



**INDEPENDENT SAFETY ASSESSMENT
FOR
TRAIN CONTROL & SIGNALLING SYSTEM**

FOR KOLKATA EAST WEST METRO LINE

CONTRACT ISA (R)

CONTRACT DOCUMENT

**Kolkata Metro Rail Corporation Limited
KMRCL Bhawan, HRBC Complex
Munshi Premchand Sarani,
2nd & 3rd Floor, Kolkata 700 021
India**

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KOLKATAMETRO RAIL CORPORATION LIMITED

Our Ref:

Date:

TO

FROM

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.....

Kolkata Metro Rail Corporation Limited
KMRCL Bhawan, HRBC Complex
Munshi Premchand Sarani,
2nd & 3rd Floor, Kolkata 700 021
India

**ISA SERVICES FOR TRAIN CONTROL & SIGNALLING SYSTEM
FOR KOLKATA EAST WEST METRO LINE
NOTICE OF INVITATION TO TENDER
CONTRACT ISA (R)**

Tender for Independent Safety Assessment of Train Control & Signalling system is being called by KMRC, from firms having experience of conducting assessment of train control and signalling system, for Kolkata East West Metro line.

Tender documents for above contract will be available for purchase between 1000 hrs and 1500 hrs from **21/08/2013 to 28/08/2013**. Copies of the tender documents will be made available from the office of The Managing Director, Kolkata Metro Rail Corporation Limited, KMRCL Bhawan (3rd floor) Munshi Premchand Sarani, Kolkata 700021, India upon payment of a non-refundable fee of INR 20,000 or US \$400 towards the cost of tender documents. Payment will be made by a bank draft drawn on a Kolkata branch of any scheduled commercial bank (except Regional Rural Banks and Local Area Banks) , in favour of Kolkata Metro Rail Corporation Limited.

The tender document can also be downloaded from the Website of Kolkata Metro Rail Corporation i.e. www.kmrc.in in which case the non-refundable fee indicated above towards the cost of the Tender documents shall be submitted along with the submission, **failing which** the Tender submission will be rejected out rightly. No tampering, alteration or changing of the contents is permissible.

The following tender information should also be noted:

Cost of Tender document	INR 20,000 or \$ 400. <i>In case tender document is downloaded from website, cost shall have to be deposited at the time of tender submission.</i>
Tender validity	180 days from the latest date of submission of Tender
Tender Security amount	INR 2 Lakhs or equivalent amount in single freely convertible foreign currency as described in (Clause 5) of the Instructions to Tenderers. The validity should be for 180 days + 28 days i.e. For 208 days from the latest date of tender submission.
Completion Period of the Contract (Subject to the achievement of Key Dates)	Refer SCC 4
Sale of Tender Document	21/08/2013 to 28/08/2013 (Except holidays)
Last date of seeking clarification	16/09/2013
Pre-bid Meeting	23/09/2013 at 11.30 hrs
Date & Time of Submission of Tender	23/10/2013 upto 1500 hrs
Date & Time of opening of Tender	23/10/2013 at 1530 hrs
Authority for seeking clarifications both hard and soft copy (on MS-Excel format by E-mail) to	Chief engineer (S&T) Kolkata Metro Rail Corporation Limited, KMRCL Bhawan (3 rd floor), HRBC Complex Munshi Prem Chand Sarani, Kolkata-700 021, India E-mail address: cest.kmrc@gmail.com Fax No: +91 33 2213 4380
Authority and place of submission of completed Tender Documents	Managing Director Kolkata Metro Rail Corporation Limited,

	KMRCL Bhawan (3 rd floor),HRBC Complex Munshi Prem Chand Sarani, Kolkata-700 021, India
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One set of tender document along with addendum and corrigendum, if any, shall be submitted with tender submittal duly signed and stamped on each page.

Please note carefully the requirements for submitting tenders, and the date and time for submittal. Late or delayed tenders will not be accepted.

-----Sd/-----
Managing Director
Kolkata Metro Rail Corporation Limited

KOLKATA METRO RAIL CORPORATION LTD.

ISA SERVICES FOR TRAIN CONTROL & SIGNALLING SYSTEM

FOR KOLKATA EAST WEST METRO LINE

CONTRACT ISA (R)

INSTRUCTIONS TO TENDERER

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INSTRUCTIONS TO TENDERER

Contract ISA (R)

INDEPENDENT SAFETY ASSESSMENT

OF

TRAIN CONTROL & SIGNALLING SYSTEM

1 Proposal

1.1 General Description of the Work

Kolkata Metro Rail Corporation Limited (KMRCL) is constructing Kolkata East West Metro line. Kolkata East West Metro line is from Howrah Maidan to Salt Lake Sector-v covering a distance of around 14.67 km of which 8.72 km is underground and 5.95 km is elevated. There are 12 stations (6 underground and 6 elevated stations) and Depot at Central Park.

The project will be financed through an ODA loan from Japan Bank for International Cooperation (JBIC), Japan. Disbursement of an ODA Loan by JBIC will be subject, in all respects, to the terms and conditions of the Loan Agreement, including the disbursement procedures and the 'Guidelines for Procurement under JBIC ODA Loans'. No party other than KMRCL shall derive any rights from the Loan Agreement or have any claim to loan proceeds. The above Loan Agreement will cover only a part of the project cost. The remaining portion shall be financed through equity participation by the Government of India and Government of West Bengal and other appropriate means.

The services under contract ISA (R) comprises independent safety audit and assessment of the safety aspects of the Train control and signalling system to be implemented in the above sections.

The detailed Scope of Services for the Contractor is described in the section "Scope of services".

1.2 KMRCL is calling for Lump Sum Tenders for Contract ISA (R).

1.3 The Tenderer to qualify for award of Contract, shall submit a written power of attorney authorising the signatories of the tender to commit each member of the partnership, consortium or joint venture.

1.4 Where the Tenderer comprises a partnership, consortium or joint venture, the Tenderer shall complete the following information to continue to meet the minimum threshold criteria "

- a. Documents evidencing company registration for each company and any joint venture contract, if appropriate
- b. Memorandum of Understanding duly registered shall be provided;

- c. Nomination of one of the members of the partnership, consortium or joint venture to be in-charge: and this authorisation shall be covered in the Power of Attorney signed by the legally authorised signatories of all members of consortium or joint venture;
 - d. Details of the intended participation expanded with complete details of the proposed division of responsibilities and corporate relationships among the individual members.
 - e. The joint venture/ consortium agreement must contain a clause stating “All the partners are jointly and severally liable to KMRCL.” The joint venture agreement, duly registered, should be provided so as to be legally valid and binding on partners/ members of the joint venture.
 - f. The lead partner in charge shall be authorized to incur liabilities, receive payments and receive instructions for and on behalf of any or all partners of the joint venture.
- 1.5 The Tenderer shall submit with his Tender full details of his ownership and control or, if the Tenderer is a partnership, joint venture or consortium, full details of ownership and control of each member thereof.
- 1.6 Documents provided under Para 1.4 shall be confirmed by an appropriate Chamber of Commerce or other similar organisation. Each power of attorney shall be notarised by a competent authority in the country of the issuing company. Documents provided under para 1.4 (a) and (b) shall be certified with a conformant apostille if the country of issue has signed the Hague Legislation Convention of 1961. Document provided from countries, which are not signatories to the 1961 convention shall be legalised by a Consular Officer of the country from which the document is issued.
- 1.7 Indian Tenderers, or Indian members of a partnership, joint venture or consortium shall submit, a certified copy of the income tax registration details (PAN/TAN).
- 1.8 Tenderer (each member in the case of a partnership, joint venture or consortium) or any associate is required to confirm and declare with his Tender that no agent, middleman or any intermediary has been, or will be, engaged to provide any services, or any other item or work related to the award and performance of this Contract. They will have to further confirm and declare in the submittal that no agency commission or any payment which may be construed as an agency commission has been, or will be, paid and that the tender price will not include any such amount. If the Employer subsequently finds to the contrary, the Employer reserves the right to declare the Tenderer as non-compliant, and declare any Contract if already awarded to the Tenderer to be null and void.
- 1.9 Canvassing or offer of an advantage or any other inducement by any person with a view to influencing acceptance of a tender will be an offence under laws of India. Such action will result in the rejection of the tender, in addition to other punitive measures.
- 1.10 The Tenderer is required to confirm that they (including all Partners/Members of a Partnership, Consortium or Joint Venture) are not one of the following:
- (i) A firm or an organization which has been engaged by the Client or the KMRCL S&T (Signalling and Telecommunications) Contractor to provide consulting services for

procurement for or implementation of this project, either at the design, installation or Commissioning stage.

- (ii) Any association/affiliates (inclusive of parent firm) of a firm or an organization mentioned in subparagraph (i) above.
- (iii) A firm or an organization who lends, or temporarily seconds its personnel to firms or organizations which have been engaged by the Client or the KMRCL S&T (Signalling and Telecommunications) Contractor to provide consulting services for procurement for or implementation of this project, either at the design, installation or Commissioning stage, if the personnel would be involved in any capacity for these Services.

1.11 The evaluation of the proposal will be rejected if it is determined that the tenderer has engaged in corrupt practices in competing for the contract in question.

1.12 Site visit

The Tenderer is advised to visit and examine the Site of works and its surroundings and obtain for himself on his own responsibility all information that may be necessary for preparing the Tender and entering into a contract for the proposed Works. The costs of visiting the Site shall be borne by the Tenderer. It shall be deemed that the tenderer has undertaken a visit to the site of Works and is aware of the site conditions, the existing details and those proposed in Train Control and Signalling System for the purpose of this tender prior to the submission of Tender Documents.

The Tenderer and any of his personnel will be granted permission by the Employer to enter upon his premises and lands for the purpose of such inspection, but only upon the express condition that the Tenderer, and his personnel, shall release and indemnify the Employer and his personnel from and against all liability in respect thereof and shall 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.

2 Tender Documents

2.1 Content of Tender Documents

2.1.1 The Tender Invitation Documents, as listed below, have been prepared for the purpose of inviting a tender for Independent Safety Assessment of Train Control & Signalling system in connection with ISA Contract (R) of the Kolkata East West Metro Line. **In the order of precedence as follows:**

- a. Notice of Invitation to Tender;
- b. Instructions to Tenderer including Annexure;
- c. Form of Tender and Appendices;
- d. Special Conditions of Contract**
- e. General Conditions of Contract**

- f. Scope of Services
 - 2.1.2 The Tenderer is expected to examine carefully the contents of all the above documents. Failure to comply with the requirements of the tender submittal will be at the Tenderer's own risk.
 - 2.1.3 The Tenderer shall not make or cause to be made any alteration, erasure or obliteration to the text of the Tender Documents.
- 2.2 Content of Supporting Documents
 - 2.2.1 The supporting documents include Particular Specification of Train Control and Signalling System, Scope of Services and S&T contract project master program.
- 2.3 Clarification of Tender Documents
 - 2.3.1 The Tenderer shall check the pages of all documents against page numbers given in indexes and summaries and, in the event of discovery of any discrepancy; the Tenderer shall inform KMRCL forthwith.
 - 2.3.2 Should the Tenderer for any reason whatsoever, be in doubt about the meaning of anything contained in the Invitation to Tender, Tender documents or the extent of detail in the Employer's Requirements, the Tenderer shall seek clarification from KMRCL, **on or before the latest date of seeking clarification given in the Notice of Invitation to Tender**. All communications between the Tenderer and KMRCL shall be in writing.
 - 2.3.3 Except for any such written clarification by KMRCL which is expressly stated to be by way of an addendum to the documents referred to in paragraph 2.1.1 above and/or for any other document issued by the Employer which is similarly described, no written or verbal communication, representation or explanation by any employee of the Employer shall be taken to bind or fetter the Employer under the Contract.
- 2.4 Amendment of Tender Documents
 - 2.4.1 Tenderer is advised that further instructions to Tenderer and addenda to the Tender Documents may be issued during the tender period. These addenda & corrigenda are the part of Tender documents. Therefore Tendered shall confirm receipt of such documents in the FORM OF TENDER - Appendix 10 and list them in the Tender Submittal.
 - 2.4.2 The Tenderer should note that there might be aspects of his Tender and/or the evaluation documents submitted with the Tender that will necessitate discussion and clarification. It is intended that any aspect of the said evaluation documents and any amendments or clarification which are to have contractual effect will be incorporated into the Contract either:
 - a. by way of Special Conditions of Contract to be prepared on behalf of the Employer and agreed in writing by the Tenderer prior to and conditional upon acceptance of the Tender; or

- b. by the Tenderer submitting, at the written request of the Employer, documents which are expressly stated to form part of the tender, whether requested before or after submission of the documents forming part of the Tender, identified in paragraph 3.2.1.1 to 3.2.1.3 below, and whether as supplements to, or amended versions of such documents.

Save as aforesaid, all such amendments or clarifications shall not have contractual effect.

3 Preparation of Tenders

3.1 Language

Tenders and all accompanying documents shall be in English. In case any accompanying printed literature is in other languages, it shall be accompanied by an English translation. The English version shall prevail in matters of interpretation.

3.2 Documents Comprising the Tender

- 3.2.1 The Tenderer shall, on or before the date given in the Notice of Invitation to Tender, submit his Tender in two separate sealed envelopes clearly marked with the name of the Tenderer and with

"Contract ISA (R) Technical Package", and "Contract ISA (R) Financial Package" This shall be addressed to The Managing Director, KMRCL and submitted to the Office of the Chief Engineer (Signal & Telecomm) at the address given in the Tender Documents. The Tenderer shall ensure that a receipt is obtained for the submission of his Tender, such receipt being issued free of charge.

- 3.2.1.1 The original Tender Guarantee shall be submitted in a sealed envelope independent of the sealed tender, at the time of opening the Tenders.

- 3.2.1.2 The Tenderer shall submit the following documents duly completed with the Technical Package of his tender submission:

- a. Form of Tender (without appendices)
- b. Appendix 1 to the Form of Tender – Contract conditions.
- c. Appendix 2 to FOT with prices left blank.
- d. Appendix 3 to the Form of Tender -Tenderer's Technical proposals (see paragraph 3.4 below)
- e. Appendices 4 to the Form of Tender – Outline Project Management Plan (See Paragraph 3.6 below)
- f. Appendix 5 to the Form of Tender – The Structure of the Tenderer including details of ownership and control of the Tenderer. (see paragraph 1.4 above)
- g. Appendix 6 to the Form of Tender – Details of Tender index (see paragraph 3.9 below);
- h. Appendix 7 to Form of Tender – Minimum eligibility criterion duly filled

- i. Appendix 8 to Form of tender – Proposed Safety Audit Plan
- j. Appendix 9 to Form of tender – Copy Right Undertaking
- k. Appendix 10 to Form of tender – Confirming Receipt of all Tender Addenda
- l. Appendix 11 to Form of Tender – Statement of Deviation

3.2.1.3 The tenderer shall submit the following documents duly completed with the financial package of his tender submission:

- a. Form of Tender (without appendices)
- b. Appendix 2 to the Form of Tender – completed pricing document
- c. Copy of tender guarantee
- d. Income Tax clearance certificate (see paragraph 4.7)

3.2.1.4 The tenderer shall submit with his technical package the documents that are identified in paragraphs below.

These documents will be used for the purpose of evaluating and analysing the tender but will not form part of the Contract, unless the same shall have been expressly incorporated into the Contract in accordance with paragraph 2.4.1 or 2.4.2 above.

- a. Documents amplifying the Tenderer’s Technical proposal.
- b. Any further documents which are requested in writing by Employer before submission of the Tender by way of evaluation documents but which are not to form part of the Contract.
- c. Documents relating to performance, current contracts, relevant experience.
 - (i) The Tenderer will be appropriately certified or accredited by an International Body or by a National Railway to assess the Signalling & Train Control systems of Metro Railways.

Certification/Accreditation Details (Certificate/proof to be attached)
(details)

- (ii) The individual or members of the JV/Consortium (could have been a member of some other JV/consortium) collectively should successfully completed a minimum of two projects of Safety Assessment of Signalling & Train Control systems of a Metro Railway, of not less than 10 km each, in the last 7 years ending 30 July 2012. The projects must demonstrate Safety Assessment of systems involving Automatic Train Control, electronic interlocking, and their interfaces (one project must include a distance-to-go Train Control system).

Name of Project *1	Details of Safety Assessment Activities **2	Length of Project (km)	Commencement and Completion Dates	System Details ***3

Notes:

- *1 **Only Metro Railways projects to be shown.** Client name to be included.
- **2 Only Signalling and Train Control Safety Assessment activities. Brief description and cost of Services and details of specific tasks undertaken, including staffing and man-months.
- ***3 Name of system, country of origin, specify details of type of system, i.e. Automatic Train Control, electronic interlocking, distance-to-go, etc., interfacing details, and any other pertinent information.
 - (i) User (Client) Certificates demonstrating achievement of each and all of the requirements in paragraph above shall be provided.

User (Client) Certificates for Projects listed in Table 1.2 ii) b) (proof to be attached)
(details)
(details)
(details)

d. Documents relating to the financial condition of the Tenderer

- i. **Annual Audited Reports/Accounts for each of the last 3 full accounting periods.**

3.2.1.5 Should any further document be required in pursuance to paragraph 3.2.1.3(b), the Tenderer will be instructed by the employer which package the tenderer's submission is to contain such documents.

3.3 Form of tender

The form of tender shall be completed and signed by a duly authorized and empowered representative of the tenderer. If the tenderer comprises a partnership, consortium or a joint venture, the form of tender shall be signed by a duly authorized representative of each member or participants thereof. Signature on the form of tender shall be witnessed and dated. Copies of relevant powers of attorney shall be attached.

3.4 ISA (R) Technical Proposal

3.4.1 The ISA (R) technical proposal shall cover in details the following:

- Understanding and comprehension of the work involved, including a discussion on the major challenges of the contract covering each of the major elements of the Signalling and Train Control systems. KMRCL S&T contract has been awarded to ANSALDO STS CONSORTIUM comprising of ANSALDO STS S.p.A, Italy and ANSALDO STS, Australia as its members. Their train control and signalling system shall include, but not be limited to, MICROLOK II, MICROCAB, AF904, UM71, point machine and Power Frequency Track Circuit.
- The general approach and methodology proposed for carrying out the services covered in the scope of services, including such detailed information, as deemed relevant.
- A detailed overall Safety audit and assessment plan on services indicated in the scope of services including any other relevant information.

In addition, the technical proposal shall contain:

- A detailed overall safety audit and assessment programme and a bar chart indicating the duration and timing of assignment of each key expert staff or other staff member assigned to the project.
- An estimate of the total man months required together with the justification for the same.
- Proposed organization chart together with clear description of the responsibilities of each key staff member within the overall safety audit programme.
- A task list of deliverables including full description and delivery dates of each, and the person responsible for performing the deliverable.
- The name, background and professional experience of each key expert staff member to be assigned to the project, with particular reference to his experience of a nature similar to that of the proposed assignment (The majority of the key expert staff must have been regular members of the firm for at least 6 months in the last 1 year). Suitable documents from the Metro/Railway authorities shall be submitted about the association of the proposed expert staff or this assignment.
- The details of the name, background and CV of any sub-contracted staff who will be employed on the project.
- The name and addresses of any firm who may be given sub-contracts, if any, or any other work together with details of their experience.
- Details of safety assessment tasks, together with their location.
- Previous Safety audit and assessment experience as detailed in para 3.2.1.4 (c). Suitable documents from the Metro/Railway authorities clearly stating which of the signalling system/sub-system was audited shall be submitted about jobs performed by the ISA.
- A typical list of proformas to be used to tabulate various parameters related to audit and assessment of similar of the various subsystems/systems.
- Table of contents of Safety Audit and assessment report.

- Table of contents of ISA's quarterly report

The entire scope of services, laid out in the appendices is required to be covered.

