DELHI METRO RAIL CORPORATION LIMITED

DMRC/CO/ST/PUR/07.14.152/II & III

SUPPLY, INSTALLATION, TETING AND COMMISSIONING
OF TICKET VENDING MACHINE AND AUTOMATIC TICKET
READER AT VARIOUS METRO STATIONS

TENDER DOCUMENT

NOTICE FOR INVITATION TO TENDERERS

INSTRUCTION TO TENDERERS

FORM OF TENDER

CONDITION OF CONTRACT

SCHEDULE OF REQUIREMENT

ANNEXURES (1 to 11)

DELHI METRO RAIL CORPORATION LIMITED

1ST Floor,Metro Bhawan,

13,Fire Brigade Lane, Barakhamba road,
New Delhi-110 001

NOTICE FOR INVITATION TO TENDERERS
NOTICE FOR INVITATION OF TENDER

DATE OF ISSUING OF TENDER DOCS : 27/08/14

LAST DATE & TIME OF SUBMISSION OF OFFERS : 15/09/14 at 15.00 Hrs.

DATE & TIME OF OPENING OF TENDERS : 15/09/14 at 15.15 Hrs.

PLACE OF OPENING OF TENDERS : THE OFFICE OF COS
Delhi Metro Rail Corporation Ltd.,
1st Floor, Metro Bhawan,
13, Fire Brigade Lane,
Barakhamba road,
New Delhi-110 001
Fax No: 011-23418413

ADDRESS FOR COMMUNICATION : THE OFFICE OF COS
Delhi Metro Rail Corporation Ltd.,
1st Floor, Metro Bhawan,
13, Fire Brigade Lane,
Barakhamba road,
New Delhi-110 001
Fax No: 011-23418413
DELHI METRO RAIL CORPORATION LTD.

Our Ref : DMRC/CO/ST/PUR/07.14.152/II & III

TO

DY.COS
Delhi Metro Rail Corporation Ltd.
1ST Floor,Metro Bhawan 13,Fire Brigade
Lane Barakhamba road,
New Delhi-110 001

FROM

Date :

SUPPLY, INSTALLATION, TETSING AND COMMISSIONING OF TICKET VENDING MACHINE AND AUTOMATIC TICKET READER AT VARIOUS METRO STATIONS

Tenders for this Contract are being called by the DY.COS/ Delhi Metro Rail Corporation Limited on behalf of Delhi Metro Rail Corporation

- Notice of Invitation to Tenderers
- Instructions to Tenderers
- Form of Tender
- Conditions of Contract
- Schedule of requirement
- Annexures

Tenders shall be submitted to the COS/DMRC at the address given above not later than mentioned date and time.

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

Offers shall be valid for a period of 180 days from the last date of submission of Tenders, and shall be accompanied by Earnest Money/ Tender Guarantee as described in Paragraph 500 of the instruction to tenderer.
INSTRUCTIONS TO TENDERERS
INSTRUCTIONS TO TENDERERS

100 GENERAL INSTRUCTIONS

101. Dy.COS/DMRC, invites tenders from established and reliable manufacturers for the supply as set forth in the “Schedule of Requirements.”

102. The Tenderer shall bear all costs associated with the preparation and submission of its tender. All offers in the prescribed format at Annexure-1 should be submitted by the prescribed date and time fixed for the receipt of offers as set forth in the tender papers. Offers received after the stipulated time and date, are liable to be rejected.

103. All information in the offer must be in English. Information in any other language must be accompanied by its authenticated translation in English. Failure to comply with this may render the offer liable to be rejected. In the event of any discrepancy between an offer in a language other than English and its English translation, the English translation will prevail.

104. Notice of Invitation to Tender
Instructions to Tenderers
Form of Tender
Conditions of Contract
Schedule of Requirement (Technical Specifications)
Annexures

In case of any conflict between the above documents the order of precedence will be as under:
1. Schedule of Requirement
2. Annexures
3. Instruction to Tenderers
4. Conditions of Contract
5. Tenderer’s offer

105. Clarification of Tendering Documents; and Pre-Tender Meeting:-

A prospective Tenderer requiring any clarification of the tendering documents may notify the Employer in writing or by cable (hereinafter, the term cable is deemed to include Electronic Data Interchange (EDI) or telefax. Similarly, if a Tenderer feels that any important provision in the documents will be unacceptable, such an issue should be raised at this stage. The Employer will respond in writing to any request for clarification or modification of the tendering documents that it receives no later than twenty-one (21) days prior to the deadline for submission of tenders prescribed by the Employer. Written copies of the Employer’s response (including an explanation of the query but not identification of its source) will be sent to all prospective tenderers that have received the tendering documents. Tenderers will note that the Technical specifications of the facilities require some plant and equipment to be necessarily sourced from India. Foreign tenderers are encouraged to associate any Indian firm/s as a partner in a Joint Venture or consortium.

106. Amendment of Tendering Documents
At any time prior to the deadline for submission of tenders, the Employer may, for any reason, whether at its own initiative, or in response to a clarification requested by a prospective Tenderer, amend the tendering documents.

The amendment will be notified in writing or by cable to all prospective tenderers that have purchased the tendering documents and will be binding on them. Tenderers are required to immediately acknowledge receipt of any such amendment, and it will be assumed that the information contained therein will have been taken into account by the Tenderer in its tender.

200. COMPLIANCE WITH TECHNICAL SPECIFICATION
201. The stores offered should be in accordance with the stipulated specifications in “Schedule of Requirements”.

202. The tenderer shall indicate his compliance or otherwise against each clause and sub-clause of the technical specifications. The tenderer shall, for this purpose, enclose a separate statement of deviations (Annexure-5, 6) indicating compliance or otherwise of each clause and sub-clause of specifications, which should invariably, be filled in (if there are no deviations, a nil statement should be submitted) and submitted along with the offer. Whenever the tenderer deviates from the provisions of a clause/sub-clause, he shall furnish his detailed justification for the same in the ‘Remarks’ column. Tenderer wishing to offer technical alternatives to the requirements of the tendering documents must first price the Employer’s design of the facilities as described in the tender document, and shall further provide all information necessary for a complete evaluation of the alternatives by the employer, including drawings, design calculations, technical specifications, breakdown of prices, proposed installation methodology and other relevant details. Only the technical alternatives, if any, of the lowest evaluated tenderer to the basic technical requirements shall be considered by the employer.

300. INDIAN ASSOCIATE & HIS SERVICES/ FACILITIES IN INDIA
301. The foreign tenderer shall include in his offer the name of the person of the firm who will be acting as his representative/associate company in India in respect of his offer. He shall also indicate the after sales service facilities which he or his representative/associate company has in India. If the foreign tenderer has no representative in India, he shall indicate in his offer the after sales service facility he intends to provide.

302. Foreign firms quoting direct against the inquiry and who want Indian Associates and/or servicing facilities in India should indicate in their offer the name of their Indian Associates or the representative they have for servicing in India.

303. Tenderers of foreign firms should furnish following particulars. Offers which do not comply are liable to be ignored. They are also required to complete the check List as per Annexure-8.

(i) The name and address of the local representative/associate company.
(ii) The precise relationship between the foreign manufacturer/principals and their Indian representative/Associates.
(iii) The mutual interest which the manufacturer/principal and the Indian representative/associates have in the business of each other.
Foreign Tenderer has to submit a certificate that bidder is not having any Commission Agent in India and no agency commission will be paid otherwise it shall be sufficient ground for rejecting of his offer. Indian Associate/representative should also mention Income tax permanent account number.

All services (including after sales) to be rendered by the agents/associates whether the general nature or relation to the particular contract and the facilities/infrastructure available with them for the same.

Past performance.

400. QUALIFYING REQUIREMENTS OF TENDERERS

401. The tenderer shall provide a satisfactory evidence acceptance to the Purchaser to show that:

(a) He is licensed manufacturer, who regularly manufactures the item offered and has adequate technical knowledge and practical experience.

(a) He has adequate plant and manufacture capacity to manufacture and supply the items offered within the delivery schedule offered by him.

(b) He has established quality control system and organization to ensure adequate control at all stages of the manufacturing process.

(c) Experience of having successfully completed similar works during last 7 years ending last day of month previous to the one in which application are invited should be either of following:

Must have completed one work of similar* nature of minimum value equal to INR 44.89 Crores
OR
Must have completed two works of similar* nature each costing of minimum INR 28.06 Crores
OR
Must have completed three works of similar* nature each costing of minimum INR 22.44 Crores

*similar work means supply, installation, testing and commissioning of ticket vending machine and automatic ticket reader at various metro stations.

** Conversion of foreign currency in to equivalent INR will be done with RBI reference B.C selling market exchange rate of last day of month previous to the one in which application are invited.

(d) The Average Annual financial turnover of during the last 3 years, ending 31st March of previous financial year, should be more than 16.83 Crores.

402. In addition to the above, further information regarding his capacity, capability, if required by the Purchaser, shall be promptly furnished by the tenderer and be would offer all facilities to representative of Purchaser for accessing capacity, capability by actual visit to his works/office.
403. Tenderer not submitting the requisite information may note that his offer is liable to be ignored.

500. **EARNEST MONEY/TENDER GUARANTEE**

501. Earnest Money/Tender Guarantee for an amount as stipulated in the “Notice of Invitation of Tender” or an equivalent amount in the currency of the country of the tenderer shall accompany each tender. The Earnest Money/Tender Guarantee shall be any one of the following alternative forms subject to the approval of the Purchaser:

(a) A crossed Bank Draft/pay order/banker cheque in favour of the Delhi Metro Rail Corporation Ltd, INDIA from a Nationalized Indian Bank/Scheduled commercial bank (in the case of indigenous offers) or from a reputable commercial Bank of the tenderer’s country having their branch in India (in the case of foreign offers). For the bank drafts in currencies as mentioned in NIT (Notice for Invitation of Tenderer) other than Indian Rupees, the validity of the same should be at least 180 days from the date of opening of tender.

(b) An irrecoverable Bank Guarantee of any Indian Nationalized Bank/Scheduled commercial bank (in case of indigenous offer) or from reputable commercial bank of the tenderer’s country having their branch office in India (in case of foreign offer), in favour of the Delhi Metro Rail Corporation Ltd. in the format attached (Annexure-3). It shall be valid for minimum period of 180 days from the date of tender opening of tender. Exact date of validity of bank guarantee is 25/03/15.

502. The Earnest Money/Tender Guarantee shall remain deposited with the Purchaser for the period of 180 days from the date of opening of tenders. If the validity of the offer is extended, the Earnest Money/ Bank Guarantee duly extended shall also be furnished, failing which the offer after the expiry of the aforesaid period shall not be considered by the Purchaser.

503. No interest will be payable by the Purchaser on the Earnest Money/Tender Guarantee.

504. The Earnest Money/Tender Guarantee deposited is liable to be forfeited if the tenderer withdraw or amends, impairs or derogates from the tender in any respect within the period of validity of his offer.

505. The Earnest Money of the successful tenderer will be returned after the Contract Performance Guarantee as required (clause-0900 of the conditions of contract) is furnished.

506. If the successful tenderer fails to furnish a Contract Performance Guarantee as specified in clause 0900 of the Condition of Contract, then the Earnest Money shall be liable to be forfeited by the Purchaser.

507. The Earnest Money of all unsuccessful tenderers will be returned by the Purchaser.

508. Any tender not accompanied by Earnest Money in one of the approved forms given in clause 501 shall be summarily rejected.

600. **SUBMISSION OF OFFERS**

601. All offers shall be either typed or written neatly in indelible ink.
“This is two packets tender. Tenderer has to submit their offer in two different sealed packets. One packet will be for technical bid and another packet will be for financial bid”.

1 Technical bid will be opened on due date (as per Notice for Invitation of Tender). This packet must contain
   - Tender document cost, if document downloaded from DMRC web site.
   - Tender guarantee (EMD) in original,
   - Technical bid
   - Documents related to qualifying requirement of the tenderer.

a. List of Technical and Commercial Deviations (if any) as per format given in Annexure- 5 & 6 along with the Undertaking that all the deviations have been listed and priced in the financial offer and Deviations not priced will be treated as Null and Void.

2 Financial bid will be in the separate sealed envelope, which will contain Price bid as per format of the Tenderers financial offers as given in tender document as Annexure- 1 & 1 (a) .

Financial bid will be opened in the presence of bidder only when tenderer’s bid qualifies technically and in case tenderer’s bid disqualifies technically, tenderers financial bid will be returned in sealed intact condition.

Tenderer has to submit their offer in two copies (one in original copy and another in duplicate copy).

602. Any individuals signing the tender or other documents connected therein should specify whether he is signing:
   (i) as sole proprietor of the concern or as attorney of the sole proprietor;
   (ii) as a partner or partners of the firm;
   (iii) as a Director, Manager or Secretary in the case of a limited company duly authorized by a resolution passed by the board of directors or in pursuance of the authority conferred by Memorandum of Association.

603. The original power of attorney or other documents empowering the individual or individuals to sign should be furnished to the Purchaser for verification, if required.

604. All prices and other information like discounts etc. having a bearing on the price shall be written both in figures and words in the prescribed offer form.

605. The envelope containing the offer should be sealed and marked “OFFER FOR TENDER NO……………………………………………..…OPENING DATE……………TIME………….Hrs”. Apart from the offer to be submitted as detailed above, no copy of the offer should be sent to other offices either at New Delhi or elsewhere.

606. Offers shall be as per the Instruction to Tenderers and “Conditions of Contract” given in the Tender documents. However the tenderer shall indicate his acceptance or otherwise against each clause and sub clause of the Instructions to Tenderers and “conditions of Contract”. For this purpose, the tender shall enclose a separate statement (Annexure 5, 6) indicating only the deviations from any close or sub clause of the Instructions to Tenderers and “conditions of Contract”, which he proposes with full justification for such deviations. The Purchaser, however reserves the right to accept or reject these deviations and his decision thereon shall be final. In order to facilitate evaluation of offers, deviation if any, from the terms & conditions or technical specifications shall be listed in Annexure. Tenderer shall also provide the additional price for withdrawal of deviation. However, attention of the bidder is drawn to the
provisions of rejection of offers if that are not substantially responsible to requirement of tender document.

607. Deleted.

608. Each page of the offer must be numbered consecutively, should bear the tender number and should be signed by the tenderer at the bottom. A reference to the total number of pages comprising the offer must be made at the top right hand corner of the first page.

609. The tenderer should avoid ambiguity in his offer e.g. if his offer to his standard sizes, lengths dimensions, he should specifically state them in details without any ambiguity. Brief descriptions such as ‘standard lengths’ etc. should be avoided in the offer.

(a) The tenderer should give a breakdown of the prices in the manner and details called in for statement of prices as given in Annexure-1 (a) to (d).

700. **PRICE BASIS AND INDEMNITY**

701. Order for all the items of Annexure 1 will be given to only one firm who shall be lowest in totality.

702. Tenderer shall quote their rates for supply, installation & other services on FOR destination at DMRC site basis in the following currencies:

1. For the activities which are to be expected within India in INR.
2. For the activities which are to be expected from outside India, in foreign currencies.

The contract price shall not be adjusted on account of fluctuations in the rates of exchange between the foreign currencies of the contract and Indian Rupees.

703. Prices should not include any type of agency commission payable to Indian Associate/Representatives. If it is established that any amount of agency commission is being paid to any associate/representative in India, if will be sufficient ground for rejection of offers.

704. **Currency of Payment**

The contract price will be normally paid in the currency or currencies in which the price stated in the successful tender. However, Purchaser reserves the right to effect payment of equivalent amount in the currency or currencies of the country of origin of the goods in case the price is stated in other currencies. The equivalent amount will be calculated on the basis of rates of exchange prevalent on the date of payment.

705. The prices quoted shall be firm and not subject to any variation.

800. **INSURANCE**

801. All risk cover marine insurance shall be arranged by the Purchaser in case of import of equipment/stores on FOB or C&F basis.

802. In the case of indigenous offers, purchaser shall not arrange for any transit insurance and the supplier will be responsible till the entire stores contracted for arrive in good condition in destination. Where the tenderer intends to insure the goods, he may
arrange for it himself and pay insurance charges. The consignee shall advise the contractor within 45 (forty five) days of the arrival of goods and it shall be responsibility of the contractor to lodge the necessary claim on the carrier and or insurer and pursue the same. The tenderer shall, however at his own cost replace/rectify the goods lost/damage to the entire satisfaction of the consignee within 30 days from the date of receipt of intimation from the consignee, without waiting for the settlement of the claim.

803. In case of import of the machine, although the insurance shall be paid by the Purchaser, and loss or damage shall be made good by the contractor free of cost, without waiting for the settlement of insurance claim. The payment after settlement of insurance claim shall be reimbursed by the Purchaser to the contractor. It will be entirely the responsibility of the Contractor to make good loss/damage without waiting for settlement of insurance claim so that machine is commissioned within the time specified in the contract.

900. OPENING OF TENDERS

901. Opening and Evaluation of Technical Tenders

i. DMRC will open the Tenders, including "Withdrawals" and " Modifications" in the presence of Tenderers' designated representatives who choose to attend, at the time, date, and location as stipulated. All Tenderers or their Representatives must bring with them an authority letter on the letterhead of the Tenderer or their Indian Agent (as the case may be) duly signed by Competent Authority to attend the Tender opening. Failing to which they will not be allowed to attend the opening of the Tenders at DMRC, Delhi.

ii. Envelopes marked "WITHDRAWAL" shall be opened first and the name of the Tenderer shall be read out. Tenders for which an acceptable notice of Withdrawal has been submitted shall not be opened.

iii. Subsequently, all envelopes marked "MODIFICATION" shall be opened and the submissions therein read out in appropriate detail. No Tender shall be rejected at Tender opening except for late Tenders.

iv. DMRC shall read out and prepare a record of the tender opening that shall include as a minimum: 'Tenderers' names, ' Tender Modifications and/or Withdrawals, the presence (or absence) of Tender Security, and any such other details as the DMRC may consider appropriate, will be announced by the DMRC at the opening.

v. Tenders not opened and read out at Tender opening shall not be considered further for evaluation, irrespective of the circumstances.

vi. First Technical Tenders will be opened and examined as per Eligibility Criteria of the tender document and as per Schedule of Requirements of the Tender Documents and Financial Tenders will only be opened of those Tenderers, who will qualify in the Technical Tenders in case of two packet system (technical bid & financial bid).

vii. DMRC will examine the Tenders to determine whether they are complete, whether the required technical submissions have been included, whether required Securities have been furnished, whether the documents have been properly signed, and whether the tenders are generally in order.
Prior to the detailed evaluation, the DMRC will determine whether each Tender is of acceptable quality, is complete and is substantially responsive to the Tender Documents. For purposes of this determination, a substantially responsive Tender is one that conforms to all the terms, conditions and specifications of the Tender Documents without material deviations, objections, qualifications or reservations. A material deviation, objection, qualification or reservation is one (i) that affects in any substantial way the scope, quality or performance of the Contract; (ii) that limits in any substantial way, inconsistent with the Tender Documents, the DMRC’s rights or the successful Tenderers obligations under the contract; or (iii) whose rectification would unfairly affect the competitive position of other Tenderers who are presenting substantially responsive Tenders.

If a Tender is not substantially responsive, it will be rejected and may not subsequently be made responsive by the Tenderer by correction of the nonconformity. The determination of a Tender's responsiveness is to be based on the contents of the tender itself without recourse to extrinsic evidence.

The DMRC will carry out a detailed evaluation of the tenders previously determined to be substantially responsive in order to determine whether the technical and commercial aspects including qualifying criteria are in accordance with the requirements set forth in the Tender Documents. In order to reach such a determination, the Employer will examine commercial aspects including qualifying criteria and compare the technical aspects of the Tenders on the basis of the information supplied by the Tenderers, taking into account the following factors:

a) overall completeness and compliance with the Instruction to Tenderers, Conditions of contract, Schedule of Requirements and Drawings;

b) Deviations from the Technical Specifications and commercial conditions as identified in Annexure 5 & 6 and those deviations not so identified; suitability of the Facilities offered in relation to the environmental and climatic conditions prevailing at the site; and quality, function and operation of any process control concept included in the Tender. The bid that does not meet minimum acceptable standards of completeness, consistency and detail will be rejected for non-responsiveness.

c) achievement of specified performance criteria by the facilities

d) Type, quantity and long-term availability of mandatory and recommended spare parts and maintenance services.

e) compliance with the time schedule provided in the Tender;

f) Any other relevant factors, if any, listed in the Tender document, or that the DMRC deems necessary or prudent to take into consideration.

902. Opening and Preliminary Examination of Financial Tenders

i. In case of tenders have been invited in two packet system (technical bid & financial bid) the date, time and place of opening of Financial Tenders will be advised to the Tenderers whose Technical and Commercial offers have been
found acceptable, so that they can be present at the time of opening of the Financial tenders. The tenderer is to note that the Financial Tender of the Tender submissions for which the Technical and Commercial offer has satisfied as per requirement of the Tender only, will be opened.

ii. DMRC shall read out and prepare a record of the Tender opening that shall include, as a minimum: the name of the Tenderer and whether there is a Withdrawal, Substitution, or Modification; the Tender Price; including any discounts. The Tenderer's representatives who are present shall be requested to sign the record. The omission of a Tenderer's signature on the record shall not invalidate the contents and effect of the record.

iii. The DMRC will examine the Tenders to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the Documents have been properly signed, and whether the tenders are generally in order.

   a. Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price, which is obtained by multiplying the unit price and quantity, or between subtotals and the total price, the unit or subtotal price shall prevail, and the total price shall be corrected. If there is a discrepancy between words and figures, the amount in words will prevail. If the Tenderer does not accept the correction of errors, its Tender will be rejected and EMD/Tender Security will be forfeited.

   b. The DMRC may waive any minor informality, nonconformity or irregularity in a Tender that does not constitute a material deviation, whether or not identified by the Tenderer in Annexure 5, 6 to its tender, and that does not prejudice or affect the evaluation of any Tenderer as a result of the technical and commercial evaluation.

903. Tenders shall be deemed to be under consideration immediately after they are opened and until such time the official intimation of Award of Contract is made by the DMRC to the Tenderer. While the Tenders are under such consideration, Tenderers and or their Representatives or other interested parties are advised to refrain from contacting the DMRC by any means. If necessary, the DMRC will obtain clarifications on the offers by requesting for such information from any or all the Tenderers, in writing by mail/fax/letter, as may be considered necessary. Tenderers will not be permitted to change the substance of their Tenders after they have been opened.

904. During Tender evaluation, the DMRC/Employer may, at its discretion, ask the Tenderer for a clarification of its Tender. The request for clarification and the response shall be in writing, and no change in the price or substance of the Tender shall be sought, offered or permitted.

905. The Tenders received will be evaluated by the DMRC to ascertain the substantially responsive, qualification and lowest Tender in the interest of the Employer, as specified in the specification and Tender Documents.

1008. EVALUATION OF THE OFFERS

1009. In case of tenders have been invited in two packet systems (technical bids & financial bids) financial Tender will be opened in the presence of all qualified Tenderers only when Tenderer’s Tenders qualifies technically and in case tenderer’s Tender
disqualifies technically, Tenderers Financial Tenders will be returned in sealed intact condition as unopened.

1010. The tenders received will be evaluated by the Purchaser to ascertain the lowest acceptable tender in the interest of the Purchaser, as specified in the specification and tender documents. Evaluation criteria not mentioned herein but mentioned specifically in the technical specifications will be taken into consideration in the evaluation of offers.

1011. Purchaser will convert all tender prices expressed in the amount in various currencies in the tender prices as payable, to the local currency of Purchaser’s country at the B.C selling market exchange rate established by State Bank of India on the due date of tender submittal. If there will be a bank holiday on the date of tender opening then Rate of Exchange will be taken on the day of previous working day of the bank.

1012. Also if a tenderer request for a variation in the payment terms stipulated in Conditions of Contract and if such variation is acceptable to the Purchaser, the same would be evaluated at an interest rate of 12% per annum for all earlier payments for the purpose of comparison with other tenderers offers.

1013. Rates may be quoted inclusive of all taxes and duties keeping in mind that service tax on the services like installation, testing, commissioning, design and other services is exempted on metro work, as per Notification No. 25/2012 -Service Tax dated 20.06.2012, under section 93(1) read with section 66(B) of the Finance Act.

1014. Tenderer shall quote their rates on final destination basis. Evaluation of offers will be made on FOR destination inclusive of all. Order will be placed on the firm who will be lowest in totality for all the items and if the offer found technical suitable as per requirement of the tender.

1100. HIGHER PRICE FOR EARLIER DELIVERY
It should be noted that if a contract is placed on a higher tender as a result of this invitation to tender, the preference to the lowest acceptable offer in consideration of offer of earlier delivery, the Contractor will be liable to pay to the government the difference between the contract rate and that of the lowest acceptable tender on the basis of final price F.O.R. destination including all elements of freight, sales tax, local taxes, duties and other incidentals in case of failure to complete supplies in terms of such contract within the date of delivery specified in the tender and incorporated in the contract. This in addition and without prejudice to other rights under the terms of contract.

1200. ACCEPTANCE OF TENDER

1201. The purchaser may accept a tender for a part of whole of the quantity offered, reject any tender without assigning any reason and may not accept the lowest or any tender.

1202. The Purchaser reserves the right to increase or decrease the quantity up to 25% of the quantity offered by the successful tenderer. The contractor is bound to accept the increase or decrease in the tendered quantity upto 25% under this clause as ordered at the time of placement of contract and/or during the currency of the contract. Purchaser may increase the qty. beyond 25% at the same rate. However, the purchaser reserves the right to operate the increase in qty. beyond 25% at its sole discretion. While operating this clause the quantity shall be rounded off to the next whole no.
1203. Acceptance of tender will be communicated by Cable, Telex, Telegram, Express Letter or formal acceptance of tender. In case where acceptance is indicated by Cable, Telex, Telegram, Express Letter or formal acceptance of tender will be forwarded to the Contractor as soon as possible, but the Cable, Telex, Telegram, Express Letter should be deemed to conclude the contract.

1300. EFFECT AND VALIDITY OF OFFER

1301. The submission of any offer connected with these specifications and documents shall constitute an agreement that the tenderer shall have no cause of action and claim, against the Purchaser for rejection of offer. The Purchaser shall always be at liberty to reject or accept any offer or offers at his sole discretion and any such action will not be called into question and the tenderer shall have no claim in that regard against the Purchaser.

1302. The offer shall be kept valid for acceptance for a minimum period of 180 (one hundred and eighty) calendar days from the date set for opening of tenders.

1303. Offers shall be deemed to be under consideration immediately after they are opened and until such time the official intimation of award of contract is made by the Purchaser to the Tenderer. While the offers are under such consideration, tenderers and or their representatives or other interested parties are advised to refrain from contacting the Purchaser by any means. If necessary, the Purchaser will obtain clarifications on the offers by requesting for such information from any or all the tenderers, either in writing or through personal contacts, as may be considered necessary. Tenderers will not be permitted to change the substance of their offers the offers have been opened.

1400. GENERAL

1401. The tenderers must ensure that the conditions laid down for submission of offers detailed in the preceding paras, are completely and correctly fulfilled. Offers, which are not complete in all respects as stipulated above, may be summarily rejected. For tenders guidance in submitting complete offers, a check List has been enclosed with the tender documents part –II which must be filled in the furnished with the tender.

1500. LAST DATE OF RECEIPT OF TENDERS

1501. The offers complete in all respects should reach the Delhi Metro Rail Corporation Ltd, New Delhi, INDIA, not later than the time and date as specified in the “NIT”.

1600. CHECK LIST

1601. A check List has been included at Annexure-8 of this document. This has been designed to help the tenderers in submitting complete offers. An incomplete offer is liable to be rejected.

The tenderers must fill the Check List & submit alongwith their offer in their own interest.

Delhi Metro Rail Corporation Ltd.
Metro Bhawan, Barakhamba Road,
FORM OF TENDER
FORM OF TENDER

1. CONTRACT CONDITIONS :

1. Amount of Performance Guarantee : 10% of the Contract Price as in COC. (CoC Sub-Clause 900)
2. Liquidated Damages : As in COC
   (CoC Sub-Clause 1302)

3. Warranty : As in COC
   (CoC Sub-Clause 2800)

4. Earnest Money/ Tender Guarantee : Earnest Money/ Tender Guarantee of INR 56,11,000/- (Indian Rupee Fifty Six lakh Eleven one thousand only) or USD 92,000/- in the form of Demand Draft/ Bank Guarantee from an Indian Nationalized/Scheduled Commercial Bank/from a reputed commercial bank of tenderer country having branch in India in favour of Delhi Metro Rail Corporation Ltd., payable at New Delhi or as mentioned in Instruction to Tenderers (Clause 500) is required along with the offer.

