



डेडीकेटेड फ्रेट कोरीडोर

BID DOCUMENT FOR

Design and Construction of Rail Flyover near Ganjkhwaja, Formation in Embankments/Cuttings including blanketing, Bridges (Major, Minor & RUBs), Supply and Spreading of Ballast and other related infrastructural works for double track electrified railway line on Design Build Lump Sum Basis in different stretches between Dehri-on-Sone & Mughalsarai of Eastern Dedicated Freight Corridor in the states of Bihar and Uttar Pradesh in India.

CIVIL AND STRUCTURES CONTRACT PACKAGE

Issued on: **14.06.2013**

Bid Document

No.: HQ/EN/EC/DOS-MGS/RFO & Bal.Works

PART -1 to PART-4

Employer:

**DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA
LIMITED**

(A GOVERNMENT OF INDIA ENTERPRISE)

MINISTRY OF RAILWAYS

COUNTRY: INDIA

**INVITATION FOR BID
DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED**

Our Ref.:

Date

To

From
Managing Director,
DFCCIL
5TH Floor, Pragati Maidan Metro
Station Building Complex
New Delhi-110001.

Design and Construction of Rail Flyover near Ganjkhwaja, Formation in Embankments/Cuttings including blanketing, Bridges (Major, Minor & RUBs), Supply and Spreading of Ballast and other related infrastructural works for double track electrified railway line on Design Build Lump Sum Basis in different stretches between Dehri-on-Sone & Mughalsarai of Eastern Dedicated Freight Corridor in the states of Bihar and Uttar Pradesh in India.

This Bidding process is open for pre-qualified bidders.

The Bid document consists of Five Parts i.e. Technical Bid in Part-1, Part-2, Part-3, & Part-4 and Financial Bid – Part-5. The contents of these Parts are as under:

TECHNICAL BID:

PART 1 – Bidding Procedures

- Section I. Instructions to Bidders
- Section II. Bid Data Sheet
- Section III. Evaluation and Qualification Criteria (Following Prequalification)
- Section IV. Bidding Forms

PART 2 – Employer’s Requirements

- Section V. Employer’s Requirements
 - Volume 1: Scope of Works**
 - Volume 2: General**
 - Volume 3: Design Procedure and Processes**
 - Volume 4: Design Criteria and Specifications**
 - Volume 5: Construction and Testing**
 - Volume 6: Appendices**

PART 3 – Conditions of Contract and Contract Forms

- Section VI. General Conditions of Contract (GCC) as per FIDIC Yellow Book 1999-Edition.
- Section VII. Particular Conditions of Contract (PCC)
- Section VIII. Contract Forms

PART 4 – Reference Documents

Site Data (As detailed in Part 4).

FINANCIAL BID:

PART – 5 - Price Schedules (To be submitted separately)

1. Preamble
2. Price Proposal Submission Sheet (BDF-10)
3. Schedule – A (Form for Lump sum cost of the Bid)
4. Schedule – B
 - Apportionment of contract Price for Payment according to Cost Centres
 - Contract Price Weightages for interim Payment

Note: *Bids duly filled in must be submitted at the place by the time and date as specified in the Bids notice. Late or delayed Bids shall not be accepted.*

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PART 1

Bidding Procedures

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**Instructions to Bidder
(ITB)**

Section 1. Instructions to Bidders (ITB)

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2. Source of Funds
3. Eligible Bidders
4. Eligible Materials and Equipment

B. Contents of Bidding Document

5. Sections of Bidding Document
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Section 1: Instructions to Bidders

A.	General
1.	Scope of Bid
1.1	In connection with the Invitation for Bids indicated in the Bid Data Sheet (BDS), the Employer, as indicated in BDS, issues this Bidding Document for “Design and Construction of Rail Flyover near Ganjkhwaja, Formation in Embankments/Cuttings including blanketing, Bridges (Major, Minor & RUBs), Supply and Spreading of Ballast and other related infrastructural works for double track electrified railway line on Design Build Lump Sum Basis in different stretches between Dehri-on-Sone & Mughalsarai of Eastern Dedicated Freight Corridor in the states of Bihar and Uttar Pradesh in India.” and as specified in Section V Employer’s requirements.
1.2	Throughout these Bidding Documents: <ul style="list-style-type: none"> a. the term “in writing” means communicated in written form and delivered against receipt; b. except where the context requires otherwise, words indicating the singular also include the plural and words indicating the plural also include the singular; and c. “Day” means calendar day.
1.3	Besides the information given in the Invitation for Bids, following further information are as under:- <ul style="list-style-type: none"> a. Date of commencement of works – within 42 days from the date of receipt of ‘Letter of Acceptance’ or as indicated in the ‘Letter of Acceptance’. b. Period of completion – 900 days from the date of commencement. c. Defect Liabilities Periods – Defect Notification Period for the Works shall be two years from the date of Taking Over of the Works (Sub-clause 10.1 of GCC) and issue of Taking-Over Certificate by the Engineer.
2.	Source of Funds
2.1	The required funds will be arranged by the employer.
3.	Eligible Bidders
3.1	A Bidder shall be a private, public or Govt. owned legal entity or any combination of them in the form of joint venture (JV) with a formal intent to enter into an agreement or under an existing agreement in the form of a Joint Venture (JV). The bidder must ensure the following: <ul style="list-style-type: none"> a. In case of Single Entity: <ul style="list-style-type: none"> (i) The applicant should be an Indian firm (ii) Submit Power of Attorney authorizing the signatory of the bid to commit the bidder. b. In case of Joint Venture: <ul style="list-style-type: none"> (i) Separate identity/name shall be given to the Joint Venture Firm. (ii) Maximum number of partners in the JV shall be limited to 3 (Three). (iii) A member of JV firm shall not be permitted to participate either in

	<p>individual capacity or as a member of another JV firm in the same Bid.</p> <p>(iv) The <i>Bid Document</i> can be purchased in the name of the Bidder/JV Firm or Lead Member of JV firm.</p> <p>(v) One of the members of the JV firm shall be its lead member who shall have majority (at least 51%) share of interest in the JV firm. The other members shall have a share of not less than 20% each in case of JV firms with upto 3 members.</p> <p>(vi) In case of JV firm with foreign member(s), the lead member has to be an Indian firm with a minimum share of 51%.</p> <p>(vii) Bidder from a country may be excluded if as a matter of law or official regulations the Government of India (GOI) prohibits commercial relations with the country.</p> <p>(viii) <u>Joint And Several Liability</u> - Members of the JV Firm to which the contract is awarded, shall be jointly and severally liable to the Employer (DFCCIL) for execution of the project in accordance with General and Special Conditions of Contract. The JV members shall also be liable jointly and severally for the loss, damages caused to the DFCCIL during the course of execution of the contract or due to non-execution of the contract or part thereof.</p> <p>(ix) <u>Duration of the Joint Venture Agreement</u> - shall be valid during the entire currency of the contract including the period of extension, if any and the defect liability period after the work is completed.</p> <p>(x) <u>Governing Laws</u> - The Joint Venture Agreement shall in all respect be governed by and interpreted in accordance with Indian Laws.</p> <p>(xi) The JV shall nominate a representative (from lead partner only) who shall have the authority to conduct all business for and on behalf of JV during the bidding process and subsequent stages.</p> <p>(xii) BID SECURITY shall be submitted by JV Firm/Lead Member of the JV firm. The BID SECURITY submitted by the Lead Member shall be deemed as BID SECURITY submitted by JV Firm.</p> <p>(xiii) A copy of Memorandum of Understanding (MOU) executed by the JV members shall be submitted by the JV Firm along with the Bid. The complete details of the members of the JV firm, their share and responsibility in the JV firm etc. particularly with reference to financial, technical and other obligations shall be furnished in the MOU.</p> <p>(xiv) Once the Bid is submitted, the MOU shall not be modified / altered / terminated during the validity of the Bid. In case the bidder fails to observe/comply with this stipulation, the full Bid Security Deposit shall be liable to be forfeited.</p> <p>(xv) Approval for change of constitution of JV Firm shall be at the sole discretion of the Employer (DFCCIL). The constitution of the JV Firm shall not be allowed to be modified except when modification becomes inevitable due to succession /laws etc. and in any case the minimum eligibility criteria should not get vitiated. However, the Lead Member shall continue to be the Lead Member of the JV</p>
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	<p>Firm. Failure to observe this requirement would render the offer invalid.</p> <p>(xvi) Similarly, after, the contract is awarded, the constitution of JV Firm shall not be allowed to be altered during the currency of contract except when modification become inevitable due to succession laws etc. and in any case the minimum eligibility criteria should not get vitiated. Failure to observe this stipulation shall be deemed to be breach of contract with all consequential penal action as per contract conditions.</p> <p>(xvii) On award of contract to a JV Firm, a single Performance Guarantee shall be submitted by the JV Firm as per Bid conditions. All the Guarantees like Performance Guarantee, Bank Guarantee for Mobilization Advance, Machinery Advance, etc. shall be accepted only in the name of the JV Firm and no splitting of guarantees amongst the members of the JV Firm shall be permitted.</p> <p>(xviii) On issue of LOA (Letter Of Acceptance), an agreement among the members of the JV Firm (to whom the work has been awarded) shall be executed and got registered before the Registrar of the Companies under Companies Act or before the Registrar/Sub-Registrar under the Registration Act, 1908. This JV Agreement shall be submitted by the JV Firm to the DFCCIL before signing the contract agreement for the work. In case the Bidder fails to observe/comply with this stipulation, the full BID SECURITY shall be forfeited and other penal actions due shall be taken against partners of the JV and the JV.</p> <p>(xix) No member of the Joint Venture Firm shall have the right to assign or transfer the interest right or liability in the contract without the <i>written</i> consent of the other members and that of the employer (DFCCIL) in respect of the said Bid/<i>contract</i>.</p> <p>(xx) In case one or more of the members of the JV Firm is/are partnership firm(s), following documents shall be submitted :</p> <ol style="list-style-type: none"> a) Notary certified copy of the Partnership Deed b) Consent of all the partners to enter into the Joint Venture /Agreement on a stamp paper of appropriate value (in original). c) Power of Attorney (duly registered as per prevailing law) in favour of one of the partners of the partnership firm to sign the JV Agreement on behalf of the partnership firm and create liability against the firm. <p>(xxi) In case one or more members is/are Proprietary Firm or HUF, the following documents shall be <i>enclosed</i> :</p> <p>Affidavit on Stamp Paper of appropriate value declaring that his/her Concern is a Proprietary Concern and he/she is sole proprietor of the Concern OR he/she is in position of "KARTA" of Hindu Undivided Family (HUF) and he/she has the authority, power and consent given by other <i>partners</i> to act on behalf of HUF.</p> <p>(xxii) In case one or more members is/are limited companies, the following documents shall be submitted :</p> <ol style="list-style-type: none"> a) Notary certified copy of resolutions of the Directors of the
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	<p>Company, permitting the company to enter into JV agreement, authorizing MD or one of the Directors or Managers of the Company to sign JV Agreement, such other documents required to be signed on behalf of the Company and enter into liability against the company and/or do any other act on behalf of the company.</p> <p>b) Copy of Memorandum and Articles of Association of the Company.</p> <p>c) Power of Attorney (duly registered as per prevailing law) by the Company authorizing the person to do/act mentioned in the para (a) above.</p>
3.2	A firm that is under a declaration of ineligibility by the Employer in accordance with ITB 35, on the date of the deadline for bid submission or thereafter, shall be disqualified.
3.3	<p>A Bidder shall not have any conflict of interest with any other party involved with the project, either as a bidder or in any other capacity during the project formulation and developmental stage. Any Bidder (s) including all members of JV found to have a conflict of interest shall be disqualified. A Bidder may be considered to be in a conflict of interest with one or more parties in this bidding process, if, including but not limited to:</p> <p>(a) If they participated as a consultant in the preparation of the design or technical specifications of the works that are the subject of this Bid; or</p> <p>(b) Where a firm, or a firm from a same economic or financial group, in addition to consulting, also has the capability to manufacture or supply goods or to construct works, that firm, or a firm from the same economic or financial group, cannot normally be a supplier of goods or works, if it provided consulting services for the contract corresponding to this Bid, unless it can be demonstrated that there is not a significant degree of common ownership, influence or control.</p>
3.4	<p>The Bidder shall be considered disqualified / in-eligible if:</p> <p>(a) The Bidder or any of its partners and/or subcontractors included in the Bid has been banned for business with Ministry of Railways along with any of its attached and subordinate offices through an order issued by Ministry of Railways as per list available on Web site (http://www.indianrailways.gov.in/railwayboard) of Civil Engg Directorate of Railway Board pertaining to Banning of Business, with the Banning being valid as on the last date of submission of the Bid.</p> <p>(b) The Bidder or any of its partners has suffered bankruptcy / insolvency or it is in the process of winding-up or there is a case of insolvency pending before any Court on the deadline of submission of Bid.</p>
3.5	Bidders shall provide such evidence of their continued eligibility satisfactory to the Employer, as the Employer shall reasonably

	request.
3.6	In case a prequalification process has been conducted prior to the bidding process, this bidding is open only to prequalified bidders.
4.	Eligible Materials and Equipment
4.1	The materials and equipment to be supplied under the Contract shall be from the approved sources as specified in Part -2, Section V: Employer's Requirements. In addition to above, materials not covered under approved sources specified in Section V: Employer's Requirements should be procured as per the approval of Engineer.
B.	Contents of Bidding Document
5.	Sections of Bidding Document
	<p>The Bid document consists of Five Parts i.e. Technical Bid in Part-1, Part-2, Part-3, & Part-4 and Financial Bid – Part-5</p> <p>The contents of these Parts are as under: TECHNICAL BID : PART 1 – Bidding Procedures Section I. Instructions to Bidders (ITB) Section II. Bid Data Sheet (BDS) Section III. Evaluation and Qualification Criteria Section IV. Bidding Forms PART 2 – Employer's Requirements Section V. Employer's Requirements As per contents detailed in section – V. PART 3 – Conditions of Contract and Contract Forms Section VI. General Conditions (GCC) As per FIDIC Yellow Book 1999-Edition Section VII. Particular Conditions of Contract (PCC). Section VIII . Contract Forms PART 4 – Reference Documents As per contents detailed in Part – 4.</p> <p>FINANCIAL BID: PART – 5 : Price Schedules (To be submitted separately) 1. Preamble 2. Price Proposal Submission Sheet (BDF-10) 3. Schedule – A (Form for Lump sum cost of the Bid) 4. Schedule – B <ul style="list-style-type: none"> • Apportionment of contract Price for Payment according to Cost Centres • Contract Price Weightages for interim Payment </p> <p>The contents of all these sections listed above shall be read in conjunction with any addenda issued in accordance with ITB-7.</p>
5.1	The Invitation for Bids (IFB) issued by the Employer is not part of the Bidding Document.
5.2	A bid can be submitted only on a set of bidding documents obtained directly from the Employer or downloaded from DFCCIL's website.
5.3	The Bidder is expected to examine all instructions, forms, terms, and

	specifications in the Bidding Document. Failure to furnish all information or documentation required by the Bidding Document may result in the rejection of the bid.
6.	Clarification of Bidding Document, Site Visit, Pre-Bid conference
6.1	A prospective Bidder requiring any clarification of the Bidding Document shall contact the Employer in writing at the Employer's address indicated in the BDS or raise his inquiries during the pre-bid meeting in accordance with ITB 6.4 . The Employer will respond in writing to any request for clarification provided that such request is received up to 3 days prior to the pre-bid conference. Should the Employer deem it necessary to amend the Bidding Document as a result of a request for clarification, it shall do so following the procedure under ITB 7 and ITB 19.2 .
6.2	The Bidder is advised to visit and examine the Site of Works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the bid and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the Bidder's own expense.
6.3	The Bidder and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such visit, but only upon the express condition that the Bidder, its personnel, and agents will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof, and will himself be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.
6.4	The Bidder's designated representative is invited to attend a pre-bid conference, if provided for in the BDS. The purpose of the meeting will be to clarify issues and to answer questions related to the subject work that may be raised at that stage.
6.5	The Bidder is requested to submit any questions/queries in writing, to reach the Employer not later than 3 days before the Pre-Bid-Meeting.
6.6	Minutes of the pre-bid meeting, including the text of the questions/queries raised, without identifying the source, and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Bidders who have acquired the Bidding Document directly from the Employer. Any modification to the Bidding Document that may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an addendum/ corrigendum pursuant to ITB 7 and not through the minutes of the Pre-Bid-Meeting.
6.7	Non-attendance at the pre-bid meeting will not be a cause for disqualification of a Bidder.
7.	Amendment of Bidding Document
7.1	At any time prior to the deadline for submission of bids, the Employer may amend the Bidding Document by issuing addenda
7.2	Any addendum issued shall be part of the Bidding Document and shall be communicated in writing to all who have obtained the Bidding Document from the Employer in accordance with ITB 5.2 . This will also

	be uploaded on DFCCIL website www.dfccil.in & www.dfccil.org . All prospective Bidders are advised to see the DFCCIL website www.dfccil.in & www.dfccil.org before submitting their bid to check for any amendments/corrigendum issued in regard to this Bid.
7.3	To give prospective Bidders reasonable time to take an addendum into account in preparing their bids, the Employer may, at its discretion, extend the deadline for the submission of bids, pursuant to ITB 19.2 .
C.	Preparation of Bids
8.	Cost of Bidding
8.1	The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Employer shall not be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.
9.	Language of Bid
9.1	The Bid, as well as all correspondence and documents relating to the bid exchanged by the Bidder and the Employer, shall be written in English. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant pages in English as certified by the Embassy/High Commission/ Consulate of Indian origin of the bidder or the Embassy /High Commission / Consulate of the country of origin of the bidder in India. For the purpose of interpretation and evaluation of the bid, translation certified by Embassy/High Commission/ Consulate shall prevail.
10.	Documents Comprising the Bid
10.1	The Bid shall comprise two separate envelopes submitted simultaneously, one containing the Technical Proposal and the other Financial Proposal , enclosed together in an outer single envelope.
10.2	Initially, only the Technical Proposals will be opened at the address, date and time specified in ITB Sub-Clause 21.1 . The Financial Proposals remain sealed and are held in custody by the Employer. The Technical Proposals are evaluated by the Employer. No amendments or changes to the Technical Proposals are permitted. Bids with Technical Proposals which do not conform to the specified requirements will be rejected as deficient Bids.
10.3	Financial Proposals of technically compliant Bids will be opened in public at a date and time advised by the Employer. The Financial Proposals will be evaluated and the Contract is awarded to the Bidder whose Bid has been determined to be the lowest evaluated substantially responsive Bid.
10.4	The Technical Proposal shall contain the following : <ul style="list-style-type: none"> (a) Technical Proposal Submission Sheet in accordance with ITB 14; (b) Bid Security, in accordance with ITB Clause 16; (c) Written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB Clause 17.2; (d) Relevant forms as specified for establishing eligibility criteria of the bidder in Part – I Section IV of the bid document; (e) All the information needed in the eligibility criteria as

	contained in Part-1 - Section III of the Bid Document. (f) any other document required in the BDS.
10.5	The Financial Proposal shall contain the following : (to be submitted separately) (a) Price Proposal Submission Sheet. (b) Price Schedule as per the format given in Part-5 Price Schedule of the Bid Document. (c) Any other document required in the BDS.
11.	Bid Submission Sheets and Price Schedules
11.1	The Bidder shall submit the Technical Proposal and the Financial Proposal using the appropriate Submission Sheets furnished in Section IV (Bidding Forms) of the Bid Document. 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.
11.2	The Bidder shall submit, as part of the Financial Proposal a Lump-Sum cost for the entire work as per the format given in Schedule A of Part – 5 - Price Schedule of the Bid Document.
12.	Bid Prices
12.1	The bidder shall quote the lump sum cost for the entire work in BDF -10 & Schedule A as contained in Part -5 of the Bidding Document. The cost should cover all the items of the work as detailed in the employer's requirement of the contract. The cost should also be inclusive of all constructional Equipment, plant, labour, supervision, materials, erection, maintenance, insurance, profit, duties, taxes, levies, royalties together with all general risks, liabilities and obligations set out or implied in the Contract under the applicable law as on the date of opening of bid.
12.2	PVC as given in clause 13.8 of Particular Conditions of Contract will be applicable on the Lump-sum cost of the bid with respect to the base date as defined in the GCC.
13.	Currencies of Bid and Payment
13.1	The bidder shall quote a lump sum cost in Indian Rupees. Payments shall be made as per billing process laid down in Part-5 – Price Schedules of Bidding Document.
14.	Documents Comprising the Technical Proposal
14.1	The bidder shall furnish all the information as detailed in Technical Proposal Section –III Evaluation and Qualification criteria of bidding document,
14.2	The Bidder shall furnish a commitment in Technical Proposal Submission Sheet (BDF -1) for deployment of equipment and personnel as stipulated in Part-1 Section - III, Evaluation and Qualification criteria.
15.	Period of Validity of Bids
15.1	Bids shall remain valid for a period of 180 days after the bid submission deadline date prescribed by the employer. A bid valid for a shorter period shall be rejected by the employer as non responsive.
15.2	In exceptional circumstances, prior to the expiration of the bid validity period, the Employer may request Bidders to extend the period of validity of their bids. The request and the responses shall be made in writing. If a bid security is requested in accordance with ITB 16 , it shall also be extended Sixty (60) days beyond the deadline of the extended

	validity period. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request shall not be required or permitted to modify its bid.
16.	Bid Security
16.1	The Bidder shall furnish as a part of its bid, a Bid Security in the shape of FDR, Banker's cheque/Demand Draft/Pay Order in favour of DFCCIL, New Delhi in original form as specified in BDS.
16.2	The bid security shall be valid for period up to Ninety (90) days beyond the original validity period of the bid, or beyond any period of extension if requested under ITB 15.2.
16.3	Any bid not accompanied by an enforceable and compliant bid security, if one is required in accordance with ITB 16.1 , shall be rejected by the Employer as non-responsive. The bid security of unsuccessful Bidders shall be returned on award of contract.
16.4	The bid security of the successful Bidder shall be kept as security deposit for fulfillment of contractual obligation
16.5	The bid security shall be forfeited: (a) if a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Letter of Bid, except as provided in ITB 15.2 or (b) if a Bidder misrepresents or omits any material facts in order to unfairly influence the procurement process; (c) if the successful Bidder fails to: (i) Sign the Contract in accordance with ITB 34; (ii) furnish a performance security in accordance with ITB 33; (iii) accept the correction of its Bid Price pursuant to ITB 28.2;
16.6	The Bid Security of a JV shall be as per ITB 3.1b (xii).
17.	Format and Signing of Bid
17.1	The Bidder shall prepare one original of the Technical Proposal and one original of the Financial Proposal as described in ITB Clause 10 and clearly mark each "ORIGINAL - TECHNICAL PROPOSAL" and "ORIGINAL - FINANCIAL PROPOSAL". In addition, the Bidder shall submit 2 copies of the Technical Proposal and clearly mark them "COPY NO... - TECHNICAL PROPOSAL". In the event of any discrepancy between the original and the copies, the original shall prevail. In addition one soft copy (Read Only) of Technical proposal should also be submitted along with the Bid.
17.2	The original and all copies of the bid shall be typed or written in indelible ink and shall be signed by a person duly 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. All pages of the bid, where entries and amendments have been made shall be signed or initialed by the person signing the bid.

17.3	Any interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the bid.
D.	Submission and Opening of Bids
18.	Sealing and Marking of Bids
18.1	The Bidder shall enclose the original of the Technical Proposal, the original of the Financial Proposal, and two copies of the Technical Proposal, in separate sealed envelopes, duly marking the envelopes as "ORIGINAL - TECHNICAL PROPOSAL", "ORIGINAL - FINANCIAL PROPOSAL" and "COPY NO... - TECHNICAL PROPOSAL" , as appropriate. These envelopes containing the original and the copies shall then be enclosed in one single envelope. One single envelope containing the envelopes of Technical bid, Financial bid & Bid security, cost of the tender (if document is downloaded) shall be signed and stamped by the authority who has signed the bids. Each copy shall be Serially numbered, Indexed and Hard Bound.
18.2	The inner and outer envelopes shall: (a) bear the name and address of the Bidder; (b) be addressed to the Employer in accordance with BDS; (c) bear the specific identification IFB No. HQ/EN/EC/DOS-MGS/RFO & Bal. Works dated 14.06.2013 of this bidding process indicated in the BDS; and (d) The outer envelope and the inner envelopes containing the Technical Proposals shall bear a warning not to open before the time and date for the opening of Technical Proposals, in accordance with ITB Sub-Clause 21. (e) The inner envelopes containing the Financial Proposals shall bear a warning not to open until advised by the Employer in accordance with ITB Sub-Clause 21.
18.3	If all envelopes are not sealed and marked as required, the Employer will assume no responsibility for the misplacement or premature opening of the bid.
18.4	In case Financial Proposal in a bid is received unsealed then the bid shall be considered as non-responsive and will not be dealt with. If, financial proposal is submitted in the technical proposal then also the bid shall be considered as non-responsive and will not be dealt with.
19.	Deadline for Submission of Bids
19.1	Bids must be received by the Employer at the address and no later than the date and time indicated in the BDS.
19.2	The Employer may, at its discretion, extend the deadline for the submission of bids by amending the Bidding Document in accordance with ITB 7 , in which case all rights and obligations of the Employer and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.
20.	Late Bids
20.1	The Employer shall not consider any bid that arrives after the deadline for submission of bids, in accordance with ITB 19 . Any bid received by the Employer after the deadline for submission of bids shall be declared late, rejected, and returned unopened to the Bidder.
21	Bid Opening

21.1	The Employer shall conduct the opening of Technical Proposals in the presence of Bidders' representatives who choose to attend, at the address, date and time specified in the BDS.
21.2	The financial Proposals will remain unopened and will be held in custody of the Employer until the time of opening of the Financial Proposals. The date, time, and location of the opening of Financial Proposals will be advised in writing by the Employer to all the bidders who have been determined qualified in technical evaluation.
21.3	All other envelopes holding the Technical Proposals shall be opened one at a time, and the following read out and recorded : (a) the name of the Bidder; (b) whether there is a modification or substitution; (c) the presence of a Bid Security, and (d) any other details as the Employer may consider appropriate.
21.4	Only Technical Proposals read out and recorded at bid opening shall be considered for evaluation. No Bid shall be rejected at the opening of Technical Proposals except for late bids, in accordance with ITB Sub-Clause 20.1 .
21.5	The Employer shall prepare a record of the opening of Technical Proposals that shall include, as a minimum: the name of the Bidder and the presence or absence of a Bid Security. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record.
21.6	At the end of the evaluation of the Technical Proposals, the Employer will invite bidders who have submitted substantially responsive Technical Proposals and who have been determined as being qualified for award to attend the opening of the Financial Proposals. The date, time, and location of the opening of Financial Proposals will be advised in writing by the Employer. Bidders shall be given reasonable notice of the opening of Financial Proposals.
21.7	The Employer shall conduct the opening of Financial Proposals of all Bidders who have submitted substantially responsive Technical Proposals and who have been determined qualified as a result of technical evaluation, in the presence of Bidders' representatives who choose to attend at the address, date and time specified by the Employer. The Bidder's representatives who are present shall be requested to sign a register evidencing their attendance.
21.8	Envelope containing Financial Proposal of technically responsive bidders shall be opened one at a time and the following read out and recorded: (a) the name of the Bidder (b) the Bid Price(s), including any discounts (c) any other details as the Employer may consider appropriate.
21.9	Only Financial Proposals, discounts, read out and recorded during the opening of Financial Proposals shall be considered for evaluation. No Bid shall be rejected at the opening of Financial Proposals.
21.10	The Employer shall prepare a record of the opening of Financial Proposals that shall include, as a minimum: the name of the Bidder, the

	Bid Price including any discounts. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record.
E.	Evaluation and Comparison of Bids
22.	Confidentiality
22.1	Information relating to the examination, evaluation & comparison of Bids and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process until information on Contract award is communicated to all Bidders.
22.2	Any attempt by a Bidder to influence the Employer in the examination, evaluation & comparison and pre-qualification of the Bids or Contract award decisions may result in the rejection of its Bid.
22.3	Notwithstanding ITB Sub-Clause 23.2 , from the time of opening the Technical Proposals to the time of Contract award, if any Bidder wishes to contact the Employer on any matter related to the bidding process, it should do so in writing.
23.	Clarification of Bids
23.1	To assist in the examination, evaluation & comparison of the Bids, the Employer may, at its discretion, ask any Bidder for a clarification of its Bid. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The Employer's request for clarification and the response shall be in writing. No change in the prices or substance of the Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Financial Proposals, in accordance with ITB Clause 28.
23.2	If a Bidder does not provide clarifications of its bid by the date and time set in the Employer's request for clarification, its bid may be rejected.
24.	Deviations, Reservations, and Omissions
24.1	During the evaluation of bids, the following definitions apply: <ul style="list-style-type: none"> (a) "Deviation" is a departure from the requirements specified in the Bidding Document; (b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document; and (c) "Omission" is the failure to submit part or all of the information or documentation required in the Bidding Document.
25.	Determination of Responsiveness
25.1	The Employer's determination of a bid's responsiveness is to be based on the contents of the bid itself, as defined in ITB 10 .
25.2	A substantially responsive bid is one that meets the requirements of the Bidding Document without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that, <ul style="list-style-type: none"> (a) if accepted, would: <ul style="list-style-type: none"> (i) affect in any substantial way the scope, quality, or performance of the Works specified in the Contract; <p style="text-align: center;">or</p>

	<p>(ii) limit in any substantial way, inconsistent with the Bidding Document, the Employer's rights or the Bidder's obligations under the proposed Contract;</p> <p style="text-align: center;">or</p> <p>if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive bids.</p>
25.3	The Employer shall examine the technical aspects of the bid submitted in accordance with ITB 14 , Technical Proposal, in particular, to confirm that all requirements of Part -1 Section III (Evaluation and Qualification criteria) have been met without any material deviation or reservation.
25.4	If a bid is not substantially responsive to the requirements of the Bidding Document, it shall be rejected by the Employer and may not subsequently be made responsive by correction of the material deviation, reservation, or omission. The employer's decision in this connection shall be final and binding.
26.	Nonconformities, Errors, and Omissions - DELETED.
27.	Evaluation of Technical Bids
27.1	The Employer shall determine to its satisfaction during the evaluation of Technical Proposals whether Bidders are qualified to perform the Contract satisfactorily.
27.2	The determination shall be based upon an examination of the documentary evidence of the Technical Proposal submitted by the Bidder, pursuant to ITB Clause 14 , to clarifications in accordance with ITB Clause 23 and the Evaluation and qualification criteria indicated in Part-1, Section-III , Evaluation and Qualification Criteria.
27.3	The Employer will carry out a detailed evaluation of the technical proposals in order to determine whether the technical aspects are in compliance with the Bidding Document. In order to reach such a determination, the Employer will examine and compare the technical proposals on the basis of the information supplied by the bidders, taking into account overall completeness and compliance with the Employer's Requirements and the technical merits;
27.4	An affirmative determination shall be a prerequisite for the opening and evaluation of a Bidder's Financial Proposal. A negative determination shall result into the disqualification of the Bid, in which event the Employer shall return the unopened Financial Proposal to the Bidder.
28.	Correction of Arithmetical Errors
28.1	<p>Provided that the bid is substantially responsive, the Employer shall correct arithmetical errors as under:</p> <p>If there is a discrepancy between words and figures, the amount in words shall prevail.</p>
28.2	If the Bidder that submitted the lowest evaluated bid does not accept the correction of errors, its bid shall be disqualified and its bid security may be forfeited.
29.	Evaluation of Financial Bids
29.1	The Employer shall evaluate Financial Proposals of each Bid for which the Technical Proposals have been determined to be substantially responsive as per evaluation criteria given in Part – 1 Section-III, of the Bid Document

29.2	To evaluate the Financial Proposal of a bid, the Employer shall consider the following: i) Total lump sum bid price; ii) Unconditional Discounts offered if any.
29.3	The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in bid evaluation.
30.	Comparison of Bids
30.1	The Employer shall compare all substantially responsive bids to determine the lowest evaluated bid, in accordance with ITB 29 .
31.	Employer's Right to Accept Any Bid, and to Reject Any or All Bids
31.1	The Employer reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to contract award, without thereby incurring any liability to Bidders. In case of annulment, all bids submitted and specifically, bid securities, shall be returned to the Bidders.
F.	Award of Contract
32.	Notification of Award
32.1	Prior to the expiration of the period of bid validity, the Employer shall notify the successful Bidder, in writing, that its bid has been accepted. The notification letter (hereinafter and in the Conditions of Contract and Contract Forms called the "Letter of Acceptance") shall specify the sum that the Employer will pay the Contractor in consideration of the execution and completion of the Works (hereinafter and in the Conditions of Contract and Contract Forms called "the Contract Price") and the requirement for the Contractor to remedy any defects therein as prescribed by the Contract.
32.2	Until a formal contract is prepared and executed, the Letter of Acceptance shall constitute a binding Contract.
33.	Performance Security
33.1	Within Thirty (30) days of the receipt of Letter of Acceptance from the Employer, the successful Bidder shall furnish the performance security in accordance with the conditions of contract, using for that purpose the Performance Security Form included in Part-3, Section VIII: Contract Forms of the Bid Document or another form acceptable to the Employer.
33.2	Failure of the successful Bidder 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 bid security.
34.	Signing of Contract
34.1	After notification and submission of performance security, the Employer shall send the successful Bidder the Contract Agreement.
34.2	Within Thirty (30) days of receipt of the Contract Agreement, the successful Bidder shall sign, date, and return it to the Employer.
35.	Corrupt Practices
35.1	It is the Employer's policy that Bidder, suppliers, and contractors and their subcontractors, observe the highest standard of ethics

during the procurement and execution of such contracts.¹ In pursuance of this policy, the Employer

(a) defines, for the purposes of this provision, the terms set forth below as follows:

(i) "corrupt practice" is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party² ;

(ii) "fraudulent practice" is any act or omission, including a misrepresentation, that knowingly or recklessly misleads or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation³;

(iii) "collusive practice" is an arrangement between two or more parties⁴ designed to achieve an improper purpose, including to influence improperly the actions of another party.

(iv) "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party⁵ or the property of the party to influence improperly the actions of a party;

(v) "obstructive practice" is

(aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede an investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation;

or

(bb) acts intended to materially impede the exercise of the Employer's inspection and audit rights provided for under sub-clause 3.1 (d) below.

(b) will reject a proposal for award if it determines that the Applicant recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for the contract in question;

(c) will sanction a firm or individual, at any time, including by publicly declaring such firm or individual ineligible, either indefinitely or for a stated period of time, Employer if it at any time determines that the firm has, directly or

¹ In this context, any action taken by a Applicant, supplier, contractor, or a sub-contractor to influence the procurement process or contract execution for undue advantage is improper.

² "another party" refers to a public official acting in relation to the procurement process or contract execution]. In this context, "public official" includes employees of other organizations taking or reviewing procurement decisions.

³ a "party" refers to a public official; the terms "benefit" and "obligation" relate to the procurement process or contract execution; and the "act or omission" is intended to influence the procurement process or contract execution.

⁴ "parties" refers to participants in the procurement process (including public officials) attempting to establish bid prices at artificial, non competitive levels.

⁵ a "party" refers to a participant in the procurement process or contract execution.

	<p>through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing.</p> <p>(d) will have the right to get the accounts , records and other documents relating to the bid submission and contract performance of the Applicants, suppliers, contractors and their sub-contractors audited by auditors appointed by the Employer.</p>
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Section – II

Bid Data Sheet
(BDS)

Section 2: Bid Data Sheet

This section consists of provisions that are specific to each procurement and supplement the information or requirements included in Section I – Instructions to Bidders.

A. General	
ITB 1.1	The number of the Invitation for Bids is IFB No.: HQ/EN/EC/DOS-MGS/RFO & Bal.Works dated 14.06.2013
ITB 1.1	The Employer is: Dedicated Freight Corridor Corporation of India Limited, NEW DELHI
ITB 1.1	The name of the IFB is: “Design and Construction of Rail Flyover near Ganjkhwaja, Formation in Embankments/Cuttings including blanketing, Bridges (Major, Minor & RUBs), Supply and Spreading of Ballast and other related infrastructural works for double track electrified railway line on Design Build Lump Sum Basis in different stretches between Dehri-on-Sone & Mughalsarai of Eastern Dedicated Freight Corridor in the states of Bihar and Uttar Pradesh in India.”
B. Contents of Bidding Document, Site Visit, Pre-bid conference	
ITB 6.1	All communication between the Employer and the Bidder shall be in writing. For the purposes of seeking clarification, the Employer's address is: Dedicated Freight Corridor Corporation of India Limited Attention : Mr.Rajendra Prasad Designation : Group General Manager/CO/ EC Address : Room # 513; 5 th Floor Pragati Maidan Metro Station Building Complex , New Delhi - 110001, India Telephone: +91 – 11 – 23454680 Facsimile number: +91 - 11 - 23454682
ITB 6.4	Pre Bid Conference: A pre-Bid conference will be held to clarify the issues related to this Bid document on the date, time and venue of the Pre Bid conference indicated below. Bidders should give their queries in writing upto 3 days prior to the pre-Bid Conference. All interested Bidders may attend the Pre-Bid Conference. DFCC response to queries will be posted on the DFCCIL's website. Non-attendance at the pre-Bid conference will not be a cause for disqualification of the Bidder. Date : 04.07.2013 Time: 15:00 Hrs. Venue : Conference Room, Dedicated Freight Corridor Corporation of India Limited, 4 th Floor, Pragati Maidan Metro Station Building Complex, New Delhi-110001. Website of DFCC : www.dfccil.org / www.dfcc.in Site visit is not proposed to be organized by the Employer. However, the bidders are advised to visit the site before pre-bid conference.
C. Preparation of Bid	
ITB 11.2	The prices quoted by the Bidder shall be adjustable in accordance with the provisions in Sub Clause 13.8 of Particular Conditions of Contract.

ITB 15.1	The bid validity period shall be 180 (One hundred and Eighty) days.
ITB 16.1	<p>The Bidder should submit along with the bid, a bid security for Rs. 2.00 crore (Rupees Two Crore only) in the shape of a FDR (Fixed deposit receipt), Demand Draft/Banker's Cheque/Pay Order in favour of "Dedicated Freight Corridor Corporation of India Ltd., New Delhi" from SBI/Nationalized /Scheduled Bank of India in original form.</p> <p><i>The validity of FDR should not be less than 270 days.</i></p>
ITB 17.2	<p>The written confirmation of authorization to sign on behalf of the Bidder shall consist of:</p> <p>In case of Companies</p> <ul style="list-style-type: none"> • Power of Attorney authorizing the signatory of the bid to commit the bidder. <p>In case of Joint Venture</p> <ul style="list-style-type: none"> • Power of Attorney for Authorised Signatory of Joint Venture.
D. Submission and Opening of Bids :	
ITB 19.1	<p>Tender Box for submission of Bid shall remain open: From 10.00 Hrs to 17:00 Hrs on 29.07.2013 and Upto 15:00 hrs. of 30.07.2013 at the address given below: Group General Manager/CO/ EC Room # 513; 5th Floor Pragati Maidan Metro Station Building Complex, New Delhi - 110001, India Telephone: +91-11- 23454680 Facsimile number: +91-11-23454682</p>
ITB 21.1	<p>The Technical bid opening shall take place at: Dedicated Freight Corridor Corporation of India Limited, Conference Hall; 4th Floor, DFCCIL, Pragati Maidan Metro Station Building Complex , New Delhi - 110001, India <u>Technical Bid Opening:</u> Date: 30.07.2013 Time: 15:30 hrs.</p>

Section III

Evaluation and Qualification Criteria

Section III. Evaluation and Qualification Criteria

The purpose of this Section is to establish that the Bidder continues to meet the criteria used at the time of prequalification. It contains all the criteria that the Employer shall use to evaluate bids and qualify Bidders in accordance with ITB 25, ITB 27, ITB 29 and ITB 30 Part 1, Section IV, Bidding forms of the Bid Document.

Technical Proposals

1. Evaluation

The documents required for submission and evaluation of Technical Proposal are detailed in Annexure-I of this section. In addition, the following factors shall apply in proposal evaluation.

2. Qualification

2.1 Updation of Information

The Bidder and any subcontractors shall continue to meet the criteria used at the time of prequalification and shall give an undertaking to this effect. The Bidder shall fill up Form number BDF - 2 and BDF-3 included in Section IV, Bidding Forms, Part 1 of Bidding Documents.

2.2 Personnel

The Bidder shall give an undertaking to arrange the following minimum no. of key personnel during the execution of work commensurate with the planning of work, in addition to required semi-skilled and skilled staff :

SN	Key Position	Minimum No. of Persons	Minimum Qualifying Requirement		
			Total Work Experience (years)	In Similar Works Experience (years)	Minimum Education Qualification
1	Chief Project Manager	1	10	6	B.E. (Civil)
2.	Project Manager	2	7	5	B.E. (Civil)
3	Planning Engineer	1	07	03	B. Tech. (Civil) or B.Sc. in IT (should be well conversant with Primavera-P6)
4	Chief Design Engineer*	1	10	03	B.E. (Civil) + M.E. in Structural Engg. having familiarity with Autocad
5	Contract Manager	1	05	03	B.E. Civil
6	Bridge Engineer	2	05	03	B.E. (Civil)
7	Survey & Alignment Expert	3	05	03	Diploma in Civil Engg. + Expertise in Autocad
8	Quantity	2	05	03	Diploma in Civil Engg.

	Surveyor & Estimator				
9	Quality Control Expert	3	05	03	Diploma in Civil Engg.
10	SHE Expert	1	05	03	Engineering Graduate with Diploma/ Specialization in Safety related field.

*Can be on Sub-contractor's team.

2.3 Equipment

The Bidder shall demonstrate that it will have access to essential equipments/plants during the execution of Works. Capacity and number of machines shall be commensurate with the Works program submitted by the Bidder to enable him to finish the work in stipulated time. The Bidder shall provide ownership/renting/leasing arrangement details of proposed items of equipment using Form BDF-9 in Part – 1 Section IV of Bidding Document.

SN	Name of Equipments
A	Earth work
1	Excavators with 2 cum or more bucket capacity
2	Graders
3.	Dozers having long blade
4	Trucks of 14 cum capacity or more
5	Rollers Pneumatic
6	Testing Equipments for Earth Work
B	Bridges
1	Hydraulic boring rigs
3	Concrete Batching Plant
4	Transit Mixers
5	Concrete Pumps

List of Equipment /Plants is indicative and not exhaustive.

2.4 Subcontractors

Subcontractors for services identified in the prequalification document must continue to meet the minimum criteria specified therein for them. The Bidder shall demonstrate in its proposal clearly the work and value of that work to be carried out by its main subcontractors, including its proposed designer if the Design is not to be carried out in-house.

3. Financial Bid

The financial proposal will comprise the documents required as per ITB-10.5.

3.1. Evaluation

The evaluation of the financial bid shall be carried out in accordance with the provisions of ITB 29. Bidders shall submit financial Bid as per the Form

– BDF-10 –Price Proposal submission sheet as given in Part – 5 of the Bidding Document.

3.2 Time Schedule for Completion of Works:

The designated period for the completion and taking over the entire Works shall be 900 **days** from the Commencement Date, as indicated with further details in Para 8.2 of GCC. Bidders shall confirm that their Technical Proposals and Financial proposal are based on this Time Schedule for Completion. No credit of any kind will be given in the evaluation of Technical Proposals and Financial proposals, to a Proposal and/ or a Bid offering to complete the Works earlier than this designated period. However, Technical Proposals and Financial Bids offering to complete the Works later than this designated period shall be rejected by the Employer.

Documents Required For Bid Submission and Evaluation of Technical Proposal

1 Type of Contract

Technical and Financial Proposals are being invited for a Lump-Sum Contract, for Design and Construction, based on the Employer's Requirements.

The detailed design of components and construction shall be done as specified in **Employers' Requirement and "General Conditions of Contract read with Particular conditions of Contract"**.

2 Documents Required for Technical Proposal

The Technical Proposal will comprise of the following documents in addition to the documents required as per Clause ITB 10:

2.1 General Submittal

S.N.	Form	Contents
1.	BDF-1	Technical proposal submission sheet.
2.	BDF-2	Applicant information Form
3.	BDF-3	Applicant's party information Form
4.	BDF-4	Draft Memorandum of understanding (MOU) for joint venture participation.
5.	BDF-5	Draft format for JV Agreement
6.	BDF-6	Proforma - letter of participation from each member of JV.
7.	BDF-7	Power of Attorney for authorize signatory of JV.
8.	BDF-8	Power of Attorney for lead partner of joint venture
9.	BDF-9	Contractors' Equipment

2.2 Technical Submittal

2.2.1 Methods Statement

The Bidder shall submit methods statement which demonstrates the Bidder's understanding of the Project and comprehension of the Works involved. In these methods statement, the Bidder shall submit Method statements for:

- Survey, layout and site investigation
- Design and Construction of Earthwork in formation and bridges
- Laying of Ballast

in strict compliance with the Contract requirements. This shall correspond to Site organization, Contractor's equipment, construction schedule and Work Plan being submitted by the Bidder as a part of bid documents.

2.2.2 Organization and Management

The Bidder shall submit an organization chart identifying the management and reporting structure for key positions and all site teams. The Bidder shall submit a commentary that describes the roles and responsibilities of the various key positions in the organization structure, the minimum

qualifications, channel of communication, organization they come from and how this organization structure will manage the execution of the works within the scheduled period.

2.2.3 Bid Programme/Work Plan

The Bidder shall submit a bid programme/Work Plan which shall indicate how the Bidder intends to organize and carry out the Works by breaking them into various activities and completing those activities by appropriate Milestones so that the whole of the work gets completed within the time of completion as mentioned in GCC para 8.2. The bid programme/Work Plan shall be prepared in terms of weeks from the Date of Commencement of Works, taking D as the Commencement Date and other time schedules marked in D+ format. (Refer to Explanatory Note 1 at the end of this Section).

2.2.4 Documents for Safety and Quality Plans

The Bidder shall submit the following documents, which shall demonstrate clearly the Bidder's proposals for achieving effective and efficient Safety and Quality procedures.

- a) Outline Safety Plan
- b) Outline Quality Plan
- c) Outline Environmental Plan

(Refer to Explanatory Note 2 at the end of this Section)

2.2.5 Concept Design & Performance Parameters Compliance

The Bidder shall submit details of compliance with the Employers' Requirements as listed in Part 2 of bidding document.

Reference Paragraph 2.2.3 Bid Programme/Work Plan of Annexure- I

Requirements of Bid Programme/Work Plan

- (1) The Bidder shall submit a Bid Programme/Work Plan which shall indicate how the Bidder intends to organize and carry out the Works by breaking them into various activities and completing those activities by appropriate Milestones so that the whole of the work gets completed within the time of completion as mentioned in GCC para 8.2. The bid programme shall be prepared in terms of weeks from the Date of Commencement of Works, taking D as the Commencement Date and other time schedules marked in D+ format. This may be in form of an Excel spread sheet/primavera or similar programme output.
- (2) The Bid Programme/Work Plan shall follow the instructions given in **Part 2, Section V, “Employer’s Requirements/ Volume 6 Appendix 4, PROJECT PROGRAM REQUIREMENTS”**
- (3) The Bid Programme/Work Plan shall take into account the Bidder’s proposed Design Submission Programme and should:
 - (a) take due account of the design co-ordination interface periods during which the Contractor shall be required to undertake and complete all aspects of design co-ordination with other consultants engaged in the review of the design of the Project such design will be compatible and coordinated with others and allowing adequate time for the Employer’s assessments and decisions.
 - (b) be consistent with the overall Work Plan and in accordance with the Employer’s Requirements;
 - (c) make adequate allowance for periods of time for review by authorities whose approval is necessary
 - (d) include a schedule identifying, describing, cross-referencing and explaining the Design packages and submissions which the Bidder intends to submit.
- (4) The Bid Programme/Work Plan shall contain sufficient detail to assure the Employer of the feasibility of the plan and approach proposed by the Bidder.
- (5) The Bid Programme/Work Plan shall be accompanied by a narrative statement that shall describe Programme activities, assumptions and logic, and highlight the Bidder’s perception of the construction and completion of the work. This narrative statement shall also indicate which elements of the Works the Bidder intends to carry out off-Site with details of the proposed locations of where any such work is to be carried out, the facilities available. In particular the Bidder must state the assumptions made in respect of the interfaces with the Employer, other contractors and any requirements for information on matters which would affect his works.
- (6) All programmes/plans shall include design, procurement periods, major material, on site, offsite, temporary construction, interface and periods for

System wide, utility and adjacent contractors, and testing alongwith other relevant information.

- (7) The proposed submission of the Bid Programme/ Work Plan and Design Submission Programme shall not, in any event, be construed as a submission under Clause 8.3 (Programme) of the General Conditions of Contract.

Reference Paragraph 2.2.4 - Documents for Safety and Quality plans of Annexure-I

OUTLINE SAFETY PLAN

The Bidder shall submit as part of his bid an Outline Safety Plan which shall contain sufficient information to demonstrate clearly the Bidder's proposals for achieving effective and efficient safety procedures. The Outline Safety Plan should include an outline of the safety procedures and regulations to be developed and the mechanism by which they will be implemented for ensuring safety as required under the Employer's Requirements and Sub Clause 4.8 and 6.7 of the GCC.

The Outline Safety Plan shall be headed with a formal statement of policy in relation to safety and shall be sufficiently informative to define the Bidder's safety plans and set out in summary an adequate basis for the development of the Site Safety Plan to be submitted in accordance with Sub Clause 4.8 and 6.7 of the GCC including a testing and strategy/plan for the whole of the Works.

OUTLINE QUALITY PLAN

The Bidder shall submit as part of his bid an Outline Quality Plan which shall contain sufficient information to demonstrate clearly the Bidder's proposals for achieving effective and efficient Quality Assurance and Control System. The Plan should include an outline of the procedures and regulations to be developed and the mechanism by which they will be implemented for ensuring Quality as required in terms of the Employer's Requirements. It shall also include an outline of procedures, verification and validation for all tests and materials for all the Works being done by him under this Contract.

OUTLINE ENVIRONMENTAL PLAN

The Bidder shall submit as part an Outline Environmental Plan illustrating the intended means of compliance with the requirements of Appendix 12, Part-2 of the bid document and shall set out in summary form an adequate basis for the development of the more detailed document to be submitted under Sub Clause 4.18 of GCC. The outlined Environmental Plan shall contain sufficient information to demonstrate clearly the proposed method of achieving the Bidder's environmental objectives with regard to the requirement of the contract.

The outline environmental Plan shall be headed with a formal statement of Policy in relation to environmental protection and shall be sufficiently informative to define the Bidder's environmental plans and set out in summary an adequate basis for the submission of a detailed and comprehensive site environmental quality management plan to be submitted in accordance with sub clause 4.18 of GCC. The outline plan shall include the methods and procedures for the Environmental Impact Assessment to be performed under the contract.

Section IV

Bidding Forms

Section IV. Bidding Forms

Table of Forms

Form No.	Description
BDF-1	Technical Proposal Submission Sheet
BDF-2	Applicant Information form
BDF-3	Applicant's Party Information form
BDF-4	Draft Memorandum of Understanding (MOU ²) For Joint Venture Participation
BDF-5	Draft Format of Joint Venture Agreement
BDF- 6	Pro-forma Letter of Participation from each partner of Joint Venture (JV)
BDF- 7	Format for Power of Attorney for Authorised Signatory of Joint Venture (JV) Members – Power of Attorney*
BDF- 8	Format for Power of Attorney to Lead Partner of Joint Venture (JV)
BDF- 9	Contractor's Equipment
BDF- 10	Price Proposal Submission Sheet

² In case of existing joint venture, the certified copy of JV Agreement be furnished.

