Insert Value of Performance Security required]** as above stated.
- 2 The Bank undertakes to immediately pay on presentation of demand by the Employer any amount up to and including aforementioned full amount without any demur, reservation or recourse. Any such demand made by the Employer on the Bank 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 Employer of Bank.
- 3 On payment of any amount less than aforementioned full amount, as per demand of the Employer, the guarantee shall remain valid for the balance amount i.e. the aforementioned full amount less the payment made to the Employer.
- 4 The Bank shall pay the amount as demanded immediately on presentation of the demand by Employer without any reference to the contractor and without the Employer being required to show grounds or give reasons for its demand or the amount demanded.
- 5 The Bank Guarantee shall be unconditional and irrevocable.
- 6 The guarantee hereinbefore shall not be affected by any change in the constitution of the Bank or in the constitution of the Contractor.
- 7 The Bank 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 Employer and the Contractor, will in any way release us from the liability under this guarantee; and the Bank, hereby, waives any requirement for notice of any such change, addition or modification to the Bank.

- 8 This guarantee is valid and effective from the date of its issue, which is *[insert date of issue]*. The guarantee and our obligations under it will expire on *[Insert the date twenty-eight days after the expected end of defect liability period]*. All demands for payment under the guarantee must be received by us on or before that date.
- 9 The Bank agrees that the Employers right to demand payment of aforementioned full amount in one instance or demand payments in parts totaling up to the aforementioned full amount in several instances will be valid until either the aforementioned full amount is paid to the Employer or the guarantee is released by Employer before the Expiry date.
- 10 The Bank agrees that its obligation to pay any amount demanded by the Employer before the expiry of this guarantee will continue until the amount demanded has been paid in full.
- 11 The expressions Bank and Employer herein before used shall include their respective successors and assigns.
- 12 The Bank hereby undertakes not to revoke the guarantee during its currency, except with the previous consent in writing of the employer. This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758.
- 13 The Guarantee shall be in addition to and without prejudice to any other security Guarantee (s) of the contractor in favour of the Employer available with the Employer. The Bank, under this Guarantee, shall be deemed as Principal Debtor of the Employer.
- 14 This guarantee shall be valid for 28days from the date of expiry of defect liability period.

Date _____

Place _____

_____ [Signature of Authorized person of Bank/Guarantor]

_____ [Name in Block letters]

_____ [Designation]

_____ [P/Attorney] No.

_____ Bank's Name and Seal

_____ [P/Attorney] No.

Witness:

1. *Signature*
Name & Address & Seal
2. *Signature*
Name & address & Seal

Notes:

1. *All italicized text is for guidance on how to prepare this bank guarantee and shall be deleted from the final document.*
2. *In case the guarantee is issued by a foreign Bank, which does not have operations in India, the said bank shall have to provide a counter-guarantee by State Bank of India.*

3. *In case the Contractor is a JV, the Performance Security is required to be furnished on behalf of the JV in favour of the Employer by the JV Partners in proportion of their respective percentage share specified in the JV Agreement. The percentage share of M/s **[Insert Name of the JV Partner]** in the JV is **[Fill share % in the JV]** percent. All the Bank Guarantee of JV Partners are liable to be encashed cumulatively.*

K-RIDE

FORM OF BANK GUARANTEE FOR ADDITIONAL PERFORMANCE SECURITY

(On non-judicial stamp paper of the appropriate value in accordance with stamp Act. The stamp paper to be in the name of Executing Bank)

From:

Name and Address of the Bank

To:

The Managing Director,
Rail Infrastructure Development Company (Karnataka) Limited,
"Samparka Soudha" , 1st Floor,
B.E.P Premises (Opp. Orion Mall),
Dr. Rajkumar Road,
Rajajinagar 1st Block,
Bangalore - 560 010

WHEREAS, Rail Infrastructure Development Company (Karnataka) Limited, hereinafter called the **Employer**, acting through **[Insert Designation and address of the Employer's Representative]**, has accepted the bid of **[Insert Name and address of the Contractor]**, hereinafter called the **Contractor**, for the work of **[Insert Name of Work]**, vide Notification of Award No. **[Insert Notification of Award No.]**.

AND

WHEREAS, the contractor is required to furnish Performance Security for the sum of **[Insert Value of Performance Security required]**, in the form of bank guarantee, being a condition precedent to the signing of the contract agreement.

WHEREAS, **[Insert Name of the Bank]**, with its Branch **[Address]** having its Headquarters office at **[Address]**, hereinafter called the **Bank**, acting through **[Designation(s) of the authorised person of the Bank]**, have, at the request of the **[Insert name of the JV partner]**, a JV partner on behalf of the contractor, agreed to give guarantee for performance security and 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 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 the Employer the full amount in the sum of **[Insert Value of Performance Security required]** as above stated.
2. The Bank undertakes to immediately pay on presentation of demand by the Employer any amount up to and including aforementioned full amount without any demur, reservation or recourse. Any such demand made by the Employer on the Bank 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 Employer of Bank.
3. On payment of any amount less than aforementioned full amount, as per demand of the Employer, the guarantee shall remain valid for the balance amount i.e. the aforementioned full amount less the payment made to the Employer.
4. The Bank shall pay the amount as demanded immediately on presentation of the demand by Employer without any reference to the contractor and without the Employer being required to show grounds or give reasons for its demand or the amount demanded.
5. The Bank Guarantee shall be unconditional and irrevocable.
6. The guarantee hereinbefore shall not be affected by any change in the constitution of the Bank or in the constitution of the Contractor.

7. The Bank 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 Employer and the Contractor, will in any way release us from the liability under this guarantee; and the Bank, hereby, waives any requirement for notice of any such change, addition or modification to the Bank.
8. His guarantee is valid and effective from the date of its issue, which is ***[insert date of issue]***. The guarantee and our obligations under it will expire on ***[Insert the date twenty-eight days after the expected end of defect liability period]***. All demands for payment under the guarantee must be received by us on or before that date.
9. The Bank agrees that the Employers right to demand payment of aforementioned full amount in one instance or demand payments in parts totaling up to the aforementioned full amount in several instances will be valid until either the aforementioned full amount is paid to the Employer or the guarantee is released by Employer before the Expiry date.
10. The Bank agrees that its obligation to pay any amount demanded by the Employer before the expiry of this guarantee will continue until the amount demanded has been paid in full.
11. The expressions Bank and Employer herein before used shall include their respective successors and assigns.
12. The Bank hereby undertakes not to revoke the guarantee during its currency, except with the previous consent in writing of the employer. This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758.
13. The Guarantee shall be in addition to and without prejudice to any other security Guarantee (s) of the contractor in favour of the Employer available with the Employer. The Bank, under this Guarantee, shall be deemed as Principal Debtor of the Employer.

Date _____

Place _____

_____ [Signature of Authorised person of Bank]

_____ [Name in Block letters]

_____ [Designation]

_____ [P/Attorney] No.

Bank's Seal

[P/Attorney] No _____

Witness:

1. *Signature*
Name & Address & Seal
2. *Signature*
Name & address & Seal

Notes:

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

- 2 *In case the guarantee is issued by a foreign Bank, which does not have operations in India, the said bank shall have to provide a counter-guarantee by State Bank of India.*
- 3 *In case the Contractor is a JV, the Performance Security is required to be furnished on behalf of the JV in favour of the Employer by the JV Partners in proportion of their respective percentage share specified in the JV Agreement. The percentage share of M/s [**Insert Name of the JV Partner**] in the JV is [**Fill share % in the JV**] percent. All the Bank Guarantee of JV Partners are liable to be encashed cumulatively.*

K-RIDE

ADVANCE PAYMENT SECURITY

(On non-judicial stamp paper of appropriate value in accordance with stamp Act. The stamp paper to be in the name of Executing Bank)

From

_____ [Name and Address of the Bank]

To

The Managing Director,
Rail Infrastructure Development Company (Karnataka) Limited,
"Samparka Soudha", 1st Floor,
B.E.P Premises (Opp. Orion Mall),
Dr. Rajkumar Road,
Rajajinagar 1st Block,
Bangalore - 560 010

Beneficiary/Employer: Rail Infrastructure Development Company (Karnataka) Limited.

Guarantee No.: [.... reference number of the guarantee...] **Dated:** [.....]

WHEREAS, Rail Infrastructure Development Company (Karnataka) Limited (**hereinafter called the Employer**) has entered into Contract No. [.... reference number of the Contract....] dated [.....] for the execution of [name of the contract] (**hereinafter called the Contract**) with [....name of the Contractor....] (**hereinafter called the Contractor**).

WHEREAS, according to the Conditions of the Contract, an advance payment is admissible to the contractor against submission of bank guarantee(s).

At the request of the Contractor, we [....name of the Bank....] with our branch at [....address....], having our Head Office at [....address....] (**hereinafter called the Bank**) have, at the request of [.....Insert name of the JV partner....], a JV partner on behalf of the Contractor, agreed to give the said guarantee as hereinafter contained:

1. KNOW ALL MEN by these present that I/We the undersigned [Insert name(s) of authorized representative(s) 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 guarantees to pay the Employer the sum of ₹. [....value in figure....] (Rupees [....value in words....] only (**hereinafter called the Full Amount**)).
2. The Bank undertakes to immediately pay to the Employer, without any demur, reservation or recourse, any amount up to and including aforementioned full amount upon first written demand/demands from the Employer.
3. On payment of any amount less than aforementioned full amount, as per demand of the Employer, the guarantee shall remain valid for the balance amount i.e. the aforementioned full amount less the payment made to the Employer.
4. The Bank shall pay the amount so demanded without any reference to the contractor and without the Employer being required to show grounds or give reasons for its demand or the amount demanded.
5. The guarantee hereinbefore shall not be affected by any change in the constitution of the Bank, the Contractor or the Employer.
6. The Bank agrees that no change, addition, modification to the terms of the Contract Agreement or to any document, which have been or may be made between the Employer and the Contractor, will in any way release us from the liability under this guarantee; and the Bank, hereby, waives any requirement for notice of any such change, addition or modification to the Bank.
7. This guarantee is valid and effective from the date of its issue, which is [....date of issue....]. The guarantee and our obligations under it will expire on dated[....Please refer note 4 & 5....]. All demands for payment under the guarantee must be received by us on or before that date.

8. The Bank agrees that the Employer's right to demand payment of aforementioned full amount in one instance or demand payments in parts totaling up to the aforementioned full amount in several instances will continue until either the aforementioned full amount is paid to the Employer or the guarantee validity period expires.
9. The Bank agrees that it's obligation to pay any amount demanded by the Employer before the expiry of this guarantee will continue until the amount demanded has been paid in full.
10. The expressions Bank and Employer herein before used shall include their respective successors and assigns.
11. The Bank hereby undertakes not to revoke the guarantee during its currency, except with the previous consent in writing of the employer. This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758.

Dated[_____]

Place[_____]

(Signature of the Authorized Person of the Bank)

(Name in Block Letters)

(Designation)

(Bank's Seal)

(Authorization No.)

Witness:

1. _____
Signature, Name & Address

2. _____
Signature, Name & Address

Notes:

1. All italicized text in brackets [...text...] is for guidance on how to prepare this bank guarantee and shall be deleted from the final document.
2. In case the guarantee is issued by a foreign Bank, the said bank shall have operations in India and should be issued by Indian operations branch of the said bank.
3. **Mobilization Advance**

(a) For Single Entity

For each Installment of Advance, two Bank Guarantees of equal amounts (each equal to half of the first installment of advance plus 10%) shall be furnished. Each Bank Guarantee shall be valid for the stipulated completion period of the contract.

OR

(b) For JV/Consortium

For each Installment of Advance, individual JV/Consortium partner shall furnish Bank Guarantee equal to his share in the installment of Advance plus 10%. Each Bank Guarantee shall be valid for the stipulated completion period of the contract.

4. **Advance against Plant and Machinery**

(a) For Single Entity

For each Installment of Advance, a Bank Guarantee equal to the installment of advance plus 10% shall be furnished. The Bank Guarantee shall be valid for the stipulated completion period of the contract.