- 3.4.2 The Memorandum of Understanding (See clause 1.3 and 1.4)
- 3.4.3 No information relating to estimated costs or financial terms of **the Tenderer's** services should be included in the Technical Proposal
- 3.4.4 The tenderer shall submit with his tender his technical proposals as described in 3.4.1 above
- 3.4.5 The tenderer may require amplifying, explaining and developing the technical proposals in substantially greater detail during the tender evaluation period such that they may be confirmed as complying clearly with the Employer's requirements and, in accordance with paragraph 2.4.2 herein, can be incorporated into the contract. Only those aspects of the contractor's technical proposal that the employer (at his sole discretion) considers clearly conforming will form part of the contract.
- 3.4.6 Notwithstanding paragraph 2.3.2, and subject to paragraph 2.3.3 of the Instructions to Tenderers, the Employer is willing to hold a meeting or meetings with the Tenderers for the purpose of discussing any matter relating to ISA of Train Control & Signalling systems which the Tenderer may wish to include in his technical proposals. The Tenderer should address any request for a meeting along with the clarification regarding the tender to KMRCL in writing not later than 3 weeks before latest date submission of Tender. The Employer will, as soon as practicable after receipt of such request, inform the Tenderer whether the Employer considers it appropriate for the requested meeting to be held and, where applicable, the time and place for such meeting. Such a meeting will be held in confidence but the Employer reserves the right to circulate to all other Tenderers any written response it may decide to issue in relation to matters raised at any such meeting and affecting all Tenderers, without identifying with whom the meeting has been held.

3.5 Safety Audit and Assessment Plan

- 3.5.1 The tenderer shall submit a detailed overall safety audit plan and assessment, Appendix 8 of FOT on services indicated in the scope of services including any other relevant information.
- 3.5.2 The safety audit plan programme shall be prepared in terms of weeks from Letter of Acceptance.

3.6 Project Management Plan

- 3.6.1 The Tenderer shall submit with his Tender a Project Management Plan as prescribed in Employer's Requirements as Appendix 4 to Form of Tender, inter-alia, indicating names, qualifications, professional experience, location during the Contract period and corporate affiliation of all proposed key management and engineering personnel (above the level of supervisor) and specialists.

- 3.6.2 The Tenderer shall include his proposals for his Co-ordination Control Team and include the name and qualifications of the Team Leader.

3.7 Pricing Document

- 3.7.1 The Pricing document is included in Annexure 1 to these Instructions to Tenderer. The Tenderer shall complete the Pricing Document in accordance with the instructions given in Annexure 1. The completed Pricing Document shall be submitted as Appendix 2 to the Form of Tender
- 3.7.2 The Tenderer is to note that Key Dates are to be determined by reference to periods from the commencement date of works.

Period for each stage of work are given in **Appendix E to Annexure of ITT**. Milestone dates shall be, likewise, determined by reference to the respective periods of Letter of Acceptance.

- 3.7.3 Prior to award, the Tenderer shall reformat the Pricing Document, Schedule of Milestones, and the safety audit plan and Programme, so as to correlate between these documents, as required by the Employer.

3.8 Currencies of Tender and Payment

- 3.8.1 The Tenderer may give his priced offer in Indian Rupees, and/or freely convertible international trading currencies. Payment to the contractor shall be made in the currencies quoted.
- 3.8.2 For the purpose of comparative evaluation of the offer, the tender prices will be converted to Rupees by using the Exchange (selling) rates for those currencies on the latest date for submission of tenders (Base Date) as detailed in clause **7.5** of ITT.

3.9 Tender Index

The tenderer shall include with his tender an index Appendix 6 to the form of tender which cross refers all of the Employer's tender requirements elaborated in these documents to all the individual sections within contract ISA (R) : Technical package and Contract ISA (R): Financial package that the tenderer intends to be the responses to each and every one of those requirements.

3.10 Modification, Substitution and Withdrawal of Tenders

- 3.10.1 Except where expressly permitted by these instructions, the Tenderer shall not make or cause to be made any alteration, erasure or obliteration to the text of the documents prepared by the Employer and submitted by the Tenderer with or as part of his Tender.
- 3.10.2 The Tenderer's modification or withdrawal notice shall be prepared, sealed, marked and delivered, with the outer and inner envelopes additionally marked "MODIFICATION" or "WITHDRAWAL", as appropriate.

- 3.10.3 No Tender may be modified by the Tenderer after the deadline for submission of Tenders.
- 3.10.4 Withdrawal of a tender during the interval between the deadline for submission of bids and the expiration of the period of bid validity specified in the Form of Tender shall result in the forfeiture of the Tender Guarantee.

3.11 Pricing of condition, Qualification, Deviation etc.

- 3.11.1 Tenderer shall further note that except for deviations listed in Appendix F to Annexure 1 of ITT, tender shall be deemed to comply with all the requirements in the tender documents including employer's requirements, without any extra cost to the employer irrespective of any mention to contrary, anywhere else in the tender.

4 Financial Package

- 4.1 The Tenderer shall submit the following documents duly completed with the Financial Package of his tender submission:

Copy of tender guarantee

All items covered in clause 3.2.1.3

- 4.2 The financial proposal, which is Appendix 2 of form of tender should be separately completed and submitted in a separate sealed envelope clearly labelled "FINANCIAL PROPOSAL". The prices entered into the form of tender shall include all costs associated with the contract. These will cover remuneration for staff, transportation, equipment, printing of documents, surveys etc. No adjustment will be made for inflation and any fluctuation in the exchange rates between Indian Rupees and other currencies. The financial proposal should be prepared using, but not limited to, the formats attached in Annexure 1 of ITT.

- 4.3 The tenderer should quote fixed lump sum price in Indian Rupees and in a foreign currency wherever required keeping in view the stage payment schedule described in Annexure 1 to the ITT and Scope of Services.

- 4.4 This Contract is a fixed Lump Sum priced Contract for Independent Safety Assessment of Train control & Signalling system. The contract price shall be fixed throughout the performance of the contract and not subject to variation on any account except as provided for in the Contract.

Tenderer shall quote all prices inclusive of all taxes, duties, levies, cess and any other charges leviable, including tax to be deducted at source.

4.4.1 Change in Cost Due to Legislation.

"Change in Law" means the occurrence or coming into force of the following, at any time after 28 days before the closing date of submission of tender.

(a) Any new tax imposed which impacts the performance of the Contractor with increased cost or which results in extra financial gains to the Contractor due to decreased cost in execution of Works.

(b) Change in any law pertaining to work having the above said impact.

Then such additional or reduced cost shall be certified by the Engineer after examining records provided by the Contractor and shall be paid by or credited to the Employer.

- 4.4.2 If any rates of Taxes/Duties/levies are increased or decreased, or a new Taxes/Duties/Levies are introduced, or an existing Tax/Duty/Levy is abolished, after 28 days before the closing date of submission of the tender, which was or will be assessed on the Contractor, in connection with performance of the Contract, an equitable adjustment of the Contract Price shall be made to fully take into account any such change by addition to the Contract Price or deduction there from, as the case may be, in accordance with Clause 4.4.1 thereof
- 4.5 All tax liabilities and the cost of insurance related to this contract shall be separately shown.
- 4.6 a) All payments shall be subject to tax deduction at source in accordance with the provisions of the Indian Income Tax act and any other applicable law. The contractor shall ensure full compliance with tax laws of India with regard to this contract and shall be solely responsible for the same. He shall submit copies of acknowledgements evidencing filing of returns every year and shall keep the employer fully indemnified against liability of tax, interest, penalty etc of the contractor in respect thereof, which may arise.
- b) The contractor should obtain necessary certificate from the Assessing Officer, under the relevant provisions of the Income Tax Act of India, for the rate at which income tax is to be deducted from the payments made to him. Pending submission of such certificate, KMRCL will deduct income tax at source as per applicable provisions under the Income Tax act. The contractor may, therefore, submit the certificate before the advance payment becomes due.
- 4.7 The Financial package shall contain an attested photocopy of the latest Income Tax clearance certificate (ITCC) in the required pro-forma of the Government of India. For foreign based consultants a suitable certified similar document from their country of origin, or a certified statement from their auditors stating that Income Tax/Corporation tax has been paid will be accepted.
- 4.8 The tender total submitted by the tenderer shall be in the format shown in the Pricing document.
- 4.9 The pricing document completed and submitted by the tenderer, as part of his tender, should use an indexing and page numbering system such that its extent and completeness is clearly evident.

5 Period of Validity of Proposal and Tender Guarantee

- 5.1 The offer submitted by the tenderer shall be valid for a period of 180 days from the last date of submission of the tender, with a provision that it will be suitably extended on request of KMRCL.
- 5.2 The Tenderer shall submit with his Tender a Tender Security for the sum of **Rs. Two Lakhs or equivalent amount in a single freely convertible foreign currency** in the form of an

irrevocable bank guarantee issued by a Scheduled Commercial Bank (including Scheduled Commercial Foreign Banks) in India in the Standard Pro-Forma SF2. The Bank Guarantee should be in the name of the Applicant or “JV/Consortium”. In the case where the Tenderer is a JV or consortium, the Bank Guarantee for Tender Security shall be from JV/Consortium and not from individual members, except that a local member of the JV/Consortium is permitted to furnish the Tender Security with an assurance from the other JV/Consortium members to back such a Security. The Tender Security shall be submitted in a sealed envelope clearly marked on top “**Tender Security for Contract ISA (R)**”. The Tender Security shall remain valid for a period of 28 days beyond the validity period for the Tender.

- 5.3 **The original of this tender guarantee is to be submitted in a separate sealed envelope in addition to the Technical and Financial proposal envelopes at the time of submittal.** This envelope will be opened in the presence of the tenderers to determine compliance of this requirement. Offers submitted without the tender guarantee or with invalid bank guarantees will be rejected outright.
- 5.4 The tender guarantee of the successful tenderer will be returned upon receipt of a performance guarantee and the signing of the contract as required herein.
- 5.5 The tender guarantees furnished by the unsuccessful tenderers will be returned to them within **30 days** of the signing of the contract by the successful tenderer and the receipt of the Performance guarantee from the successful tenderer whichever is later.
- 5.6 KMRCL reserves the right to call-in the tender guarantee under the following circumstances:
- Withdrawal of tender during period of tender validity
 - Failure to sign the contract if so awarded to the tenderer
 - Failure to submit a performance guarantee

6 Submission of Tenders

6.1 Tender submittals comprising:

- Power of attorney to submit the tender
- Original of tender guarantee
- Technical package
- Financial package

Each page of both the “Technical Package” and “Financial Package” must be machine serial numbered and signed by the authorised signatories of the consortium in token of the acceptance of the conditions stipulated in the page of the tender document.

All the inner and outer envelopes shall be addressed to the Employer at the following address:

The Managing Director,
Kolkata Metro Rail Corporation Limited

KMRCL Bhawan, HRBC Complex
Munshi Premchand Sarani,
3rd Floor, Kolkata 700 021
India

(a) **Bear the following identification:**

ISA (R) TENDER PACKAGE

Tender Reference Number: ISA (R)

DO NOT OPEN BEFORE Hrs. on

Name and address of the Tenderer to enable the tender to be returned unopened in case it is late or delayed.

6.2 The Tenderer shall seal the original and copies of his Technical Package in separate envelopes, duly marking them as "Original", "Copy 1" and "Copy 2". All the envelopes of the Technical Package shall then be sealed in an outer envelope. Soft Copy in CD shall also be submitted.

6.3 **Likewise, the Tenderer shall seal the Original and Copy of the Financial Package in separate envelopes duly marking the envelopes as "Original" and "Copy".** Both envelopes of the Financial Package shall be sealed in an outer envelope.

6.4 If the outer envelope is not sealed and marked as above the Employer will assume no responsibility for the misplacement or premature opening of the tender.

7 Tender Opening and Evaluation

7.1 Tender Opening

7.1.1 The Employer or his authorised representative will open the Technical Package in the presence of tenderers or their representatives who choose to attend at the appointed day and time in the conference hall of Kolkata Metro Rail Corporation Limited KMRCL Bhawan, HRBC Complex, Munshi Premchand Sarani 2nd Floor, Kolkata 700 021 India. If such nominated date for opening of Tender is subsequently declared as a Public Holiday by the Employer, the next official working day shall be deemed as the date of opening of Tender. The Tender of any Tenderer who has not complied with one or more of the foregoing instructions may not be considered.

The Tenderer is advised that the Employer's policy in respect of comparison of tenders is that the Technical Packages will be opened and reviewed to determine their eligibility and responsiveness to the Employer's Requirements. Unacceptable and unresponsive tenders will be rejected and the corresponding Financial Package will be returned unopened.

7.1.1.1 The Tenderer is to note that Financial Package of these tender submissions for which the associated Technical Package has satisfied the review in sub-paragraph 7.7, will be opened and the tender sums posted. **The date, time, and place of opening will be advised to tenderers whose Technical Package have been found acceptable so that they can be present at the stipulated time of opening of Financial Package.**

7.1.2 Tender if not accompanied by a valid Tender Guarantee, or is accompanied by an unacceptable or fraudulent Tender Guarantee shall be considered as non-compliant and rejected.

7.1.3 All decisions whether a tender is non-responsive, unacceptable or whether a guarantee is fraudulent or unacceptable or non-compliant will be that of the Employer.

7.2 Confidentiality of Tender Information

The Tender Invitation Documents, as listed in paragraph 2.1.1 above, and any addenda thereto, together with any further communications are issued for the purpose of inviting tenders only. The Tenderer shall not disclose any information contained in the documents or otherwise supplied in connection with this tender invitation to any third party except for the purpose of preparing his Tender. The Tenderer shall maintain complete confidentiality till the Contract is awarded. In the event that such confidentiality is breached, the Employer may reject the Tender. A letter of undertaking is attached to Appendix – 9 (FOT) - Copyright undertaking and shall be completed by the tenderer and returned in Technical package.

7.3 Clarification of Tender

To assist in the examination, evaluation of tender, the Employer may, at his discretion, ask the tenderer for clarification of his tender. The request for clarification and the response shall be in writing or by facsimile. No change in the price or substance of the tender shall be sought, offered or permitted, except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the tenders in accordance with paragraph 7.4.

7.4 Correction of Errors

7.4.1 The fixed Lump Sum Price stated by the Tenderer in words (at the top of the Tender Total Page) shall prevail. If arithmetical errors are discovered in the apportionment of this amount into Sections, Cost Centres and/or Milestones, corrections will be made by the Employer proportionately to the amounts shown against the relevant Sections, Cost Centres and/or Milestones so that the sum total of all milestones in all Sections, Cost Centres is equal to the Fixed Lump Sum Price stated in words. If the tenderer does not accept the corrected tender his Tender will be rejected, and the Tender Guarantee forfeited. Where there is a discrepancy between the amounts in figures and in words, the amount in words will govern.

7.5 Conversion to Single Currency for Evaluation of Tender

The Employer will convert the amounts in various currencies in which the tender price is payable to Indian National Rupees(INR) at Bill Selling Exchange Rates officially prescribed for similar transactions at the close of business of the State Bank of India on the last working day 28 days before the closing date of submission of tender..

7.6 Not Used

7.7 Evaluation of Tender: Technical Package

7.7.1 The Employer will evaluate whether each Tenderer is eligible and each Tender is responsive to the requirements of the Tender documents.

7.7.2 Eligibility of Tenderer:

An eligible Tenderer is one, who fulfils all the requirements of Appendix 7 to Form of Tender. If a Tenderer is not eligible, it will be rejected by the Employer and further evaluation will not be carried out.

7.7.3 Responsiveness of Tenderer:

7.7.3.1 A responsive Tender is one, which conforms to all the terms, conditions and specifications of the Tender documents without material deviation or reservation. A material deviation or reservation is one:

- (i) Which affects in any substantial way the scope, quality or performance of the Works; or
- (ii) Which limits in any substantial way, is inconsistent with the Tender documents, the Employer's rights or the Tenderers obligations under the Contract; or
- (iii) Seeks to shift to the Employer, another Government Agency or another contractor all or part of the risk and¹ or liability allocated to the Contractor in the Tender Invitation Documents; or
- (iv) Includes a deviation from the Tender Invitation Documents which would render the works, or any part thereof, unfit for their intended purpose; or
- (v) Fail to commit to the date specified for the completion of the Works.

7.7.3.2 Fail to commit to the date specified for the completion of the Works 7.7.3.2 The Employer will determine:

- (i) Whether the Tender has been properly signed;
- (ii) Whether the Tender is accompanied by the required Tender Guarantee
- (iii) Whether the proposed work plan including staffing schedule and methodology in responding to the scope of work is adequate.
- (iv) qualification, experience and competency of the key staff to be deployed for the assignment
- (v) Whether the Tender is substantially responsive to the requirements of the Tender documents;

7.7.3.3 The employer may waive any minor deviation, non-conformity or irregularity in a Tender that does not constitute a material deviation.

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

7.7.3.5 If any change in the Employer's Requirements (Scope of Works) and/or Conditions is considered necessary during Tender evaluation, the Tenderer, if his technical offer is found

to be substantially responsive in accordance with Tender requirements, will be given opportunity to revise his financial package.

7.7.4 The financial proposal, will be evaluated only if, the Tenderer is eligible and the Tender is substantially responsive.

7.7.5 Rejection of Tenders

KMRCL may reject the tenders that are considered to be substantially non-responsive to the requirements of the Proposal. Such matters may include:

- Incorrect or Fraudulent Power of Attorney.
- Incorrect or Fraudulent "Tender Security"
- Incomplete "Technical Proposal".
- Incomplete "Price schedule".
- Tenderer/Bidder requires an increase in Tender Offer price during negotiations.
- Failure to provide the Performance Guarantee.
- Failure to sign the Contract Agreement within the time limit given by KMRCL.

7.8 Evaluation of Tender: Financial Package

7.8.1 Evaluation of Reasonableness of Rates

The financial proposal, in accordance with paragraph 7.7, will be evaluated only if the Tenderer is eligible and the Tender is substantially responsive. The prices quoted by the Tenderer in Part II of Annexure 1 to ITT, will be compared with the estimated rates.

7.8.2 Financial Evaluation:

For purpose of comparative evaluation and determination of inter-se position of Tenders received as per clause 7.5, the Employer will adjust the Base Tender Total to take into account the followings:

- a) Corrections for errors pursuant to clause 7.4 of ITT and
- b) Pricing of un-qualified withdrawals of conditions, qualifications, deviations etc. in accordance with Appendix F of Annexure 1 to Instructions to Tenderers and subject to clause 3.11 of ITT for the purpose of comparative evaluation of the Tenders.

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

8 Award of Contract

8.1 The Employer will issue a letter of acceptance to the Tenderer, if he has been determined to be substantially responsive to the Tender documents and has offered the reasonable Evaluated Tender Price, and whose offer is balanced in terms of paragraph 7.7.

8.2 Signing of Agreement

The Tenderer should note that in the event of acceptance of the tender, the Tenderer will be required to execute the Contract Agreement as per the proforma "Form of Agreement", within 28 days from the date of issue of Letter of Acceptance.

8.3 Employer's Right to accept any Tender and to reject any or all Tenders

8.3.1 The Employer is not bound to accept the lowest or any tender and may at any time by notice in writing to the Tenderer, terminate the tendering process.

8.4 The work location of the ISA is covered in the scope of Service.

8.5 The employer may request the tenderer to withdraw any of the conditions, qualifications, deviations etc at the price shown in ITT, Annexure 1. In case the tenderer does not withdraw the conditions, qualifications, deviations etc proposed by him, if any, at the cost stated in Appendix F of Annexure 1, his tender will be rejected and the tender guarantee forfeited.

9 Performance Guarantee

9.1 The performance guarantee will be 10% of the contract price in the form of an irrevocable bank guarantee issued by a Scheduled Commercial Bank (including Scheduled Commercial Foreign Banks) in India. The pro-forma for the guarantee is included in these documents. The performance guarantee should be submitted immediately after the ISA contractor receives the letter of acceptance, but not later than the date of agreement is signed between the parties.

9.2 The performance guarantee shall remain valid upto 90 days after after the expiry Defect Liability Period for whole of the work.

9.3 The Tenderer should note in particular that without prejudice to the Employer's other rights under the Contract and the Tender Guarantee, the Employer may terminate the Contract in the event that the Tender is accepted but the Tenderer fails to supply the Performance Guarantee or other specified documents or fails to execute the Contract Agreement.

10 Additional Information

10.1 Every effort will be made to provide additional information to tenderers that has been requested in writing. However, requests for additional information, and any delay in providing information is entirely at tenderer's risk, and shall not be considered as a reason for late delivery of tenders or a reason for delaying the submission of tenders by the stated date.

10.2 Any information provided by KMRCL that is **not given in writing**, in response to request for additional information, shall not be considered by KMRCL and shall not be accepted as a reason for late delivery of tenders or a reason for delaying the submission of tenders by the stated date.

11 Date of completion

- 11.1 The date of completion of the services shall be: ISA services to be performed for the different sections of works shall be in synchronism of the S&T contract project master schedule submitted by S&T contractor (Appendix D, E of Annexure 1 to ITT) and as updated by S&T contractor during contract period.