Technical Proposal Submission Sheet (TPSS)

Date:

Invitation for Bid No.: HQ/EN/EC/DOS-MGS/RFO & Bal.Works

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 Bidders (ITB-7);
- (b) We confirm that our offer is fully compliant with Bid Document and Technical Preposals submitted by us are in clause by clause compliance with Employer's Requirement and other specifications, including Addenda thereon. We offer to execute the works in conformity with the Bidding Document.
- (c) Our bid shall be valid for a period of 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- III : Evaluation and Quaqlfication criteria and Section-V : Employer's Requirements;
- (f) We, including any subcontractors or suppliers for any part of the contract, do not have any conflict of interest in accordance with ITB 3.3;
- (g) We understand that this bid, together with your written acceptance thereof included in your notification of award/Letter of Acceptance (LOA), shall constitute a binding contract between us, until a formal contract is prepared and executed; and
- (h) We have not made any tampering or changes in the bidding documents on which the bid is being submitted and if any tampering or changes are detected at any stage, we understand the bid will invite summery 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.
- (i) We understand that you are not bound to accept the lowest bid or any other bid that you may receive.

Name

In the capacity of

Signed

Duly authorized to sign the Bid for and on behalf of

Date

Applicant Information Form

Date: *[insert day, month, year]*

IFB Bid Document No.: HQ/EN/EC/DOS-MGS/RFO & Bal.Works

Applicant's legal name <i>[insert full legal name]</i>
In case of Joint Venture (JV), legal name of each partner: <i>[insert full legal name of each partner in JV]</i>
Applicant's Actual or Intended country of constitution: <i>[indicate country of Constitution]</i>
Applicant's actual or Intended year of constitution: <i>[indicate year of Constitution]</i>
Applicant's legal address in country of constitution: <i>[insert street/ number/ town or city/ country]</i>
Applicant's authorized representative information Name: <i>[insert full legal name]</i> Address: <i>[insert street/ number/ town or city/ country]</i> Telephone/Fax numbers: <i>[insert telephone/fax numbers, including country and city codes]</i> E-mail address: <i>[indicate e-mail address]</i>
Attached are copies of original documents of <input type="checkbox"/> Articles of Incorporation or Documents of Constitution, and documents of registration of the legal entity named above <input type="checkbox"/> In case of JV, JV agreement, in accordance with ITB 3.1b.

Applicant's Party Information Form

[The following form shall be filled in for the Applicant's parties including partner(s) of a joint venture, subcontractors and Design Consultant]

Date: *[insert day, month, year]*

IFB Bid Document No.: HQ/EN/EC/DOS-MGS/RFO & Bal.Works

JV applicant legal name: <i>[insert full legal name]</i>
Applicant's Party legal name: <i>[insert full legal name of Applicant's Party]</i>
Applicant's Party country of registration: <i>[indicate country of registration]</i> Applicant Party's year of constitution: <i>[indicate year of constitution]</i>
Applicant Party's legal address in country of constitution: <i>[insert street/ number/ town or city/ country]</i>
Applicant Party's authorized representative information Name: <i>[insert full legal name]</i> Address: <i>[insert street/ number/ town or city/ country]</i> Telephone/Fax numbers: <i>[insert telephone/fax numbers, including country and city codes]</i> E-mail address: <i>[indicate e-mail address]</i>
Attached are copies of original documents of <input type="checkbox"/> Articles of Incorporation or Documents of Constitution, and Registration Documents of the legal entity named above, in accordance with ITB 3.1 (b).

Note :

Separate BDF form is required for all individual participants (members) in the JV as well as sub-contractor and Design Consultant.

**Draft Memorandum of Understanding (MOU)*
For
Joint Venture Participation
Between**

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

and

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

and

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

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

WHEREAS:

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

NOW, THEREFORE, THE PARTIES AGREE AS FOLLOWS:

1. The following documents shall be deemed to form and be read and construed as an integral part of this MOU.

- i) Notice for Bid, and
- ii) Bidding document
- iii) Any Addendum/Corrigendum issued by Dedicated Freight Corridor Corporation of India Limited
- iv) The bid submitted on our behalf jointly by the Lead Partner.

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

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

4. The `Parties' have resolved that the distribution of responsibilities and their proportionate share in the Joint Venture is as under:

- (a) Lead Partner;
 - (i)
 - (ii)

- (iii)
 - (b) Joint Venture Partner
 - (i)
 - (ii)
 - (iii)
- [Similar details to be given for each partner]

5. JOINT AND SEVERAL RESPONSIBILITY

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

6. ASSIGNMENT AND THIRD PARTIES

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

7. EXECUTIVE AUTHORITY

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

8. BID SECURITIES

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

9. BID SUBMISSION

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

10. INDEMNITY

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

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

12. DOCUMENTS & CONFIDENTIALITY

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

13. ARBITRATION

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

14. VALIDITY

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

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

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

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

17. NOTICES

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

Lead Partner	Other Partner(s)
.....
.....
(Name & Address)	(Name & Address)

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

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

Witness

1.....(Name & Address)

2..... (Name & Address)

***Notes:**

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

Draft Format of Joint Venture Agreement

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

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

A. CONDITIONS AND TERMS OF JV AGREEMENT

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

B. SCHEDULES

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

**Pro-forma Letter of Participation From Each Partner of
Joint Venture (JV)**

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

No....

Dated

From:

.....
.....

To,

The Managing Director,
Dedicated Freight Corridor Corporation of India Limited
5th Floor, Pragati Maidan Metro Stn. Building Complex.,
New Delhi 110001.

Gentlemen,

Re: ...“[Insert name of work].....”.

Ref: Your notice for Invitation for Bid (IFB) No. HQ/EN/EC/DOS-MGS/RFO & Bal.Works dated

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

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

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

OR

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

2. ‘In this group we act as leader and, for the purposes of applying for Bid, represent the Joint Venture:

3. In the event of our JV being awarded the contract, we agree to be jointly with i) & ii) (names of other members of our JV) and severally liable to the Dedicated Freight Corridor Corporation of India Limited, its successors and assigns for all obligations, duties and responsibilities arising from or imposed by the contract subsequently entered into between Dedicated Freight Corridor Corporation of India Limited and our JV.

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

Yours faithfully,

(Signature)

(Name of Signatory).....

(Capacity of Signatory).....

Company Seal

* Delete as applicable

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

BDF- 7

Format for Power of Attorney for Authorised Signatory of Joint Venture (JV) Partners

POWER OF ATTORNEY*

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

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

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

Dated this the day of 2013

(Signature of authorised Signatory)

Signature of Lead Partner

Signature of JV Partner(s)

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

Witness

Witness 1:

Name:

Address:

Occupation:

Witness 2:

Name:

Address:

Occupation:

**Notes:*

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

Format for Power of Attorney to Lead Partner of Joint Venture (JV)

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

POWER OF ATTORNEY *

Whereas Dedicated Freight Corridor Corporation of India Limited has invited Bids for the work of **Design and Construction of Rail Flyover near Ganjkhwaja, Formation in Embankments/Cuttings including blanketing, Bridges (Major, Minor & RUBs), Supply and Spreading of Ballast and other related infrastructural works for double track electrified railway line on Design Build Lump Sum Basis in different stretches between Dehri-on-Sone & Mughalsarai of Eastern Dedicated Freight Corridor in the states of Bihar and Uttar Pradesh in India.**

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

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

NOW THIS POWER OF ATTORNEY WITNESSETH THAT:

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

We hereby agree to ratify all acts, deeds and things lawfully done by lead member, our said attorney, pursuant to this power of attorney and that all acts deeds and

things done by our aforesaid attorney shall and shall always be deemed to have been done by us/ Joint Venture.

Dated this the Day of 2013

.....
(Signature)

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

Witness 1:
Name:
Address:
Occupation:

Witness 2:
Name:
Address:
Occupation:

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

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

Contractor's Equipment

The Bidder shall provide adequate information to demonstrate clearly that it has the capability to meet the requirements for the key Contractor's equipment listed in Section III, Evaluation and Qualification Criteria.

A separate Form shall be prepared for each item of equipment listed, or for alternative equipment proposed by the Bidder.

Item of equipment	
Equipment information	Name of manufacturer
	Capacity
Current status	Current location
	Details of current commitments
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured

Omit the following information for equipment owned by the Bidder.

<i>Owner</i>	<i>Name of owner</i>	
	<i>Address of owner</i>	
	<i>Telephone</i>	<i>Contact name and title</i>
	<i>Fax</i>	<i>Telex</i>
<i>Agreements</i>	<i>Details of rental / lease / manufacture agreements/Consent letter specific to the project</i>	

Price Proposal Submission Sheet

Please refer Part-5 (Price Schedule) for this form

PART 2

Employer's Requirement

Section V. Employer's Requirement

Contents

Volume 1: Scope of Works

Volume 2: General

Volume 3: Design Procedures and Processes

Volume 4: Design Criteria and Specifications

Volume 5: Construction and Testing

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Section V. Employer's Requirement

Volume 1 – Scope of Works

CONTENTS

- 1.0 GENERAL**
- 2.0 SCOPE OF WORKS**

1. General

- 1.1 Dedicated Freight Corridor Corporation of India (DFCCIL) is a Special Purpose Vehicle set up under the administrative control of Ministry of Railways to undertake planning & development, mobilization of financial resources and construction, maintenance and operation of the Dedicated Freight Corridors. In the first phase, DFCCIL will be constructing two corridors – the Western DFC and Eastern DFC- spanning a total length of about 3300 route km. The Eastern Corridor, starting from Ludhiana in Punjab and pass through the states of Haryana, Uttar Pradesh, Bihar, Jharkhand and terminate at Dankuni in West Bengal. The Western Corridor will traverse the distance from Dadri to Mumbai, passing through the states of UP, Delhi, Haryana, Rajasthan, Gujarat and Maharashtra.

The route alignment of Freight Corridors is mostly parallel to existing adjacent Indian Railway Track. However alignment is on detour at some locations to avoid social/environmental/wild life impact.

The project entails construction of mostly double-track electrified railway lines. Bridges and embankment would be fit for 32.5 Tonne Axle load and Track structure would be designed for handling 25 Tonne axle load with train speed up to 100 Kmph.

The Eastern Corridor will handle single stack containers whereas Western Corridor is planned to cater to double stack containers. Up gradation of transportation technology, increase in productivity and reduction in unit transportation costs have been taken as guiding principles for freight corridor.

1.2 Project Information :

DFCCIL work for the section of New Karwandia Ch. 14.108 (Appox. Rly Km 564) to Near Ganjkhwaja (Ch.112.14) of Sonnagar - Mughalsarai section is under progress. However, contract for some stretches between Sonnagar to Mughalsarai has not been awarded yet.

In order to commission the entire section of Dehri-on-Sone to Mughalsarai, DFCCIL intends to carry out the works in remaining sections between Dehri-on-Sone and Mughalsarai which includes construction of a Rail Fly Over near Ganjkhwaja Station of IR. The proposed works falls in the districts of Rohtas (Bihar State) and Chandauli District of U.P.

- 1.3 Accordingly, DFCCIL intends to carry out the work “Design and Construction of Rail Flyover near Ganjkhwaja, Formation in Embankments/Cuttings including blanketing, Bridges (Major, Minor & RUBs), Supply and Spreading of Ballast and other related works for double track electrified railway line on Design Build Lump Sum Basis in different stretches between Dehri-on-Sone & Mughalsari of Eastern Dedicated Freight Corridor in the states of Bihar and Uttar Pradesh in India.

2.0 Scope of work:

Design and Construction of Rail Flyover near Ganjkhwaja, Formation in Embankments/Cuttings including blanketing, Bridges (Major, Minor & RUBs), Supply and Spreading of Ballast, works in Pahleja Yard and other related infrastructural works for double track electrified railway line on Design Build Lump Sum Basis between Dehri-on-Sone – Mughalsarai section of Eastern Dedicated Freight Corridor in the states of Bihar and Uttar Pradesh in India in following stretches:

(i) Ch. 5.38 at Dehri-on-Sone Railway station to Ch.14.108 at New Karwandiya

Work in this section for DFC alignment includes Design and Construction of:

- (a) Formation in Embankments/Cuttings including blanketing, drainage etc.
- (b) Major Bridges (3 nos.)
- (c) Road under Bridge (1 No.)
- (d) Minor Bridges (15 nos.)
- (e) Construction of (2 Nos.) RCC Buried boxes near LC No. 35 & 37.
- (f) Supply and Spreading of Ballast
- (g) Three existing gate lodges LC No. 35, 36, & 37) are falling on the DFC alignment. At these LC gates new gate lodges are to be constructed. Other connected miscellaneous works for opening of LCs are also in the scope of work.
- (h) Works in Pahleja Yard for IR track (Ref Yard Plan of Pahleja given in Reference Document Part-4 of Bid Document):
 - i) Earthwork in formation/cutting as per RDSO/2007/GE:0014(Nov., 2009) for 25 T Axle load for New IR lines (3 loop lines + 1 future loop).
 - ii) Construction of Goods office of plinth area 170 sqm. The building shall be with RCC roof.
 - iii) Construction of New Station building, of 300.18 sq.m plinth area. The building shall be with RCC roof.
 - iv) Rail Level Goods Platform- 2 Nos. (size 690 x 12.5m and 690 x18m)
 - v) 7M wide Road with berms (1.5m on each sides) in circulating area as per yard plan and earth filling between the Goods Platform and Road.
 - vi) See- through fencing along Indian Railway boundary towards Goods yard side for 2.5 Km length.
 - vii) Extension of bridges (6 Nos.) on Goods yard side as per DFC loading.
 - viii) Spreading of Ballast in yard.
 - ix) Electrical Wiring for all buildings being constructed and arrangement of water supply etc. at Pahleja.
(External electrification and electric supply are not in the scope of work).

(ii) **Ch.112.14 to Ch.116.38 near Ganjkhwaja**

Work in this section for DFC alignment includes Design and Construction of:

- (a) Construction of Rail Flyover (RFO) for DFC double line over Howrah-Delhi IR lines.
- (b) Formation in Embankments/Cuttings including blanketing, retaining walls, drainage etc. in above section for DFC double line and for DFC single line (third line) connecting to IR yard at Ganjkhwaja.
- (c) Major Bridge cum RUB (1 No.)
- (d) Minor Bridges (9 nos.)
- (e) RUB (1 no.)
- (f) Construction of (1 Nos.) RCC Buried box near LC No. 79.
- (g) Supply and Spreading of Ballast.

The RFO is to be constructed over 3 electrified IR tracks with least disturbance to the running trains on IR lines and adhering all safety norms. The permanent works and temporary arrangement of the said RFO and its launching arrangement shall need the approval of Commissioner of Railway Safety (CRS). The employer shall arrange getting approval of CRS for such arrangements required for CRS Sanction. The contractor shall prepare all the related documents and drawings.

The launching of superstructure for RFO will be done under intermittent traffic blocks on the existing IR tracks. Where track closures (traffic blocks) are required for construction, the Contractor is responsible for the coordination with IR and will be assisted as applicable by the Employer/Engineer. These traffic blocks shall be sanctioned by operations branch of IR according to the availability of time gap between running traffic on existing IR tracks. The contractor shall need to plan resources accordingly. Nothing extra shall be payable for any time lags in getting such traffic blocks by the employer.

“Span of RFO to be constructed over existing 3 tracks Indian Railway shall have provision for two future tracks, one on either side of existing Indian Railway tracks. This RFO shall also have additional openings on both sides to provide road access with minimum 7.5m carriageway.”

The work of RFO shall comprise design and construction of the following as considered necessary but not limited to:

- i) Abutment and piers including foundation
- ii) Bearings
- iii) Superstructure including ducts/Pipes for cables
- iv) supports for OHE traction masts
- v) signages, suitable fixtures
- vi) Steel truss and other related works as considered necessary.

This will also include design, survey including geotechnical investigation, as required. All the temporary works as required for construction of foundations/sub-structure and launching of superstructure, etc.

- (iii) **Ch.119.437 to Ch.119.950** (upto connection at Dead End near East Receiving Cabin of MGS Yard)

Work in this section for DFC alignment includes Design and Construction of:

- (a) Formation in Embankments/Cuttings including blanketing, drainage etc.
- (b) Minor Bridges - 2 No.
- (c) Supply and Spreading of Ballast

- iv) **Buried Boxes between Ch. 80.00 to Ch.112.14:**

Construction of (6 Nos.) RCC Buried boxes near LC No. 64, 65, 66, 67, 69 & 77.

- v) The scope of work does not include
- any track work
 - any OHE work
 - any S&T work

- i) A Major bridge is one which has a total Linear water way of 18m or more or which has a clear opening of 12 linear metres or more in any one span.
- ii) Bridges having lesser span/Linear waterway than as mentioned above in Note (i) are minor bridges.
- iii) '0.00' Chainage starts at Km 550.245 near Sonenagar of IR track.

3.1 Supply and spreading of Ballast:

Total 60,000 cum ballast is to be supplied. Out of this 30,000 cum of Ballast is to be spread on formation along DFC Track alignment forming a ballast bed of approx. 200mm. The quantities for each stretch will be approved by Engineer. Balance quantity of ballast has to be stacked at location approved by the Engineer for use by Track works contractor.

3.2 All the Works shall be based on Part 2 "Employer's Requirement, Section V" and developed further into the Contractor's Design.

- (1) The technical data provided by the Employer in Site Details - Part 4 of Bidding Document like plan and profile, Chainages, GAD of bridges, geotechnical details, hydrological data, linear water way for bridges are indicative. However number of bridges, level crossings, RUBs, RFOs, Buried Boxes and chartered utilities are firm and any change will be treated as a variation. Contractor shall validate the indicative plan and profile provided by the Employer as above, after doing detailed topographic survey, hydrological survey, sub-surface and other site investigations. During the survey Contractor is required to capture sufficient details of existing railway network like formation, bridges (catchment area, Highest Flood Level, bed level, protection works etc.), Level Crossings, details of the structures coming on the proposed alignment, utilities and any other infringement at site etc. Based upon the survey the Contractor can modify/change the plan and profile of the alignment so as to get the best fit designed alignment of the section but remaining within the land boundaries set by the Employer.

- (2) All Site investigations, Geo-technical surveys, alignment location, bore holes, interfacing, communication, ancillary works, record keeping, material testing, inspection reports, correspondence etc. shall form part of scope of Works for successful completion of Permanent Works
- (3) Design criteria and Specifications for Design of all components of Permanent and Temporary Works are detailed in **Sec V Employers Requirement Vol.-4 of the Bidding Document.**
- (4) Following are the components of Works to be executed by the Contractor:-

(a) Earthwork In formation

Earthwork in formation, as per approved plan and profile of the alignment should be done as per the RDSO Guidelines and Specifications for Design of formation for Heavy Axle Load report No. RDSO/2007/GE: 0014 (Nov., 2009) Earthwork in formation shall include:

- earthwork in embankment, cutting, provision of longitudinal and cross drains, Nalla (open drain) diversions, construction of retaining walls and ground improvement wherever required, protection work and pitching on the approaches of bridges wherever required, turfing on embankment/ cutting slope etc
- provision of blanket and sub-grade in formation, compacted mechanically as per the cross sections and methodology approved by the Engineer.

The earth work in formation for DFC track shall be for 32.5 T axle load. The earth work in formation in Pahleja Yard for IR track shall be for 25T axle load.

(b) Construction of Bridges

Minor, major, Road Under Bridges (RUB), RCC Burried Boxes for future replacement of specific existing level crossing(s) in the parallel portion, and Rail Flyovers (RFO) are mentioned in the list included in Site Details, Part 4 of Bidding Documents.

(c) Construction of Burried Boxes :

Total 9 no. of buried boxes are to be constructed as per scope shown in the GADs. The tentative locations of said buried boxes have been listed in the Part 4 - Reference document-1. Site data. Buried box below IR Track and Road Approaches on IR Track side is not included in the scope of work to be executed by the Contractor. Buried box below DFCC Track for the barrel length shown in the GAD is included in the scope of work for this contract. They will be converted into LHS/RUB, at a later stage by DFCCIL. Therefore, the work of approaches and return/wing walls of LHS/RUB on DFCC side and connection to the nearest road is not included in the present scope of work. The design of these buried RCC boxes shall be governed by clause 3.0 of Bridge Design criteria, Part 2 Vol. 4 of bid document. The Typical GADs mentioned above are indicative. The contractor will develop definitive GADs with designs, to be adopted for construction, as detailed in Part-2, Volume-3, [Design Procedures and Processes] of bid document.

While constructing the RUBs close to IR track, contractor shall take all precautions to ensure safety to IR Track including providing a sound

supporting system for the IR formation. Protection measures and construction methodology for working near the IR track shall be approved by Engineer and shall have no objection of IR.

Any change in either the total number of buried boxes or the size of buried box/boxes shall be treated as variation.

(d) The necessary road diversions (temporary/permanent) required in connection with construction of RUBs/Buried Boxes and modification of the existing level crossing within railway land shall also be part of the scope of work.

(e) While designing the bridges standard spans and single/multiple box culverts shall be generally used. Tentative bridge locations, General Arrangement Drawings (GAD) of the bridges are given in Site Details - **Part 4**; Bidding Document.

(f) **Level Crossings**

Contractor is required to make all the necessary modification to existing level crossing gates on DFC alignment at LC locations listed in Part 4 - Reference Document; Bidding Document including construction of new infrastructure, diversion of road if any, construction of new height gauge on approach road & road signages towards DFC track, except for interlocking provisions and lifting barriers, is a part of Scope of Work etc. The roads shall be connected to both the approaches after suitable profiling.

The gate lodges to be constructed should also be provided proper electrical wirings.

(g) **Removal/ Relocation of Utilities/Trees**

The Contractor shall remove/relocate all Utilities, (chartered and uncharted) or trees coming in the way of designed alignment. Chartered utilities like electrical, signalling, civil structures, etc. are listed in Site Details - Part 4; Bidding Document. Methodology and payment procedure for dealing with all types of utilities & trees are detailed in Part 2 "Employer's Requirement, Section V, Volume 6, Appendix 1 - Utilities".

(h) **Other Modifications wherever required**

Wherever DFC alignment is passing adjacent to existing railway stations of Indian Railways, the Contractor shall undertake suitable modification to the electrical LT/HT line up to 33 KV, wherever required. These works may require mandatory clearance/approval/sanction from the concerned Railway Authorities/Civil Authorities/Concerned Authorities before they can be undertaken by the Contractor. The electrical work shall be carried out by agencies having license as per relevant rules and regulations. The responsibility of obtaining necessary sanction/clearance of the concerned authorities before undertaking the work rests upon the Contractor. Wherever required, the documentation, if the same become necessary, may be provided by DFCC to enable the contractor in obtaining such sanctions. No claim for delay or compensation from the Contractor on this account shall become tenable. Tentative details of

platforms and station buildings are in **Site Details - Part 4-Bidding Document**.

(i) Temporary Work

The Contractor shall execute all Temporary Works required to facilitate construction and the cost thereof shall be included in the overall bid price. All temporary arrangements and Works shall be designed and necessary drawings developed to ensure that these remain safe during construction. As a rule temporary Works shall be subsequently dismantled and removed by the Contractor after construction at his own cost. The Engineer however may permit retention of some of the temporary works with mutual consent between the Contractor and the Engineer.

(j) Incidental Works

In addition to above the Contractor shall undertake various incidental Works to complete the entire project successfully. The Contractor shall include cost of such incidental Works in his Bid price. Some of the incidental Works are listed below:

- (i) SHE Compliance: - The Bidder shall submit as part of his bid a SHE Plan which shall be in accordance with **Part 2, Volume 6, Appendix-10** - First Aid Base and **Appendix-12** -Site Safety and Environmental Protection Requirements. This plan should include SHE procedures and regulations to be developed by the Contractor and the mechanism by which these will be implemented for ensuring SHE compliance as per the Employer's Requirements.
- (ii) Quality Assurance:-The Bidder shall submit as part of his bid a Quality Assurance Plan which shall include Quality Assurance procedures and regulations to be developed and the mechanism by which these will be implemented for ensuring Quality compliance as per the Employer's Requirements detailed in Appendix 6, Volume 6, Part 2 of Bidding Document.
- (iii) After award of Contract the Contractor shall submit an Interface Management Plan which shall include procedures and regulations to be developed and the mechanism by which Interfacing will be implemented as per the Employer's Requirements detailed in Appendix 3, Volume 6, Part 2 of Bidding Document.
- (iv) Testing: - The Contractor for this Work shall be required to conduct necessary tests to meet the requirements as mentioned in the bidding documents.
- (v) Restoration of existing roads and services other than chartered/unchartered utilities dislocated on account of DFC alignment during construction, Road connections for the roads affected by the DFC line and relevant facilities is a part of the Scope of Work. In case the management of traffic around the worksite becomes necessary, the Contractor shall carry out the same at his cost. The Engineer however, may at times request the Contractor to leave the temporary diversion of the road in place. All such requests by the Engineer shall be entertained by the Contractor.

- (vi) While working in close proximity of existing IR track, the Contractor shall obtain permission for Works with or without traffic block from concern Railway authority/interfacing agencies wherever applicable and DFCC shall assist in obtaining such permits. Extra precautions to be observed by the Contractor while working in close proximity of existing Indian railway track as listed in **Volume 5, Construction and Testing, Part 2 Employer's Requirements.**
- (vii) Office accommodation for Engineer and Employer including communication, inspection facilities as specified in **Appendix 15, Volume 6, Part 2 of bidding Document.**
- (viii) Benchmarking, setting out, photography, videography, report submission, permanent markers like land boundary pillars, signages, boards etc. As Built drawings, inspection books, registers for record & maintenance of bridges/ alignment etc. as specified in **Volume 5, Construction and Testing Part 2 Employer's Requirements.**
- (ix) The Contractor shall be responsible for obtaining relevant certificates or clearances from local/civil authorities viz. completion certificate, fire clearance or any other mandatory clearances which may be specified by these authorities from time to time.

Section V. Employer's Requirement

Volume 2 – General

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1.0 INTRODUCTION

- (1) The Employer's Requirement has been divided into six (6) Volumes as under:
 1. **Scope of Works.**
 2. **General:** these apply throughout the Contract.
 3. **Design Procedures and Processes:** these apply in respect of procedures and processes relating to the design of the Civil, Structures, and Bridge Works.
 4. **Design Criteria and Specifications:** these apply in respect of Employer's Requirement/Performance Specifications relating to the design of the Civil, Structures, and Bridge Works.
 5. **Construction and Testing:** these apply in respect of duties and other requirements relating to the construction of the Works.
 6. **Appendices.**

2.0 DEFINITIONS AND INTERPRETATIONS

- (1) In addition to the words and expressions defined in the Conditions of Contract, further following words and expressions shall have the meaning assigned to them except where the context otherwise requires:
 - (a) **"As-Built Drawings":** means those drawings produced by the Contractor and endorsed by it as true records of construction of the Permanent Works and which have been agreed with the Engineer.
 - (b) **"Condition of Contract":** shall mean General Conditions of Contract (Section VI, Part 3) read in conjunction with Particular Condition of Contract as in Section VII, Part 3 of Bidding Documents.
 - (c) **"Construction and/or Manufacture Documents"** means all drawings, calculations, computer software, samples, patterns, models, operation and maintenance manuals and other manuals and information of a similar nature to be submitted by the Contractor.
 - (d) **"Construction Phase":** has the meaning identified in para 4 of this Volume.
 - (e) **"Defect"** is any part of the Work which is not in accordance with the Contract.
 - (f) **"Definitive Design":** prepared and accepted part of drawings, documents, standards, and instructions, which give the abilities for supply, installation and testing. Giving clearance by the Engineer, to the Definitive Design is an obligatory condition for the commencement of construction Works. "Definitive Design" has the meaning identified in Para 2, **Part 2 "Employer's Requirement, Section V, Volume 3, Design Procedures and Processes"** of the Bidding Documents.
 - (g) **"Definitive Design Submission":** means the submission of Contractor's Documents which comprise the whole or parts of the proposed Definitive Design and for which the Contractor seeks a Notice.

- (h) **"Design Criteria"**: means the governing specifications and conditions as specified in Employer's Requirement Volume 4 of Bidding Documents.
- (i) **"Design Data"**: means all survey and investigations, specifications, plans, drawings, details, graphs, sketches, models, levels, setting-out dimensions, calculations and other documents related to the design of the Works.
- (j) **"Design Manual"**: means the manual to be prepared and submitted by the Contractor as part of the Preliminary Design and as described in Para 2, **Part 2 "Employer's Requirement, Section V, Volume 3, Design Procedures and Processes"** of the Bidding Documents as applicable.
- (k) **"Design Package"**: has the meaning identified in **Part 2 "Employer's Requirement, Section V, Volume 3, Design Procedures and Processes"** of the Bidding Document as applicable.
- (l) **"Design Phase"**: has the meaning identified in para 4 of this chapter.
- (m) **"Designer"** means the Contractor or part of the group forming the Contractor, person, firm or company or group of companies, or any replacement carrying out the Design of Works or part thereof.
- (n) **"Drawings"** means the Employer's Drawings and the Drawings submitted by the Contractor and any modification of such drawings, if any, furnished from time to time, or for which the Engineer has issued a Notice of No Objection.
- (o) **"Good for Construction Drawings"**: shall be derived directly from the Definitive Design and shall detail and illustrate in full the Permanent & Temporary Works. These drawings are the ones which the Contractor considers sufficient in detail for construction and is cleared by the Engineer for construction.
- (p) **"Interfacing Contractor"** means the Contractor engaged by the Employer or other agencies having an interface issue with the Contractor for this Work.
- (q) **"Key Date"** means the date identified as such in the Contract **"Employer's Requirement, Section VI, Volume 6, Para 2; Appendix 4 – Project Program Requirements"**.
- (r) **"Milestone"** means as defined in clause 1.1.3.10 of GC
- (s) **"Milestone Date"** means the date prescribed in Schedule of Milestones by which a Milestone is to be achieved - **Employer's Requirement, Section V, Volume 6, Para 2; Appendix 4 – Project Program Requirements"**.
- (t) **"Milestone Certificate"** means the certificate to be issued by the Engineer in relation to the achievement or otherwise of Milestones.
- (u) **"Notice"**: means a Notice of No Objection.
- (v) **"Outline Environmental Plan"** means the environmental plan setting out in summary form, the Contractor's proposed means of

complying with his obligations in relation to environmental management as prescribed in the **Employer's Requirements; Part 2** of the Bidding Documents .

- (w) **"Outline Quality Plan"** means the quality plan setting out in summary form, the Contractor's proposed means of complying with his obligations in relation to quality assurance as prescribed in the Employer's Requirements.
- (x) **"Outline Safety Plan"** means the safety plan setting out in summary form, the Contractor's proposed means of complying with his obligations in relation to construction safety as prescribed in the **Employer's Requirements; Part 2** of the Bidding Documents .
- (y) **"Preliminary Design"**: means the submission of Contractor's Documents which comprise the initial stage of the design phase.
- (z) **"Preliminary Drawings"** means the drawings prepared by the Contractor that are built on the Reference Drawings and accompany the Contractor's Preliminary Design submissions.
- (aa) **"Railway"** means Railway or any portion of a Railway for public carriage of passengers and goods as defined in the Railway Act 1989. Any reference to railway means the Indian Railways and the respective Zonal Railway.
- (bb) **"Railway Envelope"**: means the zone or zones within the Works which contain the track, platforms and equipment necessary for the operation of the railway by the DFCC.
- (cc) **"Reference Drawings"** means the drawings prepared by the Employer and included in the bidding document.
- (dd) **Deleted.**
- (ee) **"Safety Procedures"**: these shall be the procedures as detailed in Employer's requirement at appropriate places.
- (ff) **"Schedule of Milestones"**: means the schedule included in para 8.2 of Time of Completion – **Appendix to Tender; Part 3 of Bidding Documents.**
- (gg) **"System Works"** : means the work connected with design, construction, manufacture, supply, installation, testing and commissioning related with electrification of Railway line, new signalling and control systems, new telecommunication system, , removal of any temporary works and diversion of utility service of IR and other authorities as included in the scope of work for system works.
- (hh) **"Systems Contractor"**: means the Contractor engaged by the Employer to carry out Works related to Systems part of the project.
- (ii) **"Technical Specification"**: means the combined specifications prepared by the Contractor in a format which combines the Technical Specifications and those parts of the Contractor's Technical Proposals which specify standards for design, procurement, manufacture, installation and construction-testing-commissioning

which are developed during the Design Phase and fully comply with the Employer's requirements.

- (jj) **"Works"** also means the work, both permanent and temporary, or services to be carried out, survey and investigation, designed, manufactured, fabricated, delivered to Site, erected, installed, completed, tested, or supplied in accordance with the Contract and include Plant, Equipment and Materials and their accessories.
- (kk) **"Working Drawings"**: comprise the drawings and documents, such as construction drawings, manufacturing drawings, installation drawings, and testing documents as are necessary to amplify the Good for construction Drawings for construction purposes and endorsed, as required, by the Engineer.
- (ll) **"Works Programme"** means the programme showing the sequence, method and timing of investigations, design, issue of No Objection Notices, execution, manufacture, delivery to site, erection, installation, testing, of the Works, indigenization (where applicable) and related activities in the form and content prescribed by the Employer's Requirements, or any amended or varied version thereof, as submitted by the Contractor and for which the Employer's Representative has issued a Notice of No Objection.

3.0 RELEVANT DOCUMENTS

- (1) These documents shall be read in conjunction with the Conditions of Contract (General and Particular), Employer's Requirement and any other document forming part of the Contract. This design-build contract shall be fulfilled, managed and commissioned in accordance with the applicable legislation in India, specific IR regulations and railway operations manuals and where none exist with applicable international norms where appropriate. Tentative list of standards is enclosed in **Part 2 "Employer's Requirement, Section V, Volume 6, Appendix 14 - Design Standards"**

4.0 CIVIL DESIGN & CONSTRUCTION PHASES

- (1) The Contractor shall execute the Civil and Structures Works in four (4) phases;
 - (a) Phase 1, comprising the submission of the Contractor's Documents which comprises the Design Phase
 - (b) Phase 2, the Construction Phase.
 - (c) Phase 3, Testing & Acceptance; and
 - (d) Phase 4, the Defect Liability Phase.
- (2) The Design Phase shall begin upon the Commencement Date of the Contract. This phase shall include the preparation and submission of:
 - (a) the Preliminary Design and Drawings;
 - (b) the Definitive Design and Drawings;
- (3) The requirements for the Preliminary and Definitive Design and Drawing are stated in **Part 2 "Employer's Requirement, Section V, Volume 3, Design Procedures and Processes"**.

- (4) The Construction Phase for the whole or a part of the Permanent Works shall commence immediately upon the issue by the Engineer of a Notice in respect of the relevant Drawings Submission and shall terminate when the section is taken over by the Engineer in terms of clause 10.1 of General Conditions of Contract.
- (5) Such Notice may be issued by the Engineer in respect of a Drawings Submission covering a major and distinctive part of the Permanent Works.
- (6) The defect liability phase shall commence immediately upon taking over of the section and issue of necessary certification thereof by the Engineer/Employer.
- (7) However, construction shall not commence until the original copies of the appropriate Definitive Design and Drawings have been endorsed by the:
 - (a) Contractor as "Good for Construction";
 - (b) Engineer that he has no objections to these drawings.

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.

- (8) Notwithstanding the above, for those elements identified under Design of Civil and Structures, the Construction Phase may commence immediately upon the issue of the Notice in respect of the Definitive Design Submission.
- (9) This Notice may be in respect of each such element subject to availability of the site in accordance with agreed programme.

5.0 SPECIFICATIONS

- (1) The Technical Specifications for the Works shall comply with Standards and Design Codes which are in accordance with or defined and listed in the Design Criteria and also the outline materials and workmanship specifications if any.
- (2) In accordance with the provisions of these documents, the Contractor shall develop the Technical Specifications during the Design stage and submit it as part of the Definitive Design Submission.
- (3) When the Specifications have received a 'Notice of No Objection' from the Engineer, these shall become the Technical Specifications.

6.0 UNITS OF MEASUREMENT

- (1) The Contract shall utilise the SI system of units.

7.0 WORKS PROGRAMME

- (1) The Contractor shall prepare and submit its Works Programme and three (3) months rolling programmes as defined in the detailed requirements contained in **Part 2 "Employer's Requirement, Section V, Volume 6, Appendix 4 - Project Program Requirements"**.
- (2) The Stages and the Key Dates are as defined in Part 2 "Employer's Requirement, Section V, Volume 6, Appendix 2 - Works Areas and Contract Stages" and are based on the Project Calendar as defined at Part 2

“Employer’s Requirement, Section V, Volume 6, Appendix 9 - Project Calendar”.

8.0 MONITORING OF PROGRESS

- (1) The Contractor shall submit to the Engineer five copies of a Monthly Progress Report (MPR) in English and on CD/DVD, as described in Part 2 “Employer’s Requirement, Section V, Volume 6 Appendix 5 - Monthly Progress Reports”.
- (2) Engineer will require the Contractor to attend monthly management meeting or any other meetings in order to review the arrangements for future Work, Works progress or other issues set out in the agenda of the meeting. The minutes of the meeting signed by the Contractor and the Engineer shall constitute an official record of matters discussed, but shall not replace any requirement in the Contract for approvals, instructions or decisions to be submitted in writing. Such meetings may be attended by representatives of all Interfacing Parties and other stakeholders as deemed fit by the Engineer or Employer at his discretion. The Employer may also be present in the meeting.

9.0 SAFETY HEALTH AND ENVIRONMENT (SHE)

- (1) The Contractor shall establish and maintain a Safety Health and Environment Assurance System in accordance with Part 2 “Employer’s Requirement, Section V, Volume 6, Appendix 12 – Site Safety Plan and Environmental Protection Requirements” for the design, construction procedures and the interfaces between them.
- (2) The Safety Health and Environment Assurance System shall, without limitation, include for Safety Health and Environment Assurance System procedures for Design, Construction, Manufacturing, Supply, Installation, Testing and shall control processes for each stage in the Works such as for design verification and validation, management of change control, non conformance procedures, inspection, testing, auditing and the like.

10.0 QUALITY ASSURANCE

- (1) The Contractor shall establish and maintain a Quality Assurance System in accordance with Part 2 Employer’s Requirement, Section V, Volume 6, Appendix 6 - Quality Assurance” for the design, construction procedures and the interfaces between them.
- (2) The Quality Assurance Plan shall, without limitation, include for quality assurance procedures for Design, Construction, Manufacturing, Supply, Installation, Testing and shall control processes for each stage in the Works such as for design verification and validation, management of change control, non conformance procedures, inspection, testing, auditing and the like.

11.0 SOFTWARE SUPPORT

- (1) Contractor shall provide to the Employer and the Engineer one (1) each of the software packages with the same software products as those that the Contractor intends to use for the project, inclusive but not limited to programs for business administration, project management, design development etc. Contractor to utilize a shared electronic document

management system with the Engineer and the Employer which shall be web/ internet based.

- (2) The Contractor shall provide full support to the Employer and the Engineer for all computer programs to be provided by the Contractor under item (1) above.
- (3) The Contractor shall submit a software support plan within twenty eight (28) days after the Commencement Date in accordance with Sub-Clause 11 (10) of this Volume and Sub-Clause 13(2) of Part 2 Employer's Requirement, Section V, Volume 3, Design Procedures and Processes".
- (4) This plan shall require the Contractor to provide all changes, error fixes, updates, modifications, amendments and new versions with the updated instructions, and Operation and Maintenance Manuals of the program as required.
- (5) The Employer and the Engineer shall not be obliged to use any new version of the software and this requirement shall not relieve the Contractor of any of its obligations.
- (6) The Contractor shall provide all tools, equipment, manuals and training necessary for the Employer/Engineer to maintain, re-configure and to make proper use all the software provided under the Contract.
- (7) If any patent, registered design or software is developed by the Contractor specifically for the Works, the title thereto shall vest in the Contractor and the Contractor shall grant to the Employer a non-exclusive irrevocable and royalty-free license to use, repair, copy, modify, enhance, adapt and translate in any form such Software for use over the project.
- (8) If the Contractor uses proprietary software for the purpose of storing or utilizing records, the Contractor shall obtain at his own expense the grant of a license or sub-license to use such software in favour of the Employer and Engineer provided that the use of such software under the license is restricted to use relating to the design, construction, reconstruction, manufacture, completion, reinstatement, extension, repair and operation of the Works or any part thereof.
- (9) The Contractor's permission referred to above shall be given, inter-alia, to enable the Employer to disclose (under conditions of confidentiality satisfactory to the Contractor) programmes and documentation for a third party to undertake the performance of services for the Employer in respect of such programmes and documentation.
- (10) If any software is developed under the Contract or used by the Contractor for the purposes of storing or utilizing records over which the Contractor or a third party holds title or other rights, the Contractor shall permit or obtain for the Employer and Engineer the right to use and apply that Software free of additional charge, together with any modifications, improvements and developments thereof, for the purpose of the design, manufacture, installation, reconstruction, testing, completion, reinstatement, extension, repair, modification or operation of the Works, or any part thereof, or for the purpose of any Dispute.
- (11) The Employer reserves the right to use other Software in connection with the Works.

12.0 CO-ORDINATION WITH INTERFACING AND OTHER PARTIES

- (1) The Contractor is responsible for detailed co-ordination of his design, manufacturing, installation, construction and testing activities and will take the lead in the management of the coordination process with IR, interfacing contractors, utility agencies, statutory authorities, private service providers, consultants and other contractors whether or not specifically mentioned in the contract that may be working on or adjacent to the site for the purpose of the Project. It is anticipated that track and Systems Contractor(s) shall be in place approximately 18 months after the Commencement Date of Works. Contractor shall plan his interfacing requirements accordingly. For certain urgent requirements and non availability of requisite information certain assumptions can be made in consultation with the Engineer so that progress of Work is not adversely affected.
- (2) For the purpose of these requirements, Contractor's responsibilities are listed at **Part 2 "Employer's Requirement, Section V, Volume 6, Appendix 3 - Design and Construction Interfaces"**.

13.0 SURVEY AND SITE INVESTIGATIONS

- (1) The Contractor shall carry out all further site investigations as necessary for the design of the Permanent Works and to enable the determination of the methods of construction and the nature, extent and design of the Temporary Works. It shall be the Contractor's responsibility to find materials from sources outside the DFCC /Indian Railway boundaries. This could be materials for earthworks, aggregate for concrete manufacture, stone for track ballast etc. and it is their responsibility to obtain all necessary permissions, approvals etc from landowners; Local, State or Central government authorities for the extraction, reconstitution and transportation of such materials to the relevant worksite.

14.0 PROJECT MANAGEMENT INFORMATION SYSTEM (PMIS)

- (1) The Contractor shall devise and utilise a PMIS such that all documents generated by the Contractor can be transmitted to the Engineer by electronic means.
- (2) The PMIS shall also allow all documents generated by either party to be electronically captured at the point of origin and be reproduced later, electronically and in hard copy.
- (3) Requirement of PMIS are explained in Part 2 "Employer's Requirement, Section V, Volume 6, Appendix 4 - Project Program Requirements"
- (4) **Enterprise wide IT System**

DFCCIL is in the process of implementing an Enterprise wide IT System. While DFCCIL would define the data collection templates, Contractor would upload actual data into the system. As such, a part of the Scope of Work of the Contractor will include the following elements:

1. Upload/definition of Project Plans as per the template and using the software defined by DFCCIL
2. Maintenance and updation of uploaded Project Plans in software used by DFCCIL
3. Upload of drawings/designs created by Contractor as per the

classification and on the software platform defined by DFCCIL

4. Online Work record Entry in Project Monitoring System, in a template defined by DFCCIL.

5. Asset details needs to be updated in the system in format prescribed by DFCCIL.

6. Geo-referencing of the alignment on WGS 84 Coordinates

7. Capture and upload of geo-referencing coordinates of the assets into GIS

8. Upload of digitally signed invoices for payment processing

It will be the responsibility of the Contractor to ensure there is interoperability between the Contractors' IT System and that being developed by DFCCIL so that movement of information and data across the DFCCIL boundaries is feasible in a seamless manner.

15.0 TECHNOLOGY TRANSFER

(1) The Contractor shall ensure that all sub-contractors engaged by him in the Works are given training, guidance and the necessary opportunity for transfer of service technology.

(2) The training shall be provided in various areas of construction such as bridge construction, instrumentation, safety, quality assurance, etc.

16.0 PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHTS

(1) Insofar as the patent, copyright or other intellectual property rights in any Plant, Design Data, plans, calculations, drawings, documents, materials, know-how and information relating to the Works shall be vested in the Contractor, the Contractor shall grant to the Employer, his successors and assignees a royalty-free, nonexclusive and irrevocable license to use and reproduce any of the Works, Designs or inventions incorporated and referred to in such plant, documents or materials and any such know-how and information for all purposes relating to the Works, including without limitation the design, manufacture, installation, reconstruction, testing, completion, reinstatement, extension, repair and operation of the Works.

17.0 TRANSLATIONS OF CONTRACTOR'S DOCUMENTS

(1) All documents, reports, drawings, calculations and correspondence and the like shall be submitted by the Contractor in English.

18.0 ALIGNMENT

(1) The proposed alignment, yard plans and Geo-technical data on alignment route listed in **Part 4 "Site Data Reference Documents."** are based on the preliminary investigations carried out by the Employer and is for reference purpose only.

(2) The Contractor shall review, verify and revalidate all relevant factors which could have an impact on the Design and construction of the earthwork including but not limited to the topography, subsurface conditions, ground water levels, Temporary Works, dewatering, drainage, climatic conditions, the availability or lack of access, working space, storage, accommodation, restrictions imposed by the existing Indian Railways Tracks, the proximity of

adjoining structures and roads, the local regulations regarding the obstruction of public highways and any other limitations imposed by the site and its surroundings, for the satisfactory completion of Works meeting with performance requirements in the stipulated time.

- (3) It will be presumed that Contractor has taken note of all effects of these constraints on his construction operations to ensure on-time completion of the Works.
- (4) No claim by the Contractor on the grounds of lack of foresight or knowledge of the site conditions or any unknown parameters shall be considered.
- (5) The Contractor is permitted to propose minor deviations in alignment to suit his construction proposals, but he must demonstrate that any such deviations shall comply with good design practice and the alignment requirement of the Design Criteria mentioned in **Part 2 “Employer’s Requirement, Section V.**

19.0 CLEARANCES

- (1) The Permanent Works shall not infringe the schedule of dimensions and land boundary limits of DFCC as shown on the drawings as listed in **Part 4; Reference Documents “Site Data”.**
- (2) In addition, the Contractor shall formulate all necessary drawings, plans, documents etc. in accordance with the applicable legislation in India, in compliance with the Contractor definitive design for all clearances.
- (3) If the definitive design requires additional land over and above that already set out in the **Part 4; Reference Documents “Site Data”**, the Contractor will inform the Engineer. Employer shall commence the acquisition procedures for the additional land after this requirement has been agreed by the Employer and the Engineer.

20.0 CLIMATIC CONDITIONS

The project length, from Sonnagar to Mughalsarai falls along the Tropic of Cancer. The climate of the project is a Tropical Monsoon Climate Marked by three distinct seasons:

Summer (March-June): Hot & dry with average temperatures of 45°C sometimes reaching 47-48°C with low relative humidity (20%) and dust laden winds.

Monsoon (June-September): 85% of the average annual rainfall of 990 mm precipitates during this period and temperatures range from 40-45 °C on rainy days.

Winter (October-February): Cold with temperatures in the range of 3-4°C sometimes dropping below freezing in elevated areas. Foggy conditions can occur in some tracts.

21.0 PLANNING SUBMISSIONS

- (1) Submissions for approval of planning works for the project shall be made by the Contractor through Employer to various authorities as detailed in **Part 2 “Employer’s Requirement, Section V, Volume 3”.**

22.0 STANDARDS

- (1) Equipment, materials and systems shall be designed, manufactured and tested in accordance with the latest issue of approved and recognised codes and standards defined and proposed by the Contractor and approved for the Work as per the base date for the same which is 28 days prior to submission of bid.
- (2) References to “standards or to materials and equipment of a particular manufacturer” in these contract documents shall be regarded as followed by the words “or equivalent”.
- (3) 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 equipment, standards, or desires to use materials or equipment not covered by the specified standards, the Contractor shall obtain the approval of the Engineer, giving full justification for the same.
- (4) Tentative list of standards to be followed are indicated in **Part 2 “Employer’s Requirement, Section V, Volume 6, Appendix 14 - Design Standards”**.
- (5) The Contractor shall provide to the Engineer two original full editions of the publications (such as, but not limited to, Technical Standards and Codes of Practice), the codes and standards proposed for carrying out the Designs, Contractor’s Documents, the Drawings and other communications relevant to this Contract. The Contractor shall provide list of all such standards and specifications, which form the basis of his design activities within 28 days of Commencement Date. A copy of other publications referenced in other communications between the Engineer and the Contractor shall be provided by the Contractor to the Engineer within 28 days following the issue of such other communication. These publications shall be for the sole use of the Engineer and Employer and, upon completion of the Contract, shall become the property of the Employer.

23.0 PUBLICITY

- (1) The Contractor / Sub-Contractors shall not publish, present at seminars, forums 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 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.

Section V. Employer's Requirement

Volume 3 – Design Procedures and Processes

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1.0 INTRODUCTION

- (1) This document specifies the procedural requirements for the preparation of the Design of the Works for civil and structures.
- (2) These requirements are subdivided into those that are to occur during the Design Phase as well as Construction Phase including those which are necessary for interface with various existing systems & agencies and those that are of general application.
- (3) In addition to the express requirements stated herein, the Contractor shall, whenever the Engineer so requests, provide information and participate in discussions that relate to Design matters.
- (4) Engineer shall obtain specific written consent of the Employer before communicating clearance for all concept design & concept drawings and GADs submitted by the Contractor for Alignment, Major bridges, Rail Fly Over and Works requiring sanction of Commissioner of Railway Safety, in terms of para 3.1 of General Conditions of Contract.
- (5) The Contractor shall, in accordance with Clause 5.1 of the General Conditions of Contract engage the designer(s) who shall undertake and prepare the Design of the Works.
- (6) The Contractor shall establish an office for his design team at site or at a place agreed by engineer from where the design team shall function. All meetings and discussions relating to design shall be held in this office or the office of Engineer/ Employer.
- (7) The Contractor shall ensure that the Designer and his team continue to be represented in India at all times by staff whose seniority and experience in their respective fields of activity, are to the satisfaction of the Engineer and whose representative is available on the Site as necessary or as required by the Engineer.
- (8) The key Designers who shall formally sign the Design must have the necessary qualification required by the applicable legislation in India, as well as their engineer's degree/diploma being recognised in India.
- (9) The Contractor shall submit his Quality Assurance Plan for the Design required in the Contract as specified in **"Part 2 Employer's Requirement, Section V, Volume 6, Appendix 6 - Quality Assurance"**

2.0 REQUIREMENTS DURING THE DESIGN PHASE

- (1) The principal requirements of the Design Phase are the production of the documents by the Contractor, which shall fully describe the Works and include the Preliminary Design, Definitive Design and "Good for Construction Drawings".
- (2) The volume and contents of the documents shall be in accordance with the applicable regulations/legislation in India, existing codes, manuals and standards applicable on Indian Railways, or suitable international norms.
- (3) The Contractor shall obtain all necessary approvals and agreements for his designs on his account in accordance with the applicable legislation in India & current practices.
- (4) The Preliminary Design shall incorporate the design and Reference Drawings included in the bidding documents, and to be developed by the Contractor sufficiently to define the main structures, track alignment, non-traction power supplies and building services etc.
- (5) In addition, general construction, manufacture, installation and testing

methodologies and documentation needed to develop the Definitive Design shall be submitted.

- (6) The Definitive Design shall accord with and incorporate the Contractor's Proposals and shall be the design developed to the stage at which all elements of the structures are fully defined and specified. In particular the Definitive Design shall be complete when:
 - (a) all calculations and analyses are complete including verification;
 - (b) all main and other significant elements are defined;
 - (c) all tests, trials and selection of materials and equipments are complete;
 - (d) The effects on the Permanent Works of the proposed methods of construction, installation, testing and of the Temporary Works are assessed.
- (7) During the preparation of the Definitive Design, all surveys, investigations and testing necessary to complete the Design of the Permanent & Temporary Works shall be undertaken by the Contractor.
- (8) The Contractor shall sub-divide the proposed Definitive Design into Design Packages which shall be clearly identified in the Design Submission Programme.
- (9) These Design Packages shall be related to significant and clearly identifiable parts of the proposed Definitive Design and shall address the design requirements as described herein.
- (10) 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 for the Definitive Design Submission.
- (11) Four hard copies and one soft copy of these Design Packages shall be submitted for approval to the Engineer.
- (12) Only after this the Contractor may proceed to the next stage of the Project for obtaining notice of No Objection.
- (13) Definitive Design Submissions shall also be prepared for those major elements to be procured through sub-contract.
- (14) Where such work is to be procured by the Contractor on the basis of outline design, design briefs and performance specifications, all such documents may be submitted as Preliminary Design Submissions provided that the Design of these elements is finalised, including verification as part of the Definitive Design which are submitted (see paragraph 2(8) and paragraph 2(10) above).
- (15) Upon issue of the Notice in respect of the Definitive Design Submission, the Contractor shall complete the Design in all respects and produce the Good for Construction Drawings, the purpose of which is to illustrate all the Permanent Works and these drawings shall govern the Construction.
- (16) These drawings shall fully detail the Construction of the elements covered by the Definitive Design, and shall show in full, the Works to be constructed.
- (17) The Definitive Design shall be prepared in accordance with the requirements for technical design in the codes, manuals & standards applicable on Indian Railways, applicable regulations/legislation in India and existing international norms/standards as agreed with the Engineer.
- (18) All technical solutions, schemes, structures, materials should be fully compatible with requirement of DFCC and should not be in conflict with the applicable rules/codes/manuals & standards as well as the legislation in

India.