5. Delivery Schedule : As per Schedule of requirement

6. Contractors Name & Address** :

7. Employers Name & Address : Delhi Metro Rail Corporation Ltd.
   1ST Floor, Metro Bhawan,
   13, Fire Brigade Lane,
   Barakhamba road,
   New Delhi-110 001
   Fax No: 011-23418413


2. **UNPRICED ITEMS**

Items against which no rate or sum is entered by the Tenderer, whether quantities are stated or not, shall be regarded as covered by other rates in the Statement of Prices/Tender Pricing. The Tenderer shall take regard of the actual site conditions and the items entered in the various statements. The Tenderer shall price his tender accordingly and the unit prices entered against a line item shall be the full and only price paid for all work performed against that item except as described in the Tender Documents.

3. **TERMS OF PAYMENT**

As mentioned in clause 1800 of “Conditions of Contract”.** (Tenderer to Complete)

CONDITION OF CONTRACT
CONDITION OF CONTRACT

100. DEFINITION AND INTERPRETATION

In the contract, unless the context otherwise requires:

101. “Acceptance of Tender” means the letter or memorandum communicating to the Contractor the acceptance of his tender and includes an advance acceptance of his tender.
“Consignee” means where the stores are required by the acceptance of tender to be dispatched by rail, road, air or streamer, the person specified in the Acceptance of tender to whom they are to be delivered at the destination; where the stores are required by the acceptance of tender to be delivered to a person as an interim consignee for the purpose of dispatch to another person, such other persons, and in any other case the person to whom the stores are required by the acceptance of tender to be delivered in the manner therein specified;

“Contract” means and includes Tender Invitation, Instructions to Tenderers, Tender, Acceptance of Tender, General Conditions of Contract, schedule of Requirements, particulars and the other conditions specified in the acceptance of tender and includes a repeat order, which has been accepted or acted upon by the contractor and a formal agreement, if excluded;

The “Contractor” means the person, firm or company with whom the order of the supply is placed and shall be deemed to include the Contractor’s successors (approved by the purchaser), representatives, heirs, executors and administrators, as the case may be unless excluded by the terms of the contract;

The “Sub-contractor” means any person, firm or company for whom the contractor may obtain any material or fittings to be used in the supply or manufacture of the stores;

“Drawing” means the drawing or drawings specified in or annexed to the specification;

The “Inspecting Officer” means the person, or organization specified in the contract for the purpose of inspection of stores of work under the contract and includes his/their authorized representatives;

“Material” means anything used in the manufacture or fabrication of the stores;

“Particulars” include:

a. Specifications;
b. Drawings
c. “Proprietary mark” or “brand” means the mark and brand of the product which is owned by an industrial firm;
d. Any other details governing the construction, manufacture or supply of stores as may be prescribed by the contract;

“Proving Test” means such test or tests as are prescribed by the specifications to be made by the Purchaser, or his nominee, after erection at site, before the plant is taken over by the Purchaser;

“Purchase Officer” means the officer signing the acceptance of tender and includes any officer who has authority to execute the relevant contract on behalf of the Purchaser;

The “Purchaser” means the Delhi Metro Rail Corporation Ltd.

“Signed” includes stamped, except in the case of acceptance of tender or any amendment thereof;

“Site” means the place specified in the contract at which any work is required to be executed by the Contractor under the contract or any other place approved by the Purchaser for the purpose;
115. “Stores” means the goods specified in the contract, which the Contractor has agreed to supply under the contract;

116. “Test” means such test as is prescribed by the particulars or considered necessary by the Inspecting Officer whether performed or made by the Inspecting Officer or any agency acting under the direction of the Inspecting Officer.

117. “Work” means all the work specified or set forth and required in and by the said specifications, drawings and “schedule of Requirements”, hereto annexed or to be implied there from or incidental thereto, or to be hereafter specified or required in such explanatory instructions and drawings (being in conformity with the said original specifications, drawings and “Schedule of Requirements”) and also in such additional instructions and drawings not being in conformity as aforesaid, as shall from time to time, during the progress of the work hereby contracted for, be supplied by the Purchaser;

118. The delivery of the stores shall be deemed to take place on delivery of the stores in accordance with the terms of the contract, after approval by the Inspecting Officer if so provided in contract: -

   i. the consignee at his premises; or

   ii. where so provided, the interim consignee at his premises; or

   iii. a carrier other person named in the contract for the purpose of transmission to the consignee; or

   iv. the consignee at the destination station in case of contract stipulating for delivery of stores at destination station.

119. “Writing” or “Written” includes matter either in whole or in part, in manuscript, typewritten, lithographed, cyclostyled, photographed, or printed under or over signature or seal, as the case may be .

120. Word in the singular includes the plural and vice-versa.

121. Words importing the masculine gender shall be taken to include the feminine gender and words importing persons shall include any company or association or body of individuals, whether incorporated or not.

122. The heading of these conditions shall not affect the interpretation or construction thereon.

123. Terms and expression not herein defined shall have the meanings assigned to them in the Indian Sale of Goods Act, 1930 or the Indian contract Act, 1872 or the General Clauses act,1897 as the case may be.


125. “Facilities” means the Plant and Equipment to be supplied and installed, as well as all the Installation Services to be carried out by the Contractor under the Contract.

126. “Employer” means the person named as such in the Tender Data Sheet and includes the legal successors or permitted assigns of the Employer.
200. CONTRACT DOCUMENTS

201. Subject to Article Order of Precedence of the Contract Agreement, all documents forming part of the Contract (and all parts thereof) are intended to be correlative, complementary and mutually explanatory. The Contract shall be read as a whole.

300. SEVERABILITY

301. If any provision or condition of the Contract is prohibited or rendered invalid or unenforceable, such prohibition, invalidity or unenforceability shall not affect the validity or enforceability of any other provisions and conditions of the Contract.

400. TIME FOR COMMENCEMENT AND COMPLETION

401. The Contractor shall commence work on the Facilities within the period specified in the Schedule of Requirement and without prejudice to the Contractor shall thereafter proceed with the Facilities in accordance with the time schedule specified.

402. The Contractor shall attain Completion of the Facilities (or of a part where a separate time for Completion of such part is specified in the Contract) within the time stated in the Tender Data Sheet.

500. CONTRACTOR’S RESPONSIBILITIES

501. The Contractor shall design, manufacture, deliver and carry out defect liability period obligation (including associated purchases and/or subcontracting) with due care and diligence in accordance with the Contract.

502. The Contractor confirms that it has entered into this Contract on the basis of a proper examination of the data relating to the Facilities provided by the Employer. The Contractor acknowledges that any failure to acquaint itself with all such data and information shall not relieve its responsibility for properly estimating the difficulty or cost of successfully performing the Facilities.

503. The Contractor shall comply with all laws in force in India. The laws will include all local, state, national or other laws that affect the performance of the Contract and bind upon the Contractor. The Contractor shall indemnify and hold harmless the Employer from and against any and all liabilities, damages, claims, fines, penalties and expenses of whatever nature arising or resulting from the violation of such laws by the Contractor or its personnel, including the Subcontractors and their personnel.

600. CONFIDENTIAL INFORMATION

601. The Employer and the Contractor shall keep confidential and shall not, without the written consent of the other party hereto, divulge to any third party any documents, data or other information furnished directly or indirectly by the other party hereto in connection with the Contract, whether such information has been furnished prior to, during or following termination of the Contract. Notwithstanding the above, the Contractor may furnish to its Subcontractor(s) such documents, data and other information it receives from the Employer to the extent required for the
Subcontractor(s) to perform its work under the Contract, in which event the Contractor shall obtain from such Subcontractor(s) an undertaking of confidentiality similar to that imposed on the Contractor.

602. The Employer shall not use such documents, data and other information received from the Contractor for any purpose other than the operation and maintenance of the Facilities. Similarly, the Contractor shall not use such documents, data and other information received from the Employer for any purpose other than the design, procurement of Plant and Equipment, construction or such other work and services as are required for the performance of the Contract.

603. The obligation of a party under the Clauses above, however, shall not apply to that information which

(a) now or hereafter enters the public domain through no fault of that party
(b) can be proven to have been possessed by that party at the time of disclosure and which was not previously obtained, directly or indirectly, from the other party hereto

Otherwise lawfully becomes available to that party from a third party that has no obligation of confidentiality.

700. PARTIES

The parties to the contract are the Contractor and the Purchaser, as defined in clauses 105 and 114.

701. A person signing the tender or any other document in respect of the contract on behalf of the Contractor without disclosing his authority to do so shall be deemed to warrant that he has authority to bind the Contractor. If it is discovered at any time that the person so signing has no authority to do so, the Purchaser may, without prejudice to any other right or remedy of the Purchaser, cancel the contract and make or authorize the making of a purchase of the stores at the risk and cost of such person and hold such person liable to the Purchaser for all costs and damages arising from the cancellation of the contract including any loss which the Purchaser may sustain on account of such purchase. The provision of clause 1300 shall apply to every such purchase as far as applicable.

800. CONTRACT

801. This contract is for the supply of the stores of the description, specifications and drawings, and in the quantities set forth in the contract on the date or dates specified therein. Unless otherwise specified, the stores shall be entirely brand new and of the best quality and workmanship to the satisfaction of the Inspecting Officer.

802. The whole contract is to be executed in the most approved, substantial and workmanlike manner, to the entire satisfaction of the Purchaser or his nominee, who, both personally and may his deputies, shall have full power, at every stage of progress, to inspect the stores at such times as he may deem fit and to reject any of the stores, which he may disapprove, and his decision thereon and on any question of the true intent and meaning of the specifications shall be final and conclusive.

803. Any variation or amendment of the contract shall not be binding on the Purchase unless and until the same is duly endorsed on the contract or incorporated in a formal instrument or in exchange of letters and signed by the parties.
900. PERFORMANCE/ADVANCE GUARANTEE BOND

901. Deleted
902. Deleted
903. Deleted

904. Performance Guarantee

905. After an advance acceptance of tender is issued by the Purchaser, the Contractor shall furnish a Performance Guarantee Bond in the preform attached (Annexure 7) from a Nationalized Indian Bank/Schedule commercial bank within 15 days from the receipt of the advance acceptance/placement of Contract. of the tender by the Contractor for an amount equivalent to 10% of the value of the contract (including excise duty P&F charges, freight & sales tax, VAT etc.).

906. In case furnishing of an acceptable Performance Guarantee Bond is delayed by the Contractor beyond the period provided in the clause 905, and the bond is accepted by the Purchaser, liquidated damages, as provided in clause 1302 for the period delay in submission of the bond, shall be levied. Alternatively, the Purchaser may declare the contract as at an end and enforce the clause 1302.

907. If the Contractor, having been called upon by the Purchaser to furnish Performance Guarantee Bond fails to furnish the same, it shall be lawful for the Purchaser: -

   i) to recover from the Contractor the amount of Performance Guarantee Bond by deducting the amount from the pending bills of the Contractor under any contract with the Purchaser or the government or any other person contracting through the Purchaser or otherwise however, or

   ii) to cancel the contract or any part thereof and to purchase or authorize the purchase of the stores at the risk and cost of the Contractor and in that event the provisions of clause 1302 shall apply as far as possible.

908. On the performance and completion of the contract in all respects the performance Guarantee Bond will be converted into warranty guarantee bond & will be returned within 3 months after completion of warranty guarantee period.

909. The Purchaser shall be entitled and it shall be lawful on his part to forfeit the amount of the Performance Guarantee Bond in whole or in part in the event of any default, failure or neglect on the part of the Contract in the fulfilment or performance in all respects of the contract under reference or any other contract with the Purchaser shall also be entitled to deduct from the amount of the Performance Guarantee Bond any loss or damage which the Purchaser may suffer or be put by reason of or due to any act or other default, recoverable by the Purchaser from the Contractor in respect of the contract under reference or any other contract and in either of the events aforesaid to call upon the Contractor to maintain the amount of the Performance guarantee Bond as its original limit by furnishing fresh Bank Guarantee of additional amount, provided further that the Purchaser shall be entitled to recover any such claim from any sum then due or which at any time thereafter may become due to the Contractor under this or any other contracts with the Purchaser.
910. The Performance Guarantee Bond shall remain in full force and effect during period that would be taken for satisfactory performance and fulfilment in all respects of the contract i.e. till satisfactory commissioning of the material at consignee’s works & later on warranty guarantee period, and shall in the first instance be valid until 90 days beyond the contract period before the expiry of the date of validity of the Performance Guarantee Bond, the Contractor on being called upon by the Purchaser from time to time, shall obtain from the Guarantee Bank, extension of time for validity thereof for a period of six months, on each occasion. The extension or extensions aforesaid, executed on non-judicial stamp paper of appropriate value must reach the Purchaser at least thirty days before the date of expiry of the Performance Guarantee Bond on each occasion.

911. As and when an amendment is issued to the contract, the Contractor shall, within 15 days of the receipt of such an amendment furnish to the Purchaser an amendment to the Performance Guarantee Bond rendering the same valid for the contract as amended and up to twelve months beyond the extended delivery date.

912. The Performance Guarantee Bond and or any amendment thereto shall be executed on a stamped paper of requisite money value in accordance with the laws of the country in which the same is/are executed by the party competent to do so. The Performance Guarantee Bonds executed in India shall also be got endorsed by the collector under section 32 of the Indian Stamp act, 1899 for adequacy of the stamp Duty, by the contractor.

The Performance Guarantee Bond shall be furnished as Annexure-7.

1000. TAXES AND DUTIES

1001. Except as otherwise specifically provided in the Contract, the Contractor shall bear and pay all taxes, duties, levies and charges assessed on the Contractor, its Subcontractors or their employees by all municipal, state or national government authorities in connection with the Facilities in and outside India.

1100. DELIVERY

1101. The Contractor shall deliver free or F.O.R, at the place detailed in the contract, the quantities of the stores detailed therein and the stores shall be delivered or dispatched not later than the dates specified in the contract. The delivery will not be deemed to be complete until and unless the stores are inspected and accepted by the Inspecting Officer as provided in the contract.

1102. Notwithstanding any inspection and approved by the Inspecting Officer on the Contractor’s premises, property in the stores shall not pass on the Purchaser until the stores have been received, inspected and accepted by the consignee.

1103. in case of foreign contracts:

the stores shall be delivered by the contractor free on board such vessels in such port or ports named in the quotation, as the Purchaser or his nominee may require.

Such number of inspection certificates, advice notices, packing accounts and invoices, as may be required by the purchaser or his nominee, shall be furnished by the contractor at his own cost.

1200. NOTIFICATION OF DELIVERY
1201. Notification of delivery or dispatch in regard to each and every instalment shall be made to the Purchaser, consignee and Port consignee (if applicable) immediately on dispatch or delivery. The Contractor shall further supply to the consignee, or the interim consignee, as the case may be, a packing account quoting number and date of the acceptance of tender and date of dispatch of the stores. All packages shall be fully described in the packing account and full details of the contents for the packages and quantity of materials shall be given to enable the consignee to check the stores on arrival at destination. The copy of Railway Receipt/Consignment note or Bill of Lading with other shipping documents, if any shall be forwarded to the consignee and or the port consignee named in the contract, as applicable, by registered post immediately on the dispatch of stores. The contractor shall bear and reimburse to the Purchaser demurrage charges, if any, paid by reason of delay on the part of the Contractor in forwarding the copy of the Railway Receipt, Consignment Note or Bill of Lading and other shipping documents.

1300. TIME FOR AND DATE OF DELIVERY; THE ESSENCE OF THE CONTRACT

The time for and the date specified in the contract or as extended for the delivery of the stores shall be deemed to the essence of the contract and delivery must be completed not later than the dates so specified or extended.

1301. Progressing of Deliveries

The contractor shall allow reasonable facilities and free access to his works and records to the inspecting officer; progress officer or such other officer as may be nominated by the Purchaser for the purpose of ascertaining the progress of the deliveries under the contract.

1302. Failure and Termination

If the contractor fails to deliver the stores or any instalment thereof within the period fixed for such delivery in the contract or as extended or at any time repudiates the contract before the expiry of such period, the purchaser may without prejudice to his other rights:

Recover from the Contractor as agreed liquidated damages and not by way of penalty a sum equivalent to 1/2% of the price of any stores (including elements of taxes, duties, freight etc.) which the Contractor has failed to deliver within the period fixed for delivery in the contract or as extended for each or part of a week during which the delivery of such stores may be in arrears where delivery thereof is accepted after expiry of the aforesaid period subject to max. of 10%, or

a. Cancel the contract or a portion thereof and if so desired purchased or authorize the purchase of the stores not so delivered or others or similar description (where stores exactly complying with particulars are not, in the opinion of the Purchaser, which shall, be final, readily procurable) at the risk and cost of the Contractor. It shall, however, be in the discretion of the Purchaser to obtain or not the Performance Guarantee Bond from the firm/firms on whom the contract is placed at the risk and expense of the defaulting firm.

Where action is taken under sub-clause (b) above, the Contractor shall be liable for any loss which the Purchaser may sustain on that account provided the purchase, or, if there is an agreement to purchase, such agreement is made, in case of failure to deliver the stores within the period fixed for such delivery in the contract or as extended within nine months from the date of such failure and in case of repudiation of the contract before the expiry of the aforesaid period of delivery, within nine months from the date of cancellation of the contract. The Contractor shall not be entitled to any gain on such purchase and the manner and method of such purchase
shall be in the entire discretion of the Purchaser. It shall not be necessary for the Purchaser to serve a notice of such purchase on the Contractor.

Note: - in respect of the stores which are not easily available in the market and where procurement difficulties are experienced, the period for making risk purchase shall be nine months instead of six months provided above.

1303. Extension of Time for Delivery

If such failure as in the aforesaid clause 1302 shall have arisen from any cause which the Purchaser may admit as reasonable ground for extension of time, the Purchaser shall allow such additional time as he considers to be justified by the circumstances of the case, and shall forgo the whole or such part, as he may consider reasonable, of his claim for such loss or damage as aforesaid. Any failure or delay on the part of Sub-Contractor, though their employment may have been sanctioned under condition 2100 hereof, shall not be admitted as a reasonable ground for any extension of time or for exempting the contractor from liability for such loss or damage as aforesaid.

1304. Consequences of Rejection

If on the stores, being rejected by the Inspecting Officer or Interim Consignee or Consignees at the destination, the Contractor fails to make satisfactory supplies within the stipulated period of delivery, the Purchaser shall be at liberty to:

i) require the Contractor to replace the rejected stores forthwith but in any event not later than a period of 21 days from the date of rejection and the Contractor shall bear all cost of such replacement including freight, if any on such replacing and replaced stores but without being entitled to any extra payment on that or any other account; or

ii) Purchase or authorize the purchase of quantity of the stores rejected or others of a similar description (when stores exactly complying with particulars are not in the opinion of the Purchaser, which shall be final, readily available) without notice to the Contractor at his risk and cost and without affecting the Contractor’s liability as regards the supply of any further instalments due under the contract; or

iii) Cancel the contract and purchase or authorize the purchase of the stores or other of a similar description (when stores exactly complying with particulars are not in the opinion of the Purchaser, which shall be final, readily available) at the risk and cost of the contractor. In the event of action being taken under sub-clause (ii) above or under this sub-clause, the provisions of clause 1302 above will apply as far as applicable.

iv) Where under the contract the price payable is fixed F.O.B port of export or F.O.R dispatching station, the Contractor shall, if the stores are rejected at destination by the consignee, be liable, in addition to his other liabilities, including refund of price recoverable in respect of the stores so rejected, to reimburse to the Purchaser the freight and all other expenses incurred by the Purchaser in this regard.

1305. Removal of rejected stores

i) On rejection of any stores submitted for inspection at a place other than the premises of the Contractor, such stores shall be removed by the Contractor at his own cost subject as herein after stipulated, within 21 days of the date of intimation of such rejection. If the concerned communication is addressed and posted to the Contractor at the address mentioned in the contract, it will be deemed to have been served on him at the time when such communication would
in the course of ordinary post reach the Contractor, provided that where the price
or part thereof has been paid, the consignee is entitled without prejudice to his
other rights to retain the rejected stores till the price paid for such stores is
refunded by the Contractor save that such retention shall not in any
circumstances be deemed to be acceptance of the stores or waiver of rejection
thereof.

ii) All rejected stores shall in any event and circumstances remain and always be at
the risk of the Contractor immediately on such rejection. If such stores are not
removed by the Contractor within the periods aforementioned, the Inspecting
Officer may remove the rejected stores and either return the same to the
Contractor at his risk and cost by such mode of transport as the Purchaser or
Inspecting Officer may decide, or dispose of such stores at the Contractor’s risk
and on his account and retain such portion of the proceeds, if any, from such
disposal as may be necessary to recover any expense incurred in connection
with such disposals (or any price refundable as a consequence of such rejection).
The purchaser shall, in addition, be entitled to recover from the Contractor
handling and storage charges on the rejected stores after the expiry of the time-
limit mentioned above.

iii) The stores that have been dispatched by rail and rejected after arrival at
destination may be taken back by the contractor either at the station where they
were rejected or at the station from which they were sent, after refunding the
price paid for such stores and other charges refundable as a consequence of
such rejection. If the contract is placed for delivery F.O.R. station of dispatch, the
Contractor shall pay the carriage charges on the rejected consignment at public
tariff rates from the station of dispatch to the station where they are rejected. If
the Contractor elects to take back the goods at the station from which they were
delivered, the goods shall in addition, be booked back to him freight to-pay at
public tariff rates and at Contractor’s risk. The Contractor shall be liable to
reimburse packing and incidental costs and charges incurred in such return of
rejected stores in addition to other charges refundable as a consequence of
rejection. The goods shall remain the property of the Contractor unless and until
accepted by the Purchaser after inspection.

1400. FORCE MAJEURE

In the event of any unforeseen event during the currency of the contract, such as
war, hostilities, acts of the public enemy, civil commotion, sabotage, fires, floods,
explodions, epidemics, quarantine restrictions, strikes, lockouts, or acts of God, as a
result of which, either party (purchaser/Contractor) is prevented ,or hindered in
performing any of its obligations under the contract, then it shall within a week from
the commencement thereof, notify the same in writing to the other party with
reasonable evidence thereof. If the force majeure condition(s) mentioned above be in
force for a period of 90 days or more at any time, the either party shall have the
option to terminate the contract on expiry of 90 days of commencement of such force
majeure by giving 14 days’ notice to the other party in writing. In case of such
termination, no damages shall be claimed by either party against the other, save and
except those, which had occurred under any other clause of this contract prior to
such termination.

1500. ACCEPTANCE OF STORES DISPATCHED AFTER THE EXPIRY OF DELIVERY
PERIOD

1501. In case where only a portion of the stores ordered is tendered for inspection at the
fag end of the delivery period and also in cases where inspection is not completed in
respect of the portion of the stores tendered for inspection during the delivery period because of the reason that adequate notice for inspection in accordance with clause 1601 was not given by the Contractor, the Purchaser reserves the right to cancel the order of the balance quantity, at the risk and expense of the Contractor without any further reference to him. If the stores tendered for inspection during or at the fag end of the delivery period are not found acceptable after carrying out the inspection, Purchaser is entitled to cancel the contract in respect of the same at the risk and expense of the Contractor. If, however, the stores tendered for inspection are found acceptable, the Purchaser may grant an extension of the delivery period subject to the following conditions:

a. The purchaser has the right to recover from the Contractor the liquidated damages on the stores, which the Contractor has failed to deliver within the period fixed for delivery.

b. That no increase in price on account of any statutory increase in or fresh imposition of Custom Duty, Excise Duty, Sales Tax, Freight charges or on any account of any other tax or duty leviable in respect of the stores specified in the contract, which takes place after the date of delivery period stipulated in the said Acceptance of Tender, shall be admissible on such of the said stores as are delivered after said date.

c. That notwithstanding any stipulation in the contract for increase in price on any other ground, no such increase which takes place after the delivery date stipulated in the contract shall be admissible on such of the said stores as are delivered after the said date.

d. But nevertheless the Purchaser shall be entitled to the benefit of any increase in price on account of reduction in or remission of Customs Duty, Excise Duty, sales tax or on account of any other ground which takes place after the expiry of the delivery date stipulated in the contract. The contractor shall allow the said benefit in his bills or in the absence thereof shall certify that no decrease in price on account of any of these factors has taken place.

1502. The Contractor shall not dispatch the stores till such time an extension in terms of clause 1501 (a) to (d) above is granted by the Purchaser and accepted by the Contractor. If the stores are dispatched by the Contractor before an extension letter aforesaid is issued by the Purchaser and the same are accepted by the consignee, the acceptance of the stores shall be deemed to be subject to the conditions (a) to (d) mentioned in clause 1501 above.

1503. In case where the entire quantity has not been tendered for inspection within the delivery period stipulated in the contract and the Purchaser chooses to grant an extension of the delivery period the same would be subject to conditions (a) to (d) mentioned in the clause 1501 above.

1600. **INSPECTION BY INSPECTING OFFICER**

1601. When Inspection during manufacture or before delivery or dispatch is required, notice in writing shall be sent by the contractor to the Inspecting Officer when the stores or material to be supplied are ready for inspection and test, and no stores shall be delivered or dispatched until the Inspecting Officer has certified in writing that such stores have been inspected and approved by him. At least 4 weeks notice must be given to the Inspecting Officer to enable him to arrange the necessary inspection. The examination of stores will be made as soon as practicable after the same have
been submitted for inspection and the result of the examination will be notified to the Contractor.

1602. In cases where the Inspecting authority specified in the contract requires on behalf of the Purchaser that inspection of the raw materials to be used and/or stage inspection during the manufacturing process of the components stores etc. is also be done, notice in writing shall be sent by the contractor to the Inspecting Officer to visit his premises/works to test the raw materials and/or conduct necessary inspecting during the manufacturing process of the component/store etc. as deemed essential.

1603. No alterations, amendments, omissions, additions, suspensions, or variations of the work (hereinafter referred to as "Variations") under the contract as shown by the drawing or the specifications shall be made by the contractor except as directed in writing by the Inspector, but the Inspector shall have full power, subject to the proviso hereinafter contained, from time to time, during the execution of the contract, by notice in writing to instruct the contractor to make such variation without prejudice to the contract, and the contractor shall carry out such variations and be bound by the same conditions, so far as applicable, as though the said variation occurred in the specifications. If any suggested variation would, in the opinion of the contractor, if carried out, prevent him from fulfilling any of his obligations or guarantees under the contract, he shall carried out. If the Inspector confirms his instructions, the contractor's obligations and guarantees shall be modified to such an extent as may, in the opinion of the Inspector, be justified. The difference of cost, if any occasioned by any such variations shall be added to or deducted from the contract price as the case may require. The amount of such difference, if any, shall be ascertained as determined in accordance with the rates specified in the schedules of prices, so far as the same may be applicable, and where the rates are not contained in the said schedules or not applicable they shall be settled by the Purchaser and contractor jointly. But the Purchaser shall not become liable for the payment of any charge in respect of any such variations, unless the instructions for the performance of the same shall have been given in writing by the Inspector.

1604. In the event of Inspector requiring any variations, such reasonable and proper notice shall be given to the contractor, as will enable him to make his arrangements accordingly, and in cases where goods or materials are already prepared, or any designs, drawings or patterns made or work done is required to be altered, a reasonable sum in respect thereof shall be allowed by the Purchaser, provided that no such variations shall, except with the consent in writing of the contractor, be such as will involve an increase in the total price payable under the contract by more than 10 percent thereof.

1605. In any case, in which the contractor has received instructions from the Inspector for carrying out the work which either then or later, will, in the opinion of contractor, involve a claim for additional payment, the contractor shall, as soon as reasonably possible, after receipt of the instructions foresaid, advise the Inspector to that effect.

1606. Marking of Inspection

The Contractor shall, if so required, at his own expense, mark all the approved stores with a recognized Purchaser's mark. The stores which cannot be so marked shall, if so required by the Inspecting Officer, be packed at the Contractor's expense in suitable packages or cases, each of which shall be sealed and marked with such mark.

1700. PACKING AND MARKING
1701. Packing

The Contractor shall pack at his own cost the store sufficiently and properly for transit by rail/road, air and/or sea as provided in the contract so as to ensure their being free from loss or damage on arrival at their destination. He shall decide the packing for the stores by taking into account the fact that the stores will have to undergo arduous transportation before reaching the destination and will have to be stored and handled in tropical climatic conditions (Including Monsoons) before being put to actual use. Unless otherwise provided in the contract, all containers (including packing cases, boxes, tins, drums and wrappings) in which the stores are supplied by the Contractor shall be considered as non-returnable and their cost as having been included in the contract price.