OR

(b) For JV/Consortium

For each Installment of Advance, individual JV/Consortium partner shall furnish a Bank Guarantee equal to his share in the installment of advance plus 10%. Each Bank Guarantee shall be valid for the stipulated completion period of the contract.

K-RIDE

**INDEMNITY BOND FOR THE SAFE CUSTODY OF THE
MATERIALS SUPPLIED BY THE CONTRACTOR**

(To be executed on Non-Judicial Stamp Paper of Appropriate Value and notarized)

THIS INDEMNITY BOND made on this _____ day of _____ 20__ by _____ (*insert the name of the Contractor and its registered address*) (hereinafter called "the Contractor") which expression shall where the context do admits or implies be deemed to include its executors, administrators and assigns, in favour of the Rail Infrastructure Development Company (Karnataka) Limited, Samparka Soudha", 1st Floor, B.E.P Premises (Opp. Orion Mall), Dr. Rajkumar Road, Rajajinagar 1st Block, Bangalore - 560 010 (hereinafter called "K-RIDE") on the other part.

WHEREAS by an Agreement/Letter of Acceptance No. _____ dated _____ (hereinafter called "the said agreement"), the Contractor has agreed to execute the _____ (*Name of Work*) (hereinafter called "the Works") .

AND WHEREAS the Contractor has submitted to K-RIDE/ the Engineer for payment on materials procured by him and brought to the site of the Works or his workshop for use in the Works.

AND WHEREAS K-RIDE/ the Engineer has agreed to make advance/stage payment to the Contractor the total sum of ₹. _____ (*in Figures*) [Rupees _____ (*in Words*)] in Interim Payment Certificate (IPC) No. _____, the quantities and other particulars of which are detailed in this IPC for the said works signed by the Contractor on _____ for the Materials brought by the Contractor to site of the works. Brief details are also mentioned in schedule 1 appended hereto.

NOW THIS INDEMNITY BOND WITNESS that in pursuance of the said agreement and in consideration of the sum of ₹. _____ (*in Figures*) _____ (*in Words*) on or before the execution of these presents to be paid to the Contractor by K-RIDE so aforesaid, the Contractor doth hereby covenant and agree with K-RIDE and declare as follows: -

1. That the said sum of ₹.. _____ (*In Figures*) _____ (*in Words*) to be paid by K-RIDE to the Contractor as aforesaid shall be utilized by the Contractor in or towards the execution of the said works and for no other purpose whatsoever.
2. That the Materials detailed in the said IPC which have been offered to and accepted by K-RIDE/ the Engineer, are absolutely the Contractor's own property and free from encumbrances of any kind and the Contractor will not make any application for or receive any further payment on the Materials which are not absolutely his own property and free from encumbrances of any kind, the Contractor indemnifies the K-RIDE against all claims on any Materials in respect of which payment is to be made to him as aforesaid.
3. That the Contractor undertakes that the Materials shall be used exclusively for the performance / execution of the Contract strictly in accordance with the terms and conditions of the Contract and no part of the Materials shall be utilized for any other work or purpose whatsoever.
4. That the Contractor is obliged and shall remain absolutely responsible for the safe transit / protection and custody of the Materials against all risks whatsoever including acts of the God till the Materials are duly incorporated in the works, commissioned and are taken over by K-RIDE/Railway (including surplus Materials, if required as instructed by K-RIDE/ the Engineer) in accordance with the terms of the Contract. The Contractor undertakes to keep K-RIDE harmless against any loss or damage that may be caused to the Materials.
5. That the said Materials shall not on any account be removed from the site of the works except with the written permission of K-RIDE/ the Engineer. Further, K-RIDE/ the Engineer shall always be free at all times to take possession of the materials in whatever form the materials may be in, if in its opinion, the Materials are likely to be endangered, mis-utilized or converted to uses other than those specified in the Contract, by any acts or

omission or commission on the part of the Contractor or any other person or on account of any reason whatsoever and the Contractor binds himself and undertakes to comply with the directions of demand of K-RIDE to return the Materials without any demur or reservation.

6. That the said materials shall, at all times, be open to inspection by K-RIDE/ the Engineer or any authorized representative. In the event of the said material or any part thereof at any time being found to be in lesser quantity than for which payment has been released or the same has been stolen, destroyed or damaged or becoming deteriorated, the Contractor will forthwith replace the same or repair and make good the same as required by K-RIDE/ the Engineer.
7. That making payment does not mean that Materials are of required specifications and quality or that whole of the quantity brought to site by Contractor will be used in the work. The Contractor is fully responsible for the materials to conform to required quality and specification and if at any time K-RIDE/ the Engineer do not find the material satisfactory, the Contractor at his own cost would replace these. K-RIDE/ the Engineer would be at liberty to recover cost of these from any dues of the Contractor. Also any Materials which are in excess of what is finally required under the contract would be the Contractor's property without any liability on K-RIDE/ the Engineer who would recover the cost of this from the Contractor.
8. That this INDEMNITY BOND is irrevocable. If at any time, any loss or damage occurs to the Materials or the same or any part thereof is mis-utilized in any manner whatsoever, then the Contractor hereby agrees that the decision of K-RIDE/ the Engineer as to assessment of loss or damage to the Materials shall be final and binding on the Contractor. The Contractor binds itself and undertakes to replace the lost and/or damaged Materials at its own cost and/or shall pay the amount of loss to K-RIDE without any demur, reservation or protest. This is without prejudice to any other right or remedy that may be available to K-RIDE/ the Engineer against the Contractor under the Contract or under this Indemnity Bond.
9. That if the Contractor shall at any time make any default in the performance or observance in any respect of any of the terms and provisions of the said agreement or of those presents, the total amount of the payment shall immediately on the happening of such default be recovered by K-RIDE/ the Engineer from any dues of Contractor. It is also clearly understood by the Contractor that non-observance of the obligations under this Indemnity Bond by the Contractor shall inter-alia constitute a criminal breach of trust on the part of the Contractor for all intents and purpose including legal / penal consequences.
10. IN WITNESS WHEREOF, the Contractor has hereunto set its hand through its authorized representative, the day, month and year first above mentioned.

11. SCHEDULE 1

Particulars of the Materials	Quantity	Value of the Materials

Signed, Sealed and Delivered by the said Contractor

(Contractor's Name)

Dated: _____

(AUTHORISED SIGNATORY)

Place: _____

SEAL OF COMPANY

IN THE PRESENCE OF:

WITNESS:

SIGNATURE _____

NAME: _____

ADDRESS : _____

Note:

*The contractor has the option to submit the **INDEMNITY BOND** to cover all the items and quantities of Materials of stage payment or to submit **INDEMNITY BOND** each time the stage payment is to be taken or Materials advance is to be taken.*

No. _____

Office of the _____

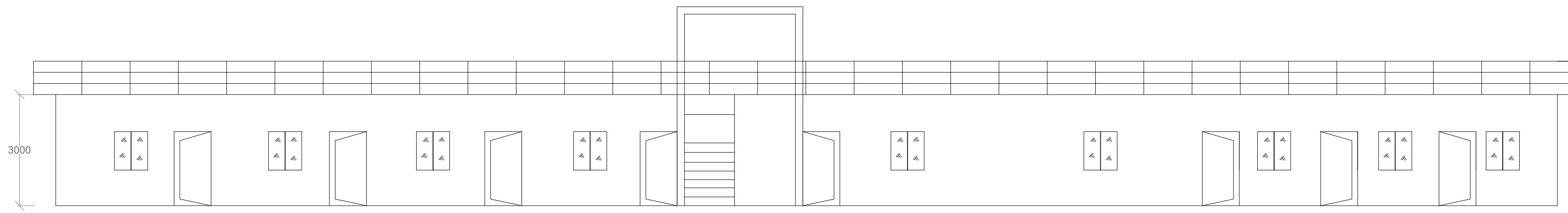
Date: _____

K-RIDE

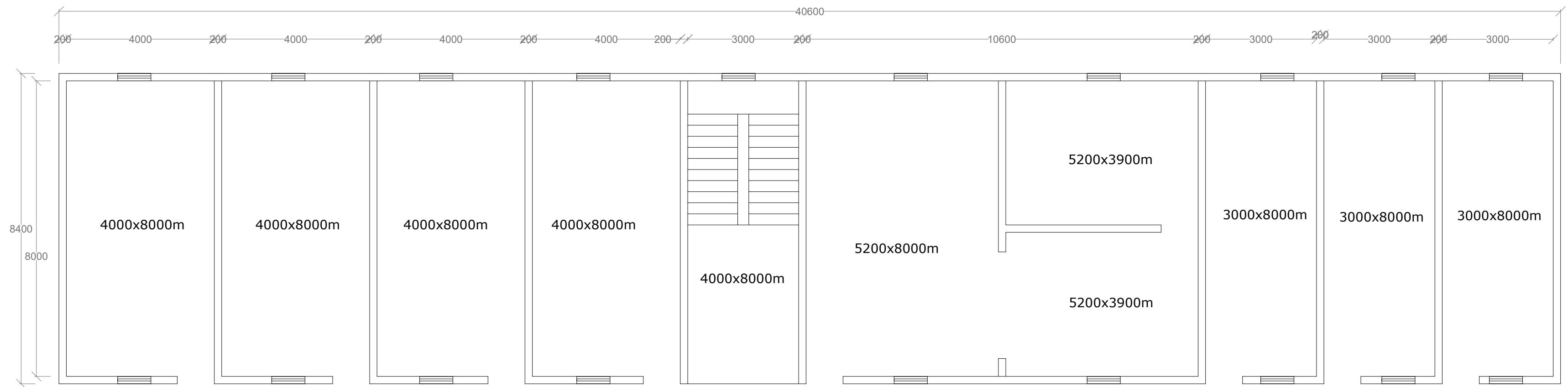
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SECTION-11