12 Tender Preparation Costs

Any costs associated with the preparation of the proposal by any tenderer will not be reimbursed.

KMRCL Bhawan, HRBC Complex
Munshi Premchand Sarani,
2nd & 3rd Floor, Kolkata 700 021
India

CONTRACT AGREEMENT
CONTRACT ISA (R)

This Contract is made at Kolkata on day of by and between:

(1) Kolkata Metro Rail Corporation Limited, represented by the CE(S&T), with office located at 3rd Floor, KMRCL Bhawan, HRBC Complex, Munshi Prem Chand Sarani, Kolkata ,700021 hereinafter referred to as the “KMRCL” or the “Employer”, as the case may be, of the one part, and;

(2) The Consortium comprising of:

a)a company registered and existing under the laws ofwith head office located atrepresented by Mr.and Mr.
Authorised to sign and bind the company under the power of attorney dated.....

And board Resolution dated..... (Note5)

b)a company registered and existing under the laws ofwith head office located at
represented by Mr.and Mr.
Authorised to sign and bind the company under the power of attorney dated.....

And board Resolution dated..... (Note5).

c)a company registered and existing under the laws ofwith head office located at
represented by Mr.and Mr.
Authorised to sign and bind the company under the power of attorney dated.....

And board Resolution dated..... (Note5)

(Note2) Who shall be jointly and severally liable for the undertaking of this Contract, hereinafter (Note3) collectively referred to as the “Contractor” of the other part.

WHEREAS the Contractor has established a consortium in accordance with Indian law and offered a tender for Independent Safety Assessment of the train control and signalling system and agrees to undertake performance of such services under the terms and conditions set forth in this Contract.

Both parties hereby agree as follows:

Clause 1

KMRCL agrees to hire and the Contractor agrees to be hired for Independent Safety Assessment of Train Control & Signalling system for Kolkata East West metro Project under the terms and conditions specified in this Contract Agreement and the other Contract Documents attached hereto as. The order of preference of these documents is as follows:

- Letter of Acceptance
- Form of Agreement
- Special Conditions of Contract
- General Conditions of Contract
- The Schedules
- Employer's Requirements
- Contractor's Proposal
- Any other documents forming part of the Contract

All of the foregoing documents, together with this Contract Agreement, are referred to herein as the Contract Documents. Also incorporated into these Contract Documents, and made part hereof, are all codes, standard specifications, and similar requirements that are referred to therein. In the event of a conflict, ambiguity or discrepancy between the contents of the Contract Documents, the contractor will seek clarification from the Employer, whose decision shall be final.

Clause 2 Obligation of the Contractor:

The Contractor agrees, subject to the terms and conditions of the Contract Documents, to perform efficiently and faithfully all of the services for Independent Safety Assessment of Train Control & Signalling system and in carrying out all duties and obligations imposed by the Contract Documents.

Clause 3 Obligation of the Employer:

The Employer agrees, subject to the terms and conditions of the Contract Documents, to pay the Contractor the amount specified, and at the rates and terms and in the manner set forth in the Contract Documents.

Clause 4 Value of Work and Completion Time:

The Employer agrees to pay for the total cost of the Works and the Contractor agrees to accept the sums mentioned below in the following currencies, to be the total cost for the Work carried out by him as part of his obligations, responsibilities and liabilities under and according to the provisions and obligations imposed on him by the Contract.

Total Fixed Lump Sum Price

- (i) In Rupees(.....Rs) ;and
- (ii) In Foreign Currency of: (.....)

The above amounts include all taxes, duties, levies, cess and any other charges leviable, and tax to be deducted at source.

The Contractor shall complete The services within(.....) week from the date stipulated in the letter of acceptance, issue by the Employer .

Clause 5 Notices:

All notices called for by the terms of the Contract Documents shall be in writing in the English language and shall be delivered by hand or by registered mail, acknowledgement due, to the parties' addresses given below. All notices shall be deemed to be duly made when received by the party to whom it is addressed at the following addresses or such other addresses as such party may subsequently notify to the other:

Employer

Kolkata Metro Rail Corporation Limited
KMRCL Bhawan, HRBC Complex
Munshi Premchand Sarani,
2nd & 3rd Floor, Kolkata 700 021
India

Consultant

.....
.....
.....

Clause 6 Obligation of tax law

- a) The contractor shall ensure full compliance with tax laws of India with regard to this contract and shall be solely responsible for the same. He shall submit copies of acknowledgement evidencing filling of returns every year and shall keep the employer fully indemnified against liability of tax, interest, penalty, etc. of the contractor in respect thereof which may arise.

- b) The contractor should obtain necessary certificate from the assessing officer, under the relevant provisions of the income Tax act of India, for the rate at which income tax is to be deducted from the payments to be made to him. Pending submission of such certificate, KMRCL will deduct income tax at source as per applicable provisions under the income Tax act. The contractor may, therefore, submit the certificate before the advance payment becomes due.

Clause 7 Integration:

The Employer and the Contractor agree that this Contract Agreement, together with the other Contract Documents, expresses all of the agreements, understandings, promises, and covenants of the parties, and that integrates, combines, and supersedes all prior and contemporaneous

negotiations, understandings, and agreements, whether written or oral and that no modification or alteration of the Contract Documents shall be valid or binding on either party, unless expressed in writing and executed with the same formality as this Contract Agreement, except as may otherwise be specifically provided in the Contract Documents.

Clause 8 Governing Law

This Contract is enforceable and construed under the laws of the Republic of India.

Clause 9 Language

This Contract Agreement and the other Contract Documents are made in the English language. Three copies of the contract document shall be prepared.

Clause 10 Jurisdiction of court

Courts at Kolkata shall have the exclusive jurisdiction to try all the disputes arising out of this agreement.

This Contract is made in three copies with identical wording. Both parties having thoroughly read and understood the contents hereof sign their names and affix the seal (if any) in the presence of witness and each shall retain one copy.

KMRCL, The Employer

Kolkata Metro Rail Corporation Limited

.....The Consultant

a)

b)

c)

()

WITNESS

KOLKATA METRO RAIL CORPORATION LIMITED

ISA SERVICES FOR TRAIN CONTROL & SIGNALLING SYSTEM

FOR KOLKATA EAST WEST METRO LINE

CONTRACT ISA (R)

INSTRUCTIONS TO TENDERER FORM OF TENDER

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FORM OF TENDER

Date:.....

To: The Managing Director
Kolkata Metro Rail Corporation Limited
KMRC Bhawan, HRBC Complex
Munshi Premchand Sarani,
2nd & 3rd Floor, Kolkata 700 021
India

INDEPENDENT SAFETY ASSESSMENT OF TRAIN CONTROL & SIGNALLING SYSTEM CONTRACT ISA (R)

GENTLEMEN,

1. Having inspected, examined the Employer's Requirements, General Conditions of Contract, Special Conditions of Contract and Instruction to Tenderers including Pricing Document, and addenda thereto (if any) issued by the KMRC for Independent Safety Assessment of Train Control & Signalling system, and the matters set out in Appendix 1 hereto, and having completed and prepared Appendices 2, 3, 4, 5, 6 7, 8, 9, 10 and 11 hereto and visited the site as required, we hereby [jointly and severally]* offer for Independent Safety Assessment in conformity with the above documents for the sum stated in the Pricing Document as completed by us and appended hereto.
2. We undertake [jointly and severally]* to complete and deliver the whole of the Works and achieve all Stages, within the times stated in Appendix B (Annexure 1 to ITT).
3. We undertake [jointly and severally]*:
 - a. to keep this Tender open for acceptance without unilaterally varying or amending its terms for the period stated in Notice of Invitation to Tender hereto [(the withdrawal of any member or any other change in the composition of the partnership/joint venture/consortium on whose behalf this Tender is submitted shall constitute a breach of this undertaking)]*; and
 - b. if this Tender is accepted, to provide Guarantees, Undertakings & Warranties for the due performance of the Contract as stipulated in the General Conditions of Contract, Special Conditions of Contract and Appendix 1 hereto; and
 - c. to hold in confidence all documents and information whether technical or commercial supplied to us at any time by or on behalf of the KMRC in connection with this Tender

or with the above-mentioned Works and, without your written authority or as otherwise required by law, not to publish or otherwise disclose the same.

4. We submit with this Tender a duly executed Tender Guarantee in respect of our obligations under this Tender.
5. Unless and until a formal agreement is prepared and executed, this Tender together with your written acceptance thereof, shall constitute a binding contract between us.
6. We understand that you are not bound to accept the tender.
7. We declare that the submission of this Tender confirms that no agent, middleman or any intermediary has been, or will be engaged to provide any services, or any other item or work related to the award and performance of this Contract. We further confirm and declare that no agency commission or any payment, which may be construed as an agency commission, has been, or will be paid and that the tender price does not include any such amount. We acknowledge the right of the Employer, if he finds to the contrary, to declare our Tender to be non-compliant and if the Contract has been awarded to declare the Contract null and void.
8. This Tender shall be governed by and construed in all respects according to the laws for the time being in force in India.

We are, Gentlemen,

Yours faithfully,

Signature:

Date.....

Name.....

For and on behalf of.....

Address

Signature:

Date.....

Name.....

For and on behalf of

Address

Witness:

Signature:.....

Date.....

Name.....

Address.....

Witness:

Signature:.....

Date

Name

Address

* Note: If the Tenderer comprises a partnership, joint venture or consortium.

FORM OF TENDER

APPENDIX 1 CONTRACT CONDITIONS

1.	Amount of Performance Guarantee (ITT Clause 9)	10% of the Contract Price in types and proposition of currencies in which the contract price is payable.
2	Amount of Tender Security	Rs Two lakhs or equivalent amount in a single freely convertible foreign currency.
3.	Latest date for commencement of the Works	Date of Issue of Letter of Acceptance issued by Employer.
4.	Liquidated Damages	0.05% of the total amount apportioned to the milestone relevant of Key Dates as per Appendix B to Annexure 1 of ITT per week of delay. Maximum limit of liquidated damages shall be 10% of the fixed lump sum price accepted for whole of the works. There is no maximum limit in levy LD for delay in individual Key Dates.
5.	Defects Liability Period Works (SCC clause 3)	Duration of Defects liability/ non-conformance to the tender specifications shall be a period of 1 year reckoned from the date each section is brought into use for the carriage of the fare paying public.
6.	Value of Tenderers Professional Indemnity Insurance (SCC clause 10)	**
7.	Period in which all insurance have to be effected (SCC clause 10)	**
8.	Tenderers Name and Address	**
9.	Employees Name and Address	Kolkata Metro Rail Corporation Limited KMRCL Bhawan, HRBC Complex Munshi Premchand Sarani, 2 nd & 3rd Floor, Kolkata 700 021 India

** (Tenderer to Complete)

FORM OF TENDER

APPENDIX 2 PRICING DOCUMENT

To be prepared from Appendices A, B, C and F to Annexure 1 to the Instructions to Tenderer with price left blank.

FORM OF TENDER

APPENDIX 3 THE TENDERER'S TECHNICAL PROPOSALS

The Tenderer shall prepare his Technical Proposals Based on the contents of the instructions to Tenderers (as per clause 3.2.1.4 of ITT).

FORM OF TENDER

APPENDIX 4 OUTLINE PROJECT MANAGEMENT PLAN

The Tenderer shall submit with his Tender an Outline Project Management Plan as prescribed in Employer's Requirement -inter-alia including names, qualifications, professional experience and corporate affiliation of all proposed key management and engineering personnel (above the level of supervisor) and specialists, for conducting the safety audit.

FORM OF TENDER

APPENDIX 5 STRUCTURE OF THE TENDERER

STRUCTURE OF THE TENDERER

The Tenderer shall supply a chart particularising the structure of the Tenderer (identifying all companies comprising the Tenderer in the event that the Tenderer is a joint venture, partnership or consortium) and the ownership of each of the companies comprising the Tenderer, identifying all respective intermediate and ultimate holding companies.

COMPOSITION OF THE TENDERER

1. A copy of any Memorandum of Understanding (MOU) relating to the composition of the Tenderer shall be submitted. For guidance, if the Tenderer is a joint venture, consortium or a partnership then the joint venture, consortium or partnership agreement is to be submitted by the Tenderer. Should the Tenderer be an entity established or to be established to tender for this Contract, details of the shareholders' agreement or proposed shareholders' agreement shall be supplied together with the percentage participation and percentage equity in the agreements. Where the Tenderer comprises a partnership, consortium or joint venture, the Tenderer shall submit the information referred to in Para 1.4 to 1.7 of Instructions to Tenderer.
2. The contractual arrangements and copies of agreements in relation thereto must, as a minimum, provide information on all members or participants involved, their respective participation in the Tenderer, the management structure, ownership and control of the members or participants comprising the Tenderer and if, appropriate, the name of the member or participant who would have overall lead management responsibility for the Works, the registered addresses of all parties and the names of their respective senior partners, chairmen or managing directors as appropriate. Such agreements should also reflect the joint and several liabilities of the members to the Employer in the event that the Contract is awarded to them and provide "deadlock" provisions in the event that decisions of the joint venture, consortium or partnership cannot be reached by unanimous agreement.
3. The Tenderer shall provide written confirmation that:
 - a. The agreement or agreements submitted represent the entire agreement between the members or participants comprising the Tenderer as to the Tenderer's legal persona;
 - b. There is or are no other agreements relating to the Tenderer's incorporation, powers or organization which may affect in any way his ability to carry out the Works; and
 - c. No changes will be made to any such agreements during the tender period without first obtaining the Employer's agreement to the proposed change or changes.

FORM OF TENDER

APPENDIX 6 TENDER INDEX

The Tenderer shall include with his Tender an index (as per clause 3.9 of ITT) which cross refers all of the employer's tender requirement elaborated in these document to all the individual section within Tender package 1: Technical package and Tender package 2: Financial package which the Tenderer intends to be the response to each and every one of those requirements.

FORM OF TENDER

APPENDIX 7 MINIMUM ELIGIBILITY CRITERION

(Refer Clause 7.7.2 of ITT)

Name of Applicant:

No.	Criterion	Yes	No
1	Has the applicant ¹ abandoned any work in last 7 years?		
2	Has the applicant ¹ been blacklisted by any organization in the last 7 years?		
3	Has the applicant ¹ been penalized by the poor quality of work in the last three years?		
4	Has any agent/middleman been engaged or will be engaged or has any agency commission been or will be paid for this work?		
5	Has the individual or members of the JV/Consortium (could have been a member of some other JV/consortium) collectively successfully completed a minimum of two projects of Independent Safety Assessment of Signalling & Train Control systems of a Metro Railway, involving Automatic Train Control, electronic interlocking, and their interfaces (one project must include a distance-to-go Train Control system), of not less than 10 km each, in the last 7 years ending 31 st December 2012?		
6	Is the Tenderer/Bidder as an organization, certified or accredited by an International Body or by a National Railway to independently audit/assess Signalling and Train Control System of Metro Railways? (Copy of certificate to be furnished with the bid.)		

¹ In case of JV/ consortium, each member individually

Signed by Authorized Representative of the Applicant

Note: A “YES” answers to question 1 to 4 will disqualify the Applicant; A “No” answers to question 5 & 6 will disqualify the Applicant.

FORM OF TENDER

APPENDIX 8 PROPOSED SAFETY AUDIT AND ASSESSMENT PLAN

FORM OF TENDER

APPENDIX 9 COPYRIGHT UNDERTAKING

Dated:

To

The Managing Director
Kolkata Metro Rail Corporation Limited,
KMRCL Bhawan, HRBC Complex
2nd & 3rd Floor,
Munshi Prem Chand Sarani
Kolkata-700021
India.

INDEPENDENT SAFETY AUDIT AND ASSESSMENT SERVICES FOR SIGNALLING & TRAIN CONTROL SYSTEM

CONTRACT ISA (R)

We, (name of individual Tenderer/Joint venture/Consortia), hereby undertake that the Tender drawings and the Tender documents purchased as a necessary part of our preparation of this Tender shall be used solely for the preparation of the Tender and that if the Tender is successful, shall be used solely for the Independent Safety Audit and Assessment of the Signalling and Train Control Systems for Bangalore Metro Rail Project.

We further undertake that the aforesaid Tender drawings (if any) and documents shall not be used in whole, in part or in any altered form on any other project, scheme, design or proposal that the individual Tenderer/Consortium/Joint venture, their parent companies or sub consultants of the individual Tenderer/Consortium/Joint venture are, or will be involved with either in India or any other country.

Signed

For and on behalf of
(Name of Tenderer/Joint venture/Consortia)

FORM OF TENDER

**APPENDIX 10 FORM OF CERTIFICATE CONFIRMING RECEIPT OF ALL TENDER
ADDENDA**

This is to certify that we, M/S _____ [* Name of the Company] have received all Tender Addenda to Tender S&T as listed below:

- 1. Addendum No.
- 2.
- 3.
- 4.
- .
- .
- .

SIGNATURE OF TENDERER

* In case of a partnership, joint venture or consortium, to be submitted by each constituent member.

FORM OF TENDER

APPENDIX 11 STATEMENT OF DEVIATION

Clause Number	Details of Deviations	Remarks explaining reasons for deviations and why it may be considered by the employer

Note:

1. We hereby confirm that the pricing for unconditional withdrawal of the above deviations has been given in the financial bid.
2. We hereby confirm that all implicit and explicit deviations, comments and remarks mentioned elsewhere in our proposal shall be treated as NULL and VOID and stand withdrawn.
3. We hereby confirm that but for the deviations noted in this Appendix 11, our proposal is fully and truly compliant.
4. We hereby confirm that all implicit and explicit deviations, comments and remarks mentioned in this Appendix11 but are not priced in Annexure F to ITT for its unqualified withdrawal, shall be treated as NULL and VOID and stand withdrawn.

SIGNATURE OF TENDERER

INDEPENDENT SAFETY ASSESSMENT
OF
TRAIN CONTROL & SIGNALLING SYSTEM

Contract No. ISA (R)

Instruction to Tenderer

Annexure 1

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**INDEPENDENT SAFETY ASSESSMENT
OF
TRAIN CONTROL & SIGNALLING SYSTEM**

Contract ISA (R)

(Part I) Instruction for completing the pricing document

A. General Requirements

1. This contract is a fixed Lump sum priced contract for Independent Safety Assessment of Train control & Signalling Systems for Kolkata East West Metro line. The price to be quoted shall be inclusive of all taxes, levies, duties and any other charges leviable, including tax deducted at source. The contractor shall be solely responsible for payment of all custom duties, custom clearances, post handling charges if any, etc., of all the imports.

B. Tender total

1. The tender total submitted by the tenderer shall be in the format shown in the pricing document.
2. The pricing document completed and submitted by the tenderer, as part of his tender, should use an indexing and page numbering system such that its extent and completeness is clearly evident.

C. Currency

1. The Lump sum price shall be indicated in Indian rupees and / or in a foreign currency wherever required.(Refer to clause 3.8 of ITT)

D. Rate per man month

1. The tenderer shall submit the Rate per man month of each key staff and other staff member and their category as per the format in Appendix C

INDEPENDENT SAFETY ASSESSMENT

OF

TRAIN CONTROL & SIGNALLING SYSTEM

Contract ISA (R)

Instruction to Tenderer

Annexure 1

(Part II) Pricing Document

INDEPENDENT SAFETY ASSESSMENT

OF

TRAIN CONTROL & SIGNALLING SYSTEM

Contract ISA (R)

Instruction to Tenderer

Annexure 1

Appendix A Tender Total

Appendix A - TENDER TOTAL (Base Tender)

(THIS DOCUMENT IS TO BE PREPARED AND COMPLETED BY THE TENDERER)

The fixed Lump Sum price of the Contract is:

Rupees _____ (In figures)

_____ (In words)

and / or (Strike out which is not applicable)

(In foreign currencies) _____ (In figures)

_____ (In words)

Note:

- “and” means in addition to Rupees.
- “or” means either in Rupees or in Foreign Currency.

INDEPENDENT SAFETY ASSESSMENT

OF

TRAIN CONTROL & SIGNALLING SYSTEM

Contract ISA (R)

Instruction to Tenderer

Annexure 1

Appendix B Schedule of Payments and Milestones

Appendix B - Schedule of Payments and Milestones

KMRC shall make payments to the ISA based on the stage payments as shown below. The stage payments shall be made on completion of the corresponding activities after necessary deductions.

The percentages shown will be made for each activity based on the amount quoted in each currency.

Note: The progress schedule (weeks from letter of Acceptance) is indicative and will be finalized during contract execution.