Each package shall contain a packing note specifying the name and address of the Contractor, the number and date of the acceptance of tender and the Designation of the Purchase Officer issuing the supply orders, the description of the stores and the quantity contained therein.

1702. Marking

The marking of all goods supplied shall comply with the requirement of the Indian Acts relating to merchandise marks or any amendment thereof and the rules made there under. The following marking of the material is required: -

The following particulars should be stencilled with indelible paint on all the materials/packages:-

a. Contract No.
b. Specification no.
c. Item No.
d. Post Consignee (wherever applicable)
e. Abbreviated Consignee marks.

In addition to the marking as specified above, distinguish colour marks should be given so as to distinguish the ultimate Consignees in India.

1800. PAYMENT TERMS

The standard payment terms subject to recoveries, if any, by way of Liquidated Damages will be as mentioned in Annexure-11. Payment should be followed strictly as per terms and conditions of Tender Documents.

1900. PAYMENT PROCEDURE

1901. Payment for indigenous suppliers will be made in Indian Rupees against bills raised by the contractor as per contract. Any payment in the foreign exchange that the contractor may have to make for imported components forming part of the tender will be arranged by him directly.

1902. Payment against foreign contractors will be through irrevocable letter of credit. All charges levied by the foreign banks shall be borne by the Contractor.

Format as per Annexure-9 may invariably be used for submission of bills.

2000. RESPONSIBILITY OF THE CONTRACTOR FOR EXECUTING THE CONTRACT
2001. Risk in the stores

The Contractor shall perform the contract in all respects in accordance with the terms and condition thereof. The stores and every constituent part thereof, whether in the possession or control of the Contractor, his agents or servants or a carrier, or in the joint possession of the Contractor, his agents or servants and the Purchaser, his agents or servants, shall remain in every respect at the risk of the Contractor, until their actual delivery to the consignee at the stipulated place or destination or, where so provided in the acceptance of tender, until their delivery to a person specified in the contract as interim consignee for the purpose of dispatch to the consignee. The Contractor shall be responsible for all loss, destruction, damage or deterioration of or to the stores from any cause whatsoever while the stores after approval by the Inspecting Officer are awaiting dispatch or delivery or are in the course of transit from the Contractor to the Consignee or the interim consignee as the case may be. The Contractor shall alone be entitled and responsible to make claims against DMRC or any other carrier in respect of non-delivery, short delivery, misdelivery, loss, destruction, damage or deterioration of goods entrusted to such carrier by the Contractor for transmission to the consignee or the interim consignee, as the case may be.

2002. Consignee’s Right of Rejection

Notwithstanding any approval which the Inspecting Officer may have been given in respect of the stores or any materials or other particulars or the work or workmanship involved in the performance of the contract (whether with or without any test carried out by the Contractor or the Inspecting Officer or under the direction of the Inspecting Officer) and notwithstanding delivery of the stores where so provided to the interim consignee, it shall be lawful for the consignee, on behalf of the Purchaser, to reject the stores or any part, portion of consignment thereof within 45 days after actual delivery thereof to him at the place or destination specified in the contract if such stores or part, portion of consignment thereof is not in all respects in conformity with the terms and conditions of the contract whether on account of any loss, deterioration or damage before dispatch or delivery or during transit or otherwise howsoever. Provided that where, under the terms of the contract, the stores are required to be delivered to an interim consignee for the purpose of dispatch to the consignee, the stores shall be at the Purchaser’s risk after their delivery to the interim consignee, but nevertheless it shall be lawful for the consignee on behalf of the Purchaser to reject the stores or any part, portion of consignment thereof upon their actual delivery to him at the destination if they are not in all respect in conformity with the terms and conditions of contract except where they have been damaged or have deteriorated in course of transit or otherwise after their delivery to the interim consignee.

The provisions contained in clause relating to the removal of stores rejected by the Inspecting Officer shall, mutatis mutandis apply to stores rejected by the consignee as herein provided.

The contractor shall refund any advance /part payment received him in respect of the rejected stores within 21 days of the receipt of intimation from the consignee about the rejection of the stores. In default, the Purchaser may take steps against contractor for recovery of such price. This is strictly without prejudice and in addition to the rights provided in clause 1304.

2003. Subletting and Assignment

The contractor shall not sublet (otherwise than that which may be customary in the trade concerned), transfer, assign or otherwise part with directly or indirectly to any
person or persons, whatever is in this contract, or any part thereof without the previous written permission of the Purchaser or his nominee. In the event of the contractor's failure to obtain such permission, the Purchaser shall be entitled to cancel the contract and to purchase the stores elsewhere on the Contractor's account and risk and the contractor shall be liable for any loss or damage which the Purchaser may sustain in consequence or arising out of such purchase.

2100. RESPONSIBILITY FOR COMPLETENESS

2101. Any fittings or accessories which may not be specifically mentioned in the specifications but which are useful or necessary are to be provided by the Contractor without extra charge, and the plant must be complete in detail.

2102. The work shall be performed at the place or places specified in the contract or at such other place or places as may be approved by the Purchaser.

2103. In all cases where the contract provides for tests on site, the Purchaser, except where otherwise specified, shall provide, free of charge, such labour, materials, fuels, stores, apparatus and instruments as may be required from time to time and as may reasonably be demanded, efficiently to carry out such tests of the plants, materials or workmanship etc. in accordance with the contract.

2200. INDEMNITY

2201. The prices stated are to include all rights (if any) of patent, registered design or trade mark and the Contractor shall at all times indemnify the Purchaser against all claims which may be made in respect of the stores for infringement of any right protected by patent, registration of designs or trade mark; provided always that in the event of any claim in respect of alleged breach of a patent, registered designs or trade mark being made against purchaser, the Purchaser shall notify the Contractor of the same and the Contractor shall, at his own expense, either settle any such dispute or conduct any litigation that may arise there from.

2202. All such property shall be deemed to be in good condition when received by the Contractor unless he shall have within 24 hours of the receipt thereof notified the Purchase Officer or the concerned authority to the contrary. If the Contractor fails to notify any defect in the condition or quality of such property, have shall be deemed to have lost the right to do so at any subsequent stage.

2203. The Contractor shall return all such property and shall be responsible for the full value thereof to be accessed by the Purchaser/loaning authority whose decision shall be final and binding on the Contractor. The Contractor shall be liable for loss or damage to such property from whatever cause happening while such property is in the possession of or under the control of the Contractor, his servants, workmen or agents.

2204. Where such property is insured by the Contractor against loss or fire at the request of the Government or Purchaser such insurance shall be deemed to be effected by way of additional precaution and shall not prejudice the liability of the Contractor as aforesaid.

2300. CORRUPT PRACTICES

2301. The Contractor shall not offer or give or agree to give to any person in the employment of the Purchaser or working under the orders of the Purchaser any gift or
consideration of any kind as an inducement or reward of doing or forbearing to do or having done or forborne to do any act in relation to the obtaining or execution of the contract or any other contract with the Purchaser or Government of for showing any favour or for bearing to show disfavour to any person in relation to the contract or to any other contract with the Purchaser or Government. Any breach of the aforesaid condition by the Contractor, or any one employed by him or acting on his behalf, under Chapter IX of the Indian Penal code, 1860 or the Prevention of Corruption Act, 1947 or any other act enacted for the prevention of corruption by public servants shall entitle the Purchaser to cancel the contract and all or any other contracts with the Contractor and to recover from the Contractor the amount of any loss arising from such cancellation in accordance with the provision of clause 1302.

2400. INSOLVENCY AND BREACH OF CONTRACT

2401. The Purchaser may at any time, be notice in writing summarily determine the contract without compensation to the Contractor in any of the following events, that is to say:

i. if the Contractor being an individual or in a firm. Any partner thereof, shall at any time, be adjudged insolvent or shall have a receiving order or order for administration of his estate made against him or shall take any proceeding for composition under any Insolvency Act for the time being in force or make any conveyance or assignment of his effects or enter into any assignment or composition with his creditors or suspend payment or if the firm be dissolved under the Partnership Act, or

ii. if the Contractor being a company is wound up voluntarily or by the order of a Court or a Receiver, Liquidator, or Manager on behalf of the debenture holders is appointed, or circumstances shall have arisen which entitle the Court or Debenture holders to appoint a Receiver, Liquidator or Manager, or

iii. If the contractor commits any breach of the contract not herein specifically provided for.

iv. Provided always that such determination shall not prejudice any right of action or remedy which shall have accrued or shall accrue thereafter to the Purchaser and provided also the Contractor shall be liable to pay to the Purchaser any extra expenditure he is thereby put to and the Contractor shall, under no circumstances, be entitled to any gain on re-purchase.

2500. LAWS GOVERNING THE CONTRACT

2501. This contract shall be governed by the Laws of India for the time being in force.

2502. Irrespective of the place of delivery and the place of payment under the contract, the contract shall be deemed to have been made at the panel in India from where the acceptance of tender has been issued.

2503. Jurisdiction of Courts: -The Courts of the place from where the acceptance of tender has been issued shall above have jurisdiction to decide any dispute arising out of or in respect of the contract.

2600. ARBITRATION
2601. If conciliation fails, then such disputes or differences, whatsoever arising between the parties, arising out of touching or relating to manufacture, measuring operation or effect of the Contract or the breach thereof shall be referred to Arbitration in accordance with the following provisions:

i. Matters to be arbitrated upon shall be referred to a sole Arbitrator where the total value of claims does not exceed Rs. 1.5 million. Beyond the claim limit of Rs. 1.5 million, there shall be three Arbitrators. For this purpose Employer will make out a panel of engineers with the requisite qualifications and professional experience. This panel will be of serving or retired engineers of Government Departments or of Public Sector Undertakings;

ii. For the disputes to be decided by a sole Arbitrator, a list of three engineers taken from the aforesaid panel will be sent to the Contractor by the Employer from which the Contractor will choose one;

iii. For the disputes to be decided by three Arbitrators, the Employer will make out a list of five engineers from the aforesaid panel. The Contractor and Employer shall choose one Arbitrator each and the two so chosen shall choose the third Arbitrator from the said list who shall act as the presiding Arbitrator;

iv. Neither party shall be limited in the proceedings before such Arbitrators(s) to the evidence or the arguments put before the Conciliator;

v. The Conciliation and Arbitration hearings shall be held in Delhi only. The language of the proceedings that of the documents and communications shall be English and the awards shall be made in writing. The Arbitrators shall always give item-wise and reasoned awards in all cases where the total claim exceeds Rs. One million; and

vi. The award of the sole Arbitrator or the award by majority of three Arbitrators as the case may shall be binding on all parties.

2602. Interest on Arbitration Award

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.

2603. Cost of Arbitration

The cost of arbitration shall be borne by the respective parties. The cost shall, inter alia, include the fees of the Arbitrator(s) as per rates fixed by the Employer from time to time.

2604. Jurisdiction of Courts

Where recourse to a Court is to be made in respect of any matter, the Employer and the Contractor agree to the sole jurisdiction of courts in Delhi/ New Delhi.

2605. Suspension of work on Account of Arbitration

The reference to Conciliation/ Arbitration shall proceed notwithstanding that the Works shall not then be or be alleged to be complete, provided always that the obligations of the Employer, Engineer and the Contractor shall not be altered by reasons of arbitration being conducted during the progress of the Works. Neither party shall be entitled to suspend the work or part of the work to which the dispute relates on account of arbitration and payments to the Contractor shall continue to be made in terms of the Contract.
2700. **SECURITY**

2701. The Contractor shall take all reasonable steps necessary to ensure that all persons employed in any work in connection with the contract, have full knowledge of the Official Secrets Act and any regulations framed there under.

2702. Any Information obtained in the course of the execution of the contract by the Contractor, his servants or agents or any person so employed, as to any matter whatsoever, which would or might be directly or indirectly, of use to enemy of India, must be treated secret and shall not any time be communicated to any person.

2703. Any breach of the aforesaid conditions shall entitle the Purchaser to cancel the Contract and to purchase or authorize the purchase of the stores at the risk and cost of the Contract in accordance with the clause 1302 of the General Conditions of Contract. In the event of such cancellation, the stores or parts manufactured in the execution of the contract shall be taken by the Purchaser at such price as he considers fair and reasonable and the decision of the Purchaser as to such price shall be final and binding on the Contractor.

2800. **WARRANTY**

2801. The contractor shall warrant the everything to be furnished hereunder shall be free from defects and faults in design, material, workmanship and manufacture and shall be of the highest grade and consistent with the established and generally accepted standards for goods of the type ordered and in full conformity, with the contract specifications and samples if any and shall if operable, operate properly.

2802. This warranty/DLP shall survive inspection of, payment for and acceptance of the goods and shall expire after 24 months after taking over the equipments of respective lines by DMRC. During warranty period firm shall provide all the repair and maintenance of the machines as mentioned in Schedule of Requirement. Any approval of acceptance by purchaser of the stores or of the material incorporated here in shall not in any way limit the contractor's liability.

2803. If the contractor so desires, the replaced parts can be taken over by him or his representative in India for disposal as he deems fit at the time of replacement of goods/parts. No claim whatsoever shall lie on the Purchaser for the replaced parts thereafter.

2804. The decision of the Purchaser in regard to Contractor's liability and the amount, if any, payable under this warranty shall be final and conclusive.

2805. All others terms and conditions for maintenance of machines during warranty period and extended warranty if any will be as mentioned in schedule of requirement.
SCHEDULE OF REQUIREMENT
PARTICULAR SPECIFICATIONS

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF TICKET VENDING MACHINE AND AUTOMATIC TICKET READER AT VARIOUS METRO STATIONS
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# LIST OF ABBREVIATIONS

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<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>AFC</td>
<td>Automatic fare collection</td>
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<td>AG</td>
<td>Automatic Gates</td>
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<td>AVM</td>
<td>Add Value Machine</td>
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<tr>
<td>CCHS</td>
<td>Central Clearing House System</td>
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<tr>
<td>CC</td>
<td>Central Computer</td>
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<td>COC</td>
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<td>COTS</td>
<td>Commercially Off The Shelf</td>
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<td>CSC</td>
<td>Contactless smart card</td>
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<td>CST</td>
<td>Contactless smart token</td>
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<td>DLP</td>
<td>Defect Liability Period</td>
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<td>EOD</td>
<td>Equipment Operating Data</td>
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<td>Equipment Control Unit</td>
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<td>LCD</td>
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<td>NFC</td>
<td>Near Field Communication</td>
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<td>OCC</td>
<td>Operation Control Center</td>
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<td>POM</td>
<td>Passenger Operated Machine</td>
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<td>PS</td>
<td>Particular Specification</td>
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<td>PSU</td>
<td>Power Supply Unit</td>
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<td>SC</td>
<td>Station Computer</td>
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<td>SDC</td>
<td>Software Development Center</td>
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<td>TOM</td>
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<td>TVM</td>
<td>Ticket Vending Machine</td>
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CHAPTER 1
INTRODUCTION

1.1 GENERAL

3.5.1 Delhi Metro Rail Corporation Ltd. (DMRC) has implemented Automatic Fare Collection system (AFC) for the Phase-I & Phase-II. It consists of 6 lines with 137 stations:

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<th>Line</th>
<th>Section</th>
<th>No. of Stations</th>
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<tr>
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<td>6</td>
<td>Central Secretariat - Badarpur</td>
<td>16</td>
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<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>137</strong></td>
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2 The contract comprises of:

Supply (including Design), Installation, Testing and Commissioning of Automatic Ticket Vending Machines (TVM), AVM cum TR and Spares for Stations of Phase-I & II (List of Stations is given in Appendix-1). This also includes all custom clearance, handling and inland transportation of all equipment under this Contract.

1.2 RELEVANT DOCUMENTS

1). This Particular Specification (PS) shall be read in conjunction with the COC and any other document forming part of the contract. In the event of a conflict between the COC and PS, the requirements of the PS shall prevail.

2). Notwithstanding the precedence specified in above paragraph, the Contractor shall always immediately seek advice from the Employer’s engineer in the event of conflicts between specifications.

3). The drawings attached with the tender document are for general information only. The contractor shall interface with DMRC for approving space at stations & interface with DMRC/O&M for final station level AFC requirements.

1.3 SYSTEM DESCRIPTION

1). Delhi Metro AFC system uses recyclable contactless smart token (CST) as single journey ticket and contactless smart card (CSC) for multiple journey. The DMRC
AFC system is capable of processing contactless smart media of Mifare Type ‘A’ and Sony Felica Type ‘C’ technology.

2). The station equipments send the data to TVM CC through LAN/WAN for processing. TVM CC further uploads this data to CCHS for end-of-day processing and revenue and traffic reports.
CHAPTER-2

SCOPE OF WORKS

2.1 SCOPE

2.1.1 The scope of the works includes:

1). Supply (including Design), Installation, Testing and Commissioning of Automatic Ticket Vending Machines (Passenger Operated Machines) and Add Value Machine (AVM) cum Ticket Reader (TR). This also includes all custom clearance, handling and inland transportation of all equipment under this Contract, till the time the equipment is installed at site, all tests completed and equipment handed over to DMRC.

2). Contractor shall interface with Central Clearing House System (CCHS) and AVM server for seamless integration with existing AFC system of DMRC, through a TVM CC provided as part of the present Contract.

3). Station wise list of equipments and spares are given in Appendix ‘2.1 to 2.2 of PS’. The delivery includes all the items which have not been included in this list but are a part of proposed solution and are required for implementation at all levels: CCHS level, Central level, Station or Equipment level.

2.1.2 TVM / AVM cum TR shall meet existing DMRC business rules and shall be designed keeping in view future Business Rules expansion/modification requirements as well as CCHS standard interface requirements.

2.1.3 The Contractor shall follow the schedules of works and supply and shall complete the sections of the works by the key dates set out in the tender document. Schedule of key dates and access dates are at Appendix -2.3 of Schedule of requirement.

2.2 GENERAL REQUIREMENTS

1). The TVM and AVM cum TR shall be designed to attain the Employers requirements as required in this Specification.

2). TVM and AVM cum TR shall be designed to process contactless smart cards / tokens already in circulation in the DMRC system.

3). Seamless integrated system design & functioning with the existing AFC system with respect to operational, maintenance, future expansion and modification requirements.

The proposed solution (hardware and software) will ensure:

- Vendor-independent delivery of modules / equipments as far as possible. Use of Standard Commercial off the Shelf products and software, encouraging use of non-proprietary items.
- Proven hardware platform.
Current/Latest operating System and COTS to be used. Contractor shall highlight above aspects in his technical offer.

4). The attainment of the reliability, availability, maintainability and safety requirements of the system will be verified by analysis, testing and system demonstrations as required in the Specifications.

2.3 SYSTEM AND EQUIPMENTS

2.3.1

1). The scope of supply shall include all necessary hardware / equipments, software, accessories, materials, documentation and facilities necessary to meet all requirements.

2). The Passenger operated Ticket Vending Machines shall be similar to that being provided already in DMRC, as far as possible. The exact design shall be approved by the Employer.

3). The contractor shall transfer to DMRC all requirements specifications, design documents, interface specifications and all software source code which are developed for this project. All source code for this project finally deposit to Escrow Account in India / handed over to DMRC. Source code developed specifically for DMRC will be handover to DMRC for change in MMI and business rule for future.

4). Contractor shall provide detailed interface specifications for following interfaces:
   a). Card / token to Reader/Writer
   b). Equipment to TVM CC

5). DMRC will provide SAM and SAM API to authenticate Smart Card. Contractor shall interface with DMRC CCHS & other designated contractors of DMRC as per Ch-7- 'Interfaces' of this PS, if required to complete the scope of work.

6). It is anticipated that the Contractor shall have previous experience of implementation of the TVM and AVM cum TR. It shall have to be ensured that the TVM and AVM cum TR is put at least 3 months trials at site, first at the SDC (Software Development Centre) and then in the actual field equipment at the Stations. The Key Date Table (Appendix 2) shall include the shipment of these items to the SDC for start of trials in Delhi.

2.3.2 SERVICES

The Services to be performed by the Contractor shall include, but not limited to, the following:

1). Design, manufacture, delivery and assurance of TVM and AVM cum TR.

2). Implementation of CCHS Standard Interface to connect TVM Server with CCHS for transactions and parameters processing.
3). Implementation of interface with AVM Server.
4). Installation, interfacing, testing and commissioning.
5). Presentations, meetings, review and audit support as specified in the Specification.
6). Project management of the implementation of the system.
7). Quality management, provision of reliability and maintainability demonstration test.
8). Overall site supervision and management.
9). Operation and maintenance support services during DLP period. Efficient management of contractor’s spares during DLP.
10). Contractor shall ensure system security from fraud possibilities, falsification of data, computer virus etc during DLP period.
12). Interface management.
13). Training to DMRC Maintenance staff, Operational staff & System security staff and modules mentioned in Appendix-3 of PS, have to be manufacture in India. However DMRC would like that vendor should try to manufacture other modules also in India.
14). Any other work to meet the Employer’s requirements.
CHAPTER 3
OPERATIONAL REQUIREMENTS

3.1 GENERAL

1). This chapter describes basic operational requirements, which will govern the TVM system.

3.2 TICKETS

1). All tickets issued from any station should be acceptable at any station and vice versa. Data on the tickets shall include all the parameters as in currently issued tickets in DMRC AFC system.

2). Types of Fare Media – TVM system shall use following type of recyclable tickets:-

   a). Contactless smart token (CST Type A )
      For single journey ticket
      Mifare Ultralite (64 bytes) (Existing)

   b). Contactless smart card (CSC Type A )/(ISO 14443 A)
      For multiple journey
      Mifare Desfire (4 KB) (Existing)

   c). Contactless Smart Card (ISO 14443 & ISO 18092)
      To be introduced shortly by DMRC.

3). Types of Fare Products

   The TVM shall provide and be capable of processing, the following types of ticket / fare products:

   a). Single Journey Token: issuing
   b). Stored value CSC : add value only

3.3 DESCRIPTION OF FARE PRODUCTS

1) Contactless Smart Token (CST)

   Tokens shall be collected in containers at the exit gates and recycled for issue from TOM, EFO & TVM of same / different station.

2) Contactless Smart card

   Stored Value Card (SV)

   In the DMRC AFC system, there is a provision of not less than sixteen (16) SV ticket types. Each SV type is allocated a set of fares and shall be capable of change by means of downloadable parameters.
3.4 BLACKLISTED TICKETS

1). The CCHS shall allow the operator to enter a list of blacklisted tickets. These tickets IDs shall be downloaded to TVM's and AVM cum TR at stations from CCHS.

2). TVM and AVM cum TR shall not accept blacklisted tickets for add value functions and display the reason to inform the operator. Every detection of blacklisted tickets shall be recorded at the TVM CC and AVM CC.

3.5 CONFIGURATION PARAMETERS

1). The operating features of the system shall be fully parameterised to provide flexibility for modification of operational parameters / conditions. Such changes shall be done at the CCHS level and downloaded to the TVM CC and AVM CC. In turn TVM CC and AVM CC will send these parameters to TVM’s to be effective at a future date/immediately. An acknowledgement from the equipments should be sent to TVM CC and AVM CC for the acceptance and validation of new EOD parameters.

2). TVM CC will accept global EOD parameters from CCHS and implement at TVM, so as to form an integrated AFC system to ensure smooth operation as regards system performance, design functionality, passenger traffic etc.

3). Configuration parameters downloaded from CCHS system shall be acceptable in the design. Any clarification in this regard can be had from CCHS contractor/DMRC as part of interface co-ordination during design / execution phase. The Contractor shall obtain the latest Business rules / fare policy from the Employer’s engineer during design phase.

4). The total time required to download EOD from TVM CC to TVM devices shall be maximum 10 minutes. During the download the device shall be able to operate normally and the time elapse to switch to new operational parameters shall not affect the normal operation.

5). The total time required to download EOD from AVM CC to AVM cum TR devices shall be maximum 10 minutes. During the download the device shall be able to operate normally and the time elapse to switch to new operational parameters shall not affect the normal operation.

6). The TVM and AVM cum TR shall keep at least two versions of configuration parameters. It shall be possible to switch back to previous version of EOD.

7). Fares: Fares shall be both station-to-station based and zonal system basis with provision for direction based issuance for each type of ticket.

8). Status of BNA, Coin dispenser/hopper and token dispenser should display on main screen.

9). TVM accept nearest amount as also dispense minimum change to the user.

10). TVM and AVM cum TR explain the recharge amount in voice (hindi/English)
CHAPTER 4
Ticket Vending Machine

TVM

4.1.1 General

1). The contractor shall propose the design architecture for interface with existing CCHS through TVM CC to meet Employer’s requirements.

2). The design shall incorporate all parameters / interface data / and other requirements for ready integration of existing AFC system & CCHS system of DMRC.

4.1.2 Functions

The TVM shall have required functionalities such as:

1. User friendly robust design and ergonomics catering to disabled people also. Housed in a suitable tamper-proof stainless steel casing, all security features incorporated at hardware and software level to make it vandal-proof. Unauthorized access prevention. Smart card / PIN based access, front operations i.e. cash handling, maintenance & token filling etc shall be done by opening front side panel.(Rear side opening not allowed)

2. Process contactless smart media for add-value (CSC), Smart Token Issue (As specified at 3.2 chapter-3) Ticket issued at TVM should be refundable at existing TOMs and also work at AFC Gate.

3. Features:

   1) Cabinet – Approximate Dimension: 1800mm (H) x 950mm (W) x 800mm(D), Thickness : 2mm, Material: stainless steel, Front maintenance access.(Exact dimensions shall be finalized during design stage.

   2) Single Printer will be used for receipts of all transactions (User Level) as well as for end-of shift report (Operation/Maintenance Level).

   3) Interactive touch screen (TFT, minimum 17 inch) display with single touch feature (not cursor based) for interactive transaction processing. Route map for destination station selection.

   4) Passenger Display – for patron guidance multi-lingual instructions (English / Hindi) with passenger enabled selection. Audible alarms and events.

   5) Currency note acceptor and recycler – Accept only bank note in denominations of Rs. 10, 20, 50, 100 & 500 (Minimum 5 types of Bank notes) . It shall reject torn / counterfeit notes. It should have a provision of Bank Note Escrow of minimum 15 notes. The system shall have the facility of recycling of deposited notes for providing balance amount to the passenger.

   6) The banknote recycler mechanism shall be high performance, extremely reliable, proven and must be procured from a reputed manufacturer such as MEI, Bill to Bill or any other similarly renowned source which shall also meet Reserve Bank of India (RBI) guidelines.

   7) The banknote recycler unit shall also be equipped with banknote loader
mechanism. The Bank Note Loader shall have a capacity to hold minimum 300 notes and 2 dual recycler module to recycle 4 denominations.

8) TVM shall be capable of returning change with best combination of coins and Bank Notes. Coin change shall be provided in two denominations which may be configurable to any two out of Re1, Rs2, Rs5 or Rs 10 coins.

9) Four way insertions of Bank Notes shall be possible The currency validator shall be only from reputed and proven manufacturers (Mars Electronics Inc., Cash Code, SADAMEL only).

10) Coin Dispenser for refund: Refund coins of Re 1/- & Rs. 5/-.  

11) Audit registers for data reconciliation at TVM CC Level.

12) In case of transaction cancellation, TVM should return currency note inserted by user.

13) Data security to be ensured by data replication in the TVM.  

14) Support downgraded mode operation.

15) Communicates with Central System for transactions, alarms, warnings, EOD, time synchronization etc.

16) Air circulation unit

17) Power – Internal power back-up, power protector of each module (fuse panel), surge protector, noise filter, ELCB switch.

18) Transactions from TVM should be incorporated in CCHS level reports. It should be possible to generate station level report for reconciliation of station revenue.

19) Provision of charging of CSC shall also be provided through bank credit/debit card. Provision shall be there for connectivity of telephone/communication line with bank server. The exact network architecture will be finalized during design stage.

20) CSC card reader shall reject different object like coin by inlet shutter, and it has a function that prevents manual ejection during processing. And after process, it shall eject CSC automatically.

21) TVMs should have Credit card insertion slot. Credit/Debit card readers should be capable of handling magnetic strip /chip based cards.

22) TVMs should have CSC insertion slot

23) The contractor shall be responsible for the installation / configuration of TVMs at designated stations. Design of TVM shall be such that it shall be possible to shift TVMs easily from one station to another.