DRAWINGS



ELEVATION




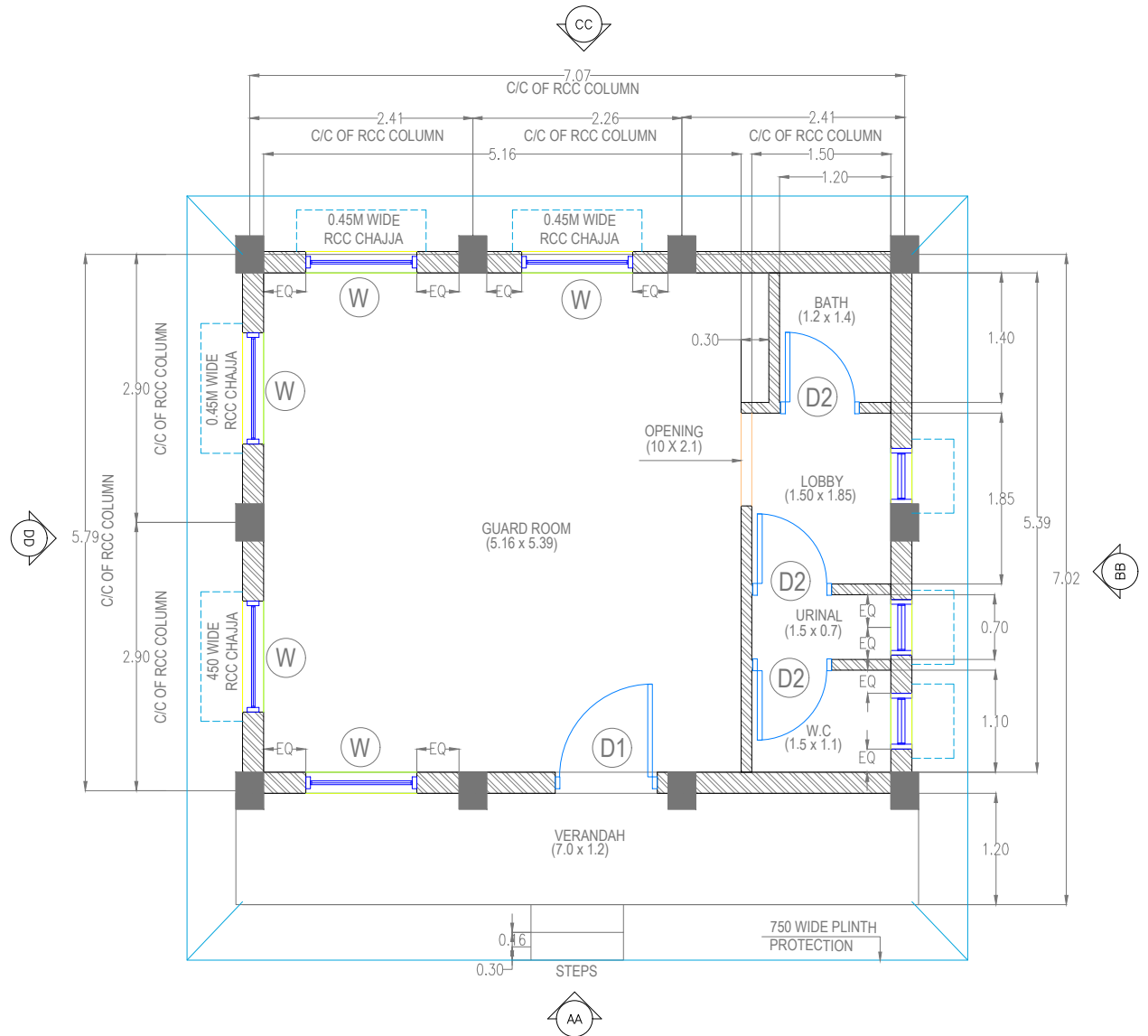
PLAN

NOTE

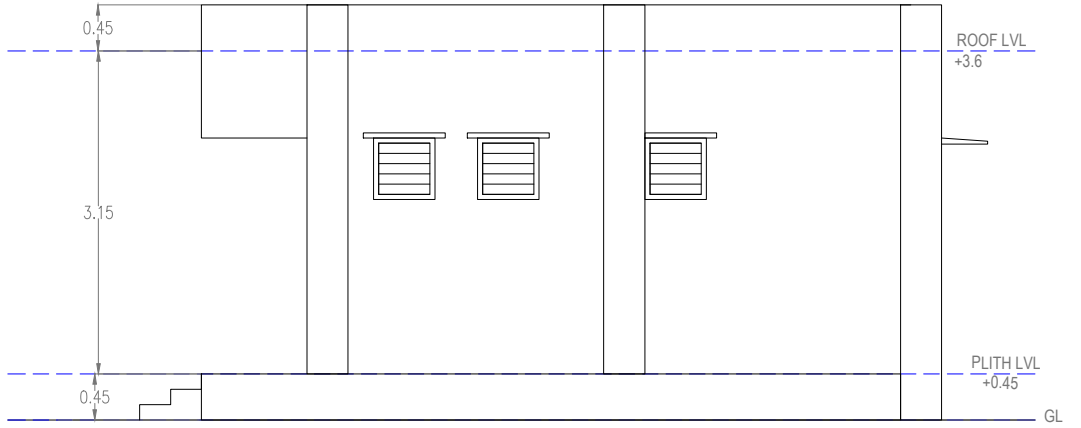
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2. FIGURED DIMENSIONS SHALL BE FOLLOWED

EXTENSION OF MULTIPURPOSE SHED

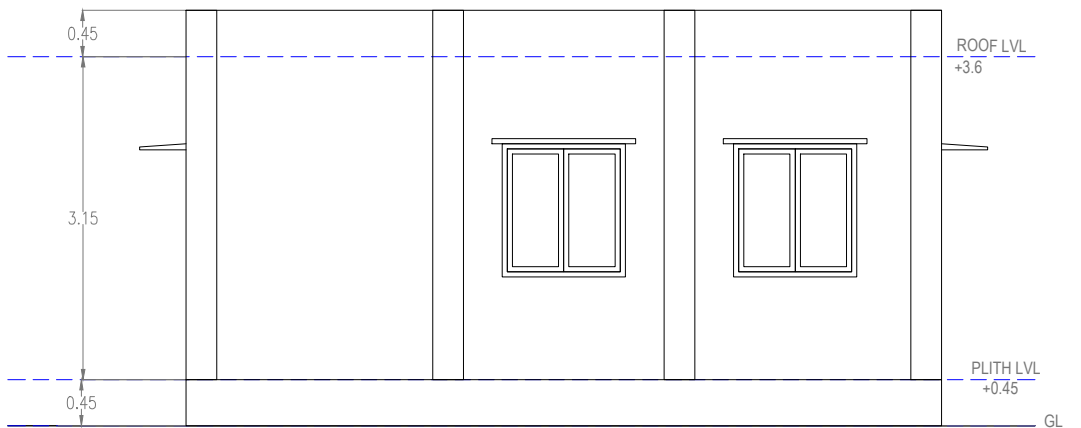
DATE	AUG 2023	K RIDE	SHEET NO.
SCALE	AS SHOWN		1/1
DRG. NO. K-RIDE / IAF / HQ TC (U) / MS /2023 / 1			
PREPARED BY		CHECKED BY	
APPROVED BY			



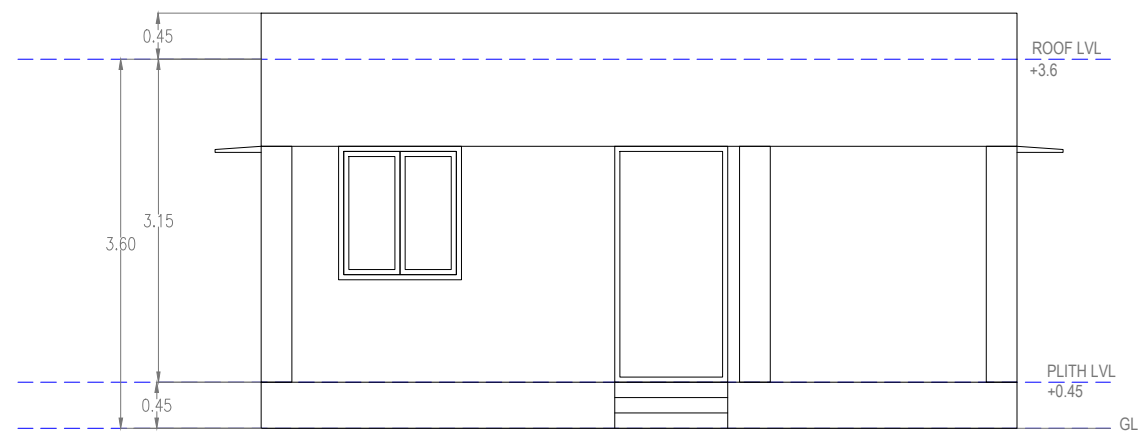
GROUND FLOOR PLAN
GUARD POST BUILDING



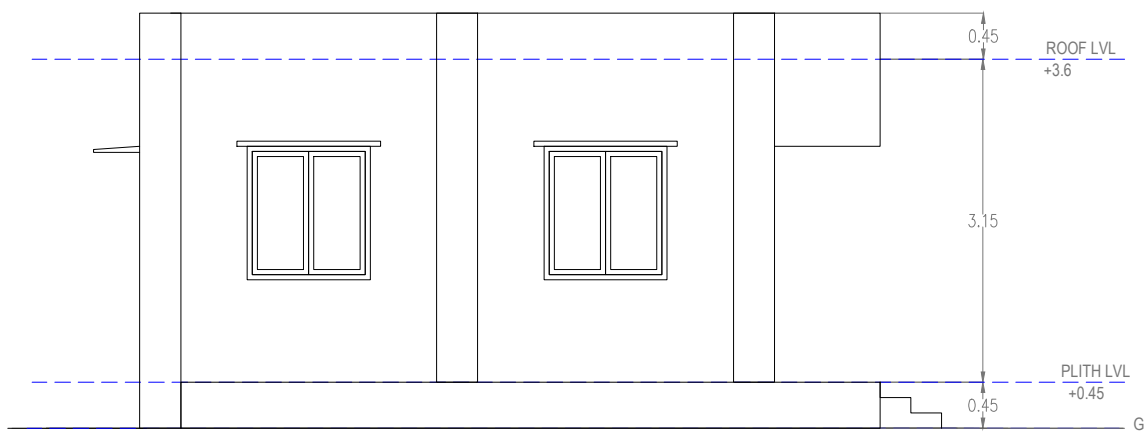
RIGHT ELEVATION-
BB



REAR ELEVATION-
CC



FRONT ELEVATION-
AA



LEFT ELEVATION-
DD

NOTE

1. ALL DIMENSIONS ARE GIVEN IN METER UNLESS OTHERWISE SPECIFIED
2. FIGURED DIMENSIONS SHALL BE FOLLOWED
3. CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS BEFORE STARTING EXECUTION OF THE WORK
4. GRADE OF CONCRETE FOR ALL RCC WORKS SHALL BE M-25 DESIGN MIX AS PER IS-456-2000
5. EXECUTIVES SHALL CHECK THE DRAWING BEFORE EXECUTION OF WORK AND IF ANY DISCREPANCY IS OBSERVED THE SAME SHALL BE REPORTED TO ACCEPTING OFFICER FOR CLARIFICATION/DECISION

COLUMN	
DIMENSION	
	0.3 X 0.4 m

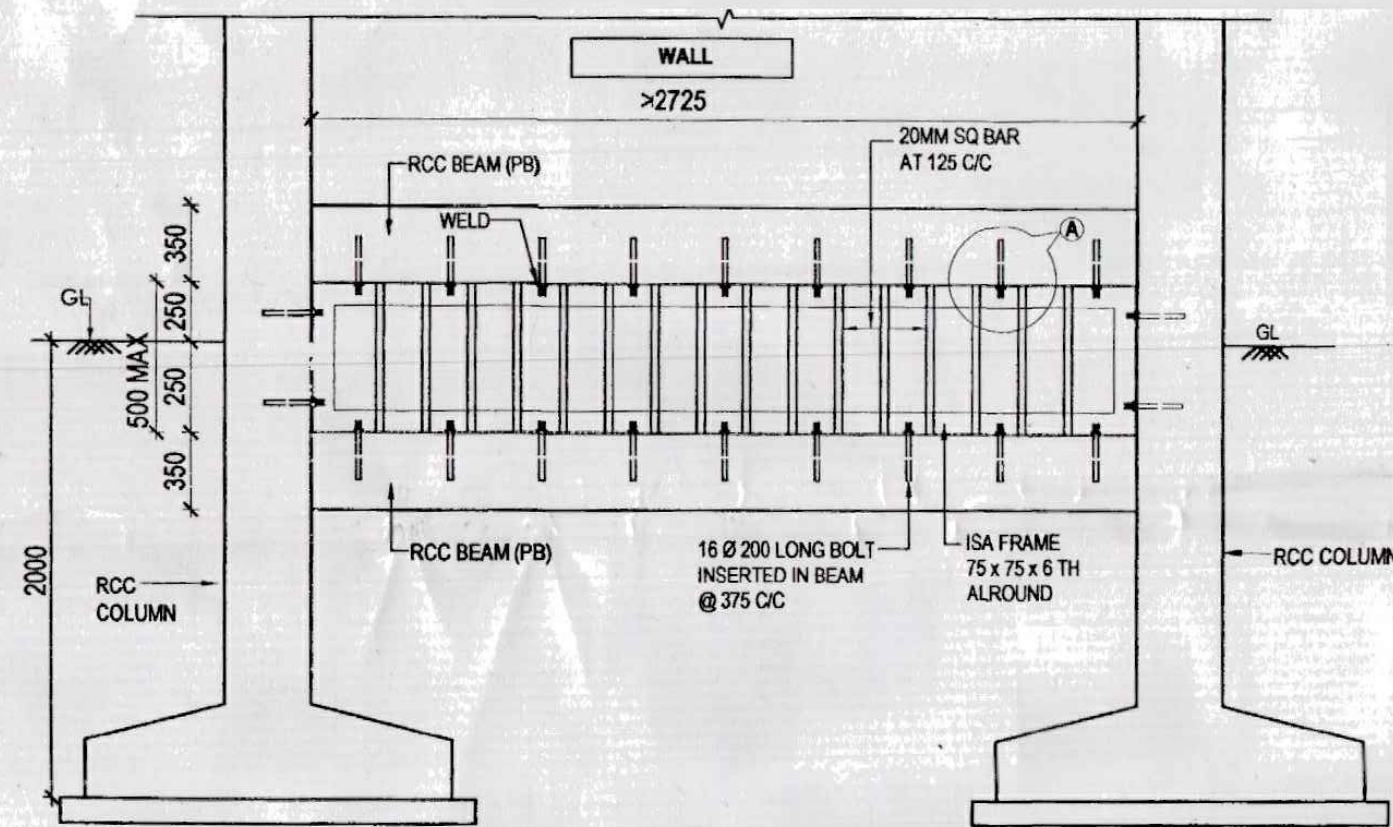
WALL			
	TYPE	THICKNESS	HEIGHT
	BRICK WALL	0.23 m	3.15 m (Floor to Floor ht)