The schedule of key dates for S&T Contractor as per the Project Implementation Plan approved on 13.09.12 for Kolkata East West Metro Project is attached in appendix E of this annexure. The Tenderer should comply with the key dates for ISA(R) contract

S.No.	Activity completed	Reference clause as per Appendix A- Scope of Services	Stage of payment of Lump Sum	Progress schedule (weeks from date of letter of acceptance)
A	B	C	D	E
	Obtain the "Notice of No Objection" or "Notice of No objection subject to ----" from the Employer's representative for:			
1	Safety Audit and Assessment Plan	7.1	10%	
2	Quarterly Audit Reports (A proportionate amount of the 32% of Lump Sum price will be paid based on actual activity during the quarter. It is currently envisaged to be approximately 2% per report but, as above, this may vary)	7.4	32%	
3	ISA Safety Certificate for Phase I	7.6	12%	
4	Combined safety audit and assessment report for Phase I	7.5	14%	
5	ISA Safety Certificate for Phase II	7.6	12%	
6	Combined safety audit and assessment report for Phase II	7.5	20%	

The percentages shown will be made for each activity based on the amount quoted in each currency.

Note:

1. Please specify the weeks for completion of milestone activities from 05-09-2011 when Notice to Proceed was issued to S&T Contractor in column (E) above adopting to suit the date of completion of each section given by S&T Contractor.
2. The schedule of key dates for S&T Contractor as per the Project Implementation Plan approved on 13.09.12 for Kolkata East West Metro Project is attached in appendix E of this annexure. The Tenderer should comply with the key dates for ISA(R) contract or any amendments therein as per Employer's Requirements (Scope of Services).

INDEPENDENT SAFETY ASSESSMENT

OF

TRAIN CONTROL & SIGNALLING SYSTEM

Contract ISA (R)

Instruction to Tenderer

Annexure 1

Appendix C Rate per Man Month

Appendix C - Rate per Man Month

Rate per man month of each category of staff deployed and their details :

The tenderer shall submit the rate per man month of each key staff and other staff member and their category in the format given below.

Sr. No.	Name of Staff	Category	Rate Per Man Month

INDEPENDENT SAFETY ASSESSMENT
OF
TRAIN CONTROL & SIGNALLING SYSTEM

Contract ISA (R)
Instruction to Tenderer

Annexure 1

Appendix D Not Used

Appendix D

Not Used

INDEPENDENT SAFETY ASSESSMENT

OF

TRAIN CONTROL & SIGNALLING SYSTEM

Contract ISA (R)

Instruction to Tenderer

Annexure 1

**Appendix E Schedule of Key Dates for Kolkata East West Metro
Line based on Revised Train Control and Signalling Schedule as
per agreed Project Implementation Plan Dated 13.09.2012**

Appendix E
Schedule of Key Dates for Kolkata East West Metro Line based on revised
Train control and signalling schedule as per agreed Project Implementation
Plan Dated 13.09.2012

S&T KEY DATES

Key Dates - PHASE I and II

No.	Description	Date
KD-00	Provide Design input to elevated and UG Contract Design Consultants	21.08.2012
KD-01	Preliminary Design Submission	30.10.2012

Key Dates - PHASE I (from Salt Lake Sector-V to Sealdah)

No.	Description	Date
KD-02	Final Design Submission	30.04.2013
KD-03	Factory Acceptance Test for Signalling and Telecom equipments	20.10.2013
KD-04	Deliver Mobile Radio/BBRS & ATC equipment (1st unit to Rolling Stock Contractor)	10.04.2014
KD-05	Mobile Radio /BBRS & ATC equipment (Last unit of the 1st set of trains to Rolling Stock Contractor)	25.07.2014
KD-06	Completion of FOTS and other communication System	05.10.2014
KD-07	Completion of EI at the Depot including ATP-ATO at the test track, transfer track and main line	05.10.2014
KD-08	Complete S&T sub systems acceptance tests for integrated testing, commissioning.	03.03.2015
KD-09	Safety Case	03.05.2015
KD-10	Safety Certificate for Service Trial for Phase I	02.06.2015

Key Dates - PHASE II (from Sealdah to Howrah Maiden)

No.	Description	Date
KD-11	Final Design Submission	30.07.2013
KD-12	Factory Acceptance Test for Signalling and Telecom equipments	23.07.2014
KD-13	Deliver Mobile Radio/BBRS & ATC equipment (1st unit to Rolling Stock Contractor)	10.02.2015
KD-14	Mobile Radio /BBRS & ATC equipment (Last unit of the 1st set of trains to Rolling Stock Contractor)	28.07.2015
KD-15	Completion of FOTS and other communication System	30.06.2015
KD-16	Completion of EI including ATP-ATO on the main line	30.06.2015

No.	Description	Date
KD-17	Complete S&T sub systems acceptance tests for integrated testing, commissioning.	12.03.2016
KD-18	Safety Case	12.05.2016
KD-19	Safety Certificate for Service Trial for Phase II	12.06.2016

INDEPENDENT SAFETY ASSESSMENT

OF

TRAIN CONTROL & SIGNALLING SYSTEM

Contract ISA (R)

Instruction to Tenderer

Annexure 1

**Appendix F Pricing of Unqualified withdrawal of Conditions,
Qualifications, Deviations etc.**

**Appendix F Pricing of Unqualified withdrawal of Conditions,
Qualifications, Deviations etc.**

Item	Condition, Qualification, Deviation	Activity affected by each condition, qualification, Deviation etc.	Increase or Decrease for unqualified withdrawal of each condition, qualification, deviation etc.	
			Foreign Currency	Rupee Portion
Total				

Notes:

1. In this Appendix, the Tenderer shall indicate every key date that will be affected by each remark, comment, condition, qualification or deviation, etc. that has been specified in Appendix FT-11 and prices for unqualified withdrawal of which has been quoted in this Appendix.
2. In case price for unqualified withdrawal of any remark, comment, condition, qualification or deviation etc. indicated in Appendix FT-11 is not quoted in this Appendix, it shall be considered that the remark, comment, condition, qualification or deviation is unconditionally withdrawn without any financial implication.
3. Where there are no deviations, the statement should be returned duly signed with an endorsement indicating 'No Deviations'.
4. The tenderer shall indicate price adjustment against each deviation, condition, qualification, reservation, etc. that he shall like to add to the tender price for withdrawing his deviations, conditions, qualifications, reservations, etc if the same are unacceptable to the Employer.

SIGNATURE OF TENDERER

CONTRACT NO. ISA (R)

INDEPENDENT SAFETY ASSESSMENT

OF

SIGNALLING & TRAIN CONTROL SYSTEM

GENERAL CONDITIONS OF CONTRACT

Kolkata Metro Rail Corporation Limited
KMRC Bhawan, HRBC Complex
Munshi Premchand Sarani,
2nd & 3rd Floor, Kolkata 700 021
India

CONTRACT ISA (R)
GENERAL CONDITIONS OF CONTRACT (GCC)

1 Definitions

The following words and expressions shall have the meanings assigned to them except where the context otherwise requires:

- (i) "Agreement" means the Conditions of Agreement (General Conditions of Contract and Special Conditions of Contract) together with Scope of Services, Standard Pro-forma, Letter of Acceptance and Formal Agreement, Remuneration and Payment.
- (ii) "Applicable Law" means the laws and any other instruments having the force of law in India, as they may be issued and in force from time to time.
- (iii) "Approved/approval" means the approval in writing.
- (iv) "Contract" means the Contract signed by the Parties, to which these General Conditions of Contract are attached, together with all the documents listed in letter of award.
- (v) "Consultant/Tenderer/Bidder" means any entity or person that may provide or provides the Services to the Employer under the Contract.
- (vi) "Day" means the period between any one midnight and the next.
- (vii) "Employer" means the KOLKATA METRO RAIL CORPORATION LIMITED (also referred to as KMRCL) which expression shall also include their legal successors and permitted assigns.
- (viii) "General Consultant" means 'general consultant appointed by KMRCL.
- (ix) "Effective Date" means the date on which this Contract comes into force.
- (x) "Foreign Personnel" mean such persons who at the time of being so hired had their domicile outside India.
- (xi) "Independent Safety Assessor" (ISA) means the Tenderer/Bidder named in the Agreement, who has been awarded the contract & entered into agreement, and which expression shall include his¹their legal successors and permitted assigns.
- (xii) "Local Personnel" mean such persons who at the time of being so hired had their domicile inside India.
- (xiii) "Month" means a period of one month according to the Gregorian calendar commencing with any day of the month.
- (xiv) "Party" means KMRCL or ISA as the case maybe and "parties" means both of them.
- (xv) "Project" means the project named in Special Conditions of Contract.
- (xvi) "Personnel " means persons hired by the Consultants as employees and assigned to the performance of the Services or any part thereof;
- (xvii) 'Proposal/Package/Tender' means the Technical Proposal/Packages/Tender and the Financial Proposal/packages/Tender as the context so requires.
- (xviii) "Rupees" means the currency of India, and shall be the currency used for the Project.
- (xix) "Services" means the work to be performed by the Consultants pursuant to this

Contract for the purposes of the Project, as described in Tender document hereto.

- (xx) "Third Party" means any person or entity other than the Government, the Employer or the Consultants.

2 Interpretation

- (i) The headings shall not limit, alter or affect the meaning of this Contract and in the Agreement shall not be used in its interpretation.
- (ii) The singular includes the plural, the masculine includes the feminine, and vice-versa where the context requires.
- (iii) If there is a conflict between provisions of the Agreement, the last to be written chronologically shall prevail, unless otherwise specified in Conditions of Contract.

3 Obligations of ISA

3.1 Scope of Services to be performed by the ISA

- (i) ISA shall perform Services related to the Scope of Services as stated in the section Scope of Services.
- (ii) ISA shall exercise reasonable skill, care and diligence in the performance of his obligations under the Agreement.
- (iii) Where the Services include the co-ordination between the ISA and other consultants and contractors employed on the Project, KMRCL/the Engineer (GC) shall provide such co-ordination with ISA and S&T Contractor.

3.2 Performance Guaranty

As stated in the 'Instructions to Tenderers' the ISA shall provide KMRC with a Performance Guarantee in the form of Bank Guarantee provided by a any scheduled Indian Bank (excluding co-operative bank) located in Kolkata acceptable to KMRC. The Performance Guarantee shall remain valid for the duration of liability as described in Special Conditions of Contract.

KMRC reserves the right to forfeit the performance guarantee amount, in the event of termination of the Services in accordance with below Clause 17 (ii) or (iii).

In the event of any non performance on the part of ISA coming to the notice of KMRC within the period of the Contract Period as described in Clause 12 herein and in the eventuality of the ISA failing to rectify the same, KMRC will forfeit the amount of the Performance Guarantee.

4 Change in Constitution

ISA shall promptly notify KMRCL of any changes in the constitution of the ISA. KMRCL reserves the right to terminate the Agreement upon death, retirement, insanity or insolvency of any person being the proprietor/partner in the ISA, or on the addition or introduction of a new partner managing the Project for the ISA without the previous approval in writing of KMRCL. But in absence of and until its termination by KMRCL as aforesaid, this Agreement shall be in full force and effect, notwithstanding any changes in the constitution of the firm by

death, retirement, insanity or insolvency of any of its proprietors/partners or addition or introduction of any new partners. In case of death or retirement, the surviving or remaining partners of the firm shall be jointly and severally liable for the due and satisfactory performance of all terms and conditions of the Agreement, and likewise on the addition of a new partner, the latter will also become jointly and severally liable. **The clause shall not apply in case of the companies incorporated with limited liability.**

5 Information

KMRCL shall within a reasonable time give to ISA, free of cost, all information which he is able to obtain and which may pertain to the Services.

6 Decisions

On all matters referred to it in writing by ISA, KMRCL shall give a decision in writing within 28 days.

7 Assistance

KMRCL shall assist ISA in:

- (i) providing unobstructed access wherever it is required for providing the Services as per the Scope of Work.
- (ii) Providing access to other organisations/Institutions for collection of information if so required under the scope of the work.

8 Mobilisation of Personnel

The qualifications and experience of the personnel who are sent by ISA to work on the project shall be acceptable to KMRC. The ISA hereby agree to engage the Key professional personnel and sub-consultants listed by title as well as by Name in the Appendix 3 of Form of Tender in order to fulfil the contractual obligations under the Contract.

9 Representatives

For the administration of the Agreement the ISA shall designate the official or individual to be his representative and who shall be responsible to the Engineer/Employer for various deliverables as per the Scope of services.

10 Changes in Personnel

- (a) Except as the Employer may otherwise agree, no changes shall be made in the Key Personnel. If, for any reason beyond the reasonable control of the Consultants, it becomes necessary to replace any of the Personnel, the Tenderer/Bidder shall forthwith provide as a replacement a person of equivalent or better qualifications with the approval of KMRCL
- (b) If the Employer (i) finds that any of the Personnel has committed serious misconduct or has been charged with having committed a criminal action, or (ii) has reasonable cause to be dissatisfied with the performance of any of the Personnel, then the Tenderer/Bidder shall, at the Employer's written request specifying the grounds therefore, forthwith, provide as a replacement a person with qualifications and

experience acceptable to the Employer.

- (c) For any of the Personnel provided as a replacement under Clauses (a) and (b) above the ISA shall bear all additional travel and other costs arising out of or incidental to any removal and/or replacement.

11 Liability of ISA to KMRCL

Tenderer/Bidder shall be liable to pay compensation to KMRCL arising out of or in connection with the Agreement if a breach of Contract is established against him. Such compensation shall be limited to the Contract price.

12 Duration of Liability

Tenderer/Bidder shall not be considered liable for any loss or damage resulting from any occurrence unless a claim is formally made on him before the expiry of the relevant period stated in Special Conditions of Contract, or such earlier date as may be prescribed by law.

13 Agreement Effective Date

This Contract shall come into force and effect on the date of issue of Letter of Acceptance (LOA) by the Employer. The LOA shall continue to remain an active agreement between Employer and the Consultant till formal Contract Agreement has been signed.

14 Commencement and Completion

The Services shall be commenced and completed at the times or within the periods stated in Special Conditions of Contract subject to extensions in accordance with the Agreement.

15 Modifications

The Contract can be modified in writing on application by either party only by written agreement of ISA and KMRCL.

16 Exceptional Circumstances

16.1 Force Majeure

If, at any time during the currency of the Contract, the performance in whole or in part by either party of any obligation under this Contract shall be prevented or delayed by reasons of any war, hostilities, invasion, acts of public or foreign enemies, rebellion, revolution, insurrection, civil commotion, sabotage, large scale arson, floods, earthquake, large scale epidemics, nuclear accidents, any other catastrophic unforeseeable circumstances, quarantine restrictions, any statutory rules, regulations, proclamation, orders for requisitions issued by a Government department or competent authority or acts of God (hereinafter referred to as "event") or any other cause whether of similar or dissimilar nature beyond the reasonable control of the party affected then, provided notice of the happening of such an event as given by either party to the other within 21 days of the occurrence thereof:-

- (a) Neither party shall, by reason of such event, be entitled to terminate the Contract or have claim for damages against the other in respect of such non-performance or delay in performance.
- (b) The obligation under the Contract shall be resumed as soon as practicable after the

event has come to an end or ceased to exist.

- (c) If the performance in whole or part of any obligation under the Contract is prevented or delayed by reason of the event beyond a period mutually agreed to if any, or 90 days, whichever is more, either party may at its option terminate the Contract.
- (d) In case of doubt or dispute, whether a particular occurrence should be considered an "event" as defined under this clause, the decision of the Engineer shall be final and binding.
- (e) If the Contract is terminated under this Clause, the Consultant shall be paid fully for the work done under the Contract up to date of termination of contract.
- (f) If neither party issues notice regarding the event within 21 days of its occurrence, the said event shall be deemed not to have occurred and the Contract will continue to have effect as such.

16.2 If circumstances arise for which the Tenderer/Bidder is not responsible and which make it impossible for him to perform in whole or in part the Services in accordance with the Contract including force majeure, he shall promptly notify to KMRCL. In these circumstances, including force majeure, if certain Services have to be suspended, the time for their completion shall be extended until circumstances no longer exist plus a reasonable period not exceeding 7 days for resumption of them.

17 Abandonment, Suspension or Termination by Notice of KMRCL

- (i) KMRCL may suspend all or part of the Services or terminate the Agreement by notice of at least 30 days to Tenderer/Bidder who shall immediately make arrangements to stop the Services and minimise the expenditure.
- (ii) If KMRCL considers that Tenderer/Bidder is not discharging its obligations, KMRCL can inform the ISA by written notice, stating grounds thereof. If a satisfactory reply is not received within 7 days of receipt of the notice by Tenderer/Bidder KMRCL can by further notice terminate the Agreement provided that such further notice is given within 30 days of the KMRCL's former notice.
- (iii) If Tenderer/Bidder is adjudged a bankrupt, or if he makes a general assignment for the benefit of his creditors, or if a receiver is appointed on account of his insolvency, or persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or otherwise is guilty of a breach of the Agreement, then KMRCL may terminate the Services of the Tenderer/Bidder as per the procedure given in the Contract Document.

KMRCL may complete the Project by whatever method may be deemed expedient and the Tenderer/Bidder shall not be entitled to receive any additional payment. Also Clause 11 of GCC shall be applied in cases of (ii) and (iii) above.

18 Rights and Liabilities of the Parties

Termination of the Agreement shall not prejudice or affect the accrued rights or claims and liabilities of either party.

19 Payment to the Consultant

KMRCL shall pay the Lump Sum Price exclusive of all taxes, duties, cess etc. (which shall

cover the sum total of all costs incurred by the Tenderer/Bidder as set out in Special Conditions of Contract Clause 5) to the Tenderer/Bidder towards the performance of services as described in Appendix B of Annexure 1(Schedule of Payments and milestone).

20 Time for Payment

The Engineer shall, within 21 days of receiving a statement and supporting documents, deliver to the Employer, with a copy to the Contractor a Payment Certificate showing the amount which the Engineer considers to be due. The payment of the certified amount shall be made by the Employer within 28 days.

21 Currency of Payment

All payments shall be made in Indian Rupees and in tradable foreign currency wherever applicable.

22 Disputed Invoices

If any item or part of an item in an invoice submitted by the Tenderer/Bidder is contested by KMRCL then KMRCL shall give prompt notice with reasons and shall not delay payment on the balance of the invoice.

23 Languages and Law

This Contract shall be executed in the English language, which shall be binding and controlling language for all matters relating to the meaning or interpretation of this contract.

This Contract, its meaning and interpretation, and the relation between the Parties shall be governed by the Applicable Law in India. The Consultants shall perform the Services in accordance with the Applicable Law and shall take all practicable steps to ensure that any Personnel of the Tenderer/Bidder comply with the Applicable Law.

24 Copyright

The copyright of all documents and drawings prepared by the Tenderer/Bidder in performance of the Services under the Agreement shall be vested in KMRCL provided that the Tenderer/Bidder may retain copies of the documentation prepared by them and may use and adapt the contents of such documentation for his own use.

25 Confidentiality

The Tenderer/Bidder shall during the tenure of the contract and at any time thereafter maintain strict confidence for all information relating to the work and shall not, unless so authorized in writing by the KMRCL, divulge or grant access to any information about the work or its results and shall prevent anyone becoming acquainted with either through managers or its personnel. The Tenderer/Bidder shall not, either during the term or after the expiration of this Contract, disclose any proprietary or confidential information relating to the Project, the Services, this Contract or the Employer's business or operations without the prior written consent of the Employer. The Tenderer/Bidder shall also return all reports, notes and technical data relating to the operational matters to the KMRCL.

The Tenderer/Bidder shall keep secret and confidential and shall not disclose to any third party not use any unauthorized manner any confidential information regarding the present

processing technology and the business affairs of the KMRCL which the Tenderer/Bidder may have acquired through the negotiations, discussions, examination of drawings, designs, process layout, use of infrastructures, etc., leading to the conclusions of this Contract. The parties further agree not use such information for any purpose whatsoever except in the manner expressly provided for in this Contract. The obligations hereunder shall survive any termination or cancellation of this Contract.

The documents, all original field records, reports, spread sheets or other materials developed by the Tenderer/Bidder under this Contract shall be delivered to KMRCL and shall become the property of KMRCL, to be used by KMRCL in any manner required for the implementation of the project.