24) The front Touch Screen can also be used as Maintenance panel during
maintenance activities.

25) TVM shall have at least one token box and also one error token box. Capacity of Error token box shall be 300 tokens at least.

26) Time synchronization: TVM will synchronize the time with TVM CC. TVM CC will be synchronized with CCHS.

27) Blank SAM provided by contractor and same will be activated by CCHS for equipment

28) Failure in Note Acceptor System: Credit/Debit card operated TVM. Message on TVM to be displayed: "No Notes Accepted. Credit/Debit Card Only."

29) Failure in Debit/Credit Card System: Note operated TVM with change making capabilities. Message on TVM to be displayed: "Cash Only. No Credit/Debit Cards Accepted."

30) Failure in Receipt Printer or Empty Receipt Stock: No receipts are available for transactions. Message on TVM to be displayed: "No Receipts Available." TVM must explicitly give customers a choice to continue with a Debit/Credit transaction without a receipt.

31) Insufficient Change: If insufficient change is available in the dispensing system, the TVM will accept exact fare only, and return any payment that does not meet these criteria. Message on TVM to be displayed: "Exact Fare Only."

32) SMS functionally required in case of “BNA near to full"," Coin/Token Container near to empty”, “TVM out of Service “

4.1.3 Design Parameters

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Functions</td>
<td>Issue of Token  Top up of Card  Ticket validity check, Blacklist Card</td>
</tr>
<tr>
<td>2. General</td>
<td>Accept all operational parameters / software from TVM CC. Provision for degraded mode  System hang faults shall not be acceptable.</td>
</tr>
<tr>
<td>3. Cabinet Material &amp; Finishes</td>
<td>The enclosure shall be fabricated of stainless steel of minimum 2 mm thickness.  The degree of protection provided by the enclosure against dust, splashing, intrusion of foreign objects shall be to the standard IP54, (IP- 43 for inlets).</td>
</tr>
<tr>
<td>4. Protection</td>
<td>All housed modules should have protection for damage due to pests or accidental water seepage.  Mechanical parts protected against corrosion.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>
| 5. Earthing | Each machine shall have provision for connection to the station earth bar and shall be connected accordingly. Contractor shall be responsible for extending of earth from nearby room (UPS/EFO/TOM/SCR) to TVM through cable trays.  
  No chances of electric shock to user in case of internal assembly/module failure. |
| 6. Smart media Validator | Power supply Protection with ELCB, maintenance sockets  
  Power shall be provided to the PSU from the AFC Electrical cabinet at 230V, 50 Hz. |
| 7. Token containers | One container per TVM of capacity 2000 token atleast. One container for faulty token of capacity 300 token. Exact token quantity count to be maintained. This stock data shall be sent to TVM CC on container replacement automatically. Stock status for current and last replaced container. One extra token container for each TVM for carrying tokens. |
| 8. Security | SAMs for Reader/writers shall be given by DMRC. (Blank SAM as per specification will be arranged by Vendor)  
  Equipment DSMs.  
  Anticollision for CSCs.  
  Secure transactions and data transfer.  
  Data protection in case of power failure (battery back-up mechanism). Protect pending initiated last transactions or data transfer.  
  Back-up data for minimum 7 days. Data not to be purged before transferred to TVM CC. |
| 9. Keyboard | Small keypad accessible inside the TVM enclosure for Operation, Maintenance Configuration etc. |
| 10. Patron sound device | Range of 60-80 db(A) measured from 1 meter from source. Software configurable. Unique alarms for intrusion, fraud, container-full / nearly empty, invalid ticket, internal UPS failure, over-heating, counterfeit currency etc. |
| 11. Environment | Operation  
  - 0° to +50°C external  
  - RH (Equivalent test 95% at 35°C)  
 Storage  
  - -20° to +70°C external  
  - 95% (without condensation) |
<p>| 12. Cables | Standard cables to be used for internal wiring. Precise / orderly routing, lacing and labeling. |
| 13. Power Failure | In the event of power failure to the TVM, the battery module should provide enough power to finish the transaction in progress and make clean TVM shutdown. |
| 14. Throughput | 2 tokens per minute (PPM) for SJT. |
| 15. Performance | As given Below: |</p>
<table>
<thead>
<tr>
<th>16. General</th>
<th>Capable to process up to 2000 tokens per day.</th>
</tr>
</thead>
<tbody>
<tr>
<td>17. MCBF</td>
<td>10,000 cycles</td>
</tr>
<tr>
<td>18. MCBJ</td>
<td>20,000 transactions</td>
</tr>
<tr>
<td>19. MTTR</td>
<td>30 minutes</td>
</tr>
<tr>
<td>20. Coin Container</td>
<td>One container of capacity of 1000 coins for each type of coin</td>
</tr>
<tr>
<td>21. Note container</td>
<td>One container of capacity of min.500 currency notes.</td>
</tr>
<tr>
<td>22. Insertion slot</td>
<td>Currency notes, Smart Card and Credit/debit card</td>
</tr>
<tr>
<td>23. MMI</td>
<td>User friendly MMI, Front loaded i.e. cash handling, maintenance &amp; token filling etc shall be done by opening front side panel. There shall have no provision for accessing machine from rear side. To be finalised as part of Design.</td>
</tr>
<tr>
<td>24. Printer</td>
<td>For printing receipt</td>
</tr>
<tr>
<td></td>
<td>Size of paper roll should be minimum 2000 receipt /roll</td>
</tr>
<tr>
<td>25. Language</td>
<td>Hindi, English with a option to select the language</td>
</tr>
</tbody>
</table>

### Data Categories

#### 4.1.4  
#### 4.1.5

a). Data to be transmitted from TVM to the TVM CC and shall be divided into the following categories.

<table>
<thead>
<tr>
<th>i). Transaction Data</th>
<th>Accounting and statistical data including cash accounting, ticket sales, passenger traffic, gate data, origin and destination data etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ii). Audit Data</td>
<td>Details of audit data of each machine including data of non-resettable registers</td>
</tr>
<tr>
<td>iii).Status Data</td>
<td>Status data including faults, maintenance alerts, mode of operation Alarms, Events and Warnings data etc.</td>
</tr>
</tbody>
</table>

b). Data will also be downloaded from the TVM CC facility to the TVM. This data will be operational and security data such as:

<table>
<thead>
<tr>
<th>Operational Data</th>
<th>EOD such as fare tables, date and time, peak and off-peak, promotional features, discounts etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security Data</td>
<td>Security data will include keys and list of black listed tickets.</td>
</tr>
<tr>
<td>Control data</td>
<td>Modes of operation of equipment and station</td>
</tr>
<tr>
<td>Maintenance data</td>
<td></td>
</tr>
</tbody>
</table>

c). TVM should have inbuilt process to ensure completeness of data from and to TVM CC.

#### 4.1.6 Equipment Management
(i). Contractor to propose and follow secure equipment management of all TVM devices including new equipment registration, equipment removal or deletion as per CCHS requirement. This will be finalised during design stage.

(ii). Identification and blacklisting of fraudulent, stolen / lost equipments.

4.1.7 Security Management / Key Management

Security requirements: - Security shall cover following aspects applicable of TVM:

(i). Physical protection of equipment
(ii). Security of data and transactions
(iii). System security
(iv). Protection of revenue
(v). Security of cash through audit trails
(vi). In any case TVM should not use in revenue when its front door open.

4.1.8 Equipment security (Protection against Vandalism and Burglary)

For protecting against vandalism and burglary for each TVM, the following requirements shall be met:

i. All latches shall be secure and robust
ii. All external screws and hinges must be covered
iii. Locks must be drill resistant, mounted

iv. Each TVM shall be equipped with a signaling and alarm system. TVMs shall be capable of surviving a kick or punch from a large adult acting in an irrational manner while the equipment is operating.

v. The signaling and alarm system shall be equipped with an electronic or mechanical siren capable of emitting a sound level of at least 110 dB(A) measured at a distance of three feet with the door open. This siren shall sound whenever unauthorized entry is detected or when severe impacts to the front door are detected.

vi. An internal momentary contact switch, hidden inside the TVM but readily accessible, shall permit an authorized technician to trigger a “silent” alarm. When activated, this switch shall cause the TVM to notify the central computer system.

4.1.9 Revenue Security

(i). The TVM shall provide a complete audit trail of all transactions, transfers of cash and other payments.

(ii). Non-resettable transaction and audit registers shall be provided in TVM to record essential information sent to the TVM CC. These registers shall be easily visible and shall be readable when the machine is switched off even after rebooting/ again power on.

(iii). The equipment shall be designed with features, which deter possibility of revenue losses from altering, copying or counterfeiting of the tickets.
(iv). Unique ticket id - Fail-safe features shall be incorporated to check that no duplicate ticket ids are introduced in the system, either through hardware or software failures. System shall address any other fraud mechanism for revenue erosion from automatic fare collection and accountal system. Sufficient security shall be provided to prevent an increase in the remaining value of the ticket except at machines having revaluation function.

4.1.10 Data Security

(i). All data and transactions shall be restored in case of power failure or software bug or crash.

(ii). In the event the TVM CC fails, each TVM will be able to operate autonomously without loss of data. When the TVM CC becomes operational after a failure, it shall automatically be updated with outstanding data from the TVM equipment.

(iii). Security of communications between the TVM and TVM CC system shall ensure no loss or tampering of data in transmission, hence providing protection from any falsification of records.

(iv). All transactions shall be initiated and concluded atomically (no tearing of transactions). All data transmission shall be done securely using advanced suitable ciphering techniques, algorithms and protocols.

4.1.11 System Security

(i). System design shall ensure protection from unauthorized access and changes to the systems and software

(ii). All software / firmware supplied by the Contractor shall be free of virus.

(iii). Suitable mechanisms to handle any possibility of system being infected by any virus shall be incorporated.

(iv). Upgradation of such measures, from time to time shall be the responsibility of the contractor during DLP period.

4.1.12 EOD and Configuration Management

(i). Refer attached EOD List in Appendix ‘3.1 of PS’.

(ii). TVM CC shall receive global EOD from CCHS and transfer to TVM.

(iii). EOD parameters shall be common for DMRC AFC system.

(iv). In addition, TVM CC shall send other local EOD parameters to TVM equipments as required.

4.1.13 Report Management
(i). Refer attached Reports List in Appendix ‘4 PS’. This list is only for reference. Global reports shall be printed at CCHS level. However, TVM CC shall be capable to produce station wise reports for all TVMs.

(ii). The TVM CC shall generate reports automatically at end of day. The TVM CC shall collate, format and enable end of day and ad hoc reports to be printed from the data transmitted by the TVMs. Data shall be stored in a relational data base structure to permit adhoc and detailed log reporting.

(iii). The Contractor shall finalize report design during design review with the Employer’s engineer. Suitable web intelligence software for accessing reports remotely shall be provided and installed at TVM CC.

(iv). The reports shall include but not be limited to:

<table>
<thead>
<tr>
<th>Daily Summary Report</th>
<th>Summary of all ticketing, financial transactions / cash received or refunded. Station wise, ticket wise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator action reports</td>
<td></td>
</tr>
<tr>
<td>Log reports</td>
<td>Chronological report of daily activities. Each event shall have date and time recorded.</td>
</tr>
<tr>
<td>Ticket stock inventory reports</td>
<td>TVM level</td>
</tr>
<tr>
<td>Equipment inventory</td>
<td>For equipment installed and removed</td>
</tr>
<tr>
<td>Events, alarms, warnings</td>
<td></td>
</tr>
<tr>
<td>Quarterly stock position</td>
<td>TVM level</td>
</tr>
<tr>
<td>Maintenance and failure reporting</td>
<td></td>
</tr>
<tr>
<td>System reports</td>
<td>System configuration related</td>
</tr>
<tr>
<td>Any other report required by Employer’s engineer at subsequent implementation stage.</td>
<td></td>
</tr>
</tbody>
</table>

(ix). Complete list of reports shall be finalized during design phase.

4.1.14 **Maintenance Analysis Mgmt.**

(i). Customized reporting tool for detailed periodic reports for maintenance log - failure information, corrective action, faulty / replaced module (with unique serial no.).

(ii). It shall include inventory flow and management feature - Accountal of movement and stock of faulty, replaced, repaired, workshop and spare equipments / modules.

4.1.15 **Blacklist Management**
(Refer Ch-3 Operational requirements)

4.1.16 **Status Monitoring at TVM CC**

Geographic area layout based GUI for monitoring and controlling

(i). Equipment status, Station/ Equipment mode of operation, EOD information

(ii). Individual modules of equipment

(iii). Current stock status

(iv). Traffic information (quarterly)

(v). Configuration parameters

4.1.17 **Alarms, Events & Warnings**

Alarm signals shall be transmitted automatically for display on TVM CC. All important alarms shall have to be acknowledged. Alarms shall be for:

(i). Power failure to any TVM machine.

(ii). Communication failure to any TVM machine.

(iii). Application program or parameter files download error to any TVM machine.

(iv). Other unwanted events.

(v). Unauthorised entry/intrusion, tampering with cash handling modules.

(vi). Other mechanical and electronic problems or anomalies output from the device’s own diagnostic and condition monitoring system.

(vii). Alarms related to Status Monitoring etc.

4.1.18 **Hardware Configuration:**

<table>
<thead>
<tr>
<th><strong>Cabinet &amp; Man Machine Interface</strong></th>
<th>✓</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel cabinet, 4 to 6 fixing points, Approximate Dimensions: width 950mm, height 1800 mm, depth 800 mm. Front loaded i.e. cash handling, maintenance &amp; token filling etc shall be done by opening front side panel. There shall have no provision for accessing machine from rear side. Dimensions will be finalized during design stage</td>
<td>✓</td>
</tr>
</tbody>
</table>

| Type A smart card reader | ✓ |
| Credit/Debit Card Reader with a provision to connect with Phone lines (Details will be finalized during design phase) | ✓ |
| Front access with agent identification module | ✓ |
| Recess : stainless steel vertical satin finish | ✓ |
| Minimum 17” touch screen for passenger | ✓ |
| Illuminated output tray for token and change | ✓ |
| 220V, 50 to 60Hz power supply unit fitted with battery modules ensuring the end of the current transaction and a clean shutdown of the TVM | ✓ |

Connectivity

LAN
| **Printer (for receipt and reports)** | 1 |
| **Supervision** | |
| Supervision module including contact management, break-in detection, temperature and power supply monitoring. | ✓ |
| Siren | ✓ |
| Air circulating | ✓ |
| **Sale & distribution** | |
| Distribution of tokens, container of 1500 units | 1 |
| **Payment** | |
| The currency validator shall be only from reputed and proven manufacturers (Mars Electronics Inc., Cash Code, SADAMEL only). | ✓ |
| Coin system able to process 2 types of coins, Coins will be used for refunding balance amount to patron. | ✓ |
| Coin reserves with capacity of 1000 coins for each type of coin | 2 |
| Banknote acceptor with escrow and banknote stacker with minimum capacity of 500 notes | ✓ |
| Banknote recycler unit shall also be equipped with banknote loader mechanism. The Bank Note Loader shall have a capacity to hold minimum 300 notes and 2 dual recycler module to recycle 4 denominations. | ✓ |
| The contractor shall provide multiple set of keys for every equipment. Similar equipments shall be keyed similarly. The keying arrangement shall be finalized with the approval of the Employer’s engineer. | |

4.1.19 **Contractor to specify system architecture** to meet the Employer’s requirement.

4.1.20 **Central Computer (TVM CC) for TVMs**

I. The central computer shall be capable to handle 400 numbers of TVMs.

II. Each TVM will do minimum 1000 number of transaction (Add value and Token issue) per day.

III. The system shall be deigned to achieve CPU, memory and hard disks average utilization of no more than 50% at the end of DLP period

IV. The system should complete end of day process within one hour

V. The abilities to place an individual TVM in service and out of service, TVM to perform self-diagnostics, and reset the TVM shall also be provided from the central computer system.

4.1.21 **Configuration Management**

All configuration parameters of the TVMs shall be alterable remotely from the central computer system, including date and time, fare tables, security access codes, passenger display messages, in-service/out-of-service times.

4.1.22 **Aesthetic Requirements**

TVMs shall be designed with all controls and customer interface display and inputs on a common front face of the enclosure. Suitable graphics shall be provided explaining the operation of the TVM.
4.1.23 **Modularity**

Each TVM shall be a self-contained machine, complete with its own cabinet and mounting stand or base, and having integral light fixtures to illuminate the control face. Each TVM shall consist of a bill processing unit, coin dispensing unit, credit card processing unit, debit card PIN pad, display and information unit, change maker, ticket and pass issuing unit, key pad and function keys, power supply, and processing and control unit, all located within a self-contained unit. Each of the basic functions within the machine shall be performed by modular components which readily permit field replacement of inoperative modules to return the machine to service in minimal time. Control and power connections shall be made via plug-in connections. Modules shall not be directly hard wired together and/or into the TVMs. The individual module shall be fixed in the unitized frame with fast latching devices and be secured by locks against unauthorized removal, where required.

4.1.24 **Design Life**

The entire TVM shall be designed for a minimum service life of 10 years of normal operation. All equipment shall be designed to operate seven days per week, twenty-four hours per day.

4.1.25 **Safety**

The interior of the TVM shall be similarly free of sharp edges or other hazards that may cause injury to maintenance personnel. Particular attention shall be given to protecting blind persons who may explore the exterior surface with their fingers.

The exterior panels and control shall be grounded to prevent electrical leakage or static charge.
CHAPTER-5

NETWORK AND CABLING

6.1. NETWORK MANAGEMENT

6.1.1. General

1) The CCHS shall communicate with the station TVM machines through TVM CC via the DMRC WAN / AFC LAN already provided at stations.
2) TCP/IP network communication protocol should be used for all data communication in the system. I.P. addresses shall be designed and implemented by the contractor in consultation with the Employer’s engineer.

5.1.2 STATION LEVEL

In order to assure station communication at an optimum rate, the speed of station LAN sufficient to handle peak traffic performance requirements. Network shall be failsafe with redundancy.

6.2 CABLING – DATA & POWER

6.2.1 General

1) The Contractor shall be responsible for the specifications, sizing, procurement, installation, wiring, terminating and testing of all power and data cables/wires required for all stations in the scope of the contract.
2) This shall include all necessary connecting cables:
   a). For link to the Switch available at SCR/EFO/TOM room at stations.
   b). For distributing power to TVM from Electrical supply from TOM EC/S&T UPS room EC.
1). Cable shall meet national or international standards applicable to data processing and data transmission systems and appropriate for the requirement.
2). Proper earthling of all TVM by a copper or copper-alloy, corrosion resistant, high-conductivity grounding pad shall be provided to ground all conductive materials such as frames, metallic covers, trays, and doors. Earthing at nearby TOM/SCR/EFO/S&T UPS room to be utilized and further cable drawn by contractor to SCR / TOM / EFO / S&T UPS.

6.2.2 Requirements

The following requirements shall be the minimum but is not limited to ensuring that contractor’s designs follow sound engineering practice and are suitable for their intended purposes and environments.
1. All material used shall be subjected to the Employer’s engineer inspection and examination at site or the factory.

2. The cables shall be installed at a safe separation from potential interfering sources, including power cables, LCX, etc. A cable routing plan shall be designed so that there is the least likelihood of coupling between the cables and the potential sources. For example, long parallel runs of signal cables and power cables shall be avoided, wherever possible, the controls/monitoring cable and the power cable shall meet at an angle as close to 90° as possible. The separation distance between control cables and signal cables shall be maintained when going through walls and floors. Similarly, controls/monitoring cables shall enter the ITB from the top through two separate holes. The Contractor should refer to guidelines recommended by IEC 1000-5-2 wherever possible.

3. The contractor shall ensure suitable separation between power, digital signal and analogue cables along the cable route.

4. The cables used in the TVM network must be adequately protected against external interference. Additional protective measures, including but not limited to the use of metallic (steel) conduits, armors, ferrite chokes, and EMI filters must be used to reduce such external interference wherever required.

5. For protection against the electrostatic capacitance coupling, direct electrical connection between ducts of power cables and controls/monitoring cables must be avoided.

6. It shall be the Contractor’s responsibility to interface with the appropriate Civil Contractors and System-wide Contractors to determine the most suitable cable route designs, bearing in mind the restraints of the structure gauge, the drawings, the various standards applicable and the requirements of this and other relevant specifications and criteria.

7. The Contractor shall prepare installation drawings and specifications for the Employer’s engineer approval prior to commencing any work on site. These shall include a schedule of locations, activities and key dates, together with lists and details of staff to be employed.

8. The Contractor shall demonstrate satisfactory use of the type of cable proposed for use in a comparable railway and tropical environment, be able to meet the specifications, and shall guarantee at least 25 years service life for the product to be provided.

9. Cable Accessories - All cable should be laid and terminated using standard accessories for laying, lacing, termination / clamping and armoring. All cables totally
exposed in above ground guide way or above ground open areas shall be armored (in GI conduits).

10. For protection against electromagnetic induction, the controls/monitoring cables should be carried in two separate cable trays / ducts, namely the data cable and power cable. These two conduits should be separated by a distance of not less than 150 mm. The latest versions of IEC 1000-5 and/or other relevant standards must be referred to wherever practical.

11. Cable routes shall be designed to avoid trapping rubbish, which could become a fire hazard. Bends shall be of maximum radius and not less than is appropriate to the size and construction of the cable. Sharp edges shall be avoided.

12. In station areas generally, the Contractor shall determine the requirements for brackets, ducts, conduits, troughs, trays and other fittings required to protect the cables for the systems supplied under this Contract. Where cable routes are, or can be made, common to more than one contract, the Contractor shall interface with the other Contractors involved to determine a mutually acceptable arrangement of common routes for the acceptance of the Employer’s representative.

6.2.4 CABLE SPECIFICATION

**Data Cable** (For other than optical fibre)

<table>
<thead>
<tr>
<th>Type</th>
<th>UTP Cat 5e cables (or superior) 4 Pair, Low smoke zero halogen (Nexans or similar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packing</td>
<td>305m/1000m</td>
</tr>
<tr>
<td>Min. bend radius</td>
<td>Operation 24 mm &amp; Installation 48 mm</td>
</tr>
<tr>
<td>Max. installation tension</td>
<td>90N</td>
</tr>
<tr>
<td></td>
<td>Proven in Underground Environment</td>
</tr>
</tbody>
</table>

**Power & Control Cable**

To be of suitable specification. Contractor to propose as per requirement.

1) Cables shall be ISI mark or similar international rating.
2) Fire retardant, Low smoke, low halogen for elevated stations and for underground stations as Zero halogen. The halogen content shall not be more than 0.5% for underground cables.
3) Cables shall comply with latest version of British, IEC, ASTM, ITU standard.
4) All cables should have continuous operating life of at least 25 years.
5) Proven in Underground Environment, for underground stations.

**Data Cable**: All data cable to be utilized in underground stations to be low smoke zero Halogen (<0.5% Halogen)
6.2.5 Electrical Cabinet

Contractor has to provide new Electrical cabinets having appropriate MCBs for input/output for drawing power for TVM. At least 2 numbers of spares MCB’s have to be provided for expansion at later date.
CHAPTER 6

INTERFACES

6.1 GENERAL

1) The purpose of the Interface Specifications is to provide information about the DMRC/Contractor involved in the interface with a clear overview of the purpose and functionality of each interface. It provides a framework such that DMRC/Contractors can set to work in a co-operative way to produce the interfacing standard.

2) The contractor shall interface with DMRC O&M / contractors (e.g. Existing AFC contractors, CCHS contractor, Building service/Civil contractor/Electrical contractor/Telecom contractor), Agencies (government or private), UPS contractor, consultants, DMRC AFC and other sub / local contractors etc. to ensure smooth execution of works.

3) The Interface Specifications detailed below are used as the key documents for the interface definition and also to define the scope of each Designated Contractor.

6.2 INTERFACE SPECIFICATION

Definitions and Scope

1) This specification describes the interface requirements between Contractor & DMRC O&M directly or through some other agencies/contractor.

2) This specification shall be read in conjunction with the relevant paragraphs of the General Specification. Contractor shall ensure that all requirements of the Specification pertaining to interfaces are properly satisfied.

3) The Contractor shall co-ordinate with the DMRC O&M directly or through some other agencies/contractor to assure that space is ready when equipment needs to be installed.

4) The Contractor shall install cables in co-ordination with the DMRC O&M directly or through some other agencies/contractor. All Tray/Conduit, all dropping / distribution conducting needs to be done by the Contractor, for extending cabling from his equipment. Wherever, exiting cable trays are available, the same can be utilised by contractor only after approval of Employer.

5) The Contractor shall furnish and install TVM at the locations shown in the design plans, to be finalised with the Employer.

6) The Contractor shall furnish and install all of the cabling required to the TVM.

7) It shall be the responsibility of the Contractor to extend the earth connection to TVM from nearby rooms.

8) It will be the contractor’s responsibility to interface with DMRC O&M directly or through some other agencies/contractor and determine the most suitable cable route
designs, bearing in mind the restraints of the structure gauge, the drawings, the various standards applicable and the requirements of this and other relevant specifications and criteria.

9) The Contractor shall be responsible for the specification, sizing, procurement, installation, wiring and testing of all single and multicore cables and wires required for the TVM.

10) The Contractor shall determine the sizes of the TVM rooms/space required at each station and inform to DMRC O&M directly or through some other agencies/contractor.

11) The Contractor shall co-ordinate with DMRC to assure that lighting, power, provision for installation of TVM, dropped ceilings, ventilation, required for TVM equipment is adequate.

12) The Contractor shall work with the DMRC/DDC Contractors to identify the locations of TVM.

6.3 INTERFACE WITH CIVIL AND ELECTRICAL WORKS

1) The contractor shall interface with DMRC/station contractor / DDC for final station level TVM requirements, drawings, civil works execution / completion / taking handover of site for TVM system installations.

2) Main Cable Routes

6.4 INTERFACES WITH EXISTING AFC CONTRACTOR

See Ch-4 of PS.
CHAPTER 7
DESIGN REQUIREMENTS

7.1 GENERAL
1) The following design requirements shall be adopted by the Contractor in addition to those specified in COC.
2) The Contractor shall submit a list of all design review documents for the review of the Employer.

7.2 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, including, but not limited to: system architecture, logic flow diagrams, operation and maintenance philosophy, and verification and test approach; and
2) Conceptual, preliminary, and final software design reviews with the Employer, including but not limited to: the software requirements specification, software architecture, logic flow diagrams, and verification and test approach.

7.3 SOFTWARE REQUIREMENTS
1) The Contractor shall demonstrate to the Employer the correct application of the standards specifically detailing the allocation of software integrity levels for all software.
2) The Contractor shall submit with the Design Plan for the review of the Employer a list identifying all software, which will be maintainable and re-configurable by the Employer.

7.4 EQUIPMENT TYPE DESIGN CRITERION
1) Environmental
The TVM shall be installed in open areas at stations. The Contractor shall follow international dust standards in respect of dust control for TVM.

2) Applicable Standards
The standards to be followed during the design, construction, and installation of the TVM shall be as stipulated in the Codes and Standards (Appendix 3.3 of PS). The Contractor may propose alternative or additional standards for review by the Employer at least 60 days before application. Such standards shall include, but are not limited to, the following:

- Tests of individual components;
- Power supply standards;
- System performance and reaction time requirements;
- Earthling & bonding;
- Terminations;
• Fire/smoke proofing of cabling;
• Electrical isolation;
• Lightning protection;
• Structural requirements;
• Cabling standard; and
• Earth leak detection.

7.5 DESIGN DOCUMENTATION
1) The Contractor shall, supply, as a minimum, the following hardware and software design documentation:
   a) Conceptual Design Specifications, details and drawings
   b) Detailed Design Specifications, details and drawings
   c) Software Design Specifications, Detailed Interface Specifications,
   d) Configuration Documents
   e) Installation, Validation Procedures and Test Reports etc.
2) The submission of the above documentation shall be included in the Submission Programme.

7.6 TICKET READING AND ENCODING MECHANISM
The TVM equipments shall be designed to process contactless SMART card and token which shall meet the following requirements:
1) Read and verify data coded on tickets.
2) Capable of being easily modified to read/verify and write.