DOOR		
MARK	SIZE	
	WD	HT
D1	1.0	2.1
D2	0.8	2.1

WINDOW				
Number	SIZE			
	Width	Height	Sill	Lintel
W	1.2	1.3	0.9	2.1

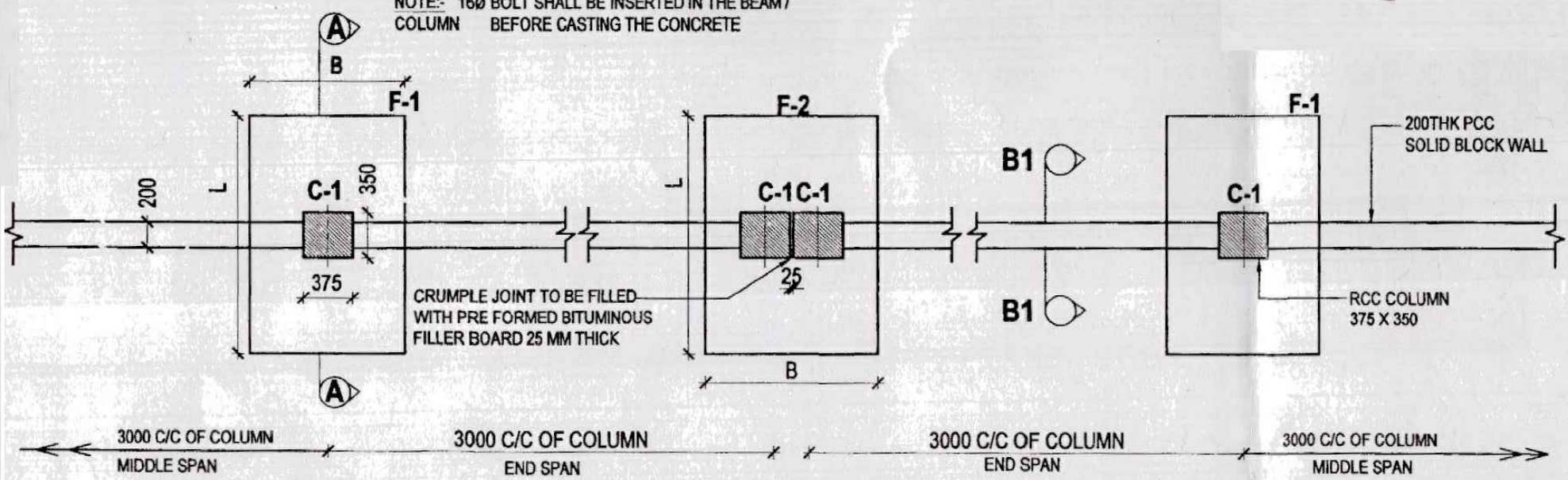
AIRMEN / DSC GUARD POST			
DATE	AUG 2023	K RIDE	SHEET NO.
SCALE	AS SHOWN		1/1

DRG. NO. K-RIDE / IAF / GP / 2023 / 1			
PREPARED BY		CHECKED BY	
APPROVED BY			



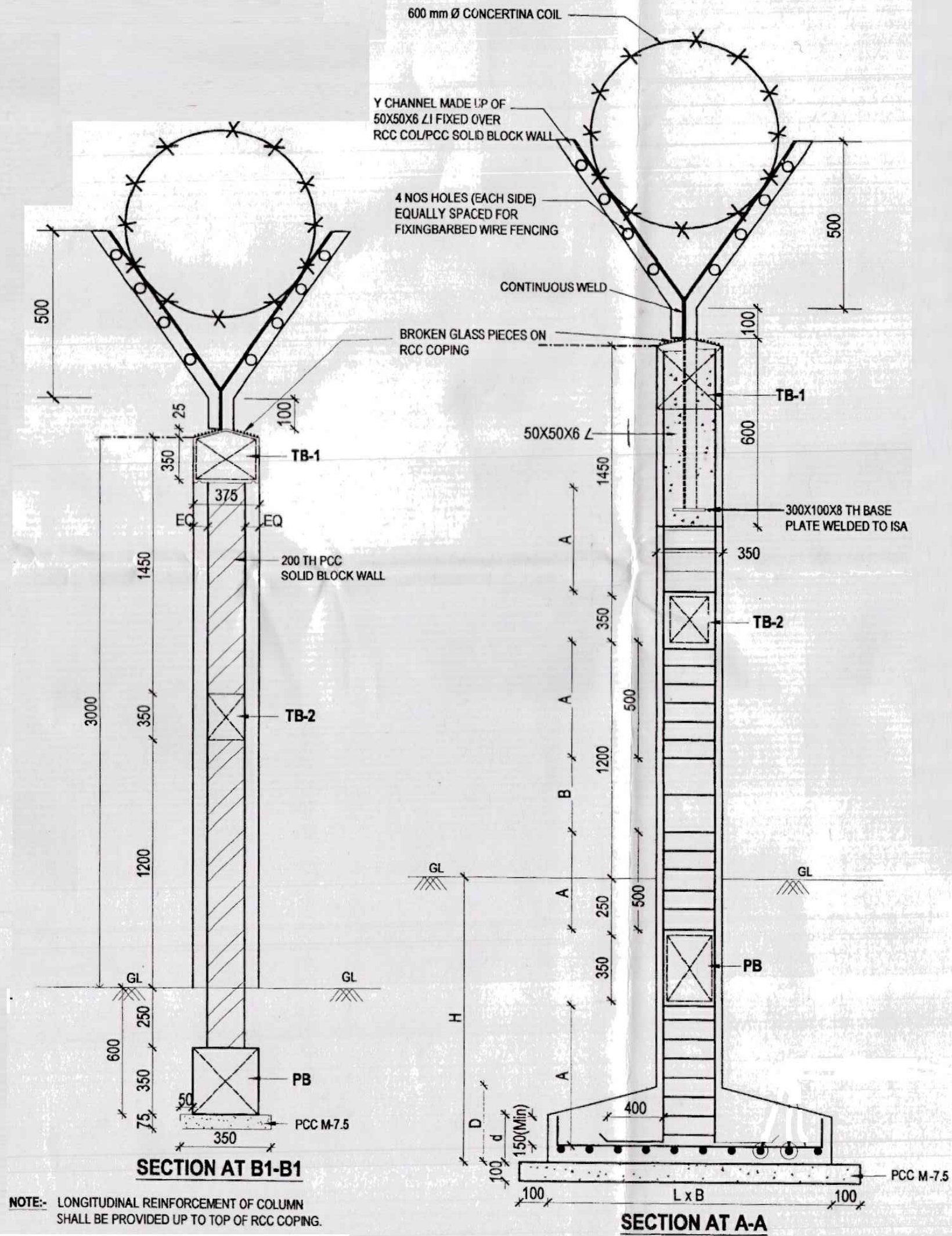
DETAIL OF GRATING AT DRAINAGE PORTION

NOTE: 16 Ø BOLT SHALL BE INSERTED IN THE BEAM / COLUMN BEFORE CASTING THE CONCRETE



PLAN OF BOUNDARY WALL AT GL

NOTE:- AT EVERY 30.0M INTERVALS CRUMPLE JOINT SHALL BE PROVIDED.




SECTION AT B1-B1

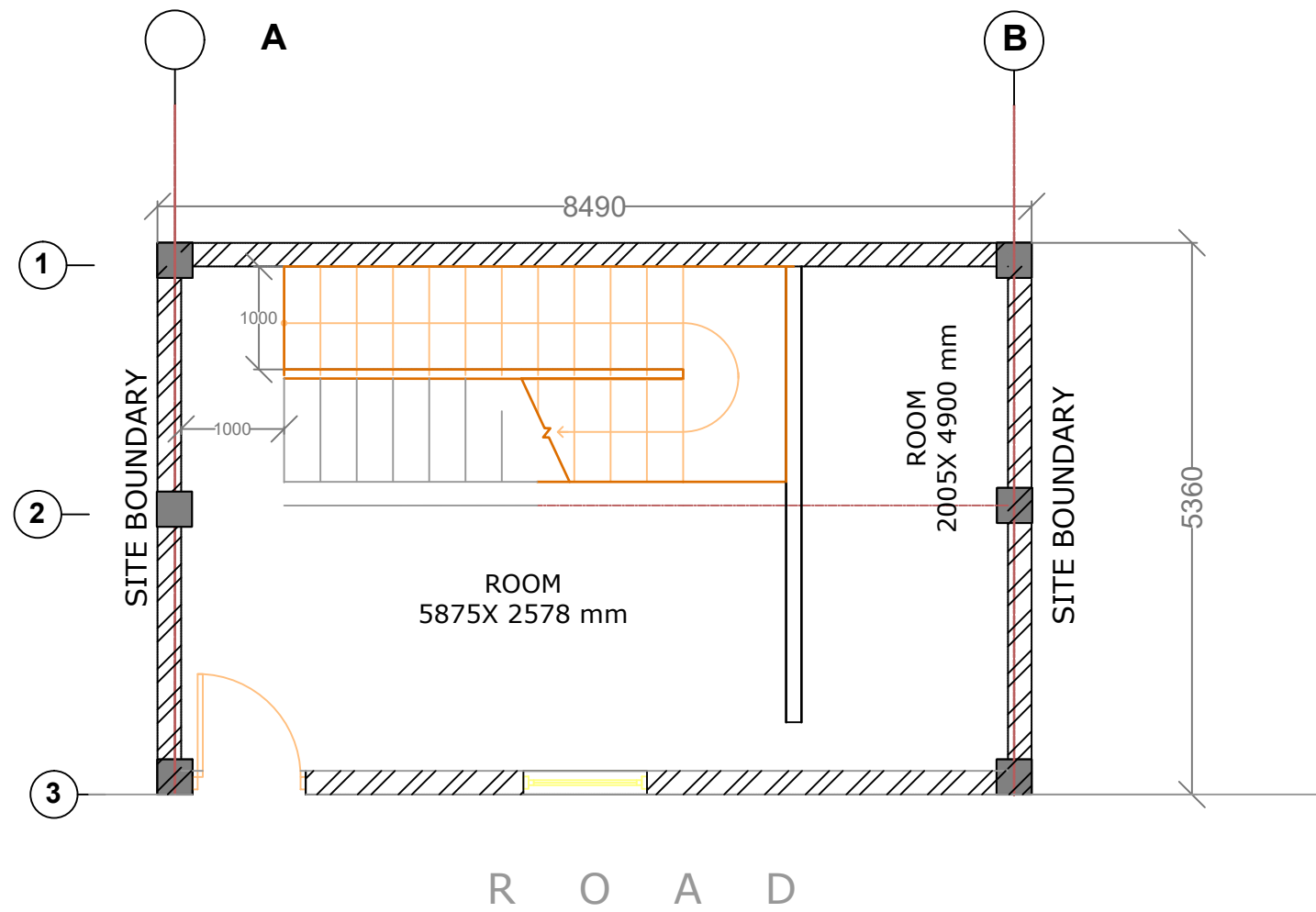
NOTE:- LONGITUDINAL REINFORCEMENT OF COLUMN SHALL BE PROVIDED UP TO TOP OF RCC COPING.