However, Tenderer/Bidder may retain and use copies of the Documents for the limited purposes for its reference and record in connection with the Project, and for statutory and regulatory requirements to which Tenderer/Bidder is subject, but Tenderer/Bidder shall not divulge the information collected, or conclusions drawn or recommendations made by it during the performance of the "Services" to any third party unless, and only to the extent, expressly authorised in writing by KMRCL to do so, for a period of 5 years from the completion of the contractual obligations.

26 Patents

The Tenderer/Bidder shall at all times indemnify KMRCL against all claims which may be made in respect of the items for infringement of any right protected by patent, registration of design or trade mark.

27 Conflict of Interest

The remuneration of the Tenderer/Bidder shall constitute the Tenderer/Bidder's sole remuneration in connection with this Contract or the Services and, the Tenderer/Bidders shall not accept for their own benefit any trade commission, discount or similar payment in connection with activities pursuant to this Contract or to the Services or in the discharge of their obligations hereunder, and the Tenderer/Bidder shall use their best efforts to ensure that any Personnel either of them, similarly shall not receive any such additional remuneration.

Neither the Tenderer/Bidder nor the Personnel of either of them shall engage, either directly or indirectly, in any of the following activities:

- (a) During the term of this Contract, any business or professional activities in India which would conflict with the activities assigned to them under this Contract.

The Tenderer/Bidder shall not be one of the following:

- (i) A firm which has been engaged by the Employer or by S&T Contractor to provide consulting services for the preparation related to procurement for or implementation of this Project.
- (ii) Any association/affiliation (inclusive of parent firms) of a firm or an organisation mentioned in Para (i) above.
- (iii) A Tenderer/Bidder who lends, or temporarily seconds its personnel to firms or organisations which were engaged in consulting services for the preparation related to procurement for or implementation of the project, if the personnel would be involved in any capacity on the same project.

28 Notices

Notices under the Agreement shall be in writing and will take effect from receipt at the address stated in SCC clause 5 of Contract Agreement. Delivery can be by hand or facsimile message against a written confirmation of receipt or by registered letter or by e-mail subsequently confirmed by letter.

29 Publication

Unless otherwise specified in Condition of Contract, Tenderer/Bidder, either alone or jointly with others, can publish material relating to the Services. Publication shall be subject to prior approval by KMRCL, if it is within two years of completion or termination of the Services.

30 Claims for Loss or Damage

Subject to Clause 11, any claim for loss or damage arising out of breach or termination of the Agreement shall be agreed between KMRCL and the Tenderer/Bidder, failing which the same shall be referred to arbitration in accordance with Clause 34.

31 Taxes and Duties

KMRCL shall pay such taxes, duties, fees and other impositions as may be levied under the Applicable Laws,

32 Conciliation and Arbitration

Any dispute or claim arising out of or relating to this Agreement or the breach, termination or the invalidity thereof, shall firstly be attempted to be settled by conciliation.

All disputes relating to this Contract on any issue whether arising during the progress of the Services or after the completion or abandonment thereof or any matter directly or indirectly connected with this Agreement shall in the first place be referred to a mutually agreed sole conciliator to be appointed by KMRCL. The conciliator shall make the settlement agreement after the parties reach agreement and shall give an authenticated copy thereof to each of the parties. The settlement agreement shall be final and binding on the parties. The settlement agreement shall have the same status and effect of an arbitral award. The views expressed, or the suggestions made or the admissions made by either party in the course of conciliation proceedings shall not be introduced as evidence in any arbitration proceedings. Any dispute that cannot be settled through the Conciliation procedure shall be referred to Arbitration in accordance with the Rules stipulated in Tender document in force on the effective date of the Agreement. No dispute or difference shall be referred to Arbitration after expiry of 60 days from the date of decision by the Engineer/Conciliator.

33 Settlement of Disputes

If the parties cannot resolve any such dispute, then dispute shall be referred to arbitration. If any dispute or difference of any kind whatsoever, concerning suitability or otherwise of the personnel employed by the Tenderer/Bidder, defective work, etc. compliance with the procedure of the Employer in respect of which the Employer's decision shall be final and binding on Tenderer/Bidder, such disputes shall not be arbitrate.

1. If any dispute or difference arises other than specified above, in connection with or arising out of the Contract Agreement or its construction or the carrying out of the services (whether during the progress or after their completion and whether before or after the determination, abandonment, breach of the Contract Agreement), it shall be referred to Arbitration as per the provisions of the Arbitration and Conciliation Act, 1996 & amendments if any.
2. Disputes to be arbitrated upon shall be referred to a Sole Arbitrator where the individual claim does not exceed Rupees fifteen lakhs or the total value of the claims does not exceed Rupees Fifty lakhs. The Managing Director from the panel of the Engineers/Professionals shall appoint the sole Arbitrator. The panel will be of three Engineers/Professionals, out of which contractor will choose one.
3. Beyond the limits stipulated in (2) above, there shall be three Arbitrators. For this purpose, Managing Director will make out a panel of Engineers with the requisite qualifications and professional experience relevant to the field in which the Contract/Services relates. This panel will be from serving or retired Engineers of the Government Department of Public Sector Undertaking residing in India only. In case three Arbitrators to be appointed, the Employer will make out a panel of five. The Tenderer/Bidder and Employer will choose one Arbitrator each from the above and the two so chosen will choose the third Arbitrator from the above panel only who will act as the "presiding Arbitrator" of the arbitration panel. If in a dispute, the two chosen Arbitrators fail to appoint third Arbitrator — presiding Arbitrator (Arbitration Panel's case) within 30 (Thirty) days after these have been appointed, the Employer may apply to the 'Indian Council of Arbitration, New Delhi', to nominate the third Arbitrator from the same panel of Arbitrators given by the Employer for the matter in dispute.
4. Neither party shall be limited in the in the proceedings before such Arbitrator(s) to the evidence or arguments put before the Engineer for the purpose of obtaining his decision. No decision given by the Engineer in accordance with the foregoing provisions shall disqualify him from being called as a witness and giving evidence before the Arbitrators on any matter, whatsoever, relevant to dispute or difference referred to Arbitrators.
5. If any reason an Arbitrator is unable to perform his function, a substitute shall be appointed in the same manner as the original Arbitrator.
6. While invoking Arbitration, the contractor shall give a list of disputes with amounts in respect of each dispute along with the notice of appointment of Arbitrator. If the Tenderer/Bidder does not make demand for appointment of Arbitrator in respect of any claims in writing as aforesaid, before certification of final stage of payment by the Employer, the claim of Tenderer/Bidder shall be deemed to have been waived and absolutely barred and the Employer shall be discharged and absolved of all liabilities under the contract.
7. English language shall be the official language for all purpose.

8. Where the arbitral award is for payment of money, no interest shall become payable on the whole or any part of the money for any period till the date on which the award is made.
9. The reference to the arbitration shall proceed notwithstanding that works/services shall not then be or alleged to complete, provided always that the obligations of the Employer, the Engineer and the Tenderer/Bidder shall not be altered by the reasons of Arbitration being conducted during the progress of work1services. Neither party shall be entitled to suspend the work/services to which the dispute relates on reason of Arbitration nor payments to the Tenderer/Bidder shall continue to be made in terms of the Contract.
10. The venue of Arbitration proceedings shall be in Kolkata, West Bengal State, India. The fees of the Arbitrators shall be borne by the each party equally.
11. In case of any dispute or difference referred to above, the Tenderer/Bidder shall not stop the work but shall proceed with the work with due diligence and until the receipt of the award in the dispute, decision of the Employer on all such matters shall be binding on the Tenderer/Bidder.
12. The Arbitrator (s) shall always give item-wise and reasoned awards irrespective of the value of claim(s) in the dispute in all cases.
13. The cost inter alia includes the fees of the Arbitrator (s) as per the rate fixed by the Kolkata Metro Rail Corporation from time to time.
14. In arbitral proceedings with more than one arbitrator, any decision of the arbitral tribunal shall be made by a majority of all its members.

34 Clarification

- (i) If the work to be done is not sufficiently detailed or explained in the contract document, the contractor shall apply to the Employer in writing for further written clarification and shall conform to the clarification provided. The Tenderer/Bidder shall promptly notify the Employer of all errors, omissions, inconsistencies, or other defects (including inaccuracies and inconsistencies) which it discovers in the Contract Documents, and shall obtain from Employer specific instructions in writing regarding any such error, omission, or defect before proceeding with the services affected thereby.
- (ii) The Tenderer/Bidder is fully responsible for all the designs of the work. The Tenderer/Bidder is responsible for correcting any errors, omissions and defects in such design through the design and/or construction process, and shall not be entitled to an increase in the Lump Sum Fixed price or extension of the contract time in connection with such correction.

35 Relations between the Parties

Nothing contained herein shall be construed as establishing a relation of master and servant or of agent and principal as between the Employer and the Tenderer/Bidder. The Tenderer/Bidder, subject to this contract, has complete charge of Personnel performing the Services and shall be fully responsible for the services performed by them or on their behalf hereunder.

36 Amendment to Agreement

Modification of the terms and conditions of this Contract, including any modification of the scope of the Services, may only be made by written agreement between the Parties.

37 Standard of Performance

The Tenderer/Bidder shall perform the Services and carry out their obligations hereunder with all due diligence, efficiency and economy, in accordance with generally accepted professional techniques and practices, and shall observe sound management practices, and employ appropriate advanced technology and safe and effective equipment, machinery, materials and methods. The Tenderer/Bidder shall always act, in respect of any matter relating to this Contract or to the Services, as faithful advisers to the Employer, and shall at all times support and safeguard the Employer's legitimate interest in any dealings with sub-consultants.

38 Indemnifications

The Tenderer/Bidder shall indemnify, protect and defend at the Tenderer/Bidder's own expense, the Employer and employees from and against any and all actions, claims, losses or damages arising out of any violation by the consultant or in the course of the services of any legal provisions, or any rights or third parties, in respect of literary property rights, copyrights, or patents, Tenderer/Bidder' actions requiring Employer's prior Approval. The Tenderer/Bidder shall obtain the Employer's prior approval in writing before taking any of the following actions:

- (a) Appointing such members of the Personnel which are not listed in proposed key personnel.
- (b) Documents Prepared by the Tenderer/Bidder to be the Property of Employer All plans, drawings, specifications, designs, reports correspondence and other documents prepared by the Tenderer/Bidder in performing the Services shall become and remain the property of the Employer, and the Tenderer/Bidder shall, not later than 30 days upon termination or expiration of this Contract, deliver all such documents to the Employer, together with a detailed inventory thereof. The Tenderer/Bidder shall not use these documents for purposes unrelated to this Contract without the prior written approval of the Employer.

CONTRACT No. ISA (R)

INDEPENDENT SAFETY ASSESSMENT

OF

TRAIN CONTROL & SIGNALLING SYSTEM

SPECIAL CONDITIONS OF CONTRACT

Kolkata Metro Rail Corporation Limited
KMRC Bhawan, HRBC Complex
Munshi Premchand Sarani,
2nd & 3rd, Kolkata 700 021
India

Special Conditions of Contract (SCC)

Clause No.	Ref to GCC clause no.	Special Condition of Contract
1	1(xv)	The Project is Kolkata Mass Rapid Transport System.
2	3.2	The Performance Guarantee shall be 10% of the Contract Price. Performance Guarantee shall be released within 90 days after the expiry of Defect Liability Period for whole of the work. Performance guarantee will be submitted before Sign of Contract Agreement i.e. within 28 days after issue of LOA.
3	12	Duration of Defects Liability shall be a period of 1 year reckoned from the date the each section is brought into use for the carriage of the fare paying public.
4	14	The date of commencement shall be the date of Letter of Acceptance. Completion of the all deliverable period shall be in accordance with the work schedule submitted by the S&T Contractor and subsequently approved by KMRCL. A schedule of key dates (Appendix E to Annexure 1 to ITT) is attached for reference. Completion of the activities of the ISA for each section during the Train Control And Signalling System Construction Phase shall be regarded to be the date of the revenue service.
5	19	The Lump Sum Price shall cover the sum total of all costs incurred by the ISA for performing the Services. This shall not only include salaries, overheads and non-salary expenses; an allowance for contingencies, fees and profits; but all other costs and expenses, taxes, duties and other imposition under the Applicable Laws, incurred in carrying out the services. This Lump Sum Price shall include all costs of sub-consultants, sub contractors, and any other professional fees or services incurred by the ISA. The Lump Sum Price shall also include all costs, travel & hotel charges, expenses and allowances paid to or on behalf of expatriate staff working in their own country or in India.
6	28	Notices shall be delivered to: Chief Signalling and Telecom Engineer Kolkata Metro Rail Corporation Limited KMRC Bhawan, HRBC Complex Munshi Premchand Sarani, 3 rd Floor, Kolkata 700 021, India
7	33	The complete clause shall be replaced by: Arbitration If the efforts to resolve all or any of the disputes through conciliation fails, then such disputes or differences, whatsoever arising between the parties, arising out of touching or relating to

Clause No.	Ref to GCC clause no.	Special Condition of Contract
		<p>construction/ manufacture, measuring operation or effect of the Contract or the breach thereof shall be referred to Arbitration in accordance with the following provisions:</p> <p>a) The Arbitration Board will consist of three Arbitrators. The Contractor and the Employer shall appoint their own Arbitrator and the two appointed Arbitrators shall appoint the third Arbitrator in accordance with the Section 11 of "Arbitration and Conciliation Act, 1996", of India. All Arbitrators shall be Indian nationals, ordinary residing in India with technical competence and experience. The Arbitrator(s) shall be appointed within a period of 30 days from the date of receipt of written notice/ demand of appointment of Arbitrator from either party. Neither party shall be limited in the proceedings before such arbitrator(s) to the evidence or arguments put before the Engineer for the purpose of obtaining his decision. No decision given by the Engineer in accordance with the foregoing provisions shall disqualify him from being called as a witness and giving evidence before the arbitrator(s) on any matter, whatsoever, relevant to dispute or difference referred to arbitrator(s). The arbitration proceedings shall be held in Kolkata only. The language of proceedings that of documents and communication shall be English.</p> <p>b) The award of majority of three arbitrators shall binding on all parties.</p> <p>c) Where the arbitral award is for the payment of money, no interest shall be payable on whole or any part of the money for any period, till the date on which the award is made.</p> <p>d) The cost of arbitration, excluding fees and expenses of the third arbitrator shall be borne by both the parties. The fees and expenses of the third arbitrator shall be shared equally by between the Employer and the Contractor.</p>
8	(New clause)	<p>1 Delays</p> <p>1.1 Time is the essence of the Contract. It shall be the responsibility of the ISA to strictly adhere to the time for performance of various services indicated in the Contract.</p> <p>1.1 Liquidated damages shall be imposed as described in Appendix 1 to FOT- contract condition.</p>
9	New Clause	NOT USED

Clause No.	Ref to GCC clause no.	Special Condition of Contract
10	New Clause	<p>Insurance:</p> <p>The contractor shall effect and maintain professional indemnity insurance for the amount in Indian Rupees not less than the contract value in respect of safety assessment work to be carried out by ISA contract (R). The insurance which shall insure the contractor's liability by the reason of professional negligence and errors in safety audit and assessment work. The validity period of insurance shall be from date of commencement of works until five years after date of submission of Combined Safety Audit And Assessment Report for Phase II as appendix B to Annexure 1 of ITT.</p> <p>Where the Contractor maintains a corporate Professional Indemnity Insurance on an annual basis this requirement may be waived. The Contractor will be required to submit evidence to KMRCL on an annual basis that this insurance is being maintained.</p>
11	New Clause	<p>Jurisdiction of Court</p> <p>Jurisdiction of Court in case of dispute or differences arising on account of this Tender: Any suit or application shall be filed in a competent court at Kolkata, West Bengal only and no other court or any other district of the country shall have any jurisdiction in the matter</p>

STANDARD PRO-FORMA

**SF 1 – FORM OF BANK GUARANTEE FOR PERFORMANCE
GUARANTEE**

SF 2 – FORM OF BANK GUARANTEE FOR TENDER GUARANTEE

SF 3 – FORM OF BANK GUARANTEE FOR ADVANCE PAYMENT

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SF 1
FORM OF BANK GUARANTEE FOR PERFORMANCE GUARANTEE
(Reference Clause 3.2 of GCC)

(To be stamped in accordance with the Stamp Act of the Country of Issuing Bank)

To: **Kolkata Metro Rail Corporation Limited,**
KMRCL Bhawan, HRBC Complex
Munshi Premchand Sarani,
2nd & 3rd Floor,
Kolkata 700 021,
India

WHEREAS -----(Name and address of Independent Safety Assessor) (hereinafter called "the ISA") has undertaken, in pursuance of Contract No. ISA (R) dated _____ to execute the Independent Safety Assessment Services ISA of Kolkata East West Metro line(hereafter called contract).

AND WHEREAS it has been stipulated by you in the said Contract that the ISA shall furnish you with a Bank Guarantee by a Scheduled Indian Bank located in Kolkata for the sum specified herein as security for compliance with his obligations in accordance with the Contract in lieu of cash deposits held by you for such compliance of obligations/performance Guarantee.

AND WHEREAS we _____(Name of the Bank with address) have agreed to give the ISA such a Bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the ISA up to a total of -----(amount of Guarantee)------(in words), such sum being payable in Indian Rupees, and we hereby unconditionally, irrevocably and without demur undertake to immediately pay you, upon your first written demand and without cavil or argument any sum or sums within the limits of -----(amount of guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the ISA before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the contract or of the Works to be performed there under or of any of the contract documents which may be made between you and the ISA shall in any way release us from any liability under the guarantee and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid upto 90 days after the expiry of defect liability period for whole of the work.

The pendency of any dispute or arbitration or other proceedings shall not affect this guarantee in any manner.

SIGNATURE AND SEAL OF THE GUARANTOR

NAME OF BANK -----

ADDRESS -----

DATE -----

Notes:

1. The stamp papers of appropriate value shall be purchased in the name of the Bank, who issue the 'Bank Guarantee'
2. The 'Bank Guarantee' shall be from a scheduled Bank located in Delhi, acceptable to Employer

SF 2
FORM OF BANK GUARANTEE FOR TENDER GUARANTEE
(Revised 1)

(Reference Clause 5.2 of the Instructions to Tenderers)

(To be stamped in accordance with Stamp Act of India)

KNOW ALL MEN by these presents that we _____(Name of Bank),
having our registered office at _____
(hereinafter called "the Bank") are bound unto KOLKATA METRO RAIL CORPORATION (hereinafter
called "the Employer") in sum of * _____ for
which payment well and truly to be made to the said Employer, the Bank binds himself, his
successors and assigns by these presents.

WHEREAS _____ (Name of Tenderer) (hereinafter called "the Tenderer") has
submitted his tender dated _____ for Contract ISA(R) (hereinafter called "the Tender").

WHEREAS the Tenderer is required to furnish a Bank Guarantee for the sum of *. _____
(Amount in figures and words) as Tender Guarantee against the Tenderer's offer as aforesaid.

AND WHEREAS _____ (Name of Bank and address) have, at the request of
the Tenderer, agreed to give this guarantee as hereinafter contained.

We further agree as follows:

- (i) That the Employer may without affecting this guarantee grant time or other indulgence to or negotiate further with the Tenderer in regard to the conditions contained in the said tender and thereby modify these conditions or add thereto any further conditions as may be mutually agreed upon between the Employer and the Tenderer.
- (ii) That the guarantee herein before contained shall not be affected by any change in constitution of our Bank or in the constitution of the Tenderer.
- (iii) That any account settled between the Employer and the Tenderer shall be conclusive evidence against us of the amount due hereunder and shall not be questioned by us.
- (iv) That this guarantee commences from the date hereof and shall remain in force till :
 - a. The Tenderer in case his tender is accepted by the Employer, executes a formal agreement after furnishing the Performance Guarantee on a scheduled Indian Bank located in India acceptable to the Employer
 - b. 28 days beyond the Tender Validity period of 180 days from the last date of submission of the tender, this shall be suitably extended on the request of KMRC.

- c. That the expression “the Tenderer” and “the Bank” herein used shall, unless such an interpretation is repugnant to the subject or context, include their respective successors and assigns.

THE CONDITIONS of this obligation are:

- (i) if the Tenderer withdraws his Tender during the period of Tender validity specified in the Form of Tender, or
- (ii) if the Tenderer having been notified of the acceptance of his Tender by the Employer during the period of tender validity:
 - a. fails or refuses to furnish the Performance Guarantee and/or
 - b. fails or refuses to enter into a Contract within the time limit specified in Clause 8.2 of the "Instructions to Tenderers".