7.7 SECURITY PROVISIONS
The equipment shall be designed with features, which deter revenue losses from the following:

1) Acts such as altering, copying or counterfeiting the tickets.
2) Protection from unauthorized changes to the software.
3) Protection from breaking the multi-pin locking concept or circumventing security access controls and PINs. The idea behind multi-PIN (Personal Identification Number of Staff) looking concept is to provide security to TVM Systems by using different personal identification number of staff. The Contractor may propose alternative means to achieve the same objectives.
4) Protection from falsification of records. Provision shall be made to allow entry at the internal keypad of pre-encoded ticket serial numbers to track the ticket supply in order to identify any variances between the tickets dispensed and the tickets used in re-supplying TOM and the exit gates.

7.8 STAND-ALONE OPERATION
TVM shall be capable to function in a stand-alone mode. Any breakdown in cabling or communication links between units of equipment or computer installation in stations or at the Central Office shall not affect operation.
7.9 MODULAR DESIGN
Modules, subsystems, assemblies and components shall be of modular design for ease of maintenance. The mean time to replace shall be less than 30 minutes.

7.10 MAINTAINABILITY
1) All components shall be packaged in replaceable and repairable modules. The mean time to replace line replaceable unit shall be less than 2 minutes. Standard hardware and components shall be used for flexibility and ease of maintenance.

2) Special customized carrying cases shall be provided to avoid damage to sensitive modules, as necessary, in quantities sufficient to support the level of maintenance required.

7.11 MAINTENANCE
Employer’s maintenance philosophy is to fully maintain the TVM equipment with its own staff or by a nominated agency. The job of the TVM Field Technicians is to perform preventive maintenance on the equipment and to isolate failures in the field only to the extent to enable identification of a failed replaceable unit. The failed unit will be replaced and the unit will be sent to Employer’s maintenance facility for further failure analysis to determine the specific cause of failure and appropriate action.

7.12 TROUBLESHOOTING AIDS
The primary troubleshooting aid for field diagnosis shall be used. All possible failures shall be uniquely coded so that the failure can be isolated to the faulty module or subassembly. The Contractor shall demonstrate this capability on each type of equipment as part of the demonstration tests. The Employer and Contractor will introduce failures at random for this demonstration. Upon request from a technician using the service keyboard, the failure codes shall be displayed on the display board. Failure codes shall be transmitted to TVM CC with a data and time. The number of failure codes to be provided shall be related to the complexity of the unit of equipment. The failure codes shall be retrievable after a power loss or CPU reset, and shall be comprehensive and detailed and shall include, but not be limited to, such failures as:

1) Decoding error
2) Card /Token jam
3) Sequence error in handler
4) No response from assembly
5) Check sum error
6) Wrong parameter
7) Record read impossible
8) Accounting error
9) Transmission error
10) Disk and File error
11) Not initialized

7.13 SELF-DIAGNOSTICS AND SELF-CLEARING
Self-diagnostics shall be employed to the maximum extent possible to assure the highest possible availability. Standard diagnostic programs shall be provided for computer hardware and software programs. Customized diagnostics shall be employed to assure such items as all modules in place, communications link up, non-computer electronics working properly, battery backup ready and monitoring of wear for signs of deterioration. The Contractor shall indicate in the Manuals how the tests are initiated and provide a complete definition of the results of the tests and ranges of the possible results. A problem detected by self-diagnostics and problems occurring during a transaction shall be subjected to automatic resolution before the offending system or the unit of equipment is removed from service. Automatic resolution shall be unique to each subsystem, module or component.

7.14 SHOP MAINTENANCE
The design and fabrication of equipment modules shall be such that detailed failure analysis of failed modules and repair of such modules can be accomplished by Employer's maintenance personnel.

7.15 SOFTWARE

Downloading

Downloading of commands and parameters shall be accomplished remotely from OCC through TVM CC. Downloading shall be accomplished using standard communications protocols, cables and connectors. All necessary cables and connectors shall be provided.

2) Software Use and Verification

All software shall be complete and fully tested prior to shipment of the TVM. The software shall be fully programmed, debugged and updated. The Contractor shall provide the latest version of software source code and documentation for use during Contractor-conducted operation and maintenance training, and shall provide the final software source code and documentation prior to revenue service for the first equipment.
7.16 **LOCKS AND KEYS**

The lock and key configurations for all the doors and internal components shall provide separate set of key for operations and maintenance and revenue service.

7.17 **GROUNDING**

A copper or copper-alloy, corrosion resistant, high-conductivity grounding pad shall be provided within each TVM equipment to ground all conductive materials such as frames and metallic covers, motor frames, trays and doors.

7.18 **SAFE GUARDS**

The safety of all operating personnel using the equipment or performing their duties shall be an essential aspect of the TVM equipment design and fabrication. The Contractor shall provide appropriate safeguards. Such safeguards shall include shields or barriers placed to prevent injury, including burns from heated surfaces or cuts from sharp edges. Safety label shall be shown on moving parts, live voltage etc to alert operating or maintenance staff.

7.19 **PAINTING AND PLATING**

All exterior non-stainless steel surfaces shall be painted or plated. Parts or areas in contact with concrete or masonry walls or floors shall receive a minimum of 2 coats of rust and corrosion preventive primer and 2 coats of non-corrosive finish paint.

7.20 **DESIGN REVIEWS**

1) Design reviews as detailed in the following Articles will be conducted by the Employer. These reviews shall be conducted to evaluate the progress and technical adequacy of the design and conformance with the requirements of the Contract. Each design review shall include a design review submittal and a design review meeting. For each design review, a design package shall be submitted that includes all documents listed. The Employer will review the documents for conformance with the Specifications and will discuss its comments with the contractor at the design review meeting. The Employer will schedule the design review meeting approximately two weeks after the Employer has received the design review submittal. The Contractor shall incorporate the Employer’s comments on the next design review submittal. Satisfactory completion of each design review shall require the approval of the Employer. Design reviews shall occur in the following chronological order:

2) **Conceptual Design Review**

The Conceptual Design Review (CDR) shall evaluate the Contractor’s system concept and design approach. The CDR shall include at least the following items:

a) General description of the major sub-assemblies including identification of components supplied by subcontractors for each type of equipment.

b) Preliminary internal layout of sub-assemblies for each type of
c) Preliminary layout of the front operating panels for each type of equipment.
d) Functional block diagram of the system and equipment.
e) Catalog cuts of the following modules: Main Display Unit, soft keys and numeric keypad; smart card interface device; and the equipment CPU.
f) Identification and description of all interfaces between the major sub-assemblies.
g) Identification and general description of all functions, data elements and its transfer supported by communications protocol.
h) Information and decisions required from the Employer.
i) Physical dimensions of each type of equipment.
j) Power and other facility requirements of each type of equipment.
k) Plans, programs, data related to management, training, manuals, quality assurance, reliability assurance and configuration control.

3) Final Design Review

The Final Design Review (FDR) shall evaluate the detailed design and the production drawings for the equipment. The FDR is the mechanism for determining whether the detailed design has a high probability of meeting all the design requirements, subject only to the results of any following tests or audits such as the pre-production tests, the reliability test during revenue service, and reliability and data accuracy audits. Work performed by the Contractor prior to required approval of the FDR by the Employer shall be entirely at the Contractor risk and expense. The FDR shall not commence until all Manual Outlines have been submitted by the Contractor and approved in writing by the Employer.

a) The FDR shall include at least the following items:
b) Latest revisions of the drawings, documentation and samples that were submitted at the CDR, PDR and MDR.
c) Complete production drawings for each type of equipment
d) Electrical schematic drawings, down to the individual signal and component level.
e) Complete baseline software and preliminary software documentation for each type of equipment.
f) Fully operating ticket handling mechanism
g) List of maintenance service commands, codes and messages.
h) Fully operating smart card components.

i) Plans, programs and other data

j) Latest revisions of the interface description that were submitted at PDR.

4) **Pre-Production Review**

- The Pre-Production Review (PPR) shall evaluate actual operation and performance of the pre-production equipment in an in-service environment.
- The PPR shall provide the basis for the Employer’s release of manufacturing of the production equipment. Pre-production equipment approved as noted shall be the Production Configuration Baseline.
- The PPR shall not commence until all First Draft Manuals have been submitted by the Contractor and approved in writing by the Employer.
- The PPR shall include at least the following items:
  1. Fully operating units for each type of equipment in the quantities and locations indicated.
  2. All interfaces fully operating.
  3. All software and firmware fully operating.
  4. Special tools and test equipment in the quantities and locations indicated.

7.21 **EQUIPMENT PLACEMENT DETAILS REVIEW**

The Equipment Placement Details Review (EPDR) shall be held to evaluate the placement details and resolve issues resulting from the Employer's review of placement drawings and documents. The EPDR shall evaluate at least the following items:

1) Physical mounting items, including base plates, lifting procedures, and filler panels for each type of equipment;
2) Electronic/electrical interfaces; and
3) Installation/cutover plans.
8.1 GENERAL
1) The requirements on packaging, shipping, storage and delivery shall be as given herewith.
2) The Contractor shall designate a single point of contact for logistics support to insure compliance with specifications related to inventory and logistic support, including packing, marking, shipping, delivery, and storage of contract deliverables, including spare parts.
3) The Contractor shall be responsible for and shall, at Contractor's expense, repair or replace, as approved by the Employer, any deliverables damaged during shipment or storage.

8.2 PACKAGING
1) Immediately after the tests at the place of manufacturing, all TVM equipments shall be tightly packed with waterproof material and adequately secured to prevent ingress of moisture.
2) Particulars of TVM equipment i.e. name of equipment, number, gross and net weights, shall be clearly shown on the packing
3) Standard Practice for Commercial Packaging shall be followed for preservation, packaging, packing, unitization, and marking of all deliverables. Deliverables shall be packaged to insure the integrity of the product during transportation, handling, and storage. Protection shall be provided against loss, pilferage, corrosion and deterioration. Packaging shall be such that the parts can be identified, inspected and stored for long periods without damage or degradation.
4) Cushioning materials shall be applied to reduce the effect of externally applied shock or vibration.
5) Devices such as relays and meters shall be so blocked and fastened to their main structures that they will withstand rough handling in transit.
6) Parts susceptible to damage by static electricity shall be enclosed in antistatic wrappers.
7) Small parts shall be packaged to prevent dispersal and loss. An itemized list of the contents shall be firmly affixed to the outside of each package.
8) Each unit pack, intermediate pack, and shipping container shall bear markings that meet the requirements of Standard Practice for Commercial Packaging.
8.3 OFFICE AND STORE
1) The Contractor shall be responsible for erecting / arranging his own storage, office and facilities for storage of all items / project management for this contract.
2) No Space for office / store will be provided by DMRC.
3) Contractor’s Project manager and Interface manager shall be stationed in Delhi during Design, interface, installation / commissioning stages.

8.4 DELIVERY
1) The Contractor shall deliver all items supplied under this contract to the site as designated by the Employer.
   a) Delivery of individual pieces of equipment, spare parts, keys, special tools, test equipment, and other deliverables shall be as indicated in the Contract Specifications for the subject deliverable.
   b) Materials shall be delivered undamaged in manufacturers’ original containers, as applicable, packaged as indicated, with identifying labels intact and legible.
   c) Deliveries shall be made in accordance with the Contract Documents, including General Conditions and the Contract Schedule and as approved by the Employer.
   d) Unless otherwise indicated, Contractor shall notify the Employer at least five working days prior to proposed delivery to the placement or set-up site. Unloading at placement site or set-up site shall be performed by the Contractor.
2) The Contractor shall ensure the Site is ready and in good conditions for delivery.
3) The Contractor shall ensure security of the delivered items on Site.
4) The Contractor shall remove of temporary fittings, if necessary, for delivery of his items to site and shall restore the fittings to the original state and to the satisfaction of the Employer.
5) No dangerous goods shall be delivered to the Site.
CHAPTER 9
INSTALLATION

9.1 GENERAL

1) This chapter of the specifications covers placement and connection of the TVM equipment and describes the facilities and provisions available for this work. The Contractor shall set in place and anchor all TVM equipment and shall connect such equipment to power and communication cables.

2) The Contractor shall conduct field surveys and make inspections of all locations where equipment will be placed to ensure that placement provisions, including raceways, wireways, cabling, and anchor bolts, are satisfactory. Surveys and inspections shall be made as necessary prior to the placement of TVM equipment. Any discrepancies that will affect the placement or operation of the TVM equipment shall be reported to the Employer.

3) The Contractor shall supervise all installation of the works and shall ensure all technical, safety and quality matters adhered to the design reviewed by the Employer.

4) The Contractor shall maintain the site in a neat and tidy state at all times. The Contractor shall also clear the site daily before leaving.

5) The Contractor shall take every precaution to protect existing equipment and facilities on site from damage, and shall make good any damage caused. Care shall also be taken not to interfere with the operation of existing equipment.

6) The Contractor shall provide all necessary and sufficient resources such as tools, test instruments, spares, equipment, manpower and communication facilities to complete all the installation activities.

7) The Contractor shall ensure his staff is competent and possess all the necessary skills to carry out the installation in a proper and safe manner.

8) The Contractor shall submit calculation, if required by the Employer, to demonstrate the proposed brackets and mounting methods are sufficient to withstand the wind loading for the equipment.

9) The Contractor shall submit installation method statements for each type of installation activities at least three months before the commencement of the activity to the Employer for review.

10) The installation method statement shall include the details on the methods and procedures of installation, site arrangement, manpower resources,
equipment and tools required. Drawings shall be included to illustrate the
proposed installation details.

11) All installation activities shall commence only after the method statement
and the Employer has reviewed related submissions without objection.

12) The Contractor shall assign competent site supervisors for each work site to
be responsible for all site-related matters.

13) The Contractor shall carry out regular site audit on both technical and safety
matters and maintain records of the site audits. The Contractor shall make
these records available to the Employer for inspection upon request.

9.2 INSTALLATION PROGRAMME

1) The Contractor shall develop and submit to the Employer for approval an
Equipment Placement Plan. The Plan shall include the following:

   a) Schedule for each station.

   b) Tools and equipment required.

   c) Placement drawings.

   d) Step-by-step, detailed procedures for all placement work in the stations,
      including:
      - Pre-delivery of the equipment to the storage;
      - Inspection at the storage facility;
      - Final assembly, if needed, and pre-delivery testing;
      - Delivery to the station site; and
      - Testing.

   e) Procedures for running and terminating of power cabling and control
      wiring, if necessary, between gate consoles.

   f) Contingency plans for placement delays.

   g) Number and qualifications of personnel required.

   h) Time of day that placement will be performed.

   i) Movement of equipment within the station including up and down stairs
      and exact placement and connections.

   j) Identification of interfaces with others.

   k) List of activities required from DMRC or its other contractors.

2) The Contractor shall co-ordinate with relevant Designated Contractors to
agree the date of access to the physical areas to carry out installation
activities.

3) The Contractor shall develop the Installation Programme and take the
following into account:

   a) the Co-ordinated Installation Programme;
b) Key Dates and Milestones given in the Particular Specification;
c) Site access;
d) Interfacing with relevant Designated Contractors.

4) The Contractor shall highlight in his Installation Programme any items, materials, equipment, resources and supports to be provided by the Employer with dates, duration and locations.

5) The Contractor shall also highlight all relevant constraints, which may affect the Installation Programme to the Employer’s attention.

6) The Contractor shall include dependencies between relevant activities in the Installation Programme.

7) The Contractor shall ensure sufficient floats or slacks in all activities and avoid critical paths built in his Installation Programme. In case critical paths cannot be avoided, the Contractor shall highlight any critical paths to the Employer’s attention.

8) The Contractor shall propose contingency plan to ensure all the major Key dates and Milestones can be met in case there is slippage in the installation activities.

9) Any subsequent changes in the reviewed Installation Programme shall be submitted to the Employer for review.

9.3 INSTALLATION WORKS

1) Installation in Equipment Rooms
   The following areas will be provided by Designated Contractors (Civil Works) to install the TVM equipment:
   • Station premises for installation of TVM equipments.

2) Electric power to the equipment room shall be drawn from the nearest power supply switch, as per interface with designated Station contractor. In case electrical power is not available, the contractor shall make his own arrangement at his own cost for installation / testing of TVM.

3) The Contractor shall liaise with the Employer and relevant Designated Contractors for access to the site for installation.

4) The Contractor shall submit the following to the Employer for review at least three months before the commencement of the installation inside the equipment room:
   a) Drawings showing the equipment layouts and positions of the racks, cabinets and enclosures;
   b) Racks, cabinets layout drawings;
   c) Specifications, sample of all the mounting brackets and accessories;
   d) Schematic diagrams and wiring diagrams of the system;
e) Electrical distribution schematics within the room including the earthing details;
f) Cable route diagrams.

5) Installation work inside the room shall be carried only after the Employer has reviewed these submissions without objection.

6) Working in Confined Spaces
The Contractor shall observe the safety precautions under the Factories and Industrial Undertakings (Confined Spaces) Regulations when working in areas defined as Confined Spaces like the equipment room in Metro.

9.4 CABLELING

1) Designated Contractors will provide primary cable trays around station areas for Telecom Contracts. The TVM Contractor can make use of the available primary cable containment for cabling only after approval from the Employer. However, wherever the primary cable trays are not available, it shall be responsibility of TVM Contractor to arrange on his own.

2) The Contractor shall provide all necessary cable containment /conduits and supports in addition to the primary cable containment, if used to complete the connection to the Contractor's equipment.

3) The Contractor shall submit the working drawings with the following details to the Employer for review at least three month before the cabling activities:
   - Cable routes;
   - All cables shall be neatly run and fitted in ducts or conduits

4) All wiring and cabling shall be identified and submitted to the Employer for approval.

5) Any modification or extension to the underfloor ducts shall be performed by the Contractor. The ducts shall be hot dipped galvanized steel cable trays, which shall be supplied and installed by the Contractor. The Contractor shall also repair and make good to the floor after any modification work.

6) Cables shall be terminated within the equipment no less than 300mm above the finished floor surface. Cable entry from the underfloor ducting shall be sealed from the cable duct.

7) The periphery of the equipment base shall be sealed with the floor finish after installation so as to prevent the ingress of water.

9.5 HOUSING, ENCLOSURE AND CABINET

1) All equipment installed shall be able to withstand vibration levels likely to be experienced in railway stations, tunnels and structures.
2) The housing of equipment shall not allow entry of rodents inside the equipment.

3) All design of housing and enclosure shall be submitted to the Employer for review.
CHAPTER 10

VERIFICATION, TESTING AND COMMISSIONING

10.1 GENERAL REQUIREMENTS

1) General
   a) This section of the Specifications covers the requirements for tests to be performed by the Contractor on TVM equipment, special tools, materials and accessories furnished under this Contract. Factory tests shall be performed prior to shipment and field tests shall be performed after shipment. A series of inspections and tests shall be conducted on the pre-production units and production units of equipment in order to:
      - Demonstrate compliance with the Specifications from a physical, operating servicing, and reliability standpoint.
      - Confirm satisfactory operation prior to delivery, after installation, and prior to revenue service.
      - Evaluate efficiency of the equipment in the performance of transactions.
      - Identify potential problem areas.
   b) The Employer reserves the right to inspect all equipment at the Contractor's and Subcontractor's facilities at any time and as often as deemed necessary during manufacture and again prior to preparation for shipment. Equipment shall not be prepared for shipment before the Employer has either inspected the equipment or waived inspection. Any deficiencies found shall be corrected prior to shipment of the equipment. Any inspection or waiver of inspection shall in no way relieve the Contractor of the responsibility of furnishing equipment in accordance with these Specifications.
   c) The Contractor shall perform testing and commissioning activities by stages in accordance with the requirements given in this Specification.
   d) The Contractor shall ensure the system is in a state ready for testing and commissioning before the commencement of the tests witnessed by the Employer. The Contractor may conduct trial tests by himself before the Employer witnesses the tests, if necessary.
   e) Test results of the Contractor's own trial tests shall be made available to the Employer on request before the tests are witnessed by the Employer, to indicate the readiness of the system for tests witnessed by the Employer to commence.
f) The Contractor shall satisfy himself that all items interfacing to Designated Contractors are in satisfactory condition for the Contractor’s tests to be carried out.

g) The Contractor shall provide all necessary test instruments, special tools, emulators, simulators and test software to carry out the tests.

h) The Contractor shall provide simulation for testing in case the interfacing equipment is not available for testing.

i) The Contractor shall extend full support to the Employer and provide all necessary facilities to enable convenient inspection of materials, work and testing.

j) The Contractor shall investigate and provide corrective actions for all the faults detected during the tests. The tests shall be resumed only after all the faults are properly cleared. The Contractor shall submit fault report to the Employer to describe the symptom and causes of the faults and the corrective actions taken.

k) If the operation of other Designated Contractor’s system or equipment is suspected to be interfered by the system during the test, the Contractor shall withhold the test, investigate and provide corrective actions, if necessary. The test shall be resumed only after the interference has been eliminated or found to be not related to the system.

l) The Contractor shall prepare check-off sheets to list all items to be inspected, demonstrations to be presented, and measurements to be made for each piece of equipment. Examples of such items include but not be limited to the following:
   - Fabrication workmanship and quality.
   - Wire and cabling installation, attachments, tags, and connections.
   - Existence of all required features such as a door stop, maintenance telephone jack, bar codes, model and serial numbers.
   - Weight checks.
   - Leakage current measurement.
   - Existence of safety precautions.
   - Primary power and RAM back-up power.
   - Memory storage space capacity.
   - Durability and stress tests.
   - Confirm waterproof and electrically isolated keyboard.
   - Check immunity against water accidentally entered into machine from seepage, splashing or wet tickets and intentional insertion of liquids.
   - EMI interference.
2) **Test Plan**

The Contractor shall submit a Test Plan for the Employer’s approval. The approved plan shall be used as a controlling document for all inspections and tests. The Test Plan shall include, but not be limited to the following information for each test:

- Test title.
- Reference to specification section requiring the test.
- Organization performing the test (Contractor, Subcontractor, independent test
  organization).
- Test location(s).
- Schedule showing dates for submittals of test procedure, test report, and/or certified test document.
- Test start date.
- Test duration.
- Test objectives.
- Test pre-requisites.
- Problem recording, tracking and resolution reporting format.

3) **Test Procedure**

The Contractor shall develop a detailed ‘Test Procedure’ for each test to be performed. Test procedures shall be prepared by equipment type or assembly. The test procedures shall be submitted for approval by the Employer. The test procedures shall include but not be limited to the following:

- Test title.
- Equipment and instrumentation with accuracies and calibration data.
- Test methodology.
- Personnel and equipment requirements.
- Step-by-step procedure to perform the test.
- Test input and expected output.
- Forms to record data, with fields for date, name and signature of persons conducting or witnessing the test.
- Test procedure revision number and date.
- Forms for entering problem descriptions and unique tracking identifier. In the case of problems related to software, problem descriptions shall be entered also into the configuration control software.

4) **Revision**

Based upon the results of the first items tested, the Contractor may initiate ‘Revisions’ to the test procedures. The modified test procedures shall be resubmitted to the Employer for review and shall meet the same submittal
requirements indicated. If the procedures are revised, the complete test shall be re-conducted.

5) **Test Reports**

Within 30 calendar days after completion of each test, the Contractor shall submit three copies of each test report to the Employer for approval. Each report shall document the results obtained and shall include but not be limited to the following:

- Title of test.
- Reference to the Test Procedure number and revision number.
- Location and date of test.
- Test Equipment used, including serial numbers and copies of calibration certificates.
- Printed names and signatures of individuals who performed the test.
- Printed names and signatures of individuals who reviewed the test and test results.
- Printed names and signatures of individuals who witnessed the tests on behalf of the Employer, if any.
- Results including tables, curves, photographs and any additional test data required to support the test results.
- Descriptions of any failures and modifications including reasons for such failures and modifications and names of individuals approving such modifications.

6) **Witnesses**

The Employer shall have the right to witness all tests including factory tests conducted by the Contractor, its contractors, or by independent laboratories. The Contractor shall confirm the date of any scheduled test at least 10 days prior to the test.

7) **Test Responsibility**

a). The Contractor shall be responsible for all tests performed under the Contract including Reliability Demonstration Test (RDT), Revenue Readiness Test and Maintainability Demonstration Test (MDT).

b). The Contractor shall furnish all test instruments and other equipment and materials necessary for performing all tests required.

c). Should there be any loss of TVM equipment or damage to such equipment as a result of tests, the Contractor shall be fully responsible for replacing the damaged equipment and/or repairing such equipment. Replacement of
damaged equipment shall include all costs, including but not limited to, removing damaged equipment, furnishing, transporting, installing and testing replacement equipment.

8) **Rejection and Retesting**

a). Failure of equipment to meet test specifications or ratings shall be sufficient ground for rejection of equipment. Equipment failing to pass the test criteria shall have deficiencies corrected and be retested. If the modifications or changes affect any drawings, diagrams, or other documents submitted to and accepted by the Employer, such drawings or diagrams shall be revised and re-submitted for the Employer’s approval showing the proposed changes before changes or modifications are made on the equipment.

b). Modifications or changes, which do not warrant revisions of any drawing, shall still be furnished to the Employer with notice of the retest schedule. If it is not possible to rework rejected equipment, replacement equipment shall be provided. The requirement for drawings and design calculations of the original unit shall be applicable to the replacement unit. The entire cost of the rework or the replacement unit shall be borne by the Contractor, including retesting and the costs incurred by the Employer to witness the retesting.

9) **Ambient Conditions**

Unless otherwise indicated measurements and tests shall be made at the ambient temperature and humidity conditions that exist within the test area and are typical of the stations in which the equipment will be installed. Whenever conditions must be controlled in order to obtain reproducible results, a fixed set of conditions shall be used of approximately: 45 °C degrees, and 90 percent humidity. Ambient conditions shall be recorded periodically during the test. The Contractor shall be responsible to monitor and control the environmental conditions required.

10) **Demonstration Tests**

The demonstration tests shall be conducted on pre-production units of fare collection equipment. The Contractor shall fully demonstrate the functions and operations of each type of TVM equipment.

11) **PERFORMANCE MONITORING PROGRAMS**

a). **General**

This chapter of the Specifications covers the requirements of performance, reliability and maintainability to ensure long-term performance of the TVM equipment furnished under this Contract. Performance monitoring is also included in order to obtain acceptance and confidence in the calculated levels
of performance. The Contractor shall submit evidence collected from factory
tests and from field tests on the pre-production equipment and on the
production equipment.

The Contractor shall develop and implement a Performance Monitoring
Program to measure the reliability and maintainability of the equipment during
the tests on the pre-production equipment at the factory and in the field, and
on the production equipment once revenue operation has started. Data shall
be obtained from as many sources as practical. The data shall be processed
to produce computer generated reports. The report shall represent the
reliability and maintainability of the equipment by specific unit and by modules.

b). Reliability
The reliability required shall be in accordance with the following table:

<table>
<thead>
<tr>
<th>Parameters</th>
<th>TVM</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCBF</td>
<td>10,000</td>
</tr>
<tr>
<td>MCBJ</td>
<td>20,000</td>
</tr>
<tr>
<td>MTTR</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

c). RELIABILITY TESTS
i. General
The Cycling Test, Field Test, and Reliability Demonstration Test shall be
used to demonstrate the reliability of the equipment as well as to
demonstrate functional requirements. Data shall be recorded as necessary in
order to predict or compute the Mean Cycles Between Failures (MCBF) and
Mean Cycles Between Jams (MCBJ) for each unit of equipment.

ii. Production Field Test.
The production field test shall be the formal Reliability Demonstration Test
(RDT).

iii. Data Collection
- The Contractor shall be responsible for collection of the data and the
calculation of reliability test for all equipments.
- For the Cycling Test and the Field Test if the collected data indicate
that the reliability of the pre-production equipment is below 75 percent
of the specified levels, the test shall be stopped. The source of this
low reliability shall be investigated and the problems corrected before the test is permitted to continue. The Contractor shall submit his plans to achieve the specified 100 percent levels. Retrofit kits shall be prepared as necessary and installed by the Contractor at no additional cost to the DMRC.

- The Contractor shall be primarily an observer and shall participate in the classification of the failures. The Contractor shall respond to reliability levels below those specified. If Contractor's response is unsatisfactory, the Contractor shall stop any further work until the causes of the poor performance are found and corrected.

iv. Reliability Formula

- Mean Cycles Between Failures (MCBF)
- Mean cycles between failures is the average number of equipment cycles that were conducted between chargeable failures. These failures are exclusive of jams.
- \( \text{MCBF} = \frac{\text{Total number of cycles}}{\text{chargeable failures}} \)
- Mean Cycles Between Jams (MCJB).
- Mean cycles between jams is the average number of equipment cycles that were conducted between chargeable jams.
- \( \text{MCBJ} = \frac{\text{Total Number of Cycles}}{\text{Chargeable Jams}} \)

v. Cycle Definition.