SECTION AT A-A

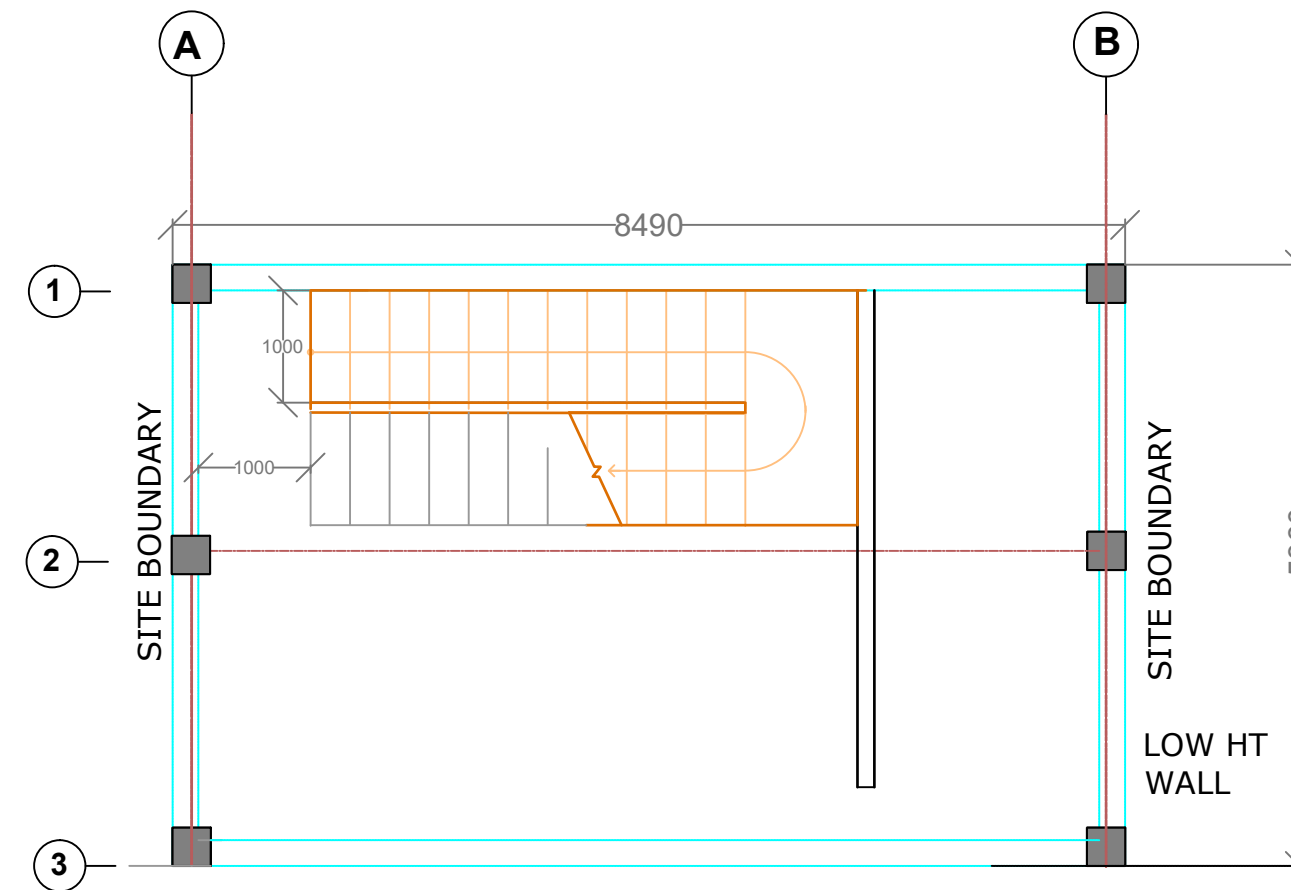
- NOTE**
- ALL DIMENSIONS ARE GIVEN IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
 - FIGURED DIMENSIONS SHALL BE FOLLOWED.
 - THE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS BEFORE STARTING EXECUTION OF THE WORK.
 - GRADE OF CONCRETE FOR ALL RCC WORKS SHALL BE M-25 DESIGN MIX AS PER IS : 456- 2000.
 - EXECUTIVES SHALL CHECK THE DRAWING BEFORE EXECUTION OF WORK AND IF ANY DISCREPANCY IS OBSERVED THE SAME SHALL BE REPORTED TO ACCEPTING OFFICER FOR CLARIFICATION / DECISION.
 - CEMENT SHALL BE 43 GRADE ORDINARY PORTLAND CEMENT CONFORMING TO IS : 8112 - 2013.CEMENT AND IT SHALL BE ISI MARKED. REINFORCEMENT BARS SHALL BE TMT BARS GARDE Fe 500D CONFORMING TO IS :1786-2008. BARS SHALL BE ISI MARKED. MINIMUM ELONGATION SHALL BE 18%.
 - CLEAR COVER TO REINFORCEMENT BAR SHALL BE AS UNDER:
 - FOOTING & BEAMS BURIED IN SOIL = 50MM
 - COLUMNS :- MAIN LONGITUDINAL BAR = 50MM
 - BEAMS :-
 - STIRRUPS BAR = 50 MM
 - LONGITUDINAL BAR = 30MM + DIA OF STIRRUPS.
 - STRUCTURAL DETAILS SUCH AS DIA. OF BAR, SPACING OF BAR, SIZE OF MEMBERS ETC. ARE TENTATIVE. THE SAME WILL BE PROVIDE AS PER STRUCTURAL DESIGN APPROVED BY DESIGNED AND APPROVAL OF COMPETENT AUTHORITY OF K RIDE.
 - WATER TO BE USED FOR CONCRETING SHALL MEET ALL REQUIREMENTS OF CLAUSE 5.4 OF IS :456 - 2000. SOURCE OF WATER SHALL BE APPROVED BY K RIDE.
 - BEAM BARS SHALL ALWAYS PASS THROUGH INNER SIDE OF THE COLUMN BARS.
 - HOOKS OF REINFORCEMENT BARS OF STIRRUPS IN BEAMS AND TIES / LINKS IN COLUMNS SHALL BE BENT TO AN ANGLE OF 135°. HOOK LENGTH SHALL BE 8 TIMES DIA OF BAR OR 75MM WHICHEVER IS MORE.
 - PCC SOLID BLOCK TO BE USED IN MASONRY SHALL BE OF GRADE C (5.0) AS PER IS :2185 (PART-1) 2005 WITH COMPRESSIVE STRENGTH OF 50KG/CM².
 - PROPER DRAINAGE AROUND THE WALL SHALL BE ENSURED TO AVOID INGRESS OF WATER IN FOUNDATION.
 - AT EVERY 30.0M INTERVALS CRUMPLE JOINT SHALL BE PROVIDED.
 - WEEP HOLES IN THE FORM OF 110Ø UPVC PIPE SWR GRADE (10KG/CM² PRESSURE) SHALL BE PROVIDED IN WALL AT EVERY 3.0M AT GL. PREFORMED BITUMINOUS FILLER BOARD 25MM THK SHALL BE PROVIDED AT CRUMPLE JOINT.
 - CONCERTINA COIL WITH ANGLE IRON FRAME/GLASS COPING (IF ANY) SHALL BE PROVIDED.
 - ONLY STEEL PROPS SHALL BE USED. NO WOODEN BALLIES SHALL BE USED. ONLY STEEL FORM WORK SHALL BE USED. FORM WORK SHALL BE WELL DESIGN DESIGNED MADE AND ERECTED IN ACCORDANCE TO THE RELEVANT IS CODE AND SHALL BE APPROVED BY K RIDE.
 - PLINTH BEAM SHALL BE CASTED USING FORM WORK ON ALL THREE FACES (INCLUDING BOTTOM).
 - IF ANY DETAILS OF REINFORCEMENT IS NOT SHOWN IN THE DRGS, THE PROVISIONS GIVEN IN HANDBOOK FOR DETAILING OF REINFORCEMENT (SP-34) AND IS: 13920 - 2016 SHALL BE FOLLOWED.

HIGH SECURITY WALL 3.0M

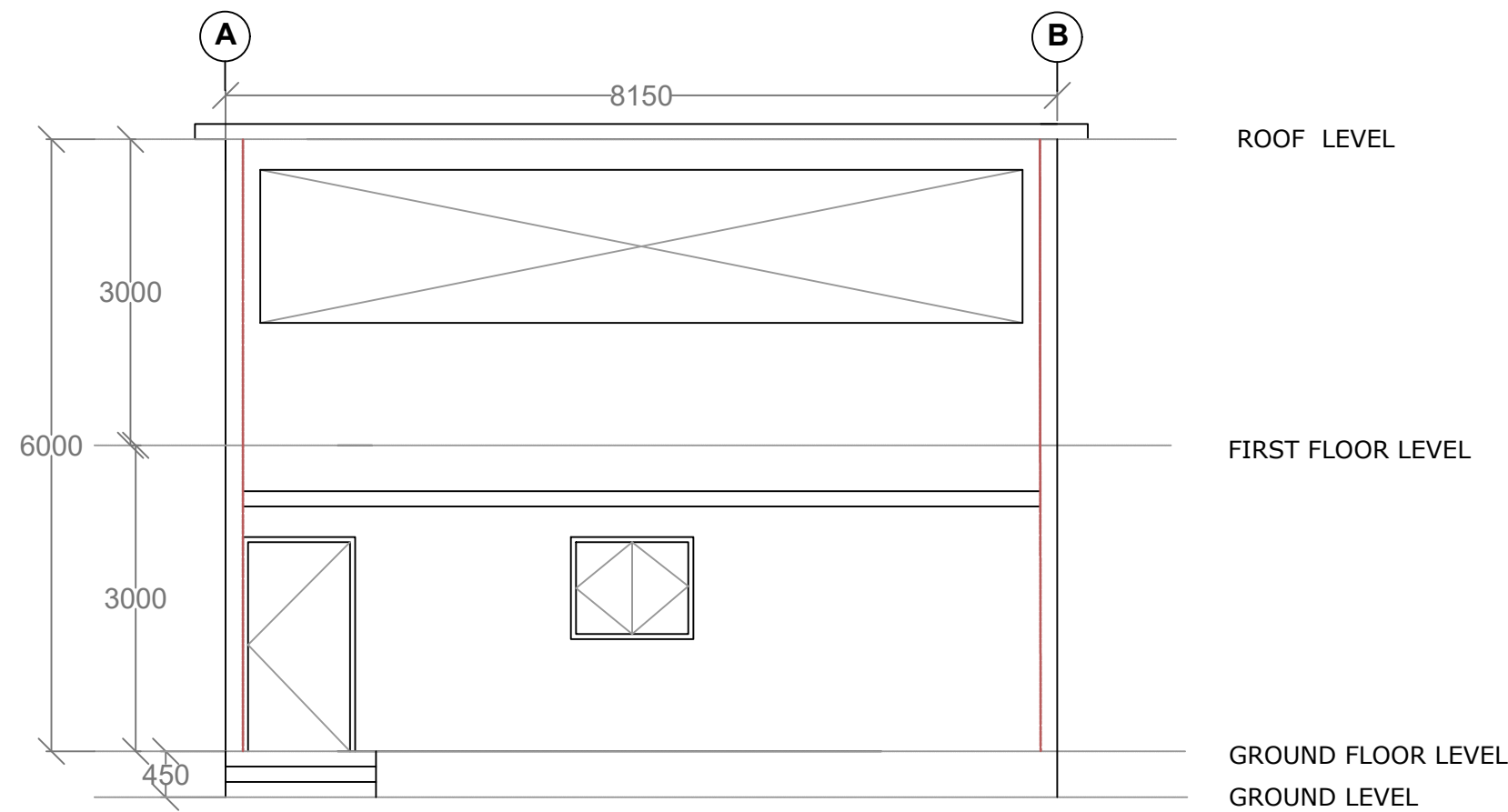
DATE	AUG 2023	K RIDE	SHEET NO.
SCALE	AS SHOWN		1/1
DRG. NO. K RIDE / IAF / BW / 2023 / 1			
PREPARED BY		CHECKED BY	
APPROVED BY			