- (19) The Contractor shall prepare the necessary sets of his designs in English for submitting to the relevant authorities responsible for the approvals in accordance with the contractual provisions & the applicable legislation in India.

3.0 REQUIREMENTS DURING THE LAND ACQUISITION PHASE

- (1) The Contractor is to develop his Definitive Design within the land acquired or proposed to be acquired by the Employer for the project.

4.0 REQUIREMENTS DURING CONSTRUCTION PHASE

- (1) The principal requirements relating to the Contractor's documents during the construction Phase are the production by the Contractor of Working Drawings and documents, the preparation of technical submissions as required under the Contract, the compilation of the final design and the production of the As-Built Drawings and final documentation.
- (2) Working Drawings and documents shall be prepared as required under the Contract.
- (3) The Contractor shall endorse the Working Drawings and documents as being in accordance with the Definitive Design and Good for construction drawings.
- (4) The Contractor shall endorse the submissions required under the contract that "all effects of the designs 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".
- (5) Contractor shall submit a schedule for As-built Drawings 3 months prior to the anticipated time of completion of the Works.
- (6) The final design is the design of the Permanent Works embodied in:
 - (a) The latest revisions of the documents comprising the Definitive Design, taking account of comments in the schedules appended to Notices of No Objection;
 - (b) The latest revisions of all the drawings;
 - (c) The calculations (see **Clause 13.0** herein); and
 - (d) Such other documents as may be submitted by the Contractor at the request of the Engineer to illustrate and describe the Permanent Works and for which a Notice has been issued.
- (7) The Contractor shall maintain all records necessary for the preparation of the As-Built Drawings and documents.
- (8) Upon completion of the Works or at such time as agreed to or required by the Engineer, the Contractor shall prepare drawings which, subject to the Engineer's agreement, shall become the As-Built Drawings and final documents and shall hand over the same to the Engineer.
- (9) All such drawings and documents 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.
- (10) Where the Contractor temporarily requires additional land, for the period of construction to facilitate the construction, the Contractor shall arrange for the same entirely at his own cost and risk.
- (11) The contractor shall provide a maintenance support plan that shall include

- procedure for routine inspection, periodical inspection and maintenance of the bridge and other civil engg structures.
- (11) The Contractor shall maintain all records necessary for the financial completion and commissioning. These records shall form part of completion report and shall consist of as a minimum:
- (a) The implemented work according to activities, places and price;
 - (b) Used materials – type, name of manufacturer along with batch No., place & price etc.;
 - (c) Any other records as required.

5.0 Contractor's Coordination with Others

The Contractor shall take in to account the interface coordination requirements of Other Contractors who will be working at site and or duly constituted authorities who will be employed or required by the Employer to execute the work within or adjacent to site in connection with or ancillary to the works. In this regard, the Employer/Engineer shall organize coordination meetings to sort out any interfacing issues amongst the interfacing Contractors. In addition to the coordination meetings to be arranged by the Employer / Engineer, the Contractor may also arrange his own coordination meetings with the Other Contractors.

The Contractor shall fully integrate and coordinate, wherever required, the design and construction of the Works with Other Contractors, Interfacing Parties and related bodies parties and entities including but not limited to Indian Railways, RDSO, as well as the designated contractors/consultants who are engaged in part of the Works, relevant statutory authorities, relevant public utility agencies and adjacent contractors who are or may be working adjacent to the Site.

The Contractor shall be responsible for keeping Other Contractors fully informed on all matters of progress insofar as those may affect the progress of Other Contractors and for all coordination with such Other Contractors.

The Contractor shall actively seek out solutions to integration issues, and to anticipate, to plan for, and to comply with the needs of these related parties, which are properly required and consistent with the obligations under the Contract. The Contractor shall comply in this respect with the requirements of Appendix 3 [Design and Construction Interfaces] to the Employer's Requirements. Further details regarding design co-ordination with the other related entities are given in the Employer's Requirements – Design Procedure and Processes and Employer's Requirements – Construction and Testing.

In case of the Other Contractor is not in place, the Contractor shall co-ordinate with the Engineer/Employer for the Interfacing issues.

The Engineer/ Employer shall facilitate in drawing up the Interface Management Plan amongst the interfacing contractors.

6.0 PLANNING SUBMISSIONS

- (1) Submissions for approval of planning of Works for the project shall be made by the Contractor to the following authorities *wherever required* :
 - a) Station areas including buildings and passenger/public underpasses – Railway Authority, local municipality.
 - b) Water supply and sewerage – local municipality,
 - c) Power supply – power distribution company or authority
 - d) Road traffic control : appropriate local authority
 - e) Reconstruction of Irrigation Systems – State Irrigation Department or other appropriate local authority.
 - f) Reconstruction of road connections to ROB and RUB – Railway authority, Local Public Works Department or other appropriate local authority.
 - g) Archaeological Sites in proximity to the alignment – appropriate State or Central Govt. department;
- (2) The list as in 6 (1) above is only an indicative list and it shall be extended, as necessary by the contractor, in compliance with the design and construction stages, structures types etc. in accordance with the applicable legislation in force in India.
- (3) The Employer will assist the Contractor in such activities, as appropriate.

7.0 DESIGN SUBMISSION

7.1 PRELIMINARY DESIGN SUBMISSION

The Preliminary Design shall provide initial design documents for review of all elements of construction and shall be sufficiently detailed to show the elements of the design and documents required for preparation of the Definitive Design. The preliminary design should take into account as far as possible all the interface requirements identified by the Contractor at this stage. It shall also include, but not be limited to:

7.1.1 General

- (a) Design submission programme;
- (b) Geo technical investigation plan including bore holes, machines, methodology etc. complete.
- (c) The quality assurance plan for design within 42 days of Date of Commencement;
- (d) Preliminary construction methodology;
- (e) Basis of Design at this stage, factors influencing the Design and a review of the outline design criteria;
- (f) The identification of design codes and standards;

- (g) Linking of technical specifications proposed for the work or submission of technical specifications if these are not already existing;
- (h) The CAD procedures;
- (i) The Design Manual;
- (j) The submission of proposed software;
- (k) The preliminary off site (manufacturer's premises) testing recommendations;
- (l) The preliminary testing report;
- (m) The preliminary maintenance analysis and report;
- (n) The preliminary equipment proposals, layouts and details;
- (o) The utility diversion plan;

7.1.2 Alignment & Field Survey

- a) An alignment review;
- b) Proposed site surveys and other field surveys like geological, hydrological, seismic etc.;
- c) Topographic survey of the site.
- d) Preliminary validation of the indicative plan and profile given in the bidding document;
- e) Validation of indicative yard plans given in the bidding document.
- f) Details of reference pillars.
- g) Standard details of preliminary alignment like plan and cross section including bench marking, At a scale no smaller than 1:2500, it should show for the entire route corridor, the alignment, the shape of the earthworks, the necessary highway/road/track works, identify all bridge structures (ROB, RUB, Culvert, RFO etc) which should be labelled, location of all utilities whether IR, public or private, temporary works such as construction haul roads and compounds, retained level crossings and associated staff shelters, and outline links to utilities.

7.1.3 Earthwork

- a) Preliminary geo-technical report including collection of site data, sub-soil investigation required for the design;
- b) Preliminary design of formation including drainage system – longitudinal and cross drains, diversions of nalla (open drain) etc;
- c) Preliminary design of retaining wall wherever required.
- d) Reports detailing the identification of borrow areas for formation and their soil properties.
- e) Planning for blanket material, prepared sub-grade along with source of material

7.1.4 Bridges

- a) Collection of existing bridge data like chainage, opening size, bed level, HFL, scour level and protection works if any.
- b) Data for catchment area, hydrological report and geotechnical investigation report for each bridge
- c) Preliminary recommendation of opening sizes of DFC corridor based upon cross verification between existing opening sizes, discharge calculations and other site related parameters.
- d) Validation of the indicative GAD given in the bidding document.
- e) Preliminary RUB, Rail Fly Over ;
- f) Preliminary GADs containing the following details (containing formation level, highest flood level, bed level, freeboard, railway chainage, and distance between the track)–
 - Key plan
 - Details of existing railway bridge,
 - Details of proposed DFC bridge,
 - Their respective half plans, elevations & sections at top and bottom
 - Section of proposed embankment
 - Details of wing wall, return wall, drop and curtain walls
 - Details of bore hole log
 - Details of catch water drains wherever needed
 - Architectural requirements, if any.
 - Details of protection works
 - Details of bearing arrangements
 - General Notes

7.1.5 Buildings

- a) Preliminary architectural layouts and main materials

7.2 DEFINITIVE DESIGN SUBMISSION

The Definitive Design Submission shall be a complete set of Contractor's documents, properly consolidated and indexed and shall fully describe the proposed Definitive Design. In particular, and where appropriate, it shall define but not be limited to:

7.2.1 General

- a) The dimensions of all major features, elements and members;
- b) Schedules of all materials;
- c) Potential forces and movements due to all possible loadings and actions on the structures, and their accommodation;
- d) All stress calculations due to secondary loading;

- e) Standard details;
- f) Proposed Good for Construction drawings pertaining to each component for consideration of the Engineer;
- g) Electrical and mechanical services and equipment and their interaction with the structures;
- h) Erection methods;
- i) Utilities to be diverted /supported;
- j) IR equipment interface recommendations;
- k) Report on interfacing contracts;
- l) Provisions and proposals for construction interfacing with the Interfacing Contractors;
- m) Maintenance report;
- n) Environmental impact correction measures;

7.2.2 Alignment & Field Survey

- (a) Final location survey, geometry (vertical and horizontal) and setting-out of all main elements and features of alignment including horizontal and vertical curves, transitions, grade compensations etc complete with corresponding calculations and layouts;
- (b) Standard details on updated alignment as mentioned in para 7.1.2 (h) above.
- (c) Final hydrology report with field data and samples;
- (d) Final geotechnology report with field data and samples;

7.2.3 Earthwork

- (a) Earthwork design including sub-soil suitability/availability, slopes stability analysis, adequacy of blanketing material used and prepared subgrade etc complete with calculations;
- (b) Cross section of the proposed embankment/cutting at specified intervals (at 20m in straight and 10m on curve) indicating thickness of different layers with specification details;
- (c) Final geo-technical report with field data and samples;
- (d) Borrow pit locations with lead diagrams of cut/ fill / borrow;
- (e) Schedules of all equipments;
- (f) Testing proposals;

7.2.4 Bridges

- a) Updated bridge list for the section.
- b) Definitive GAD which includes the final drawing and design to be adopted for construction. This includes details of
 - Key Plans
 - Existing & proposed bridge

- Layout
 - Protection work- guide bunds, wing wall, drop wall, curtain wall, return wall, flooring & toe wall as applicable
 - Expansion joints, Construction joints, bearing;
 - Launching arrangement temporary works, equipment deployment
 - General notes
 - References
 - Typical details of reinforcement in structural concrete members;
- c) The locations and nature of all steel structures alongwith relevant joints and connections and details thereof;
- d) Final hydrology report with field data and samples for each bridge.
- e) Schedules of all equipment;
- f) Testing proposals;

7.2.5 Buildings

- a) Architectural requirements;
- b) Potential forces and movements due to all possible loadings and actions on the structures, and their accommodation;
- c) Typical details of reinforcement in structural concrete members;
- d) Schedules of all materials;
- e) Building services documents;

7.2.6 Drawings

- (1) The Definitive Design Submission shall include proposed Good for Construction Drawings that shall illustrate the proposed Definitive Design. The Contractor shall submit for consideration of the Engineer. After these are agreed by the Engineer, Contractor shall endorse these as Good for Construction. These shall in particular shall include, but not be limited to:
- (a) General arrangements;
- (b) Location plans, geometry (vertical & horizontal), yard plans, yard diagrams and setting out drawings;
- (c) Structural drawings of bridges and other structures with in the project;
- (d) Architectural elevations and landscaping;
- (e) Layouts and details of structural elements ;
- (f) Associated fittings;
- (g) Slopes and earthworks;
- (h) Access roads and temporary road works;
- (i) Dumping & borrow areas;
- (j) Catch-water and surface drainage;
- (k) Existing and proposed utilities;
- (l) Road-works and works related to traffic management including decking;
- (m) Temporary construction depots & depot equipment layouts;

- (n) Station yard layouts;
- (o) Equipment schedules;
- (p) Wiring diagrams;

7.2.7 Operation and Maintenance (O&M) Manuals:

In addition to the various existing Codes and Manuals applicable to Indian Railways for operation and maintenance of bridges, the Contractor shall produce additional Manuals covering the additional provisions (if any) over and above the various existing Codes and Manuals of Indian Railways in respect of the following for Operation and Maintenance of various assets created under the Contract.

With reference to the requirements as above:

- (1) The Contractor shall produce manuals for the major bridges & RFO for their efficient operations and maintenance.
- (2) Operation & Maintenance manual shall also contain the following
 - (a) Technical description of each component of the bridge written to ensure that the Employers staff fully understands the scope and facilities provided.
 - (b) Name, addresses, telephone, e-mail and fax numbers of the manufacturer of every component of the bridge.
 - (c) Manufacturer's service manual for each component of the bridge, installed specifically for the project, including detailed drawings, illustrations and preventative maintenance program.
 - (d) Procedures for fault finding, where applicable, data or recommended maintenance procedures, maintenance intervals.
 - (e) All test results conducted on the relevant components of the bridge whether at the manufacturer's place or at site.
 - (f) Manufacturer's list of recommended spare parts for items subject to wear and deterioration, giving expected running period and indicating specifically those items, which may involve extended deliveries.
- (3) Operating/User Manuals and a summary (suitable for use at technician level) of the O&M Manuals shall be prepared in both English and Hindi languages unless otherwise instructed by the Engineer.
- (4) The Contractor shall submit all the Manuals for review at least 6 months prior to the targeted date of Taking Over for the Engineer's consent.
- (5) The Contractor shall provide 6 controlled copies of all Manuals for the use of the Engineer.
- (6) O&M Manuals and drawings as submitted by the Contractor shall be updated by him during the Defects Notification Period, if required, and shall be re-submitted to the Engineer for review without any extra cost to the Employer.

7.3 DOCUMENTS

7.3.1 Document submission

- (1) The Contractor's technical proposals shall be amplified during the Preliminary and Definitive Design as required at **Sub Clauses 7.1 and 7.2** above and shall include but not be limited to the following documents:

7.3.1.1 Technical specifications

- (1) The Specifications included in the Contractor's technical proposals together with the Design criteria shall be amplified so as to comprehensively specify the design and construction of the Works.

7.3.1.2 Design manual

- (1) The Design Manual shall incorporate all design requirements, standards, codes and all other documents or matters which are relevant to and govern the design.
- (2) In addition it shall refer to all materials, codes and standards used, making clear their specific applications.
- (3) 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.

7.3.1.3 Building services documents

- (1) These documents shall include detailed designs, performance specifications and all technical requirements relating to the Permanent Works for non-traction power supplies and building services equipment comprised in the Works.

7.3.1.4 Report on interfacing contracts

- (1) The report shall include details of the Design and Construction of the Works sited adjacent to other contracts, details of provisions required to be provided by the Interfacing Contracts, indicating arrangements for accesses, fixings, casting-in, openings, supports, decks, manholes, trenches and the like, equipment installation in other Interfacing Contractor's works along with updated interface management plan relating to design integration and co-ordination.

7.3.1.5 Testing reports

- (1) The report shall include details of proposals for testing procedures for all relevant elements and equipment contained in the Permanent Works.

7.3.1.6 Maintenance reports

- (1) The report shall be updating the statement of maintainability in the Contractor's technical proposals and detailing maintenance routines necessary for the achievement of the required life of the various elements of the Works.

7.3.2 Supporting documents

- (1) Where relevant or required, these documents shall be accompanied by a design note stating clearly how the information has been used in the design of the Permanent Works.

7.3.2.1 Construction / manufacturing / installation analysis reports

- (1) A report shall be containing a stage-by-stage construction / manufacturing / installation sequence for all structures / equipment.

7.3.2.2 Construction method statements

- (1) A report shall provide sufficient information on the methods of Construction / Installation of the Contractor's Equipment to allow the Engineer to assess their effects on the Permanent Works and to enable these to be taken into account in the review of the Definitive Design.

7.3.2.3 Final geotechnical report

- (1) The report shall include site investigation and laboratory test results 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 cuts, foundation and geotechnical designs.
- (2) The report shall also include the full logs and descriptions of confirmatory boreholes drilled by the Contractor, statistical analysis of samples.

7.3.2.4 Survey report

- (1) The report shall cover all survey work undertaken by the Contractor, including checks on mapping, survey stations, co-ordinates and setting-out.
- (2) Updated topographical and survey drawings shall also be included.

7.3.2.5 Utilities report

- (1) The report shall furnish details of arrangements and working methods in respect of the existing utilities (chartered and unchartered) and shall be including protection measures, diversions/shifting, reinstatements and programme allowances.

7.3.2.6 Temporary works design report

- (1) The report shall provide sufficient information on the design of the Temporary Works to allow the Employer's Representative to assess their effects on the Permanent Works and to enable these to be taken into account in the review of the Definitive Design.

7.3.2.7 Hydrology report

- (1) The report shall contain the details of the hydrology, forming the basis for design of the drainage structures and bridges, calculations sheets.

7.3.2.8 Project schedule review

- (1) The Contractor shall, prior to submitting the Definitive Design Submission, review the project schedule against the current version of the Design Submission Programme.
- (2) The Design submission programme should be in accordance with the Project Schedule.
- (3) In the event that the Contractor considers there to be any discrepancies or inconsistencies between the design submission programme and the project schedule, the Contractor shall submit with the Definitive design submission programme, its proposed revisions to the project schedule such that the discrepancies or inconsistencies are removed.
- (4) The Contractor shall provide details of submissions of the proposed Working Drawings and documents and their anticipated timing during the

- construction phase.
- (5) The Contractor shall identify information required from or actions to be undertaken by the Employer or others and which are necessary to permit the completion of the design of the Permanent Works and the Working Drawings and documents.
 - (6) Dates of the receipt required by the Contractor of such information or for the completion of such actions shall be included with appropriate justification.

7.3.2.9 Use of Works Areas report

- (1) The report shall be updating the proposals from those contained in the Contractor's technical proposals for the use of Works Areas and their reinstatement, detailing the station accesses and access facilities.

8.0 DESIGN SUBMISSIONS – GOOD FOR CONSTRUCTION DRAWINGS

- (1) These drawings shall form part of the Working Drawings to be used for construction purposes.

9.0 DESIGN SUBMISSIONS – CONSTRUCTION PHASE

- (1) On the issue of a Notice in respect of the Good for Construction Drawings, the Contractor shall produce the proposed Working Drawings.
- (2) These shall either be identical to the Good for Construction Drawings or shall be further drawings and documents developed in accordance with these drawings such as fabrication and shop drawings, construction installation and erection sequences and the like and all such drawings shall comply with the requirements of the Contract.
- (3) Prior to submission of the proposed Working Drawings, the Contractor shall endorse the appropriate original paper drawings as "Good for Construction".
- (4) If the Engineer so requires, the endorsed original shall be submitted to the Engineer 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.
- (5) On the endorsement by the Engineer, the original will forthwith be returned to the Contractor as the Working Drawings.
- (6) Only the Working Drawings endorsed as above or those that the Engineer has expressly stated as not requiring his endorsement shall be issued to the Site and the construction of the Works shall be strictly in accordance with these Working Drawings.
- (7) The Contractor shall finalise details of the proposed method of construction and/or installation and submit such finalised details to the Engineer for review.
- (8) As-Built Drawings and documents, endorsed by the Contractor shall be submitted to the Engineer for agreement in accordance with para 10.0 below.

10.0 DESIGN SUBMISSIONS - REVIEW PROCEDURES

- (1) Design submissions shall be reviewed by the Engineer who shall coordinate the design review for the Employer and communicate the decision within 28 days of receipt of complete information on the subject matter.
- (2) 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 municipalities and utility undertakings, and demonstrate that all required approvals have been obtained.

- (3) All submissions for Temporary and Permanent Works shall be accompanied by two original copies of a 'Design Certificate' as set out in **Part 2 "Employer's Requirement, Section V, Volume 6, Appendix 11 – Design Certificate"** hereto and signed by the Contractor and the Designer.
- (4) As-built Drawings and documents shall be submitted to the Engineer for approval within the time period as mutually agreed by the Engineer and the Contractor.

11.0 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 Good for Construction Drawings submission.
- (2) The Design submission programme should be in accordance with the Project Schedule.
- (3) The Design Submission Programme shall:
 - (a) Be consistent with and its principal features integrated into the Works Programme, and show all relevant Milestones and Key Dates;
 - (b) Identify dates by and subjects for which the Engineer's decisions should be made;
 - (c) Make adequate allowance of 28 days for periods of time for review by the Engineer and other review bodies;
 - (d) Make adequate allowance of 28 days 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 Good for Construction Drawings; and
 - (f) Indicate the Design Interface and Co-ordination periods for each Interfacing Contractor.
- (4) The Contractor shall submit the Design Submission Programme to the Engineer within twenty eight (28) days of the Commencement Date, and thereafter up-dated versions thereof at intervals of not more than twenty eight (28) days throughout the Design Phase.
- (5) The Construction and Defect Notification Period shall be as indicated in the Conditions of Contract. The Contractor shall be required to plan the various components of work in such a sequence that the entire work is completed within this time frame. Defect Notification Period shall commence after issue of Taking Over Certificate by the Engineer. Contractor's Design submission programme shall consider all these aspects.
- (6) The Contractor shall submit complete set as approved "As-Built" Drawings and certificates for conclusion of any legislative procedures.

12.0 SUBMISSIONS PROGRAMME DURING THE CONSTRUCTION PHASE

- (1) The Contractor shall identify submissions required during the Construction

Phase in accordance with **Part 2 “Employer’s Requirement, Section V, Volume 2, General”**.

13.0 CALCULATIONS

- (1) Comprehensive set of calculations relevant to the Construction proposals, Definitive Design and Good for Construction Drawings and any Design change shall be submitted for review with the respective Design packages in soft as well as hard copies.
- (2) The Engineer 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.
- (3) Calculations to be included as part of the submission herein shall comprise the up-to-date calculations in respect of the Definitive Design, the Good for Construction Drawings and such further calculations which the Contractor has prepared during the production of Working Drawings.

14.0 DOCUMENT REQUIREMENTS

- (1) Drawings shall be prepared on CAD to the sizes as stipulated in **Part 2 “Employer’s Requirement, Section V, Volume 6, Appendix 7 – Drawings and CAD standards”**.
- (2) The titles & numbering scale of drawings of drawings shall be as per Indian Railway Works Manual (IRWM) as well as above CAD standards to be decided mutually by the Contractor and the Engineer.
- (3) The Contractor shall submit 4 hard copies and a soft copy of the Definitive Design and drawings including calculations for review by the Engineer. After receipt of the Notice from the Engineer, the Contractor shall submit 4 hard copies and a soft copy of the final Design and drawings for the use of the Engineer.
- (4) The approval of drawings shall however be certified on the hard copy only.

Section V. Employer's Requirement

Volume 4 – Design Criteria and Specifications

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1.0 GENERAL DESIGN CRITERIA

1.1 DURABILITY AND MAINTENANCE

- (1) The Permanent Works shall be designed and constructed such that, they shall endure in a serviceable condition throughout their minimum design lives as described in the Design Criteria and standards contained in the technical specifications to minimise the cost of operation and maintenance whilst not compromising safety or the performance characteristics of the railway.
- (2) Electrical and mechanical equipment where supplied shall be of a quality and durability to fully meet the performance and operational requirements described in the Design Criteria.

1.2 OPERATIONAL REQUIREMENTS

- (1) The Permanent Works shall be designed to permit the railway to operate satisfactorily at a maximum design speed of 100Km/h for freight trains, All the bridges, culverts and the entire embankment and cutting would be constructed for “DFC loading (32.5 tonnes axle load)”.
- (2) In the design and construction of the Works, the Contractor shall, as a fundamental objective and as a priority, ensure that staff and the public will, throughout the operational period of the operating railway, and within the confines thereof, be provided with as safe an environment as is reasonably practicable.
- (3) The Contractor's attention is directed to requirements concerning the role of the Commissioner of Railway Safety (CRS) as mentioned in para 2 of **Part 2 “Employer’s Requirement, Section V, Volume 1”**. Sanction of CRS will also be required in terms of Chapter XIII of IRPWM.
- (4) It is a requirement that the Indian Railway (IR) adjacent to the contractor’s work area remains operational during the construction phase.

1.3 RESPONSIBILITY FOR THE CIVIL, STRUCTURE and BUILDING WORKS

- (1) The Contractor shall be responsible for detailed design, layout, construction, manufacture, supply, installation and testing of the civil, structures, and building works and building services wherever applicable under this Contract.
- (2) The Contractor undertakes that the designers shall be available to attend discussions with the Engineer and Employer at all reasonable times during the Contract period. The Contractor shall furnish Designer's Warranty in the format provided in CF 6 Section VIII – Part 3 of bidding documents.

The Contractor shall be fully responsible, for the suitability, adequacy, integrity, durability and practicality of the Contractor's proposal.

Wherever there is any inadequacy, insufficiency, impracticality or unsuitability in or of the Employer's Requirements or any part thereof, the Contractor's proposal shall take into account, address or rectify such inadequacy, insufficiency, impracticality or unsuitability.

The Contractor shall certify that:-

- the Works have been or will be designed, manufactured, installed and otherwise constructed and to the applicable standards available using proven up-to-date good practice.
- the Works will, when completed, comply with enactments and regulations relevant to the Works.
- the design of the Works have taken or will have taken full account of the effects of the intended manufacturing and installation methods, Temporary Works and Contractor's equipment.

The Contractor shall also provide an undertaking from the Designer for his Designs for suitability, adequacy, practicality and absolutely meeting the Employer's Requirements as detailed in Appendix 11 – Volume 6 Part 2 of Bidding Documents. The undertaking shall also state that reasonable skill and care expected from a professionally qualified and competent designer experienced in works of similar nature has been exercised. This shall be applicable for such Designs which may be or have been prepared, developed issued by the Employer, or any of Contractor's consultants, his sub Contractors and/or his qualified personnel/persons or cause to have been prepared, developed or issued directly or indirectly by the Contractor. All the aforesaid shall be applicable notwithstanding the fact that any part of the work may have been inadvertently accepted, passed and paid for by the Engineer or Employer.

- (3) The Civil, Structures, and Building Works shall comply with Indian standards and IR regulations and standards as set down in **Part 2 "Employer's Requirement, Section V, Volume 6, Appendix 14 - Design Standards"**.

1.4 AESTHETICS

- (1) The Permanent Works for bridges shall be designed to achieve an aesthetic character and provide a feeling of design commonality throughout the project.

1.5 SAFETY, HEALTH & ENVIRONMENTAL CONSIDERATIONS

- (1) The design of the Permanent Works shall be according to Indian laws and regulations related to Safety, Health & Environmental Requirements.

Safety, Health & Environmental aspects shall be kept in mind during the Design/Construction and Testing phase, requirement for which has been specified at appropriate places in the bidding document as well as in **Part 2 "Employer's Requirement, Section V, Volume 6 Appendix 12"**. It shall be the overall responsibilities of the Contractor to ensure compliance of Safety, Health & Environmental aspects at all times conforming to the provisions mentioned in this Bidding document.

1.6 QUALITY CONTROL

- (1) Quality control aspects shall be kept in mind during the Design/construction and testing phase, requirement for which has been specified at appropriate places in the bidding document as well as in **Part 2 "Employer's Requirement, Section V, Volume 6, Appendix 6 - Quality Assurance"**. It shall be the overall responsibilities of the Contractor to ensure deliverables

of quality products at all times conforming to the provisions mentioned in this bidding document.

2.0 EARTH WORKS

2.1 SCOPE

- (1) This section provides the requirements for the design and construction of formation earthwork, drainage and erosion control.
- (2) These requirements include the following components of work which are to be carried out in accordance with the conditions of contract:
 - a) Investigation and testing of borrow areas and additional geotechnical investigations to supplement and/or confirm the subsurface conditions along the alignment.
 - b) Clearing and grubbing the site
 - c) Design, construction and testing of earthwork in excavation and embankment
 - d) Design, construction and testing of any ground improvement / treatment / modifications as required
 - e) Construction and testing of prepared sub-grade and blanket layers
 - f) Design and construction of erosion control measures for fill and cut slope surfaces
 - g) Design and construction of side drains for proper drainage of the formation

2.2 GENERAL

2.2.1 Terminology and definitions

- (1) The following terms appearing in these specifications will have the following meaning:

Blanket: A layer of select clean and well-graded granular material of specified gradation and properties and designed thickness provided over the full width of the formation below the ballast.

Formation: A general term which refers to the whole of blanket, prepared sub-grade, embankment fill and sub-soils below the ballast

Formation level: The design level of the formation at the top of the blanket

High Embankment: Embankment having height more than 4.5 meters above toe of the bank on either side of the bank.

Prepared sub-grade: A layer of soil of superior specifications, which is provided below the blanket

Sub-grade: The part of the formation which is below the prepared sub-grade and which may comprise of embankment fill or sub-soils

Sub-soils: Soils of natural ground below embankments or prepared sub-grade in cuts

2.2.2 Submittals

- (1) Prior to the start of construction operations, the Contractor shall submit to the Engineer all relevant documents, drawings, calculations and data including, but not limited to the following, and shall obtain the approval of the Engineer for the proposed materials, design, construction methods and quality control procedures
 - a) Geotechnical investigation reports and evaluation of sub-surface conditions along the alignment.
 - b) Geotechnical investigation reports for borrow areas.
 - c) Details of earthwork balance (cut & fill), properties of materials to be imported / exported, and management of excess materials, Material test reports for embankment fill, prepared sub-grade and blanket.
 - d) Slope stability calculations. analysis of the stability and settlement of formation and design of remedial measures if required. Details of earthwork design solutions and criteria used
 - e) Details of proposed instrumentation and monitoring if required.
 - f) Details of construction equipments.
 - g) Construction quality control plan.
 - h) Design Alignment including deviations adopted by the Contractor within the land acquired or proposed to be acquired by the Employer.
 - i) Proposed Good for Construction drawings including longitudinal and cross-sections of formation based on final design of alignment.
 - j) Proposed Good for Construction drawings including plan, longitudinal sections and cross-sections of the formation at an interval of 20m in the block sections and 10m in the DFCC and Indian Railway yards, Detailed drawings of the drainage works, retaining walls, erosion control and ground improvement (if any).

2.3 DESIGN

2.3.1 Designed Alignment:

- (1) The alignment details are given in **Reference Documents; Part 4 of bidding document**. However, the Contractor is required to review and revalidate it with respect to his own Design and Construction proposals and shall satisfy himself that there is no conflict in regard to new constructions proposed and existing structures to be preserved.
- (2) The Contractor is permitted to propose minor deviations in alignment to suit his construction proposals but he must demonstrate that any such deviations shall comply with good design practice and the alignment requirement of the Design Criteria of bank fulfilling the following conditions :-
 - There is no extra cost to the Employer.
 - Changes proposed are essentially required to suit the Contractor's specific design and shall be accommodated within right of way as shown in the bidding document.

2.3.2 Geometric and Cross-Sectional Features

1) The following table specifies the geometric parameters and design principles with regards to Earthwork Structure of DFC project.

Geometric Parameter of Earthwork

S. No.	Parameter	Value
1.	Formation Width Embankment	i) For Double Track : 13.5 m ii) For Single Track : 7.6 m
2.	Slope Gradient for Embankment	2H : 1V
3.	Slope Gradient for Cut	1H : 1V
4.	Cross Slope at Top of Blanket	1 : 30
	Cross Slope at Top of Prepared Sub grade	1 : 30
6.	Cross Slope at Top of Embankment Fill	1 : 30
7.	Cross Slope at Berm	1 : 30

(2) Bidders shall follow RDSO GE: 0014 “Guidelines and specifications for design of formation of heavy axle load. For DFCCIL liens loading shall be taken as 32.5T axle load. In Paheja Yard Earthwork in formation/cutting loading shall be taken as 25 T Axle load for New IR lines (3 loop lines + 1 future loop).

However in GE:0014, specifications of Nov. 2009, in the diagrams on Page 35 of 75 and Page 36 of 75, minimum layer of 1.0 meter of embankment fill above HFL have been indicated. These provisions are not mandatory. For exceptional locations prone to flooding, the Engineer may call for the stability analysis of banks.

(3) Following aspects of the work shall require additional attention while designing the formation:-

- Pressure on Formation and sub-soil: The maximum pressure on formation at bottom of ballast, typical values as good design practice, should not exceed 0.3MN/m^2 or 3.0kg/cm^2 , and the pressure on sub-soil should not generally exceed 0.1MN/m^2 or 1 kg/cm^2 . Indicative load distribution pressure bulb through the layers, due to wheel load, is represented in RDSO “Guidelines and specifications for design of formation of heavy axle load Nov. 2009
- Formation has to be provided with layers well designed to be safe against shear failure and accumulated/ plastic deformations under repetitive axle loads.
- Subgrade/subsoil shall be designed and checked to ensure not to allow any shear failure.
- Additional width of formation on the outside of curves.

- Minimum Track centre distance between double lines shall be 6.0 meters. However, in yards the distance between main line and loop line shall be 6.25m for DFC lines. For IR lines track centre distance as shown in Pahleja yard shall be followed.
 - A uniform total thickness of formation layers of 1.75 m should be provided including blanket, prepared subgrade & top layer of embankment fill etc. (Ref foot note on page 33 of 75 and page 34 of 75 of RDSO “Guidelines and specifications for design of formation of heavy axle load Nov. 2009 (2.0 metre has been changed to 1.75 metre). In case the difference between formation level and ground level is less than required, the existing ground will have to be excavated to provide the formation layers of requisite thickness and specifications as mentioned in the said specifications. In case the existing ground soil at a particular level satisfies the specifications of the formation layers at that level, then the existing ground shall not be cut to provide total thickness.
 - Minimum height of embankment shall generally be 1.0 meter except at obligatory points like level crossings, junction yards, bridge approaches etc.
 - The bottom width of cuts (including side drains).
 - Cross slope on the finished surface of the formation (top of blanket)
 - Cross slope on the finished surface of prepared sub-grade/embankment fill/cut on which the blanket is to be placed
 - Required amount of formation cross-slopes on curves
 - Tolerances for top level of formation to be included.
 - Large deformation without shear strength failures, geometrical requirements for the soil formation etc. shall be as per RDSO “Guidelines and specifications for design of formation of heavy axle load Nov. 2009
- (4) Formation levels shown on the longitudinal section sheets furnished as part of the bidding documents shall be reviewed, verified and corrected by the Contractor on the basis of his own surveys and in compliance to the provisions of the Indian Railway Manuals, codes and specifications.

2.3.3 Geotechnical Investigations

- (1) The Contractor shall carry out additional subsurface investigations along the alignment which may include boring, sounding, trial pits, sampling, field and laboratory testing etc. as required to supplement and confirm the geotechnical information furnished in **Site Data, Reference Documents; Part 4 of the bidding documents.**
- (2) The additional investigations shall be sufficiently detailed in scope to allow a reliable and comprehensive assessment of the subsurface conditions in accordance with the requirements of design and construction.

2.3.4 Track Substructure

- (1) The formation on DFC alignment is required to provide satisfactory support for the ballast and track structure which in the long-term is intended to carry traffic with axle load of 32.5 Tonnes.

- (2) At Pahleja Yard the formation on IR alignment is required to provide satisfactory support for the ballast and track structure which in the long-term is intended to carry traffic with axle load of 25 Tonnes.

2.3.5 Embankments & Cuts

Any Design adopted for formation Design shall fulfil the following:-

- (1) The minimum long-term factor of safety of embankment slope as determined by an effective stress stability analysis using effective stress shear strength parameters shall be 1.4.
- (2) In the case of formation slopes, a minimum factor of safety of 1.2 at the end of construction stage (as determined by a total stress stability analysis using undrained shear strength parameters) may be allowed, subject to the condition that the factor of safety is shown to increase with time.
- (3) In all cases the minimum long-term factor of safety of fill slopes as determined by an effective stress analysis using effective stress shear strength parameters shall be 1.4.
- (4) Cut slopes shall not be steeper than 1v:1h and have a minimum long-term factor of safety of 1.4 as determined by an effective stress stability analysis using effective stress shear strength parameters and should be suitably designed.
- (5) All cuttings and embankments shall have provision for trolley refuges as per IR standards.
- (6) The procedure for slope stability analysis shall be in accordance with RDSO guidelines. Computer software approved by the Engineer may be used for slope stability analysis.
- (7) Foundation stability of high embankments shall be checked and the following minimum factor of safety shall be ensured; where the required factor of safety is not achieved suitable ground improvement shall be carried out:
 - Bearing capacity: 2.0
 - Lateral sliding: 1.5
 - Foundation extrusion: 1.5
 - Deep seated slip failure: 1.2 (short-term) and 1.4 (long-term)

2.3.6 Retaining structures

- (1) Where space limitations or other constraints do not permit provision of a stable slope for the formation, retaining walls, Reinforced Soil Wall/Slopes shall be provided to safely retain and support the formation, ballast and the track structure. Such situations may include the following (retaining walls, wing walls and abutments required to retain the approaches to bridges, rail flyovers, road under bridges etc. do not come under the purview of this section and are covered elsewhere):
 - (a) On parallel sections, where the formation level of the proposed DFC track is at a higher elevation than the existing Indian Railway formation and the space available between the embankments is not sufficient

- (b) Locations where the embankment height is large and the right-of-way is not adequate.
- (2) Retaining walls shall be designed in accordance with accepted engineering practice to resist the lateral earth pressures resulting from weight of retained soil and applied dead and live load surcharges to ensure a minimum factor of safety of 1.5 against sliding, 2 against overturning and 2.5 against bearing failure.
- (3) The structure shall be safe against overturning and sliding forces.
- (4) The minimum grade of concrete shall be M20 for plain cement concrete and M25 for reinforced cement concrete.
- (5) Materials, structural design and detailing of structural components shall conform to the requirements of relevant IS, Indian Railway or equivalent codes.
- (6) Type of back fill including backfill arrangement like material, drainage etc. shall be an integral part of structural drawing submitted by the Contractor.

2.3.7 Slope erosion control

- (1) The slopes of embankments and cuts shall be protected against erosion by providing a protective vegetative cover comprising perennial turf forming grass.
- (2) The species of grass should be compatible with the local soil and climatic conditions.
- (3) The materials and techniques shall be suitable for the slope height and angle, soil type, intensity of rainfall and climatic conditions and shall perform its function with minimum maintenance requirements.
- (4) In the case of cuts with relatively steeper slopes, special attention shall be paid to provide a stable and sustainable vegetative cover.
- (5) Flyover, approaches of bridges High Embankments shall be designed with the provision of slope revetment work to be approved by the Engineer.

2.3.8 Drainage

- (1) In general side drains are not required to be provided when the formation is on embankment and the topography is such that there are no obstructions to the flow of water away from the base of the embankments.
- (2) Where the alignment is parallel to the existing Indian Railway formation and the distance between the centre lines of the nearest DFC and IR tracks is equal to or more than 8.0 m, Pucca open drains shall be provided to ensure satisfactory drainage of the area between the DFC and Indian Railway's formation. These drains shall be designed and shall consist of suitable shape, material and dimensions to provide adequate flow capacity, permit easy maintenance and uniform longitudinal gradient adequate to ensure a self-cleansing velocity etc. As per site requirements these shall be linked with cross drains at suitable intervals wherever required.

Where the distance between the centre lines of DFC and IR tracks is less than 8.0 m (a situation which may arise in existing IR yards) and provision of open drains is not feasible, alternative drainage arrangements in the form of suitably designed drains using good engineering practices and technically sound systems such as perforated pipes etc. should be used with the approval of the Engineer. It should be functional throughout the year and amenable to user-friendly maintenance.

- (3) The Contractor shall be responsible for installation of a good track drainage system and its connection to main drainage system/nearby bridge.
- (4) When the formation is in cutting or where the bottom of the blanket is below the existing ground level, Pucca side drains shall be provided at suitable distance for the proper drainage of the formation, the invert level of the drains shall be at least 300mm below the bottom of the blanket at the edge of formation. Such side drains shall generally be lined open drains of suitable shape and dimensions to provide adequate flow capacity permit easy maintenance and shall have a uniform longitudinal gradient adequate to ensure a self-cleansing velocity. The lining shall be reinforced cement concrete of adequate thickness to prevent erosion and caving. Alternative Designs for this item can also be suggested by the Contractor.
- (5) Before work in or in the vicinity of Indian Railway yard is taken up, a drainage plan for protecting DFCC as well as IR track shall be submitted by the Contractor for No Objection of Engineer. Such plans should be sufficiently detailed. The side drains shall be extended as necessary to lead the water clear of the Works to natural drainage courses, culverts or any other suitable outlets.
- (6) At Pahleja Yard kachcha open drains shall be provided to ensure the satisfactory drainage of the area.

2.4 MATERIALS

2.4.1 General

- (1) Materials to be used in the work shall conform to the requirements laid down in the Design and drawings agreed by the Engineer.

2.4.2 Borrow Areas

- (1) The borrow areas shall be located outside the land acquired by the DFCC and Indian Railway land and shall be sufficiently away from the project limits so as not to have any adverse impact on the project.
- (2) The Contractor shall arrange the necessary permission from property owners and the required clearances from all pertinent government departments and municipal bodies and shall comply with all applicable rules and regulations.
- (3) The Contractor shall carryout a satisfactory geotechnical investigation of the borrow areas to evaluate the suitability of the materials for construction and submit the same for approval of the Engineer.
- (4) The Contractor shall take all reasonable precautions to avoid any damage to adjacent property or structures, minimize the adverse impact of the excavations on the environment and inconvenience to the local inhabitants.

2.4.3 Blanket, Prepared Sub-grade, Embankment Fill

- (1) Material for blanket, prepared sub-grade, embankment, formation fill shall be conforming to the specification of material as detailed in the relevant specifications of formation

2.4.4 Turf/Sods

- (1) The sod shall consist of dense, well-rooted growth of permanent and desirable grasses, indigenous to the locality where it is to be used, and shall be practically free from weeds or other undesirable matter.
- (2) Thickness of the sod shall be as uniform as possible and shall be such that practically all the dense root system of the grasses is retained in the sod strip.
- (3) The sods shall be cut in rectangular strips of uniform width, of approx. 250mm x 300mm in size but not so large that it is inconvenient to handle and transport these without damage.
- (4) During wet weather, the sod shall be allowed to dry sufficiently to prevent rearing during handling and during dry weather shall be watered before lifting to ensure its vitality and to prevent the dropping of the soil in handling.
- (5) Sods shall be delivered in healthy condition and be free from weed and disease.

3.0 BRIDGE DESIGN CRITERIA

3.1 GENERAL

- (1) Bridges to be designed and constructed shall allow simultaneous, unhindered and safe movement of traffic over the DFC and IR (Pahleja Yard) and over/under roads, railway or flow of water in canals/nallas/watercourses. The opening sizes of bridges of DFC/IR (Pahleja Yard) shall be based upon cross verification between existing opening sizes, discharge calculation and other site related parameters.
- (2) The proposed bridges constructed for the DFC/IR (Pahleja Yard) tracks shall be sized as a minimum to match the existing bridges on the IR tracks on the parallel section to ensure the least obstruction to the flow of water. In parallel sections, if the existing opening sizes of bridges are different in adjacent UP & DN IR tracks, then in such cases, the minimum recommended opening size / linear water way for the DFC tracks shall be the maximum of the existing opening sizes.
- (3) The data and information provided by the Employer in Site Data; **Part 4 Reference Documents**, including GADs, are indicative and for guidance only. These should be re-checked, verified and modified by conducting site investigation to suit the site conditions. Site Investigation should include but not limited to topographical survey, hydrological survey and geotechnical surveys.
- (4) The Contractor is fully responsible for delivering a safe, sound, durable and satisfactorily functioning state of the art structures conforming to the project

requirements, applicable standards, codes and manuals as listed in **Part 2 “Employer’s Requirement, Section V, Volume 6, Appendix 14 - Design Standards”**.

- (5) However for the guidance of the Contractor it is suggested that –
- For maximum Moving Dimensions, Eastern DFC Schedule of Dimensions shall be followed for DFC alignment. For work in Pahleja Yard for IR track, SOD applicable for IR shall be followed.
 - For investigations and sampling IRC code may be followed.
 - For design discharge IRS code may be followed.
 - For loading standards primarily IRS code may be followed and for thermal loading IRC code may be followed.
 - For Buoyancy & serviceability limit state stresses – IRS Bridge concrete code may be followed.
 - For load testing IS/IRS codes may be followed.

Indicative GADs showing the opening size of the bridges and type of structure for minor and major bridges, Rail Flyover, Burried Boxes and Road Under Bridges are given in Site Data; **Part 4 Reference Documents**. Contractor is at liberty to choose any other type of structure and structural system, except for main span of RFO for which the Open Web through steel girder shall be provided. The superstructure of main span of RFO shall be constructed as per RDSO drawing No. RDSO/B-17101 to 17118. Minimum size of RCC Boxes with or without fill shall be 1.2 x 1.2 m.

All this shall have no bearing on the Bid Price quoted by the Contractor.

- (6) Bridges shall have simply supported spans and shall be designed to accommodate the curvature of track alignment.
- (7) The Design of bridges shall be such that it is capable of allowing the construction to be carried out in minimum possible time as well as to the required quality standards. For this purpose, use of precast girders/ boxes should be given preference, for which the contractor shall develop centralised casting yard(s).
- (8) The Design philosophy of the contractor shall have prior agreement of the Engineer in respect of its impact on safety, aesthetics, constructability, serviceability and maintainability.
- (9) Forces due to continuation of LWR/CWR shall be taken as per provisions of UIC 774-3R Oct., 2001 edition with latest modification (if any) with provision of values for track resistance as specified therein subject to the provision that a track resistance of 60KN/m in loaded conditions shall be taken except RFO bridge portion.
- (10) The bridge loading for the DFC including loading for RUB and Burried Boxes shall be 32.50T axle load with corresponding locomotives and wagons as per IRS Bridge Rules. At Pahleja Yard for extension of IR bridges DFC loading shall be used.
- (11) Clearance in case of overhead and other structures connected with DFC and IR track shall be in accordance with respective Schedule of Dimensions as mentioned in **Appendix 14, Volume 6 – Part 2 of bidding documents**.

- (12) In case of girder bridges, the deck for each track shall be separate. In case of ballasted deck minimum width between face to face of ballast retainer for each track shall be 4.5m.
- (13) Transition on the approaches to the bridge from the embankment leading to the bridge shall provide a smooth passage for rail vehicles by a gradual change in the Track Modulus support stiffness with no settlement.
- (14) All bridge abutments are to be designed with an appropriate drainage system. Reinforced Soil Walls /Slopes and other earth retaining structures may be used in RUBs as well as RFOs, but **not behind the bridge** abutments. Similarly, reinforced soil Walls /Slopes may be used in approach embankment slopes of RUBs and RFOs. Design specifications for Reinforced Soil Walls/Structures shall be as per Para 3.1 (34), Volume 4, Part 2 of the bidding documents.
- (15) Back fill arrangement including materials for foundation, behind abutments and retaining structures shall be as per relevant RDSO guidelines.
- (16) Each bridge shall have a walkway/duct-way of 900mmwidth on both sides i.e. one each for up and down track unless otherwise agreed by the Engineer, except open web girder bridge for RFO.
- (17) M35 Grade concrete wearing course with minimum thickness 40mm and cross slope of 1 in 40 shall be used on the deck of all ballasted bridges.
- (18) All major bridges shall be capable of supporting masts of the 2x25 KV OHE electrical systems including earthing and bonding arrangements as appropriate. All bridges shall be capable of carrying signalling and telecommunication cables through pipes/ ducts and drawings prepared by the Contractor shall indicate details of such provisions.
- (19) All bridges shall have trolley and man refuges as per SOD of Eastern Corridor.
- (20) Provisions shall be kept in the structures for replacement of its components such as bearing, expansion joints, etc., which may have a shorter design life than that of the main structure.
- (21) The Contractor shall submit manufacturer's warranty for all types of bearings as a part of the design submission. These shall be accepted after conforming to relevant codes/manuals.
- (22) Painting/galvanizing steel members including structural as well as supporting to be done as per relevant codes / manuals.
- (23) Construction of RUBs - The Contractor shall design and construct RUBs as per specifications of the IRS Code and MORTH (Ministry of Road Transport and Highways of India) specifications. Adequate approach roads including connection to both approaches after suitable profiling, drainage facilities and road diversions etc are to be provided as per latest guidelines of Indian Railways and MORTH.
- (24) Bridges should be designed in such a manner that fabrication and erection can be performed without undue difficulty or distress and that locked in stress effects are within tolerable limits.
- (25) The design is to be clear in all manner of construction like detailing, sequencing etc.

- (26) Wherever work is to be executed in electrified territory like extension of ROB, FOB etc. Contractor shall use protective screens as per Para 2.1.9, Appendix VII, Part II Vol II of ACTM and RDSO's letter no: T1/CIV/MS/08 dated 07/07/2009.
- (27) Bridges shall be designed and provided among others with the following if required but not limited to:
- (a) Safety Refuge, Maintenance Staff Refuge / Platform
 - (b) Supports for locating OHE mast
 - (c) Signages
 - (d) Inspection steps at approaches / ladders to the bearing area.
 - (e) Drainage arrangement at deck
 - (f) Wearing course at bridge deck
 - (g) Bridge bearings
 - (h) Jacking arrangements for spans
 - (i) Earthquake restraints
 - (j) Expansion joints
- (28) Piles / Wells shall be designed as per IRS Manual on the Design and Construction of Well and Pile Foundation (1985), IRS Sub-structure code and IS: 2911
- (29) **OHE Mast**
While designing the Bridge, necessary provisions for the OHE mast shall be made as required and requirements for OHE shall be co-ordinated with the Other Contractors.
- (30) **Traction Earthing and Bonding of Steel / Composite Bridge Structures**
In a major bridge Traction earthing and bonding of steel / composite bridge structures shall be provided. A typical arrangement is indicated in part 4 of bid documents.
- (31) **Welded Steel Bridge Superstructure**
Bridge having superstructure of steel shall be fabricated as conforming to IS: 2062-2006 as per the Specifications . The complete super structure shall be in welded construction as per IRS- "Welded bridge code for steel Bridge Girders" and IRS-"Fabrication and Erection of Steel girder bridges and locomotive turn tables (B1-2001)".
- (32) **Bearings of Bridges** - For bridge spans smaller than 30.5m, either POT-PTFE or Elastomeric bearings may be provided. However, for open web girder, rocker and roller bearing shall be provided. Bearing should be procured through RDSO approved source or other International reputed firm to be approved by Engineer.
- (33) Post-tensioned precast segmental box girder construction is not permitted for this project.
- (34) **Reinforced Soil Walls/Structures:** Reinforced soil walls/structures should be designed in accordance with any of the following standards/guidelines - BS 8006-1:2010, FHWA GEC-011. The design requirements shall be as follows:
- (1) Design life for reinforced soil walls shall be 120 years.
 - (2) The structures shall be designed to satisfy the requirement to maintain the designed horizontal and vertical alignment of the DFC tracks and to

resist the relevant loads and vibrations imposed by the DFC loading.