The following definition of cycles shall be used.

- TVM- One ticket issued or one smart card issued or reload, or one cancellation.

A ticket jam counts as one cycle.

d). MAINTAINABILITY

i). The maintainability of the equipment is affected primarily by the design. The Contractor shall submit a Maintainability Program as part of the Performance Assurance Plan. The goal of the program shall be to monitor the design and contribute suggestions, which result in minimizing equipment down time and maintenance costs.

ii). Time To Return to Service.

- The Time To Return to Service (TTRS) is the elapsed time for a trained and qualified technician to repair and return a failed piece of TVM equipment to revenue service. The TTRS shall not include travel time.
- The mean TTRS shall be 30 minutes for TVM.
- The 90th percentile TTRS shall be 2 hours for TVM
- The absolute maximum TTRS shall be 24 hours for TVM.

iii). **Time to Perform a Diagnostic**

The time for a trained technician to perform a diagnostic of a failed field replaceable unit on the Primary Maintenance Test Bench shall be no more than 60 minutes.

iv). **Time to repair.**

The Time to Repair a failed secondary maintenance Test Bench shall be less than 2 hours.

v). **Maintainability Report.**

A Maintainability Report shall be submitted to the Employer for approval. The Maintainability Report shall address the following items as a minimum:

- Layout of components, modules, displays, assemblies, and sub-assemblies.
- Identification of Lowest Level Replaceable Units (LLRU).
- Physical requirements of maintenance personnel such as lifting and reaching.
- Test points for quick isolation of faults.
- Built-in test devices such as keypads and displays.
- Fault-diagnostic hardware, firmware, and software for both field and depot use.
- Generation of failure codes.
- Standardization and interchangeability of parts, modules, assemblies, and sub-assemblies.
- Type and quantity of spares required.
- Preventative maintenance and servicing schedules.
- Contractor's recommendations for spare parts policy, including quantities.
  Storage location, availability in the stations or in secondary depots.

The report shall be based on DMRC maintenance philosophy and shall be designed to achieve the specified time to return to service and time to repair. The report shall reflect the results of the tests and the Contractor's experience acquired from other installations with similar equipment.

e). **Failure Review Team.**

A Failure Review Team shall be established to evaluate which failures are chargeable against the Contractor's reliability requirements. The Failure Review Team shall be comprised of one member from the DMRC reliability staff and one from the Contractor's reliability staff, as a minimum. Responsible
parties within these two staffs will initially attempt to settle disputes. The Employer will make a final and binding decision on any disputes that remain unsettled after a period of two weeks.

f). FAILURE REPORTING AND CORRECTIVE ACTION SYSTEM (FRACAS)
   i). General.
   The Contractor shall develop and submit to the Employer a Failure Reporting and Corrective Action System (FRACAS). The FRACAS shall apply to factory and field reliability tests on both the pre-production and production equipment. The FRACAS shall include failure analysis for both hardware components and software modules.

   ii). Reports.
   The FRACAS shall generate a log of failures, detailed failure analysis to the component level, and the corresponding corrective actions. These shall include maintenance review chapters, verification of repair/replacement/restoration, and the results of Employers review of the failure. Reports shall be submitted by the Contractor to the Employer daily during pre-production equipment testing and weekly after production equipment is placed in revenue service.

g). Classification of Failures/Jams
   All failures/jams shall be classified as either "chargeable" or "non-chargeable." Only chargeable failures/jams shall be included in the reliability calculations. The Failure Review Team shall classify a failure/jam as non-chargeable only after review.

   i). Definitions
   Jams are defined as an obstruction to the movement of the ticket media located anywhere within their path that prevents completion of their travel and which cannot be attributable to an equipment malfunction.

   A chargeable failure is defined as the inability of the equipment to perform as specified, unless the failure is caused by one or more of the occurrences listed under "Non-Chargeable Failures/Jams." Only one failure is to be charged per reported incident.

   iii). Non-Chargeable Failures/Jams.
   Failures/Jams that shall be considered as non-chargeable are caused by:

   ▪ Environmental conditions beyond those indicated in the Specifications.
- Clearly incorrect maintenance, abuse or operating practices that are not a result of incomplete or inaccurate operating and maintenance manuals, or incomplete or inadequate training by the Contractor.
- Consumable items that ate at more than 85 percent of their published life span.
- Failure not substantiated by staff/technician.
- Vandalism or misuse by patrons.
- Power failure exceeding battery back-up capacity.

### h). Reliability and Availability Warranty.

In addition to the guaranty and warranty provisions, Contractor shall warrant that each unit of TVM equipment under this Contract will meet the Reliability and Availability requirements for a period of two more years. If these requirements are not met, Contractor shall take immediate corrective action to bring the performance of the equipment into compliance with the requirements without cost to the DMRC. In addition, if performance testing is terminated due to requirements not being met, testing shall be restarted after corrective action by Contractor and warranty period shall be extended accordingly. If at the end of the warranty period, Contractor has been unable to achieve compliance with these requirements, DMRC may, at its option, exercise any and all actions as may be provided by this Contract for default of Contractor due to nonperformance.

### 12) TYPE OF TESTS.

The following tests shall be performed on the pre-production equipment either at the Contractor’s facility or at one of the DMRC facility where pre-production equipment is installed, or both, as indicated:

- Functional Test
- Servicing Test
- Maintainability Test
- Environmental Test
- Interface Test
- Cycling Test
- Field Test

#### A) FUNCTIONAL TEST

The Functional Test shall be a test of all the operating features of the equipment. The Functional Test shall be performed on the pre-production equipment at the
Contractor's facilities. The Contractor shall identify and list all the operating features and test each one. All operating modes, such as primary, secondary and maintenance, and the switching between modes shall be included in the test. The test of the features and operating modes shall be intermixed so that all the test cycles are not performed at one time on the same feature before going to the next feature. The test shall include all boundary conditions that can be anticipated due to either improper passenger action, invalid or partially damaged ticket, or malfunctioning equipment.

B) **SERVICING TEST**

Servicing Test shall be conducted on the pre-production equipment installed at a station. The servicing tests shall check the functions of the equipment that are used by the Revenue field personnel. These tests shall include but not limited to the following:

a) Access to the equipment, door opening, security level entry authorization, door closing, and return to revenue service.

b) Features of the ticket supply such as ease of re-supply, near empty and empty alarms, ticket dispensed counters.

c) Features of captured ticket bins such as ease of removal and replacement from gate consoles, near full and full alarms.

d) Times specified for servicing the equipment.

e) Times to reset and return to service.

f) Transmission to TVM CC of financial summary of the service.

C) **MAINTAINABILITY TEST**

The Maintainability Test shall be performed at the Contractor's facilities and in the station. Functions to be demonstrated shall include but not be limited to the following:

a) All local and TVM CC failure codes and text messages, to the extent that is practical with real failures.

b) Ability to meet the time to return to service requirements stated in Article

c) Menu driven troubleshooting and repair procedures under real failure conditions in revenue and maintenance mode operation.

d) Automatic and continuous self-diagnostic routines.

e) Manual diagnostics with the use of logic analyzers, emulators, or equal and other test equipment useful in isolating and correcting a problem.

f) Ability to meet the time to perform diagnostic.

g) Ability to meet the time to repair.
h) Demonstration of TVM CC operation relative to the TVM equipment.

i) Time to switch between various operating modes.

j) Timing of gate configuration changes.

D) ENVIRONMENTAL TESTS

a). The Environmental Tests shall be performed at the Contractor’s facilities. The tests to be conducted shall include the following:

- Electrical Environment (EMI)
- Shock and Vibration
- Dust Laden Air
- Exposure to Sunlight
- Seismic Protection
- Noise

Environmental tests shall be performed on the TVM equipment to demonstrate compliance with the equipment environmental design requirements.

b) Test Cycle

One cycle of the functional test shall be performed for each of the above tests. Each unit of equipment shall be operational for all tests, and operating status shall be monitored continuously during the test. One cycle of the functional test shall be repeated under ambient conditions immediately after each environmental test. Special tests, such as the EMI test, where conditions are difficult to duplicate shall be conducted with as many machine cycles as necessary to assure immunity from and cause of electro-magnetic interference.

c). TEMPERATURE AND HUMIDITY TEST

The temperature and humidity tests shall be conducted under the following requirements and guidelines:

- The tickets to be used shall be left in the test chamber unwrapped and uncovered during the entire test period.
- One cycle of the functional test shall be conducted at each of the four extreme and achievable combinations of temperature and humidity.
- At least 20 percent of the conducted tests shall be repeated at the two temperature extremes with the supply voltage increased by 10 percent and repeated for a supply voltage decreased by 10 percent.
• All other requirements shall be identical to the tests under ambient conditions.

E) CCHS INTERFACE TEST.

The CCHS Interface Test shall be performed at Test Platform connected with SDC at Shastri Park. The CCHS Interface Test shall test interface data protocol and messages between the TVM equipment, TVM CC and CCHS. The Token issued & card top up by TVM should work on Gate/TOM of AFC system of Phase-I & Phase-II of DMRC.

F) CYCLING TEST

The Cycling Test shall be performed on the pre-production equipment at the Contractor's facilities or at an independent laboratory. The Cycling Test shall represent a realistic accumulation of a maximum number of machine cycles over a minimum time span.

Objectives:

The objectives of the Cycling Test are:

a). Determine with reasonable certainty that the mean time between chargeable failures as indicated in the reliability requirements can be achieved.

b). Obtain with reasonable certainty that the jam rate of tickets is below the limits specified.

c). Obtain with absolute certainty that the cash reconciliation as derived from the audit registers, from electronic storage devices, and from the data to be transmitted through the data interface is within a maximum error of 0.01 percent.

d). Obtain information on modules, assemblies and components wear that will be used to estimate the life of consumable parts.

G) FIELD TEST

The Field Test will be performed by the DMRC on the pre-production equipment installed by the Contractor in a designated station or Test Platform/SDC. The Contractor shall conduct one cycle of the Functional Test and the TVM CC interface Test to confirm that the equipment is functioning properly prior to the start of the Field Tests

a). Maintenance. Maintenance during the test period shall be performed by the Contractor. The DMRC shall have the right to assign its maintenance staff personnel to accompany the Contractor assigned staff during all maintenance
testing during this period. The machine downtime shall not exceed 24 hours for each incident.

b). **Treasury Service.** The DMRC Treasury/Commercial staff will service the equipment during the test and replenishing ticket stock.

c). **Record and Report** Using forms provided by the DMRC, the Contractor shall keep a record of failures and equipment cycles in order to obtain an estimate of MCBF and MCBJ during the test. If possible, automatic transmission of data over telephone lines directly to the Contractor's facility shall be performed to closely monitor the equipment.

d). **Employer's Report:** The Employer will also make observations of equipment performance and customer behavior and report on his/her findings during the course of the test. The Employer will also report on his/her evaluation of other design aspects such as servicing, installation, appearance, and maintainability.

e). **Evaluation and Upgrade.** The pre-production equipment shall be kept upgraded during the course of production to assure that it becomes functionally identical to the production equipment and contains interchangeable assemblies and subassemblies before final delivery to the DMRC.

10.2 **TESTING STAGES**

The Contractor shall carry out testing and commissioning activities in the following phases:

- Factory Acceptance Tests;
- On Site Testing and Commissioning.

10.3 **FACTORY ACCEPTANCE TESTS**

1) The Contractor shall carry out factory acceptance tests at the place of manufacturing. The test shall include, but not be limited to, visual, environmental, electrical and functional tests on each individual equipment and associated Subsystem as well as simulation before delivery of the equipment to the Site.

2) Factory acceptance test shall be carried out for all TVM equipment.

3) The Contractor shall prepare and submit a Factory Test Plan at least three months before the tests. In addition, the Factory Test Plan shall also include the following:

- The program of all the activities related to factory acceptance tests;
- The locations where factory acceptance tests to be carried out;
- The estimated duration of tests activities at each locations; and
- Submission schedule of all the factory acceptance test procedures for equipment and cable.
4) The Contractor shall prepare the factory acceptance test procedures for equipment and cables and submit to the Employer for review.

5) The factory acceptance test procedures shall describe all tests to demonstrate the functional, electrical and physical performance of the equipment and cable under designed environmental conditions.

6) Contractor shall not proceed with production until the Employer issues formal written Production Approval. A satisfactory conclusion and acceptance by the Employer of the demonstration tests with the exception of the Field Test and reports on the pre-production equipment, and acceptance of any deviations shall be mandatory in order for the Contractor to obtain a formal Production Approval. The DMRC will identify required modifications to be made and demonstrated before accepting the results of the tests. Should a major design change be made after the test, the performance of the modified equipment shall be demonstrated and the test results submitted for acceptance. The Contractor shall maintain the pre-production equipment to the latest configuration for hardware and software throughout the Contract duration.

10.4 ON-SITE TESTING AND COMMISSIONING
1) General
   a) The on-site testing and commissioning shall be undertaken in the following phases:
      - Installation Tests;
      - Partial Acceptance Tests;
      - System Acceptance Tests; and
      - Tests on Completion.
   b) The Contractor shall prepare and submit to the Employer for review an On-Site Testing and Commissioning Plan.

2) INSTALLATION TESTS
   a). Installation Tests shall be carried out on individual Subsystem location by location after the completion of equipment physical installation.
   b). The objective of the installation tests shall ensure:
      i). The equipment is installed in accordance with the reviewed design documentation;
      ii). The equipment is installed in accordance with the requirements detailed in this Specification;
      iii). All cables are properly and accurately connected and terminated; and
      iv). All installation works are of acceptable workmanship.
v). The Contractor shall develop procedures for Installation Tests and submit to the Employer for review.

vi). The Installation Test shall not be started unless the Employer has reviewed the test procedures without objection.

vii). All installed equipment shall be physically inspected against all relevant review design documentation.

viii). All the installation test results, physical locations of the equipment and serial numbers shall be captured in the test record forms. The Contractor shall include completed test record forms in the Test Report and submit to the Employer for review.

3) PARTIAL ACCEPTANCE TESTS

a). Partial Acceptance Tests shall be carried out on individual Subsystem location by location, on areas or section basis to verify the functions, performance and services coverage at the stage:

i). After successful completion of the Installation Tests;

ii). After the Subsystems have been configured with correct settings and parameters;

iii). Properly connected to the power supply and can be switched on for Partial Acceptance Tests; and

iv). Before the equipment of different locations are connected up and ready for System Acceptance Tests.

b). The Contractor shall develop Partial Acceptance Tests Plan at least three months before the test.

c). The Contractor shall develop Partial Acceptance Tests procedures for each Subsystem and submit to the Employer for review at least two months before the tests.

d). The Partial Acceptance Tests procedures shall include:

i). Objectives of the Partial Acceptance Tests for all Subsystems;

ii). List of specifications and standards, reviewed design documentation for reference;

iii). Step-by-step test instructions;

iv). List of test instrument and special tools;

v). Test record forms; and

vi). Pass or fail criteria.
e). Where performance across interfaces to Designated Contractors or to other parties is required to be verified during the Partial Acceptance Tests, the Contractor shall include a list of Designated Contractors and the interface test procedures agreed with the relevant Designated Contractors in the Partial Acceptance Tests procedures for the relevant Subsystem.

f). The functional and timing performances of the Subsystems shall be verified against the requirements and relevant international standards.

g). All equipment settings and parameters shall be verified and recorded in the reviewed test record forms.

h). The Contractor shall perform functional check.

i). The Field Test will be performed by the DMRC on the pre-production equipment installed by the Contractor in a designated station or stations for use.

j). The Partial Acceptance Tests are considered completed only if the Employer without objection reviews the Partial Acceptance Tests results.

k). Upon completion of the Partial Acceptance Test, the individual Subsystem shall be operational and ready to be connected to other Subsystems and interfacing systems for testing.

4) SYSTEM ACCEPTANCE TESTS

a). System Acceptance Tests shall be carried out to ensure the System operates in accordance with functional and performance requirements given in the Particular Specification.

b). System Acceptance Tests shall be carried out at the stage:

c). after completion of Partial Acceptance Tests for each Subsystems; and

d). After all individual Subsystem has been connected together and the System as a whole is capable to operate in all respect in accordance with the requirements given in the Particular Specification.

e). The Contractor shall submit a System Acceptance Tests Plan including software quality assurance plan to the Employer for review.

f). The system response time of relevant Subsystems and the System shall be tested and measured.

g). The Contractor shall carry out load test on each Subsystem to verify the designed system capacity and performance in accordance with the requirements given in the Particular Specification under full load condition.

h). The Contractor shall carry out tests on the operation of the System in accordance with the normal operation procedures and emergency operation procedures, which has been reviewed without objection by the Employer.
i). The Contractor shall conduct tests to verify the proper inter-operation among Subsystems.

j). The System Acceptance Tests are considered completed only if the Employer without objection reviews the System Acceptance Tests results.

k). Upon completion of the System Acceptance Tests, the System shall operate in accordance with the functional and electrical performance requirements given in the PS.

l). Prior to placement of the equipment in revenue service, tickets will be loaded by the DMRC into the TOM. A limited Functional Test shall be performed on all units to confirm that the equipment is ready for revenue service. All registers and audits shall be reset to zero or recorded for reference, whichever is appropriate.

m). The Contractor shall provide all necessary support and attendance to the Employer during the Pre-Revenue Operations period in accordance with the requirements given in General Specification.

n). The Contractor shall provide on-Site supports to the Employer in all aspects related to the operation of the System. The Contractor shall also conduct investigation and provide corrective actions for any problems related to the System or the interfaces with the System.

o). The Contractor shall assign competent staff to support the Pre-Revenue Operations as required by the Employer. The persons shall have sufficient skills and knowledge of the System and have involved in either the design, installation or commissioning of the System.

p). The Contractor shall submit a manpower plan to the Employer for review at least 1 month before the commencement of the Pre-Revenue Operations.

q). The manpower plan shall include the organisation chart of the Contractor’s Pre-Revenue Operations supporting group, individual person’s role and responsibility and 24-hour contacts for emergency cases.

5) TESTS ON COMPLETION

a). The Contractor shall carry out Tests on Completion after the completion of the System Acceptance Tests.

b). The Contractor shall co-ordinate with the Employer and with all the interfacing Designated Contractors including CCHS contractor to ensure all the interface test activities are completed in accordance with the program on Completion Plan.

c). The Contractor shall provide all necessary supports, conduct investigation and provide corrective actions, if necessary, to ensure all matters related to interfacing are properly resolved.
d). Within two weeks upon completion of all interface test activities, the Contractor shall submit the test results to the Employer for review.

e). After the Employer without objection has reviewed the test results of all interface test activities, the Contractor shall start the reliability demonstration test in accordance with the reviewed reliability demonstration test plan.

f). The Contractor shall advise the Employer in writing the commencement date of the reliability demonstration test.

g). The reliability demonstration test period shall be at least three months.

h). The Contractor shall submit a reliability demonstration test plan to the Employer for review at least three months before the test.

i). The Contractor shall include the following in the reliability demonstration test plan as a minimum:

- Calculation of the maximum allowable number failures of equipment, Subsystems and System during the reliability demonstration period in accordance with requirements on reliability performance of the equipment, Subsystems and System given in the Particular Specification;
- Definition of relevant failures;
- Pass and fail criteria; and
- Sample of fault logs.

j). During the reliability demonstration test period, the Contractor shall record details of all faults in a fault log which shall include:

- The date and time the fault occurs;
- The date and time the Contractor's staff arrive on site;
- The date and time the fault is cleared and the normal operation is restored;
- The description of the fault;
- The cause of the fault; and
- Equipment or component replaced.

k). All fault logs shall be submitted to the Employer for review.

l). The reliability demonstration test is considered failed if the actual number of relevant failures exceeds the maximum allowable number of failures for any equipment, Subsystems or System identified in the reliability demonstration test plan; and

- Any fault resulted from the design omission or omission error and shall require design modification in order to fix the fault.
• If the reliability demonstration test fails, the Contractor shall provide all
  the necessary corrective actions and rectify the fault to the satisfaction
  of the Employer.

• The reliability demonstration test shall be repeated on the affected Subsystem
  or Subsystems for another two months until the test is successfully completed.

m). Within two weeks upon completion of the reliability demonstration test, the
  Contractor shall submit the test results for the Employer to review.

n). The Tests on Completion are considered completed only if the Employer
  without objection has reviewed all the test results of the Tests on
  Completion.
CHAPTER 11

OPERATION AND MAINTENANCE SUPPORT

11.1 GENERAL

1) The Contractor shall ensure that the design of the software and hardware of the TVM is supportable throughout the service life of the System to address, as a minimum, the following:
   a) Design errors in the system;
   b) Operational changes;
   c) Environmental changes; and
   d) Changes in infrastructure.

2) The Contractor shall ensure that in order to support the Employer during the DLP, personnel are available with the relevant skills and level of competence.

3) The Contractor shall investigate all failures, major failures, repetitive failures, design defects and provide all necessary corrective actions throughout the Contract period.

4) The Contractor shall investigate interference problems either from or to the systems of other Designated Contractors and provide all necessary corrective actions throughout the contract period.

11.2 OPERATION AND MAINTENANCE DOCUMENTATION

1) Maintenance Plan
   a) The Contractor shall submit a Maintenance Plan to the Employer for review before the commencement of installation activities.
   b) The Maintenance Plan shall describe the Contractor’s proposed maintenance regime for preventive and corrective maintenance of the system, including, but not be limited to the following:
      - The maintenance philosophy and approach;
      - All necessary tasks for corrective maintenance; and
      - Frequency of each maintenance task.
   c) The Contractor shall include the following information on each maintenance task described in the Maintenance Plan:
      - The equipment, sub-systems covered in the task;
      - Step by step procedure to carry out the task;
      - Tools and tests equipment list of each task;
      - Diagrams and flowcharts for illustration, if applicable;
      - Recovery procedures, if applicable;
      - Precautions the maintenance personnel to follow; and
• Estimated duration and manpower required.

d) In addition to the Maintenance Plan, the Contractor shall also submit a Yearly Routine Maintenance Schedule to the Employer for review and shall indicate the schedule of maintenance tasks in a calendar year.

11.3 SOFTWARE SUPPORT

1) General
   a) The Contractor shall provide all changes, debugging, updates, modifications and upgrade of all the software developed or delivered for the system if such changes are necessary and in order to maintain the normal operation and meet the requirements given in this Particular Specification.
   b) All changes and modifications of the software shall not degrade the performance or have adverse impacts of the system.
   c) The Contractor shall maintain backup copies of all software developed or delivered for the system.
   d) The Contractor shall ensure that all new versions are fully tested and validated and reviewed without objection by the Employer prior to loading into the system.
   e) The Contractor shall provide training for the Employer's staff for use of new version, if necessary and applicable.

11.4 SECURITY OBLIGATIONS

Within 14 days of the installation of any software, which is developed or modified for this Contract, the Contractor shall submit to the Employer for retention by the Employer two backup copies of the software, which shall include, without limitation:
• All source and executable code;

11.5 SUPPORTS DURING DEFECTS LIABILITY PERIOD (DLP)

1) General
   a) During the Defects Liability Period, the Contractor will provide all maintenance support to the Employer.
   b) The Contractor shall provide workshop repair services of all defective and faulty items of the system.

2) Workshop Repair
The Contractor shall collect and repair defective parts that are removed from the system during maintenance or from the Employer.

a) The Contractor shall perform all necessary adjustments or alignments as to the repaired parts. The repair of defective parts can only be considered as completed and returned to stock or back to the system if the parts are tested and verified fit for use in the system.

b) The Contractor shall use only components of equal or higher specification than the original components in his repair activities.

c) The performance of the defective parts after repair shall not be degraded or deteriorated due to repairing.

d) The maximum turnaround time for workshop repair shall be less than 15 calendar days. The turnaround time is started to count when the defective parts are removed from the system and ended when the parts are repaired and returned to stock or to the system. Any extension of workshop repair time shall be agreed with the Employer.
CHAPTER 12
SPARE PARTS, SPECIAL TOOLS & TEST EQUIPMENT

12.1 SPARES

1) General
   a) The Contractor shall provide his own spares during installation and commissioning period as well as for support during the Defects Liability Period. The Contractor shall also provide separate spares for the Employer to enable the Employer to operate and maintain the system.
   b) Spare parts shall be interchangeable with their corresponding original equipment part, and shall be subject to the same inspections and test requirements.
   c) Logistics, packaging shall be designed to protect the reliability of the parts and shall be such that the parts can be identified, inspected, stored for long periods, and can endure multiple handling without damage or degradation. Spare parts accompanying equipment shall be furnished in storage boxes that conform to commercial standards for weather resistance.
   d) The Contractor shall submit the lists of spares within three months after the Date of Commencement of the Works to the Employer for review. The lists shall include:
      - Grouping by Subsystem, diagnostic and test equipment and special tools, as applicable, for stocking identification; and
      - Detailed description with references and correlation with the maintenance manuals.

2) Contractor’s Own Spares
   a) The Contractor shall keep and maintain sufficient stock of his own commissioning spares and Defects Liability Spares. In addition, in determining the list of spare parts for the commissioning spares and Defects Liability Spares, the Contractor shall provide calculation to support the proposed types and quantities with the following taken into account:
      - The expected failure rate of the parts;
      - Population of the parts in the system;
      - Criticality of the parts in the system;
• Availability and Mean Time to Repair (MTTR) figures of the System;
• Spare delivery lead time; and
• Workshop repair turnaround time.

b) The Contractor shall submit the list of commissioning spares, with the types and quantities of spares the Contractor intends to hold, at least three months before the commencement of installation activity to the Employer for review.

c) The Contractor shall submit the list of Defects Liability Spares, with the types and quantities of spares the Contractor intends to hold, at least three months before the commencement of the Defects Liability Period to the Employer for review.

d) The Contractor shall include details of the stock of the Contractor’s own spares in the monthly progress report. The status of the spares, either in store or under workshop repair, shall also be included.

3) Employer’s Spares
• The Contractor shall submit a list of recommended spare parts to the Employer for review before the commencement of installation work.
• The Employer’s spares recommended by the Contractor shall be of appropriate types and sufficient quantities to support the Employer’s own operation and maintenance of the system for 2 years.

12.2 SPECIAL TOOLS AND TEST EQUIPMENT

1) The Contractor shall provide his own test equipment and tools during the installation, commissioning periods and Defects Liability Period.

2) Special equipment required to perform the placement of TVM equipment shall be provided. The placement equipment shall include templates, gauges, door jacks, bolts, covers, and other special tools required to set in place, adjust, level, and facilitate the physical installation of the TVM equipment. One set of placement equipment shall consist of one full complement of the above noted equipment/tools. Consumables such as bolts and covers shall be furnished in a single batch in sufficient quantity for the placement of all equipment furnished under the procurement.

3) All the special tools provided for the Employer shall not be used on site prior to delivery to the Employer.

4) List of Tools to be proposed by contractor in the attached performa as Appendix 4.1 of PS.
CHAPTER 13
TRAINING AND TRANSFER OF KNOWLEDGE

13.1 GENERAL REQUIREMENTS

1). This section of the specification covers the requirements for a Training Program to train the DMRC maintenance and operations and training personnel. The training Program shall enable the staff to operate, service, enhance, maintain, and interact with, the hardware, software, and firmware, such that the automatic fare collection system and equipment will perform in accordance with the specifications of this contract.

2). The Contractor shall provide comprehensive training to the Employer’s staff, including Employer’s trainers.

3). The Contractor shall provide competent training instructors, training manuals, training simulators, all necessary aids and materials in support of all training courses.

4). The training instructors shall be qualified, competent, with sufficient years of practical experience in the relevant fields and possesses good communication skills.

5). The training instructors shall be competent staff of the Contractor, or the subcontractors or the equipment manufacturers.

13.2 SCOPE OF TRAINING

13.2.1 The training shall be provided by the contractor to the Employer’s personnel in design, manufacturing, testing, system architecture, installation practices. This will cover training in India including training at manufacturing facilities.

13.2.2 ON SHORE TRAINING

Contractor shall submit a training programme for TVM as per the BOQ and minimum in following areas.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Description</th>
<th>Total Period (Trainer/Instructor Man Months)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Design, Operation, Functioning and Maintenance of TVM including its components</td>
<td>1</td>
</tr>
</tbody>
</table>

1 Man Month = 25 Working Days

13.3 TRAINING PLAN

1) The Training Program shall consist of a logically related sequence of separate courses. The Program shall include separate courses, as required, for System and Equipment Operation, System Management Primary Maintenance, and Secondary
Maintenance. The Program shall not be limited to the courses listed if additional courses are required to achieve the Program Objectives.