GROUND FLOOR LEVEL
SCALE 1.100



FIRST FLOOR PLAN
SCALE 1.100



ELEVATION A
SCALE 1.100

ALL DIMENSION IN MILLIMETER

NOTE

1. ALL DIMENSIONS ARE GIVEN IN MILLIMETER UNLESS OTHERWISE SPECIFIED
2. FIGURED DIMENSIONS SHALL BE FOLLOWED
3. CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS BEFORE STARTING EXECUTION OF THE WORK
4. GRADE OF CONCRETE FOR ALL RCC WORKS SHALL BE M-25 DESIGN MIX AS PER IS-456-2000
5. EXECUTIVES SHALL CHECK THE DRAWING BEFORE EXECUTION OF WORK AND IF ANY DISCREPANCY IS OBSERVED THE SAME SHALL BE REPORTED TO ACCEPTING OFFICER FOR CLARIFICATION/DECISION

LEGEND

WALL			
	TYPE	THICKNESS	HEIGHT
	BRICK WALL	230 mm	3000 mm (Floor to Floor ht)
	LOW HT BRICK WALL	230 mm	1000 mm

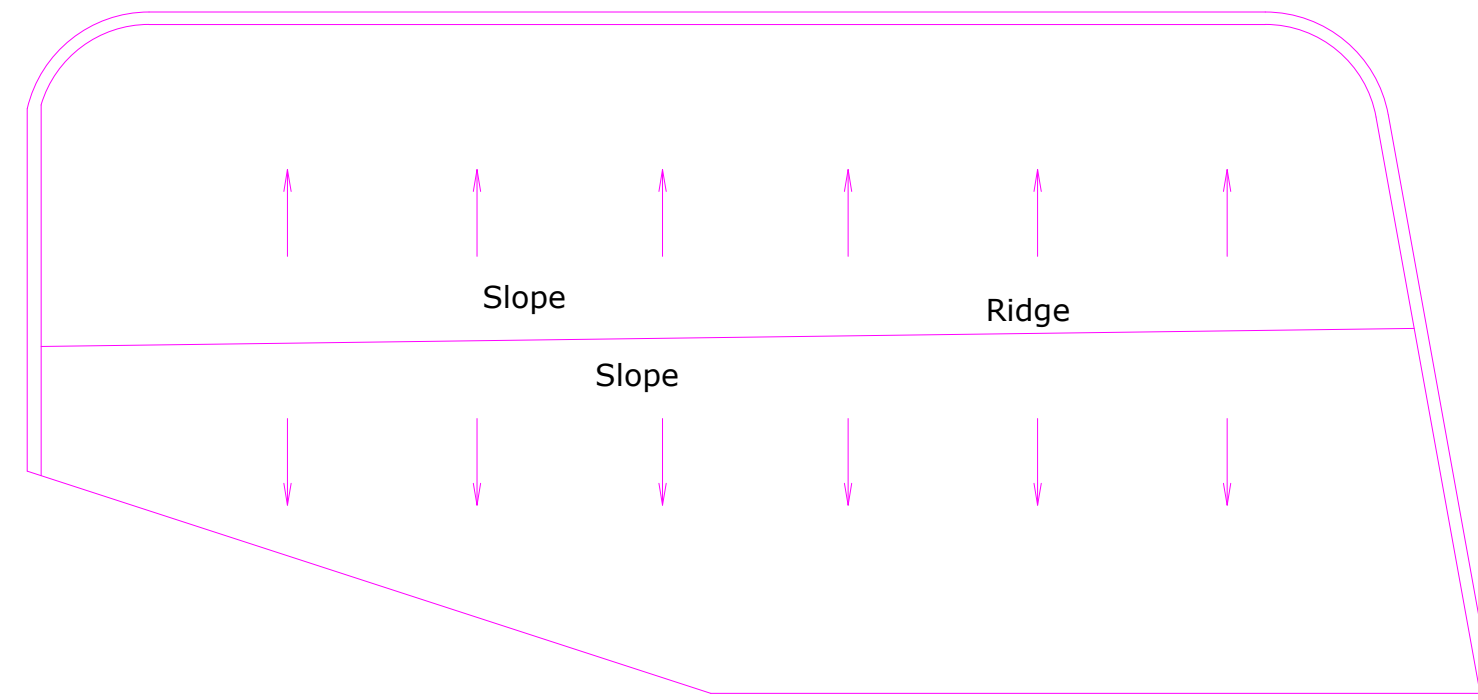
DOOR		
MARK	SIZE	
	WD	HT
1	1000	2100

WINDOW				
Number	SIZE		Sill	Lintel
	Width	Height		
1	1200	1000	900	2100

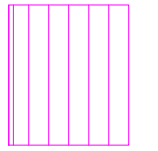
COLUMN	
DIMENSION	
	340 X 340 mm

INTEGRATED WATCH TOWER

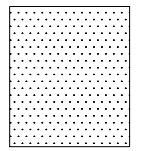
DATE	AUG 2023	K RIDE	SHEET NO.
SCALE	AS SHOWN		1/1
DRG. NO. K-RIDE / IAF / IWT / 2023 / 1			
PREPARED BY		CHECKED BY	
APPROVED BY			