We undertake to pay to the Employer the above amount upon receipt of his first written demand, without the Employer having to substantiate his demand provided that in his demand the Employer will note that the amount claimed by him is due to him owing to the occurrence of any one or more of the conditions (I) & (ii), mentioned above, specifying the occurred condition or conditions.

Signature of
Authorised Official
Of the Bank: _____

SIGNATURE OF WITNESS

Name of Official: _____
Designation _____

NAME OF WITNESS

Address of witness

STAMP/SEAL OF BANK

**The currency of the amount shall be in Rupees. or equivalent amount in a single freely convertible foreign currency.*

SF 3
FORM OF BANK GUARANTEE FOR ADVANCE PAYMENTS

Not Used

Kolkata Metro Rail Corporation Limited

AGREEMENT ISA (R)

Independent Safety Assessment of Signalling & Train Control System

PARTICULAR CONDITIONS

APPENDIX 1 – SCOPE OF SERVICES

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1 INTRODUCTION

1.1 Scope Overview

This document describes the Scope of Services to be provided by the Independent Safety Assessor for KMRCL project.

In brief, the Independent Safety Assessor shall carry out an Independent Safety Assessment (ISA) of the Signalling and Train Control. The ISA will include the interfaces with any other safety systems.

The Works of the Signalling and Train Control will be carried out by the S&T Contractor. The S&T contract has been awarded to ANSALDO STS consortium.

1.2 Applicable Documents

The Applicable Documents for the Services are:

The ISA Agreement (R)

- all documents of the Agreement

The S&T Contract

- Volume 3 - Client's Requirements - General Specifications including Appendices
- Volume 4A - Client's Requirements - Particular Specifications Including Appendices

1.3 Definitions and Abbreviations

Kolkata Metro Rail Corporation Limited (KMRCL) is the Client and is responsible for construction, operation, maintenance & safety of Kolkata East West Metro line.

The System Safety Assurance Plan refers to the Safety Plans and Procedures developed by the S&T Contractor for the Signalling & Train Control associated trackside and train borne systems and equipment. These Plans and Procedures will detail the activities and analyses that ensure adequate measures have been taken to implement a safe and reliable system as required in the Systems Specifications of the S&T Contract.

Abbreviations:

Acronym	Description
ATC	Automatic Train Control
ATO	Automatic Train Operation
ATP	Automatic Train Protection
ATS	Automatic Train Supervision
BDR	Baseline Design Review
BIS	Bureau of Indian Standards
CENELEC	European Committee for Electrotechnical Standards (Comité Européen de Normalisation Electrotechnique)
CDS	Conceptual Design Stage
CRS	Commissioner of Railway Safety
GCC	General Conditions of Contract
GS	General Specification
IEC	International Electrotechnical Commission
IR	Indian Railways
IRS	Indian Railway Standards
ISA	Independent Safety Assessment
ISO	International Standards Organisation
KMRCL	Kolkata Metro Rail Corporation Limited
PDS	Preliminary Design Stage
QR	Quarterly Report
RAMS	Reliability, Availability, Maintainability, Safety
SCC	Specific Condition of Contract
T&C	Testing and Commissioning

2 OVERVIEW OF THE PROJECT

2.1 General

- 2.1.1 This Chapter gives an overview of the Project.
- 2.1.2 Information provided in this Chapter is for reference purposes only.

2.2 Overview

- 2.2.1 The East-West Corridor consists of approx. 14.58 km from Howrah Maidan to Salt Lake Sector V, comprising of, elevated and underground sections. There are 12 stations on this Corridor along with one Depot at-Grade with Maintenance workshop facilities opposite to Central Park station.
- 2.2.2 The East-West Corridor will operate with trains driven by train Operators and using Continuous Automatic Train Control System (CATC) consisting of Automatic Train Protection (ATP), Automatic Train Operation (ATO) and Automatic Train Supervision (ATS). The Operational Control Centre (OCC) will be located at Central Park Depot.
- 2.2.3 The East-West Corridor will utilize 750 V DC Third Rail for traction power on Standard Gauge (1435 mm).
- 2.2.4 Trains will be Electric Multiple Unit (EMU).

2.3 Backup Control Centre

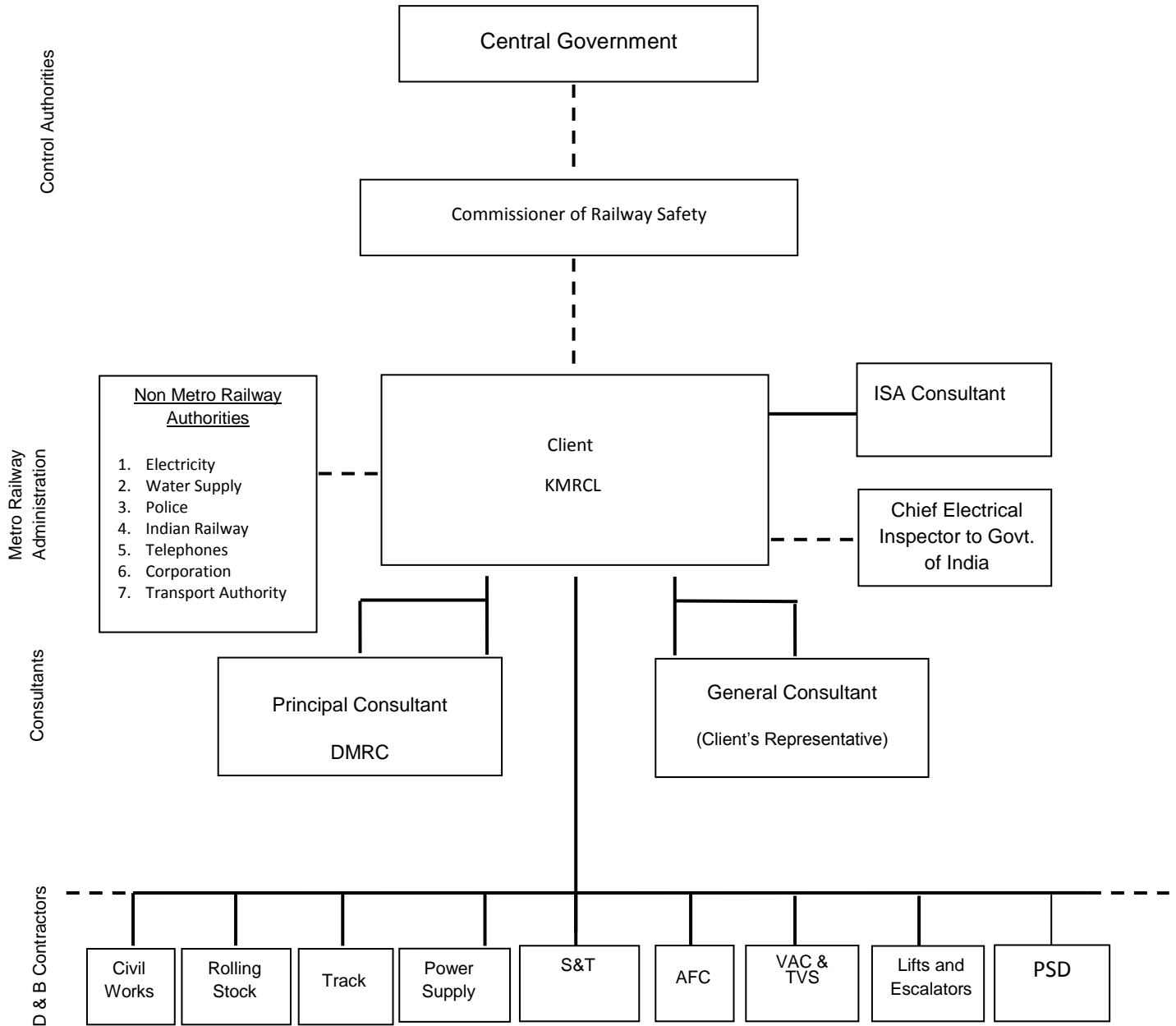
- 2.3.1 In the event of the OCC becoming inoperable, System-wide control will be carried out at the Backup Control Centre (BCC) located at Howrah Station.
- 2.3.2 When not in use as a control facility the BCC will be used for training of the Controllers.

2.4 Interchange with existing Railway system

- 2.4.1 This line will have a passenger interchange at following stations;

Railway System of Indian Railways	Interchange Station
Eastern Railway	Howrah
Eastern railway	Sealdah
Metro Railway (North – South corridor)	Central

Kolkata East West metro Line – Stakeholder General Organisation



Legend

----- Relation Linked with Safety and / or Execution of Work

————— Contractual Relation

Organisation	Role
Kolkata Metropolitan Development Authority (CMDA)	<ol style="list-style-type: none"> 1. Release of land owned by CMDA at various places. 2. Coordination required for corridor alignment and station location in tune with CMDA's master plan
Calcutta Electric Supply Corporation (CESC)	<ol style="list-style-type: none"> 1. Provision of Power through sub-stations to the Metro for traction and auxiliary power systems. 2. Power supply to D&B Contractors for operating equipment during construction. 3. Diversion of power-lines.
West Bengal Pollution Control Board	Concurrence on the method of construction- waste disposal and coordination on pollution hazard management
Kolkata Police	Traffic diversion and management during construction phase
Indian Railway	<ol style="list-style-type: none"> 1. Coordination on interchange stations at Howrah, Central and Sealdah 2. Connectivity between Kolkata Metro and the Metro to complement each other
Bharat Sanchar Nigam Ltd (BSNL) and a few Telecom Companies in the private sector such as Air-Tel, Reliance and Tata Indicom	Diversion of communication lines and optical fibre cables
Chief Electrical Inspector to Govt. of India	Inspection, testing and final approval of Power Supply and other Electrical Installations for energisation for operation of the Metro
Commissioner of Railway Safety (CRS)	Inspection, testing and final approval for operation of the Metro

2.5 Principal Consultant

The Delhi Metro Rail Corporation (DMRC) was first appointed as the Interim Consultant (IC), entrusted with the tasks of preparing the Feasibility Studies, the Detailed Project Report (DPR) and consultancy.

DMRC were later been appointed as the Principal Consultant (PC) for providing necessary technical inputs to facilitate decision making by the Client at various stages of project execution.

2.6 General Consultant

In line with the recommendations made in the DPR submitted by PC, the Client has decided to get project executed through outsourcing of all essential project management and implementation processes to competent professional agencies, but retaining the decision making powers.

Accordingly, a five-company Consortium, MYCEL (Mounsell/Aecom , YEC, CES, Egis and LHPA) has been engaged as the General Consultants (GC) to provide comprehensive consultancy services.

The GC will be involved at all stages of the project design, procurement, construction, testing and commissioning of metro, including all civil engineering structures, tracks, signals, telecom facilities, traction arrangements, air conditioning & ventilation, rolling stock, maintenance depots, stations, operation control centre, offices, station integration areas, bridges, flyovers, elevated, surface and underground sections, and integration with other modes of transport, etc.

During all stages of project execution, the GC will function as the Client's Representative (CR) of the Client.

Design and Build (D & B) Contractors are the agencies for executing Phase 1 under the general supervision of the CR.

A preliminary list of Project Contracts is given below :

Kolkata Metro Rail Corporation Ltd - East West Metro Project

S/No.	Type	Ref	Contract Title	Contractor
1	Civil	EWE-1 Elevated Viaduct (D/B)	Part Design & Construction of 4.725 km viaduct from (Ch. KM 7.763 to KM 13.328) excluding viaduct at stations namely Salt Lake stadium, Bengal Chemical, City Center, Central Park, Karunamoyee and Salt lake Sector-V each of length 140 m on Subhas Sarovar to Salt lake Sector-V elevated section of East West Corridor of Kolkata Metro	Gammon India Limited
2	Civil	EWS-1 Elevated Stns (Build only) CP-SLV	Design & Construction of Three Elevated Stations at Salt Lake Sector-V, Karunamoyee and Central Park including track supporting viaduct structure of 140 m length for each station on East-West Metro Project of KMRCL	Simplex Infrastructures Limited
3	Civil	EWS-2 Elevated Stns (Build only) SLS-CTC	Design & Construction of Three Elevated Stations at City Centre, Bengal Chemical and Salt Lake Stadium including track supporting viaduct structure of 140 m length for each station on East-West Metro project of KMRCL	Simplex Infrastructures Limited
4	Civil	Depot (D/B)	Design, Manufacture, Supply, Construction and Commissioning of Central Park Depot	Consolidated Construction Consortium limited
5	Civil	EWSAF 6 Elev Stns (Build only)	Architectural Finishing and Plumbing works for 6 Elevated stations of East West Corridor of Kolkata Metro	To be Awarded
6	Civil	EWSR-1 6 Elev Stns (Build only)	Design, Fabrication, Supply & Erection of Prefabricated Steel Roof structure including Roof Portals, Purlins, Sheetting etc. for 6 Elevated stations and 2 Foot Over Bridges for 1 station, Cable Runner for 1 station of East West Project, Kolkata Metro	To be Awarded
7	Civil	Viaduct Corridor Noise Barrier (D/B)		To be Awarded
8	Civil	UG2 Tunnel & 3 C+C Stns (D/B)	Design and Construction of Underground Section from Central Station to Subhas Sarobar	ITD-ITD CEM Joint Venture
9	Civil	UG1 Tunnel & 3 C+C Stns (D/B)	Design and Construction of Underground Section from Howrah Maidan Station to West End of Central Station	Transtunnelstroy-Afcons Joint Venture

S/No.	Type	Ref	Contract Title	Contractor
10	E+M	EL E&M 6 Stns (D/B)	Detailed Design, Supply, Installation, Testing and Commissioning (Including Integrated Testing & Commissioning) of E&M, Fire Detection, Fire Suppression and Vac Services for 6 Elevated Stations, Via Duct Lighting and Lighting of Rss & Tss/Ass of Car Depot of East West Corridor of Kolkata Metro	Isolux and Sterling & Wilson
11	E+M	UG/EL L&E 12 Stns (D/B)	Lifts and Escalators	To be Awarded
12	E+M	UG E&M 6 Stns (D/B)	Electrical and Mechanical	To be Awarded
13	E+M	UG ECS (D/B)	Environmental Control Systems	To be Awarded
14	E+M	UG TVS (D/B)	Tunnel Ventilation Systems	To be Awarded
15	E+M	UG/EL PSD 12 Stns (D/B)	Platform Screen Doors	To be Awarded
16	Rail-Sys	RS (3R) (D/B)	Design, Manufacture, Supply, Testing, Commissioning And Integration Of Passenger Rolling Stock (Electrical Multiple Units) and Training Of Personnel	M/s CAF-MELCO consortium
17	Rail-Sys	TWK (D/B)	Trackwork	Kalindee – Rahee Joint Venture
18	Rail-Sys	PS (D/B)	Design, Supply, Installation, Testing And Commissioning of Power Supply and Distribution System, Third Rail system and SCADA System	Consortium of M/s Siemens AG and Siemens Ltd India
19	Rail-Sys	ATC / S&T / LVS (D/B)	Design, Manufacture, Supply, Installation, Testing, Commissioning of Control and Signalling, Telecom and Low Current Systems	Consortium of M/s Ansaldo STS S.p.A and Ansaldo STS Australia Pty Ltd
20	Rail-Sys	AFC (D/B)	Design, Manufacture, Supply, Installation, Testing and Commissioning of Automatic Fare Collection System	To be Awarded
21	Rail-Sys	DSM (Supply only)	Depot Special Machines	Many individual suppliers

3 PRILIMINARY TRAIN OPEARTION PLAN

3.1 The East West Metro Line

3.1.1 The line is elevated Between Salt Lake Sector-V to Salt Lake Stadium. The line goes inside tunnel after salt lake stadium station through a ramp and rest of the section is underground.

3.1.2 There are six stations each on viaduct and six on underground.

3.2 Stages of the Project

3.2.1 The line is planned for opening in two stages:

- **Phase 1—Salt Lake Sec-V to Sealdah in 2015**
- **Phase 2—Sealdah to Howrah Maidan in 2016**

3.3 Depot and exchange of rakes

- The Depot is located at Central Park Salt Lake at grade.
- The entry and exit of depot is connected to a rake stabling line on viaduct. This line is connected to East Bound (EB) and West Bound (WB) main line through a set of points and crossings. The rake stabling line which also has a platform face of Central Park Station shall later on be linked to airport extension
- Trains are exchanged between main line and depot through a pair of lines on ramp which is signalled for bi-directional movement. These lines are connected with rake stabling line on viaduct.
- Trains can be dispatched to Depot from West bound main line after crossing Central Park Station directly via the train stabling line on viaduct through the crossovers.
- Depot bound rakes from east bound main line after crossing City Centre Station enter rake stabling line through cross over on main line. From rake stabling line the rake enters Depot once train operator has changed cab.
- Main line bound rakes from Depot to Salt Lake Sector-V direction exit directly using crossovers. However those rakes bound for Howrah Maidan direction are required to stop on rake stabling line and train operator has to change cab or shift with another.
- The Depot has stabling lines for 15 trains of 6 car composition. Depot expansion is planned to stable 20 rakes.

3.4 Operational Control Centre/Depot Control Centre/Backup Control Centre

- OCC is located at Central Park Depot. All train control activity on main line is managed from this centre.
- Depot Control Centre is also located at Central Park and controls all train movements inside the designated area inside the depot.

- Backup Control Centre is located at Howrah Station.

3.5 Terminal & turn back

- Howrah Maidan and Salt Lake Sector-V are terminal stations.
- A scissors cross over at Howrah Maidan, having island platform, at Howrah Station end of the platform allows trains to change track from West Bound track to East bound track as necessary during reception/dispatch.
- Salt Lake Sector-V has separate platform for EB and WB line.
- At Salt Lake Sector-V a set of crossovers before and after the platform enable trains to transfer from East bound line to West bound line.
- In Phase 1 Sealdah Station with one platform acts as terminal station.

3.6 Operating plan;

3.6.1 Phase 1

- Trains will be run between Salt Lake Sector-V to Sealdah.
- Between Salt Lake Sector-V to Phool Bagan there will be double line on viaduct (elevated portion), and underground up to scissors cross over between Phool Bagan and Sealdah. Between scissors cross over and Sealdah platform trains run on single line.
- At Sealdah only one platform will be available.

3.6.2 Phase 2

- Trains operate between Salt Lake Sector-V and Howrah Maidan on double line.

Hours of operation

- 0500 hrs to 2300 hrs

3.6.3 Normal Operations Principle

- The line is designed for headway of 2 minutes in order to permit a sustained headway of 2.5 minutes.
- The maximum designed operating speed of trains is 80 Kmph.
- On Sunday and public Holiday there will be no peak hours.
- Only 6 Car train sets are operated in both the phases.
- The trains will run on left hand track.
- Trains stop at each station.. The dwell time is adjustable.

- At Howrah Maidan terminal train will restart in east bound track from the arrival platform using scissors crossover, if necessary, at Howrah Station end of platform.
- At Salt Lake Sector-V train will restart from departure platform on West bound line) after exchange of track from arrival platform using crossovers provided.
- One train driver in front cab operates the train. At terminal driver changes ends or a driver shift arrangement is provided as per headway requirements.
- Trains will normally be operated on CTAC using ATO/ATP mode.
- Restricted manual mode will be operational for all trains while exchanging with depot and also inside depot and speed restricted to 15 Kmph.
- Inside depot ATP does not work and trains are moved on RM mode.
- Speed in RM/ROS mode is restricted on the main line to 25 Kmph.
- Trains negotiate a 1 in 9 turn out at 40 kmph maximum and a 1 in 7 turn out at 25 kmph.
- During non peak hours trains can be stabled in depot, and also at Salt Lake Sector-V in extended stabling lines and also at rake stabling line at Central Park Station.
- During non operation period of line, rakes are stabled at above locations depending on maintenance and cleaning requirements and keeping the starting of service in view next day.

3.7 Degraded Operation

- Crossovers located at Sealdah, Salt Lake Stadium, Central Park allow temporary degraded modes of operation over a limited section using any two of them as operationally necessary during revenue operation in the case of any unforeseen incident on the section beyond the unaffected section (when normal train operation is not possible). Traction power services boundaries will define these sections.
- Single track operation shall be possible whenever required by using bi-directional ATP capability and using crossovers on the line.
- All speed restrictions shall be enforced when trains operate in reverse direction: trains can be operated on ATP mode, ROS mode etc.
- In the event of failure of a train on any section recovery shall be by push back operation. The following train shall be coupled with the failed train and the faulty train pushed to the next station to disembark passengers. Faulty train will then be removed to depot or a stabling line. Speed of a train while pushing a faulty train is limited to 15 Kmph.
- All faulty trains shall be worked to Depot for attention at RM/ROS mode or as specified by OCC.
- Depot entry and exit track arrangement provide alternate routes in the event of malfunction of one route to avoid total stoppage of train exchange with Depot.