2) The Program shall utilize classroom, hands-on, and field instruction, as appropriate, and any models, mockups, aids, documentation, and equipment required to implement, sustain, or complete the Program.

3) Within three months after the Date of Commencement of Works, the Contractor shall submit a Training Plan to the Employer for review.

4) The Training Plan shall include, but not limited to, the following:
   a). The program of the training courses and submission schedule of the training materials;
   b). Overview and description of objectives of each training course;
   c). The location where the training courses to be conducted;
   d). Set ups for practical exercises;
   e). The Contractor’s training organisation chart, including the role and responsibilities of individual key persons;
   f). The qualifications and experience of the training instructors; and
   g). Details of training simulators to be provided or developed, if applicable.

13.4 TRAINING COURSES

1). The Contractor shall provide Training Courses on all facilities, systems, equipment, hardware, and firmware, software. Each Course shall be specific, and shall consist of classroom, hands-on, or field training as necessary to accomplish the Course Objectives specified in the Training Program Plan.

2). The Contractor shall provide training courses for each of the sub-systems, including, but not be limited to:
   ▪ TVM System;
   ▪ Audits and Supervisory function

3) The number of trainees from different disciplines shall not be less than:
   ▪ 20 Employer operations staff;
   ▪ 5 of Employer’s maintenance staff;

4) Different types of training courses of each subsystem shall be provided for staff from different disciplines. Operations training courses shall be provided for the operations staff. Maintenance courses shall be provided for maintenance staff. The Employer’s Training Instructors shall attend all types of training courses such that the Employer’s Training Instructors shall be able to subsequently train the Employer’s staff in all aspects of operation and maintenance of the System.
5) The maximum number of trainees of each training class shall normally not be more than fifteen. Class size, which is larger than fifteen shall be subject to the review of the Employer.

6) The Contractor shall determine the number of classes for each type of training course to ensure the objectives of the course can be met.

13.5 OPERATIONS TRAINING COURSES

1) The operations training courses shall be developed to provide all necessary knowledge and skills for operations staff of the Employer to operate the system under normal and emergency situations and recovery from minor or simple faults. In particular, the training course shall include the following as minimum:
   a). Overview of the TVM System;
   b). Brief description of the operation principle of the Subsystem;
   c). Operational features and functions;
   d). Familiarisation and use of all man-machine interfaces involved;
   e). Reading and interpretation of system status and alarm messages or indications;
   f). Normal operating procedures;
   g). Operating procedures under emergency situations;
   h). Procedures for recovery from minor or simple faults; and
   i). Use of Operation and Maintenance Manuals and documentation.

2) Particular exercises shall be included in the operations training course for each trainee to operate and manage the system under normal and emergency operating conditions and simple faults recovery.

13.6 MAINTENANCE COURSES

1) The maintenance courses shall be developed to provide all necessary knowledge and skills:
   a). To perform full maintenance, including both preventive and corrective maintenance, on the System; and
   b). To perform system Employering management including system parameter configuration, enhancement, expansion and provision of new circuits.

2) The Contractor shall determine the content of the courses and the courses shall include the following as minimum:
   a). Overview of the TVM System;
   b). System features and functions;
   c). Operation principles;
   d). Description of system components;
   e). Test and commissioning procedures;
   f). Use of test equipment and special tools;
   g). Reading and interpretation of alarm indications, messages and print-outs;
h). Preventive maintenance procedures;
 i). Fault diagnosis, troubleshooting and corrective maintenance procedures;
 j). Equipment settings and parameters configuration;
 k). Use of equipment manuals, Operation and Maintenance manuals, circuit diagrams and wiring schematics;
 l). Methods and procedures to provide new circuits, system expansion and enhancement;
 m). Data, software backup and loading; and
 n). Use of software such as peripheral control and configuration, utility, database structure, generation and modification.

3) Practical exercises shall be provided for each trainee to practice the following as minimum:
 a). Use of test equipment and special tools;
 b). Preventive maintenance;
 c). Fault diagnosis and troubleshooting with induced faults set by the Contractor to simulate real-life situation; and
 d). Faulty modules or cards replacement and restore the system to normal operation.

13.7 TRAINING MATERIALS

1) Training Aids, Training Materials, and Training Devices shall be of durable construction, and shall become the property of the DMRC on approval of the Training Demonstration, or on approval of the Final Deliverables, as applicable.

2) The Contractor shall provide all Training Aids, Training Materials, Training Devices, Special Tools, fixtures, models, mockups, simulators, or other equipment required to train Course participants.

3) The Contractor shall provide sufficient Training Aids, Training Devices, Special Tools, fixtures, models, mockups, simulators, or other equipment for the number of Course participants.

4) Models, mockups and Training Devices used in the Course shall be connected and configured to simulate the existing environment.

5) Throughout the Contract and Warranty, it shall be the responsibility of the Contractor to supply the DMRC with all changes and revisions to the Training Aids, Training Materials, and Training Devices.

6) The DMRC reserves the right to reproduce all Training Aids, Training Materials, Training Courses, and Training Devices for use in the Training Courses.

7) Training Manuals are a convenient source document for use in the field. The Contractor may prepare Training Manuals in place of the Student Handout Package upon approval by the Employer.
8) Training Manuals shall be separate from Operation and Maintenance Manuals.
9) The Contractor shall prepare Training Manuals, and submit them to the Employer for review and approval at least 60 days prior to the start of the Training Demonstration.
10) Throughout the Contract and Warranty, it shall be the responsibility of the Contractor to supply the Employer with all changes and revisions to the Training Manuals.
11) Training Manuals shall become the property of the DMRC.
   a). The Contractor shall provide the master and thirty-five copies of the Training Manual for each course/subject.
   b). The DMRC reserves the right to copy all Training Manuals for use in Training Courses.
12) At least two months before the commencement of the training course, the Contractor shall submit all the training materials including the trainer's guides, training manual for trainees, training aids and presentation materials to the Employer for review. The training materials shall be prepared in a form allow easy future reproduction.
13) The format of the trainer's guides and training manual for trainees shall be submitted to the Employer for review.
14) The Contractor shall, for each course, distribute two sets of trainer's guides, one set of training manual for each trainee, two sets of trainer's guides and three additional sets of training manual to the Employer before the commencement of the training course.
15) All the training materials shall be accurate and match with the actual design of the System.

13.8 TRAINING RECORDS
1) The Contractor shall keep records on the attendance of trainees.
2) The Contractor shall devise a system, standards in assessing the level of knowledge, understanding of the course content and proficiency of the trainees. The system and standards shall be submitted to the Employer for review four weeks before the commencement of the training course.
3) The Contractor shall issue appropriate training certificate to the trainees who pass the assessment and have over 80-90% attendance.

13.9 TRANSFER OF KNOWLEDGE
13.10.1 Tenderer shall submit the detailed plan of transfer of technology along with MoU with suitable Indian companies or company having proven track record and are working in related areas for all major systems/software.
13.10.2 TOT shall be essential and shall include manufacture system assembly, installation, maintenance and software configuration / source code modification to cover.

1) All configuration/application programmes for TVM system for:
   - Addition, revocation, relocation of equipment to a station
   - Modification of equipment
   - Configuration of all equipment level and EOD parameters
   - Configuration / customization of all MMI, PIDs, displays, information of TVM equipment
   - Source code modification
   - Any other configuration / programmes required for maintenance/up gradation of hardware/software.

2) Modules as specified in Appendix - 3 shall be manufactured in India.

13.10.3 The Transfer of Technology shall also include implementation of TVM software development / customization, networking of station equipments, data cabling, system integration etc. The Tenderer shall submit the detailed plan for progressive implementation of these items in India along with MoU with Indian companies.

13.10.4 The MoU with the local company shall necessarily confirm that the Technology shall be transferred to the Local Company. All software/products shall be jointly owned with DMRC and further DMRC shall have full right to use the knowhow and the software/hardware for its own use in future. The Local Transfer of Knowledge partner shall be bound to extend all necessary assistance in future to DMRC at the market rate in India.

13.10.5 The Contractor shall undertake to supply or make arrangement with the original manufacturer to supply additional equipment required for replacement or expansion of the network in future. The contractor shall undertake to provide, if required during the life of the equipment ordered, technical assistance in the form of additional drawings, maintenance practice and technical advice.
CHAPTER 14

DOCUMENTATION

14.1 GENERAL

1) The Contractor shall submit a Submission Programme. The Submission Programme shall identify all submissions to be submitted, submission titles, submission numbers and target submission dates.

2) The Contractor shall provide configuration management to ensure that the System is correctly configured. The Contractor shall ensure that a configuration control programme is maintained. The programme shall ensure that the configuration of each item is recorded and maintained during the life of the Contract and Defects Liability Period.

3) The Contractor shall submit a configuration management plan to the Employer for review within 60 days of the Date for Commencement of the Works. The Configuration Management Plan shall identify the persons to be responsible and the methods and arrangement to carry out the configuration management.

14.2 SUBMISSION REQUIREMENT

1) General

The Contractor shall include records of amendment in each submission with the following details:

- Revision history and status of the submissions;
- Description on changes for each revision; and
- The Contractor’s signature for authorisation of the submission indicating proper design check has been carried out before the submitting to the Employer.

a) The revision status and date of preparation of the submission shall be clearly indicated at the header of each page of the submission.

b) The first submission shall be revision 0 and subsequent revision shall be A, then B, so and so forth.

c) The Contractor shall maintain records of the submission and updated record shall be included in the Monthly Progress Report. The submission record shall include the following details:

- Submission number;
- Submission title;
- Revision history;
- Status of Employer’s Response for each revision;
• Submission dates and dates of return from the Employer for each revision; and
• Current status.

2) Levels of Submissions
   a) The Contractor shall adopt top-down approach and submit submissions of the following levels in a logical sequence for the review of the Employer:
   • System level related submissions;
   • Equipment level related submissions;
   • Installation design related submissions;
   • Design calculations;
   • Management plans and procedures;
   • Approval certificates; and
   • Miscellaneous submissions.

   b) System level related submissions shall show the total system including the configuration block diagrams, operating principle, system features and functions, capacity, expandability, interconnection within the Subsystem, between Subsystems and between other Project Contractors.

   c) Equipment level related submissions shall show the specifications on electrical, mechanical and functionality of the equipment/materials employed for the System and the Subsystems.

   d) Installation design related submissions shall include:
   • The installation methods and procedures for different types of installation activities;
   • Drawings showing the equipment locations and positions, Subsystems coverage;
   • Schematic and wiring diagrams;
   • Equipment mounting details; and
   • Layouts of equipment, in equipment rooms.

   e) Design calculations shall demonstrate the performance of the System and

   f) Subsystems. Detailed requirements on calculation submissions are given in respective volumes of individual Subsystem
CHAPTER 15
PROGRAMME REQUIREMENTS

15.1 GENERAL
1) The dates of completion of different sections of the Works and the Key Dates are given in this Tender.

15.2 DESIGN
To ensure proper co-ordination of design efforts, the Contractor’s attention is drawn to the tender and award programme for the interfacing Designated Contractors.

15.3 KEY DATES AND ACCESS DATES
Key Dates and Access Dates for various sections have been shown in Appendix 2 & Appendix 2.3 of Schedule of requirement respectively.

15.4 PROJECT MEETINGS

1) General
   a). The Contractor representatives shall attend meetings scheduled by the Employer for the collection and dissemination of information related to the Contract.
   b). The Employer will prepare the agenda and will record the minutes of each meeting and distribute them to each of the participants.
   c). Routine progress meetings shall be conducted at the Employer’s facilities. Meetings requiring demonstration of equipment and major hardware shall be held at the Employer’s facilities, at the Contractor’s or its sub-Contractor’s facilities, as decided by the Employer.

2) Post Award Meeting
A Post Award meeting will be scheduled by the Employer. Before the meeting, the Employer will distribute a notice of the meeting along with an agenda of the subjects to be addressed.

   a) The Employer will perform the following at this meeting:
      • Explain and discuss the responsibilities and authorities of the Employer.
      • Discuss procedures for meetings, project correspondence, and points of contacts for administrative and technical communications.
      • Discuss procedures for shop drawings, product data and other Contract submittals.
      • Discuss procedures for processing change notices and change orders.
      • Discuss monthly progress estimate cut-off dates.
      • Discuss progress and final payments.
   b) The Contractor shall perform the following at this meeting:
Introduce Contractor representatives and briefly describe each person’s responsibilities. Provide an organization chart-identifying managers of all departments, lead Employees, quality control staff and subcontractors.

Introduce the major sub-contractors representatives and their scope of work.

Discuss design and manufacturing schedule and the sequencing of entire Contract.

Provide an overview of the basic design concepts and point out where design efforts will be most critical to the success of the program.

Discuss breakdown of lump sum items in the proposal form.

3) **Progress Meetings**

   a) Progress meetings shall be held each month, and weekly when equipment placement starts, or as scheduled by the Employer, for the complete and timely execution of the Contract. Progress meetings shall include representatives of subcontractors who are or will be performing work during the coming weeks.

   b) The Employer will:

   - Distribute notices of progress meetings to the Contractor who shall forward notices to sub-contractors engaged in the Work, and all those expected to be engaged in the work before the next scheduled meeting.
   - Prepare the agenda.

   c) The agenda for progress meetings will include the following:

   - Introduction of new attendees and areas of responsibility.
   - Review of minutes of previous meetings, amendment of minutes if necessary, and acceptance of minutes.
   - Analysis of work accomplished since previous meeting, design issues, fabrication, product delivery, schedule changes, problems arising from proposed changes, and other circumstances which might affect progress of work Contractor shall have an updated schedule showing all activities started, completed, and ongoing during previous month and all activities scheduled for the next month.
   - Discussion of sequence of work and Progress Schedule. Contractor shall report on all activities which are forecasted to be completed beyond the approved schedule date(s) and shall identify means of maintaining the approved schedule.
   - Discussion of work quality observations, problems, and employee work standards as they pertain to successful completion of the Contract.
- Discussion of changed conditions, time extensions, and other relevant subjects as they affect the progress of the work.
- Discussion of corrective measures to maintain progress schedule when necessary.
- Discussion of upcoming month's work.

d). Inquiries, requests for information, and requests for solutions of problems presented during such meetings shall be answered, when possible, during the meeting; those not answered during the meeting shall be resolved, documented and delivered in person or fared to the person requesting the information within 10 working days of the close of the meeting. The Employer will develop and maintain an action item list which will indicate items to be resolved, person assigned to follow or resolve, and anticipated date for resolution. Answers provided orally at the meetings shall be recorded in the minutes.

4) **Special Meetings**

Special meetings will be scheduled by the Employer as the Employer deems necessary.
### Appendix 1

#### List of Stations

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<tr>
<th>S.No.</th>
<th>Station</th>
<th>S.No.</th>
<th>Station</th>
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<tbody>
<tr>
<td>1</td>
<td>Inderlok</td>
<td>1</td>
<td>DW - Sector 21 to Noida City Centre</td>
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<td>2</td>
<td>Kirti Nagar</td>
<td>2</td>
<td>DW - Sector 6</td>
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</tr>
<tr>
<td>28</td>
<td>Ghitorni</td>
<td>1</td>
<td>Laxmi Nagar to Vishal</td>
</tr>
<tr>
<td>29</td>
<td>Arjan Garh</td>
<td>2</td>
<td>Preet Vihar</td>
</tr>
<tr>
<td>30</td>
<td>Guru Dronacharya</td>
<td>3</td>
<td>Karkarduma</td>
</tr>
<tr>
<td>31</td>
<td>Sitaparpur</td>
<td>4</td>
<td>Karkarduma</td>
</tr>
<tr>
<td>32</td>
<td>MG Road</td>
<td>5</td>
<td>Anand Vihar ISBT</td>
</tr>
<tr>
<td>33</td>
<td>Sector 5</td>
<td>6</td>
<td>Kaushambi</td>
</tr>
<tr>
<td>34</td>
<td>Huda City Centre</td>
<td>7</td>
<td>Vishal</td>
</tr>
</tbody>
</table>

#### Rithala - Balashad Garden

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dilshad Garden</td>
</tr>
<tr>
<td>2</td>
<td>Jhilml</td>
</tr>
<tr>
<td>3</td>
<td>GTB Enclave</td>
</tr>
<tr>
<td>4</td>
<td>Shahnara</td>
</tr>
<tr>
<td>5</td>
<td>Welcome</td>
</tr>
<tr>
<td>6</td>
<td>Seelampur</td>
</tr>
<tr>
<td>7</td>
<td>Shastri Park</td>
</tr>
<tr>
<td>8</td>
<td>Kashinri Gate Rai</td>
</tr>
<tr>
<td>9</td>
<td>Tis Hazari</td>
</tr>
<tr>
<td>10</td>
<td>PulBangash</td>
</tr>
</tbody>
</table>

#### Central Sectt. to Badarpur

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sachivalaya</td>
</tr>
<tr>
<td>2</td>
<td>Khan Market</td>
</tr>
<tr>
<td>3</td>
<td>JLN Stadium</td>
</tr>
<tr>
<td>4</td>
<td>Jagipura</td>
</tr>
<tr>
<td>335</td>
<td>Lajpat Nagar</td>
</tr>
<tr>
<td>6</td>
<td>Moolchand</td>
</tr>
<tr>
<td>7</td>
<td>East of Kailash</td>
</tr>
<tr>
<td>8</td>
<td>Nehru Place</td>
</tr>
</tbody>
</table>

- Sachivalaya to Kalkaji Mandir
- Khan Market to Govindpur
- JLN Stadium to Okhla
- Jagipura to Jasola
- Lajpat Nagar to Sarita Vihar
- Moolchand to Mohan Cooperative Ind. Estate
- East of Kailash to Tughlakabad
- Nehru Place to Badarpur Border
### Schedule of Key Dates for TVM

<table>
<thead>
<tr>
<th>S No.</th>
<th>Description</th>
<th>Dated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Detailed Design Finalisation(Submission)</td>
<td>D0 + 2 months</td>
</tr>
<tr>
<td>2</td>
<td>Finalisation and approval by DMRC</td>
<td>D0+3 months</td>
</tr>
<tr>
<td>2 A</td>
<td>Start of Trial for TVM in Delhi</td>
<td>D0 + 4 Months</td>
</tr>
<tr>
<td>3</td>
<td>Integration of TVM CC with CCHS, Integration of TVM with TVM CC, Integration of DMRC SAM with TVM card Reader, Integration of Credit/debit card reader with TVM</td>
<td>D0 +7 months</td>
</tr>
<tr>
<td>4</td>
<td>TVM equipments shipment</td>
<td>D0 + 7 months</td>
</tr>
<tr>
<td>5(a)</td>
<td>Commissioning of TVM at all Stations</td>
<td>D0 + 12 months</td>
</tr>
<tr>
<td>7</td>
<td>DLP (Defect Liability Period)</td>
<td>2 years from the date of taking over of the respective Line</td>
</tr>
</tbody>
</table>

DO is the date of issue of Purchase order.
<table>
<thead>
<tr>
<th>S.No.</th>
<th>Station</th>
<th>TVM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dilshad Garden to Rithala</td>
<td>42</td>
</tr>
<tr>
<td>2</td>
<td>Inderlok to Mundka</td>
<td>32</td>
</tr>
<tr>
<td>3</td>
<td>Jahangirpuri - Huda City Centre</td>
<td>68</td>
</tr>
<tr>
<td>4</td>
<td>Central Secretariat to Badarpur</td>
<td>32</td>
</tr>
<tr>
<td>5</td>
<td>Dwarka Sector 21 to Noida City Centre</td>
<td>86</td>
</tr>
<tr>
<td>6</td>
<td>Yamuna Bank to Vaishali</td>
<td>14</td>
</tr>
<tr>
<td>7</td>
<td>Terminal, Interchange &amp; other important stations</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td><strong>Grand Total</strong></td>
<td><strong>300</strong></td>
</tr>
</tbody>
</table>
## List of spare modules, spares and consumables

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Spares</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power cables</td>
<td>150 meter</td>
</tr>
<tr>
<td>2</td>
<td>Data cables</td>
<td>150 meter</td>
</tr>
<tr>
<td>3</td>
<td>Electrical Cabinet</td>
<td>8 nos.</td>
</tr>
<tr>
<td>4</td>
<td>Tool Kit Sets</td>
<td>8 nos.</td>
</tr>
<tr>
<td>5</td>
<td>TVM complete modules (except cabinet)</td>
<td>8 sets</td>
</tr>
<tr>
<td>6</td>
<td>Cryptoflex R/W modules</td>
<td>8 nos.</td>
</tr>
<tr>
<td>7</td>
<td>Various size Patch chords</td>
<td>8 nos.</td>
</tr>
<tr>
<td>8</td>
<td>RJ 45 Male connector</td>
<td>8 nos.</td>
</tr>
<tr>
<td>9</td>
<td>RJ 45 Female connector</td>
<td>8 nos.</td>
</tr>
<tr>
<td>10</td>
<td>MCB &amp; ELCB (Merlin Gerin make or similar) 10A</td>
<td>15 nos. of each type</td>
</tr>
<tr>
<td>11</td>
<td>All Consumables</td>
<td>5% of installed quantity</td>
</tr>
<tr>
<td>12</td>
<td>Cryptoflex Cards</td>
<td>15 nos.</td>
</tr>
<tr>
<td>13</td>
<td>Fuse of various ratings used in the TVM</td>
<td>50 nos. for each rating</td>
</tr>
<tr>
<td>14</td>
<td>Any other modules/items necessary for TVM operations</td>
<td>5% of installed quantities</td>
</tr>
</tbody>
</table>

Appendix- 2.2
## Schedule of Access Dates for AFC

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Section</th>
<th>Access Dates for Station Concourse</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Line 1, 2 &amp; 3,4,5,6</td>
<td>Available</td>
</tr>
</tbody>
</table>
Appendix 2.4

Physical dimension of Smart Token and Smart Card

<table>
<thead>
<tr>
<th>Physical characteristics of Contactless Smart Card</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Card geometry</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physical characteristics of Contactless Smart Token</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Item</strong></td>
</tr>
<tr>
<td>1) Diameter</td>
</tr>
<tr>
<td>2) Thickness</td>
</tr>
<tr>
<td>3) Weight</td>
</tr>
<tr>
<td>4) Shape</td>
</tr>
</tbody>
</table>

Drawing of station
### Appendix 3

**List of module compulsory to be manufactured in India**

<table>
<thead>
<tr>
<th>Module Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Touch Screen Unit</td>
<td>The Touch screen unit will allow passengers to select destination Stations, No. of tokens or Add value amount</td>
</tr>
<tr>
<td>Token Issuing Module</td>
<td>Token Issuing Module (TIM) is device to save and record the data in Contactless Smart token and it returns Contactless Smart token to Token/Coin outlet.</td>
</tr>
<tr>
<td>Credit/debit Card Module</td>
<td>The credit/debit card module is used for credit/debit card Payments in Contactless Smart Cards add value function.</td>
</tr>
<tr>
<td>Report/Receipt Printer</td>
<td>Report printer can print the accounting data.</td>
</tr>
<tr>
<td>Power Supply Unit</td>
<td>Power supply unit (PSU) consistently provides the AC, DC Electronic power to TVM.</td>
</tr>
</tbody>
</table>
**EQUIPMENT PARAMETERS**

**(SYSTEM LEVEL)**

**TOM PARAMETERS**

<table>
<thead>
<tr>
<th>EOD Name</th>
<th>Value</th>
<th>Unit</th>
<th>No Configurable by EOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>NbTransactionDisplay</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Operator action Timeout</td>
<td>86400</td>
<td>s</td>
<td></td>
</tr>
<tr>
<td>CSC R/W Max Consecutive Errors</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AgentPIN_EntryRetries</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MaximumTicketsIssued by BIM</td>
<td>2000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AuthenticationPeriod</td>
<td>86400</td>
<td>s</td>
<td></td>
</tr>
<tr>
<td>Number of Function</td>
<td>9</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>TransactionSendTime</td>
<td>300</td>
<td>s</td>
<td></td>
</tr>
<tr>
<td>Audir Send Time</td>
<td>780</td>
<td>s</td>
<td></td>
</tr>
<tr>
<td>EventLogSendTime</td>
<td>960</td>
<td>s</td>
<td></td>
</tr>
<tr>
<td>TimeWithout SC Answer</td>
<td>60</td>
<td>s</td>
<td></td>
</tr>
<tr>
<td>CloseShiftTime</td>
<td>86400</td>
<td>s</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>--------</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>BonusPercentValue</td>
<td>10</td>
<td>s</td>
<td></td>
</tr>
<tr>
<td>BonusThreshold</td>
<td>0</td>
<td>Rs</td>
<td></td>
</tr>
</tbody>
</table>

**FunctionTypeList**

<table>
<thead>
<tr>
<th>OpFunctionType</th>
<th>OpReceiptselect</th>
</tr>
</thead>
<tbody>
<tr>
<td>0: TicketIssue</td>
<td>2: Receipt enabled on demand by operator</td>
</tr>
</tbody>
</table>

**TicketSaleDefinitionList**

<table>
<thead>
<tr>
<th>Ticket Type ID</th>
<th>Default add value</th>
<th>Min of add value</th>
<th>Max of add value</th>
<th>Step of add value</th>
<th>Max of stored value</th>
<th>Ticket Deposit</th>
<th>Refund Authorized</th>
<th>Refund Charge</th>
<th>Open Ticket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1: Yes</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ticket Validity Duration mode</th>
<th>Ticket Validity Duration</th>
<th>Sale Price Mode</th>
<th>Sale Fixed Price</th>
<th>Media Type Index</th>
<th>OverStayin gFeeIndex</th>
<th>UnderFare fee index</th>
<th>Entry/Exit mismatch fee index</th>
</tr>
</thead>
<tbody>
<tr>
<td>2: Fixed Day (24 Hours)</td>
<td>1</td>
<td>1: Origin / Destination calculated</td>
<td>0</td>
<td>1: Blue Token</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**BUSINESS RULE**

Version – IX

**Business Rules for Fare Collection System of DMRC**

I. **Business Day Hours:** From 05:55 Hrs of today to 00:17 Hrs of next day.

II. **Rules Pertaining to Cash Collection through AFC System**

1. Types of Fare Products

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Ticket Type</th>
<th>Type of Fare Product</th>
<th>Fare Product Name</th>
<th>Fare Product Code</th>
<th>Reference Para No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Contact Less Smart Token (CST)</td>
<td>One Time Travel Purpose</td>
<td>Single Journey Token</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Exit Purpose</td>
<td>Paid Exit Token</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>Free Exit Token</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Contact Less Smart Card (CSC)</td>
<td>Store Value - 2</td>
<td>Daily Commuter Card</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Store Value - 5</td>
<td>DMRC / Citibank Co-Branded Smart Card</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Store Value - 6</td>
<td>Key Chain Smart Card</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Tour Card - 1</td>
<td>Tourist Card</td>
<td>21</td>
<td>9</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Tour Card - 3</td>
<td></td>
<td>23</td>
<td></td>
</tr>
</tbody>
</table>
2. Contactless Smart Token

2.1 Colours of Token: - There are different coloured tokens viz. Red, Blue and Black. All colour forms of tokens may be used in issuing of Single Journey Token, Paid Exit Token or Free Exit Token.

2.2 a). Issue of Single Journey Token: - The Single Journey Token can be issued from TOM/CCC. Generally Single Journey Tokens will be issued from TOMs. However, in need tokens may also be issued from CCCs.

b). The maximum number of Token, which is to be issued by the operator to a passenger, is six.

2.4 Electronic Validity of tokens: - The token shall be valid for use on the Business Day of purchase only.

2.5 Maximum Permissible Length of Time to stay in paid area:
   I. The maximum permissible length of time to stay within the system shall be 140 Minutes i.e. from entry at a station and exiting from another station.
   II. The maximum permissible length of time shall be 20 minutes between entry and exit from same station.

2.6 (i) Refund of Single Journey Token: - The refund of a Token is only permissible from CCC. The Refund shall be granted at full amount only. There shall never be partial refund of value.

(ii). The refund of an unused Single Journey Token is permissible within 60 minutes of issuing of token from token issuing station only.

(iii). When entry and exit from same station is sought, no refund shall be permissible and the gate will capture the token.

The engraved ID of the refunded tokens must be written on the back of the SAF along with its status as refund. The refunded token shall be kept separately and submitted to SCR after end of shift. These tokens can be added up in token stock of the after end of Business Day.
(v). **Refund of a Partially Used Single Journey Token:** Refund of partially used Single Journey Token is not authorised. However, in case of failure in revenue services, refund of partially used token will be granted at full amount by implementing **Incident Fare Mode only.** The rules for implementation of Incident Fare Mode are described in Para 12.5.d.