(3) The minimum embedment of the reinforced soil walls below ground level shall be 1.0 m.

(4) The facing for walls shall be precast concrete discrete panels with a minimum nominal thickness of 180 mm. The thickness at any point (except along joints) shall not be less than 160 mm. The minimum grade of concrete shall be M35.

(5) Steel soil reinforcement and connection fixtures shall be hot dip galvanized with a minimum zinc coating thickness of 140 microns.

(6) The long-term design strength of geo-synthetic reinforcement shall be determined in accordance with ISO/TR 20432 considering the service temperature as 30°C. Certifications from a competent authority or test reports from an independent accredited laboratory shall be furnished in support of the reduction factors.

(7) The reinforcement shall be connected to facing using durable mechanical fixtures, fasteners or devices. Purely frictional connections are not permitted. The connections shall be designed to transfer the load without rupture or excessive deformations. Satisfactory documentary evidence to demonstrate the adequacy of the connection including design calculations, test reports and performance report of actual structures should be furnished.

(8) The long-term design strength of the connection between the facing and reinforcement shall not be less than the long term design strength of the reinforcement. The long-term design strength of the connection should be determined through appropriate calculations and testing taking into account the actual conditions experienced during construction and in service.

(9) The fines content (passing 75 micron sieve) of reinforced fill for walls shall not exceed 10 %. In the case of geo-synthetic reinforcement, the maximum particle size of fill should not exceed 37.5 mm.

(10) Satisfactory outlet for surface runoff and water draining out of the ballast and blanket should be provided. The structures should have adequate internal drainage arrangement.

(11) Provision for supporting masts of the 2x25 KV OHE electrical systems and pipes/ ducts for signalling and telecommunication cables should be made.

(12) The topmost reinforcement layer shall be minimum 300 mm below the bottom of the blanket to permit future maintenance / replacement of the blanket layer.

(13) The design, detailing and construction should cater to the stringent requirements of compaction of fill – 100 % for blanket, 98 % for prepared sub-grade and 97 % for embankment fill.

The design calculations and construction drawings for the reinforced soil structures shall be prepared by a qualified engineer with a minimum of three years experience in the design of similar structures. The construction of the reinforced soil structures shall be supervised by a qualified technician with a minimum of three years experience in the construction of similar structures.

- (35)** All bridges should have suitable hand railing of height not less than 750 mm above rail level.
- (36)** All Reinforcement Steel (TMT Bars) and Structural Steel shall be procured as per specifications mentioned in BIS's documents – IS: 1786 and IS: 2062

respectively. Independent tests shall be conducted, wherever required, to ensure that the materials procured conform to the specifications.

These steel shall be procured only from those firms, which are Established, Reliable and Primary Producers of Steel, having Integrated Steel Plants (ISP), using iron ore as the basic raw material and having in-house iron rolling facilities, followed by production of liquid steel, as per Ministry of Steel's (Government of India) guidelines.

However, only certain isolated sections of structural steel, not being rolled by ISPs can be procured from the authorised re-rollers of ISPs or authorised licensee of BIS having traceability system and who use billets produced by ISPs with the approval of Engineer.

(37) Construction of RFO :

Span of RFO to be constructed over existing 3 tracks Indian Railway shall have provision for two future tracks, one on either side of existing Indian Railway tracks. This RFO shall also have additional openings on both sides to provide road access with 7.5m carriageway.

The work of RFO shall comprise design and construction of the following as considered necessary but not limited to :

- a) Abutment and piers including foundation
- b) Bearing
- c) superstructure including ducts/Pipes for cables
- d) supports for locating OHE traction masts
- e) signages
- f) suitable fixtures/ arrangements for inspection of superstructure
- g) steel truss and other related works as considered necessary

This will also include design, survey including geotechnical investigation, as required. All temporary works as required for construction of foundations/sub-structure and launching of superstructure, etc. While designing RFO adequate clearance for the IR tracks as per the SOD of IR shall be provided.

3.2 DURABILITY

- (1) The bridges shall be durable and serve satisfactorily for full minimum design life as per IRS Concrete Bridge Code. The bridge shall be designed for the service life as given in Clause 15.1.3 of Concrete Bridge Code for Bridges in "Rest of India".
- (2) The structures shall be designed to withstand conditions of exposure as per the IRS Concrete Bridge Code.

The exposure condition to be considered shall be 'Moderate'.

- (3) In order to mitigate the effects of earthquake forces seismic devices shall be provided to prevent girder – bearing separation.

3.3 GEOTECHNICAL INVESTIGATION, HYDROLOGY and HYDRAULICS

- (1) The Contractor is to carry out geo-technical investigation, hydrologic analysis as per relevant codes and manuals.
- (2) Hydrologic and hydraulic studies and assessments of bridge sites for stream crossings are to be carried out by the Contractor. These are to be submitted along with design.
- (3) The details of these studies should cover all important risks associated with the structure.
- (4) The evaluation of the bridge design shall consider stream stability, backwater, flow distribution, stream velocities, scour potential, flood hazard, bridge protection work and river training works.
- (5) Bridges must be designed for the following minimum recurrence interval of flood, in accordance with IR standards:
 - a) For major bridges 1 in 100 years;
 - b) For minor bridges 1 in 50 years.
- (6) Bridges are defined as follows:
 - a) **Major Bridges** are bridges, which have a linear waterway of 18m or more or which has a clear opening of **12m or more** in spans;
 - b) **Minor bridges** are other than important or major bridges.
- (7) The Contractor's design shall recognise that the new bridges are to comply with the vertical clearances and freeboard as set down in the applicable standards, irrespective of the vertical clearance and free board of the adjacent IR Bridge. However, for relaxation in freeboard /vertical clearance as specified in the relevant provision of IRS Codes specific approval from the Engineer shall be taken under unavoidable circumstances like non-availability of land or presence of other obligatory points etc.
- (8) For geotechnical information for design of Bridges, Contractor shall make out a detailed geo-technical investigation plan as per IR/IRC standards or equivalent, if not available, and seek prior approval of Engineer before executing the same. This plan shall include location of borehole samples, type of sample, location of samples in the borehole, plate load tests, equipment for sampling, sampling techniques, location of field labs, field and lab testing programme etc. After the plan is approved, the total results, bore logs, samples, analysis, calculations, conclusions shall be submitted to Engineer as a part of Definitive design submission.
- (9) RDSO Technical Monograph 50 - "Hand Book for Estimation of Design Discharge for Railway Bridges" shall be used for the determining Discharge in bridges.

3.4 SEISMIC ANALYSIS

The criteria for seismic analysis shall be governed by the provisions of IIT/Kanpur-RDSO guidelines on Seismic Design.

3.5 MAINTAINABILITY

- (1) Bridges shall be capable of maintenance with minimum effort with regard to accessibility, cleanability, taking observations etc.

- (2) All sections of the bridge shall be easily accessible for detailed inspection, including the ground level of abutments from the top of each abutment, top of each pier from the deck by way of suitable steps/ ladder.
- (3) Inspection ladders, walkways, catwalks, covered access holes, where necessary, shall be provided where other means of inspection are not practical.
- (4) Provision of future strengthening of the structural components shall be kept in mind while finalising the design.
- (5) Structural systems whose maintenance is expected to be difficult are to be avoided.
- (6) Areas around the bearing seats and the deck joints shall be designed to facilitate approach, facilities to these locations, jacking, cleaning, repair and the replacement of bearing and joints.
- (7) Inaccessible cavities and corners are to be avoided, wherever possible.
- (8) Where such cavities are not avoidable suitable protection is to be provided to prevent bird or animal access.

3.6 AESTHETICS

- (1) The aspect shall be governed by the provisions para 1.4 above.

3.7 TESTING

- (1) Steel/Concrete structures shall be tested as per the provisions of relevant IRS codes.

3.8 ACCEPTANCE CRITERIA

- (1) Each element of the bridge and the bridge as a whole must conform to approved design, drawing and material specification.
- (2) Every component of each element of the bridge shall conform to the specifications and must satisfy all prescribed tests for quality, strength and durability
- (3) The quality assurance programme shall be in line with Appendix 6, Part 2 Vol 6 of this Bidding Document.
- (4) Results of all tests prescribed in codes and manuals for the completed structure shall be in conformity to acceptable standards as specified therein.

3.9 RESPONSIBILITY

The Contractor is fully responsible for obtaining the necessary approvals for all the drawings including General Arrangement Drawings (GADs) from the pertinent /Railway/ State/ Local authorities before the commencement of construction. Where applicable the Employer/Engineer will assist the Contractor in obtaining the approval of such authorities.

3.10 CONCRETE FOR STRUCTURES

Quality of concrete for all structures including insitu, transported, ready mix concrete, batch mixing plant etc. for manufacturing, supplying, placement and testing shall always comply with the provisions of IS 456 or other applicable codes. Any deviation shall have prior consent of the Engineer.

3.11 Wayside Signs

The Contractor shall design and install the Wayside Signs in accordance with the requirements as specified in relevant IRS Codes and Manuals. The list of the Wayside Signs indicated herein below and in the Reference Drawings is not exhaustive and the Contractor shall provide all the Wayside Signs as per the IRS Codes and Manuals as applicable:

- a) Bridge Number Plaque
- b) Inscription Plaques on Bridges
- c) Any other board as per the requirement of relevant IR codes/manuals.

4.0 ALIGNMENT DESIGN CRITERIA

4.1 ALIGNMENT DESIGN

4.1.1 General

- (1) The DFC alignment layout shall be based on the provisions contained in Indian Railways Permanent Way Manual, Track Manual & relevant IRS specifications with latest amendments/corrections upto the base date .
- (2) Where the design features any deviations from such provisions these are to be fully justified based upon acceptable international practice and agreed by the Engineer.
- (3) The alignment as shown in project sheets is to be considered only indicative and the Contractor is to acquaint and satisfy himself regarding the site conditions.
- (4) The final designs of the alignment layouts, including horizontal and vertical alignment, station yard layout plans, etc. shall be agreed by the Engineer before execution of track works.

4.1.2 Track Gauge

- (1) The nominal DFC track gauge shall be 1676 mm.

4.1.3 Horizontal Curves

- (1) Horizontal curve in the DFC tracks shall be circular with transition curves at either end of such circular curve.
- (2) The horizontal curve radius is measured on the track centre line between the two rails. The DFC tracks will have concentric curves unless otherwise approved by the Engineer.
- (3) Curves shall be designed for average running speed of 75 km/h with minimum limit of cant deficiency.
- (4) The normal minimum horizontal curve radius will be 700m (2.5 degree) and in exceptional *situations with the approval of Employer* the curve radius may be reduced to 585m (3 degree), however such locations shall not adversely affect the train operations on DFCC alignment by way of imposition of constraints on average speed of the train over the section.
- (5) On entry to the existing IR operational system curvature may be up to 438m (4 degree).
- (6) The maximum actual cant shall be limited to 165mm.

- (7) The maximum cant deficiency shall be 75mm and cant excess shall be 65mm.
- (8) All curves on mainlines shall be provided with transition curves to the straight which shall take the form of a cubic parabola with the equation as $y = x^3 / 6RL$
- (9) The minimum length of the transition shall be the maximum length obtained from the following equation:

$$\begin{aligned}
 L &= 0.008 * Ca * V \\
 &= 0.008 * Cd * V \\
 &= 0.72Ca
 \end{aligned}$$

Where, Ca & Cd = Value of actual cant & cant deficiency respectively in mm
V = Maximum permissible speed in km/h

- (10) For the design of transition length, the value of Ca shall be calculated for speed of 100 km/h with Cd = 0, and V shall be taken as 100km/h, where it is not practical to use 100km/h a reduced speed may be utilised with the approval of the Engineer.
- (11) Transitions between reverse curves may adjoin each other if the rate of change of cant and the cant gradient are constant through both transitions.
- (12) Horizontal curves and transition length shall be avoided at turnout portion locations.

4.1.4 Gradients

- (1) The ruling gradient of the section on the main line shall be 0.5% (1 in 200). Contractor shall select sectional gradients for the alignment so as to enable smooth train operations taking into consideration the required optimum tractive effort, curvature and other obligatory parameters. Wherever ruling gradient is adopted specific approval of Employer shall be taken.
- (2) The gradients shall be compensated for curves @ 0.04% per degree of curve and the maximum gradient shall not be steeper than the ruling gradient of the section.
- (3) The maximum gradient at stations yards shall not exceed 1 in 1200 (approx. 0.083%) and 1 in 400(0.25%) in exceptional cases, requiring specific approval of the Engineer.
- (4) Change of gradient shall not be done at turnout locations.

4.1.5 Vertical Curves

- (1) A vertical curve is to be provided when the algebraic difference in change of gradient at the locations is more than 0.4%.
- (2) Minimum radius of vertical curve shall be 4000 m.

4.1.6 Formation levels

- (1) The formation levels at various chainages along the alignment are indicated in the project sheets for the guidance of the Bidders. These shall be verified and corrected in the final alignment Design in conformity with the provisions

in the bidding documents, IR's manuals and specifications, adequate clearances/free board under the bridges.

- (2) The formation levels at the level crossings, where the DFC track is running parallel to the existing IR tracks, shall be checked and modified as per the actual site conditions so as to keep the rail level of the DFC track the same as that of the IR tracks/as provided in IRPWM.
- (3) The final design sheets shall be agreed by the Engineer before the construction commences.

4.1.7 Track Layouts in Railway Station Yards

- (1) Site details showing the proposed works in indicative drawing for Pahleja yard is enclosed for guidance in "**Site Data; Reference Document; Part 4 of Bidding Document**".
- (2) The Contractor shall design and prepare the scale plans ,if required, of station yard for Pahleja station mentioned in scope of work in Vol 1, Section V of bidding documents incorporating all the requirements considered necessary for safety as per IRPWM provisions and overall operational considerations of DFCC.
- (3) Contractor shall prepare the detail yard plans, if required, for obtaining the approval of the concerned Railway authority for which Employer shall provide necessary assistance to the Contractor.

5.0 BALLAST

- (1) All ballast shall be procured from the quarries approved by the Engineer.
- (2) All ballast shall be machine crushed and comply with the specifications set out in IRS GE 1 June 2004 With latest amendments. Necessary sampling as provided in this document shall be carried out by the Engineer before acceptance of ballast.
- (3) When transported by road vehicle all ballast shall be dampened prior to leaving the quarry.
- (4) Minimum ballast cushion and ballast profile below the bottom of sleeper on main lines and on other lines in the yard shall be as under:

Ballast cushion below bottom of sleepers is to be of minimum 350 mm on main lines and 250 mm in other lines in the yard. Slope of the ballast profile below the sleepers shall be taken as H:V=1.5:1.

6.0 BUILDING DESIGN CRITERIA

6.1 GENERAL

- (1) All buildings, required to be constructed under this Contract, shall comply with the applicable Indian building standards and codes. Wherever Standard Railway drawings for buildings are available these shall be followed.
- (2) Contractor to submit all building plans for prior agreement of Engineer.
- (3) Normally ceiling fans shall be provided for air circulation, except where air-conditioning is required which will be indicated by Engineer
- (4) Exhaust fans shall be provided in toilets and other locations as directed by the Engineer.

- (5) At each location water supplies shall be derived from the local water utility wherever possible. If local water utility supplies are not available then adequate no. of Hand Pumps shall be provided to meet the water supply requirements.
- (6) Illumination of buildings and installations shall be as approved by Engineer.
- (7) Energy efficient fittings shall be provided.

6.2 CONSTRUCTION

- (1) The design shall be capable of allowing the construction to be carried out in the minimum time possible and to the required quality standards.

6.3 DURABILITY

- (1) The buildings shall be durable and serve satisfactorily for full service and designed life.
- (2) The building shall be designed to withstand relevant weather conditions of exposure as per the Indian building codes.
- (3) Buildings shall be specially detailed for ductility requirements as per the relevant codal provisions.

6.4 MAINTAINABILITY

- (1) All buildings shall be capable of maintenance with minimum effort.

6.5 AESTHETICS AND CONFORMITY

- (1) The architecture and profile of all buildings shall conform to the local aesthetics, cultural ethos, local architecture and environment, where ever applicable.

6.6 RESPONSIBILITY

- (1) The Contractor is fully responsible for obtaining the necessary clearances for all the drawings including General Arrangement Drawings (GADs) from the pertinent Central/State/local authorities before the commencement of construction. Employer shall assist the Contractor in this regard.

7.0 FENCING DESIGN CRITERIA

- (1) Permanent Fencing to be provided along the IR boundary towards goods yard side at Pahleja Yard.
- (2) Fencing can be designed as RCC/ Pre-cast of suitable strength.
- (3) All fencing construction shall comply with the applicable Indian building standards and codes.
- (4) Fencing height shall be 1.8m.
- (5) The design shall be capable of allowing the construction to be carried out in the minimum time possible and to the required quality standards.
- (6) The fencing and platform shall be designed to withstand Moderate weather conditions of exposure as per the Indian building codes.

- (7) The architecture and profile of all fencing shall conform to the local buildings, aesthetics, architecture and environment.
- (8) While working in vulnerable locations from safety and security point of view. like in close proximity of the running track of Indian Railways the Contractor shall construct temporary fencing, and shall follow the provisions of para 14.2 of Part 2 “Employer’s Requirement, Section V, Volume 5”.
- (9) While working in other locations from safety & security point of view of his working area as detailed in para 2- Part 2 “Employer’s Requirement, Section V, Volume 6, Appendix 2 - Works Areas and Contract Stages”.
- (10) Contractor shall submit plans of all types of fencing to the Engineer for prior agreement.

8.0 LEVEL CROSSING DESIGN CRITERIA

All level crossings on the alignment requiring new construction on DFCC alignment or modifications to the existing level crossings on IR alignment shall comply with the provisions of chapter IX of IRPWM in all respects which includes - track structure, type and width of road, fencing, clearances, rumble strips, gradient, drainage etc., and equipment for level crossing. The level crossing shall be connected to adjacent approach roads after suitable profiling of surface.

The linking of track is not within the scope of this contract. The contractor shall design and construct the level crossing on DFC tracks in such a way that level crossing portion of 2.5 m on either side of the proposed center line of DFC track may be constructed later on with the track linking works of the section without disturbing the construction done in the present contract.

The plan including methodology of work on IR level crossings shall be approved by the Engineer before commencement of works at site.

Gate lodges .as per details of which are given in Reference Document. Part – 4 of bidding document, are coming on DFCCIL alignment. These gate lodges are to be shifted to the new location as approved by Engineer. Gate lodges shall be made as per GAD provided in the reference document. Contractor has to provide sanitary, water supply (Hand Pump) and Electrical Connection at these gate lodges.

9.0 ROAD & GOODS PLATFORM DESIGN CRITERIA

- (1) Contractor shall construct and also maintain; till taking over; roads in Pahleja Yard as per plan and cross section provided in the Reference Document Part-4. The road shall be of adequate strength as per relevant specifications for similar category/cross sections of roads.
- (2) Goods Platform surfacing at Pahleja Yard shall be provided with subgrade, GSB layer, WM, Premix carpet as shown in the cross section of goods platform in Reference Document Part-4.

Section VI. Employer's Requirement

Volume 5 – Construction and Testing

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1.0 CONTRACTOR'S SUPERINTENDENCE

- (1) The Contractor shall submit a staff organisation plan in accordance with the bidding document along with the details of the qualifications and experience of all proposed staff to the Engineer for his approval. This plan shall be updated and resubmitted whenever there are changes to the staff.
- (2) The plan shall show the management structure and state clearly the duties, responsibilities and authority of each staff member.

2.0 CONTRACTOR'S TEMPORARY WORKS DESIGN

- (1) The Contractor shall, prior to commencing the construction of the Temporary Works, submit a certificate to the Engineer 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.

3.0 THE SITE

3.1 GENERAL

- (1) Site details furnished by the Employer are those as identified in **Part 4 "Site Data – Reference Documents"**.

3.2 USE OF THE SITE

- (1) The Site as well as Contractor's equipment shall not be used by the Contractor for any purposes other than for carrying out the Works, except that, with the consent in writing of the Engineer.
- (2) Rock crushing plant, if considered essential shall be located with the prior approval of the Engineer. No rock crushing plant shall be used on the site in violation of local bye laws.
- (3) The location and size of each stockpile of materials, including excavated materials, within the Site shall be as permitted by the Engineer. Stockpiles shall be maintained at all times in a safe and stable condition with all documentary records.

3.3 ACCESS TO THE SITE

- (1) Access to the Railway Envelope by the Contractor shall be in accordance with any procedures, requirements and conditions defined in **Part 2 "Employer's Requirement, Section V, Volume 6, Appendix 4 - Project Program Requirements"**.

3.4 CLEARANCE OF THE SITE

- (1) All Temporary Works which are not to remain on the Site after the completion of the Works shall be removed after approval by the Engineer.
- (2) The Site shall be cleared and reinstated as stated in the Contract.

4.0 SURVEY

- (1) A site survey shall be carried for entire Site to establish its precise boundaries and the existing ground levels and features within it.

- (2) 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.
- (3) 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.
- (4) The plan for survey as well as the final report of the survey shall be made by the Contractor and agreed by the Engineer.
- (5) The Contractor shall relate the construction of the Works to the site grid. To facilitate this, survey reference points have been established and the Engineer will provide benchmarks/ survey points in the vicinity of the site. Upon handing over of site to the Contractor, the maintenance of survey reference points will become the responsibility of the Contractor.
- (6) Before the Contractor commences the setting out of the Works, the Engineer will approve a drawing, provided by the Contractor, showing the position of each survey reference point and bench mark, together with the co-ordinates and/or level assigned to each point.
- (7) The Contractor shall satisfy itself that there are no conflicts between the data given and shall establish and provide all subsidiary setting out points, observation towers and the like which may be necessary for the proper and accurate setting out and checking of the Works.
- (8) The Contractor shall carefully protect all the survey reference points, bench marks, setting out points, observation towers and the like from any damages and shall maintain them and promptly repair or replace any points damaged from any causes whatsoever.
- (9) The Contractor shall regularly recheck the position of all setting out points, bench marks and the like to the satisfaction of the Engineer.
- (10) The Contractor shall ensure that these survey points continue to remain consistent with the bench marks.
- (11) The checking of any setting-out or of any line or level by the Engineer shall not in any way relieve the Contractor of his responsibility for the accuracy or correctness thereof and the Contractor shall carefully protect and preserve all bench-marks, sight-rails, pegs and other things used in setting out the Works.

5.0 ENVIRONMENTAL REQUIREMENTS

The Contractor shall comply with all respects with the Acts and Regulations issued by the Government of India and its authorised agents in respect of the protection of the environment. Particular requirements applicable to this Contract for the protection of the environment during construction are defined in **Part 2 “Employer’s Requirement, Section V, Volume 6, Appendix 12 – Site Safety Plan And Environmental Protection Requirements”**.

6.0 SAFETY MEASURES

6.1 GENERAL

- (1) The Contractor shall be fully responsible for the safety of the Works, his personnel, sub contractors' personnel, the public and all persons directly or indirectly associated with the Works or on or in the vicinity of the Site.
- (2) The Contractor shall treat safety measures as a priority in all his activities throughout the execution of the Works.
- (3) The project site safety requirements have been provided in **Part 2 “Employer’s Requirement, Section V, Volume 6, Appendix12 - Site Safety Plan And Environmental Protection Requirements”** .
- (4) The Contractor shall comply with these requirements provided that the standards set out in the project Site Safety requirements and Contractor’s Site Safety plan shall be regarded as the minimum to be achieved and shall not relieve the Contractor of any of his statutory duties or his responsibilities under the Contract.
- (5) The provisions of the Contract regarding safety shall apply to and be binding upon the Contractor for any part of the Works and the persons employed by sub-contractors of any tier.
- (6) The Contractor shall ensure that the requirements of the Contract in respect of safety are included in all sub-contracts placed by him.
- (7) The Engineer reserves the right to order the immediate removal and replacement of any item of Contractor's equipment or Temporary Works which, in his opinion, is unsatisfactory for its purpose or is in an unsafe condition.

7.0 CARE OF THE WORKS

7.1 GENERAL

- (1) Unless otherwise permitted by the Engineer all work shall be carried out in dry conditions.
- (2) The Works, including materials for use in the Works, shall be protected from damage due to exposure of weather condition, including ingress of water.
- (3) Water on the Site and water entering the Site shall be promptly disposed of at a location or locations to which the Engineer has given his consent.
- (4) The methods used for keeping the Works free of water shall be such that settlement of, or damage to, new and existing structures do not occur.

7.2 PROTECTION OF THE WORKS FROM WEATHER

- (1) 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 Engineer.
- (2) Permanent Works, including materials for such Works, shall be protected from exposures of weather conditions that may adversely affect such Permanent Works or materials.
- (3) During construction of the Works storm restraint systems shall be provided where appropriate.
- (4) These systems shall ensure the security of the partially completed and on going stages of construction in all weather conditions.

- (5) The Contractor at all times shall plan and execute the Works and make all protective arrangements such that the Works can be made safe in the event of storms.

7.3 PROTECTION OF THE COMPLETED WORK

- (1) The finished works shall be protected from any damage that could arise from any activities on the adjacent site/ works, water inflow etc.

8.0 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 especially those pertaining to train operations of existing IR system like working signalling, telecommunication, civil, mechanical, electrical etc.;
 - c) structures (including foundations), roads, 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.
- (2) Heritage structures shall not be damaged or disfigured on any account.
- (3) The Contractor shall inform the Engineer 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.
- (4) Such items shall not be removed or diverted until the consent of the Engineer to such removal or diversion has been obtained.
- (5) 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 Engineer and to at least the same condition as existed before the work started
- (6) Contractor shall use cable route locator to identify cables within the zone of construction, and ensure its safety during construction activity. If required these be relocated/removed as detailed in para 9.0 below.
- (7) Any claims by utility agencies due to damage of utilities by the Contractor shall be borne by the Contractor. The Contractor shall negotiate a settlement in respect of such claims and indemnify the Engineer and the Employer in respect of all claims, proceedings, damages, costs, charges and expenses in relation thereto.

9.0 UTILITIES

Manner of dealing with all types of utilities are defined in **Part 2 “Employer’s Requirement, Section V, Volume 6, Appendix 1 - Utilities”**.

10.0 STRUCTURES, ROADS AND OTHER PROPERTIES

10.1 GENERAL

The Contractor shall immediately inform the Engineer of any damage to structures, roads or other properties.

10.2 ACCESS

- (1) Alternative access shall be provided to all premises if interference with the existing access, public or private, is necessary to enable the Works to be carried out.
- (2) The arrangements for the alternative access shall be as agreed by the Engineer and the concerned agency.
- (3) Unless agreed otherwise, the permanent access shall be reinstated as soon as practicable after the work is complete and the alternative access shall be removed immediately as it is no longer required, and the ground surfaces reinstated to the satisfaction of the Engineer.
- (4) Where ever required service road for construction activity, connectivity to the existing road network for the sake of Works has to be made by the Contractor and no extra payment shall be made for the same.
- (5) Proper signage and guidance shall be provided for the traffic / users regarding diversions.

10.3 TREES

- (1) Manner of dealing with removal of trees from the alignment are defined in **Part 2 “Employer’s Requirement, Section V, Volume 6, Appendix 1 - Utilities”**.

10.4 REMOVAL OF GRAVES AND OTHER OBSTRUCTIONS

- (1) If any graves and other obstructions are required to be removed in order to execute the Works, the Contractor shall draw the Engineer's attention to them in good time. Similarly if there are any permanent structures other than those defined in the utilities, para 9.0 above, these shall be brought to the notice of Engineer in good time to allow all necessary arrangements and authorization for such removal. Contractor shall not itself remove them unless the Engineer has given consent. The modalities of removal shall be after mutual discussion between the Contractor and the Engineer.

10.5 PROTECTION OF THE ADJACENT STRUCTURES AND WORKS

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.

All operations for the execution of the Works shall be carried out so as not to interfere unnecessarily with the convenience of the public or the access to public or private roads or footpaths or properties owned by the Employer or by any other person.

If during the execution of the Works, the Contractor receives any claim arising out of the execution of the Works in respect of damage to highways or bridges etc., he shall immediately report the facts to the Engineer. The Contractor shall negotiate a settlement in respect of such claims and indemnify the Engineer and the Employer in respect of all claims, proceedings, damages, costs, charges and expenses in relation thereto.

11.0 USE OF ROADS AND FOOTPATHS

11.1 GENERAL

- (1) Public roads and footpaths on the Site in which the work is not being carried out shall be maintained in a clean and usable condition.
- (2) 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.
- (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.
- (4) All such loads shall be covered or protected to prevent dust being emitted.

11.2 REINSTATEMENT OF PUBLIC ROADS AND FOOTPATHS

- (1) Temporary diversions, pedestrian access and lighting, signing, guarding and traffic control equipment, if any, shall be removed immediately when they are no longer required.
- (2) 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.
- (3) The Contractor shall submit his design for the reinstatement to the relevant authorities and obtain their prior clearances to carrying out the work.
- (4) Reinstatement works wherever required shall include:
 - a) Footpath and Kerbs
 - b) Road Signage
 - c) Street Lighting
 - d) Landscaping
 - e) Traffic Lights and Control Cable
 - f) Road Painting
 - g) Telecommunication Tower / Cables

12.0 SITE ESTABLISHMENT

12.1 ENGINEER'S MAIN SITE ACCOMMODATION

The Contractor shall provide, erect, maintain and remove the Site accommodation for the use of the Engineer/Employer, as are set out in **Part 2 "Employer's Requirement, Section V, Volume 6, Appendix 15 - Engineer's Accommodation"**.

12.2 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 other construction materials.
- (2) This laboratory shall be at a location agreed to by the Engineer.
- (3) For details of field geotechnical laboratories see Clause 15.2

12.3 CONTRACTOR'S SITE ACCOMMODATION

- (1) The Contractor shall provide and maintain its own site accommodation at locations consented to by the Engineer. Offices, sheds, stores, mess rooms, garages, workshops, latrines and other accommodation on the Site shall be maintained in a clean, safe and secure condition.

12.3.1 Contractor's Labour Camp

12.3.2 General

- (1) The Employer will not provide living accommodation for the use of the Contractor or any of his staff or labour employed on the Works.
- (2) Living accommodation shall not be established on any land provided to the Contractor by the Employer without prior approval of the Engineer.
- (3) It should be ensured by the Contractor that the camp area is cleared of the debris and other wastes and upon completion of construction, the land should be restored back to its original form.

12.3.3 Provision of Labour Camp

- (1) The Contractor shall, at his own expense, make adequate arrangements for the housing, supply of drinking water and provision of bathrooms, latrines and urinals, with adequate water supply, for his staff and workmen.
- (2) No labour camp shall be allowed at any Work site or at any unauthorised place.
- (3) The Contractor at his own cost shall maintain all camp sites in a clean and hygienic condition.
- (4) The Contractor shall obey all health and sanitation 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, Engineer and the staff of the local municipality or other authorities concerned.
- (5) Should the Contractor fail to provide adequate health and sanitary arrangements these shall be provided by the Employer and the cost recovered from the Contractor.
- (6) The Contractor shall at his own cost, provide first aid and medical facilities at the labour camp and at work site.
- (7) The Contractor shall at his own cost, provide the following minimum requirements for fire precautions:
 - a) Portable Fire Extinguishers.
 - b) Making and marking exit plan at locations for exit during fires.
- (8) The Contractor at his own cost shall provide necessary arrangements for keeping the camp area sufficiently illuminated to avoid accidents to the workers.
- (9) The Contractor shall ensure that electrical works are executed by trained electricians and these installations shall be maintained and daily maintenance records be made available for inspection of the Engineer.

12.3.4 Camp Discipline

- (1) The Contractor shall take requisite precautions, and use his best endeavours to prevent any riotous or unlawful behaviour by or amongst his workmen, and others, employed directly or through sub-contractors.
- (2) These precautions shall be for the preservation of peace and protection of the inhabitants and to secure property in the neighbourhood of the Works.
- (3) 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 owned or occupied by, or within the control of, the Contractor or any of his employees directly or through sub-contractors employed on the work, shall be forbidden, and the Contractor shall exercise his influence and authority to secure strict compliance with this condition.
- (4) 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.
- (5) The Contractor shall remove from his camp such labour and their families, who refuse protective inoculation and vaccination when called upon to do so by the Engineer on the advice of the medical authority.
- (6) Should cholera, plague or any other infectious disease break out, the Contractor shall at his own cost burn the huts, bedding, clothes and other belongings of or used by the infected parties.
- (7) The Contractor shall promptly erect new accommodation on healthy sites as required by the Engineer, within the time specified by the Engineer, failing which the work may be done by the Engineer and the cost recovered from the Contractor.
- (8) Identification card/ badges incorporating the name and photograph of the person and the name of the direct employer (Contractor, Sub-Contractor, etc.) shall be provided to all staff.

12.3.5 Labour Accommodation

- (1) The Contractor shall provide living accommodation for all staff employed by himself or his sub-contractors that is equal to or exceeds the minimum criteria established in the following sub-sections.
- (2) The buildings shall be constructed so as to have a minimum life of not less than the length of the Contract.
- (3) The roofs shall be watertight and laid with suitable non-flammable materials permissible for residential use under local regulations and for which the consent of the Engineer has been obtained.
- (4) Each unit shall have suitable ventilation with all doors, windows and ventilators provided with security leaves and fasteners and back to back units are to be avoided.
- (5) The minimum height of each unit shall be 2.10m and each shall have a separate cooking place.
- (6) The Contractor may provide a common cooking place.
- (7) A suitable number of common toilet/bath shall be provided with separate toilets for ladies.

12.3.6 Water Supply

- (1) The Contractor shall provide an adequate supply of water in the Camp.

- (2) Where piped water supply is available, supply shall be at stand posts and where the supply is from wells or river storage tanks shall be provided.
- (3) The Contractor shall also at his expense make arrangements for the provision and laying of water pipe lines from the existing mains wherever available.

12.3.7 Drainage and Sanitation

- (1) The Contractor shall provide efficient arrangements for draining away surface water so as to keep the camp neat and tidy.
- (2) Surface water shall be drained away from paths and roads and shall not be allowed to accumulate into ditches or ponds where mosquitoes can breed.
- (3) 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.
- (4) The Contractor shall provide a sewage system that is adequate for the number of residents in the camp, and which meets the requirements of the municipal authorities.
- (5) The Contractor shall provide latrines and wash places for the use of its personnel and all persons who will be on the Site.
- (6) 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.
- (7) The Contractor shall arrange regular disposal of effluent and sludge in a manner that shall be in accordance with local bye-laws/ regulations.
- (8) 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.
- (9) The Contractor shall also take such steps and make such provisions as may be necessary or directed by the Engineer to ensure that vermin, mosquito breeding etc. are at all times controlled.

12.4 SITE UTILITIES AND ACCESS

- (1) The Contractor shall be responsible for providing water, electricity, telephone, sewerage and drainage facilities for all site accommodation, structures and buildings in accordance with **Part 2 “Employer’s Requirement, Section V, Volume 6, Appendix 8 - Temporary Power Supply and Appendix 15 - Engineer’s Accommodation”** and all such services that are necessary for satisfactory performance of the Works.
- (2) The Contractor shall make all arrangements with and obtain the necessary clearances from the relevant civil and utility authorities for the facilities.
- (3) The Contractor shall be responsible for provision of power supply for its works, plants, equipments and the like etc. from State power supply authorities as well as standby generators etc. at this own cost.
- (4) The Employer cannot guaranty provision of adequate, continuous power supply however assistance will be given in obtaining the necessary permissions for Site generators and the like.

- (5) Access roads and parking areas shall be provided within the Site as required and shall be maintained in a clean, acceptable and stable condition.

12.5 TELEPHONE COMMUNICATION

The Contractor shall be responsible for obtaining and making all payments in respect of all permits licences and charges involved in the provision and use of the telephone system and for ensuring that such arrangements are safe to use at all times during the construction period including Defect Liability period.

12.6 ASSISTANCE TO ENGINEER/EMPLOYER

- (1) The Contractor shall provide for the exclusive use of the Engineer at all times during the Contract all such experienced chainmen, two office attendants, watchmen, instruments, apparatus and protective clothing as required.
- (2) Chainmen and office attendants provided by the Contractor shall be bilingual (Hindi/English).
- (3) All instruments and apparatus shall be maintained in good working order to the consent of the Engineer.
- (4) The minimum equipment/ apparatus to be available for the exclusive use of the Engineer/Employer are listed in **Part 2 “Employer’s Requirement, Section V, Volume 6, Appendix 15 - Engineer’s Accommodation”**.
- (5) The Contractor shall be solely responsible for all such instruments and apparatus and shall ensure that they are at all times in good repair and adjustment and shall replace items as necessary to meet this requirement.
- (6) All equipment other than expendable items shall revert to the Contractor at the end of the Defect Notification Period.
- (7) Any operation of the Works that interferes with the checking of lines and levels shall be temporarily suspended at the request of the Engineer until the checking is complete.
- (8) It may be necessary for chainmen and survey equipment supplied by the Contractor under this Contract to be used occasionally on work outside the Site in connection with the project although not directly associated with construction activities.
- (9) The Contractor shall make all necessary arrangements to permit this requirement to be implemented.

12.7 SUBMISSION OF PARTICULARS

- (1) The following particulars shall be submitted to the Engineer for his consent not more than thirty (30) days after the Commencement Date of the Works:
 - a) Drawings showing the formation works and the layout within the Site of the Engineer's accommodation, 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 layout and the construction details of the Engineer's accommodation; and

- c) Drawings showing the details to be included on the project signboards and diversion boards.
- (2) Drawings showing location of stores, storage areas, concrete batching plants and other major facilities and their access roads/paths shall be submitted to the Engineer 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.

13.0 SECURITY

- (1) The Contractor shall be responsible for the security of the Site for the full time the Site is in its possession, except for the specific case of the Railway Envelope after handover to the Employer.
- (2) The Contractor shall always maintain all Site boundary fences in good 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., is not restricted by the system or method of achieving the required security measures.
- (3) Notices shall be displayed at intervals around the Site to warn the public of the dangers of entering the Site.
- (4) 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 sub-contractor's work and equipment and shall co-ordinate and plan the security of both the work under this Contract and the work of others having access to and across the Site and the Works.
- (5) The Contractor shall liaise with the sub-contractors and the contractors responsible for the adjacent and other interfacing contracts and ensure that co-ordinated security procedures are operated, in particular in respect of vehicles permitted to pass through the Site and/or the adjacent sites in the latter periods of the Contract.

14.0 CONSTRUCTION-EARTHWORKS

14.1 GENERAL

- (1) Prior to the commencement of construction operations, the Contractor shall obtain all necessary clearances from the concerned authorities.
- (2) Prior to the commencement of any site work, the Contractor shall submit and obtain approval of relocation/ removal of all types of utilities as required vide Appendix 1 of Part 2 Vol 6 of this Bidding Document.
- (3) Contractor shall provide a temporary barricading, as shown in the safety / protection arrangement sketches, to ensure safety of running traffic on adjacent Indian Railway Track.

14.2 PRECAUTIONS WHILE WORKING IN CLOSE PROXIMITY OF EXISTING INDIAN RAILWAY TRACK

14.2.1 General

Any construction activity involving the existing embankment/formation/ running track of the Indian Railways shall be carried out only with the prior specific authorization of the Engineer.

14.2.2 Works being executed outside running lines are further divided into

following 3 sub groups depending upon their distance from the IR track:-

- a) works being done within 3.5 meters from centre of track.
- b) works being done between 3.5 meters and 6 meters from centre of track
- c) works being done beyond 6 meters from centre of track

If a work site is located far away from the existing track but the vehicles in connection with the work are required to ply within the distance from center of track as mentioned above, it will be construed that the work is being executed under above classification.

14.2.2.1 Works being done within 3.5 meters from centre of track.

All works planned within 3.5 meters from centre of running line or which involve working of machineries and vehicles within this zone, are to be done essentially under block protection and necessary safety precautions for protection of track as per para 806 and 807 of IRPWM be taken. This includes even occasional plying of vehicles/ machineries for short durations.

14.2.2.2 Works being done between 3.5 meters and 6 meters from centre of track.

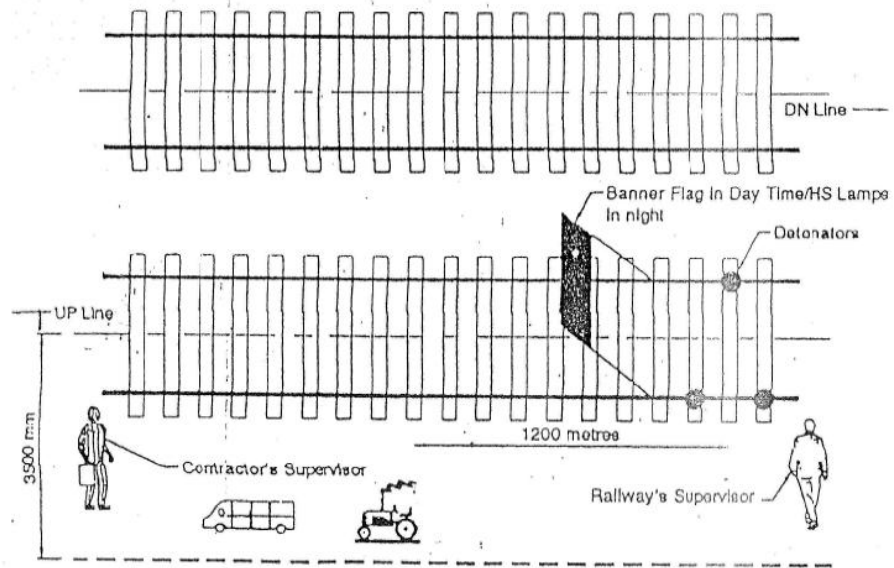
Following precautions be taken when works are required to be done between 3.5 meters to 6 meters from track centre or machines/vehicles are required to work/ply within this zone.

- (i) Before start of work demarcation should be done parallel to running track at a distance of 3.5 meters from centre of track in advance, as per sketch B, by 150 mm wide white line of lime. Any work or movement of machinery infringing this line will need block protection. Rail barricading should be put up at such locations, as per sketch C, to ensure that even by carelessness or over sight, vehicles do not infringe fixed dimensions. Barricading design shall be approved by the Engineer.

SAFTY/PROTECTION ARRANGEMENT SKETCHES

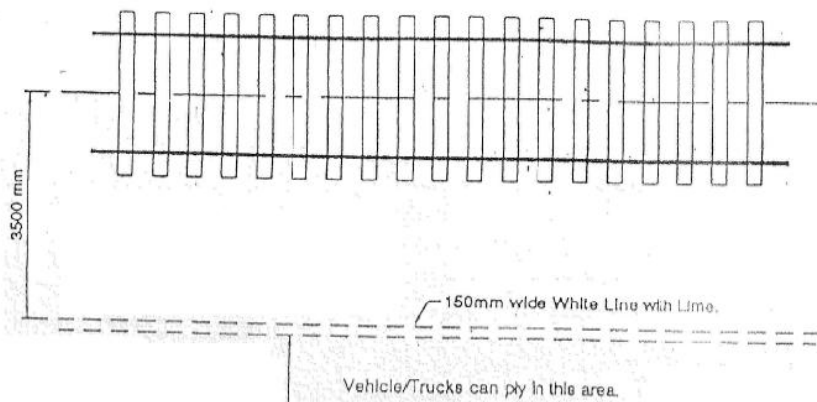
SKETCH - A

Plying of Vehicles/Machinery within 3.5 Mts. from centre of track.

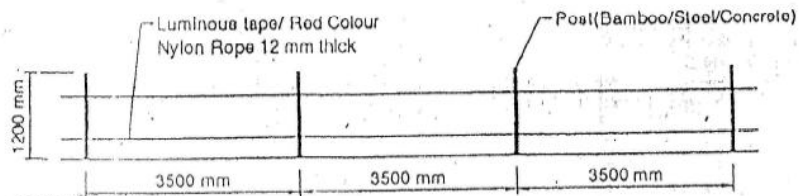
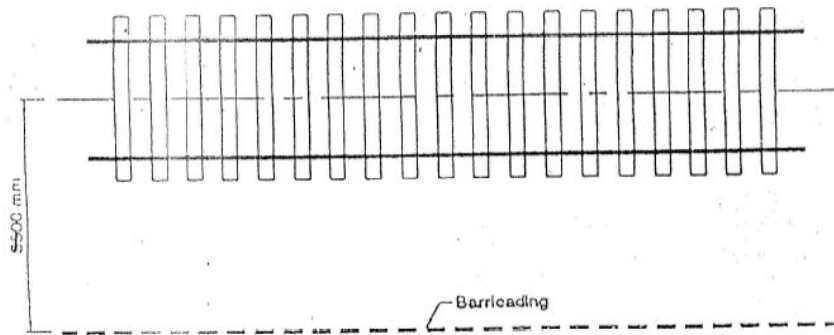


SKETCH - B

Marking of White Line with Lime.

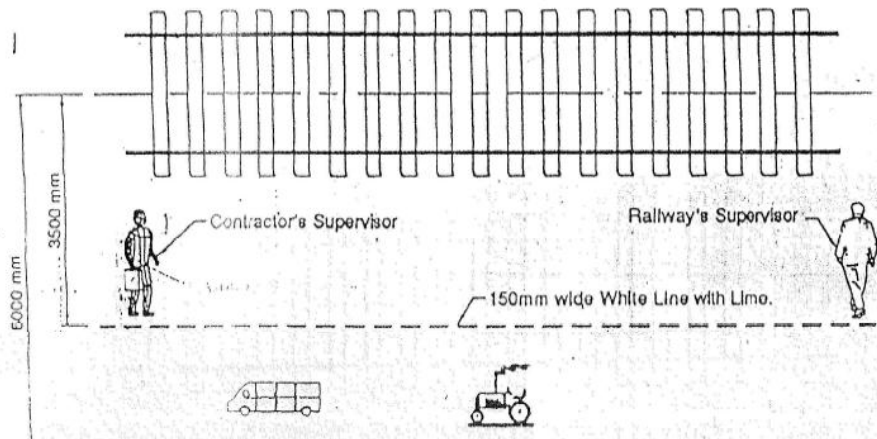


Provision of Barricading.



Elevation of Barricading

Plying of Vehicles/Machinery between 3.5 Mts. to 6.0 Mts. from centre of track.



- (ii) In case vehicles have to ply or machineries have to work within this zone, railway's and contractor's supervisors be positioned as shown in sketch D except for the following:
 Instead of a Railway supervisor it would be a responsible and trained staff of the Contractor as mentioned in para 14.2.2.1 (ii) above.
- (iii) Additional trained staff of the Contractor, as mentioned in para 14.2.2.1 (ii) above, shall be posted where turning of vehicles is required during working e.g. earth work, bridge work, ballasting etc. Location for reversing vehicles should be nominated and it should be selected in such away that there is no danger to running trains at such a location. Such trained staff of the Contractor should be available with hand flags so that vehicles do not come closer to track by 3.5 meters. Wherever vehicles have to take turn, it should be done in such a way that the driver is invariably facing the running track at all times.
- (iv) Look out men should be posted along the track at a distance of 800 meters from location of work with red flag and to whistle in face of road vehicles and approaching trains. Look out men shall also be suitably trained staff of Contractor as mentioned in para 14.2.2.1 (ii) above.
- (v) In addition to look out men, caution order needs to be issued to trains and speed restrictions imposed wherever considered necessary through Employer.
- (vi) Arrangements should be made to protect the track in case of emergency at work site.
- (vii) All temporary arrangements required during execution should be done in a manner that moving dimension is not fringed.
- (viii) Individual vehicle/machinery shall not be left unattended at site of work. If it is unavoidable and essential to stable it near running track, it shall be properly secured and manned even during non working hours with all arrangements to protect the track from infringement.
- (ix) Any materials unloaded or shifted along the track should be kept clear of moving dimensions and stacked at a specified distance from running track.
- (x) Movement of vehicle/working of machineries should be prohibited at night. However, in case of emergency when night working is unavoidable, adequate lighting shall be provided with all protection measures as mentioned above in full force. All night working near IR track shall require Engineer's prior approval.
- (xi) The work site should be suitably demarcated to keep public and passengers away. Necessary signages, boards, such as "work in progress" etc should be provided at appropriate location to warn public/passengers.
- (xii) Contractor's drivers/operators handling vehicles/machineries shall be issued a fitness certificate by the safety officer of the Contractor after educating them about safety norms and after taking assurance in writing for working within vicinity of railway's track.
- (xiii) While working on cuttings with machineries or when there is movement of vehicles above cutting, if there is possibility of any of

the following circumstances, work has to be done under block protection:

- a) Any possibility exists for machinery/vehicle after toppling/due to loss of control come over track or infringe it.
- b) Chance of machineries/vehicles to come within 3.5 meters from track centre though working beyond it.

14.2.2.3 Works being done beyond 6 meters from centre of IR track.

No precautions are needed except in cuttings or where the work can affect train running in any way.

14.2.3 Procedure to be followed for cutting of existing IR formation

Locations where it is necessary to cut the existing IR formation for the construction of the DFC formation, are classified into the following two categories:

- a) Where the distance between the centre line of existing IR track and the proposed DFC track is less than 8 m
- b) Where the distance between the centre line of existing IR track and the proposed DFC track is greater than or equal to 8 m

14.2.3.1 Distance between centrelines of IR and DFC track is less than 8 m.

(1) Such a situation may arise while working in existing IR yards. In such cases, if it is agreed with IR to suspend the nearest IR line for the traffic, the existing IR formation can be cut vertically at a distance of 3.8 m from the centre line of the proposed DFC track for the depth required to provide the formation layers (blanket and prepared sub grade) of the DFC track as per specifications. In case it is not agreed to suspend the traffic on nearest IR line, detailed methodology for the work will be submitted by contractor to the Engineer for the approval and work will be executed accordingly following all safety precautions.

(2) Due care and precautions shall be taken to avoid any slippage of the cut. In case of any slippage, damage or disturbance of the IR track and formation, the Contractor shall rectify and restore the same to its original configuration at his own cost to the satisfaction of the Engineer.

(3) The suspension of the IR line will not be more than two weeks and this portion of the earthwork shall be completed within this period.

(4) This work shall not be carried out during monsoon, during rainy days or when the IR formation is in a saturated condition.

14.2.3.2 Distance between centrelines of IR and DFC track is greater than or equal to 8 m.

(1) While constructing the bank by the side IR running track, benching of existing slope shall be done, before new earthwork is taken up, to provide proper bonding between old and new earthworks. It should be ensured that there is no humus material left on the benched slope. Care need to be taken to avoid entry of rain water into the formation from this weak junction to avoid development of weakness in formation, slope failure, maintenance problems due to uneven settlement.

(2) Starting from the toe, benching at every 30cm height shall be done on the sloped surface of existing IR bank as in sketch below, so as to provide proper amalgamation between old and new earthwork.

14.3 CLEARING AND GRUBBING

- (1) Unless otherwise directed by the Engineer, the area to be cleared is that which is occupied by the completed works and stockpile sites, plus a clearance of 2m beyond the toe of embankments and top of cuts.
- (2) The Contractor shall ensure that the operations are only carried out within the project right-of-way limits and only such methods, tools and equipments which will not affect the property outside the limits or objects designated to remain shall be employed.
- (3) The area within the specified limits shall be cleared and grubbed of all trees, shrubs, vegetation, stumps, stones, debris, trash, organic matter, any other objectionable materials or obstructions except those designated to remain as stated in the contract documents or as directed by the Engineer.
- (4) Contractor shall also remove any scattered material such as Rails and Sleepers of Indian Railways, if any, and stack it at a location specified by Engineer.
- (5) Grubbing is to be carried out to a level of 0.5 m below the natural ground surface or 1.5 m below the formation level, whichever is deeper.
- (6) Any depressions and holes shall be filled with suitable soils and compacted.
- (7) All materials arising from site clearance and preparation work shall be the property of Employer and the same except objects/materials designated to remain or specified for reuse or salvaging or as otherwise specified by the contract documents or directed by the Engineer shall be removed from the site as the work progresses and shall be disposed of in a satisfactory and acceptable manner in locations outside the project limits with the approval of Engineer.
- (8) Such materials should not be permitted to accumulate and the site shall be maintained in a safe and workman like condition at all times.
- (9) Obtaining of all necessary consents, permits and clearances for clearance and disposal shall be the sole responsibility of the Contractor.