3.8 Communication

Telecommunication system shall comprise of CCTV, Passenger Information Display system, Public Address System for public and Fibre Optic Transmission System, Telephone system, Radio system and Broad Band Radio System, Supervisory Control and Data Acquisition system for train operation and control.

3.9 Rolling Stock

Number of rakes of 6 car formation shall be available for the East West Line to achieve the desired headway. The rolling stock compositions shall be:

DTC-MC-MC-MC-MC-DTC

3.10 Train operator management

- Train operators shall be managed from Crew Control Centre at Depot. For operational purposes crew can also be relieved and report at terminus.
- For driver shift train operators shall be positioned at terminals.

4 SCOPE OF SERVICES

4.1 Scope of the ISA

The Works to be executed under the S&T Contract include design, manufacture, verification, delivery, installation, testing, commissioning and technical maintenance support including training of personnel. The ISA Consultant's safety activities shall follow every stage of the S&T Contractor's development process.

The ISA Consultant shall verify that the required level of safety/quality is achieved by the Signalling & Train Control, and the interfaces with other systems, to ensure the safe operation of the Metro as per the Safety Requirements.

The ISA Services will be limited to safety aspects of the S&T Contractor's activities regarding design, installation, T&C, and inputs to O&M.

Aspects such as Core Reliability, Availability, Maintainability (RAM) issues, as well as, non-safety functions, health & safety issues (during the construction phase), and security are not part of the ISA Services.

The ISA Consultant shall assess both the Hardware and Software components of the Signalling & Train Control.

The ISA Services shall be performed following the principles and processes described in the CENELEC Railway Application Standards EN 50126, EN50128 and EN 50129, and CENELEC Guides for the implementation of these Standards.

The ISA objective is to collect, inspect and analyse all necessary data from all stakeholders to assess whether the S&T Contractor has, throughout the project duration, applied appropriate processes and safety solutions in accordance with the requirements of the applicable safety standards, the Contract between the Client and the S&T Contractor, and local and national applicable laws/acts.

The ISA shall be focused on Signalling and Train Control System and ensure that all hazards are mitigated. Specifically, the ISA consultant shall ensure, either by direct assessment or by **examination or acceptance** of the assurance work of other agencies, that all SIL4 interfaces with Signalling and Train Control System meet the required safety standards. This shall include, but not necessarily be limited to, the interlocking proving circuit for the Platform Screen Door System **for underground stations & Platform Screen Gate for elevated stations** and the interface between the Automatic Train Control System and the vehicle Emergency Brake System.

The conclusions of the ISA will be given by the ISA Consultant through signed ISA Certificates at the completion of the design stage of the Signalling & Train Control systems and at the opening of each revenue operation.

4.2 ISA Activities

a) General ISA Activities

To perform the Safety Assessment of the Signalling & Train Control, the ISA Consultant shall:

- Assess the S&T Contractors development process of the systems and their interfaces, during every stage of the process.
- assess the systems based on the S&T Contractors design approach and specifications and in-built safety principles, safety demonstrations and safety analyses

The ISA Consultant may adapt the level of detail of the Safety Assessment according to following factors:

- Sub-system Safety Integrity Level SIL or SSIL
- Existing safety demonstrations for the related system/sub-systems

The Safety Assessment shall be based upon two types of activities:

- Review of the S&T Contractors documentation as pertaining to quality/safety aspects throughout the various stages of development of the Signalling & Train Control
- Inspections and Safety Audits within the S&T Contractor entities and on site

b) Documentation Review

The ISA Consultant shall independently review the S&T Contractors documents for compliance with the selected standards, and consistency with the respective specifications, as well as for adequacy of the determined Safety Integrity Level according to EN 50126/EN 50128/EN 50129.

The ISA Consultant shall provide comments on the Contractors documents within a maximum of 21 calendar days from the date of submittal by the said Contractor.

The ISA Consultant shall pay special attention to the applicability and appropriateness of the available pre-certificates and reports, fulfilment of safety-related application conditions, impact and requirements on the operational concept, including the safety-related systems directly or indirectly interfacing with the Signalling & Train Control. This will include audit of the S&T Contractors report on EMC/EMI analysis, Signalling & train control and PSD interface documentation and test data.

The ISA documentation review, and meetings with S&T Contractor and other stake-holders, shall be systematically recorded and any comments, recommendations or actions required shall be entered into one master Tracking Log. This Tracking Log shall be used to monitor the S&T Contractors activities.

c) Safety Audits

For each Safety Audit the ISA Consultant should:

- Prepare the Safety Audit Plan at least 2 weeks prior to the Safety Audit
- Develop the Safety Audit protocol
- Carry out the Safety Audit

- Record all discussions and observations
- Produce the Safety Audit Report

The ISA Consultant shall submit the draft version of the Safety Audit Reports to the Client within a maximum of ten working days of completing the Safety Audits.

The ISA Consultant shall discuss the draft Safety Audit Reports with the audited party and the Client before the final version is completed and submitted.

After completion of the Safety Audits, the ISA Consultant shall document all observations and enter them in the Tracking Log.

For each Non Conformance item, the ISA Consultant shall verify the implementation and effectiveness of the corrective action performed by the Contractor.

5 INTERACTION

5.1 Authority

- The S&T Contractor will provide access to all the relevant design and product information at the ISA Consultants request
- The S&T Contractor shall also supply all the documents as well as analyses as required by the ISA Consultant for his necessary verification and validation

The ISA Consultant shall closely coordinate and cooperate with the Client and the S&T Contractor during the ISA.

The ISA Consultant shall be present during the statutory inspection of the Commissioner of Railway Safety (CRS), and assist the Client in providing answers to the questions of the CRS related to the ISA.

5.2 Disputes with the S&T Contractor

In the event that there is a dispute or lack of cooperation by the S&T Contractor, the ISA Consultant shall notify the Client in writing within 48 hours and provide details of the full circumstances, impact to program and possible solutions to the overcome the dispute.

5.3 Coordination between the ISA Consultant and the S&T Contractor

The Client and the ISA Consultant will meet with the S&T Contractor at the kick-off meeting of the ISA, to discuss and agree on the Safety Assessment Plan. After the kick-off meeting, the ISA Consultant shall regularly coordinate and interface directly with the S&T Contractor, with all communications or notes of discussions forwarded to the Client. The ISA Consultant shall submit the ISA schedule of meetings and Safety Audits with advance notice to enable the Client to attend, if necessary.

5.4 Notification of Safety Audits

The ISA Consultant shall conduct Safety Audits in accordance with the approved Safety Audit and Assessment Plan. The ISA Consultant shall be responsible for liaising with the S&T Contractor to ensure that he is fully aware of the scope and timing of the Safety Audits and must give a minimum of 14 days notice, in writing, before conducting the Safety Audits.

5.5 Safety Audit Locations

The Safety Audits of the S&T Contractor shall be performed at the S&T Contractor's main premises in USA, as well as sub-contractor/suppliers/other designated project contractor premises as appropriate, and at site in Kolkata. The location of the S&T Contractor's, sub-contractor's and other designated project contractor's premises will be intimated to the ISA Consultant as soon as they are known and transmitted by the S&T Contractor.

6 DOCUMENTATION

6.1 The S&T Contractors Documentation

An estimated, but non exhaustive, view of the documentation intended to be assessed by the ISA Consultant could be divided into the following categories:

- General understanding documentation
- System/sub-system safety documentation
- System/sub-system technical documentation (design, procurement, manufacture, installation)
- Verification and validation, and test and commissioning, documentation.
- Operational & Maintenance documentation

6.2 The Clients Documentation

The following documents will be made available to the ISA Consultant upon request:

- The S&T Contract Agreement
- Interfaces Specifications (relevant portions) for the Rolling Stock, Track, Traction, Power Supply, PSD and Civil Works
- Safety-related systems relevant interface specifications

The ISA Consultant may request the Client to provide any other document considered necessary to perform the ISA.

7 DELIVERABLES

7.1 Safety Audit and Assessment Plan

The ISA Consultant shall prepare, and submit to the Client, a Safety Assessment Plan. This document is to provide a detailed plan covering all activities of the ISA.

The Safety Assessment Plan shall present the organization of the ISA Consultants team required to perform all the activities of the ISA.

The Safety Assessment Plan shall give a breakdown of the activities of the ISA into individual tasks, their start and end dates, and their interdependences, and shall provide details of the methods used and the resources involved in individual tasks as well as the associated deliverables.

7.2 Project Management Plan

The ISA Consultant shall prepare, and submit to the Client, the Project Management Plan. This document shall define how the Contractor intends to execute, monitor and control the Services.

7.3 The ISA Overall Safety Audit Plan

The ISA Consultant shall prepare, and submit to the Client, a detailed Overall Safety Audit Plan based on the Scope of Services and including any other relevant information arising during the Signalling & Train Control development.

7.4 Quarterly Reports

The ISA Consultant shall prepare, and submit to the Client, a Quarterly Report (QR) including as a minimum; highlights, summary of work completed, matters of concern and an updated action list of all Safety Audit findings and summary conclusions in regard to the achievements in each Safety Audit.

This report shall also contain the program of the scheduled activities for the next quarter.

7.5 ISA Reports

The ISA Consultant shall submit an Assessment Report:

- at the end of the final detailed design of the Signalling & Train Control
- for each opening for Revenue Operation (Phase I and Phase II).

The ISA Consultant shall submit intermediate draft reports as requested by the Client.

The ISA Consultant shall include the results of the activities, document reviews, inspections, audits, etc., defined in the Safety Assessment Plan.

The ISA Consultant shall include the Tracking Log in the reports.

The ISA Consultant shall supply all supporting information as requested by the Client or the CRS.

7.6 ISA Safety Certificates

The ISA Consultant shall provide a **Safety Assessment Certificate (SAC)** on completion of each Stage, in a format agreed by the Client and/or CRS, attesting that the Signalling & Train Control systems are safe for opening for Revenue Operation.

Each SAC shall:

- Identify the Stage of the Project which it relates to
- Either state that the system complies with the relevant Safety Requirements, or identify the relevant Safety Requirement with which the system is non-compliant and in which matter it does not comply

8 SERVICES AND INFORMATION

All Services and information to be provided by the ISA Consultant to the Client are free of copyright of any other encumbrance to the future use by the Client in the design, construction and operation of the Metro and any other railways.

Attachment A to Scope of Services

DESIGN REQUIREMENT CHAPTER OF VOLUME 4A OF BIDDING DOCUMENTS OF CONTRACT S&T

DESIGN REQUIREMENT

1. DESIGN REQUIREMENTS

1.1 General

- 1.1.1 The design shall be in accordance with the Design Criteria (in Appendix D), specification of the EI (Appendix N), specification of the ATC (Appendix O), and other requirements of this Particular Specification. In case of conflict between any of these specifications, the contractor shall seek the advice of the Employer's Representative.
- 1.1.2 The following design requirements shall be adopted by the Contractor in addition to those specified in the GS.
- 1.1.3 The Contractor shall submit a list of all design review documents for the review of the Employer's Representative, as per the submission schedule given in the GS.
- 1.1.4 No Single point failure shall cause the failure of equipment or sub system of the Signalling & Train Control System. No single point failure shall cause wrong side failures.
- 1.1.5 The provision of safety critical functions and equipment shall comply with appropriate international railway practices.

1.2 Design Process

The Contractor shall adopt a structured design process, including, but not limited to, the following:

- (1) Conceptual, preliminary and final design reviews with the Employer's Representative, including, but not limited to, requirements capture and decomposition, system architecture, logic flow diagrams, RAMS allocations, Standards to be followed, Safety integrity levels, operation and maintenance philosophy, and verification and test approach; and
- (2) Conceptual, preliminary, and final software design reviews with the Employer's Representative, for the software design, including but not limited to: the software requirements specification, software architecture, requirements decomposition, logic flow diagrams, Standards to be followed, Safety integrity levels, MMI prototypes, and verification and test approach.
- (3) In order to ensure that the RAM specifications and objectives are satisfied, the contractor shall:

- Define RAM objectives for each sub-systems of the System.
- Define a RAM organization.
- Define the general RAM specification and the tasks related to this activity.
- Coordinate and control the RAM activities inside its organization, manage the interfaces between the different sub-systems.
- Define the operating specifications and recommendations, as well as the maintenance policy that the O&M Company has to respect to reach the specified performances. These operating rules and maintenance policy shall be relevant and realistic, and shall be compliant with the Operation and Maintenance Concept.
- Define the operating and maintenance work charges for the O&M Company.
- Define the tools, methods and processes to measure the RAM performances.
- Ensure the monitoring of the RAM performance of the system until the end of its guarantee period.
- Perform a quantified RAM synthesis.

1.3 Software Requirements

1.3.1 General

- (1) All software shall be designed, developed, tested, verified and be validated in accordance with the CENELEC standards EN50126, EN 50128, EN 50129, and EN 50159. If an equivalent recognised International standard other than CENELEC is proposed to be adopted, the requirements specified in paragraph 6.3.3 (2) (h) below shall be fulfilled.
- (2) The Contractor shall demonstrate to the Employer's Representative the correct application of the standards specifically detailing the allocation of software integrity levels for all software. The Employer reserves the right to review the software validation and verification at the Contractor's facility and also to employ a third party for this purpose. The Contractor shall provide any document required for assessment by this third party.
- (3) The Contractor shall submit with the Design Plan for the review of the Employer's Representative a list identifying all software, which will be maintainable and re-configurable by the Employer. The re-configuration process shall respect the requirements of the contractor's configuration management and control plan.

1.3.2 Security

- (1) The Contractor shall define the procedures to maintain the security of the software. Aspects to be considered include:

(a) Sabotage

The Contractor shall describe what measures are to be taken to protect the software against sabotage during the development phase. This description shall define the physical restrictions as well as procedural measures and specific tests to be carried out on the software.

(b) Unauthorised Access

The Contractor shall describe what measures are to be taken to protect the software against unauthorized access and subsequent modification. The description shall define both physical and procedural methods.

(c) Virus

The Contractor shall ensure software, which is susceptible to viruses, is developed in environment certified free from computer viruses. To achieve this, the Contractor shall use propriety virus detection software and suppression tools.

- (2) All software delivered to site shall be accompanied by evidence that demonstrates the media is free of viruses.

1.3.3 Software & System Design, Verification & Validation Standards with Complete Verification and validation Documents

- (1) The Contractor shall submit the complete documents of Software & System Verification & Validation plan and report along with a copy of the standard to which all the sub-systems of Signalling & Train Control System have been designed, developed, manufactured, tested, verified and validated.
- (2) The Contractor shall supply the following documents:
- (a) Proof of safety report containing detailed analysis of software and hardware in accordance with CENELEC or an equivalent recognized approved international standards (Generic product safety case and Generic Application safety case)
 - (b) Type test results performed on equipment before its use for regular production
 - (c) Acceptance test results performed before dispatch.
 - (d) Environmental test results performed on the equipment by manufacturer/ independent testing agency.
 - (e) Full documentation of verification and validation procedure, quality assurance program complete with report and certification from the Quality Assurance (QA) Group.
 - (f) Any assessment reports from the Independent Safety Assessor for the Generic product safety case, and the Generic Application safety case, as stipulated by relevant CENELEC standards for both Hardware and Software.

- (g) In case of equipment that has been tested and approved for unconditional and unrestricted use on any passenger railway by any railway administration, the manufacturer should submit complete details of test carried out, test results and approval certificate issued by concerned railway administration.
- (h) If an equivalent recognised International standard other than CENELEC is proposed to be adopted:

- A copy of the standards followed shall be submitted, in the English language
- A certificate from an independent Safety Assessor (ISA), internationally recognised as capable to perform SIL assessment and certification, shall be submitted by the contractor, stating that the proposed standards are equivalent to CENELEC standards.

A representative list of reputed certifier for metro installation is the following: TUV of Germany, Veritas and Certifer of France, Llyods Register of United Kingdom, Arthur D. Little of USA.

The contractor shall provide proof or present the methods planned to be applied in order to demonstrate that the system will respect all restrictions, exemption, or applicative conditions included in the certificate,

- Credentials of the independent recognised body issuing such certificate shall be submitted for verification by the Employer.
 - The certificate shall present the equivalent SIL of the system in its actual design
- (i) Any other information, considered necessary by the Employer
- (j) Such certificate has to be certificate along with the Tender to comply with requirement defined in Appendix A of Vol 1.

1.4 System Safety Design Requirements

1.4.1 System Safety Objectives

- (1) The Contractor shall define a systematic approach to ensure that:
- (a) Safety is consistent within sub-systems, functional requirements are designed into the system in a timely, cost-effective manner.
 - (b) Hazards associated with each system/sub-system are identified and evaluated, and eliminated throughout the entire life cycle of the system/sub-system.
 - (c) Historical safety data generated by associated systems are considered and used, where appropriate.

- (d) No risk is involved in accepting and using designs, materials and production and testing techniques.
 - (e) Retrofit actions required to improve safety are eliminated through the timely inclusion of safety features during development and acquisition of a system.
 - (f) Modifications do not degrade the inherent safety of the system
- (2) Risk classification and assessment

The objective of the risk assessment and classification is to assess the probability of a hazard leading to a potential accident. This combined with the hazard severity level defines the risk. The below stage is to classify that risk in terms of its acceptability.

- (a) The Contractor shall classify risks by combination of the hazard consequence and the hazard probability
 - (b) The contractor shall use the table 3 for risk classification.
 - (c) Safety analysis will be conducted in accordance with the required level of Safety defined in the Hazard Analysis and Assessment document.
- (3) Risk categorization

- (a) The hazard severity levels will be classified into the following categories

Interpretation	Severity level providing of [A1]		
Category	Severity Level	Consequence to persons or environment	Consequence to service
I	Catastrophic	Fatalities and/or multiple severe injuries and/or major damage to the environment.	Loss of all the system
II	Critical	Single fatality and/or severe injury and/or significant damage to environment.	Loss of a major system
III	Marginal	Minor injury and/or significant threat to the environment.	Severe system(s) damage
IV	Insignificant	Possible minor injury.	Minor system damage

Tab 1: Hazard Severity Levels

- (b) The probabilities of occurrence will be classified according to the categories shown in the following table

Interpretation	Frequency level providing of [A1]		Interpretation of category
Category	Frequency level	Description	Probability (per train/hours)
A	Frequent	Likely to occur frequently. The hazard will be continually experienced.	$> 10^{-3}$
B	Probable	Will occur several times. The hazard can be expected to occur often.	$10^{-3} - 10^{-5}$

Interpretation	Frequency level providing of [A1]		Interpretation of category
Category	Frequency level	Description	Probability (per train/hours)
C	Occasional	Likely to occur several times in the life of the system. The hazard can be expected to occur several times.	$10^{-5} - 10^{-7}$
D	Remote	Likely to occur sometime in the system life cycle. The hazard can reasonably be expected to occur.	$10^{-7} - 10^{-8}$
E	Improbable	Unlikely to occur, but possible. It can be assumed that the hazard may exceptionally occur.	$10^{-8} - 10^{-9}$
F	Incredible	Extremely unlikely to occur. It can be assumed its occurrence may not be experienced	$< 10^{-9}$

Tab 2 : Hazard Probability Levels

(4) Risk evaluation

- (a) The risk classification is the combination of the hazard consequence and the hazard probability. The contractor shall apply the following tables.