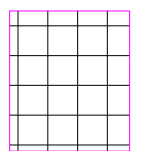
ROOF FLOOR



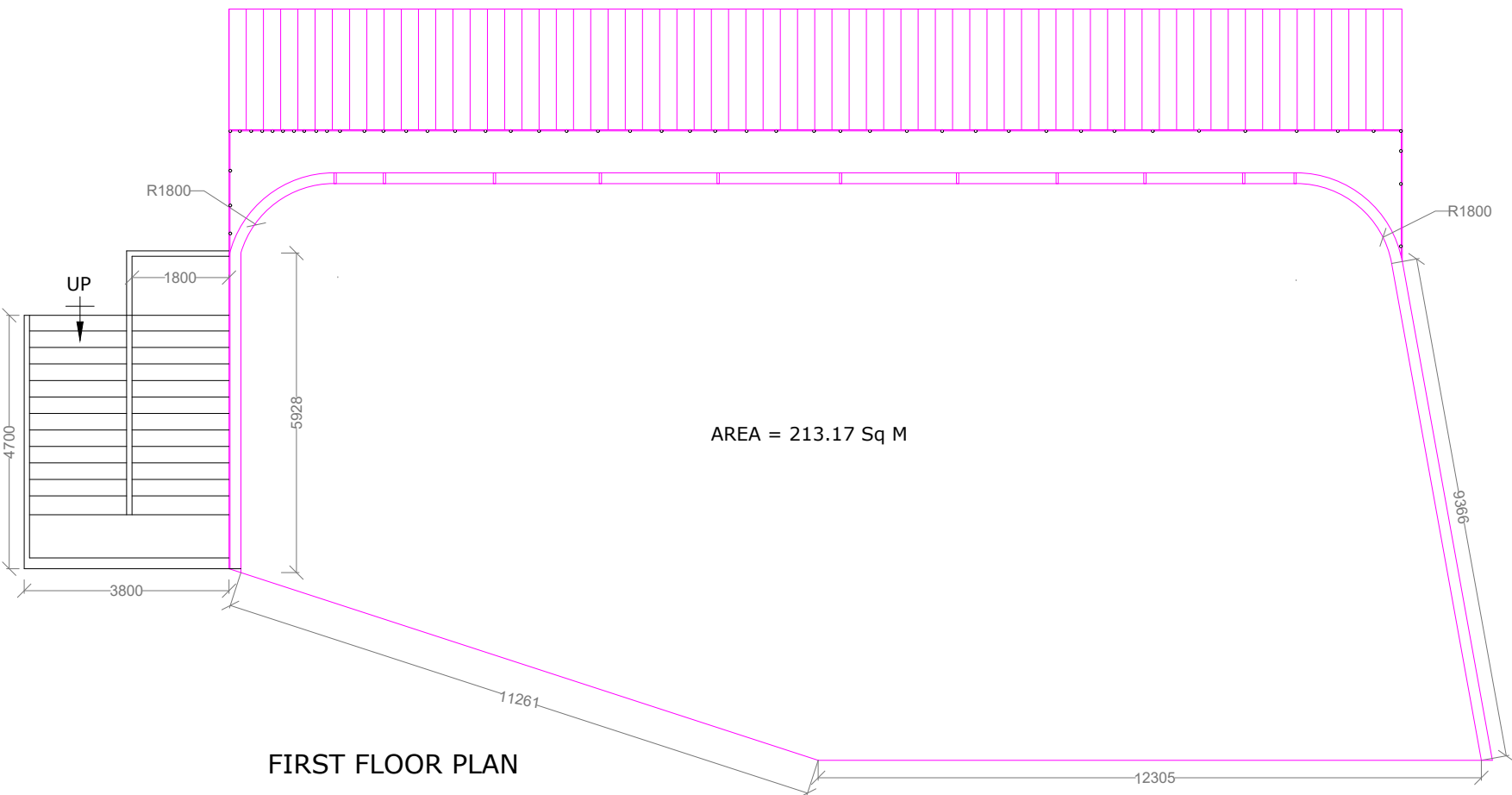
Galvalume Sheet



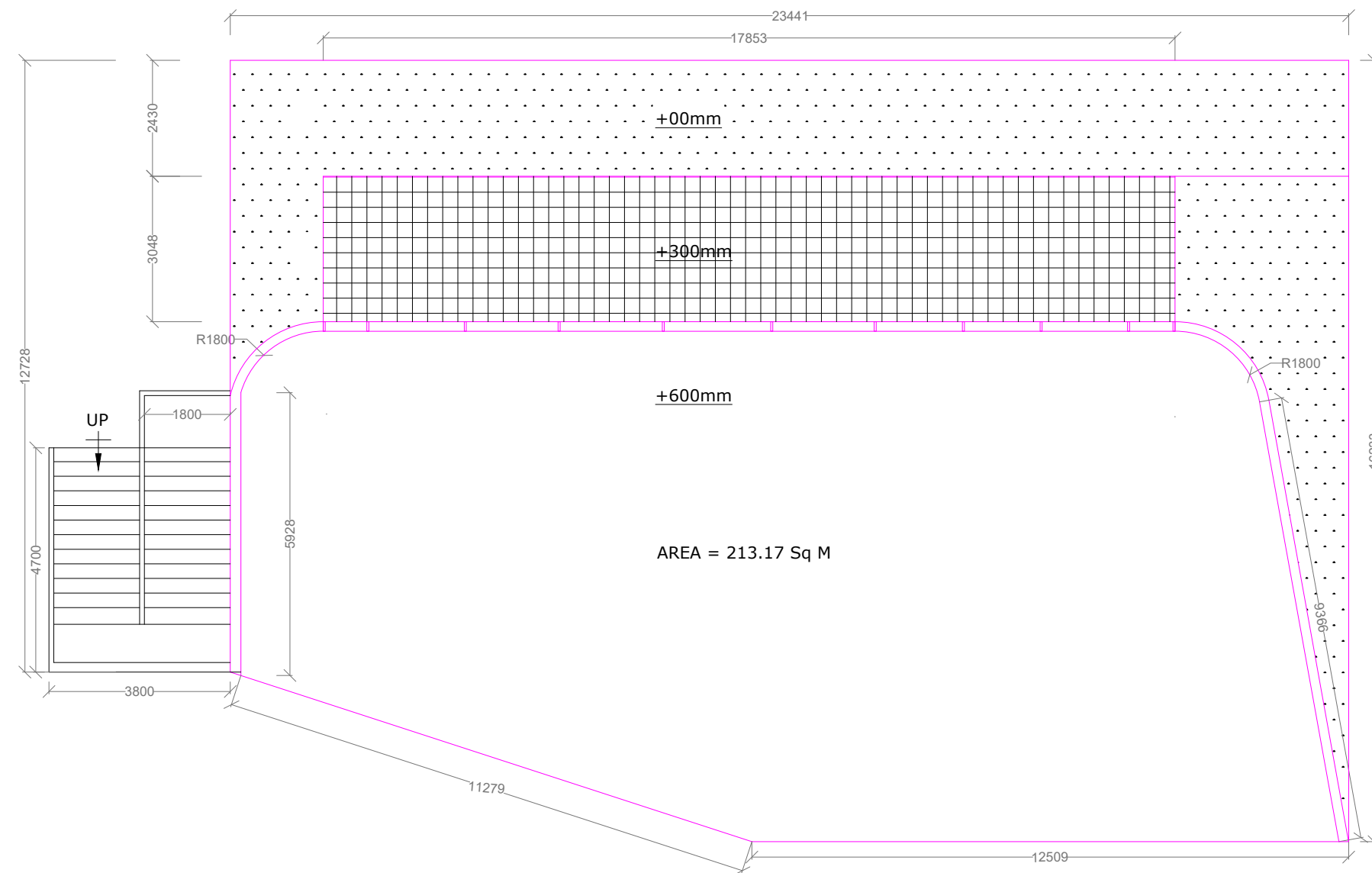
Green Grass




1x1 Outdoor Tiling



FIRST FLOOR PLAN

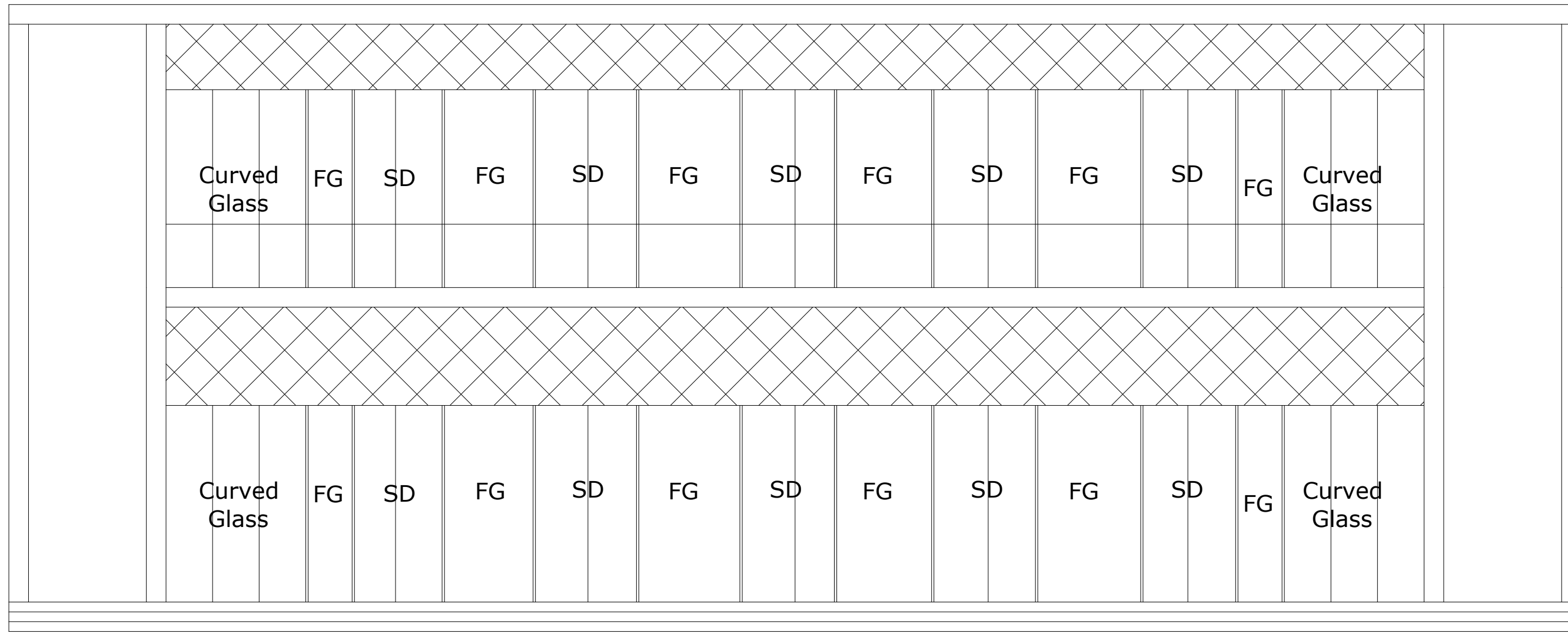


GROUND FLOOR PLAN

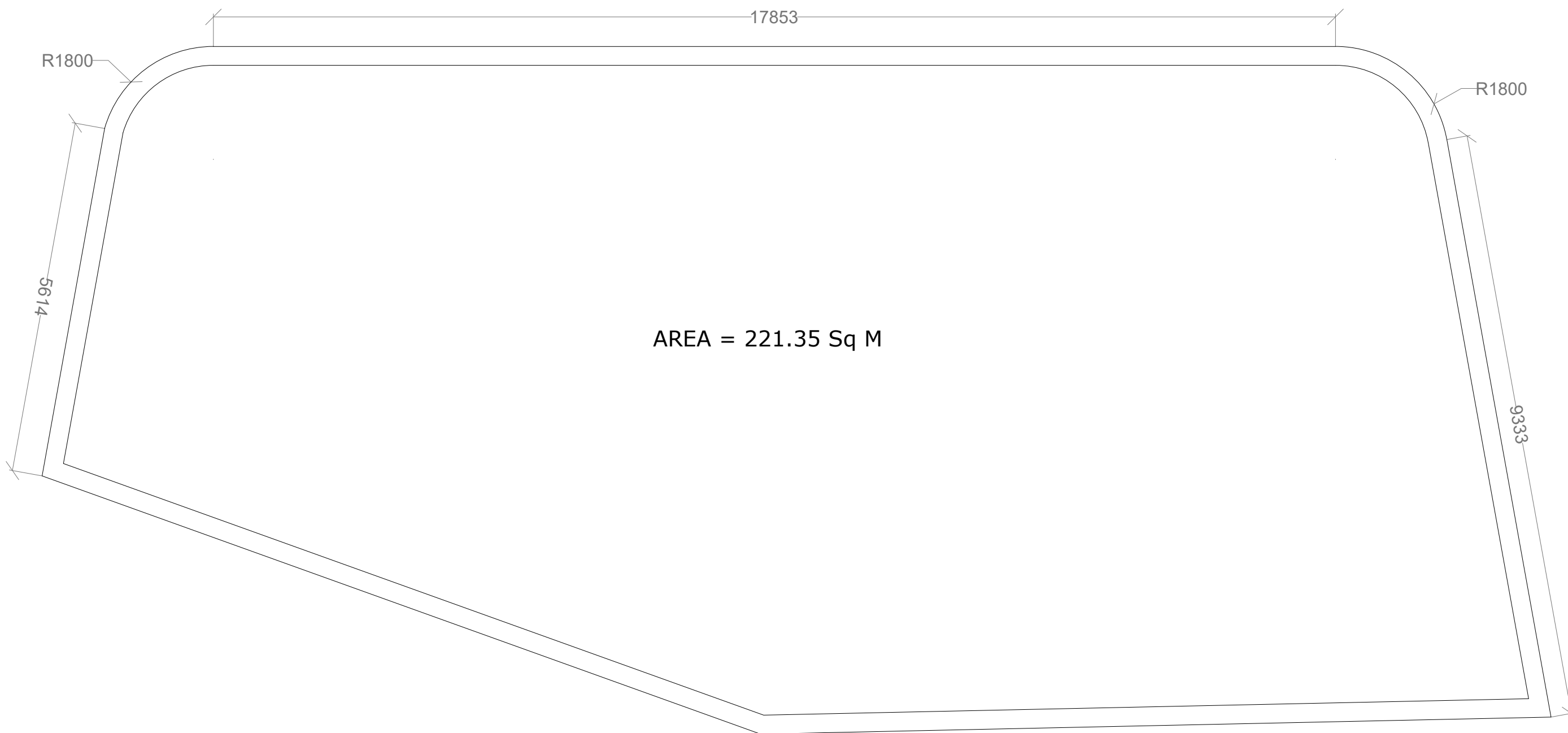
OTM ACCOMMODATION FOR SHOPPING CENTER			
DATE	AUG 2023	K RIDE	SHEET NO.
SCALE	AS SHOWN		1/1
DRG. NO. K-RIDE / IAF / HQ TC (U) / SC / 2023 / 1			
PREPARED BY		CHECKED BY	
APPROVED BY			

NOTE

1. ALL DIMENSIONS ARE GIVEN IN MILLIMETER UNLESS OTHERWISE SPECIFIED
2. FIGURED DIMENSIONS SHALL BE FOLLOWED




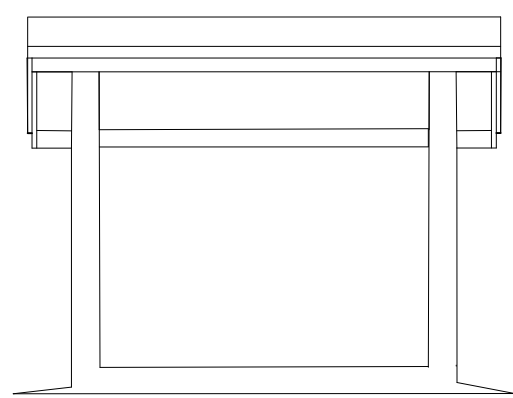
FRONT ELEVATION



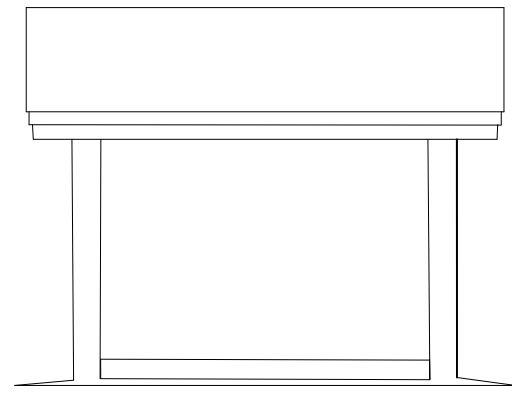
PLAN

OTM ACCOMMODATION FOR SHOPPING CENTER

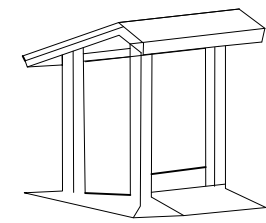
DATE	AUG 2023	K RIDE	SHEET NO.
SCALE	AS SHOWN		1/1
DRG. NO. K-RIDE / IAF / HQ TC (U) / SC / 2023 / 1			
PREPARED BY		CHECKED BY	
APPROVED BY			