14.4 SETTING OUT

- (1) The Contractor shall be responsible for the true and proper setting out of the Works and for the correctness of the position, alignment, levels and dimensions of all parts of the Work.
- (2) The Contractor shall establish a system of horizontal and vertical controls in relation to the reference bench marks and coordinates as specified by the Engineer, as required for the setting out and verifying the position, line, levels and dimensions of the earthworks and drainage works during the execution.
- (3) The Contractor shall keep updated schedules and drawings of such information and shall submit the same to the Engineer as the setting out proceeds.
- (4) All bench marks and control points shall be of robust construction, facilitate easy identification and shall be checked regularly for accuracy, carefully protected and maintained in good working condition to the satisfaction of the Engineer, till the completion of the contract.

- (5) If any of the bench marks or permanent ground markers become displaced or damaged during the Contract, then the Contractor shall re-establish them immediately to the satisfaction of the Engineer and provide the Engineer with the amended position and level details.
- (6) The Contractor shall not commence any construction activity at the site before obtaining the approval of the Engineer to the setting out of the Site boundaries.
- (7) The checking of any setting out or any line, level or dimension by the Engineer or the Engineer's representative shall not in any way relieve the Contractor of his responsibility for the correctness thereof.

14.5 EXCAVATION

- (1) The Contractor shall ensure that the safety and stability of all adjacent structures is ensured at all times and take suitable precautions against any soil erosion and water pollution
- (2) Excavations shall be carried out to the lines, levels, dimensions and slopes as shown on the drawings or as directed by the Engineer.
- (3) The Contractor shall not excavate outside the limits set by the Engineer. Undercutting of slopes will not be permitted under any circumstance

14.6 GROUND PREPARATION

- (1) Where ever necessary the ground surface shall be scarified, moisture added as required and compacted so as to ensure a satisfactory foundation for the placement of formation / prepared sub-grade / blanket.
- (2) Any portion of the ground or existing embankment slope steeper than 1v on 4h shall be benched in accordance with standard procedures before filling is placed on it, unless otherwise directed by the Engineer.
- (3) In case the ground surface is too soft or deformable to function as a satisfactory base for the placement and compaction of formation / prepared sub-grade / blanket (as applicable), suitable stabilization should be carried out so that the fill materials can be placed and compacted to the specified density. Details of any such stabilization should be submitted to the Engineer for approval before any stabilization works commence.
- (4) Any foundation treatment required for High Embankments shall be carried out in accordance with the designs, material specifications, drawings and methodology as approved by the Engineer.
- (5) The construction of any section of formation / prepared sub-grade / blanket (as applicable) shall not be commenced until the foundation for that section has been cleared by the Engineer and ground levels recorded jointly.

14.7 FILLING

- (1) Materials arising from site clearance and preparation work shall be subject to relevant acceptability tests to assess its suitability for re-use on site or landfill waste acceptance criteria if applicable. The fill material shall be placed, spread, graded and compacted in layers of uniform quality and thickness, parallel to the camber and grade for the full width of the cross-section unless specified otherwise or approved otherwise by the Engineer.

- (2) The movement of all construction vehicles and other traffic shall be distributed over the full width of the filling area, so as not to damage or overstress the construction.
- (3) Damage by construction plant and other vehicular traffic shall be repaired by the Contractor to the satisfaction of the Engineer. Successive layers shall not be placed until the layer under construction has been thoroughly compacted, tested and passed by the Engineer.
- (4) Additional filling width of 500 mm shall be placed on either side to ensure proper compaction of the fill at the edges, with the extra soil later cut and dressed to avoid any loose earth on the slopes.
- (5) In the absence of field compaction trials, the maximum compacted lift thickness shall be limited to 200mm.
- (6) The Engineer may allow higher lift thickness, provided the Contractor satisfactorily demonstrates the efficacy of the compaction equipment and methodology through field compaction trials.
- (7) Field compaction trials shall be in accordance with RDSO guidelines.
- (8) Moisture content of fill materials as placed shall be uniform throughout the lift and shall be within the limits specified in accordance with IS:2720:Part 8: 1983 or approved Design and Drawings of formation.
- (9) Each lift of fill shall be compacted using appropriate equipment and standard procedures as agreed with the Engineer, so that the specified relative compaction is achieved uniformly and throughout the full depth of the layer.
- (10) For formation, the minimum relative compaction with respect to the maximum dry density shall be determined in accordance with IS:2720: Part 8:1983 or approved Design and drawings of formation.
- (11) In case any lot or part of the earthworks has failed to meet the acceptance criteria during quality control checks, the entire lot or part shall be rectified to the satisfaction of the Engineer.
- (12) The Contractor shall investigate all such instances of poor quality of work, identify the reasons and shall take the necessary corrective action.
- (13) In case a layer or portion of the earthworks which has been completed and accepted by the Engineer is subsequently damaged or deteriorated at any time till the completion of the contract, the same shall be rectified by the Contractor to the satisfaction of the Engineer.

14.8 PREPARED SUB-GRADE

- (1) The construction procedures for prepared sub-grade are similar to that used for embankment fill, with the additional requirements of higher relative compaction and frequency of quality control testing.
- (2) For prepared sub-grade, the minimum relative compaction with respect to the maximum dry density determined in accordance with IS:2720: Part 8:1983 shall be as per GE - 14 or as per the approved Design and Drawings of formation.

14.9 BLANKET

- (1) The construction procedures for blanket are similar to that for embankment fill, with the additional requirements of higher relative compaction and frequency of quality control testing.
- (2) For blanket, the minimum relative compaction with respect to the maximum dry density determined in accordance with IS:2720: Part 8:1983 shall be as per GE - 14 or as per the approved Design and Drawings of formation.

14.10 FINISHING

- (1) The top surface and side slopes of the formation shall be shaped, dressed and finished to conform to the alignment, levels, cross-sections, dimensions and cross slopes shown on the approved construction Drawings and to the requirements and tolerances stated in this specification. Ballast bed shall be laid only after the top surface has been cleared by the Engineer.

14.11 RETAINING STRUCTURES

- (1) Method and sequence of construction of retaining walls, drainage bay and backfilling shall be in accordance with approved Design and Drawings for this purpose.
- (2) The sequence of activities shall be well-coordinated with the construction of earthworks.
- (3) Quality control of concrete shall conform to the requirements of IS 456.

14.12 EROSION CONTROL

- (1) All erosion control arrangements including revetment/ sodding - type of soil, source of sods, anchoring arrangements, fertilizer usage, small gap filling arrangement etc. shall form part of Design of Embankment/formation and approved before execution at site.
- (2) The surface to be sodded shall be checked to ensure that it has been constructed to the required slope and cross-sections.
- (3) The surface shall be freed of all stones larger than 50 mm, and any other undesirable objects or materials.
- (4) Where the surface to be sodded consists of soils suitable for sustaining vegetation, the soil should be scarified in a direction parallel to the alignment to a depth of about 50mm.
- (5) Where the surface to be sodded consist of soils which cannot be improved sufficiently to support good plant growth by the addition of fertilizers and/or other additives, the surface shall be scarified and a 75 mm thick layer of topsoil shall be placed and compacted using a light-weight compactor.
- (6) The surface of the top soil shall be scarified in a direction parallel to the alignment to a depth of about 50mm.
- (7) Where ever required fertilizer and additives like lime etc. shall be spread uniformly on the prepared surface and worked into the soil. The type and quantum of fertilizer and any other additives and method of application shall be suitable for the sods.
- (8) Immediately prior to implanting sods, the soil shall be uniformly moist to a depth of 150 mm.

- (9) If this condition is not met by natural means, the Contractor shall carryout watering as directed by the Engineer.
- (10) The final prepared surface shall be made slightly rough to ensure a good penetration of roots into the soil.
- (11) Sods once harvested or delivered from a nursery, shall not be allowed to dry out. Sods shall be planted within 24 hours of being removed from the soil or growing medium, unless proper storage arrangements can be made by the Contractor.
- (12) Sods shall be laid in regular rows with staggered joints and with individual pieces closely butting against each other without any openly visible gaps or any overlaps between pieces.
- (13) The first row of sods, where it is possible, shall be laid in a straight line and starting at the bottom of the slope.
- (14) Any gaps shall be planted with a sod cut to the gap size or, filled with top soil.
- (15) Sods shall be suitably tamped to ensure a good bond with the underlying soil.
- (16) Where the slope is 2 (horizontal) to 1 (vertical) or steeper, the sods shall be secured against slippage by anchoring them with stakes, pegs or pins driven almost vertically into the soil to be almost flush with the sods.
- (17) The type, length and spacing of the anchoring fixtures shall be chosen by the Contractor to ensure stability of slopes.
- (18) After completion of planting, the surface shall be cleaned off all excess soil, sods and any other undesirable objects or materials.
- (19) The sods shall be well-watered after planting and not be allowed to deteriorate due to lack of moisture.
- (20) The Contractor shall maintain the sodded areas by watering, fertilizing, replanting etc. as required to establish a uniform and healthy turf free of eroded or bare areas until the completion of the contract period.
- (21) For High Embankment or at certain location, earth slopes may warrant revetment works which shall be carried out as per the approved Drawings and methodology as per 14.12(1) above.

14.13 DRAINAGE

- (1) Methodology, construction and sequence of construction of side drains shall be carried out in accordance with Good For Construction Drawings.
- (2) The level at any point on the surface of the lining shall be within ± 20 mm of the design levels.
- (3) For other types of drains, the construction shall be carried out as per the Drawings along with methodology agreed by the Engineer.

14.14 RCC Pipes for Signalling and Communication cables

While doing earthwork Contractor shall make provisions of suitable RCC pipes at the following locations at his own cost including pipes:-

- i) At Level Crossing Gates

- a) 2X200mm dia RCC pipes across the formation near the gate lodge.
- b) 1X200mm RCC pipe across the road surface near the lifting barrier.
- ii) At approach of RFO
1 x 200 mm dia RCC pipes across the formation at both approach of the RFO.

15.0 QUALITY CONTROL

15.1 GENERAL

- (1) The Contractor shall be responsible for quality control including all testing, checking and measurement.
- (2) The Employer or the Engineer may carryout independent quality control tests through his own personnel or other agencies.
- (3) The Contractor shall provide all necessary assistance and cooperation to the Employer and the Engineer in obtaining samples for laboratory tests or carrying out field tests.

15.2 FIELD GEOTECHNICAL ENGINEERING LABORATORY

- (1) The Contractor shall establish and operate or hire approved field geotechnical laboratories adequately equipped to carry out all required in-situ and laboratory tests to assess the nature and properties of the sub-soils, monitor and control the properties of the blanket and borrow materials and finished earthworks which are of significance to design, construction and performance of the formation and earthworks.
- (2) The number and location of the laboratories shall be finalized in consultation with the Engineer on the basis of the volume of earthworks, schedule of completion, frequency of testing etc.
- (3) The laboratories shall have all the required facilities, equipment and competent staff for carrying out all the tests which are required for purpose of quality control.
- (4) The number of sets of equipment for each test and the number of staff deployed shall be adequate to ensure the specified frequency of testing without adversely impacting the time schedule of construction
- (5) All equipment and accessories shall conform to the appropriate Indian or approved international standard, from a reputed manufacturer and shall be in good working condition.
- (6) Wherever applicable, the equipments or parts shall be calibrated in accordance with established standards and practices.
- (7) Each laboratory shall be furnished with an original set of the latest version of all relevant standards for all the required test methods
- (8) Contractor shall systematically maintain records of all tests in a format approved by the Engineer.
- (9) The Contractor shall ensure unhindered access at all times to Employer, Engineer or their representatives to inspect the laboratory, equipments and samples, to witness the tests and to verify the records.
- (10) Employer and the Engineer shall have the right to use the field laboratory to make independent assessments of the accuracy and repeatability of the

tests and verification of the results by their personnel or representatives from time to time.

15.3 QUALITY CHECK ON MATERIALS

- (1) The tests to be conducted and their frequency for materials used as blanket, prepared sub-grade, formation etc. shall be as specified in IS 2720.

15.4 QUALITY CONTROL OF COMPACTION

- (1) Control on compaction shall be exercised on each lift of compacted materials by taking measurements of the dry density and moisture content of the compacted fill at representative locations selected at random.
- (2) Each sample constituting a set of measurements representing a part or lot of the lift shall comprise a minimum of 6 individual test locations (which may be increased to 10 if considerable variations in individual test results are observed).
- (3) The frequency of sampling will be as per approved specification of earthwork.
- (4) The benchmark test method for dry density shall be the sand replacement method in accordance with IS:2720: Part-28.
- (5) The benchmark test method for moisture content shall be oven-drying in accordance with IS:2720: Part 2.
- (6) Calcium carbide gas pressure moisture tester may be used subject to the condition that reliable soil-specific correlations are established with results obtained in accordance with IS:2720: Part 2
- (7) Nuclear gauge method may be used for the determination of both density and moisture content subject to the following conditions and with prior approval of the Engineer:
 - a) The test is performed by a qualified and competent operator well-trained in the use of the equipment;
 - b) Reliable soil-specific correlations are established with density measurements in accordance with IS:2720:Part-28 and moisture content measurements in accordance with IS:2720: Part 2;
 - c) The equipment is standardized and calibrated in accordance with standard procedures;
 - d) The method shall not be used in locations close to objects or structures which can induce incorrect readings.
- (8) Use of any methods other than listed above shall be only with the permission of the Engineer and provided that the method is demonstrated to be suitable for the soil types and compaction methods used, gives reliable results consistently and offers significant advantages over the standard methods in terms of speed, frequency of sampling, automation, safety etc.
- (9) Control shall not be based on the result of any one individual test but based on the mean value obtained for a sample (comprising a set of minimum of 6 to 10 individual test locations)

15.5 TOLERANCES FOR FINISHED WORKS

- (1) The top width of the formation (measured at the top of the blanket) and the bottom width of cuttings shall not be less than the specified width
- (2) The finished surface of the formation (top of blanket) shall be constructed to the following tolerances:
 - a) The finished level shall be within + 0mm and - 25mm of the level shown on Drawings
 - b) The deviation of the finished surface from a 3m straight edge laid on the surface parallel to the alignment shall not exceed 15mm.
 - c) The deviation of the finished surface from a 3m straight edge laid on the surface perpendicular to the alignment shall not exceed 15mm.
 - d) The cross-slope of the formation shall not deviate from the cross-slope shown of the drawings by more than 3mm per metre.
- (3) The cross-slope of the finished surface of cuttings shall not deviate from the cross-slope shown of the Drawings by more than 3mm per metre.
- (4) Side slopes of fills and cuts shall not be steeper than the slopes shown on Drawings
- (5) The finished surface of the prepared sub-grade and blanket shall not have depressions or ridges which could hold water or prevent proper drainage

15.6 COMPLETION AND ACCEPTANCE

- (1) The Contractor shall complete the earthworks, erosion control and drainage works in accordance with the drawings agreed by the Engineer.
- (2) The Contractor shall carryout a final survey of the completed earthworks to certify that the earthworks have been placed within the specified tolerances to the design alignment and grades and furnish the results to the Engineer.
- (3) The Contractor shall provide As-Built Drawings for the earthworks, erosion control and drainage works
- (4) The Contractor shall maintain the earthworks, erosion control and drainage works for the Defect Notification Period as specified in the contract.
- (5) The Contractor shall provide a handover package containing, but not limited to, the following data:
 - a) Subsoil investigation reports
 - b) All records related to material testing and quality control including request for inspections and test reports.
 - c) Construction records and feedback reports, instrumentation and performance monitoring details.

16.0 CONSTRUCTION-BRIDGES

- (1) The design shall be capable of allowing the construction to be carried out in the minimum time possible and to the required quality standard.
- (2) The construction methodology to be adopted for RFO shall be such as to allow unhindered and safe movement of existing rail traffic with minimum numbers and duration of traffic blocks and incorporating suitable temporary arrangements conducive to working under running traffic.

- (3) Where track closures (traffic blocks) are required for construction, the Contractor is responsible for the coordination with IR and will be assisted as applicable by the Employer/Engineer.
- (4) When the Design has assumed a particular sequence of construction in order to account for the construction load effects, the same sequence is to be followed during the construction.
- (5) All structural materials/products like non-pre-stressing and pre-stressing steel, pre-stressing anchorage system, bearings, expansion joints, etc shall be procured from IR/RDSO approved suppliers or from other approved suppliers with the approval of Engineer.
- (6) Concreting process all structures including insitu, transported, ready mix concrete, batch mixing plant etc. for manufacturing, supplying, placement and testing shall always comply with the provisions of IS 456 or other applicable codes. Any deviation shall have prior consent of the Engineer. Curing of concrete shall be ensured as per the applicable codes of practice.

17.0 CONSTRUCTION - Ballast Bed

- (1) The ballast duly inspected by the Engineer shall be brought at site such that it is free from quarry dust and any other contamination.
- (2) Ballast bed shall be laid directly on to the prepared formation and support structure like bridge deck slabs, using methods that keep the amount of road traffic over the formation and support structures to a minimum and that make no damage to the utilities and other structures as existing at or near the site.
- (3) The ballast shall be laid in loose layers of maximum 100mm thickness each and compacted by a minimum of 4 passes of a smooth vibrating roller having a minimum static load of 4kN per 100mm of width or similar.
- (4) The ballast bed shall be laid so as to make an initial neat ballast cushion of **approx. 200 mm below the bottom** of the sleepers after the required rolling.
- (5) The ballast bed shall be neatly dressed up so that there is no obstruction to working of the plant and machinery for further activities of rail spreading, sleeper laying etc.
- (6) On completion of the ballast bed a survey shall be undertaken to demonstrate the acceptability of the bottom ballast for track laying. Track laying is not in the scope of the present work. The prepared ballast bed shall be inspected and approved by the Engineer.
- (7) The contractor shall provide the balance quantity of ballast in the stacks at locations as approved by the engineer.
- (8) In case spare land is available with the Employer the same can be handed over to the Contractor free of cost for the purpose of establishing temporary construction depot(s)/stacking of Ballast. However, whenever Employer requires this portion of land back, the same shall be handed over to the Employer with a month's notice at no extra cost/compensation to the Contractor.

17.1 FENCING

The fencing shall be constructed as per the agreed Drawings and methodology. .

17.2 TEMPORARY WORKS

- (1) The land, as required for all the temporary arrangements and works including the requirement of borrow pits, quarrying, etc. shall be arranged by the Contractor by himself at his own cost. While extracting material from the borrow pits he shall ensure compliance of applicable provisions as per Environment Management Plan (EMP) of DFCC.
- (2) All temporary works shall be removed on completion of permanent works, or as directed by the Engineer.

18.0 OTHER ENGINEERING WORKS

- (1) Works of approach road construction, fencing, Goods platforms, modification of level crossing gates etc. shall be done as per the drawings and procedures agreed by the Engineer based upon the Design criteria mentioned in Volume 4, Employer's Requirement, Part 2 of the Bidding Document.

19.0 TESTING

19.1 GENERAL

- (1) The Contractor shall provide and perform all forms of testing procedures applicable to the Works and various components including all necessary factory, site and acceptance tests required therein. Until the time the Works are taken over by the Employer, Contractor shall maintain the same in a manner so as to continuously meet the acceptance criteria for all aspects, as per the requirements mentioned in the **Employer's Requirement, Part 2 of Bidding Documents**. Contractor shall make a consolidated list of all the tests required for Testing alongwith the testing procedures and applicable codes/ manuals and submit the same to the Engineer for enabling a joint program of testing.
- (2) All testing procedures shall be submitted at least twenty eight (28) 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 changes in design of civil works, interface systems or the identification of additional testing requirements.
- (4) The Engineer, the Employer's Personnel and authorized agencies shall at all reasonable times:
 - (a) Have full access to all parts of the Site and to all places from which natural Materials are being obtained, and
 - (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.

- (c) The Contractor shall give them 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. They shall be provided the facilities for monitoring all tests and have access to all testing records.
- (5) Ample time shall be allowed within the testing programmes for necessary alterations to equipment, systems and designs to be undertaken, engagement of Engineer, together with re-testing .
- (6) All costs associated with the testing as above shall be borne by the Contractor, unless otherwise specified, including the services of any specialised personnel or independent assessors concerned to the work done by him. 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 for the works done by him.
- (7) Unless agreed in writing by the Engineer, the personnel engaged on testing shall be independent of those directly engaged in the design or installation of the same equipment.
- (8) All testing equipment shall carry an appropriate and valid calibration labels.
- (9) Examination of Works before covering up: No work or part of work shall be covered up or put out of view, without the prior approval of the Engineer or the Engineer's Representative. The Contractor shall uncover any part or parts of the Works, or make openings in or through the same, as the Engineer may from time to time direct, and shall reinstate and make good such part or parts, to the satisfaction of the Engineer.
- (10) If any defect or damage is one requiring immediate attention from a safety, environment or operational aspect, the Engineer has the authority to proceed with the rectification in any manner suitable and deduct the cost from the next due interim payment.

19.2 BATCHES, SAMPLES AND SPECIMENS

- (1) A batch of material is a specified quantity of the material that satisfies the specified conditions.
- (2) 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 Engineer there is sufficient proof that the other specified conditions applying to the batch apply to all of the material delivered over the period.
- (3) 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.
- (4) A specimen is the portion of a sample that is to be tested.

19.3 SAMPLES FOR TESTING

- (1) Samples shall be of sufficient size and in accordance with relevant standards to carry out all specified tests.
- (2) Samples taken on the Site shall be selected by, and taken in the presence of, the Engineer and shall be suitably marked for their identification. An

identification marking system should be evolved at the start of works in consultation with the Engineer.

- (3) 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.
- (4) Samples shall be delivered by the Contractor, under the supervision of the Engineer, 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 Engineer.
- (5) 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.
 - (d) Engineer is in agreement with the proposal of Contractor.
- (6) Additional samples shall be provided for testing if in the opinion of the Engineer:
 - 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.

19.4 TESTING

- (1) The Contractor shall be responsible for all on-site and off-site testing and for all in-situ testing.
- (2) All appropriate laboratory tests shall be carried out in the Contractor's laboratory, unless otherwise permitted or required by the Engineer.
- (3) 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 provided that:
 - a) they are accredited for the relevant work to a standard acceptable to the Engineer , and
 - b) particulars of the proposed laboratory are submitted to the Engineer for his consent.
 - c) Prior intimation to the Engineer shall be given regarding the date/time and location of testing.
- (4) In-situ tests shall be done in the presence of the Engineer.
- (5) Equipment, apparatus and materials for in-situ tests and laboratory compliance tests carried out by the Contractor shall be provided by the Contractor.

- (6) 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 Engineer.
- (7) The equipment, apparatus and materials for in-the situ tests shall be removed by the Contractor as soon as practicable after the testing is complete.
- (8) The Contractor shall be entitled in all cases to attend the testing carried out in the other laboratories, to inspect the calibration certificates of the testing machines and to undertake the testing on counterpart samples.
- (9) Testing of such samples shall be undertaken in laboratories and particulars of the laboratory proposed shall be submitted to the Engineer for consent prior to the testing.
- (10) Attendance on tests, including that by the Engineer, Contractor and Designer, shall be as laid down in the Quality Assurance procedures.

19.5 COMPLIANCE OF BATCH

- (1) The results of tests on samples or specimens shall be considered to represent the whole batch from which the sample was taken.
- (2) A batch shall be considered as complying with the specified requirements for a material if the results of specific tests of the specified properties comply with the specified requirements for the properties.
- (3) If additional tests are permitted or required by the Engineer but separate compliance criteria for the additional tests are not stated in the Contract, the Engineer shall determine if the batch complies with the specified requirements for the material on the basis of the results of all tests or may decide to get special tests undertaken.
- (4) The cost of such tests shall be borne by the Contractor.

19.6 RECORDS OF TESTS

- (1) 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 Engineer within seven (7) days, or such other time stated in the Contract or in the Quality Assurance Programme, after completion of each test.
- (2) In addition to any other requirements, the report shall contain the following details:
 - a) material or part of the Works tested;
 - b) location of the batch from which the 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.
- (3) Reports of tests shall be signed by the Contractors Site Representative or his assistant, or by another representative authorised by the Contractor.
 - (4) If requested by the Contractor records of tests carried out by the Employer's staff or by the Engineer shall be given to the Contractor.

19.7 PRODUCTION TESTS (AT WORKS)

- (1) Should the Contract include any equipment not previously proven in service the Contractor shall undertake a thorough testing of pre-production units to the satisfaction of the Engineer.
- (2) The Contractor shall identify any equipment in this category, or equipment which differs significantly from that already in service elsewhere.
- (3) All materials, components, sub-assemblies, unit assemblies (including software, cables and wiring) shall be subject to testing and certification. Notification of these Tests shall be submitted to the Engineer twenty eight (28) days in advance of carrying out any Tests.
- (4) The Engineer will then determine which, if any, items may be accepted based on previous supply or experience.
- (5) Works Tests shall include wherever required, but not be limited to:
 - a) Physical inspection
 - b) Dimension check
 - c) Electrical check
 - d) Calibration
 - e) Output check
 - f) Operational performance
 - g) Full Load test
 - h) Non-destructive test to assess integrity or strength of parts
- (6) Where processor based equipment is to be used, then the works Test shall include also verification of software used in this application.

19.8 POST INSTALLATION TESTS (ON SITE)

- (1) During and on completion of the installation, the Contractor shall undertake testing of all the permanent works in accordance with the overall testing programme.
- (2) These tests shall culminate in functional tests to verify the correct operation of full apparatus and, where appropriate, correct response to the respective control and physical operation of the device/ components.

19.9 ACCEPTANCE TESTS

- (1) The Contractor shall prepare and organise a comprehensive programme of acceptance tests to demonstrate to the Engineer that all systems, sub-systems and apparatus defined under the Contract meet the specified performance requirements in all respects.
- (2) These tests shall be conducted by the Contractor in the presence of the Engineer.

19.10 TEST ON COMPLETION

- (1) The results of the Testing shall be compiled and evaluated by the Engineer and the Contractor.
- (2) If the Works, or a part thereof, or a section, fail to pass the Testing, the Engineer shall require such failed tests, to be repeated under the same terms and conditions. If such failure and retesting result from a default of the Contractor and cause the Employer to incur additional costs, the same shall be recoverable from the Contractor by the Employer, and may be deducted by the Employer from any monies due, or to become due, to the Contractor.
- (3) If the Works, or a part thereof, or a Section, fail to pass Testing 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 instruct the Contractor to carry out such adjustment or modification, at his own cost or to other contractor(s) if the item(s) of Works is attributable to other contractor(s) and to satisfy the requirements of Testing within such time as the Engineer may deem to be reasonable.
- (4) The Contractor along with others shall carry out all statutory tests and trials, under the supervision of the Engineer, necessary for obtaining sanction of the competent authority, if required, for opening the railway system.
- (5) During testing, the Contractor shall be required to carry out coordination with all interfacing contractors and agencies as and if required.

20.0 RECORDS

20.1 DRAWINGS PRODUCED BY THE CONTRACTOR

- (1) Drawings produced by the Contractor including Drawings of Site layouts, Temporary Works, etc. for submission to the Engineer shall generally be to ISO A1 size.
- (2) They shall display a title block with the information as detailed in **Part 2 “Employer’s Requirement, Section V, Volume 6, Appendix 7 - Drawing and CAD Standards”**.
- (3) The number of copies to be submitted to the Engineer shall be as stated in the Contract, or as required by Engineer.
- (4) The Contractor shall provide five sets of As Built Drawings along with read only electronic version of the same on CD/DVD to the Engineer.

20.2 PROGRESS PHOTOGRAPHS AND VIDEOGRAPHY

- (1) The Contractor shall provide monthly progress photographs which have been properly recorded to show the progress of the works to the Engineer.

- (2) The photographs, of not less than 20 in number per month, shall be taken on locations agreed with the Engineer to record the exact progress of the Works. All important events shall be photographed.
- (3) Two sets of photographs shall be provided on CD ROM format with two sets of colour prints of 175 mm x 125 mm size in albums duly labelled.
- (4) The Contractor shall mount each set of each month's progress photographs in a separate album of a type to which the Engineer 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.
- (5) Each label shall record the location, a brief description of the progress recorded and the date on which the photograph was taken.
- (6) All photographs shall be taken by a skilled photographer.
- (7) Photo processing shall be carried out by a competent processing firm to the satisfaction of the Engineer.
- (8) The Contractor shall ensure that no photography is permitted on the Site without the consent of the Engineer.
- (9) Important events, construction activities, working of new machinery, weather effects or any occasion advised by the Engineer shall be video graphed. The recording shall be done or converted to appropriate format and presented in a CD/DVD with appropriate voice recording describing the event.

20.3 RECORDS OF WAGE RATES

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 Engineer during inspection.

20.4 REGISTERS FOR MAINTENANCE

- (1) After completion of works, Contractor shall produce the following registers similar to the ones in use over IR and as per IRPWM, IRBM, IRWM, IR Engg Code and other relevant codes and manuals as under:-
 - i) Bridge Register (2 sets)
 - ii) Level Crossing
 - iii) Land Boundary
 - iv) L-Section
 - v) Index Plan and Section
 - vi) Earthworks
 - vii) The above list is not exhaustive and Contractor is required to prepare an Asset database which identifies all infrastructures along the route. This database shall be expandable to allow maintenance requirements to be called up together with an Asset Management and Planned Preventative Maintenance Schedule of DFCC.
 - viii) Any other registers as directed by Engineer to be used during maintenance.

21.0 MATERIALS

- (1) Materials and goods for inclusion in the Permanent Works shall be new unless the Engineer has consented otherwise. Preference shall be given to local materials where available.
- (2) Certificates of tests by manufacturers which are to be submitted to the Engineer shall be current and shall relate to the batch of material delivered to the Site.
- (3) Certified true copies of certificates may be submitted if the original certificates could not be obtained from the manufacturer.
- (4) Parts of materials which are to be assembled on the Site shall be marked to identify the different parts.
- (5) 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 Engineer provided that the materials are of the same or better quality and comply with the specified requirements.
- (6) Samples of materials submitted to the Engineer 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 Engineer.
- (7) The samples shall be used as a mean of comparison which the Engineer 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.

22.0 PROVISION AND DISPOSAL OF EARTHWORKS MATERIAL

- (1) 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 Work Area or obtained from any other sources, which are located outside the Site, for which the Engineer has given the consent.
- (2) 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 Engineer.
- (3) The Contractor shall also provide security for such sites. The dumping sites to be used by the Contractor shall be as directed by the Engineer.
- (4) All excavated material, excluding waste material, bentonite fluid and bentonite contaminated material shall be disposed of at the appointed site only.
- (5) This material shall be placed and compacted in accordance with the construction specification for earth works or as otherwise directed by the Engineer .
- (6) The disposal of waste material, bentonite fluid and material contaminated with bentonite shall be the sole responsibility of the Contractor and these materials shall be disposed off by the Contractor at an approved location at his own cost.
- (7) The dumping sites provided by the Engineer, if any, shall not be used for disposal of waste material, bentonite fluid or material contaminated with bentonite.

23.0 DEFECT NOTIFICATION PERIOD

- (1) After the Works are taken over by the Employer in terms of para 10.1 of General conditions of Contract it will be followed by the Defect Notification Period of two years.

During this period Contractor shall replace/ remedy the defects occurring under normal usage of Works by the Employer, except for normal wear and tear under such usage.

Maintenance activities to be done during Defect Liability Period shall be done by the Employer at its own cost.

Section V. Employer's Requirement

Volume 6 – Appendices

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APPENDIX 1:UTILITIES

1.0 UTILITIES

1.1 General

- (1) The Bidder for this Work is required to remove all chartered and unchartered utilities coming in the way of alignment. Chartered utilities are listed in **Part 4 – Reference documents -Site Data of Bidding documents** and Contractor shall not be paid extra for removal of chartered utilities. Work of removal of unchartered utilities shall be treated as a Variation to the Contract and shall be dealt as per the provisions for dealing with Variations in Contract. Contractor shall be paid as per the actual work done for removal of unchartered utilities based on the Variation approved by the Engineer, on case to case basis.
- (2) Before removing any utilities Contractor should submit a utility diversion report to the Engineer with the following details, for approval :-
 - a) location of utility;
 - b) name and address of the utility owner;
 - c) nature and sizes of the utilities;
 - d) description and condition of utility;
 - e) temporary or permanent supports required; and
 - f) temporary or permanent diversion required
 - g) use of specific construction methods to complete the underground structures around and below the utilities including support of the utilities during construction.
 - h) Materials required for removing / relocating the utility.
 - i) Time required for removing / relocating the utility.
 - j) For unchartered utilities - date on which the utilities were encountered and the cost involved based upon the proposed Variation to Contract for removal of such utilities.
- (3) A utility diversion plan with schedule of utility removal/ relocation shall be prepared by the Contractor and submitted along with the preliminary Design for all utilities. Unchartered utilities shall be included as soon as these are encountered by the Contractor and the plan updated accordingly. The Contractor shall take into consideration the time taken for utility diversions and shall take all steps to enable the utility diversions to proceed in accordance with the overall Works programme.
- (4) The Contractor shall set up and manage a utility liaison group of experienced personnel for the duration of the Contract which shall maintain close liaison with the utility owners and undertakings.
- (5) The Contractor shall immediately inform the Engineer and the utility agencies of any
 - a) damage to utilities;
 - b) leakage of utilities;
 - c) discovery of utilities not previously identified.
- (6) Work of utility removal shall deem to include the following and shall be done by the Contractor at his own cost for this Work:-

- a) Identifying the utilities, their owner and agencies involved in granting clearance for their removal/ relocation.
 - b) Preparing plans/ drawings/ applications for their removal/ relocation.
 - c) Liaisoning and obtaining necessary clearances from the concerned authorities. Employer shall assist the Contractor in this regard.
 - d) Carrying out the removal/ relocation of utilities, to the specified locations within or outside the Site, including all under and over ground structures, temporary or permanent diversions etc. required as per the clearances of concerned authorities/ utility owners.
 - e) Providing temporary/ permanent supports and protection as per the methods proposed by the Contractor and agreed by the utility owner and Engineer wherever required for the safety and security of the utility service and public.
 - f) The work for relocation /modification of all utilities shall be done as per relevant latest standards and specifications prescribed by the concerned utility owner/ authority. It will be the responsibility of the Contractor to obtain such standards/ specifications from the concerned utility owner/ authority.
 - g) Arranging inspection /testing of modified /relocated utilities by the concerned authorities/ utility owners and preparation of test reports and any other reports required under applicable rules, Acts, regulations of such authorities/ utility owners.
 - h) Dismantling of old utilities and disposing off the released material as per agreement arrived at with the owners of the utilities.
 - i) Handing over of relocated / modified utilities to the owners of utilities/ agencies with 'no objection certification' from them.
- (8) The Contractor shall consider following stipulations while relocating / modifying electrical utilities.
- a) Regulations for power line crossings of Railway tracks as per Indian Railways Manual of AC Traction (Vol.-II, Part-II, and Appendix-IV) read along with Correction Slip no.-18 dated Jan 19, 2009 will be followed by the Contractor.
 - b) Contractor/ Sub contractor (engaged by the Contractor for electrical works) should have an electrical contractor license as per Indian Electricity Act 2003.
- (9) No extra payment of any money required to be paid by the Contractor to the utilities owner for supervision charges or on any other account shall be payable by the Employer.
- (10) Records of the existing utilities encountered shall be kept by the Contractor on the Site and a copy provided to the Engineer. The records shall contain the following details:-
- a) location of utility;
 - b) date on which the utilities were encountered;
 - c) date on which the utilities were removed/ relocated;
 - d) nature and sizes of the utilities;

- e) condition of utility;
 - f) temporary or permanent supports provided; and
 - g) diversions made –temporary or permanent
 - h) details of materials used
 - i) relevant photographs/ drawings of various stages
 - j) clearances of utility owners/ relevant authorities at various stages.
- (11) The Contractor shall include the details (completed plans showing clearances of relevant authorities and owners, location, ownership, size and material) of all such utilities in the As Built Drawings.
- (12) The Contractor shall allow, subject to such conditions as the Employer may specify, access to, and use of the Site for laying telephone lines, water pipes, electric cables or other public utilities. For the avoidance of doubt, it is agreed that use of the Site under this Sub-Clause shall not in any manner relieve the Contractor of its obligation to construct the Works in accordance with this Contract and any damage caused by such use shall be restored forthwith at the cost of the Employer.
- (13) Relocation/ modification of utilities pertaining to Signalling and Telecommunication will be dealt by the DFCC itself. Similarly Relocation/ modification of utilities pertaining to traction installation and transmission line crossings above 33KV will be dealt by the DFCC itself

1.2 Removal of Trees

- (1) The felling/re-plantation of trees is governed by the relevant preservation of trees legislation of the Government of India or the concerned State Government.
- (2) If for the purposes of the works trees are required to be cut/trimmed/re-planted or removed, the Contractor must notify the Engineer of the tree felling requirements.
- (3) Such trees shall be limited to those which cause a material adverse effect on the construction of Works.
- (4) The Contractor shall obtain the applicable permits for felling/re-plantation of such trees from the concerned authorities and the Employer shall assist him in this regard.
- (5) The felled trees shall be deemed to be the property of Contractor unless deemed otherwise by the legislation vide item 1.2 (1) above.
- (6) No cost for cutting/ replanting/ relocating of trees shall be paid to the Contractor as unchartered utility.
- (7) Required permission/NOC for tree felling has already been/being obtained by the Employer. Required money for planting of trees in replacement of existing trees likely to be felled has already been/being deposited with the concerned authorities by the Employer.

**APPENDIX 2:
WORKS AREAS AND CONTRACT STAGES**

1. Works Areas

- (1) The Contractor shall divide the Site into separate Works Areas/Railway Envelopes and shall elaborate a schedule for the time periods of the availability of these areas for his contract performance. This should be synchronized with the **Schedule of access to Site provided in Appendix to Tender – Part 3 of the Bidding documents** taking account of the Contractor's co-ordination and integration responsibilities with the interfacing contractors.
- (2) The Contractor shall indicate the exact nature of the various Works Areas and the extent of works to be carried out prior to the execution of the permanent systems works or making use of the area as working space and/or for temporary Site facilities.
- (3) The schedule as per (1) and (2) above shall include, but not limited to the following data:
 - a) Indication of the Works Areas;
 - b) Description and intended use of the Works Areas;
 - c) The start and the end date of the availability of the Works Areas, required by the Contractor;
 - d) The start and the end date of the periods in which the Contractor is to allow the Works Areas to be accessed by interfacing party(ies).
- (4) The information as in (1) and (2) above shall be submitted as part of the Contractor's preliminary design and shall be subject to agreement by the Employer and approval by the Engineer.
- (5) On the basis of the approved information as in (1) and (2) above the Contractor shall submit proposals for the use and the occupation of the Works Areas, such submissions being at least fifty six (56) days prior to the programmed use of the specific Works Area.
- (6) Prior to the scheduled dates for returning of any of the Works Areas for subsequent use by an interfacing party, the Contractor shall carry out the following activities:
 - a) Construct all Permanent Works within the Works Area, to the extent as defined in the Definitive design and in accordance with the requirements of the Contract;
 - b) Reinstate the area to the same condition as it was taken over;
 - c) Form the area to the approved lines and levels and carry out such other works as may be required by the provisions of the Contract;
 - d) Remove all rubbish, debris and other materials.
 - e) Carry out and record jointly with the Engineer and interfacing contractors a condition survey of the area.
- (7) Restrictions on the timing of occupation so as to avoid affecting operation will be made.
- (8) Temporary electrical works provisions in Works Areas are detailed in **“Employer’s Requirement, Section V, Volume 6, Appendix 8 – Temporary Power Supply”**.

- (9) The interfacing parties shall be required to vacate the Works Areas at least 56 days before the due date for handing back of the Works Areas from the Contractor to the Employer, thus allowing the Contractor to clear and reinstate the works areas in accordance with the Contract.
- (10) Entry to and exit from the Site shall be controlled and shall be only available at the locations for which the Engineer has given his consent.
- (11) The Contractor shall ensure that access to every portion of the Site is continually available to the Employer and Engineer.
- (12) Other contractors engaged for project execution shall also be allowed to use the temporary facilities so created by him to access the Site without any consideration.
- (13) Employer will take over the entire stretch as per para 10.1 of General Conditions of Contract.
- (14) 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 use of such access or egress by its employees and sub contractors.

2. Standard and Engineering Conditions

The following standard engineering conditions apply to all Works Areas:

- a) Forming of Areas
 - i. The Works Areas shall be formed to the levels shown on the drawings.
 - ii. No levels shall be amended without prior consent of the Engineer.
 - iii. The Works Areas shall be surfaced in a manner agreed with the Engineer, compatible with their intended use, and, in particular, footpaths and roadways connecting facilities shall be provided.
 - iv. Measures shall be taken to the satisfaction of the Engineer to ensure all areas are properly drained and kept free of static water.
- b) Roads and Parking
 - i. Space shall be provided within the Works Areas for parking, loading/unloading and manoeuvring of motor vehicles.
 - ii. Any damage caused by the Contractor to the adjoining public roads and fixtures and properties (public or private) shall be made good to the satisfaction of the Engineer and its owner.
- c) Drainage and Sewerage
 - i. All storm or rainwater from the Work Areas including any access roads thereto shall be conveyed to the nearest stream course, which has the necessary capacity, catch-pit, and channel or storm water.

- ii. 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 Site and adjacent property.
 - iii. Damage or obstruction caused to any watercourse, drain, main or other water installations within or adjoining the Works Areas shall be made good to the satisfaction of the Engineer.
 - iv. Treatment and disposal of sewage and wastewater from the Works Area shall be provided to the satisfaction of the Engineer following the ecological requirements.
- d) Buildings
- i. No permanent structures other than those required for the Permanent Works shall be permitted on the Works Areas.
 - ii. The Contractor, as required, for all temporary buildings, shall provide electricity, water, telephone and sewerage.
- e) Pedestrian Access
- Any accesses or passing through the Works Areas shall be maintained in a usable condition at all times to the satisfaction of the Engineer including lighting, signing and guarding.
- f) Fencing and Signboards
- i. For executing the work in urban areas, the Contractor shall erect hoardings, fences and gates around its areas of operations to prevent entry by unauthorised persons to his Works Areas and necessary identity cards /permits should be issued to workers and staff by the Contractor.
 - ii. For executing the work in adjacent to running traffic areas, the Contractor shall erect fences and gates around its areas of operations to prevent accidents as well as post competent flagmen as detailed in **para 14.2 Part 2 “Employer’s Requirement, Section V, Volume 5 – Construction, Testing”**.
 - iii. For areas other than urban areas, the work Site shall be suitably fenced to prevent, within reason, unauthorised entry / accidents wherever required.
 - iv. Project signboards shall be erected before commencement of the Works.
 - v. The types, sizes and locations of project signboards shall be agreed with the Engineer before manufacture and erection. Other advertising signs shall not be erected on the Site.
 - vi. The consent of the Engineer 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 Engineer.
 - vii. Hoardings, fences, gates and signs shall be maintained in 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.

- viii. All hoardings, fences, gates and signs installed by the Contractor shall be lit during night as required and advised by the Engineer and removed by the Contractor upon the completion of the Works, unless otherwise directed by the Engineer.
- ix. Hoarding/fencing can be reused after removing from one place to other locations/Sites provided they are maintained in good condition and agreed by the Engineer.
- x. Damage/worn-out fencing/hoarding shall be replaced by Contractor within 24 hours. Engineer's decision regarding need for replacement shall be final and binding and if no action is taken by Contractor the cost of any repairs will be deducted by the Engineer from any payment due to the Contractor.

3. Contract Stages

- (1) The Contractor shall divide the Works into Stages.
- (2) *These Stages shall be achieved by Key Dates mentioned in "Employer's Requirement, Section V, Volume 6, Appendix 4 – Project Program Requirements". For this purpose the Contractor shall elaborate a schedule of his own internal schedule to achieve these Key Dates.*
- (3) The schedule of achieving these Key Dates as per the previous sub-item shall be submitted as part of the Contractor's Preliminary design and shall be subject to agreement by the Engineer.
- (4) The schedule of Key Dates shall include, but not limited to the following data:
 - a) Stage identification;
 - b) Key Date No.;
 - c) interfacing parties (information to be provided by the Engineer);
 - d) Related bodies and/or organisations certifications/approvals;
 - e) Works to be performed and/or actions to be executed before the Key Date;
 - f) Intended achievements.
- (5) Completion of works at a Key date does not imply handing over of the appropriate Works Area to any other interfacing party.

**APPENDIX 3:
DESIGN AND CONSTRUCTION INTERFACES**

1 GENERAL

- (1) The civil and structures Contractor will be responsible for the interface planning and management of all the civil and structures within the scope of works of Civil and Structures contract.
- (2) The track and systems works contractor will be responsible for the interface planning and management of all the track and systems works within the scope of the works of the track and systems works contract. It is anticipated that the Track and System contractor shall be in place by 18 months of Commencement Date.
- (3) The Contractor shall co-ordinate its interface requirements with the Employer and other interfacing contractors, which the Employer may engage from time to time in such a manner as to minimise disruption to any party arising from such concurrent work.
- (4) The co-ordination responsibilities of the Contractor shall include but not be limited to the following:
 - (a) Provision of all information reasonably required by the interfacing parties in a timely and professional manner to allow them to proceed with their design or construction activities and specifically to meet their contractual obligations.
 - (b) Assurance that the interfacing parties' requirements are provided to all other interfacing parties in time providing them ample opportunity to do their part of requirement for interfacing.
 - (c) Receipt from the interfacing parties of such information as is reasonably required to enable the Contractor to meet the design submission schedule as identified in Part 2 "Employer's Requirement, Section V, Volume 3 – Design Procedures and Processes".
 - (d) Where the execution of the work of the interfacing parties depends upon the Site management or information to be given by the Contractor, the Contractor shall provide to such interfacing parties the services or information required to enable them to meet their own programme or to enable them to construct their work.
 - (e) Co-ordination with the interfacing parties on attendance.
 - (f) The Contractor shall conduct separate meetings with the interfacing parties as necessary to clarify particular aspects of the interfacing requirements of the Works.
 - (g) The party convening the meeting shall prepare minutes recording all matters discussed and agreed at the meeting.
 - (h) Assurance, copies of all those correspondence, drawings, meeting minutes, programmes, etc. relating to the Contractor's co-ordination with the interfacing parties are issued to all concerned parties and four (4) copies issued to the Engineer no later than seven (7) calendar days from the date of such correspondence and meetings.
- (6) The Contractor shall, in carrying out his co-ordination responsibilities, provide sufficient information for the Engineer to decide on any

disagreement between the Contractor and the interfacing parties as to the extent of services or information required to pass between them.

- (7) If such disagreement cannot be resolved by the Contractor despite having taken all reasonable efforts, then the decision of the Engineer shall be final and binding on the Contractor.
- (8) Where an interfacing contract is yet to be awarded, the Contractor shall proceed with the co-ordination activities with the Engineer until such time as the interfacing contractor is appointed.
- (9) The Contractor shall note that the information exchange is an iterative process requiring the exchange and updating of information at the earliest opportunity and shall be carried out on a regular and progressive basis so that the process is completed for each design stage by the respective dates.
- (10) The Contractor shall co-ordinate with the Engineer on all matters relating to works that may affect the IR operation on the existing railway such works shall be carried out in accordance with IR Rules and Regulations.
- (11) The contractor should also produce an issue log for those areas where he has been unable to determine the interface requirements.

2. INTERFACE MANAGEMENT PLAN

- (1) The Contractor shall prepare an Interface Management Plan within twenty eight (28) days of Commencement Date which shall identify the interface manager, the structure and responsibilities of the interface management team and the procedures that will be implemented to identify and close out all interfaces.
- (2) The Interface Management Plan shall:
 - a) identify the sub-systems as well as the civil works and facilities with interfacing requirements
 - b) define the authority and responsibility of the Contractor's and all other contractors' (and any relevant sub-contractors') staff involved in interface management and development
 - c) identify the information to be exchanged, precise division of responsibility between the Contractor and the other contractors and tests to be performed at each phase of the Contractor's and other contractors' works
 - d) Address the interface issues during Design as well Construction as detailed in para 2.1 and 2.2 below.
- (3) The Interface Management Plan shall include procedures for identifying and resolving interfaces within the Contractor's scope of work, between the Contractor and the Employer and between the Contractor and other contractors.
- (4) All interfaces shall be documented through the use of interface co-ordination documents to ensure that each interface is identified, the responsibilities to provide information are defined, the criteria for resolution are agreed and the progress to resolution can be tracked at all times.

2.1 DESIGN INTERFACE

- (1) The Contractor shall commence the design interface with the interfacing contractor as soon as he has been notified by the Engineer that an interfacing contract has been awarded.
- (2) In the case of utility agencies and other statutory boards, interfacing shall commence as soon as it is practicable.
- (3) 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.
- (4) The Contractor shall submit together with each of his Design submissions a joint statement from the Contractor and the relevant interfacing party 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.
- (5) The design interface is an iterative process requiring regular exchange and update of interfacing information and the Contractor shall ensure that the information it requires from the interfacing parties is made known at the outset of each design interface so that the information can be provided in time for the Contractor and the interfacing parties to complete their design to meet their various design submission stages.

2.2 CONSTRUCTION INTERFACE

- (1) Construction interfacing will be necessary throughout the duration of the Works commencing from the time the Contractor mobilises on the Site to the completion of the Works. Construction interfacing will overlap the design interface and involve the definition of interfacing parties' requirements for provision of cast-in and buried items in the Contractor's works such as pipes for the interfacing parties' services, supports including support brackets, plinths, ducts, service buildings, openings, cableways, trenches etc., that are to be incorporated at the initial stages of the Contractor's installation up to provision of attendance during the testing stage.
- (2) The Contractor shall ensure that there is no interference with the Works of the interfacing parties and shall maintain close co-ordination with them to ensure that his work progresses in a smooth and orderly manner.
- (3) The Contractor shall carry out and complete the Works, or any part thereof, in such order as may be agreed by the Engineer or in such revised order as may be instructed by the Engineer from time to time.

2.3 EMPLOYER'S/ENGINEER'S INPUT

- (1) The Engineer will coordinate the activities of the Contractor with reference to interfacing with other contractors and agencies during all the phases of the Contract.
- (2) The Employer/Engineer, within the scope of the relevant Contract provisions, will support and assist the Contractor in the following fields:
 - (a) Interfacing with Indian Railways Authorities, State and local authorities for timely receipt of the required permits, certificates and approvals related to the design and construction process;
 - (b) Interfacing with State and local tax authorities for VAT reimbursement arrangements if applicable;

- (c) Interfacing with State and local authorities for implementation of the additional land acquisition procedures;
 - (d) Any other fields of activities related to the Contract as may be required with the purpose of facilitating the Contractor's performance.
- (3) This support and assistance of the Employer/Engineer shall **not** release the Contractor of any of his obligations under this Contract.

3. INTERFACE MANAGEMENT

- (1) The Contractor shall create, in co-ordination with the other contractors, an Interface Co-ordination Document (ICD) for each interface, which shall be signed by all the parties involved.
- (2) An interface list shall be prepared and maintained by the Contractor and updated on a regular basis to reflect the actual needs of both parties.
- (3) The Contractor shall co-ordinate all interface items on the list and agreed solutions with the other contractors.

4. INTERFACE CO-ORDINATION DOCUMENT (ICD)

- (1) ICD shall be created for each interface describing, in a formal manner, the particulars of the functional and technical requirements to be implemented.
- (2) ICD shall be updated on a regular basis as information becomes available or agreement is reached between two contractors.
- (3) The Interface Co-ordination document template format and minimum contents shall be agreed to between the Contractor and the Engineer.