Risk level			Severity level of hazard consequence			
			I	II	III	IV
			Catastrophic	Critical	Marginal	Insignificant
Frequency of occurrence of hazardous event	A	Frequent	Inacceptable	Inacceptable	Inacceptable	Undesirable
	B	Probable	Inacceptable	Inacceptable	Undesirable	Tolerable
	C	Occasional	Inacceptable	Undesirable	Undesirable	Tolerable
	D	Remote	Undesirable	Undesirable	Tolerable	Acceptable
	E	Improbable	Undesirable	Tolerable	Acceptable	Acceptable
	F	Incredible	Acceptable	Acceptable	Acceptable	Acceptable

Tab 3 : Risk Classification Matrix

Risk evaluation	Risk reduction/control
Inacceptable	Shall be rejected, eliminated
Undesirable	Shall only be accepted when risk reduction is impracticable and with agreement of the railway authority.
Tolerable	Acceptable with adequate control and the agreement of railway authority

Risk evaluation	Risk reduction/control
Acceptable	Acceptable: suitable for requirements

Decision table

- (b) For the mitigation of the potential or actual hazard identified through analyses, the following criteria, as a minimum, shall be adopted by the contractor with the following order or preference:
- Use of design techniques
 - Use of safety devices
 - Use of warning devices
 - Use of special procedures
- (5) Safety Integrity level
- (a) Contractor's activities related with safety assurance for SIL 1 and 2 and for SIL 3 and 4 shall include verification, validation and demonstration of safety in the sense of the standards EN 50126.
- (b) For Safety relevant function, the Contractor shall mitigate random and systematic failures by use of adequate design principles / methods as defined by the CENELEC Standards EN20128 and 50129 according to the SIL identification.
- (c) The contractor shall study the contribution of any sub-system to the operation (including degraded modes). To this purpose, all the functions, even those which can not cause by themselves hazardous situations shall be analyzed; the consequences of their degradation on the system safety level will be taken into the final risk level quantification.
- (d) The Contractor shall categorize all Identified hazards into levels of severity and frequency by using the EN50126 standard as a guideline. The contractor shall use the risk assessment matrix based on these levels.
- (e) The contractor shall assign SILs to each item (sub-system, equipment, hardware or software components) of the System during Safety studies.
- (f) The contractor shall determine SILs using the methodology defined in the EN50126 standard: for each accident severity, the maximum frequency leading to an acceptable hazard is considered and converted to a SIL using the "continuous/high demand mode of operation". The result is as follow:

SIL	Tolerable Hazard Rate (THR) per hour
4	$10^{-9} \leq \text{THR} < 10^{-8}$

SIL	Tolerable Hazard Rate (THR) per hour
3	10-8 <=THR<10-7
2	10-7 <=THR<10-6
1	10-6 <=THR<10-5

(6) Hazard list

(a) The contractor shall at least consider this list of undesirable events:

N°	Undesirable event
01.01	Rear end collision of two LRT
01.02	Side on collision of two LRT
01.03	Frontal collision of two LRT
01.04	Collision of a LRT with a fixed obstacle
01.05	Collision of a derailed LRT with a passing LRT
02	LRT derailment without collision
03	Electrocution of person(s)
04	Fall of person(s) : on the track, on the platform, into the LRT, during evacuation, ...
05	Dragging people
06	Contact, trapping, crush people
07	Panic
08	Fire
09	Intoxication, asphyxiation, suffocation, burn
10	Explosion

(b) The undesired events of this list are considered at a very high level. The contractor shall complete and detail this list and submit it to the Employer for approval before starting through its SAP (Safety Assurance Plan).

1.4.2 System Safety design

The system safety design requirements shall include, but not be limited to, the following items:

(1) Eliminate identified hazards or associated risk through design, including material selection or substitution.

- (2) Isolate hazardous substances, components, and operations from other activities, areas, personnel and incompatible materials.
- (3) Locate equipment so that access during operations, servicing, maintenance, repair, or adjustment minimizes personnel exposure to hazards (e.g. hazardous chemicals, high voltage, electromagnetic radiation, cutting edges, or sharp points).
- (4) Minimize risk resulting from excessive environmental conditions (e.g. temperature, humidity, dust and vibration).
- (5) Design to eliminate risk created by human errors in the operation and support of the systems.
- (6) Protect the power sources, controls and critical components of subsystems by physical separation or shielding.
- (7) Ergonomic design that takes care of ease of maintenance by suitable slotting/bar location of sub-system equipment.

1.4.3 System Safety Engineering

- (1) Safety shall be the primary consideration in the design and performance requirement for the system. To meet these requirements, all safety critical equipment shall be designed to fail-safe and check redundancy principles. Structured and systematic approach shall be employed to identify, analyse and resolve potential system hazards.
- (2) The system shall conform to CENELEC standard EN50126 for Reliability, Availability, Maintainability and Safety. The system shall in addition conform to CENELEC standard EN50129 for safety related electronics system for Signalling and CENELEC standard EN50128 for software for railway control and protection system.
- (3) All safety critical equipment shall be designed, manufactured and validated to Safety Integrity Level 4 as defined in the CENELEC standard EN50126, EN50128, and EN 50129.
- (4) Deployment process of ATS and ATO systems shall follow Safety Integrity Level 2 as defined in the CENELEC standard EN50126, EN50128 and EN50129. All potentially under safe effects of safety related functions performed by ATS and ATO shall be mitigated by mandatory integration with SIL-4 sub-system (ATP and CBI).

1.4.4 System safety organization

- (1) The contractor shall set up an organization that makes it possible to preserve the independence of judgment of the different participants and satisfy the requirement of the EN50129 standard.
- (2) The contractor shall carry out safety activities by an independent and autonomous structure with respect to the "project" structure of the contractor.
- (3) The safety team of the Contractor shall be represented by the contractor's Safety engineer who shall have notable experience in dependability.
- (4) The contractor shall make sure that the people in charge of the safety on the project has the authority, the responsibility and the means necessary to guarantee the quality of the services carried out.
- (5) Links with Quality
 - (a) The contractor shall consider that the Safety of the system is based upon its level of Quality: the contractor shall define a Quality Management system in order to identify errors and control their impact throughout the life-cycle of the system.
 - (b) The contractor shall define Quality requirements in order to control the Quality of the design.
 - (c) The contractor shall led Safety Activities such as testing and verification in accordance with the Quality Assurance Program.
- (6) Links with the Independent Safety Assessor (ISA)
 - (a) Within the context of the procedure of authorization of the revenue in service, the ISA mission will cover all the phases of definition, design and realization (manufacture, installation test & Commissioning and revenue of service) of the subsystem.
 - (b) The Contractor shall entitle the ISA to audit the contractor in order to make sure of the respect of the measures stated in the plans (in particular safety, software safety and management of configuration) of the contractor, according to the audit rules (see EN ISO 19011, December 2002).
 - (c) The exchanges between the contractor and the ISA could be done directly.
 - (d) The contractor shall always inform the Employer of these exchanges.
 - (e) The Contractor shall hold regularly safety follow-up meetings with the ISA and the Employer.
 - (f) The Contractor shall adjust the interval between each of these meetings according to the project phase.

- (g) The Contractor shall satisfy the requirements of the Independent Safety Assessor.
- (h) The Contractor answers the comments that the ISA should submit to the Contractor through a specific Hazard Log.

1.4.5 System safety process

The contractor shall manage the entire safety process of the system.

The Contractor and the sub-contractors concerned by Safety issues shall designate a Safety representative for the project.

Each entity of the Contractor concerned by Safety issues shall establish and maintain a Safety Assurance Plan (SAP) for the demonstration of the Safety Requirements. The Contractor shall establish this SAP in accordance with the Safety Assurance Plan of the contractor. The Contractor shall submit his SAP for approval by the Employer and the Independent Safety Assessor.

The Safety Assurance Plan shall describe tasks and activities required to meet the Safety Requirements defined through system Safety analysis.

It shall describe in particular:

- the Safety approach,
- the Safety organization of the contractor, sub-contractor, ...
- the task listing and time phasing for each task,
- the list of Safety documents,
- the description of Safety analysis to be used during design and development of the equipment,
- the description of the method of verification,
- the tools and methods used.

The Contractor shall produce a Safety Case including all documentary evidence required to demonstrate the safety of the system.

The mandatory Safety Activities shall include:

- sub-system hazard analysis including the identification and the effects of potential hazards,
- a failure mode and effect analysis to determine the effect on the system and all sub-systems of each mode of failure of every part of the studied system,
- test activities and Safety verification,
- a risk assessment and report.

The contractor shall document all analysis in a format approved by the Employer.

The contractor shall justify the origin of all the data used.

The contractor shall describe all methods that will be used.

The contractor shall submit the safety case for approval to the Employer and to an Independent Safety Assessor (ISA).

- in case of non-consistency, the Employer or the Independent Safety Assessor will return the Safety Case with recommendations for modification,
- in case of consistency, the Employer or the Independent Safety Assessor will eventually forward the Safety Case to the Commissioner of Railway Safety for his instruction. In case of a negative conclusion, the Safety Case will be returned with recommendations for modification.

Requirement verification shall be performed during the testing periods before commercial operation. If this verification fails, the Contractor shall review the design and implement improving design changes at no cost for the Employer.

1.5 **Deliverables**

A list of project deliverables shall be submitted as part of the System Safety Management Requirements. The deliverables shall include, but not be limited to the following:

- (1) Safety Assurance Plan as defined in the GS.
- (2) Hazard Analysis conducted for the various phases of the system life cycle as defined in the GS.
- (3) Identification of the Employer's requirements and supporting rules and procedures required to ensure safe operation and maintenance of the Signalling / Train Control System.
- (4) All documents as per paragraph 6.3.3 (2) above, for all the subsystems including but not limited to Trackside ATP, On-board ATP, EI, Track circuits and ATO, ATS.
- (5) Proof of final safety report containing detailed analysis of software and hardware; and the assessment report of the ISA for the same as required by the relevant CENELEC standards for both Hardware and Software.
 - All the subsystems including but not limited to Trackside ATP, On-board ATP, EI, coded audio frequency Track circuits, distance to go generation and ATO, ATS.
 - Signalling & Train Control system as a whole.
 - If an equivalent recognised International standard other than CENELEC is proposed to be adopted, the requirements specified in paragraph clause 6.3.3 (2) (h) shall be fulfilled.
- (6) All the data of the EI, ATP/ATO and ATS shall be provided to KMRCL for reference in the required format.

- (7) The Contractor shall provide in his offer a draft version of his safety assurance plan. This Safety Assurance Plan shall specify in particular:
- What is to be done: to define the tasks to be realized and their logical sequence.
 - Why: to specify the forecasted results (all the identified risks must be closed at the end of the instruction of safety report)
 - Who: to define the people in charge of safety at the contractor's, mentioning the relations between this people and the other entities of the contractor (project team and quality), as well as the person charged of the safety in the contractor organisation and of the relations with the other contributors of the project.
 - How: to define the methods implemented.
 - When: to define the various steps and the planning.
- (8) The contractor shall submit a planning presenting the scheduled delivery of the safety documentation.
- (9) The Contractor shall provide all the safety documentation he will produce. This documentation shall at least include:
- System Safety Assurance Plan
 - Hardware Safety Assurance Plan
 - Software Safety Assurance Plan
 - Preliminary Hazard Analysis
 - Hazard Log
 - Failure Mode and Hazard Analysis
 - Operating and Support Hazard Analysis
 - Interfaces Hazard Analysis
 - Fault trees
 - Compatibility studies
 - Configuration management and control Plan
 - Configuration review sheets
 - Software safety studies
 - Data generation and data validation process safety documentation
 - List of the safety components and equipments
 - List of the safety tests
 - Procedure for evolution or modification of the system during the operation
 - System Safety case
 - Software and Hardware Safety Certificates
 - Safety requirements for operation and maintenance

1.6 Trackside Equipment

1.6.1 General

- (1) All trackside equipment shall be verified against the structure gauge and submitted for the Employer's Representative's review. KMRC East-West Metro Project Schedule of Dimensions shall be followed for the structure gauge.
- (2) A set of typical Employer's Representative's trackside services drawings is provided in Appendix B of this PS. The Contractor shall use this set of drawings as a guideline for the design of trackside equipment. The outdoor junction boxes shall be made of stainless steel for rust protection. The Contractor shall submit the specifications of junction boxes for review by the Employer's Representative.

1.6.2 Rail Connections

- (1) All connections to the rail shall be suitably welded to give resistance & corrosion free smooth contact. The rail welding material shall conform to IRS: S103-2004 or the latest.
- (2) Prior to the selection of the connection, the Contractor shall demonstrate the reliability and maintainability of their chosen method. In fulfilling these criteria, the Contractor shall provide evidence, typically in the form of:
 - (a) Mechanical and electrical test results;
 - (b) Evidence of their reliable service on other metros/railways;
 - (c) Environmental test results; and
 - (d) Maintainability in terms of removal, refitting and testing.

1.7 Environmental

1.7.1 All Signalling & Train Control equipment shall be suitable for the prevailing environmental conditions encountered in Kolkata.

1.7.2 All Signalling & Train Control System equipment shall operate correctly to the environmental conditions broadly as per IS: 9000 & other specifications herein.

1.7.3 The Signalling & Train Control System shall conform to IEC 60529 Ed. 2.0 b to the following levels:

- (1) Trackside equipment: IP code 54;
- (2) Internal trainborne equipment: IP code 52;
- (3) External trainborne equipment: IP code 67; and
- (4) CER/SER equipment: IP code 52.

1.7.4 The Signalling & Train Control System shall be able to withstand the following environmental conditions stipulated below:

(1) Temperature

- (a) Trainborne equipment: 0°C to 70°C;
- (b) Trackside equipment: 0°C to 70°C;
- (c) CER and SER equipment: Shall be capable of working in a non air conditioned environment upto 400C without any degradation in RAMS and MTBSAF requirements of the contract; and
- (d) Control room equipment: Shall be capable of working in a non air conditioned environment upto 400C without any degradation in RAMS and MTBSAF requirements of the contract.

(2) Humidity

- (a) Trainborne equipment: 0 to 95 % relative (non-condensing);
- (b) Trackside equipment: 0 to 95% relative (non-condensing);
- (c) CER and SER equipment: 0 to 95% relative (non-condensing); and
- (d) Control room equipment: 0 to 95% relative (non-condensing).

1.8 Shock and Vibration

1.8.1 All Signalling / Train Control equipment shall be protected from damage or reliability degradation due to shock or vibration.

1.8.2 Vibration and Shock (sinusoidal and random): The vibration and shock requirements will conform to the ranges and classification contained in IEC721.

1.9 Applicable Standards

1.9.1 The standards to be followed during the design, construction, and installation of the Signalling / Train Control System shall be as stipulated in this Specification. The Contractor may propose additional standards for review by the Employer's Representative at least 60 days before application. Such standards shall include, but not be limited to, the following:

- (1) Isolation of safety-critical logic;
- (2) Tests of individual components;
- (3) Power supply standards;
- (4) System performance and reaction time requirements;
- (5) Electro-magnetic compatibility/ interference (EMC/EMI);
- (6) Earthing & bonding (refer to Earthing Policy in Appendix M);

- (7) Terminations;
- (8) Fire/smoke proofing of cabling;
- (9) Electrical isolation;
- (10) Lightning and surge protection;
- (11) Structural requirements;
- (12) Cabling standard; and
- (13) Earth leakage detection.

1.10 Design Documentation

1.10.1 The Contractor shall, in addition to the documentation requirements specified in the GS, supply, as a minimum, the following hardware and software design documentation:

- (1) Conceptual design specifications, details and drawings;
- (2) Preliminary design specifications, Software and system verification and validation standards, Signalling plans with final location of signals, Earthing and lightning protection plan, Specifications for Indoor and lineside equipments. The Preliminary design shall include but not be limited to:
 - System and Sub-system Overview,
 - System requirement specification, System traceability specification,
 - System safety plan,
 - System Verification & Validation Plan
 - System Assurance Plans consisting of EMC Management Plan, RAMS Plans, Software Quality Assurance Plan and Quality Plan
 - ATC interface with Rolling stock, including the design of driver's MMI for ATP, etc
- (3) Final design specifications, details and drawings including Complete Specifications for various sub-systems e.g. EI, ATP, ATO, ATS, Point Machines, Track Circuits, Train to Wayside communication devices, Communication network, Line side signals etc. and their configuration for required headway, which shall include as minimum the following:
 - Design reviews, Design Verification Table;
 - Failure mode effect and criticality analysis (FMECA);
 - Project risk management plan, Hazard Analysis;
 - Hardware adaptation report;
 - Result from simulation studies including Design Data, formulas, calculations, and computer simulation logic, results and printouts for demonstrating that both safe

braking and the specified theoretical headways have been provided by the design & obtain the approval of the Employer's Representative.

- Approved signalling layout and numbering plan;
- Control table;
- Data preparation validation report;
- Signalling principles;
- Overall signalling principle report;
- Installation design;
- Systems Engineering Plan;
- Lightning, Transient and surge protection Plan; and
- Final System Assurance Plan.
- Design Safety case
- RAM plan
- The Operating rules to respect in order to reach the specified performances
- Maintenance plan

1.10.2 The submission of the above documentation shall be included in the Submission Programme specified in the GS.

1.11 Equipment Cabinet and Equipment Enclosure

1.11.1 All indoor equipment cabinets and enclosures used for housing the Signalling & Train Control equipment shall be provided with lock and key. Padlocks shall not be used.

1.11.2 All outdoor equipment cabinets and enclosures used for housing the Signalling & Train Control equipment shall be provided with suitable locking or protection arrangement. The key or opening arrangement for identical equipment shall be same. The key or opening arrangement for different equipment should be same as far as possible. The Contractor shall provide to the Employer, as a minimum, 3 keys per cabinet/ enclosure.

1.11.3 Sufficient ventilation shall be provided for the indoor equipment cabinets and enclosures in which active equipment are housed.

1.11.4 All metallic cabinets/ parts shall be properly earthed.

1.12 RAM specifications

1.12.1 RAM plan

- (1) The Bidders shall submit a Preliminary RAM plan that will be the base for the writing of the actual RAM Plan during the project stage. The Contractor shall update the RAM plan throughout the course of the Project, as required by actual design progress. This document shall cover the design, development, manufacture, test, installation and commissioning phases of the system.

- (2) The Preliminary RAM plan shall define the process for the specification, verification and control of the Reliability, Availability, Maintainability and Operability requirements for the Kolkata Metro Rail. It shall describe in particular:
 - the retained RAM and Operability approach,
 - the management of the Reliability, Availability, Maintainability and Operability activities,
 - task listing and time phasing for each task related to these activities,
 - list of RAM and Operability documents to be produced,
 - the description of RAM and Operability analysis methods and tools to be used during the design and development of the system,
 - the description of the method of verification.
- (3) The Preliminary RAM plan shall update the Preliminary RAM Plan submitted during the call of tender, in order to:
 - Detail the RAM organization and activities that the Contractor will perform during the Project,
 - Take into account any potential modifications of the project, its schedule or organization.
- (4) The RAM Plan of the Contractor shall cover the design, development, manufacture, test, installation, commissioning and operation phases of the system.

1.12.2 RAM assessment

- (1) The Contractor shall perform a RAM assessment and report that shall demonstrate the achievement of the RAM requirements of the System.
- (2) The Contractor shall develop procedures and performance analysis routines to confirm that the System achieves the RAM performances.
- (3) The Contractor shall estimate the RAM performances of the System taking into account:
 - The reliability and maintainability predictions.
 - The RAM studies,
 - The Operation Plan;
 - The Maintenance Plan;
 - The Operation and Maintenance Concept;
 - Any other factor that could have any impact on RAM performances.
- (4) The Contractor shall use an adapted methodology as reliability block diagrams to explain demonstrations.

- (5) The Contractor shall perform reliability predictions based upon the knowledge of the previous equivalent systems or based on part failure rates.

1.12.3 RAM reviews

- (1) The Contractor shall carry out RAM reviews at least after each major development phase and at Employer's demand.
- (2) The aim of each Reliability, Availability and Maintainability review is to assess the conclusions of the RAM tasks in order to:
 - estimate whether the RAM requirements have been correctly taken into account,
 - identify the consequences of these conclusions on the remaining RAM tasks,
 - identify the consequences of these conclusions on the design.
- (3) During these reviews, the Contractor shall pay particular attention to changes that may effect earlier decisions.

1.12.4 Maintenance Plan

- (1) The contractor shall provide a maintenance plan of the system.
- (2) The maintenance plan shall provide a complete list of preventive maintenance procedures for each type of piece of equipment supplied under the contract.
- (3) The Contractor shall define and present in the maintenance plan:
 - The technical means and procedures necessary for the operator to perform his maintenance operations
 - The maintenance time and workforce for every procedure
 - For corrective maintenance, the minimum information necessary for the operator to define, when an alarm occurs, the exact nature of the failure, as well as the precautions to be taken (by the operator) to perform efficient maintenance tasks.
 - For corrective maintenance, the tests and controls to perform in order to identify the exact nature of the failures, and after repair, to ensure the compliance of the equipments and their proper and safe operating condition.
- (4) For each preventive maintenance task, the Contractor shall issue a study in order to:
 - Identifies the RAM or safety risk covered by the preventive maintenance task;
 - Justifies the periodicity of the maintenance task.