③ FRONT ELEVATION

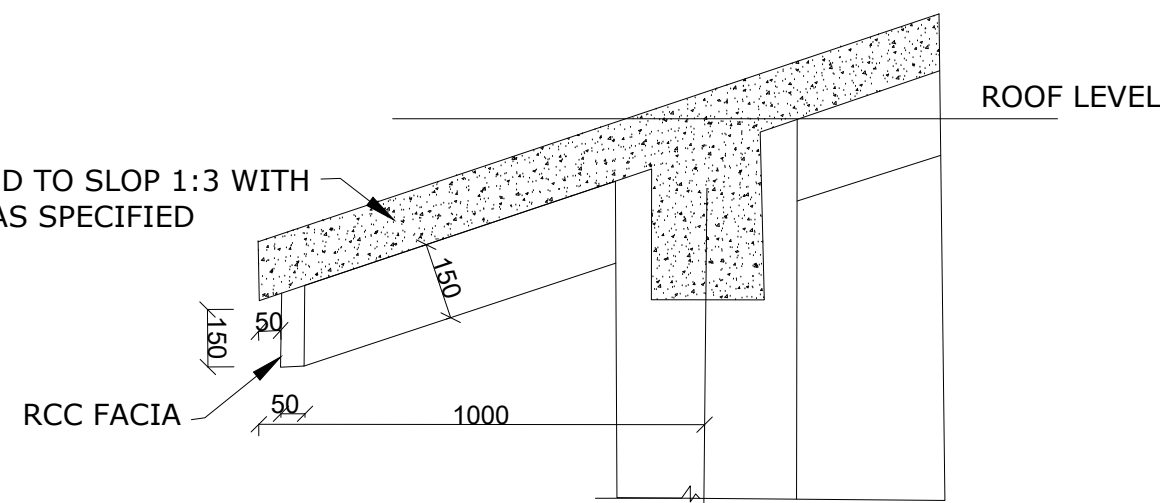


④ REAR ELEVATION

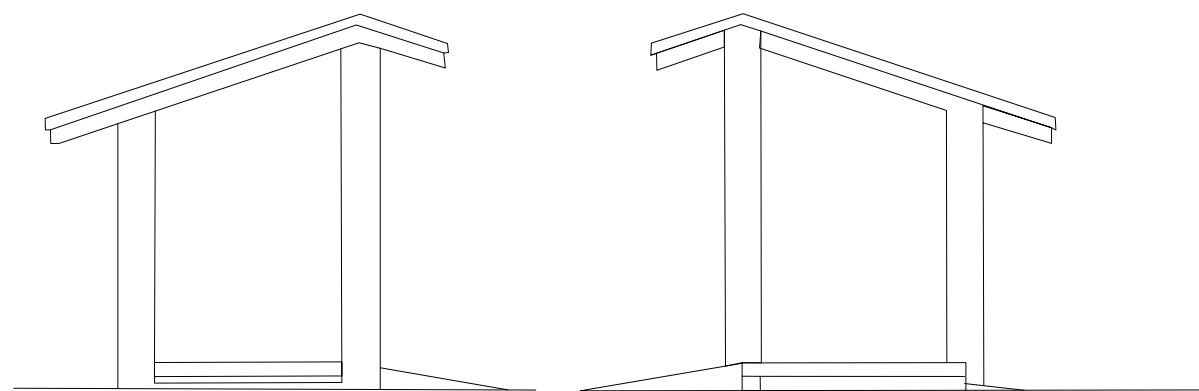


⑨ 3D VIEW

RCC ROOF LAID TO SLOP 1:3 WITH WPT ON TOP AS SPECIFIED

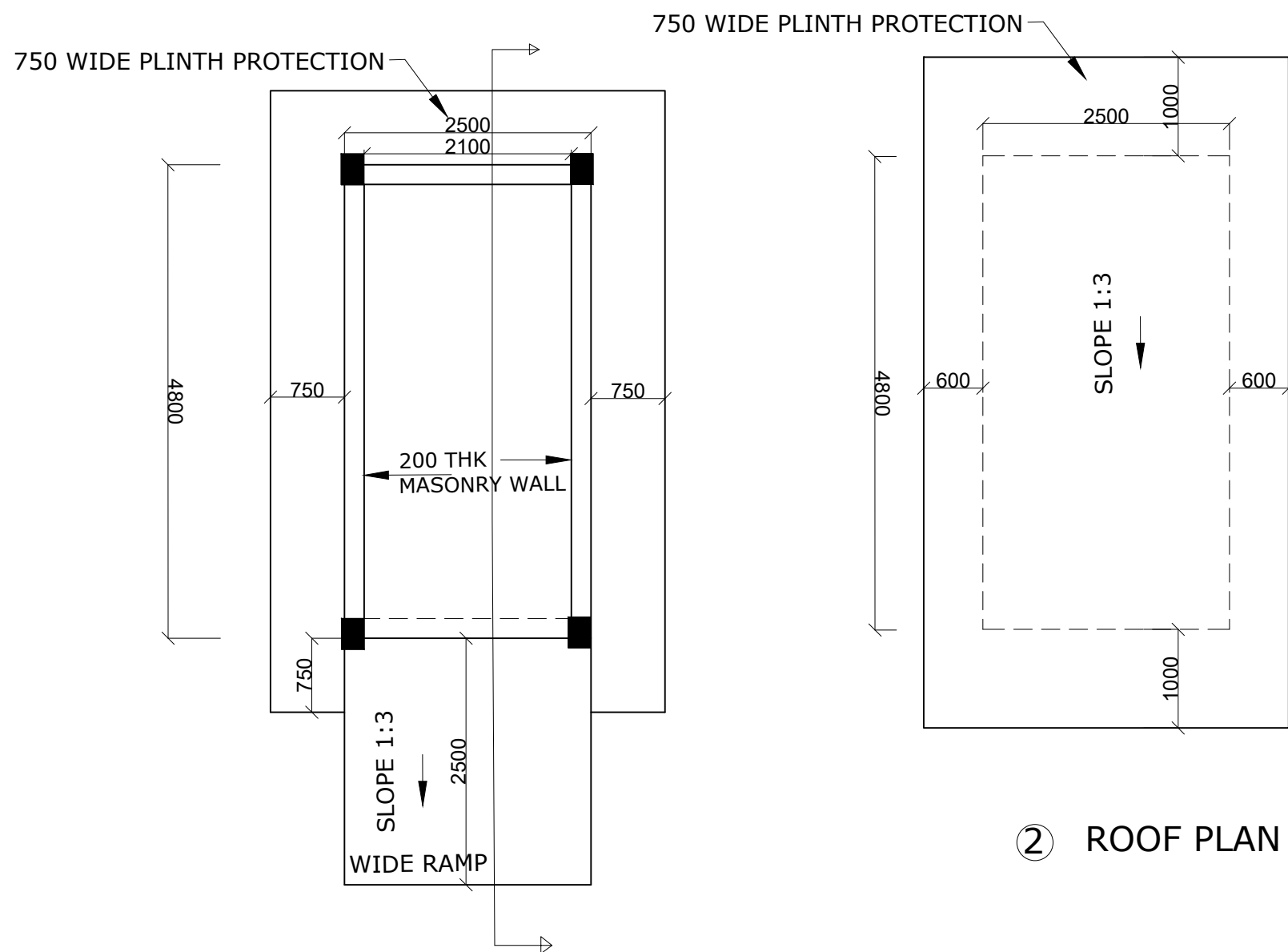


⑧ DETAILS OF FACIA

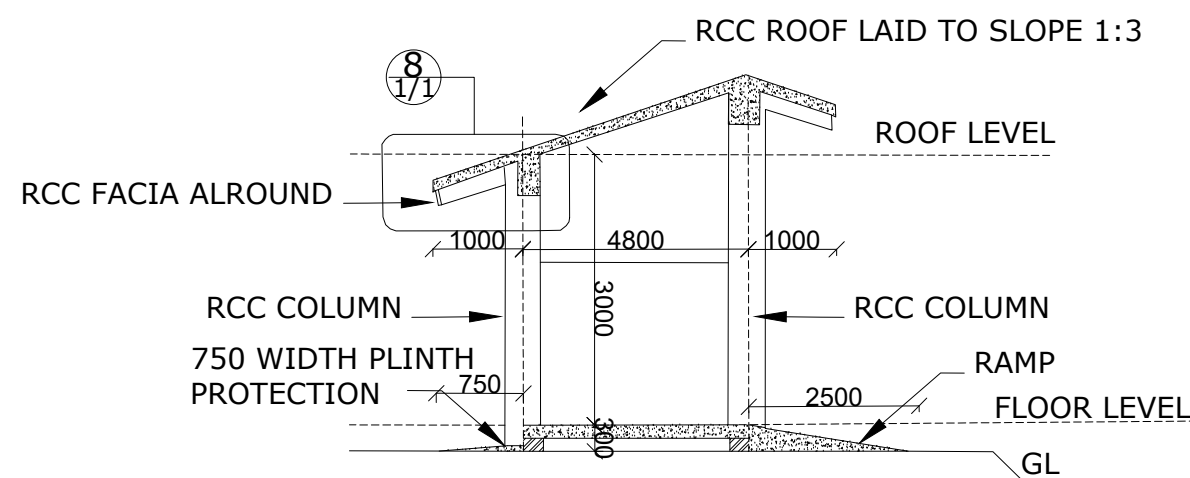


⑤ LEFT SIDE ELEVATION

⑥ RIGHT SIDE ELEVATION

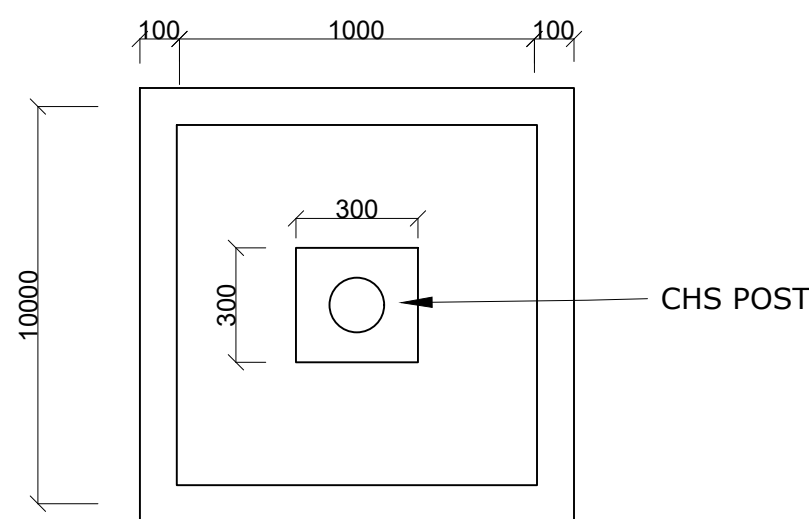


② ROOF PLAN

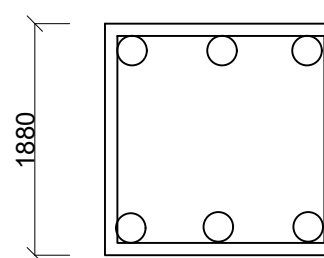
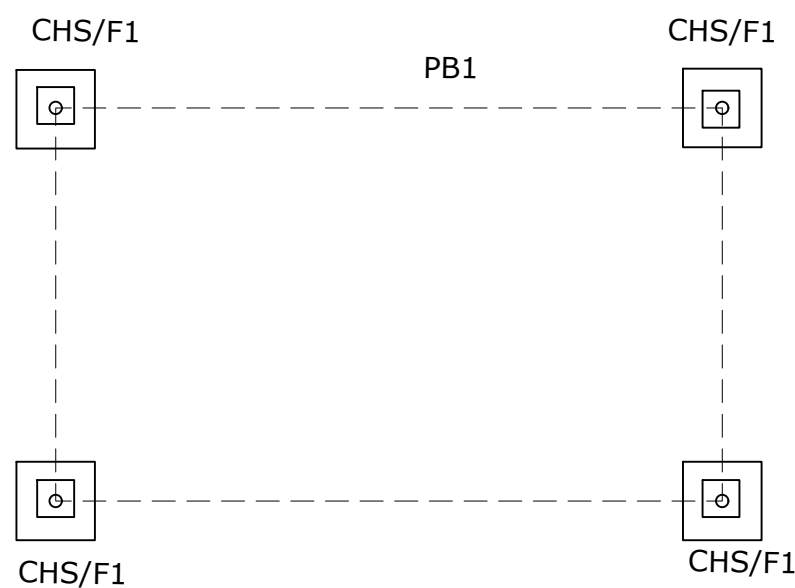


⑦ SECTION 1

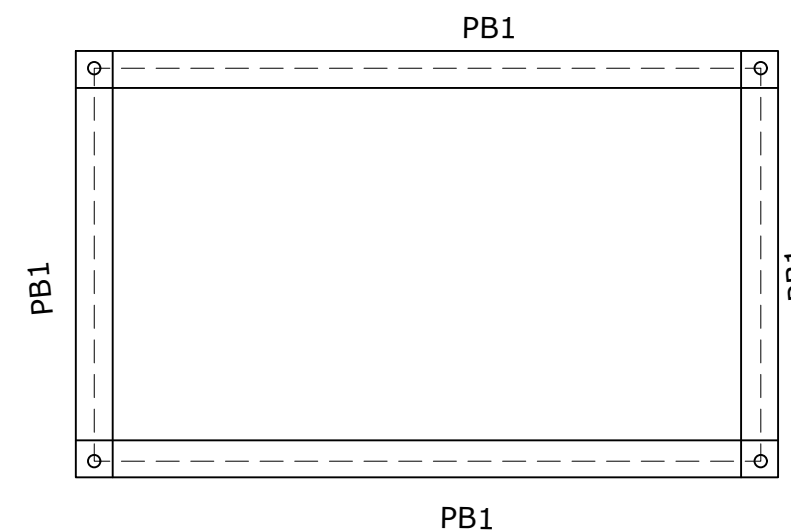
① PLAN



CHS POST




1880



NOTE

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PARKING SHED (12 Sqm)

DATE	AUG 2023	K RIDE	SHEET NO.
SCALE	AS SHOWN		1/1
DRG. NO. IAF / K RIDE / PS / 2023 / 1			
PREPARED BY		CHECKED BY	
APPROVED BY			