5. CO-ORDINATION WITH OTHER CONTRACTORS AND INDIAN RAILWAYS

- (1) The contractor will appoint a coordinator, reporting to the contractor's Project Manager, whose primary function is to provide a vital link between the contractor's design team and other contractors.
- (2) The Contractor shall undertake design co-ordination with the other contractors and Indian Railways within the periods agreed for design interfacing and co-ordination.
- (3) The Contractor may commence design interfacing with other contractors and Indian Railways prior to the given period once information has been developed to a level where meaningful interaction can take place.
- (4) Design co-ordination shall include, but not be limited to, the following:
 - a) Definition and agreement with other contractors of interface areas and contract limits;
 - b) Definition and design approach by the Contractor with the other contractors and/or Indian Railways regarding continuation of formation, bank, drains, track structure, alignment, embedded ductwork and cables, other cast-in items such as lifting hooks and eyes, fixing bolts and sockets, environmental control requirements, system functionality requirements and control interfaces;
 - c) Agreement of combined service drawings and structural opening drawings

- (5) The Contractor shall liaise with the Engineer in developing a uniform identity code system which shall be used to uniquely identify each item of equipment and software component provided under this Contract and provided by the other contractors and/or Indian Railway.
- (6) Such identity codes shall be used for labelling each item of equipment and shall also be used in design reports, drawings and operations and maintenance manuals. Such codes shall comprise mnemonics for location names and equipment types as well as alpha-numeric for unique numbering.
- (7) The Contractor shall undertake Site activity co-ordination with the other contractors and/or Indian Railways within the periods agreed for access and installation interfacing and co-ordination.
- (8) The Contractor shall undertake installation and testing in accordance with the milestones set in the Contract and as agreed with the other contractors and/or Indian Railways.
- (9) Any additional costs arising to the Contractor due to his late and/or improper interfacing with the other contractors and/or Indian Railways, shall be to the Contractor's account. Such improper interfacing shall include, but not be limited to:
 - a) Late provision of interfacing information
 - b) Failure to adhere to agreed interface
 - c) Changing an interface after it has already been agreed and signed off
- (10) Works will be taken over by the Employer as per clause 10.1 of Contract conditions. This inter-alia mentions - The Permanent Works of entire geographical jurisdiction shall be completed in stages for temporary use of the Employer without carrying out the Tests for Completion (Sub clause 9.1 of GC) and without taking over of the works for carrying out Tests on Completion (Clause 9 of GC), required for taking over entire Permanent Works completed in all respects as per Employer's Requirement mentioned in the Contract. These stages shall be achieved at various time intervals. Contractor shall permit use of this Works so constructed by other contractors at no extra cost. In case of any derailments or damage caused to the Works by the other contractors/ agencies, Engineer shall set up an enquiry committee of concerned agencies/ other contractors which shall also include the representative of the Contractor who had constructed this work. This committee shall submit its report in a reasonable time indicated to the Engineer. Decision to apportion the cost of damage shall be taken based upon the findings of this committee by the Engineer and his decision in this regard shall be binding and final.

APPENDIX 4 :
PROJECT PROGRAM REQUIREMENTS

1. GENERAL

- (1) In accordance with the Conditions of Contract Clause 8.3 the Contractor shall submit his detailed time program to the Engineer within twenty eight (28) days of the Commencement Date of the Works.
- (2) The Programme as per the previous sub-item (1) above shall be supplemented at the time of the Contractor's Preliminary Design submission by Part 2 "Employer's Requirement, Section V, Volume 6, Appendix 2 – Work Areas and Contract Stages", duly approved in accordance with the contract provisions, these appendices becoming an inseparable part of the said Programme.
- (3) In compiling its Works Programme and in all subsequent updating and reporting, the Contractor shall make provision for the time required for co-ordinating and completing the design, construction, procurement, manufacture, supply, installation, testing, of the Works.
- (4) This period shall include but not be limited to design co-ordination periods during which the Contractor shall co-ordinate its design with those of interfacing parties, review procedures, determining and complying with the requirements of all government departments and obtaining all necessary permits.
- (5) This period will include co-ordination with all others whose consent, permissions, authority or licence is required prior to the execution of any work.
- (6) The Works Programme shall take full account of the Design submission programme.
- (7) This supplementing, however, shall not relieve the Contractor from his obligation to observe the overall Contract performance term as mentioned in Contract conditions.
- (8) The Contractor shall, during the progress of the Works, constantly monitor his progress against the programmes described below.
- (9) The Works Programme, and all more detailed or revised versions, shall be submitted to the Engineer for his consent in accordance with the provisions of the conditions of Contract.

2. MILESTONES

Milestones have been derived from clauses 8.2, 8.7 and 10.1 of Conditions of Contract. These are the broad key deliverables and Contractor is required to develop project program to achieve these deliverables and dates. Accordingly he should set his own internal targets which are commensurate with these Milestones and incorporate in his all internal schedules for approval of Engineer. The details of Milestones and Key Dates are mentioned under appropriate clauses in Appendix to Tender, Part 3 of Bidding Documents.

3. PMIS REQUIREMENTS AND PROCEDURES

- (1) Timely performance is of the essence on this project. The Contractor may complete the project or any part of the Project earlier than is stipulated in the Contract and the Milestone requirements.

- (2) All design and/or construction work, including all sub-contractors' work, under this Contract shall be planned, scheduled, executed, reported and accomplished using the precedence diagramming Critical Path Method (hereinafter referred to as CPM). The work required by this section includes the requirement to prepare, maintain, and update all detailed schedules as described in this section. The CPM schedules shall be prepared in such a manner as to permit the orderly planning, organization, and execution of the Work and be sufficiently detailed to accurately depict all the work required by the Contract. The Contractor shall resource (labor and equipment) and cost load its schedule as specified herein.
- (3) All schedules and schedule submittals under this Contract shall be computerized by the Contractor utilizing the latest version of ORACLE PRIMAVERA P6 PROFESSIONAL PROJECT MANAGEMENT SOFTWARE, hereinafter referred to as ORACLE PRIMAVERA P6. The Contractor shall have sufficient capabilities to perform this work and share the PMIS with the Engineer and the Employer.
- (4) The Contractor shall formally transmit all schedule submittals and schedule narratives identified herein to the Engineer in the form of four (4) hard copies and one (1) soft copy on a CD at the times identified herein or at the request of the Engineer.
- (5) The primary objectives of the requirements of this section are:
 - a) To insure adequate planning and execution of the Works by the Contractor;
 - b) To assist the Engineer in evaluating progress of the Works;
 - c) To provide for optimum coordination by the Contractor of its trades, Sub-contractors, and suppliers, and of its work with the Works or services provided by any separate contractors;
 - d) To permit the timely prediction or detection of events or occurrences which may affect the timely prosecution of the Works;
 - e) To provide a mechanism or tool for use by the Engineer and the Contractor in determining and monitoring any actions of the Contractor which may be required in order to comply with the requirements of the Contract documents relating to the completion of the various portions of the Works by the Contract Milestones and Contract completion specified in the Contract documents.
- (6) The Contractor is responsible for determining the sequence of activities, the time estimates for the detailed design and construction activities and the means, methods, techniques and procedures to be employed. The schedules identified herein shall represent the Contractor's best judgment of how it will execute the Work in compliance with the Contract requirements. The Contractor shall ensure that the schedule is current and accurate and is properly and timely monitored, updated and revised as project conditions may require and as required by the Contract documents.
- (7) The Contractor shall provide the basic data relating to activities, durations, specified Contract Milestones, and sequences to the Engineer, as part of Contractor required schedule submittals. This data shall reflect the

Contractor's actual plan for the project, and shall fully comply with all requirements of the Contract documents.

- (8) Subject to the Engineer's agreement and unless identified elsewhere in the Contract documents, the Contractor shall determine when, where, and how it will interface with others performing work on the program and to coordinate its activities with all parties including the Employer and its consultants, suppliers and other contractors.
- (9) The Contractor shall include in the interim schedule and Contract baseline schedule all interface points with others. These points shall be in the form of start milestones for deliverables due to the Contractor from others and as Finish Milestones for deliverables that Contractor must supply to others.

4. SCHEDULER QUALIFICATIONS

- (1) The Contractor shall have within its employment or under contract, throughout the execution of the Work, such expertise in CPM scheduling and experience with ORACLE PRIMAVERA P6 so as to ensure its effective and efficient performance under this Contract.

5. SCHEDULE ORIENTATION SESSION

- (1) The Contractor shall, upon notification from the Engineer, attend a schedule orientation session relating to the schedules and reports requirements for this Contract. The schedule orientation session is designed to review in detail, the objectives of the schedules and reports requirements. The Contractor shall arrange for its Project Manager, superintendent, and scheduler to attend the schedule orientation session.
- (2) The following items shall be discussed during the schedule orientation session:
 - a) The procedures and requirements for the preparation of the interim schedule, contract baseline schedule, and monthly updates by Contractor;
 - b) How the requirements of the Contract documents will be monitored and enforced by the Engineer;
 - c) Long-lead items and time requirements for the Work by sub-contractors will be identified and included in the contract baseline schedule;
 - d) Work packages;
 - e) Coding and logic for the contract baseline schedule; and
 - f) Identification and scheduling of Shop Drawings and other submittals;
 - g) Listing of major project milestones;
 - h) Cost loading of major project summary activities.

6. INTERIM SCHEDULE

- (1) The Contractor shall submit its interim schedule, to the Engineer for review and acceptance at the Pre-Construction conference (or kick-off meeting for the Design portion of the project). The interim schedule shall indicate a detailed work plan for the first fifty six (56) days after the Commencement Date. Work beyond the first fifty six (56) days shall be in summary form. Use

of the accepted interim schedule shall not exceed the first fifty six (56) days after the Commencement Date.

- (2) The interim schedule detail plan shall include but not be limited to planned mobilization, sequence of early operations, submittals and procurement of materials and equipment. The interim schedule shall also include the following information as a minimum:
 - a) Activity identification number of the task or event;
 - b) Description of the task or event;
 - c) Duration of the task or event;
 - d) Earliest start and finish dates for the task or event;
 - e) Latest start and finish dates for the task or event;
 - f) Various stages of Design development and Construction completion
 - g) Milestones for activities given in this document and consequent critical points for interface with others.
 - h) Logic links to previous tasks upon which the task is dependent before it can start and to subsequent tasks which are dependent on the task to be completed before they can commence
- (3) During the first fifty six (56) days following the Commencement Date, the interim schedule shall be updated regularly and submitted to the Engineer to indicate the progress of the Work, unless the contract baseline schedule is approved within fifty six (56) days of Commencement Date. Once the contract baseline schedule is accepted by the Engineer, no further updates of the interim schedule are required.

7. CONTRACT BASELINE SCHEDULE

- (1) Within forty-two (42) calendar days after the Commencement Date the Contractor shall complete the contract baseline schedule, which expands the accepted interim schedule, and submit it to the Engineer for review and acceptance. The contract baseline schedule submittal shall not show any progress until it is accepted by the Engineer.
- (2) The Contractor shall submit to the Engineer a complementary and detailed narrative description of its plan for performing the Work with the submittal of the contract baseline schedule. The narrative description shall summarize the overall approach to design and/or construction sequencing, including, but not be limited to:
 - a) The anticipated lost days due to weather;
 - b) The equipment and personnel requirements by craft to complete a resource loaded schedule;
 - c) Whether it proposes the Work be performed on single, double or triple shifts;
- (3) No application for payment shall be accepted until the contract baseline schedule is approved.

8. ACCEPTANCE OF THE INTERIM SCHEDULE AND CONTRACT BASELINE SCHEDULE

- (1) The Engineer and the Contractor shall review and discuss the interim schedule or contract baseline schedule after it has been submitted to the Engineer.
- (2) After the Engineer accepts the interim schedule and contract baseline schedule, these schedules will then be used to monitor and record progress of the Work, forecast completion dates, evaluate revisions and generate the payment application amounts, where applicable. Acceptance of the interim schedule or the contract baseline schedule by the Engineer shall not relieve the Contractor of total responsibility for the Contractor's means and methods, scheduling, sequencing, and prosecuting the Work to comply with the requirements of the Contract.
- (3) The Engineer shall have the right to require the Contractor to revise and resubmit the interim schedule and the contract baseline schedule to modify any Contractor data in the schedules or any portion of the schedules that the Engineer determines to be:
 - a) Impracticable;
 - b) Based upon erroneous calculations or estimates;
 - c) Unreasonable;
 - d) Required in order to ensure proper coordination by the Contractor of the work of its Sub-contractors and with the work or services being provided by any separate contractors;
 - e) Necessary to avoid undue interference with plant operations or those of any utility owners or adjoining property owners;
 - f) Necessary to ensure completion of the Work by the Contract Milestones and Contract completion dates set forth in the Contract documents;
 - g) Required in order for Contractor to comply with any other requirements of the Contract documents;
 - h) Not in accordance with the Contractor's actual operations, unless the revision or modification will change the original scope of Works. The Contractor shall bear the expense of such revisions. If the Engineer requires such revisions, the Contractor shall revise the interim schedule or contract baseline schedule and submit it for Engineer's acceptance within seven (7) calendar days.
- (4) The Engineer reserves the right to require that the Contractor to adjust, add to, or clarify any portion of the schedules that may be determined to be insufficient for monitoring of the Work after the schedules are accepted. No additional compensation shall be provided for such adjustments, additions or clarifications.

9. SCHEDULE CONTENT AND FORMAT

- (1) All construction activity durations shall be given in working days. The Contractor shall develop activities for the schedules so that no single activity shown has duration longer than fourteen (14) working days, except for procurement and fabrication, delivery, submittal development and approval activities that may have longer durations .

- (2) For all equipment and materials to be fabricated or supplied for the Project, the contract baseline schedule shall show a sequence of activities including:
 - a) Preparation of Shop Drawings and sample submissions;
 - b) Twenty eight (28) calendar days for review of Shop Drawings and samples;
 - c) Shop fabrication, delivery and storage;
 - d) Erection or installation;
 - e) Testing of equipment and materials.
- (3) The interim schedule and contract baseline schedule shall show dependencies (or relationships) between each activity. Each activity must have a successor and predecessor, except for the project start and finish milestone. The use of date constraints shall be limited to Contract milestones and Contract completion dates only.
- (4) The interim schedule and contract baseline schedule shall contain or be able to demonstrate that the following items have been addressed:
 - a) The Project's name;
 - b) The Contractor's name;
 - c) Revision or edition number;
 - d) Activities of completed work;
 - e) Activities relating to different areas of responsibility, such as subcontracted Work which is distinctly separated from that being done by the Contractor directly;
 - f) Labour resources distinguished by craft or crew requirements;
 - g) Equipment and material resources distinguished by equipment and material requirements;
 - h) Distinct and identifiable subdivisions of work such as structural slabs, beams, columns;
 - i) Locations of work within the contract limit lines that necessitates different times or crews to perform;
 - j) Outage schedules for existing utility services that will be interrupted during the performance of the Work;
 - k) Acquisition and installation of equipment and materials supplied and/or installed by the owner or its separate contractors;
 - l) Material to be stored on Site;
 - m) Phases;
 - n) interim milestones and the Contract Completion dates.
- (5) The Contractor shall be responsible for expediting the delivery of all materials and equipment to be furnished by the Contractor so that the progress of construction shall be maintained according to the currently accepted contract baseline schedule for the Works. The Contractor shall notify the Engineer in writing, and in a timely manner, whenever the Contractor anticipates that the delivery date of any material or equipment

will be later than the delivery date indicated by the currently accepted contract baseline schedule.

10 MONTHLY SCHEDULE UPDATE

- (1) An update of the accepted interim schedule or contract baseline schedule shall be submitted by the Contractor to the Engineer monthly and with the monthly application for payment generated in ORACLE PRIMAVERA P6 (the "monthly schedule update"). Receipt by the Engineer of the monthly schedule update will be an express condition precedent to processing each invoice.
- (2) On a monthly basis, the Contractor shall arrange for its Project Manager, superintendent, and scheduler to meet at the project Site with the Engineer to review Contractor's monthly schedule update. The schedule will be marked-up to show the agreed upon progress, signed by the Contractor, and a signed copy issued to the Project Manager. The monthly schedule update shall show up-to-date and accurate progress of the Works, and shall forecast the completion date for activities in progress based on the contract baseline schedule. The monthly schedule update shall be prepared by the Contractor in consultation with all its principal sub- contractors and suppliers.
- (3) The monthly schedule update shall include actual activity data for progress to date, but in the monthly schedule update, the Contractor shall not change the schedule logic, the activity relationships/dependencies, or planned activity durations and shall not add or delete activities. If the Contractor believes that any of these items should be changed, then a proposed revised baseline schedule must be submitted by the Contractor to the Engineer. Although activities shall not be added or deleted in the monthly schedule update, activities associated with Work authorizations that have been recommended for approval shall be included in the next monthly schedule update.
- (4) The Contractor will be notified by the Engineer, in writing, as to acceptance, reasons for rejection, or any revisions required to the schedules. Changes to the schedules agreed upon by the Contractor and the Engineer shall be incorporated by the Contractor into the schedules within seven (7) calendar days after agreement.
- (5) The monthly schedule update shall show actual activity commencement and completion dates, the actual remaining duration in workdays and physical percent complete for those activities commenced and not complete. For the stored materials, the update shall show the amount of material stored, representing the total cost of the materials delivered and properly stored. The monthly schedule update shall also show a graphic comparison of the current status and the baseline plan for each activity in the network.
- (6) Each monthly schedule update shall continue to show all work activities including those already completed. These completed activities shall accurately reflect "as built" information by indicating when activities were actually started and completed.
- (7) Monthly schedule updates shall also contain the following information for each activity:

- a) Activity identification number, description and estimated original duration in workdays;
- b) Calculated early and late finish dates;
- c) Actual start and actual finish dates, and remaining duration, in calendar, for those activities started and not completed;
- d) Days ahead and/or behind schedule of the milestones representing the specified Contract Milestones and Contract completion dates;
- e) Physical percent complete for each activity;
- f) A float analysis of the longest path through the schedule detailing potential delays and areas for acceleration. Actual start and finish dates shall be indicated for each activity as appropriate. Completed activities will be omitted from remaining float and late start slots.

11. REVISED BASELINE SCHEDULE

- (1) If the current contract baseline schedule or monthly schedule update no longer represents the actual or planned prosecution and progress of the Work, the Contractor shall submit (at no additional cost to the Employer, a proposed revision to the current contract baseline schedule in accordance with this section.
- (2) If the Engineer believes that the current contract baseline schedule or monthly schedule update no longer represents the actual or planned prosecution and progress of the Work, the Engineer may require of the Contractor, and the Contractor shall submit (at no additional cost to the Employer, a proposed revision to the current contract baseline schedule in accordance with this section.
- (3) Schedule Revisions, as defined herein, shall refer to modifications made to activities in the accepted interim schedule or contract baseline schedule in any of the following items:
 - a) Activity duration;
 - b) Changes in logic connections between activities;
 - c) Changes in constraints;
 - d) Changes in value loading;
 - e) Changes to activity descriptions;
 - f) Activity additions and deletions.
- (4) Any proposed revisions to the contract baseline schedule must be submitted to the Engineer for acceptance. This submittal must include, at a minimum, a written narrative with a full description and reasons for each work activity revised a full schedule printout, and a soft copy of the proposed revised contract baseline schedule. For revisions affecting the sequence of work, the Contractor shall provide a schedule diagram Fragmented Network (Fragnet) which compares the original sequence to the revised sequence of work. This diagram shall maintain the Contract Milestone and Contract completion dates.

12. RECOVERY SCHEDULE

- (1) Should the updated interim schedule, contract baseline schedule or monthly schedule update, at any time during Contractor's performance, show that the Contractor is fourteen (14) or more calendar days behind schedule for any Contract interim Milestone, substantial completion or for Contract completion, the Contractor shall prepare a recovery schedule separate from the updated and approved monthly schedule update explaining and displaying how the Contractor intends to reschedule its work in order to regain compliance with the contract baseline schedule during the immediate subsequent pay period.
- (2) If a recovery schedule is required, the Contractor shall prepare and submit to the Engineer a recovery schedule, incorporating the best available information from sub-contractors and others, which will permit the forecasted completion dates to return to the interim milestones and the Contract completion dates. The Contractor shall prepare a recovery schedule to the same level of detail as the originally accepted contract baseline schedule submittal.
- (3) Within seven (7) working days after submission of the recovery schedule, the Contractor shall meet with the Engineer to review and evaluate the recovery schedule. Within seven (7) working days of that meeting, the Contractor shall submit the recovery schedule, including any revisions necessitated by the review, to the Engineer for its review and acceptance. The recovery schedule, once accepted by the Engineer, shall be implemented as the revised contract baseline schedule for the remaining Work.

* * *

APPENDIX 5 :
MONTHLY PROGRESS REPORTS

1. GENERAL

- (1) The Contractor shall submit to the Engineer, a monthly progress report in accordance with the Conditions of Contract.
- (2) This Report shall be submitted no later than the 7th day of each calendar month and shall account for all work actually performed during the last month.
- (3) It shall be submitted in English in five hard copies and one copy in CD/DVD.
- (4) It shall be submitted in a format agreed to by the Engineer and shall contain sections/sub-sections for, but not be limited to the topics listed in Clauses 2 to 10 below.
- (5) The results of quality audits shall be summarised in the Contractor's monthly reports.

2. SAFETY

- (1) A review of all safety aspects during the month including reports on all accidents and actions proposed to prevent further occurrence including details of safety training and drive conducted during the period and proposed in coming months. This shall be the first item of Monthly Progress Report.

3. FINANCIAL STATUS

- (1) A narrative review of all significant financial matters, and actions proposed or taken in respect to any outstanding matters.
- (2) A spread sheet indicating the status of all payments due and made including recoveries if any.
- (3) A report of the status of any outstanding claims even if these is NIL.
- (4) The report shall in particular provide interim updated accounts of continuing claims.

4. PHYSICAL PROGRESS

- (1) It shall describe the status of work performed in descriptive form, significant accomplishments, including critical items and problem areas including current and anticipated delaying factors and their impact, corrective actions taken or planned and other pertinent activities, and shall, in particular, address interface issues with all agencies involved, problems and resolutions during the period or anticipated.
- (2) It shall include a simplified representation of progress measured in percentage terms compared with percentage planned as derived from the Works Programme.

5. PROGRAMME UPDATE

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 last day of the month and expected activity completion based on current progress.
- b) The Programme update shall be accompanied by an activity report and a narrative statement.

- c) 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 "**Employer's Requirement, Section V, Volume 6, Appendix 4 – Project Program Requirements**"..
 - ii. Updated detail programme submittals – state in the narrative the Works actually completed and reflected along critical path in terms of days ahead or behind allowable dates, specific requirements of narrative are:
 - 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.
 - Identification of any deviation from previous month's critical path.
 - Identify by activity number and description, activities in progress and activities scheduled to be completed.
 - Discuss variation work order items, Value Engineering items, if any.
- d) Programme Status which shall:
- iii. Show Works Programme status up to and including the current report period, display cumulative progress to date and a forecast of remaining work.
 - iv. 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.
- e) The activity variance analysis which shall analyse 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 Programme.

6. **THREE-MONTH ROLLING PROGRAMME**

The three month rolling programme shall be issued on a monthly basis.

7. **PLANNING AND CO-ORDINATION**

- (1) A summary of all planning/co-ordination activities during the month and details of outstanding actions.
- (2) A schedule of all submissions and consents/approvals obtained/outstanding.

8. **PROCUREMENT REPORT**

- (1) A summary of all significant procurement activities during the month, including action taken to overcome problems.
- (2) A report listing major items of plant and materials which will be incorporated into the Works.
- (3) The items shall be segregated by type 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.

9. PRODUCTION AND TESTING

- (1) A review of all production and manufacturing activities during the month.
- (2) Summaries of all production and manufacturing outputs during the month together with forecasts for the next month.
- (3) Review of all testing activities (both at Site and at the manufacture's premises) during the month

10. ENVIRONMENTAL AND CLIMATIC ISSUES

A review of all the environmental and climatic issues during the past month including all monitoring reports, weather conditions at Site, mitigation measures undertaken and activities to control environmental impacts as detailed in **Part 2 “Employer’s Requirement, Section V, Volume 6, Appendix 12 – Site Safety Plan And Environmental Protection Requirements”**.

11. DEPLOYMENT OF MANPOWER MATERIAL AND EQUIPMENT AT SITE

- (1) Detail showing the extent of deployment of manpower, equipments and stock of important construction materials utilized at the Site.
- (2) A list of major construction equipment used on the Project during the reporting period.
- (3) A list of all major or critical materials and equipment, indicating current availability and anticipated job Site delivery dates.
- (4) The total number of personnel by craft actually engaged in the work during the reporting period, defined separately as to office, supervisory, and field personnel.
- (5) A manpower and equipment forecast for the upcoming twenty eight (28) days, stating the total number of personnel by craft, defined separately as to office, supervisory and field personnel.
- (6) Changes or additions to Contractor’s supervisory personnel that occurred from the preceding Monthly Progress Report. The Monthly Progress Report shall accompany the Application for Payment and monthly schedule update.

12. PHOTOGRAPHS and VIDEOGRAPHY

Submission requirements for photographs and videography are defined in Clause 20.2, **Part 2 “Employer’s Requirement, Section V, Volume 5, Construction and Testing.”**

**APPENDIX 6:
QUALITY ASSURANCE**

1. GENERAL

- (1) The Contractor shall implement a project quality management plan in accordance with EN ISO-9001-2001, international (ISO 9001-2000), "Quality System" - Model for Quality Assurance in Production, Installation and Servicing" to ensure that all materials, workmanship, plant and equipment supplied and work done under the Contract meets the requirements of the contract.
- (2) This plan shall apply to all activities related to the quality of items, including designing, purchasing, inspecting, handling, assembling, testing, storing, and shipping of materials and equipment and different elements of construction work and installations of components.
- (3) The Contractor shall, within Ninety (90) days of the Commencement Date, prepare and submit to the Engineer for review his proposed Quality Assurance Plan, which shall comply with the requirements as mentioned in this **Appendix**.

2. QUALITY ASSURANCE MANAGEMENT PLAN

- (1) The Project Quality Management Plan (PQMP) shall as a minimum address the quality system elements as required by EN ISO 9001-2001, generally noting the applicability to the Contractor's Works Programme for the Project.
- (2) Procedures or quality plans to be prepared by others (suppliers, sub-contractors, etc) and their incorporation in the overall PQMP shall be identified.
- (3) The Contractor shall provide and maintain with the Engineer a Quality Assurance (QA) plan to regulate methods, procedures, and processes to ensure compliance with the Contract requirements.
- (4) The QA Plan, including QA written procedures, shall be submitted to the Engineer for his review.
- (5) Adequate records shall be maintained in a readily retrievable manner to provide documented evidence of quality monitoring and accountability.
- (6) These records shall be available to Engineer at all times during the term of the Contract and during the Defects Notification Period.
- (7) The Plan shall identify:
 - a) special product realisation processes that are product realization activities that control or verify quality and are performed by certified personnel in accordance with documented procedures that have the written consent of the Engineer;
 - b) Measuring and monitoring procedures shall provide for control and reporting of non-conformances conditions to the Engineer; Inspection shall occur at appropriate points in the installation sequence to ensure compliance with drawings, test specifications, process specifications, and quality standards while the Engineer may designate, if necessary, inspection hold points into construction, installation or inspection planning procedures;
 - c) Inspection on delivery procedures to preclude the use of nonconforming materials and to ensure that only correct and accepted items are used and installed;

- d) Identification, tracking and inspection status system to identify and track the progressive inspection status of equipment, materials, components, construction, subassemblies and assemblies as to their acceptance, rejection, or non-inspection shall be maintained;
 - e) Identification and control of items: an item identification and traceability control shall be provided;
 - f) Handling, storage, preservation and delivery: provide for adequate work, surveillance and inspection instructions.
- (8) The QA plan shall ensure that conditions adverse to quality such as failures, malfunctions, deficiencies, deviations, and defects in materials and equipment shall be promptly identified and corrected.
 - (9) The QA plan shall provide for establishing, and maintaining an effective and positive system for controlling non-conforming material including procedures for the identification, segregation, and disposal of all non-conforming material while the use or repair of non-conforming materials shall require the Engineer's consent.

3. PLAN IMPLEMENTATION AND VERIFICATION

- (1) The Plan shall clearly define the Quality Assurance (QA) organisation. Management responsibility for the QA shall be set forth on the Contractor's policy and organisation chart.
- (2) The plan shall define the requirements for QA personnel, their skills and training.
- (3) Records of personnel certifications shall be maintained and monitored by the QA personnel. These records shall be made available to the Engineer for review, upon request.
- (4) The QA operations shall be subject to the Engineer's, Employer or his authorised representative's verification at any time.
- (5) Verification will include: surveillance of the operations to determine that practices, methods and procedures of the plan are being properly applied; inspection to measure quality of items to be offered for acceptance; and audits to ensure compliance with the Contract documents.
- (6) The Contractor's quality audit schedule shall be submitted to the Engineer for consent every three months or more frequently as required.
- (7) The results of quality audits shall be summarised in the Contractor's monthly reports.
- (8) The Contractor shall provide all necessary access, assistance and facilities to enable the Engineer to carry out on-Site and off-Site surveillance of QA audits to verify that the quality system which has the consent of the Engineer is being implemented fully and properly.

APPENDIX 7 :
DRAWING AND CAD STANDARDS

1.0 INTRODUCTION

- (1) The purpose of this document is to define the minimum Drawing 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 maximise the use of CAD in the co-ordination process.
 - (a) All submissions shall be made to the Engineer's requirement in a format reviewed without objection by the Engineer in accordance with the requirements in the Contract;
- (3) Paper and drawing sizes shall be "A" series sheets as specified in ISO 5457.
- (4) The following software compatible for use with Intel-Windows based computers shall be used, unless otherwise stated, for the various electronic submissions required:

<u>Document Type</u>	<u>Electronic Document Format</u>
Photographic	Adobe Photoshop CS2 or last version
Desktop Publishing	Page Maker 7.0 or latest version
CAD Drawings	AutoCAD 2011 or latest version.

- (5) For electronic file submission one copy shall be submitted unless otherwise stated on CD-ROM media. The media shall be CD-R and the recording method shall not allow any further changes to the recordable disk.
- (6) Internet File Formats/Standards:
 - (a) The following guidelines shall be followed when the Contractor uses an internet browser as the communication media to share information with the Engineer /Employer.
 - (b) All the data formats or standards must be supported by Microsoft Internet Explorer version 7 or above running on Windows XP or above.
 - (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 Engineer for a different data format:

<u>File Type</u>	<u>Data Format</u>
Photo Image	Joint Photographic Experts Group (JPEG)
Image other than Photo	GIF or JPEG
Computer Aid Design files (CAD)	Computer Graphics Metafile (CGM) and DWG

Video Window video (.avi)

Sound Wave file (.wav)

- (7) The following states the standards to be used on the internet when connecting to database(s). The Contractor shall comply with them unless prior consent is obtained from the Engineer 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)

2.0 GENERAL REQUIREMENTS

2.1 GENERAL

- (1) The Contractor shall adopt a title block measuring 15 cm x 19 cm on the right top corner of every drawing. This title block shall generally contain the following details in order specified below and other details as specified by the Engineer:
- DFCC Approval No. (1 cm Height)
 - Engineer Approval No. (1 cm Height)
 - Contractor's Drawing Number. (1 cm Height)
 - DFCC Logo with Controlling CPM office Address (3 cm Height)
 - Engineer's Name & Address (2 cm Height)
 - Drawing Title (5 cm Height)
 - Name of The Project (3 cm Height)
 - Scale of Drawing (1 cm Height)
 - Name of Contractor (2 cm Height)

The legend and Notes pertaining to that drawing shall be given below the title block. Reference drawings shall be given below the notes.

Signature boxes for signatures of all the approving officials shall be provided in ascending order from left to right at the bottom right corner. Each Signature box shall be of 5cm x 4 cm size.

All revisions shall be highlighted with circle (1 cm dia) giving the revision number within that circle; at the particular location in the drawing and such revisions shall be tabulated in a box at the suitable location in the drawing and approval of the concerned officials shall be obtained in this box only.

- (2) Each document shall be uniquely referenced by a document number and shall define both the current status and revision of the drawing.
- (3) The current status of each document shall be clearly defined by the use of a single letter code as follows:
- A single letter character denoting the status of the drawings e.g.

T	Tender Design
W	Working Drawing
M	Manufacturing Drawing
S	Site Drawing
D	Shop Drawing
A	As Built Drawing

(b) A single digit code denoting the contract number (for the whole line):
 Design/Civil Works/Track Works/Systems Works

(c) A two (2) letter code denoting the type of civil works or system elements e.g.

CG	General Works
ST	Stations
TU	Tunnels (if any)
AL	Alignment
RW	Right - Of - Way
CE	Civil Engineering (earth work, culverts, pedestrians, foot bridge, agricultural underpass, survey, track drainage, etc.)
RB	Railway Bridges
ROB	Road Over Bridges
RUB	Road Under Bridges
EC	Environmental Control System
UT	Utilities (Power, Gas, Telecoms, Electric, Water supply, Sewer lines)
SE	Structural Engineering (structural steel, reinforced concrete etc.)
GE	Geotechnical Engineering (Instrumentation, ground treatment, de-watering, etc.)
AR	Architecture
LS	Landscape
EE	Electrical Engineering (low voltage)
ME	Mechanical Engineering (ventilation, fire fighting, plumbing)
PS	Power Supply (high voltage, traction power)
SG	Signalling (train control)
CM	Telecommunications, SCADA System
TK	Track-work
TM	Traffic Management (Roads, Pavements)
WS	Water Supply

- (d) A unique four (4) digit number (from 0001 to 9999), identifying each drawing.
- (e) A single letter (A to Z except I and O) denoting the sequence of revision to the drawing. The initial drawing issue will carry a revision letter "A".

Example: Drawing Title Block:

Status	Drawing No:	Revision:
D	1 / ST / 0235	B

(Note: The comparable computer reference is "1ST0235B")

Denotes:

(D) Shop Drawing (1) Civil Work (ST) Stations (0235B) Drawing number 0235 Rev. B.

2.2 TYPES of DRAWINGS

- (1) 'Working drawings' are those as defined in Volume 2 Section VI, Part 2 of Bidding Documents.
- (2) 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.
- (3) 'Shop drawings' are special drawings prepared by the manufacturer or fabricator of various items within the Works to facilitate manufacture or fabrication.
- (4) 'Reference Drawings' are those as defined in Volume 2 Section VI, Part 2 of Bidding Documents.
- (5) 'As-built drawings' are those as defined in Volume 2 Section VI, Part 2 of Bidding Documents. These drawings shall be completed on a regular basis as the Works progress, and shall not be left until completion of the entire Works.

3.0 COMPUTER AIDED DESIGN AND DRAWING (CAD) STANDARDS

3.1 INTRODUCTION

- (1) The production of all CAD data files shall comply with the applicable legislation in India, standards for the relevant issue and the requirements as defined hereinafter.

3.2 OBJECTIVES

- (1) The main objectives of the CAD standards are as follows:
 - (a) To ensure that the CAD data files produced for project are coordinated 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 data files.
- (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.
- (2) The intent of the issue of digital information is to aid the interface design by others.
- (3) 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 and also held in the Project's electronic document control system.
- (4) Drawings and drawing packages issued for co-ordination, record purposes or for acceptance shall be accompanied by a complete set of the corresponding CAD data files.
- (5) Any contractor or organisation 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.
- (6) 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.
- (7) Figured dimensions shall always be taken as correct where discrepancies occur.

3.4 TERMINOLOGY AND ASSOCIATED STANDARDS

- (1) Any terminology used within this section that is ambiguous to the user shall be clarified with the Engineer. Indian national and Indian Railways standards are to be used in principle as a guide for drawing practice, convention, CAD data structure and translation.

3.5 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.

3.6 CAD QUALITY CONTROL

- (1) Random CAD Quality control audits will be carried out by Engineer 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 organisation); however compliance with project CAD and Drawing 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.
- (4) 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

- (1) When CAD data is received and transmittal between the Engineer and the Contractor, the media shall be as follows:
 - (a) All CD-R/RW and DVD+/-R must be labelled on the data shield with:
 - i. Name of Company
 - ii. Project Title
 - iii. Drawing Filenames
 - iv. Disk No. / Total No. of disks
 - (b) All media shall be submitted with a completed form (CAD Disk)
 - (c) The CAD data file transmittal format required by from all contractors shall be in AutoCAD (version 2011) or latest version.

3.8 REVISIONS

All 'Revisions', 'In abeyance' and 'Deletions' shall be located on a common layer which can be turned on or off for plotting purposes.

3.9 BLOCK LIBRARIES, BLOCKS and NAMES

- (1) All construction industry symbols produced as CAD Cells shall typically conform to Indian Standards.
- (2) All blocks created shall be primitive (i.e. NOT complex) and shall be placed absolute (i.e. NOT relative).
- (3) The Contractor's specific block libraries shall be transmitted to Engineer together with an associated block library list containing the filename (max. 6 characters) and block description.
- (4) The Contractor shall ensure that the library is regularly updated and circulated to all other users, together with the associated library listing.
- (5) All blocks of a common type, symbols or details should initially be created within a CAD "Model Space File" specifically utilised for that purpose. These files will be made available on request by Engineer.
- (6) All blocks created will typically be 2D unless 3D is specifically requested. In both instances they shall have an origin at a logical point located within the extents of each block's masked area or volume.

3.10 CAD DIMENSIONING

- (1) Automatic CAD Dimensioning will be used at all times.
- (2) Any dimensional change must involve the necessary revision to the model space file.
- (3) 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 CAD LAYERING

- (1) All CAD elements shall be placed on the layers allocated for each different discipline.
- (2) The Contractor's layer naming convention shall be submitted for the Engineer's approval.

3.12 GLOBAL ORIGIN, LOCATION AND ORIENTATION ON THE ALIGNMENT DRAWINGS

- (1) Location or plan information in "Model Space" files shall coincide with the correct location and orientation on the project grid for each specific contract.
- (2) Location plans shall have at least three setting out points shown on each CAD "Model Space" file. Each setting out point shall be indicated by a simple cross-hair together with related Eastings and Northings co-ordinates.
- (3) The civil, structures and track Contractor(s) will establish the three setting out co-ordinates for their respective works, which will then be used by all other contractors including the Contractor.

3.13 LINE THICKNESS AND COLOUR

- (1) To assist plotting by other users, the following colour codes will be assigned to the following line thickness / 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

3.14 CAD UTILISATION of 2D and 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 visualisation process (i.e. architecture, survey and utilities).

3.15 CAD FILE NUMBERING

Contractor's CAD file numbering shall be as described in 2 above.

APPENDIX 8
TEMPORARY POWER SUPPLY

1 INTRODUCTION

The standard conditions applying to temporary power supply to any Works Area by the Contractor for its Site facilities are given under Clause 2 of this **Appendix**.

2 GENERAL

- (1) The Contractor shall nominate a qualified electrical supervisor, whose name and qualifications shall be submitted in writing to the Engineer for review, who shall be solely responsible for ensuring the safety of all temporary electrical equipment on Site.
- (2) The Contractor shall not install or operate any temporary electrical systems on the Site until this electrical engineer is appointed and has commenced duty.
- (3) The name and contact telephone number of the qualified electrical engineer shall be displayed at the main distribution board for the temporary electrical supply so that he can be contacted in case of an emergency.
- (4) All electrical installation work on Site shall be carried out in accordance with the requirements laid down in the Performance Specification and Indian standards.
- (5) All work shall be supervised or executed by qualified engineers or suitably skilled and authorised electricians.
- (6) Temporary electrical Site installations and distribution systems shall be in accordance with the rules and regulation applicable for and/or applied by:
 - a) The local electrical company supply rules;
 - b) Wiring regulations;
 - c) Distribution of electricity on construction and building sites;
 - d) Distribution assemblies for electricity supplies for construction and building sites;
 - e) Regulations for fire safety norms and requirements for civil works; and
 - f) Any other applicable Indian standards and regulations.

2.1. MATERIALS, APPLIANCES AND COMPONENTS

All materials, appliances and components used within the distribution system shall comply with Indian standards.

2.2. EARTHING

- (1) Earthing and bonding shall be provided for all electrical installations and equipment to prevent the possibility of dangerous voltage rises and to ensure that faults are rapidly cleared by installed circuit protection.
- (2) Earthing systems shall conform to the following standards:
 - a) Wiring regulations;
 - b) Guide for safety in AC substation grounding.

2.3. PLUGS, SOCKET OUTLETS AND COUPLERS

Low voltage plugs, sockets and couplers, as well as the high voltage couplers and 'T' connections shall be colour coded in accordance with, and conform to Indian Standards.

2.4. LIGHTING INSTALLATION

- (1) Where Site works are required during the night, the lighting circuits shall be run separate from other sub-circuits and shall be in accordance with Indian Standards.
- (2) Voltage shall not exceed 55V to earth except when the supply is to a fixed point and where the lighting fixture is fixed in position.
- (3) Luminaries shall have a degree of protection not less than IP 54.
- (4) In particularly onerous environments where the luminaries are exposed to excesses of dust and water, a degree of protection to IP 65 shall be employed.
- (5) The Contractor shall provide a minimum lighting level of 200 lux by localised lighting in all areas where required for carrying out the works.
- (6) Wherever a risk of damage may occur, luminaries shall be mechanically protected against impact damage by use of wire guards or other such devices.

2.5. ELECTRIC MOTORS

- (1) Totally enclosed fan cooled motors to Indian Standards shall be used.
- (2) Motor control and protection circuits shall be as stipulated in Indian Standards.
- (3) Emergency stop switches shall be provided for all machinery.

2.6. INSPECTION AND TESTING

Electrical installations on Site shall be inspected and tested in accordance with the requirements of the wiring regulations.

2.7. IDENTIFICATION

Identification labels shall be affixed to all electrical switches, circuit breakers and motors to specify their purpose.

2.8. MAINTENANCE

- (1) Regular maintenance and checking of control apparatus and wiring distribution systems shall be carried out by a engineer or electrician (duly qualified to carry out the said checks) to ensure safe and efficient operation of the systems.
- (2) All portable electrical appliances shall be permanently numbered (scarf tag labels or similar) and a record kept of the date of issue, date of the last inspection and the recommended inspection period.

**APPENDIX 9 :
PROJECT CALENDAR**

1. The Project Calendar

- (1) The Project Weeks shall be commenced on a Monday.
- (2) A day shall be deemed to commence at 00:01 hour on the morning of the day in question.
- (3) 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.

Requirements for the computation of Key Dates are given in Paragraph 3, **Part 2 “Employer’s Requirement, Section V, Volume 6, Appendix 2 – Work Areas and Contract Stages”**.

- (5) A 7 day week calendar shall be adopted for various (Work) programme schedules for scheduling purposes, which shall also display the rest day and holidays.
- (6) For Project purposes, the presentation shall be in ‘Week’ units.

**APPENDIX 10:
FIRST AID BASE**

1. FIRST AID BASE

- (1) First aid bases shall be located at each of the Contractor's principal Works Area.
- (2) The base shall consist of a treatment room fitted with two treatment couches, a hand wash basin, sterilising equipment and lockable cupboards to contain sufficient medical supplies for the Contractor's personnel, the Employer's personnel, the Engineer's personnel and the interfacing contractor working in the area and any visitors to the Site.
- (3) In addition, two stretchers shall be stored, available for instant use.
- (4) The first aid base shall contain a recovery room that shall be furnished with six chairs and a centre table.
- (5) The first aid base shall be air-conditioned. ,

2. STAFFING

- (1) A qualified doctor shall be available on call during all times when work is being undertaken on Site.
- (2) In each Site office and location at least one employee of the Contractor shall be trained in first aid and shall be available during all working hours for the purpose of attending to emergencies.
- (3) The Contractor may have a tie-up with the local health centres where they are unable to implement any of the above services.

3. EQUIPMENT

- (1) A fully equipped ambulance and driver shall be available on call during all working hours.
- (2) The ambulance shall be equipped with emergency life support equipment suitable for application in construction Site accidents.
- (3) Portable first aid boxes will be maintained fully equipped at each of local Site offices and work locations where twenty (20) or more persons work at a time.

**APPENDIX 11 :
DESIGN CERTIFICATE**

DESIGN CERTIFICATE

This Design Certificate refers to Submission No. which comprises:

[*Design Package No. / the Definitive Design and Drawing Submission No. / Technical Submission No.] in respect of :

[description of the Works to which the submission refers]

The contents of this submission are scheduled in Section A below.

The documents scheduled in Section B below, for which a Notice of No Objection has been issued, are of relevance to this submission.

DESIGNER'S STATEMENT

We hereby certify that :

- a) the design of the Works, as illustrated and described in the documents scheduled in Section A below, complies with the specifications requirements and *[see note 1 below]*;
- b) the outline designs, design briefs and performance specifications of those elements of the Works as illustrated and described in the documents scheduled in Section A below comply with the specifications requirements and *[see note 1 below]*;
- c) the design of the Works, as illustrated and described in the documents scheduled in Section A below, complies with the Employer's Requirements specifications requirements and *[see note 1 below]* except in the following respects:
 - (i) (to be completed by Contractor/Designer)
 - (ii) (etc.)
- d) an in-house check has been undertaken and completed to confirm the completeness, adequacy and validity of the design of the Works as illustrated and described in the documents scheduled in Section A below;
- e) all necessary and required approvals relating to the design of the Works, as illustrated and described in the documents scheduled in Section A below, have been obtained and copies of such approvals are annexed in Section C below;
AND (in the case of a submission covering a part of the Works only) :
- f) 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 'Authorised Representative'

(for Designer)

Name

Position/ Designation

Date

CONTRACTOR’S CERTIFICATION

This is to certify that all design has been performed utilising the skill and care to be expected of a professionally qualified, 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.

Signed by ‘Authorised Representative’ (for Contractor)

Name

Position/Designation

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

Section A

Submission no. comprises the following :

Drawings : *(Title, drawing number and revision)*

Documents: *(Title, reference number and revision)*

Others:

Section B

Documents for which a Notice of No Objection has been issued and which are of relevance to this Submission No.

Document:

Submitted with

[*Design Package No. /

Definitive Design Submission No..... /

Good for Construction Drawing Submission No. /

Technical Submission No. /

Date of Issue of Notice of No Objection

(Delete as appropriate)*

The Contractor is required to provide this information in respect of each document in Section B

Section C

[Contractor to attach copies of necessary and required approvals]

APPENDIX 12 :
SITE SAFETY PLAN AND ENVIRONMENTAL
PROTECTION REQUIREMENTS

1 Site Safety Plan

1.1 General

- (1) The Contractor shall, within sixty (60) days of the Commencement Date, prepare and submit to the Engineer for review his proposed safety plan, as part of the Contractor's Safety, Health and Environment Plan, which shall contain as a minimum items as mentioned in 1.2 to 1.13 below. .
- (2) Procedures for updating the site safety plan and associated assurance system shall be given.
- (3) The compensation for affected workers or their relatives shall be paid by the Contractor in such cases utmost expeditiously in accordance with the Workmen's Compensation Act.

1.2 Statement of the Contractor's Safety Policy

The Contractor shall produce:

- (1) a policy statement signed by the managing director of the Contractor or other senior officer acceptable, to the Engineer or the managing directors or other senior officers of each company of the joint venture comprising the Contractor, declaring that the Contractor shall ensure that safety and industrial health are given priority consideration in all aspects of the Works by the Contractor in discharging his contractual obligations;
- (2) An understanding of and means of ensuring due compliance with the statutory regulations and standards relating to construction work in India;
- (3) The statutory and contractual obligations regarding safety, rescue and industrial health imposed on the Contractor; and the means by which the Contractor will supervise, monitor and audit his site safety assurance system to ensure due compliance with these obligations.

1.3 Appointment, Duties and Responsibilities of Safety Staff

- (1) The "safety staff and organisational structure", should identify the personnel to be engaged solely for site safety assurance, the responsibilities of the participants and the subdivision of the site safety assurance tasks into elements which can be effectively controlled, technically and managerially.
- (2) Names, addresses, telephone and facsimile numbers of all participants shall be listed where known (supplements to the site safety plan will update and complete this information);
- (3) The powers vested in the safety staff, which shall be sufficient to enable them to take urgent and appropriate action to make safe the site and prevent unsafe working practices or other infringements of the safety plan or statutory regulations;

1.4 Policy for Identifying Hazards

- (1) The means by which the Contractor will identify hazards, assess the risks and develop procedures and method statements to minimise the risk for those risks which will occur during the works;
- (2) The Contractor shall produce a list of safety and health hazards identified for this Contract and the procedures and method statements for achieving

effective and efficient minimisation of the risks associated with such hazards;

1.5 Safety Equipment

The means by which safety equipment, scaffolds, guard-rails, working platforms, hoists, ladders and other means of access, lifting, lighting, signing and guarding equipment shall be inspected, tested and maintained and the standards below which such items will be removed from the site and replaced shall be elaborated.

1.6 Contractor's Equipment

- (1) The Contractor shall produce policy and procedures for ensuring that all his plant and equipment used on the works site is maintained in a safe condition and is operated in a safe manner;
- (2) Also regulations and procedures covering all safety and health aspects of the Works, including where appropriate but not limited to the following shall be produced by the Contractor:
 - a) housekeeping
 - b) working on or near operating railways
 - c) fire prevention precautions and fire fighting equipment
 - d) hot weather working
 - e) electrical equipment
 - f) welding/cutting operations and equipment
 - g) personal protection clothing and equipment
 - h) cranes
 - i) hoists
 - j) other lifting appliances
 - k) manual lifting
 - l) power tools
 - m) hand tools and portable power driven tools
 - n) hazardous substances
 - o) working at height
 - p) structural steel erection
 - q) lighting
 - r) protection against falling objects;
 - s) working in confined places
 - t) excavation
 - u) Conveyance, Handling & Use of explosives
 - v) Scaffolding & work Platforms
 - w) Working at height
 - x) Protection against falling objects

1.7 Sub-Contractors

- (1) The means by which safety, rescue and industrial health matters and requirements will be communicated to sub-Contractors of all tiers and their

due compliance with the site safety plan and all relevant statutory regulations is ensured by the main Contractor.

1.8 Disciplinary Procedures

- (1) The Contractor's disciplinary procedures with respect to dealing with safety related matters both with his own staff and that of sub-Contractors shall be given.

1.9 Accident Reporting

- (1) The Contractor's procedure for reporting and investigating accidents, dangerous occurrences or occupational illness;

1.10 Safety Promotion

- (1) The Contractor shall provide details of the frequency, coverage and intent of site safety meetings together with the rationale for attendance.

1.11 Site Security

- (1) The Contractor's system for the protection of authorised and unauthorised visitors to the site;
- (2) The Contractor's proposals to ensure that construction methods do not compromise the Contractor's commitment to the site safety plan or its compliance with the statutory regulations.

1.12 Labour Safety

- (1) The activities of Contractor shall be co-ordinated with Indian Railways so as to ensure safety of all Contractor's personnel.
- (2) Labour safety arrangements by the Contractor shall be in accordance with the applicable legislation in India.
- (3) The design and construction shall comply with the applicable legislation in India.
- (4) The Contractor shall provide the equipment needed for the labour safety during the operation of the line.

1.13 Site Safety Plan

The brief outline of site safety plan shall cover the following:

1.13.1 Safety Personnel

- (1) The Contractor shall appoint a safety officer whose duties throughout the period of the Contract shall be entirely connected with the safety and industrial health aspects of the Contractor's activities on the site.
- (2) The Contractor shall ensure that the safety officer maintains a daily site safety diary, such diary comprehensively recording all relevant matters concerning site safety, safety inspections and audits, safety related incidents and the like.
- (3) The site safety diary shall be reviewed and signed on a weekly basis by the Contractor's site representative and shall be available at all times for inspection by the Engineer.

1.13.2 - Site Safety Inspections

- (1) The Contractor will conduct site safety inspections at a regular frequency.
- (2) The findings of the inspections shall be recorded on suitable forms which shall be kept available for inspection by the Engineer.

1.13.3 Safety / Accident Reporting

- (1) The Contractor shall submit regular site safety reports to the Engineer in accordance with the site safety plan.
- (2) Such reports shall be submitted as part of the Monthly Progress Report. Prior to submission, the site safety report shall be endorsed by the Project Director responsible for the Contract and the Contractor's site representative.
- (3) The Engineer shall be informed by the Contractor verbally immediately after occurrence of any accidents whether on-site or off-site in which the Contractor, its personnel or plant, or those of its sub-Contractors are directly or indirectly involved and which results in any injuries to any persons, loss / damage to plant and machinery, disruption of traffic etc. This shall be followed by a written comprehensive report within 24 hours of the accident.

1.13.4 Sub-Contractors

- (1) The Contractor shall provide its sub-Contractors with copies of the site safety plan and shall incorporate into all sub-contract documentation provisions to ensure the compliance with such plan at all tiers of the sub-contracting.

1.13.5 Safety Meetings

- (1) The Contractor shall convene regular safety meetings in accordance with the safety plan and shall ensure attendance by the safety officer and safety representatives of sub-Contractors unless otherwise agreed by the Engineer.
- (2) All safety meetings shall be notified in advance to the Engineer who may attend in person or by representative at his discretion.
- (3) The minutes of all safety meetings shall be taken and sent to the Engineer within seven (7) days of the meeting.

1.13.6 Safety Equipment

- (1) The Contractor shall identify the safety equipment, rescue apparatus and protective clothing which will be required for the Works.
- (2) The Contractor shall ensure that safety equipment and protective clothing as described in the safety plan is available and used on the site at all material times and those measures for the effective enforcement of proper utilisation and necessary replacement of such equipment and clothing is incorporated into the site safety plan.
- (3) The Contractor shall regularly inspect, test and maintain all safety equipment, and those found damaged, dirty, incorrectly positioned or not in working order shall be repaired or replaced immediately.

1.13.7 First Aid

- (1) The Contractor shall establish, maintain, staff, and fully equip a first aid base

as detailed in **Employer's Requirement Appendix – 10.**

1.13.8 Site Publicity

- (1) The Contractor shall ensure that safety, rescue and industrial health matters are given a high degree of publicity to all persons regularly or occasionally on the site.

1.13.9 Training

- (1) The Contractor shall conduct regular safety training and rescue training drills, the frequency, coverage and application of which shall be in accordance with the site safety plan, and in any case shall not be more than every six months. Engineer may monitor the content of such training programs.

1.13.10 Breach of Safety Regulations

- (1) Any employees of the Contractor or sub-Contractor of any tiers who commit a serious breach of the safety regulations shall be liable to summary dismissal and shall not be re-employed on the Contract or allowed on any of the sites.
- (2) The due notice of this sanction shall be prominently displayed on the site.

1.13.11 Safety Devices

- (1) All plant and equipment used on or around the site shall be fitted with appropriate safety devices which shall be operational at all times and shall be regularly inspected and tested.

1.13.12 Testing and Certification of Lifting Gear

- (1) The Contractor shall provide and maintain safe mechanical cranes, hoists and conveying facilities for the lifting **and transport of materials and shall comply with all** relevant codes of practice for safe use of cranes.
- (2) All cranes, hoists and the like shall be fitted with audible overload warning devices.
- (3) All such equipment shall be regularly maintained in accordance with manufacturers' recommendations and standards having regard to local legislation and recommendations from the appropriate statutory authority.

1.13.13 Fire Regulations and Safety

- (1) The Contractor shall provide and maintain all necessary temporary fire protection and fire fighting facilities on the site during the construction of the Works, and shall comply with all requirements of the local fire services department.
- (2) 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 Engineer for review prior to commencement of work on the site.

1.13.14 Interface with Indian Railway Operations

- (1) The Contractor will review the interfaces with Indian Railway's operations and prepare a specific safety plan for all works that may affect the operating railway.
- (2) The Contractor will comply with and incorporate Indian Railway's rules and regulations for track, signalling and operations possessions into his safety plan and will operate a permit to work system for all works which may affect the operations of the existing railway.
- (3) Similarly, the site safety plan shall consider with other interfacing contractors in the closed vicinity of the Employer.

1.13.15 Standby Equipment

- (1) The Contractor shall provide adequate stand-by equipment to ensure the safety of personnel, the Works and the public.

1.13.16 Co-operation

- (1) The Contractor shall provide full co-operation and assistance in all safety surveillance carried out by the Engineer or 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 Engineer to exercise his authority to require the Contractor's site representative's removal from the site. Besides this Engineer may impose token penalty for such lapses as considered fit.

2 Environmental Protection Requirements

2.1 Measures for the Mitigation of Environmental Impacts

This section describes mitigation measures to be taken in pre-construction construction and defect notification stages against environmental impacts. While compliance of applicable statutory laws is essential, mitigation measures as described herein are to be adopted.

2.2 General

- (1) The Contractor shall develop within sixty 60 days of the Commencement Date its own Environment Management Plan (EMP), as part of the Contractor's Safety Health and Environment Plan (SHE), and submit to the Engineer for approval in accordance with, relevant Government of India Legislation like Pollution Control Board, various environmental monitoring agencies of Government etc.
- (2) The Contractor's detailed technical designs for the Works and operations during construction shall conform to Indian Environmental Laws.
- (3) The current national standards established by the Indian Government for control of environmental pollutants such as air, water, noise and visual impacts/aesthetics shall be followed for compliance during pre-construction, construction and defect notification stages, .
- (4) The Contractor shall ensure that proper and adequate provisions to this end are included in all sub-contracts placed by him.

- (5) The provisions mentioned here however, shall not be applicable in the case of emergency works necessary for saving of life and property or safety of the Works which shall have prior approval of Engineer in all cases.
- (6) The Contractor shall undertake environmental monitoring as required under the contract.
- (7) The Contractor shall prepare a plan for self-monitoring over the course of the project and submit to the Engineer for approval.
- (8) The Contractor shall ensure that audits of all the activities detailed in his EMP are carried out at monthly intervals and reported in the Monthly Reports to ensure the continuing effectiveness and compliance with the EMP.
- (9) The Contractor shall make available on request any document, which relates to his recent internal audits.
- (10) The Engineer may conduct quarterly audits of the Contractor's EMP and its effective implementation on the works site.
- (11) During the audit the Contractor shall provide a suitable number of qualified staff as directed as directed by the Engineer to assist the Engineer during the audit.
- (12) Requirements established in the EMP specification shall apply to all sites and all activities of the Contractor, including the detailed technical designs of the civil infrastructure, and shall supplement the Employer's Requirements.
- (13) In the EMP the Contractor shall appoint a suitably qualified manager responsible for the environmental as well as a support team to assist this manager. Roles and responsibilities and key communication links must be highlighted to ensure responsibility for implementing the EMP.
- (14) The Contractor shall ensure that its Environment Plan documentation includes but is not limited to the provisions covered in the SHE requirements.

2.3 Environmental Management Process

Environmental management is based on the potential impacts assessed for the project. Assessment of potential impacts is based on the review of secondary data substantiated by site visits – environmental monitoring, public consultation, household survey and discussion with concerned Govt. Dept. The implementation of Environmental Management Plan (EMP) requires the following:-

- a) An organizational structure
- b) Assign responsibilities
- c) Define timing of implementation
- d) Define monitoring responsibilities

2.4 EMP during Construction

The project activities shall be executed in a phased manner, pre-construction phase, construction phase and operation phase. The major activities to be undertaken during construction phase are described below.

The environmental issues during construction phase generally involve quality, safety and public health issues. The Contractor is required to comply with the laws with respect to environment protection, pollution control, forest conservation, safety and any other applicable laws. Environmental pollution control during the construction phase shall be the responsibility of the

Contractor. EMP is an executable part of project and the activities are to be guided, controlled, monitored and managed as per the provisions provided.

2.5 Land Acquisition / Diversion Plan

Acquisition of land for ROW is the responsibility of DFCCIL. The proposed alignment is not passing through any forest area.

- i. The acquisition of land and private property shall be carried out in accordance to the RAA - 2008.
- ii. Where temporary land is acquired by the Contractor for setting up labour camp, work site, placing of construction related equipment, dumping of wastes, stacking of excavated earth, construction materials etc., the Contractor shall be responsible for such land acquisition/ hiring from the rightful owners following applicable procedures/ rules, compensation / rent thereof.

2.6 Avoidance of Nuisance

- a) The Contractor shall take all precautions to avoid any nuisance arising from his operations. This shall be accomplished, wherever possible by suppression of nuisance at source rather than abatement of the nuisance once generated.
- b) Following site clearing and before construction, the Contractor shall remove all trash, debris and other weeds.
- c) The Contractor shall ensure that the work place is free of trash, garbage, debris and weeds. He shall provide and ensure proper uses of refuse containers to ensure that rodents, insects and other pests are not harboured and attracted.
- d) The Contractor shall provide a dedicated team of workers at each work site who shall be solely employed to keep the site and its surroundings in a clean condition and maintain a good standard of house-keeping on the site.
- e) The Contractor shall promptly transport all excavation disposal materials of whatever kind so as not to delay work on the project. Stockpiling of materials shall only be allowed at sites designated by the Engineer.
- f) The Contractor's temporary dumping areas shall be maintained by the Contractor till the materials are re-utilized for back-filling or any other purpose as per instruction of Engineer.

2.7 Utility Shifting

This shall be dealt as per provision in Appendix 1 (Utilities) and other provisions of Bid Documents.

2.8 Construction / Labour Camp Management

During the construction phase, proper construction camp development plan has to be formulated to control degradation of the surrounding landscape due to the location of the proposed construction camp. The Contractor must provide, construct and maintain necessary living condition and ancillary facilities which shall include:

- a) Sufficient supply of potable water must be provided at camps and working sites. If the drinking water is obtained from the intermittent public water

- supply, then storage tanks must be provided. All water supply storage may be sufficiently away from the toilets or drains.
- b) Adequate and clean washing and bathing facilities must be provided that also have sufficient drainage.
 - c) Adequate sanitary facilities may be provided within every camp. The place must be cleaned daily and maintain strict sanitary conditions. Separate latrine must be provided for women. Adequate supply of water must also be provided.
 - d) The contractor must ensure that there is proper drainage system to avoid creation of stagnant water bodies.
 - e) No open fires may be allowed in camps.
 - f) The sites should be secured by fencing and proper lighting.
 - g) The construction contractor may ensure that all construction equipments and vehicle machinery may be stored at a separate place / yard.
 - h) Fuel storage and refilling areas may be located 500 m away from the water bodies and from other cross drainage structures.
 - i) All the construction workers should be provided with proper training to handle potential occupation hazards and on safety and health which include the following:-
 - Environmental awareness program
 - Medical surveillance
 - Engineering controls, work practices and protective equipment
 - Handling of raw and processed material
 - Emergency response
 - j) Construction / labour camps shall be located away from forest areas, settlements, cultural heritage and historical sites and water bodies and dry river beds.
 - k) It should be ensured by the construction contractor that the camp area is cleared of the debris and other wastes after the completion of construction. On completion of construction, the land should be restored back to its original form to the satisfaction of DFCCIL.

2.9 Mitigation Measures of Land Environment during Construction

While DFCCIL is responsible for land acquisition for clear ROW, the Contractor shall be responsible for use of the land during construction. Hence, the Contractor shall take necessary measures as enumerated in the EMP to prevent/ arrest soil erosion, contamination.

2.10 Borrow Area Management Plan

Borrow areas shall be identified and finalized by the Contractor in consultation with Engineer. Formal agreement between landowners and the Contractor has to be made. Suitability of borrow areas from civil Engineering as well as environmental consideration have to be ensured. Meeting the guidelines/notifications as stipulated from time to time by the Ministry of Environment and Forests, Government of India, and local bodies, as applicable shall be the sole responsibility of the Contractor.

Besides this, precautions are to be taken by the Contractor for no unauthorized borrowing. No borrow area shall be opened without permission

of the Engineer. Engineer in addition to the established practices, rules and regulation shall also consider under-mentioned criteria before approving the Borrow areas.

To avoid any embankment slippage, the borrow areas shall not be dug continuously and the size and shape of borrow pits shall be decided by the Engineer.

To ensure that the spills, which might result from the transport of borrow and quarry materials do not impact the settlements, it shall be ensured that the excavation and carrying of earth shall be done in a careful manner. The unpaved surfaces used for the haulage of borrow materials shall be maintained properly. Contractor shall ensure the following issues are covered to the satisfaction of Engineer.

- a) Water pooling to be avoided/managed so that no disease spread or mosquito breeding takes place due to water stagnation.
- b) Precautionary measures as the covering of vehicles may be taken to avoid spillage during transportation of borrow area.
- c) Haulage of material to embankments or other areas of fill shall proceed only when sufficient spreading and compaction facility is operating at the place of deposition, to minimize dust pollution.
- d) During rains appropriate measures to be taken to minimize soil erosion, silt fencing to be provided as directed by Engineer/EO.
- e) Burrow pit should have proper guard to prevent accidental falling of children or animals.

An appropriate Borrow Area Management Plan shall be formulated to control the degradation of the surrounding landscape due to the excavation work. The national standard which applies to the manual borrowing of earth is detailed in IRC-10:1961.

2.11 Mitigation Measures to Minimize Soil Erosion during construction

- a) Suitable protection measures consisting of bio-Engineering techniques such as plantation of grass and shrubs, may be provided to control erosion. The measures shall be applied along the slopes at high embankment where bridges shall be constructed.
- b) Borrow areas may be finalized in concern with ecological sensitivity of the area. Agriculture land may not be used as borrow areas. Priority may be given to degraded area for excavation of borrows material.

2.12 Geo-technical issues

The Contractor shall submit within the EMP the expected construction impacts for all major facilities and sections of higher embankments and deeper excavations, including materials used for the building of the formation prior to construction, these impacts should include:

- a) Determination of formation material quality and placement impact;
- b) Stability factors, including seismic migration;
- c) Drainage facilities for groundwater dewatering;
- d) Effects on the local communities and transportation networks from overland truck transport of fill and excavate to and from the specific borrow and fill sites.

- e) Specific mitigation measures and maintenance-of-traffic plans to ensure minimal disruption on local traffic conditions and the environment.

2.13 Mitigation Measures for Ambient Air Quality

1. Pre Construction / preparatory Phase: The dust generation due to pre-construction activities shall be temporary in nature and localized and shall be effectively countered by sprinkling of water wherever required.
2. Construction Phase: Contractor shall undertake following specific measures regarding this aspect:-
 - a) Locating plant at a significant distance from nearest human settlement in the predominant down wind direction.
 - b) Vehicles delivering fine materials like soil and fine aggregates may be covered to reduce spills on existing roads.
 - c) Water shall be sprayed on earthworks, temporary haulage and diversions on a regular basis.
 - d) Pollution control systems like water sprinkling and dust extractors and cover on conveyors shall be installed for the crushers.
 - e) All vehicles, equipment and machinery used for construction shall be regularly maintained to ensure that the emission levels conform to the SPCB/CPCB norms.

2.14 Mitigation Measures for Water Quality

2.14.1 Water Quality Management

Contractor shall undertake following measures to avoid contamination of water bodies:-

- a) The discharge standards promulgated under the Environmental Protection Act, 1986 shall be strictly adhered to. All wastes arising from the project shall be disposed off in a manner that are as per the provisions of the State Pollution Control Board (SPCB).
- b) Water quality shall be monitored regularly near the construction site.

2.15 Sensitive Receptors – Mitigation Measures

All schools, hospitals and cultural properties and heritage sites that are within 100 m distance of the project area require noise control measures.

2.16 Mitigation Measures for Noise during Construction Phase

- a) Machinery and vehicles shall be maintained regularly, with particular attention to silencers and mufflers, to keep construction noise levels to minimum.
- b) Workers in the vicinity of high noise levels shall be provided earplugs/ earmufflers helmets and shall be engaged in diversified activities to prevent prolonged exposure to noise levels of more than 90dB(A) per 8 hour shift. CPCB standard is to be observed.
- c) During construction vibratory compactors will be used with due care within the urban areas.

2.17 Control requirements

Under the Contract, the Contractor shall:

- a) Perform work within the procedures outlined herein and comply with applicable codes, regulations, and standards established by the Indian Government and their agencies.
- b) Schedule and conduct operations in a manner that shall 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.
- c) Submit to the Engineer a Noise Monitoring and Control Plan (NMCP), within 3 months from Commencement Date, which shall form part of the overall EMP, including 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.
- d) The NMCP prepared by the Contractor shall guide the implementation of construction activity.
- e) The NMCP will be reviewed on a regular basis and updated as necessary to ensure that current construction activities are addressed.
- f) It shall appear as a regular agenda item in project coordination meetings

2.18 Mitigation Measures for Hydrological Condition (Rivers and Lakes)

1) Construction Phase -

- a) To avoid any unwanted accumulation of water/ water logging, provision of temporary drainage arrangement due to construction activities shall be made by Contractor.
- b) Silt fencing may be provided near water bodies.
- c) Proper drainage may be planned in the area to avoid water logging.

2) Implementation Phase -

Cross drainage structures shall be provided at appropriate locations wherever local drainage is likely to be affected.

2.19 Mitigation Measures for Flora and Fauna during Construction

- a) For temporary land / site hired/ acquired by the Contractor for construction labour camp, materials stacking/ storage, operating equipment etc. cutting of trees will be the responsibility of the Contractor. The Contractor shall follow all procedures as per Forest Department and / or statutory law/ guidelines including compensation.
- b) Labour camps and office site shall be located outside and away from the forest area.

2.20 Landscape

Landscaping plan may be formulated for restoration, leveling and landscaping of the area once construction activities are over. This can involve the following:-

- a) The stockpiles may be designed such that the slope does not exceed 1:2 (vertical to horizontal) and the height of the pile to be restricted to 2 m.

- b) Stockpiled topsoil may be used to cover the disturbed areas and cut slopes. The top soil shall be utilized for redevelopment of borrow areas, landscaping along slopes, incidental spaces etc.

2.21 Vibration level limit

- a) The vibration level limits adjacent to the alignment shall conform to appropriate legislation of Government of India in this regard.
- b) The scheme for monitoring the vibration level at the site shall be submitted to Engineer for his approval.

2.22 Public Health and Safety

The Contractor is required to comply with all the precautions required for the safety of the workmen. The Contractor must comply with all regulation regarding scaffolding, ladders, working platform, excavation, etc.

2.23 Waste

2.23.1 Control of waste generation during construction and its safe disposal is the responsibility of the Contractor.

- a) Principle of 3R's (Reduce, Reuse, Recycle) shall be followed while handling waste from the construction Site. 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 off.
 - 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, wherever required, for disposal.
- b) A mechanism shall be developed to ensure that the pre-designated area is available for the segregation and temporary storage of reusable and recyclable materials. This shall be incorporated in the WMP. The WMP should be prepared and submitted to the Engineer for approval.
- c) The Contractor shall handle waste in a manner that ensures that wastes are held securely, maintained and waste storage area is cleaned regularly.
- d) The Contractor shall remove waste at regular interval and dispose at landfill sites, if available nearby, after obtaining approval/ consent of concerned authority. If such authority or landfill site is not available nearby, the wastes may be dumped at a pre-designated site within Project area in consultation with Engineer.
- e) The Contractor shall not burn debris or vegetation or construction waste on the site but remove as per relevant Rules.
- f) The Contractor shall make arrangements to disposal off metal scrap and other wastes which can be sold to authorized dealer(s) and maintain record of such sale for inspection by the Engineer.

2.23.2 Hazardous Waste Management (by Contractor)

- 1) Any waste classified as hazardous under the "Hazardous Wastes (Management, Handling and Transboundary) Rules, 2008, shall be disposed according to the concerned Rules.
- 2) Chemicals classified as hazardous chemicals under "Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 shall be stored in compliance with the said Rules.
- 3) Outside the storage area, the Contractor shall place a display board clearly mentioning 'Hazardous Wastes' and quantity and nature of wastes, on date. Hazardous Waste needs to be stored in secured manner..
- 4) 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 labeling and packaging is required to be easily visible and be able to withstand physical conditions and climatic factors.
- 5) The Contractor shall approach only registered & authorized Recyclers of Hazardous Waste for direct sale/ disposal of Hazardous Waste.

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APPENDIX 13 :
TRAFFICE BLOCK (POSSESSION) MANAGEMENT

1. GENERAL

- (1) The Contractor shall comply with the traffic block (Possession) management system operated by Indian Railways (IR).
- (2) The Contractor shall appoint a responsible person who shall coordinate with IR and with the other adjacent civil, structures and track works contractors and the systems contractor as applicable and who will act as the traffic block coordinator for the Contractor only.
- (3) The person appointed must have experience of IR operations and must be fully aware of IR rules and regulations related to possession of track for construction of railway works and in accordance with IR regulations to issue possession requests.
- (4) For the purpose he shall be duly certified in accordance with the said rules.

2. POSSESSION PERIODS

- (1) The Contractor may use possessions on the line for execution of works as per approved plan following strict safety procedures.
- (2) Line closures may be agreed subject to IR approval.
- (3) The Employer gives no warranty that line closures and possession periods will be available during the period of the Works.
- (4) The Employer will however provide any assistance necessary to the Contractor to enable him to obtain the line closures and possessions required by him for the Works but will not be responsible if any Possession requests are refused by IR.
- (5) The Contractor shall prepare technological and organizational schedule for construction which shall include the work times in the weekends and during the dark part of the day.
- (6) The Contractor shall submit his requests for 'possessions' at least fourteen (14) days earlier and inform IR at least 48 hours earlier if he is not able to use the permitted 'possessions'.

**APPENDIX 14 :
DESIGN STANDARDS**

Following is the indicative list of Design standards. All codes and manuals with correction slips issued upto 28 days prior to last date of submission of bid shall be applicable for this bid. Any other applicable code, circular, instruction of UIC to be referred with the approval of the Engineer.”

In case of any contradiction in the various codal provisions, the order of precedence shall be as follows:

- a) Specific provisions in Part-2- Employers Requirement.
- b) IRS Codal provisions
- c) IRC Codal Provisions
- d) IS/BIS Codal provisions
- e) Provisions in the other foreign codes.

However in case of road related structures, IRC codal provisions shall prevail over IRS codal provisions.

Earthworks

- a) IS:2720 Part 2 Determination of water content.
- b) IS:2720 Part-4 Grain size analysis.
- c) IS:2720 Part-5 Determination of liquid and plastic limits.
- d) IS:2720 Part-8 Determination of water content – dry density relation using heavy compaction.
- e) IS:2720 Part-16 Laboratory determination of CBR.
- f) Ministry of Railways Guidelines And specifications-Design of Formation for Heavy Axle Load-Report No: RDSO/2007/GE:14
- g) Ministry of Road Transport and Highways Specification for Bridge Works, 4th edition.
- h) Report on “Guidelines for Use Of Geosynthetics On Railway Formation Including Specifications” (Provisional) Report No. RDSO/2007/GE:G-0009(D) July 2008
- i) Concept And Design Of Reinforced Earth Structures Report No. GE: R – 73 June – 2005
- j) Ministry of Railways, Guidelines for Earthwork in Railway Projects, Guideline No GE:G-1.

Civil Structures

- a) DFC Loading Standards.
- b) IR Bridge Rules.
- c) IR Code of Practice for the Design of Substructures and Foundation of Bridge (Bridge Substructure and Foundation Code).
- d) IR Manual of Design and construction of Pile and Well Foundations.

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- e) IR Code of Practice for Plain and Reinforced Concrete Bridge Construction (Concrete Bridge Code).
 - f) BS 5400 for Bearings of Bridges
 - g) DFC Schedule of Dimensions for Eastern Corridor.
 - h) Indian Railway Schedule of Dimensions:- to be consulted with the approval of Engineer where provisions in DFC schedule of dimensions do not cover the particular situation.
 - i) IR Steel Bridge Code.
 - j) IS: 2062-2006 – Structural steel
 - k) IR Welded Bridge Code
 - l) Guidelines on Fabrication of Steel Griders for Construction..... (BS-110).
 - m) IR Standard Specification for Fabrication and Erection ...(B-1:2001).
 - n) Indian Railway Works Manual.
 - o) Indian Railway Bridge Manual.
 - p) IS 456- Code of Practice for Plain and Reinforced Concrete.
 - q) IS 2911 (all Parts) Code of Practice for Design and Construction of Pile Foundations.
 - r) IS 1493- Design of Bored and Cast in Situ Piles Founded in Rock- Guide lines.
 - s) IS 1893- Indian Seismic Code
 - t) IS 1343 – Code of Practice for Pre-stressed Concrete.
 - u) IRC 5: Standard Specifications and code of practices for Road Bridges Section I – General features of design.
 - v) IRC 6: Standard Specifications and code of practices for Road Bridges Section II – Loads and stresses.
 - w) IRC 18: Design Criteria for Prestress Concrete Road Bridges (Post-tensioned concrete).
 - x) IRC 21: Standard Specifications and code of practices for Road Bridges Section III – Cement Concrete (Plain and reinforced).
 - y) IRC 22: Standard Specifications and code of practices for Road Bridges Section VI – Composite construction.
 - z) IRC 78: Standard Specifications and code of practices for Road Bridges Section VII – Foundation and Substructure.
 - aa) IRC 83 Bearing Design.
 - bb) UIC 772/R- Specifications for Neoprene Bearings.
 - cc) UIC 774-3R- Track / Bridge Interaction.
 - dd) Code of practice for Readymix concrete – IS 4926
 - ee) IIT Kanpur-RDSO Guidelines on Seismic Design of Railway Bridges.

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- ff) MMD of eastern DFC.

Track

- a) Indian Railway Permanent Way Manual.
- b) Manual of Instructions on LWRs of IR.
- c) IRS GE 1 June 2004 Ballast specification.

Fire Standards

- a) IS 1641: 1988 Code of practice for fire safety of buildings (general) : General principles of fire grading and classification (first revision).
- b) IS 3844: 1989 Code of practice for installation and maintenance of internal fire hydrants and hose reels on premises (first revision).
- c) IS 1646: 1997 Code of practice for the safety of buildings (general) : Electrical installations (second revision).
- d) IS 11360: 1985 Specification for smoke detectors for use in automatic electrical fire alarm system.
- e) IS 1644: 1988 Code of practice for fire safety of buildings (general) : Exit requirements and personal hazard (first revision).
- f) IS 2175: 1988 Specification for heat sensitive fire detectors for use in automatic fire alarm system (second revision).
- g) IS 11360: 1985 Specification for smoke detectors for use in automatic electrical fire alarm system.
- h) IS 2189: 1999 Code of practice for selection, installation and maintenance of automatic fire detection and alarm system (second revision).
- i) IS 884: 1985 Specification for first-aid hose reel for fire fighting (first revision).
- j) IS 940: 1989 Specification for portable fire extinguisher, water type (gas cartridge) (third revision).
- k) IS 2878: 1986 Specification for fire extinguisher, carbon-dioxide type (portable and trolley mounted) (second revision).
- l) IS 11833: 1986 Specification for dry powder fire extinguisher for metal fires.

Electricity Standards

- a) Power supply installations and other electric installations shall comply with Indian Electricity Standards.
- b) Internal wiring of buildings shall comply with Indian Building code of practice.
- c) All electrical installations shall be earthed as per relevant Indian standard code for earthing of electric installations.

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- d) In station buildings electric fittings and electric gadgets shall be provided as per Indian Railways Boards letter No. 99/Electric/(G)/136/1 dated 17.03.2006.
- e) Deviations if any to improve performance standards shall be with the approval of Engineer.
- f) Regulations for Power line Crossings of Railway tracks as per Indian Railways Manual of AC Traction

Additional Codes and Standards

The following Indian Codes and Standards shall be referred to where applicable:

- The Energy Conservation Act, 2001
- Guidelines on Equipment issued by the Bureau of Energy Efficiency
- Energy Conservation Building Code
- IR General and Subsidiary rules
- IR Safety Rules
- Relevant pollution control codes
- Applicable labour laws like Workmen's Compensation Act etc.

**APPENDIX 15 :
ENGINEER'S ACCOMMODATION**

1.0 GENERAL

1.1 Site Office Requirements

The Contractor shall design, construct, equip or provide and furnish the site offices for the Employer's and Engineer's use within **90 days** after the commencement date. The Contractor shall also maintain the site offices in good conditions and provide services including, but not limited to maintenance of the office equipment and furniture, repairing and mending, cleaning, consumable replenishment in respect of toiletries, cartridges for the plotter and colour laser writers, first aid box, batteries / battery cells, drinking water etc. Design of all the Site Offices shall be submitted to the Engineer for review prior to commencement of the construction of those facilities. Details of the Engineer's site office including provisional site offices are described in the following paragraphs.

All furniture, furnishings, fittings & fixture and equipment etc. shall be of the configuration, make and quality as consented by the Engineer.

Contractor can also provide the site office by hiring a existing building subjected to the requirement of the area specified in 1.2 (3) below with the approval of Engineer.

1.2 Engineer's Site Offices

- (1) The area surrounding the office shall be well drained and provided with concreted pavements, walkways and parking areas for the vehicles.
- (2) The main office buildings shall be of sound design and of the material as approved by the Engineer, complying with national building codes. The office shall be weatherproof, lined inside with plywood, and painted internally and externally. Floors shall be tiled and floor to ceiling height shall be as approved by the Engineer. Each room having an internal wall shall have at least one screened window. The office building shall have two external lockable doors with screened storm doors. Electricity supply and receptacles shall be provided in various locations appropriate to the usage of the rooms. Rooms shall be well lighted, appropriate HVAC systems with temperature control and other necessary building services as described in the National Building Code of India.
- (3) Two Site offices one main site office and other satellite site office shall be provided for Engineer. The location of there offices will be decided with approval of Engineer.

Engineer's Site Offices shall be furnished as referred to the following

parameters and the design shall be submitted to the Engineer for review.

Room and Designation		Min. Area (m ²)
A	Employer	
i.	Chief Project Manager Office	40
B	Engineer	
i.	Project Manager	180
ii.	Senior Engineers/ Jr. Engrs./ Inspectors/Surveyors	
iii.	Administration Office/ Filling Room/ Store/	
iv.	Satellite site office	60
	Total	280

Note :

Changes in the area to be provided for various subheads under B can be made as per the requirement of the Engineer keeping the overall area as 240sq/m

- (4) The Contractor shall provide for the exclusive use of the Engineer at all times during the Contract all such experienced chainmen, two office attendants, watchmen, instruments, apparatus and protective clothing as required.
- (5) Plumbing fixtures shall be standard types made out of porcelain or stainless steel and all pipe work and fittings shall be polyvinyl chloride (PVC). All works, materials and fixtures shall comply with the national plumbing code, sanitary engineering standards, and other applicable regulations.
- (6) The equipment and furniture to be provided are listed in Table at the end of this Appendix. The equipment and furnitures shall be of suitable make/Brand, model, type, size and capacity.

2.0 FACILITIES - SATELLITE SUBSIDIARY STAFF COMPOUND

Each satellite subsidiary staff compound shall have a minimum of three (3) furnished office rooms, a kitchenette, messing facilities, WC/shower room and resting facilities.

At each of the Engineer's subsidiary staff compounds, the Contractor shall provide hard covered sheds sufficient for twenty (20) Engineer's/ Engineer's visitors' vehicles.

3.0 REST AREAS

- (1) Annexed to each main site office there shall be a rest area with a 15 m² for and including basic overnight stay and facilities including air-conditioning, beds and bedding and all other appropriate items. Each rest area shall have WCs/showers.

4.0 GENERAL REQUIREMENTS

- (1) Materials used for the construction of the offices shall be of good quality and finish. Materials shall be chosen such that the buildings when erected shall give good heat and sound insulation. Both external and internal walls shall be sound proof.
- (2) Windows to each room shall be of an area not less than 10% of the floor area. All windows to ground floor offices shall be fitted with burglar bars firmly attached to the structure of the building. All windows shall be fitted with mosquito netting. All windows shall be fitted with venetian blinds.
- (3) Internal doors shall be hollow core flush doors and shall be fitted with door closers, lever latches, mortise lock and keys.
- (4) External doors shall have barrel bolts both at top and bottom of one leaf and a Yale lock on the other leaf. External doors shall be of solid external quality and hung with heavy-duty hinges. All sets of keys shall be delivered to the Engineer.
- (5) All buildings shall be supplied with continuous (24 hour) running potable water to the kitchens and wash rooms. The toilets may use raw water for flushing, shall be equipped with water closets and sitting type stools and shall be adequately ventilated. The Contractor shall also arrange for the constant and hygienic disposal of all effluent, sewage and rubbish from the buildings. Storage tanks will be required due to restricted water supply at most locations.
- (6) All buildings shall be supplied with electricity at 220 voltage and 50 Hz that shall be distributed to each room in accordance with the regulations. Lighting and electrical power points shall be provided in each room. The disposition and location of light and power points will be as directed by the Engineer. A back up generator is required to be provided to meet the full power load in case of power disruption.
- (7) Each kitchen shall be provided with worktops, a 2 drainer stainless steel double sink, cupboards beneath the worktop and mounted on the walls, a cooker with 2 gas rings and a microwave oven and a 5 cu ft. refrigerator. Tea/Coffee making facilities for 20 persons shall be provided. Tiling shall be provided to the walls above the kitchen table top.
- (8) Changing and shower facilities shall be provided as follows:
 - Male facilities: 3 showers and 3 wash basins with 15 clothes lockers and benching with pegs over for 6 persons.
 - Female facilities: 1 showers and 1 wash basins with 5 clothes lockers and benching with pegs over for 2 persons.

Each shower shall be provided with hot and cold water supply and shall be contained in an individual cubicle with a screen or curtain to the entrance. Modesty screens shall be provided adjacent to the entrance to all changing and shower facilities.

- (9) Fire fighting equipment shall be provided in accordance with the recommendations of the local fire brigade station.
- (10) The Contractor shall supply the new furniture and equipment to the Engineer's offices in the manner required by the Engineer. Given below is the indicative list of items required for Engineer's office in the main and satellite subsidiary compounds.

FIXTURES AND FURNISHINGS IN ENGINEER'S SITE OFFICE

<u>Fixture/Furnishing</u>	<u>Number of items to be furnished</u>
Executive desk (lockable) with drawer and chair	3
Desk (lockable) with drawer and chair	15
Side Table	3
Additional chairs	15
Plan table, adjustable w/lamp & stool	2
Conference Table	1 with 20 Chairs
Plan rack with holders	as one thinks fit
Drawing Hangers	as one thinks fit
Drawing Cabinets	3
Filing cabinet (4 drawer-lockable)	5
Steel cabinet (lockable)	5
Office safe (combination lock)	1
Book cabinet (glass fronted)	2
Wall shelving (set)	6
Window curtains (set)	as one thinks fit
Internet Connection & telephone communication	As per Engineer Consent
Fire extinguisher	as an applicable code stipulates
Wastepaper can	25
Color LaserWriter (FAX/Copier)	2
Plotter	1
Display boards (wall type)	3
Fully automatic camera with date and time recording facility downloadable to a PC	1
First aid box	3
Refrigerator	1
Crockery/cutlery set	2 sets
Hot and cold drinking water dispenser	1
Sink unit with worktops and geyser	1
Lavatories with water closet	3
Urinals with flush	3
Wall mirror	3
Safety helmets (various sizes)	20

Rain coats (various sizes)	10
Industrial safety goggles	10
Pair safety boots (various sizes)	20
Flashlight with batteries.	20
Wall clock	2
Lockers	15
Safety High Glow Jackets	20
Safety Harness (full body)	10

- (11) Offices shall be at locations agreed by the Engineer.
- (12) The office accommodation shall be retained until the expiry of the Defects Notification Period unless otherwise instructed to the contrary by the Engineer.
- (13) Prior to commencing the erection of the Engineer's accommodation the Contractor shall obtain the consent of the Engineer to the accommodation, including layout, equipping, electrification plan and furnishings proposed by the Contractor.
- (14) The Contractor shall make such reasonable amendments to the layout and furnishings as the Engineer may request.
- (15) Unless otherwise permitted by the Engineer, the Contractor shall complete the accommodation and provide all equipment and furnishing in sufficient time to allow the Engineer to occupy the offices prior to the commencement of excavation or any Permanent Works.
- (16) From the Commencement Date of the Works until such time as the Engineer's offices have been completed and accepted by the Engineer, the Contractor shall provide such temporary offices and equipment and furnishings at such location or locations as the Engineer may require.
- (17) The accommodation shall be maintained in a clean, stable and secure condition and shall be cleaned at least daily.
- (18) Equipment provided for the use of the Engineer shall be maintained in a clean and serviceable condition and all consumables shall be replenished when required.
- (19) Measuring and testing equipment shall be calibrated before they are used and at regular intervals to which the Engineer has given his consent.
- (20) Survey equipment shall be maintained by the service agent and shall be regularly checked but the overall responsibility shall rest with the Contractor.
- (21) Equivalent replacements shall be provided for equipment which are not in working order or otherwise are not in a serviceable condition or are being repaired or serviced.
- (22) The consent of the Engineer shall be obtained before accommodation or equipments are removed.

4.1 ENGINEER'S ACCOMMODATION FOR OFF SITE WORK

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- (1) Where any portion of the Works is prepared or fabricated off-Site or at any fabrication facilities away from the Site, whether by the Contractor or one of his subcontractors or suppliers, the Contractor shall provide and maintain office accommodation, furnishings, and equipment for the use of the Engineer and its staff at each such location for the duration of such work as and if required by Engineer.
 - (2) The accommodation furnishings and equipment shall be suitable and sufficient for the purposes of the Engineer and shall be according to the Engineer's consent.
 - (3) Transport for the Engineer/Employer :

Contractor shall provide following road transport for Employer/Engineer :

Airconditioned four wheeled vehicle of a type and colour approved by Engineer/Employer and having no trade name displayed except the name of the Manufacturer of the vehicle. The vehicle shall have an engine capacity of atleast 1800 cc and have at least 4 seats -for a total period of sixty (60) vehicle months.

PART – 3

Section -VI

General Conditions of Contract (GCC)

As per FIDIC Yellow Book 1999-Edition

The conditions of Contract comprise the “General Conditions” which form part of the conditions of Contract for Plant and Design Build first edition 1999 published by the Federation Internationale Des Ingenieurs – Conseils (FIDIC) and the following “Particular Conditions” which include amendments and addition to such General Conditions.

Copies of the above FIDIC publication i.e. “Conditions of Contract for Plant and Design Build” can be obtained from

International Federation of Consulting Engineers
FIDIC Bookshop – Box- 311 – CH – 1215 Geneva 15 Switzerland
Fax: +41 22 799 49 054
Telephone: +41 22 799 49 01
E-mail: fidic@fidic.org
www.fidic.org

PART – 3

Section -VII

Particular Conditions of Contract (PCC)

Particular Conditions

The Conditions of Contract comprise the “**General Conditions**”, which form part of the “Conditions of Contract for Plant and Design Build for Electrical and Mechanical, and for Building and Engineering Works designed by the Contractor”, First Edition, 1999 published by the Federation Internationale des Ingénieurs-Conseils (**FIDIC**), and the following “**Particular Conditions**”, which include amendments and additions to such General Conditions. The General Conditions are incorporated herein by reference only and are not set out at length. The Contractor is deemed to have obtained for himself and read and fully understood the General Conditions in their entirety. The following Particular Conditions shall supplement the General Conditions in **Section VI**. Whenever there is a conflict, the provisions herein shall prevail over those in the General Conditions.

Clause	PROVISIONS
Sub-Clause 1.1.3.10	Insert additional Sub-Clause 1.1.3.10 “Milestone” means the completion of a part of the Works, or the occurrence of an identified event.
Sub-Clause 1.1.3.11	Insert additional Sub-Clause 1.1.3.11 “Stage” means the part of the Works identified as such and more particularly described in the Price Schedules, Part 5 Bidding Document
Sub-Clause 1.1.6.9	Delete the existing clause and modified as under: “Variation” means any change to the scope of works, design criteria and specifications, and criteria for the testing and performance of the completed works specified in the Employer’s Requirements.
Sub-Clause 1.2. Interpretation	Insert the following sub-paragraphs after sub-paragraph (d): (e) the word “tender” is synonymous with “bid”, and “tenderer” with “bidder” and the words “tender documents” with “bidding documents”.
Sub- clause 1.7 Assignment	Delete Sub-clause 1.7 (a)
Sub- clause 1.9 Errors in Employer’s Requirements	Delete sub-clause 1.9 and replace with “If the Contractor suffers delay and/or incurs Cost as a result of an error in the Employer’s Requirements with reference to purpose, scope, design and /or other technical criteria for the works and an experienced contractor exercising due care would not have discovered the error when scrutinizing the Employer’s Requirements with respect to purpose, scope, design and/or other technical criteria for the works under Sub-Clause 5.1 [General Design

	<p>Obligations], the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:</p> <p>(a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and</p> <p>(b) payment of any such Cost plus reasonable profit, which shall be included in the Contract Price.</p> <p>After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine (i) whether and (if so) to what extent the error could not reasonably have been so discovered, and (ii) the matters described in sub-paragraphs (a) and (b) above related to this extent.”</p>
<p>Sub- clause 1.14 Joint and Several Liability</p>	<p>Delete Sub- clause 1.14 and replace with following:</p> <p>If the contractor constitutes (under applicable laws) a Joint Venture, etc, the following provisions will be applicable :</p> <p>(i) One of the members of the JV firm shall be its lead member who shall have majority (at least 51%) share of interest in the JV firm. The other members shall have a share of not less than 20% each in case of JV firms with upto 3 members.</p> <p>(ii) <u>Joint And Several Liability</u> - Members of the JV Firm to which the contract is awarded, shall be jointly and severally liable to the Employer (DFCCIL) for execution of the project in accordance with General and Special Conditions of Contract. The JV members shall also be liable jointly and severally for the loss, damages caused to the DFCCIL during the course of execution of the contract or due to non-execution of the contract or part thereof.</p> <p>(iii) <u>Duration of the Joint Venture Agreement</u> - shall be valid during the entire currency of the contract including the period of extension, if any and the defect liability period after the work is completed.</p> <p>(iv) <u>Governing Laws</u> - The Joint Venture Agreement shall in all respect be governed by and interpreted in accordance with Indian Laws.</p> <p>(v) Once the Bid is submitted, the MOU shall not be modified / altered / terminated during the validity of the Bid. In case the bidder fails to observe/comply with this stipulation, the full Bid Security Deposit/Earnest Money shall be liable to be forfeited.</p>

	<p>(vi) Approval for change of constitution of JV Firm shall be at the sole discretion of the Employer (DFCCIL). The constitution of the JV Firm shall not be allowed to be modified after submission of the Bid by the JV Firm, except when modification becomes inevitable due to succession laws etc. and in any case the minimum eligibility criteria should not get vitiated. However, the Lead Member shall continue to be the Lead Member of the JV Firm. Failure to observe this requirement would render the offer invalid.</p> <p>(vii) Similarly, after, the contract is awarded, the constitution of JV Firm shall not be allowed to be altered during the currency of contract except when modification become inevitable due to succession laws etc. and in any case the minimum eligibility criteria should not get vitiated. Failure to observe this stipulation shall be deemed to be breach of contract with all consequential penal action as per contract conditions.</p> <p>(viii) <i>On issue of LOA (Letter of Acceptance), an agreement among the members of the JV Firm (to whom the work has been awarded) shall be executed and got registered before the Registrar of the Companies under Companies Act or before the Registrar/Sub - Registrar under the Registration Act, 1908. This JV Agreement shall be submitted by the JV Firm to the DFCCIL before signing the contract agreement for the work. In case the tenderer fail to observe/comply with this stipulation, the full BID SECURITY shall be forfeited and other penal actions due shall be taken against partners of the JV and the JV.</i></p> <p>(ix) No member of the Joint Venture Firm shall have the right to assign or transfer the interest right or liability in the contract without the written consent of the other members and that of the employer (DFCCIL) in respect of the said Bid/contract.</p>
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<p>New Sub- clause 1.15 Fraud & Corruption</p>	<p>If the Employer determines that the Contractor and/or any of its personnel, or its agents, or its Subcontractors, sub-consultants, services providers, suppliers and/or their employees has engaged in corrupt, fraudulent, collusive coercive, or obstructive 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 15 shall apply as if such expulsion had been made under Sub-Clause 15.2.</p> <p>For the purposes of this Sub-Clause</p> <ul style="list-style-type: none"> (i) "corrupt practice" is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party¹; (ii) "fraudulent practice" is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation²; (iii) "collusive practice" is an arrangement between two or more parties³ designed to achieve an improper purpose, including to influence improperly the actions of another party; (iv) "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party⁴ or the property of the party to influence improperly the actions of a party; (v) "obstructive practice" is <ul style="list-style-type: none"> (aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation.
<p>1. Another party' refer to a public official action in relation to the procurement or contract Execution. In this context, public official' includes employees of other organsiation taking or reviewing procurement decisions. 2. "Party" refers to a p;ublic official; the terms "benefit and obligation " relate to the procurement process or contract execution and the "act or omission" is intended to influence the procurement process or contract execution. 3. "Parties" refer to participants in the procurement process (including public officials) attempting to establish bid process at artificial, non competitive level. 4. "Party" refers to a participant in the procurement process or contract execution.</p>	

<p>Sub- clause 2.1 Right to Access to Site</p>	<p>Delete Sub- clause (b) in para 3 and replace with: Payment of any such cost plus reasonable profit subject to a maximum of Rs. 2000.00 (Two Thousand) per day for every km. For length less than a kilometer pro-rata amount shall be calculated. Provided further that if such dealy in handing over does not affect the execution of formation works, provisions under para 2.1(b) of this sub clause shall not apply.</p>
<p>Sub-Clause 3.1 Engineer’s Duties and Authorities</p>	<p>Add the following at the end of this Sub-Clause: Notwithstanding anything contained hereinabove, the Engineer is required to obtain approval of the Employer before exercising specific authorities as listed below:</p> <ul style="list-style-type: none"> i) giving consent to proposed Subcontractors pursuant to Sub-Clause 4.4 (b) earthwork and bridge; ii) clearance of concept design & concept drawings and GADs submitted by the Contractor for alignment of major bridge, Rail Flyover and Works/ drawings requiring sanction of Commissioner of Railway Safety; iii) Taking action in connection with variation in the Employers’ requirement which has been initiated by the Employer. iv) Employer’s taking over of the work as per clause 10. v) Issue of performance certificate as per sub clause 11.9; vi) Approving any extension of time for completion of work, vii) Instructing or approving Variations pursuant to Sub-Clauses 13.1, 13.2 and 13.3; except in an emergency affecting the safety of life or of the works or of adjoining property or track, he may, without relieving the Contractor of any of his duties and responsibility under the Contract, instruct the Contractor to execute all such things as may, in the opinion of the Engineer, be necessary to abate or reduce the risk. In case the emergency mentioned above occurs on account of failure of Contractor, by way of not adhering to the sound industry practice or not taking adequate safety precautions, then no amounts shall be paid to the Contractor for attending to such emergencies.
<p>Sub-clause 4.2 Performance Security</p>	<p>Add the following at the end of para 4(d) – in which event the Employer shall forfeit the amount of the Performance Security as indicated in Sub-clause 15.4. Delete paragraph 5 of Sub-clause 4.2 “The</p>

	<p>Employer ... claim.” and substitute by the following: In case the Employer makes a claim on the Performance Security, which it was not entitled to make, the Employer shall forthwith refund such amount of claim to the Contractor.</p>
Sub Clause 4.4 Subcontractors	<p>Delete the first line and substitute by the following: The Contractor shall not subcontract more than 50% of the total Works.</p>
Sub-clause 4.7 Setting Out	<p>Delete paragraph 2,3 &4 of Sub-clause 4.7 and substitute by the following: Accuracy of these specified items of reference shall be deemed to have been verified by the Contractor. Accordingly, the Contractor shall have no right to claim towards time or cost caused due to errors in these specified items of reference.</p>
Sub-Clause 4.10 Site Data	<p>Paragraph 1 of Sub-Clause 4.10. Add at the end of the paragraph Accordingly, the Contractor shall have no claim in this regard.” Paragraph 2 of Sub-Clause 4.10. Delete the words - To the extent which was practicable (taking account of cost and time). Start the word “the” with a capital letter. Delete “To the same extent” from the fourth line and Start the word “the” with a capital letter.</p>
Sub-clause 4.12 Unforeseeable Physical Conditions	<p>Delete the Sub-Clause and Substitute by the following: In this Sub-Clause, "physical conditions" means man-made or natural physical conditions including sub-surface and hydrological conditions which the Contractor encounters at site during the execution of the Works. Except as otherwise stated in the Contract: (a) the Contractor accepts total responsibility for having foreseen all difficulties and physical conditions; and (b) the Contract Price shall not be adjusted to take account of any unforeseen physical conditions</p>
Sub-clause 4.25 Change of Control	<p>Insert the following additional Sub-clause Any change in Control of the Contractor, or in case if the Contractor is a JV, any change of Control of any of the members of the JV, shall require prior approval of the Employer. Such approval shall not be unreasonably withheld, unless, such change in Control, if had taken prior to the date of submission of the bid, would have rendered the Contractor or any such member in case the Contractor is a JV, ineligible to bid for the Project in terms of the Instructions to</p>

	<p>Bidders or in the opinion of the Employer such change in Control shall jeopardize national security or interest. For the purposes of this clause "Control" shall mean the possession, directly or indirectly, of the power to direct or cause the direction of the management and affairs of such person, whether through the legal and beneficial ownership of more than 50% (fifty percent) of the voting securities of such person, by agreement or otherwise or the power to elect majority of directors, partners or other individuals exercising similar authority with respect to such person.</p>
<p>Sub-clause 5.1 General Design Obligations</p>	<p>Delete Sub-Clause 5.1 and substitute the following:</p> <p>The Contractor shall carry out, and be responsible for, the design of the Works. Design shall be prepared by qualified designers who are engineers or other professionals who comply with the criteria (if any) stated in the Employer's Requirements with reference to purpose, scope, design and/or other technical criteria for the works. Unless otherwise stated in the Contract, the Contractor shall submit to the Engineer for consent the name and particulars of each proposed designer and design Subcontractor.</p> <p>The Contractor warrants that he, his designers and design Subcontractors have the experience and capability necessary for the design. The Contractor undertakes that the designers shall be available to attend discussions with the Engineer at all reasonable times, until the expiry date of the relevant Defects Notification Period.</p> <p>Upon receiving notice under Sub-Clause 8.1 [<i>Commencement of Works</i>], the Contractor shall scrutinise the Employer's Requirements with reference to purpose, scope, design and /or other technical criteria for the works (including design criteria and calculations, if any). Within the period stated in the Appendix to Tender, calculated from the Commencement Date, the Contractor shall give notice to the Engineer of any error, fault or other defect found in the Employer's Requirements with reference to purpose, scope, design and /or other technical criteria for the works.</p> <p>After receiving this notice, the Engineer shall determine whether Clause 13 [<i>Variations and Adjustments</i>] shall be applied, and shall give notice to the Contractor accordingly. If and to the extent that (taking account of cost and time) an experienced contractor exercising due care would have discovered the error, fault or other defect when examining the Site and the Employer's Requirements with reference to purpose,</p>

	scope, design and/or other technical criteria for the works before submitting the Bid, the Time for Completion shall not be extended and the Contract Price shall not be adjusted.
Sub-Clause 6.12 of Employment Foreign Nationals	Add New Sub-Clause The Contractor acknowledges, agrees and undertakes that employment of foreign personnel by the Contractor and/or its Subcontractors may be subject to grant of requisite regulatory permits and approvals including employment/residential visas and work permits, required if any, and the obligation to apply for and obtain the same shall always be of the Contractor. Notwithstanding anything to the contrary contained in the Contract, refusal of or inability to obtain any such permits and approvals by the Contractor or any of its Subcontractors shall not constitute Force Majeure event, and shall not in any manner excuse the Contractor from the performance and discharge of its obligations and liabilities under the Contract.” The Employer, on a best effort basis, will provide reasonable assistance in obtaining such visas and permits, but without thereby incurring any liability whatsoever towards the Contractor.
Sub-Clause 7.4 Testing	Insert the following at the end of this Sub-Clause: The Contractor shall not be released from any liability or obligation under the Contract by reason of any such inspection or testing or witnessing of testing, or by the submission of reports of inspection or testing to the Engineer.
Sub Clause 8.2 Time for Completion	Delete this Sub-Clause and substitute by the following: The Permanent Works of entire geographical jurisdiction shall be completed in stages as under: (1) Completion of foundation including sub-structure of entire RFO bridge portion – 450 days. (Milestone 1) (2) Completion of Work at Pahleja Yard as per clause 2 (i) (h) of Scope of work Vol. -1, Section V – 450 days (Milestone 2). (3) Completion of all works by the contractor and taking over of the works by the Employer - 900 days (Milestone – 3) Testing shall be done as per the provision of Employer’s requirement.
Sub-Clause 8.3	Delete para 3 of Sub- Clause 8.3 “The Contractor shall [Variation Procedure].”
Sub-Clause 8.4	Delete Sub-Clauses (c) Delete “(d)” and substitute as under:- Unforeseeable shortages in the availability of Goods caused due to changes in laws in accordance with the

	<p>provisions of Sub-Clause 13.7</p> <p>Add sub-clause (f) - A cause of delay in handing over possession of Site in accordance with the provisions of Sub-clause 2.1</p>
<p>Sub-Clause 8.7 Delay Damages</p>	<p>Delete Sub-Clause 8.7 and substitute by the following:</p> <p>The Contractor shall complete the Works in accordance with the programme set forth in Sub-Clause 8.2 [Time for Completion]. In the event that the Contractor fails to achieve any Milestone on the date set forth for such Milestone in the Time for Completion, unless such failure has occurred due to Force Majeure or for reasons solely attributable to the Employer, it shall pay Delay Damages to the Employer in a sum calculated at the rate stated in the Appendix to Tender until such Milestone is achieved; provided that if the construction period for any or all Milestones is extended in accordance with the provisions of this Contract, the dates set forth in the Sub-Clause 8.2 [Time for Completion] shall be deemed to be modified accordingly and the provisions of this Contract shall apply as if Appendix to Tender has been amended as above; provided further that in the event Project is completed within the Time for Completion as stated in the Appendix to Tender, the Delay Damages paid under this Sub-Clause shall be refunded by the Employer to the Contractor, but without any interest thereon. It is agreed that recovery of Damages under this Sub-Clause shall be without prejudice to the rights of the Employer under this Contract including the right of Termination thereof.</p> <p>The Parties hereby accept that delays cause loss to the public and the national economy for whose benefit the Works is meant, and that the loss is not susceptible to precise measurement. The Parties hereby agree that the rate of Delay Damages agreed in this Clause 8.7 is a reasonable pre-determined amount, and that the Delay Damages are not by way of penalty.</p> <p>The Employer shall notify the Contractor of its decision to impose Delay Damages in pursuance with the provisions of this Sub-Clause. Provided that no deduction on account of Delay Damages shall be effected by the Employer without notifying the Contractor its decision to impose the Damages. Further, the total amount of Delay Damages under Sub-Clause 8.7 shall not exceed the maximum amount of delay damages (if any) stated in the Appendix to</p>

	Tender.
<p>Sub-Clause 8.8 Suspension of Work</p>	<p>Delete Sub-Clause 8.8, Substitute deletion by the following:</p> <p>In the event of the failure of the Contractor to duly and effectively perform any of its obligations or to perform proper execution of the Works in accordance with the provisions of this Contract, the Engineer may by notice require the Contractor to suspend forthwith the performance of any obligations under the Contract or the whole or any part of the Works.</p> <p>The Contractor shall, pursuant to the notice under this Sub-Clause, suspend the Works or any part thereof for such time and in such manner as may be specified by the Engineer and thereupon carry out remedial measures to rectify the defects and secure the safety of the suspended works. The Contractor may by notice require the Engineer to inspect such remedial measures forthwith, with a request that the suspension hereunder may be revoked. The Engineer shall either revoke such suspension or instruct the Contractor to carry out such other and further remedial measures as may be necessary and the procedure set forth in this Sub-Clause shall be repeated until the suspension hereunder is revoked.</p> <p>All reasonable costs incurred for maintaining and protecting the Works and remedying the defects during the period of suspension shall be borne by the Contractor.</p> <p>During the period of Suspension, the Employer may at its own discretion, on behalf of the Contractor, undertake to fulfill any of the Contractor's obligations for remedying and rectifying the cause of Suspension. Provided that any cost incurred by the Employer in fulfilling the obligations of the Contractor for the remedying or rectifying the cause of Suspension shall be borne by the Contractor. The Employer shall have the right to deduct any such expense incurred and another twenty percent thereof as Damages from any payment due or to be due to the Contractor under the provisions of this Contract.</p> <p>If and to the extent the cause for the suspension is the responsibility of the Contractor, the following Sub-Clauses 8.9, 8.10, and 8.11 shall not apply.</p> <p>The Contractor shall not be entitled to extra cost (if any), incurred by him, during the period of suspension of Work, if such suspension is:</p> <ul style="list-style-type: none"> (a) provided for in the Contract; or (b) necessary for proper execution of Woks or by reasons of weather condition or by some default on the part of the Contractor; or

	<p>(c) necessary for the safety of Works or any part thereof; or</p> <p>(d) necessary for the safety of adjoining public or other property or safety of the public or workmen or those who have to be at the site; or</p> <p>(e) to ensure safety and to avoid disruption of traffic and utilities, as also to permit fast repairs and restoration of any damaged utilities.</p>
Sub-Clause 10.2 Taking Over of Parts of the Works	Delete.
Sub-Clause 13.3 Variation procedure	<p>Add the following below the last paragraph: For varied works of items due to variation as per Sub-Clause 1.1.6.9 determination of adjustment to the Contract Price shall be based on the following:</p> <ol style="list-style-type: none"> a. Inputs of man-days, machine hours and quantities of materials; b. (i) Prevailing market rates for Materials, hiring of equipment; (ii) Rates being paid by the Contractor for unskilled, semi-skilled and skilled worker as per the records maintained by the Contractor in accordance with the Laws; c. Contractor's overheads and profit at the rate of 15 (fifteen) per cent of the cost arrived at on the basis of (a) and (b) above and; d. Applicable taxes. <p>No price adjustment shall apply. The approval for Variation shall state the period of extension of time, if any, allowed for the Variation. If no extension of time is allowed, the same shall be stated.</p>
Sub-Clause 13.4 Payment in Applicable Currencies	<p>Delete Sub-Clause 13.4 and Substitute deletion by the following: The contract provides for payment of contract price in Indian Rupees only.</p>
Sub-Clause 13.7 Adjustments Changes Legislation for in	<p>Delete first paragraph of the Sub-Clause and Substitute deletion by the following: The Contract Price shall be adjusted to take account of any increase or decrease in Cost after the Base Date resulting from:</p> <ol style="list-style-type: none"> a. a change in the Laws of the Country (including the introduction of new Laws and the repeal or modification of existing Laws); or b. in the judicial or official governmental interpretation of such Laws, or c. the commencement of any Indian law which has not entered into effect until the Base Date; or d. any change in the rates of any of the Taxes or

	<p>royalties on Materials that have a direct effect on the Project which affect the Contractor in the performance of obligations under the Contract.</p> <p>End of the Sub-Clause Insert at the end of the Sub-Clause: If as a result of change in law, interpretation, or rates of taxes or royalties, the Contractor benefits from any reduction in costs for the execution of this Contract, save and except as expressly provided for in this Sub-Clause or in accordance with the provisions of this Contract, the Contractor shall, within [28] days from the date he becomes reasonably aware of such reduction in cost, notify the Employer with a copy to the Engineer of such reduction in cost.</p>				
<p>Sub-Clause 13.8 Adjustment Changes in Cost</p>	<p>for</p> <p>Delete Paragraph 3 of this Sub-Clause and Substitute deletion by the following: <i>The adjustment to be applied to the amount otherwise payable to the Contractor, as valued in accordance with the amount certified in Payment Certificates, shall be determined from formulae.</i> <i>The formula for adjustment for changes in cost shall be as follows:</i> $P_n = a + b(L_n/L_0) + c(C_n/C_0) + d(S_n/S_0) + e(F_n/F_0) + f(M_n/M_0)$ where: <i>"P_n" is the adjustment multiplier to be applied to the contract amount paid against cost center / stage as per Price Schedule for the completed stage of work;</i> <i>"a" is a fixed coefficient, stated in the table of adjustment data as given below, representing the non-adjustable portion of the work;</i> <i>"b" is a fixed coefficient, stated in the table of adjustment data as given below, representing the adjustable portion for labour component;</i> <i>"c" is a fixed coefficient, stated in the table of adjustment data as given below, representing the adjustable portion for cement component;</i> <i>"d" is a fixed coefficient, stated in the table of adjustment data as given below, representing the adjustable portion for steel component;</i> <i>"e" is a fixed coefficient, stated in the table of adjustment data as given below, representing the adjustable portion for fuel & lubricant;</i> <i>"f" is a fixed coefficient, stated in the table of adjustment data as given below, representing the adjustable portion for Machinery & Machine Tools;</i></p> <table border="1" data-bbox="646 1766 1362 1898"> <tr> <td data-bbox="646 1766 971 1898"></td> <td data-bbox="971 1766 1149 1898">Earthwork</td> <td data-bbox="1149 1766 1268 1898">Major/ Bridges Other works</td> <td data-bbox="1268 1766 1362 1898">Minor & Engg.</td> </tr> </table>		Earthwork	Major/ Bridges Other works	Minor & Engg.
	Earthwork	Major/ Bridges Other works	Minor & Engg.		

	<i>Fix Component (a)</i>	<i>0.15</i>	<i>0.15</i>
	<i>Labour (b)</i>	<i>0.50</i>	<i>0.30</i>
	<i>Cement (c)</i>	<i>-</i>	<i>0.15</i>
	<i>Steel (Bars & rods) (d)</i>	<i>-</i>	<i>0.25</i>
	<i>Fuel & Lubricant(e)</i>	<i>0.20</i>	<i>0.15</i>
	<i>Machinery & Machine Tools (f)</i>	<i>0.15</i>	<i>-</i>
<p><i>Values for “Ln”, “Cn”, “Sn” “Fn” and “Mn” correspond to the date 49 days prior to the last day of the period (to which the particular payment certificate relates) and shall be as follows :</i></p>			
<i>“Ln”</i>	<i>The All India Consumer Price Index for Industrial Works as published by the Labour Bureau, Ministry of Labour, Govt. of India.</i>		
<i>“Cn”</i>	<i>The Wholesale Price Index for Cement Code-1309030001 as published by Economic Advisor, Ministry of Commerce, Govt. of India.</i>		
<i>“Sn”</i>	<i>The Wholesale Price Index for Steel (Rebars Code : 1310010201)) as published by Economic Advisor, Ministry of Commerce, Govt. of India.</i>		
<i>“Fn”</i>	<i>The Wholesale Price Index for Fuel (High Speed Diesel – code: 1200020005) as published by Economic Advisor, Ministry of Commerce, Govt. of India.</i>		
<i>“Mn”</i>	<i>The Wholesale Price Index for Machine and Machine Tools – Code - 1311000000 as published by Economic Advisor, Ministry of Commerce, Govt. of India.</i>		
<p><i>Values for “Lo”, “Co”, “So”and “Fo” “M0” correspond to the base date and shall be as follows :</i></p>			
<i>“L0”</i>	<i>The All India Consumer Price Index for Industrial Works as published by the Labour Bureau, Ministry of Labour, Govt. of India on the base date.</i>		
<i>“C0”</i>	<i>The Wholesale Price Index for Cement (Gray Cement Code-1309030001) as published by Economic Advisor, Ministry of Commerce, Govt. of India on the base date.</i>		
<i>“S0”</i>	<i>The Wholesale Price Index for Steel (Rebars Code: 1310010201) as published by Economic Advisor, Ministry of Commerce, Govt. of India on the base date.</i>		

	<p>"FO" <i>The Wholesale Price Index for Fuel (High Speed Diesel – code: 1200020005) as published by Economic Advisor, Ministry of Commerce, Govt. of India on the base date.</i></p> <p>"MO" <i>The Wholesale Price Index number for Machinery and Machine tools Code - 1311000000 as published by Economic Advisor, Ministry of Commerce, Govt. of India on the base date.</i></p>	
Sub-Clause 14.1 Contract Price	<p>Add the following after the last paragraph – The Contract Price includes all duties, taxes, royalties, premiums for various insurances, licenses 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 the Contract and on the services performed under the Contract. Nothing in the Contract 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 the Contract.</p>	
Sub-Clause 14.2 Advance Payment	<p>Delete Paragraph 1 and substitute by the following : The Employer shall make an advance payment, as an interest bearing loan for mobilisation and design, 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), the rate of interest, and the applicable currencies and proportions shall be as stated in the Appendix to Tender.</p>	
Sub-Clause 14.3 Application for Interim Payment Certificates	<p>Delete first paragraph of this Sub-Clause and substitute by the following: The Contractor shall prepare his monthly bill, in the format agreed with the Engineer, in six copies (hard) and a soft copy. This shall be accompanied by supplementary details in two hard copies and a soft copy. All hard copies shall bear the original signatures of the Contractor and submitted to the Engineer. If these are found in order then Engineer shall forward and the same with copy of supplementary details to the Employer, with Interim Payment Certificate, as per clause 14.6, for payment to the Employer, otherwise return back all documents to the Contractor for rectification and resubmission. Responsibility of preferring the bill and entering the details shall vest with the Contractor. It is his responsibility to ensure that under no circumstances the payment claimed is more than the amount</p>	

	<p>equivalent of Work done for that stage. If it is discovered otherwise during the check by the Engineer or the Employer then a warning will be issued in the first instance and in the second instance amount equivalent to 10% of excess claimed shall be forfeited besides denying the extra claim.</p> <p>While submitting the bills all supplementary details like measurements, sketches, drawings, approvals, calculations etc. shall accompany the bill so that payment can be substantiated by the Engineer as well as the Employer.</p> <p>Even if no stage of work is completed during the month or Contractor does not choose to prefer a bill a 'NIL' bill shall be submitted by him.</p> <p>Paragraph 2 (a) third line Delete the word “(g)” and substitute by “(h)”</p> <p>Add the following paragraph at the end</p> <p>(h) any amount to be deducted for taxes in accordance with the applicable laws.</p>
<p>Sub-Clause 14.4 Schedule of Payments</p>	<p>Delete this Sub-Clause and substitute by the following:</p> <p>The Employer shall make interim payments to the Contractor as certified by the Engineer under Sub-Clause 14.6 on the basis of the estimated value of the Works executed as determined in accordance with the following procedure:</p> <p>(a) Schedule 'A' (Part -5 Price Schedule of Bid Document) specifies the lump sum cost given by the contractor and accepted by the employer.</p> <p>(b) The above lump sum cost/contract price has been apportioned in 9 cost centres to facilitate stage payment. (Schedule 'B') (Part -5 Price Schedule of Bid Document).</p> <p>(c) Each cost centres indicated in Schedule 'B' has been further sub-divided into different items of work alongwith their corresponding weightages (i.e. Schedule 'B' has been further sub-divided into Price Schedule (B-1 to B-9) (Part -5 Price Schedule of Bid Document).</p> <p>(d) The payment procedure has also been indicated in each Price Schedule (B-1 to B-9) and payment will be done accordingly.</p> <p>(e) The description of items of work in the Schedules does not limit in any way the Contractor's obligations under the Contract to provide all the Works described in the Employer's Requirements.</p> <p>(f) The Bidder shall compute, and supply to the Engineer, the total quantities (in units as described in the Price Schedule) of various items of works and components on the basis of detailed design</p>

	<p>reviewed/approved by the Engineer.</p> <p>(g)The Contractor shall base its claim for interim payment for each stage for various items of the work on completion till the end of the month for which the payment is claimed, supported with documents and an up-dated programme in accordance with the Employer's Requirements.</p> <p>(h)The weightage/percentage assigned to cost centre will apply only to the Contract Price stated in the Contract Agreement. It shall not apply to any additions or subtractions to the Contract Price arising from the issue of any Variation Orders. Each Variation Order shall specify the manner of interim payments and completion of stages for it.</p>
Sub Clause 15.2 Termination by Employer	Delete the words "the whole of" in Sub-Clause (d) and substitute the deletion by the following words "more than the percentage specified in Clause 4.4".
Sub-Clause 15.3 Valuation at Date of Termination	Delete the last line of this Sub-clause "work executed.... Contract" and substitute by the following: Work completed upto any defined stage of payment in accordance with the Contract. Extent of damages to the Employer due to termination under sub-clause 15.2 has been fixed as (1) Forfeiture of Performance Security (2) Forfeiture of Retention money/Security Deposit (3) five percent (5%) of the cost of the balance work at the date of termination. The Parties hereby agree that the rate of these damages agreed in this is a reasonable pre-determined amount, and that these damages are not by way of penalty.
Sub-Clause 15.4 Payment Termination after	Delete the Sub-Clause 15.4 and substitute the following: After a notice of termination under Sub-Clause 15.2 [<i>Termination by Employer</i>] has taken effect, the Employer may: (a) proceed in accordance with Sub-Clause 2.5 [<i>Employer's Claims</i>], (b) withhold further payments to the Contractor until the actions in accordance with subparagraphs (c), and (d) are completed. (c) encash and forfeit the whole of the amounts of Performance Security and Retention Money and take possession of Plant and Materials delivered to Site, for which payment has been made by the Employer. (d) encash and appropriate the bank guarantee for the Advance Payment to recover the outstanding amount, if any, of the Advance Payment (e) pay to the Contractor any sums due under Sub-clause 15.3 [<i>Valuation at Termination</i>], after the full

	<p>amounts of the Performance Security and Retention Money/Security Deposit and five percent(5%) of the cost of the balance work (as per clause 15.3) and any other amount due from the Contractor have been received by the Employer. Any outstanding amounts against the Contractor shall immediately become due and payable by the Contractor to the Employer.</p>
Sub-Clause 16.2	<p>Delete the subclause 16.2 (d) Delete the following words from 16.2 (e) “ of Sub-clause 1.7 [Assignment]”</p>
Sub-Clause 17.3 Employer’s Risks	<p>Sub-paragraph (h) - Delete</p>
Sub-Clause 18.1 General Requirement of Insurance	<p>Sub –paragraph 6 (b) Modify as following “copies of the policies for the insurances described in Sub-clause 18.2 (Insurance for works and Contractor’s Equipment), Sub Clause 18.3 (Insurance against Injury to Person and Damage to Property) and Sub Clause 18.5 (Professional Indemnity Insurance)”.</p>
Sub-Clause 18.2 Insurance of Works and Contractor’s Equipment	<p>Sub-paragraph 4 (d) Delete the words “(c), (g) and (h)”, and substitute by the words “(c) and (g)”.</p>
Sub-Clause 18.3 Insurance Against Injury to Persons and Damage to Property	<p>Add the following at the end of this Sub-Clause: The insurance policy shall include a cross liability clause such that the insurance shall apply to the Employer, the Contractor and Subcontractors (wherever applicable) as separately insured. 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 any Sub- Contractor (wherever applicable), other than death or injury resulting from any act or default of the Employer, his agents or employees. The Contractor shall indemnify and keep indemnified the Employer against all such damages and compensation, other than those for which the Employer is liable as aforesaid, and against all claims, proceedings, damages, costs, charges, and expenses whatsoever in respect thereof or in relation thereto.</p>
Sub-Clause 18.5 Professional Indemnity Insurance	<p>Add new sub-clause The Contractor shall provide evidence of professional indemnity insurance carried by its Designer for the Works. The professional indemnity insurance shall cover the risk of professional negligence in the design of the Works. This insurance shall be for a limit of not less than that set down in the Appendix to Tender and shall be maintained in full force and effect from the Commencement Date of the Works until 03 years after the date of completion of the Defect Notification</p>

	<p>period. The Engineer will not issue any payment certificate until the Contractor has provided evidence of this insurance and its period of effectiveness.</p>
<p>Sub Clause 20.6 Arbitration</p>	<p>Delete Sub-paragraph 1 (a, b & c) and replace as under –</p> <p>Unless settled amicably, any dispute in respect of which the DAB's decision (if any) has not become final and binding shall be finally decided by reference to arbitration by a Board of Arbitrators appointed in accordance with sub-clause (i) below. Such arbitration shall be held in accordance with the Indian Arbitration and Reconciliation Act, 1996. The seat of such arbitration shall be New Delhi, and the language of arbitration proceedings shall be English.</p> <p>The employer shall provide a panel of five (5) arbitrators to the contractor. The employer at the time of offering the panel of Arbitrator(s) to be appointed as Arbitrator shall also supply the information with regard to the qualification of the said Arbitrators nominated in the panel along with their professional experience, phone no. and address to the contractor. The contractor shall have to choose one Arbitrator from the panel of five. The employer shall also choose one Arbitrator from this panel of five.</p> <p>The third arbitrator shall be appointed by the two arbitrators from the panel of five so selected and shall act as presiding arbitrator. In case of failure of the two Arbitrators, appointed by the parties, to reach upon a consensus within a period of 28 days from their appointment as Arbitrators, the Presiding Arbitrator shall then be appointed by MD/DFCCIL. Arbitrator's Fee and other admissible expenses shall be as per DFCC letter No. HQ/Procurement/Arbitration Panel dated 28.3.2013.</p>

APPENDIX TO TENDER

Item	GC Sub-Clause	Data															
Employer	1.1.2.2, 1.3	Dedicated Freight Corridor Corporation of India Limited, 5 th Floor Pragati Maidan, Metro Station Building Complex New Delhi, India – 110001															
Contractor	1.1.2.3 & 1.3	To be filled in															
Engineer	1.1.2.4, 1.3 & 3.1	to be filled in															
Time for Completion	1.1.3.3	As per Sub-clause 8.2 of GC															
Defects Notification Period	1.1.3.7	Defect Notification Period for the Works shall be two years from the date of Taking Over of the Works (Sub-clause 10.1) and issue of Taking-Over Certificate by the Engineer.															
Communications	1.3	By fax and e-mails but confirmed in hard paper copy within 48 hours.															
Law and Language	1.4	Indian Laws & English Language															
Right of Access to the Site	2.1	<p>The Employer shall give Right to Access to site to the Contractor as per the following schedule subject to the Contractor providing Performance Security in terms of Sub-Clause 4.2 of General Conditions of Contract.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>SN</th> <th>Period after Commencement Date in days</th> <th>Cumulative percentage of site to be handed over for work with respect to total length</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>28</td> <td>50%</td> </tr> <tr> <td>2</td> <td>91</td> <td>80%</td> </tr> <tr> <td>3</td> <td>180</td> <td>95%</td> </tr> <tr> <td>4</td> <td>240</td> <td>100%</td> </tr> </tbody> </table>	SN	Period after Commencement Date in days	Cumulative percentage of site to be handed over for work with respect to total length	1	28	50%	2	91	80%	3	180	95%	4	240	100%
SN	Period after Commencement Date in days	Cumulative percentage of site to be handed over for work with respect to total length															
1	28	50%															
2	91	80%															
3	180	95%															
4	240	100%															
Amount of Performance Security	4.2	(Five) 05 Percent of the Accepted Contract Amount, in INR currency.															
General Design Obligation	5.1	56 days.															
Normal working hours	6.5	(Eight) 8 hours shift in a day and total (Forty eight) 48 hours in a week.															
Amount of Delay Damages	8.7	(1) For Milestone 1 – Rs.25,000/- per day of delay. (2) For Milestone 2 – Rs.25,000/- per day of delay. (3) For Milestone 3 - Rs.1,00,000/- perday of delay.															
Limit of Delay Damages for the whole of the Works	8.7	(Five) 05 per cent of the Accepted Contract Amount in INR ` Indian currency.															
Provisional Sum	13.5	No Provisional Sum is payable under this Contract.															
Advance Payment	14.2	<p>Delete Paragraph 1 and substitute by the following :</p> <p>Mobilization Advance:</p> <p>The Employer shall pay on written request by the Contractor a Mobilization Advance up to (Ten) 10 per cent of the Contract Price at an interest rate of 4.5% per annum above the base rate of State Bank of India as effective on the date of approval of payment of</p>															

		<p>mobilization advance by the Competent Authority, compounded yearly. The Mobilization Advance shall be released in two installments as under:</p> <p>(a) Upto (Five) 5 per cent: On Submission of Performance Security and commencement of mobilization process; and</p> <p>(b) Upto (Five) 5 per cent: On Submission of the Preliminary Designs and details of utilisation of initial Mobilization Advance of 5% to the satisfaction of Engineer.</p> <p>The Advance Payment will be released on submission of unconditional Bank Guarantee for an amount equivalent to 110% of the component of the advance payment requested by the Contractor.</p> <p>Note: The Contractor shall have a one time option to reduce the Bank Guarantee for the mobilization advance by the amount already recovered, once the 50% of mobilization advance has been recovered.</p>
Percentage of Retention	14.3 (c)	(Ten) 10 per cent
Limit of Retention Money	14.3 (c)	(Five) 5 per cent of the Contract Price
Payment	14.7	As per Sub-clause 13.4 of GC above
Delayed Payment	14.8	These financing charges shall be calculated at an annual rate of 8% (Eight percent) of Indian Currency.
Retention money	14.9	A retention amounting to 10 (ten) per cent of the value of the work done shall be deducted by the Engineer in the first and following Interim Payment Certificates, until the amount so retained reaches a limit of retention money of 5 (five) percent of the Contract Price. The Contractor may, at his option, replace the Retention Money with an unconditional bank guarantee from the Bank, and valid for the period up to the end of the Defect Notification Period,
Currencies of Payment	14.15	Currency of Payment shall be INR.
Evidence of Insurance	18.1 (a), 18.5	Before Commencement Date of Works
Relevant Policies	18.1(b)	Within 84 days of Commencement Date of Works
Insurance of Works and Contractors Equipment	18.2	Full Replacement Cost+ 15%; The Insurance Policy to cover the Employer's Risk as per Sub-Clause 17.3 of GC shall be taken by the Employer.
Minimum amount of third party Insurance	18.3	Rs. 50 lakh for any one occurrence.
Professional Indemnity Insurance	18.5	Rs. Two Crores
Appointment of Dispute Adjudication Board	20.2	The DAB shall comprise of one Sole member and sole member shall be appointed by Managing Director/DFCCIL. List of DAB members will be provided to the contractor by the Employer within three months of commencement date.
Failure to Agree	20.3 (d)	Managing Director/DFCCIL

Dispute Adjudication Board		
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CONTRACT FORMS

Section VIII

Contract Forms (CF)

Table of Forms

CF No	Sub- Clause of GC	Description
01	1.1.1.3	Letter of Acceptance
02	1.6	Form of Contract Agreement
03	4.2	Form of Performance Security (Guarantee) By Bank
04	14.2	Mobilization Advance Payment Guarantee Form
05	14.3, 14.9	Form of Retention Money Guarantee
06	5.1, 18.5	Form of Designer's Warranty
07	18	Insurance Requirement

LETTER OF ACCEPTANCE

(Sub-Clause 1.1.1.3)

To

Date:.....

Dear Sir

Project: **Design and Construction of Rail Flyover near Ganjhwaja, Formation in Embankments/Cuttings including blanketing, Bridges (Major, Minor & RUBs), Supply and Spreading of Ballast and other related infrastructural works for double track electrified railway line on Design Build Lump Sum Basis in different stretches between Dehri-on-Sone & Mughalsarai of Eastern Dedicated Freight Corridor in the states of Bihar and Uttar Pradesh in India.**

To,

This is to notify you that your bid proposal dated.....for execution of the above Project for the firm Contract Price of (INR) and as corrected and modified in accordance with the bidding documents, is hereby accepted by DFCC.

You are requested to furnish the performance security as required by the contract and bidding document.

You are hereby instructed to proceed and prepare your mobilization for the execution of the said Contract works. Contract Agreement documents will be prepared and forwarded to you for signature.

Yours truly,

For – Dedicated Freight Corridor Corporation of India Limited

(_____)

Name:.....

Signature

Stamp

CONTRACT AGREEMENT

(Sub-Clause 1.6 of General Conditions of Contract)

THIS AGREEMENT (“Agreement”) is made at New Delhi on the _____ day of _____, _____,

BETWEEN

(1) Dedicated Freight Corridor Corporation of India Limited, incorporated under the laws of India and having its principal place of business at 5th Floor, Pragati Maidan Metro Station Building Complex, New Delhi, India – 110001 (hereinafter called ‘**the Employer**’), and _____, a company/corporation/JV incorporated under the laws of _____having its principal place of business at _____ (hereinafter called “**the Contractor**”).

WHEREAS the Employer desires to engage the Contractor to

Design and Construction of Rail Flyover near Ganjkhwaja, Formation in Embankments/Cuttings including blanketing, Bridges (Major, Minor & RUBs), Supply and Spreading of Ballast and other related infrastructural works for double track electrified railway line on Design Build Lump Sum Basis in different stretches between Dehri-on-Sone & Mughalsarai of Eastern Dedicated Freight Corridor in the states of Bihar and Uttar Pradesh in India. contract package (“the Works”), and the Contractor has agreed to such engagement upon and subject to the terms and conditions hereinafter appearing.

NOW IT IS HEREBY AGREED as follows:

Article 1. 1.1 Contract Documents (Reference GC Clause 1.5)

Contract Documents The following documents shall constitute the Contract between the Employer and the Contractor, and each shall be read and construed as an integral part of the Contract:

- (a) This Contract Agreement and the Appendices hereto
- (b) Letter of Acceptance
- (c) Letter of Bid and Price Schedules submitted by the

Contractor

- (d) Particular Conditions & Appendix to Tender
- (e) General Conditions
- (f) Employer's Requirements
- (g) Contractors Technical & Financial Proposal;
- (h) Information furnished in Part 4 of Bidding document
- (i) Other completed bidding forms submitted with the Bid;
and
- (j) Any other documents forming part of the Employer's requirements and Bidding documents.

1.2 Definitions (Reference GC clause 1 and Employer's Requirement).

Capitalised words and phrases used herein shall have the same meanings as are ascribed to them in the General Conditions and Employer's Requirement.

Article 2.

Contract Price and Terms of Payment

2.1 **Contract Price** (Reference GC Clause 14.1)

The Employer hereby agrees to pay to the Contractor the Contract Price in consideration of the performance by the Contractor of its obligations pursuant to the Contract. The Contract Price shall be as specified in Schedule A Price Schedule, or such other sums as may be determined in accordance with the terms and conditions of the Contract.

2.2 **Terms of Payment** (Reference GC Clause 14.4)

The terms and procedures of payment according to which the Employer will reimburse the Contractor are given in Terms and Procedures of Payment subject to such additions thereto or deductions there from as may be made under the provisions of the contract at the times and in the manner prescribed by the Contract.

The amount payable under Schedule – B (B1 to B6) is adjusted in accordance with GC 13.8 or with any of the other terms of the Contract.

Article 3.

Commencement Date

3.1 **Commencement Date** (Reference GC Clause 1.1.3.2)

42days from the date of receipt of letter of acceptance or as indicated in the Letter of Acceptance.

Article 4.
Time for
Completion

4.1 **Completion** (Reference Clause 1.1.3 GC & ----
Employer's Requirements)

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 by **900 days and** remedy any defects therein in conformity in all respects with the provisions of the Contract.

Article 5.
Communications

5.1 The address of the Employer for notice purposes, pursuant to GC 1.3 is:

The Director Project & Planning,
Dedicated Freight Corridor Corporation,
5th Floor Pragati Maidan, Metro Station Building Complex
New Delhi, India – 110001

5.2 The address of the Contractor for notice purposes, pursuant to GC 1.3 is: _____.

Article 6.
Obligations of the
Contractor

6.1 **Contractor's General Obligation** GC 4.1

The Contractor shall ensure full compliance with the laws of India including taxation and other fiscal laws, with regard to the Contract and the Works shall be solely responsible for the same. The Contractor shall submit copies of acknowledgements evidencing filing of returns every year and shall keep the Employer fully indemnified against liability of levies, custom duties, tax, interest, penalty etc. of the Contractor in respect thereof, which may arise.

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

For and on behalf of the Contractor

For and on behalf of the Employer

Signature of the authorized official

Signature of the authorized official

Name of the official

Name of the official

Stamp/seal of the Contractor

Stamp/Seal of the Employer

SIGNED, SEALED AND DELIVERED

By the said

By the said

_____ Name

_____ Name

on behalf of the Contractor in the

on behalf of the Employer in the

presence of:

presence of:

Witness _____

Witness _____

Name _____

Name _____

Address _____

Address _____

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SAMPLE FORM OF PERFORMANCE SECURITY (GURANTEE) BY BANK

(Sub-Clause 4.2)

This deed of guarantee made this day of Between Bank of (hereinafter called the “**Bank**”) of the one part, and Dedicated Freight Corridor Corporation of India Limited called the “**Employer**” of the other part.

Whereas Dedicated Freight Corridor Corporation of India Limited has awarded the contract for (Hereinafter called the Contract) to (Hereinafter called the **Contractor**). (Name of the Contractor)

AND WHEREAS the Contractor is bound by the said Contract to submit to the Employer a Performance Security for a total amount of Rs..... (Amount in figures and words). Now we the undersigned(Name of the Bank) being fully authorized to sign and to incur obligations for and on behalf of and in the name of(full name of the Bank), hereby declare that the said bank will guarantee the Employer the full amount of Rs.(Amount in figures and words).

After the Contractor has signed the aforementioned Contract with the Employer, the Bank is engaged to pay the Employer, any amount up to and inclusive of the aforementioned full amount of the Performance Security upon written order from the Employer to indemnify the Employer for any liability of damage resulting from any defects or shortcomings of the Contractor or the debts he may have incurred to any parties involved in the Works under the Contract mentioned above, whether these defects or shortcomings or debts are actual or estimated or expected. The Bank will deliver the money required by the Employer immediately on demand without delay and demur and without reference to the Contractor and without the necessity of a previous notice or of judicial; or administrative procedures and without it being necessary to prove to the Bank the liability or damages resulting from any defects or shortcomings or debts of the Contractor. The Bank shall pay to the Employer any money so demanded notwithstanding any dispute/disputes raised by the contractor in any suit or proceedings pending before any court, Tribunal or Arbitrator/s relating thereto and the liability under this guarantee shall be absolute and unequivocal.

This guarantee is valid till(the initial period for which this Guarantee will be valid must be for at **least 6 months (six months) longer than the anticipated expiry date of Defects Notification Period as stated in Clause 1.1.3.7 of the Appendix to Tender.**

At any time during the period in which this guarantee is still valid, if the Employer agrees to grant a time extension to the Contractor or if the Contractor fails to complete the Works within the time of completion as stated in the Contract, or fails to discharge himself of the liability or damages or debts as stated in the Contract, or

fails to discharge himself of the liability or damages or debts as stated in the Contract, it is understood that the Bank will extend this guarantee under the same conditions for the required time on demand by the Employer and at the cost of the Contractor.

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

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

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

Notwithstanding anything contained herein:

Our liability under this bank Guarantee shall not exceed Rs.....(Rupees).

This bank guarantee shall be valid up to

We are liable to pay the guarantee amount or part thereof under this bank Guarantee only and only if you serve upon us a written claim or demand on or before.....

In witness whereof I/We of the Bank have signed and sealed this guarantee on the day of (Month) being herewith duly authorized.

For and on behalf of

Thebank

Signature of Authorized bank Official

Name

Designation

Stamp/seal of the Bank:.....

Signed, sealed and delivered

For and on behalf of the
Bank of the above

Name _____

In The presence of :

Witness 1.

Signature

Name

Address

Witness 2.

Signature

Name

Address

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**SAMPLE FORM FOR MOBILISATION ADVANCE PAYMENT
GUARANTEE**

(Sub-Clause 14.2)

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

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

AND WHEREAS vide Clause 14.2 of the General Conditions of Contract, Mobilization Advance up to ---% (--- percent) of the original contract value of Rs..... is payable to the contractor against Bank Guarantees, the Contractor hereby applies for Mobilization Advance of --% (--- percent) amounting to Rs...../- (Rupees.....) of the Contract Price, as per Appendix to Tender

AND WHEREAS this Bank Guarantee is for Rs...../- (Rupees.....) being the 1st one of the two Bank Guarantees, totalling to the above Mobilization Advance amount of Rs...../-.

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

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

This guarantee is valid till

At any time during the period in which this guarantee still valid of the Contractor fails to fulfill its obligation under the Contract, it is understood that the Bank will extend

this guarantee under the same condition for the required time on demand by the Employer at the cost of the Contractor.

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

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

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

Notwithstanding anything contained herein:

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

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

We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or before(date of expiry of Guarantee).

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

For and on behalf of the Bank of.....

Signature of Authorized Bank Official

Name _____

Designation _____

Stamp/Seal of the bank _____

Signed, sealed and delivered for and on

Behalf of the bank by the above named

..... in the presence of

Witness 1

Signature _____

Name _____

Address _____

Witness 2

Signature _____

Name _____

Address _____

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SAMPLE FORM OF RETENTION MONEY GUARANTEE

(Sub-Clause 14.3 c, 14.9)

Brief description of Contract

Name and address of Beneficiary

_____ (whom the Contract defines as the Employer).

We have been informed that _____ (hereinafter called the "Principal") is your Contractor under such Contract and wishes to receive early payment of [part of] the retention money, for which the Contract requires him to obtain a guarantee.

At the request of the Principal, we (*name of bank*) _____ hereby irrevocably undertake to pay you, the Beneficiary / Employer, any sum or sums not exceeding in total the amount of _____ (the "Guaranteed Amount", say: _____) upon receipt by us of your demand in writing and your written statement stating:

- a) that the Principal has failed to carry out his obligation(s) to rectify certain defect(s) for which he is responsible under the Contract, and
- b) the nature of such defect(s).
- c) That the Principal has failed to carry out his obligation(s) for which he is responsible under the Contract,

At any time, our liability under this guarantee shall not exceed the total amount of retention money released to the Principal by you, as evidenced by your notices issued under Sub-Clause 2.5 and 14.9 of the Conditions of the Contract with a copy being passed to us.

Any demand for payment must contain your signature(s) which must be authenticated by your Bankers. The authenticated demand and statement must be received by us at this office on or before (*the date 56 days after the expected expiry of the Defects Notification Period for the Works*) _____ (the "**Expiry Date**"), when this guarantee shall expire and shall be returned to us.

We have been informed that the Beneficiary may require the Principal to extend this guarantee if the performance certificate under the Contract has not been issued by the date 28 days prior to such Expiry Date. We undertake to pay you such Guaranteed Amount upon receipt by us, within such period 28 days, of your demand in writing and your written statement that the performance certificate has not been issued, for reasons attributable to the Principal, and that this guarantee has not been extended.

This guarantee shall be governed by the laws of Republic of India.

Date Signature(s)

- 1 In consideration of the Employer not objecting to the Contractor and the Designer entering into the Consultancy Agreement, the Designer warrants and undertakes to the Employer that he has exercised and will continue to exercise all the skill and care to be expected of a professionally qualified and competent designer experienced in work of similar nature and scope as the Works in carrying out the design of the temporary and Permanent Works and in performing the other duties and functions ascribed to him in the Contract.
- 2 The Designer agrees that, in the event of the termination of the Contract by the Employer or its appointee, the Designer will, if so required by notice in writing given by the Employer, accept subject to Clause 4 given herein, the instructions of the Employer or his appointee to the exclusion of the Contractor in respect of the carrying out and completion of the Works upon the terms and conditions of the Consultancy Agreement.
- 3 The Designer further agrees that he will not, without first giving the Employer not less than 21 days' previous notice in writing, exercise any rights it may have to terminate the Consultancy Agreement or to treat the same as having been as repudiated by the Contractor or to discontinue the performance of any duties to be performed by the Designer pursuant thereto. The Designer's right to terminate the Consultancy Agreement or to treat the same as having been repudiated or to discontinue the performance thereof shall cease if, within such period of notice and subject to Clause 4, the Employer shall give notice in writing to the Designer requiring the Designer to accept the instructions of the Employer or his appointee to the exclusion of the Contractor in respect of the carrying out and completion of the Contract Works upon the terms and conditions of the Consultancy Agreement.
- 4 Any notice given by the Employer under Clause 2 or 3 above shall state that the Employer or his appointee accepts liability for payment of the fees payable to the Designer under the Consultancy Agreement and for performance of the Contractor's obligations under the Consultancy Agreement, including payment of any fees outstanding at the date of such notice.
- 5 The Employer shall be entitled to assign the benefit of this Warranty at any time without the consent of the Designer being required.
- 6 All documents arising out of or in connection with this Warranty shall be served:
 - (1) upon the Employer at [] marked for the attention of [];
 - (2) upon the Designer at [].
- 7 The Employer and the Designer may change their respective nominated addresses for service of documents to another address in India but only by prior written notice to each other. All demands and notices must be in writing.
- 8 This Warranty shall be governed by and construed according to the laws for the time being in force in India.

- 9 (i) In the event that the Contract or the employment of the Contractor under the Contract is terminated for any reason whatsoever and if so requested by the Employer in writing within 21 days of such termination, the Designer shall carry out and complete his obligations under this Warranty and shall enter into a novation agreement with the Employer and the Contractor in which the Designer will undertake inter alia to perform the Design and be bound by its terms and conditions as if the Employer had originally been named as a contracting party in place of the Contractor. The said novation agreement will be in such form as the Employer may reasonably require.
- (ii) In the event that the Employer does not require the Designer to enter into a novation agreement as required by Sub-clause 9 (i), the Designer shall have no claim whatsoever against the Employer for any damage, loss or expense howsoever arising out of or in connection with this Warranty.

Except to the extent (if any) expressly permitted by the Consultancy Agreement, the Designer shall not sub-contract any of the Designer's obligations under the Consultancy Agreement without the prior written consent of the Engineer.

- 10 Without prejudice to its obligations under this Warranty, the Designer shall maintain with well established underwriters of repute and on terms and conditions reasonably acceptable to the Employer, professional indemnity insurance (as per sub-clause 18.5 of the Particular Conditions of Contract) in respect of the Designer and its sub-consultants for Indian Rupees Two Crores **(2,00,00,000 Rupees)** in relation to his design of the Works for any one occurrence or series of occurrences arising out of any one event from the date of notification of acceptance until 3 years after the issue of Performance Certificate for the whole of works. The Designer shall immediately inform the Employer if for any reason professional indemnity insurance is not maintained in accordance with this Warranty or becomes void or unenforceable.
- 11 Insofar as the patent, copyright or other intellectual property rights in any Design Data (as defined in the Contract), plans, calculations, drawings, documents, materials, computer software, know-how and information relating to the Works shall be vested in the Designer, the Designer grants to the Employer his successors and assigns a royalty-free, non-exclusive and irrevocable license (carrying the right to grant sub-licenses) to use and reproduce any of the works designs or inventions incorporated and referred to in such documents or materials and any such know-how and information for all purposes relating to the Works (including without limitation the design, construction, reconstruction, completion, reinstatement, extension, repair and operation of the Works). To the extent beneficial ownership of any such patent, copyright or other intellectual property right is vested in anyone other than the Designer or the Contractor, the Designer shall use his best endeavors to procure that the beneficial owner thereof shall grant a like license to the Employer. Any such license granted shall not be determined if the Designer shall for any reason cease to be employed in connection with the Works.

- 12 (i) Any dispute or difference of any kind whatsoever between the Employer and the Designer arising under out of or in connection with this Warranty shall be referred to arbitration in accordance with Clause 20 of GC "Dispute" as defined in the Contract shall be deemed to include any such dispute or difference between the Employer and the Designer.
- (ii) In the event that the Employer is of the opinion that the issues in such a dispute or difference will or may touch upon or concern a dispute or difference arising under out of or in connection with the Contract ("the Contract Dispute") then provided that an Arbitrator has not already been appointed, the Employer may by notice in writing to the Designer require and the Designer shall be deemed to have consented to the referral of such dispute or difference to the Arbitrator to whom the Contract Dispute has been or will be referred.
- (iii) Save as expressly otherwise provided, the Arbitrator shall have full power to open up, review and revise any decision, opinion, instruction, notice, order, direction, withholding of approval or consent, statement of objection, determination, certificate, assessment or valuation by the Engineer or the Contractor, relating to the dispute or difference.
- (iv) This Warranty shall be governed by and construed according to the laws for the time being in force in India and the Designer agrees to submit to the jurisdiction of the courts of Delhi/New Delhi.

IN WITNESS whereof this Warranty has been executed as a deed on the date first before written.

THE COMMON SEAL of

[Designer]

was affixed hereto in

the presence of:-

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Insurance Requirements

[Sub Clause- 18]

Insurance to be taken by the Contractor

In accordance with the provision of GC Clause 18, the Contractor shall at its expense take out and maintain in effect, or cause to be taken out and maintained in effect, during the performance of the Contract, the insurances set forth below in the sums and with the deductibles and other conditions specified. The identity of the insurers and the form of the policies shall be subject to the approval of the Employer, such approval not to be unreasonably withheld.

(A) Insurance of Works and Contractor's equipments-

In accordance with the provision of sub clause 18.2 contractor shall insure to cover loss or damage to works, plants, materials and contractor's documents occurring prior to completion of the facility until the date of issue of the performance certificate.

Amount (in currency (ies)	Deductible limits ((in currency (ies)	Parties insured (names)	From	To
As per GCC/ PCC/Appendix to Tender	-	Contractor and Employer	Commencement Date	Issue of Performance certificate

(B) Insurance against Injuries to Person and Damage to property

Covering any loss, damage, death or bodily injuries which may occur to any physical property or to any person covering loss and damage to Employers property and Employer's personal.

Amount (in currency (ies)	Deductible limits ((in currency (ies)	Parties insured (names)	From	To
As per GCC/ PCC/Appendix to Tender	-	Contractor and Employer	Commencement Date	Issue of Performance certificate

(C) Automobile liability Insurance -

Covering use of all vehicles used by the contractors or its sub contractors (whether or not owned by them) in connection with the design, construction testing and commissioning of the facilities under the contract in accordance with statutory requirements.

(D) Workers' Compensation -

In accordance with the statutory requirements applicable in any country where the facilities or any part thereof is executed.

(E) Professional Indemnity Insurance-

To cover professional negligence in the design of the Works.

Amount (in currency (ies)	Deductible limits ((in currency (ies)	Parties insured (names)	From (Place)	To (Place)
As per GCC/ PCC/Appendix to Tender	-	Contractor and Employer	Commencement Date	3 Years beyond defect liability period

Insurance to be taken by the Employer - Nil

PART – 4

Reference Documents

Reference Documents

The technical data provided by the Employer in Site Details - Part 4 of Bidding Document like plan and profile, Chainages, GAD of bridges, geotechnical details, hydrological data, linear water way for bridges are indicative. However number of bridges, level crossings, RUBs, RFOs, Buried Boxes and chartered utilities are firm and any change will be treated as a variation.

(1) List of various structures like major bridges, minor bridges, rail flyovers, LCs and chartered utilities are given below:

A. Details of Major Bridges

S.No.	Section	Bridge No.	Ch.	Clear Span (m)
1	Ch. 5.38- Ch 14.108 Dehri on Sone to New Karwandiya	533	5.550	3 x 18.3
		535A	6.300	15 x 4.5 x 1.5
		547	12.610	3 x 6.1
2	Ch. 112.14 to Ch. 116.38	723	113.134	1 x 18.30 (Over canal and road of LC 79)

B. Details of Railway Flyover

S.No.	Section	Bridge No.	Ch.	Clear Span	Remarks
1	Ch. 112.14 to Ch. 116.38	724A	114.125	1 x 76.2 m (main span) +1x30.50m +1x12.20m	Superstructure for two Tracks Separately

C. Details of Minor Bridges

S. No	Section	Prop. Br. No.	Prop. Ch.	Prop. Span
1	Ch. 5.38 to Ch. 14.108 Dehri on Sone to New Karwandiya	534	5.830	1 x 4 x 2.2
		535	6.067	1 x 3 x 1.2
		536	6.825	1 x 1.2 x 1.2
		536A	6.920	2 x 6 x 2
		537	7.177	1 x 1.2 x 1.2
		538	7.306	1 x 1.2 x 1.2
		539	7.612	1 x 2 x 1.2
		540	7.917	1 x 1.2 x 1.2
		541	8.650	1 x 1.2 x 1.2
		542	9.500	1 x 2 x 1.5
		543	9.870	1 x 2 x 1.5
		544	10.510	1 x 4 x 2.0
		545	10.885	1 x 9.10
		546	11.580	1 x 3 x 3
2	Pahleja Yard	537 PH	7.177	1 x 1.2 x 1.2
		538 PH	7.306	1 x 1.2 x 1.2
		539 PH	7.612	1 x 2 x 1.2
		540 PH	7.917	1 x 1.2 x 1.2
		541 PH	8.650	1 x 1.2 x 1.2
		542 PH	9.500	1 x 2 x 1.5
3	Ch. 112.14 to 116.38	721	112.363	1 x 1.2 x 1.2
		722	112.730	1 x 2 x 2
		724	113.288	1 x 1.2 x 2.00
		725	114.208	1 x 1.2 x 2.00
		725 Loop	114.197	1 x 1.2 x 2.00
		726	114.600	1 x 2 x 2
		726 Loop	114.503	1 x 2 x 2
		727	115.480	1 x 3 x 3
		728	116.211	1 x 2 x 2
4	Ch. 119.437 to 119.950 MGS Yard MGS Connection works	739	119.566	1 x 1.2 x 1.2
		270	119.880	1 x 1.2 x 1.2

D. Details of RUBs

S.No.	Section	Bridge No.	Prop. Ch.	Span
1	Ch. 5.38 to Ch. 14.108	531 A	5.400	3 x 4.5 x 3.7
2	Ch. 112.14 to 116.38	726 A	114.904	1 x 7.5 x 4.00

E. Details of LCs

S.No.	Section	Location	LC No.	Remarks
1	Ch. 5.38 to Ch. 14.108 Dehri on Sone to New Karwandiya	556/25-27	35	35, 36, 37, 79 (New Gate Lodge to be made in lieu of existing Gate Lodge by Contractor)
2		559/15-17	36	
3		562/11-13	37	
4	Ch. 112.14 to 116.38	663/7-9	79	
5	Ch. 112.14 to 116.38	663/7-9	79	Road to be passed under RUB/Bridge No. 723, road to be connected to the existing roads.
		665/1-3	80	Road to be passed under RUB/Bridge No. 726A (new bridge), road to be connected to the existing roads.

F. Details of RUBs in Lieu of LCs (Burried Boxes)

S. No.	LC No.	Location (Rly. Km)
1	35	556/25-27
2	37	562/11-13
3	64	630/9-11
4	65	633/7-9
5	66	637/5-7
6	67	638/7-9
7	69	642/5-7
8	77	659/13-15
9	79	663/7-9

(2) List of Chartered Utility (which are coming on DFC alignment).

S. No	Name of Structure	Location (Rly. Km)	Remarks
1	Gate Lodge at LC /35/C	556/25-27	New Gate lodge to be constructed by Contractor.
2	Gate Lodge LC/36/C	559/15-17	
3	Gate Lodge at LC/37/C	562/11-13	
4	Gate Lodge at LC/79	663/79	
5	SSP Pahleja*	558/16-18	New Building including internal wiring to be constructed by Contractor.
6	M.W. Tower at Pahleja Station	559/16-18	To be shifted by DFCCIL.
7	Relay Room	559/8	New Relay Room Building including internal wiring to be constructed by Contractor.
8	2 No. 11/33 KV each Electrical Power line X-ing	555/24-26	
9	11 KV LT Line having approx. 7 nos. PCC pillar of approx. length 280 Mtr.	555/34-556/8	
10	1 no. 33 KV electrical power line X-ing	556/12-14	
11	33 KV LT Line having approx.12 nos. pillars of approx. length 980 mtr parallel to DN track.	557/8 - 558/6	
12	11 KV LT Line having approx. 10 nos. PCC pillar of approx. length 710 Mtr. Parallel to DN track	557/14-558/6	
13	Approx. 2 no. 11/33 KV electrical power line X-ing	558/4-6	
14	33 KV LT Line having approx. 10 nos. pillars of approx. length 650 mtr parallel to UP track.	558/3A-558/23A	
15	11 KV LT Line having approx. 05 nos. PCC pillar of approx. length 220 Mtr. Parallel to UP track	558/3A-558/11A	
16	1 No. 11 KV BSEB PCC pillar for private house supply	558/26-28	
17	Approx. 3 No. 11 KV BSEB PCC pillar for private house supply	559/6-8	
18	1 no. 11 KV electrical power line X-ing	562/24-26	
19	11 KV LT line of approx. length 710 mtr parallel to DN track.	564/8-10	

Note:

* All Electric works including foundation for Electrical installation shifting of Electrical installation will be done by DFCCIL.

- (3) Employer site data containing following data is enclosed (see separate Booklet Part- 4):
- (i) Plan and profile for the section (Total 10 Sheets)
 - (a) Ch. 5.38 to 14.108 - 8 Sheets
 - (b) Ch. 112.14 to 116.38 - 1 Sheet
 - (c) Ch. 119.437 to 119.950- 1 Sheet
 - (ii) GADs of RFO - (1 Sheet)
 - (iii) GADs of Bridges (Major, Minor, RUBs) - (38 Sheets)
 - (iv) GADs of Burried Boxes - (2 Sheets)
 - (v) Yard Plan of Pahleja - (1 Sheet)
 - (vi) GAD of LC Gate Lodge - (1 Sheet)
 - (vii) Cross section of Road - (1 Sheet)
 - (viii) Cross section of goods handling platform – (1 Sheet)
 - (ix) Geotechnical Data (RFO)
 - (x) Traction earthing diagram

PART – 5

**Price Schedules
(See Separate Booklet)**