2.7 **Entry – Exit Mismatch**

In event of Entry/Exit mismatch on a Single Journey Token, surcharge will be levied according to following rules: -

I. **Mismatch at Entry (Error Code 110):**
   a) This error comes at entry, when the passenger shows two times at the entry i.e. proper entry/exit sequence has not been followed.
   b) The penalty amount shall be adjusted to ‘Zero’.

II. **Mismatch at Exit (Error Code 109):**
   a) This error comes when passenger tries to exit with a token without 'a proper entry recorded' in it.
   b) The penalty amount is adjusted to zero. In case there is a mismatch at exit and patrons have also overstepped their journey, the surcharges will be collected as per Para. 2.8.II.

2.8 **Penalties and Surcharges on Single Journey Token**

I. **Charges for overstaying in system (Error Code-159):** A penalty at the rate of Rs.10/- per hour subject to maximum of Rs.50/- will be charged for overstaying in the system beyond the permissible time limit as explained in Para 2.5. The surcharge amount shall be adjusted in the same token and let passenger to exit using the same token under supervision of CCC operator.

II. **Under fare (Error Code-31):** Once a patron has purchased a token/ticket for any destination, he is authorised to travel to any destination in the direction of his travel in terms of subsection 69 (2) of the metro railway (O&M) Act 2002. If in the direction of travel, he oversteps his journey beyond the destination for which he has paid the fare, he will have to pay additional fare of the overstepped distance only. CCC Operator will do adjustment in the same token/ticket. However, if he is caught trying to exit the gate (tailgating, jumping over the gate etc) without paying the difference of fare, he will be...
liable to pay excess fare of Rs 50/- in addition to difference in fare of the overstepped distance.

2.9 Errors on Token

2.9.1 Read Ticket Error: -

a) Read Ticket Error at entry gate: - CCC operator has to first re-issue this token for minimum fare value and ‘cancel’ the same transaction without removing token from CSC/CST reader/writer. During this re-issue and cancel of the token, there should not be any transaction in between. Now the token is ‘proper’ and can be given to passenger for entry.

b) In case above method does not work then this token should be sent to RCC as per Outstanding procedure. A fresh token as per desire of passenger is to be issued and same amount should be claimed through outstanding procedure.

c) Read Ticket Error at exit gate: - CCC operator shall collect such token from passenger and issue Free Exit Token with due consent of Station Manager/Station Controller to the passenger and let him exit in personnel supervision. The operator will submit all such type of tokens to the Station Controller after end of shift and such tokens should be sent to Revenue Cell at the month end as defective.

2.9.2 MAC Error (Error Code 167): -

a) At Entry: - CCC operator shall analyse the token, as this token is readable, note down the zone for which the token was issued. Refund this token using AFC system. Issue a fresh token of the same zone, as noted during analysis, to the passenger. The passenger will travel using the new token issued to him. The refunded token shall be deposited to SCR after end of shift as refunded token. In case MAC Error token is non-refundable, then this token should be sent to RCC as per Outstanding procedure. A fresh token of the analysed denomination shall be issued to passenger and same amount should be claimed through outstanding procedure.

b) At Exit: - If the value of the token is equal to the fare between the issuing station and exiting station, the CCC operator will collect this token from passenger and let the passenger exit using ‘Free Exit Token’ under personnel supervision. The collected token will be deposited in SCR along with SAF and cash. Such tokens shall be included in station stock at the end of Business Day.

c) If the MAC Error token is under-fare token, surcharge equal to less-amount paid should be collected from passenger manually before issue of ‘Free Exit Token’. The collection of surcharge should be done through Manual Receipt Book named “Money Receipt for
Sale of Application Form / Document for Shop / Stall / Kiosk”. The amount collected and physical ID of Token should be mentioned on the receipt. This amount should be declared separately as this amount will not be included in AFC End of Shift Report. The operator will submit all such type of tokens as loose to the Station Controller. Such tokens should be added in the stock after end of the day.
2.9.3 Write Ticket Error (WTE): -
If WTE comes during issue/adjustment of tokens, then acknowledge the WTE by pressing ‘OK’ button or ‘Enter’ key, now the value of the token will be entered onto the token, and this token can now be given to passenger for further transactions.

2.9.4 Error Code 156: -
This error is shown when TOM operator gives ‘Un Issued’ token to the passenger. It shows that the TOM operator has handed over the ‘Un Issued’ token to the passenger without issuing through TOM. The concerned TOM operator will replace the token to passenger without taking any charge. The CCC operator shall inform to Station Manager/Station Controller to take appropriate action against the TOM operator.

2.9.5 Error Code 163: -
This error shows that the tokens basic data has become corrupted. Such token shall be deposited in SCR after end of shift as defective token. Such tokens should be submitted to Revenue Cell for further analysis.

2.10 The engraved ID of tokens collected at CCC/TOM on account of Refund/Defective/Errors should be mentioned on back of SAF form along with their status.
The collected tokens will be deposited into SCR after End of Shift along with cash and SAF. The loose tokens collected through Refund/MAC Error in entire of the Business Day will be added to Station Stock in the night before start of next Business Day.

The tokens collected as Defective will be kept separately and returned to Revenue Cell after end of month along with Balance Sheet.
3 **Paid Exit Token: -**

If a passenger found without valid ticket in paid area of a station, the passenger shall be let exit using Paid Exit Token. The cost of the Paid Exit Token shall be equal to sum of excess charge of Rs 50/- and Maximum Fare of the System. Issuing of AFC generated print receipt is mandatory.

a) Paid Exit Token, once issued should not be cancelled and refunded.

b) If passenger produces the token after the realization of penalty then the amount will not be refunded to passenger. Such tokens are to be collected by operator as DMRC’s property and mention its engraved ID on back of SAF and deposit it in SCR. The collected token shall be added in station stock at end of Business Day.

4 **Free Exit Token: -**

Issued to patron in exceptional circumstances when patron is unable to exit from paid area as explained below: -

a. If passenger is having a token with ‘Read Ticket Error’ at exit point.

b. If the passenger having token with ‘MAC Error (Error Code 167)’ of proper fare at exit point.

c. In case the flap does not open even after inserting the token in the exit gate.

d. In case the flap does not open even after proper deduction of amount from Smart Card of patron.

e. The reason for issue of ‘Free Exit Token’ must be mentioned on Surcharge register. The issue of ‘Free Exit Token’ should be issued in consent with Station Controller/Station Manager.
5 Contact-less Smart Cards (CSC)

5.1 Initialization of Smart Cards: - Smart Cards will be initialised after delivery from manufacturer at Bulk Initialization Machine (BIM) located at OCC at zero value. These cards will be distributed to stations for sale.

5.1.2 The initialised Contact-less Smart Cards can be sold to passengers in the form of Store Value Cards or Tourist Cards.

5.2 Sale of Smart Cards: - Contact-Less Smart Cards can be sold from CCCs only unless some TOMs are permitted under special instructions by competent authority.

5.3 Replacement of lost Smart Card: - Lost Smart Card shall neither be replaced nor be refunded. Blacklisting of such Smart Card shall not be done. DMRC shall not be liable for the loss of Smart Card.

5.4 Validity of Smart Cards: - The Validity of Smart Cards is according to issued fare product. After expiry of Smart Card, the Smart Card needs to be refunded.

5.5 Sequence of use of Smart Card: - The sequence permitted will be that of Entry-Exit. Every entry will have to be followed by a valid exit. Mismatch for the permitted sequence will be penalised at CCC as per penalty procedure of DMRC, except in case of exit having been made due to emergency / incident.

5.6 If a passenger performs entry and exit from same station, under normal fare mode, a fare of Rs 16/- will be deducted from his stored value of the Smart Card (SV-2, SV-5, SV-6) at the time of exit without recourse to CCC. Maximum period of stay within paid area for entry/exit from same station is defined as 20 minutes. For stay beyond 20 minutes a penalty at the rate of Rs 10/- per hour subject to the maximum of Rs 50/- shall be charged.

5.7 If a passenger performs simultaneous entry and exit at a station, i.e. making pseudo entry or exit at AFC gates, a penalty of Rs 80/- will be imposed on passenger. Manual penalty receipt will be issued to passenger. If a passenger has been penalised inside paid area and exit has been recorded, a Free Exit token will be issued to the passenger for exit purposes.

6 Daily Commuter Smart Card (SV-02)
6.1 **Issue of Store Value -2 Smart Cards:** A Security Deposit of Rs.50/- is to be taken at the time of sale of Smart Card and Add Value of Rs.50/- shall be done at the time of sale. Initially at the time of Store Value-2 Smart Card sale a card shall cost Rs.100/- to commuters.

6.2 **Add Value Operation:** Add Value in Smart Cards shall be done by minimum of Rs.100/- and thereupon in multiples of Rs.50/- i.e. 100, 150, 200, 250, 300 etc.. Operator should check the Error 109, 110 and 159 before making any Add Value in Smart Cards. Add Value on Smart Cards can be performed from paid as well as unpaid area of stations.

6.3 **Total Maximum Possible Store Value on SV-2 Cards:** The total maximum value on a SV-2 Smart Card shall be Rs. 1000/-. 

6.4 **Minimum Value Require to enter in Metro System:** A minimum balance equivalent to minimum fare is required to enter in paid area and for travel.

6.5 **Negative Balance:** A Smart Card having balance equal to more than minimum fare value is allowed to enter in paid area of a station. If a passenger performs travel of value more than the balance in Store Value card, the difference will be created as Negative Balance on Smart Card. This negative balance will be adjusted at the time of the subsequent Add Value operation on the Smart Card or at the time of refund of Smart Card it will be adjusted from Security Deposit amount.

6.6 **Period of Validity of Electronic Value of Store Value Smart Card:** Electronic Value of Store Value Smart Card will have a validity of one year from the date of last Add Value Operation.

6.6.1 The Validity of Store Value Smart Card shall extend to further one year from last Add Value Operation date.

6.6.2 After expiry of Store Value of Smart Card, the Smart Card shall be refunded.

6.7 **Discount:** A discount of 10% will be given on every journey made by the passenger.

6.7.1 The discount shall not be applicable, if passenger made entry and exit from same station.

6.7.2 The discount shall not be applicable in case of entry/exit mismatch.

6.8 **Refund of Store Value Smart Cards:** The Smart Cards can be refunded from CCC only.

6.8.1 **Refund of Electronically Readable Store Value Smart Cards:** During refund, processing charges of Rs 5/- will be chargeable. Hence, the Electronic Balance plus (+) Security Deposit minus (-) Rs 5/- will be refundable i.e. while refunding, Rs 5/- will be
deducted from sum of electronic balance and Security Deposit. Bonus amount (if any) is not refundable. This is applicable both for physically damaged and physically ok electronically readable cards.

6.8.2 **Refund of Electronically Unreadable Store Value Smart Cards:**

6.8.3 Unreadable cards will be submitted / collected only at CCCs of stations.

6.8.4 Unreadable Smart Card deposited in full i.e. all the broken pieces must be intact, may only be considered for refund of balance amount.

6.8.5 The CCC operator will give proper receiving of the card to passenger in “Unreadable Card Receipt Book” duly filling all columns.

6.8.6 After end of shift the CCC operator will submit Unreadable Cards with details to on duty Station Controller. On duty station Controller will cross verify the status of physical condition of card. Station manager will be final authority to declare the physical condition of Unreadable card.

6.8.7 Station Manager will monitor the record on daily basis.

6.8.8 Station Manager is empowered to judge the physical condition of unreadable card. Any discrepancy found while submitting Unreadable Card Case or granting manual refund will be sole responsibility of Station Manager.

**Process of Submission and refund of Unreadable Cards with legible ID**

6.8.9 The details of only Visible ID unreadable card cases will be submitted online on daily basis by on duty station controller on web address [http://172.16.10.10/revenue/login.php](http://172.16.10.10/revenue/login.php).

6.8.10 Before on line submission of details of Unreadable Cards, Station Manager / Station Controller will crosscheck the details of unreadable cards like physical condition, engraved ID, etc.
6.8.11 The summary (ANNEXURE-‘A’) of the visible ID Unreadable Cards and cards will be segregated by physical condition i.e. physical OK or Damaged have to be submitted on periodic basis (01-10, 11-20 & 21-31) within five days after period ends.

6.8.12 The online submitted details of Unreadable Cards by stations will be submitted to AFC for analysis and refundable value details on daily basis.

6.8.13 System analyst (AFC) will analyze the detail of Unreadable Cards and certify the remaining refundable value of Smart Card.

6.8.14 Within four working days of the online submission of Unreadable Cards details, the refundable value of Unreadable Cards will be uploaded on http://172.16.10.10/ts/index.php/revenue.html. In case the reply is not found on the given web address, the same should be reported to Revenue Cell immediately.

6.8.15 If the refundable details of the unreadable cards is remarked as details required, the station has to submit additional information from passenger in the attached format (ANNEXURE-‘D’) and submit it to Revenue Cell immediately.

**Process of Submission and refund of Unreadable Cards with illegible ID**

6.8.16 The collected illegible ID Unreadable Smart Cards and their details with ANNEXURE “C” will be submitted (in physical) to Revenue Cell on daily basis. And Revenue Cell will further submit these cases to AFC for analysis and refundable value details.

6.8.17 Further, refundable details provided by AFC will be uploaded on http://172.16.10.10/ts/index.php/revenue.html.

6.8.18 System analyst will analyze the detail of Unreadable Cards and certify the remaining refundable value of Smart Card (illegible).

6.8.19 If it appears that the Unreadable Smart Card is damaged specifically at card chip / engraved ID area and system analyst is able to retrieve the transaction data from the AFC system, only the balance amount as per AFC transaction details will be refunded to the passenger and the security deposit will be forfeited.
6.8.20 In case of Unreadable Smart Card with physically OK condition and the transactions details could not be retrieved from the AFC system, the maximum amount of Rs50/- as balance amount will be refunded to passenger along with the security deposit of Rs.50/-. The maximum limit of balance amount of Rs 50/- has been considered as this is the most prominent denomination in add value operation.

6.8.21 After receipt of resolved cases of unreadable cards from Revenue Cell, Station manager will ensure that a call has been made to passenger to collect his due amount from station and details should be posted on Unreadable Record Register.

6.8.22 Any irregularity must be reported to Revenue Cell immediately.

6.8.22.1 Definition of physically damaged Smart Card: - CCC operator will judge Smart Card for physical damage. A Smart Card will be considered physically Damaged if:

I. Card is in bent-condition. (To check this- Place the Smart Card on flat surface and see that all the four corners are not touching the surface.)

II. Smart Card has visible cut mark or corner is cut.

III. Smart Card surface is badly worn out and engrave ID is not visible.

6.8.23 Re-sale of refunded Smart Cards: -

I. Refunded CSC shall not be re-sold on same day.

II. After end of the shift, the operator shall deposit all the refunded CSC to SCR.

III. All refunded CSCs of the day shall be included into the CSC stock of station. The Station Controller will segregate the refunded re-issuable, defaced, damaged & illegible ID or printed ID Smart Cards.

IV. The re-issuable cards will be included in fresh stock of Cards.

V. Station Controller must prepare separate bundle of refunded defaced, damaged & illegible ID or printed ID Smart Cards.

VI. The non-re-issue-able CSC with details should be kept separately in the SCR and will be sent to OCC/Rev at the end of month along with the periodicals and Balance Sheet in detail.

VII. The Station Manager will send soft copy of the attached format at the end of the month. Hard copy of refunded Defaced/Damaged/Illegible ID/Printed ID with Balance Sheet will be sent to Revenue Cell. Printed list of Eng. ID will be sent with separate bundle like refunded defaced Eng. ID list with refunded defaced bundle.
## Details of Refunded Defaced/Damaged/Illegible Eng. ID Smart Card

<table>
<thead>
<tr>
<th>Dated</th>
<th>Defaced CSC (Physically OK with Eng. ID.)</th>
<th>Damaged CSC</th>
<th>Illegible ID or Printed ID CSC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sipmenns &amp; Axalta</td>
<td>Sony</td>
<td></td>
</tr>
<tr>
<td>Eng. ID</td>
<td>No. of CSC</td>
<td>Eng. ID</td>
<td>No. of CSC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 6.9 Penalties and Surcharges on Store Value Smart Cards

#### 6.9.1 Overstaying in the System:
- The maximum stay permissible in the System is 140 minutes when Entry/Exit from different stations. But the maximum period of stay within paid area for entry/exit from same station is defined as 20 minutes.

#### 6.9.1.1 In case of overstaying beyond permissible time, penalty of Rs.10/- per hour subject to the maximum of Rs.50/- will be imposed at the CCC after informing the commuter of the amount of penalty. Penalty amount is to be collected in cash from the patron.

#### 6.9.1.2 In case the passenger enters into the system, exits by tailgating, then again enters by tailgating, penalty will be charged as per the above rules.

#### 6.9.2 Entry/Exit Mismatch:

#### 6.9.2.1 Mismatch at Entry (Error Code-110)

i). This error comes at entry, when passenger shows the Smart Card two times at the entry consecutively i.e. proper entry/exit sequence has not been followed. The penalty amount is adjusted to ‘zero’ if the operator makes sure that no other passenger has already entered fraudulently with this card.

ii). When the passenger goes out of system/paid area without proper exit and then comes afterwards and tries to enter into system, then 110 error will come, CCC operator will analyse last five transactions of the card and if the transactions show entry and exit from same set of stations, then fare applicable between above set of stations is to be
charged. If the transactions are not between same set of stations then maximum amount / fare of travelling among those transactions is to be charged.

6.9.2.2 Mismatch at Exit (Error Code 109): -  

i). This error comes when passenger tries to exit with a card without proper entry recorded on it or when passenger shows the Smart Card two times at the exit consecutively i.e. proper entry/exit sequence has not been followed.

ii). Such mismatch sequence is penalised by CCC operator. CCC operator will analyse last five transactions of the card and if the transaction show entry/exit from same set of stations, then fare applicable between above set of stations is to be charged. If the transactions are not between the same set of stations then maximum amount / fare of travel among those transactions is to be charged. Penalty is to be charged by adjusting the card on the applicable fare as above minus value equal to minimum fare, as this is automatically deducted from Smart Card while exiting through the gate.

iii). In case of proper fare deducted from card and AFC Gate flap not opened or if the operator makes sure that no other passenger has made exit fraudulently with this card, Free Exit Token may be issued to patron for exit purposes.

6.9.2.3 In case of surcharge collection, discounts will not be applicable.

6.10 Errors on Smart Cards: -
6.10.1 Write Ticket Error: - Don’t move the Smart Card from the reader till acknowledgement beep comes and screen returns to main menu. If Write Ticket Error comes then in case of:

i) ISSUE: - Acknowledge the Write Ticket Error by pressing “OK” button or “ENTER” key. Analyse this Smart Card. If card has been issued properly, do further proceedings. Otherwise, keep this Smart Card aside and issue another Smart Card to passenger. Write down the Engrave ID of the Smart Card pertaining to WTE and try to issue it to another passenger. Even now if it is not saleable, return this Smart Card to Revenue Cell along with statement.

ii). REFUND: - Acknowledge the Write Ticket Error by pressing “OK” button or “ENTER” key. Refund the amount to passenger. Forward the End of Shift Report and this Card to Revenue Cell.
iii). **ADD VALUE**: - Acknowledge the Write Ticket Error by pressing “OK” button or “ENTER” key. Cancel this transaction by pressing “Ticket Cancel” button. Write down the Engrave ID of the Smart Card pertaining to WTE and make another Add Value command.

In case of i), ii) and iii) above, the operator may have cash short, the short amount may be claimed through Outstanding format mentioning the engrave ID of Smart Cards, that will be sent to System Analyst/AFC along with Smart Card and shift end report through Revenue Cell.

### 6.10.2 Error Code-130: - Error-130 comes when an adjustment on any Smart Card is not followed by a transaction at the AFC gates of the same station. If Error-130 comes in unpaid area then the operator must adjust the Error Code-130 at ‘ZERO’ only. Now when the card is to be shown at AFC gates from entry side, it will show an Error Code-110. The operator must adjust this Error Code-110 at ‘ZERO’. Now the CSC will function properly.

### 6.10.3 Error Code – 44: - These Smart Cards are expired Smart Cards. Such Cards can be revalidated only after refund.

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### 7 DMRC/Citibank Co-Branded Smart Card (SV-05)

#### 7.1 Issue of DMRC/Citibank Co-Branded Smart Card (SV-05): - The DMRC/Citibank Co-Branded Smart Cards will be issued from a nominated TOM at non-refundable zero security amount with permission of Revenue Cell only. These Smart Cards will be handed over to Citibank for sale among customers. The DMRC/Citibank Co-Branded Smart Cards can be issued from Citibank only.

#### 7.2 Any of the Co-Branded Smart Card will not be deposited at any of Station or CCC under any circumstances.

#### 7.3 Add Value Operation: -The POS machines, for deduction of amount from credit card, have been installed at stations listed below.


Add Value on SV-5 Smart Cards from other station is not permissible.
7.3.1 Before starting any transaction, operator will confirm the genuineness of the card and confirm that the card is signed.

7.3.2 Before making add value operator will first deduct the desired amount from credit card by swapping it on POS machine for the amount equivalent to add value to be done.

7.3.3 After deduction of amount from Card, operator will make add value in the card and will generate two slips each from POS machine and DMRC printer. Operator will take signature of the card holder on the receipts generated by POS machine and tally the signature with signature available on Credit Card. Customer copy of the receipt will be given to the customer along with add value receipt generated by DMRC printer. Whereas other receipt known as Merchant copy along with add value receipt generated by DMRC printer will be retained by the operator in box.

7.3.4 Only Citibank/DMRC Co-branded cards are authorized on these POS machines. No other Credit or Debit card is to be accepted.

7.3.5 No cash will be charged from the passenger for add value on DMRC & Citibank co-branded card.

7.3.6 At the end of shift the CCC operator will generate Batch Settlement report from POS. The operator will prepare a summary of add value on these cards and deposit less (as mentioned in batch settlement report) cash by sum of add value done on DMRC & Citibank co-branded card in SCR. Station controller will verify it by viewing this amount mentioned on the POS generated receipts. In absence of Batch Settlement report, full amount is to be deposited in SCR.

7.3.7 If due to some technical reasons, the Batch Settlement Report not generated, the same should be reported to Revenue Cell immediately and to authorise representative of Citibank.

7.3.8 The station controller will further prepare summary of add value on DMRC & Citibank Co-branded card for day and relay corresponding figures to Revenue Cell in night along with daily revenue earning.

7.4 On very next working day by 12.00 Hours concerned Station Manager will send Summary report of add value amount done on DMRC & Citibank co-branded cards after verification of receipts collected at station. The receipts copy of add-value done through POS will also be kept in personal custody of Station Manager.

7.5 On next day in morning, AFC department will provide details of number and amount of add-value done through Credit Cards vide “add-value Day Credit Report”.
7.6 Revenue Cell will further prepare summary of add value on DMRC & Citibank Co-
Branded Smart Card for previous day and fax or e-mail it to Citibank nominated office by
13:00 Hrs for consolidation.

7.6.1 Citibank will send an agent wise transactions done on previous day along with amount
deducted through POS machine to AM/Revenue.

7.6.2 The details of payments made by Citibank to DMRC Accounts (as provided by Citibank)
shall be send to respective stations. Station Manager shall cross check the payments, in
case of mismatch, the same should be immediately reported to Revenue Cell.

7.6.3 After receiving DMRC report Citibank will send the confirmation report back to DMRC by
15.00 Hours by E-Mail (AM/Revenue) & will ensure that the said amount is credited into
DMRC’s account on the very same day. Revenue Cell will cross check it from E-Mail
received from Citibank. AM/Fin/Rev will confirm it to AM/Rev for the deposition of
amount into DMRC’s account from Citibank. Final reconciliation will be done between
AM/Fin/Rev and AM/Rev.

7.6.4 In case of any discrepancy the print receipt generated by POS at stations will be
considered as final. DMRC will not be responsible for any kind of discrepancy occurred
due to fraud and cloned credit cards or any other resource. Citibank will be liable to pay
this amount to DMRC accordingly (as per agreement already signed).

7.6.5 The print receipts will be kept in safe custody at Station with Station Manager for twelve
months from date of issue/generation.

7.6.6 All rules pertaining to usage / penalties of CSC mentioned in business Rules in vogue
will be followed as it is.

7.6.7 No cash transactions are to be made on these Co-Branded Smart Cards during add-
value. However, the penalties and surcharges are to be paid in cash only as per
prevailing Business Rule.

7.7 **Total Possible Store Value on DMRC/Citibank Co-Branded Smart Cards:** - The total
possible store value on a DMRC/Citibank Smart Card would be Rs.1000/- only.

7.8 **Period of Validity of Electronic Value of Store Value Smart Card:** - Electronic Value
of Co-Branded Smart Card will have a validity of one year from the date of last Add
Value Operation. The Validity of SV-5 Smart Card extends to further one year from last
Add Value Operation date. After expiry of SV-5 Smart Card, the Smart Card can be
revalidated by initialization from Revenue Cell/OCC/SHPK and reissuing from SHPK
Metro Station.
7.9 **Discount**: A discount of 10% will be given on every journey made by the passenger on Base Fare. The discount is not applicable, if passenger enters and exit from same station.

7.10 **Refund of DMRC/Citibank Co-Branded Smart Cards (SV-5)**:

7.10.1 **At the surrender of Co-Branded Smart Cards**: If the passenger surrender his/her DMRC/Citibank Co-Branded Smart Card with Citibank, DMRC will not be liable for the refund of balance of such Co-Branded Smart Cards.

7.10.2 **Co-Branded Smart Cards having unreadable chip**: Unreadable smart card can only be declared as unreadable at any of the CCC. Operator will only verify that the said Smart Card has become unreadable and need replacement. DMRC operator will not deposit it with him/her under any circumstances. The DMRC operator will request the customer to deposit the Smart Card with Citibank. If the Smart card becomes unreadable in Paid area, the operator will exit the passenger through Free-Exit token. The passenger will deposit the Co-Branded Smart Card with Citibank. Citibank will destroy these Co-Branded Smart Cards. The balance details of the Co-Branded Smart Cards will be provided by AFC to Revenue Cell. The same amount will be transferred to Citibank by Account Department.

7.10.3 **Co-Branded Smart Cards having unreadable Citibank Magnetic Strip**: Such Smart Card will directly be deposited with Citibank. Citibank will destroy these Co-Branded Smart Cards. No refund of balance amount of these Co-Branded Smart Cards is applicable.

7.10.4 **Expired Co-Branded Smart Cards**: In case of expired Co-Branded Smart Card, the customer will deposit the card to Citibank. No refund/add value can be done in the expired Co-Branded Smart Cards. CCC operator will advise passenger to deposit such Smart Cards to Citibank.

7.10.5 **Replacement of lost DMRC/Citibank Co-Branded Smart Cards (SV-5)**: The customer will inform Citibank about the loss of Co-Branded DMRC/Citibank Smart Card. DMRC will not entertain a passenger in this regard. After proper verification of the passenger and his Card, Citibank will inform Revenue Cell in writing and request for blacklisting of Smart Card. DMRC will blacklist maximum 4 such cards in a month with remaining value more than Rs.200/-. This will be done on 15th and last date of the month. DMRC will not be liable to bear any loss occurred on account of misuse of co-branded card. The balance details of the Co-Branded Smart Card will be provided by
AFC to Revenue Cell. The same amount will be transferred to Citibank by Accounts Department.

7.11 **Penalties and Surcharges on DMRC/Citibank Co-Branded Smart Cards (SV-5):** The penalties and surcharges on Co-Branded Smart Cards will be same as mentioned for SV-2 Smart Cards.

7.12 **Errors on SV-5 Smart Cards:** - The Errors on SV-5 Smart Cards will be managed according rules mentioned in Para 6.10 for SV-2 Smart Cards.

8 **Key Chain Smart Card:**

8.1 **Issue of Key Chain Smart Card:** - The Key Chain Smart Cards can be issued from CCC of nominated Stations. The Key Chain Smart Card will be issued with one-time non refundable activation charge of Rs. 50/- and a minimum Add Value of Rs.50/- . Hence, the Key Chain Smart Card can be issued at a minimum cost of Rs.100/-

8.2 **Add Value Operation:** - As per Para 6.2 of SV-2 Smart Cards.

8.3 **Total Possible Store Value:** - The total value on a Smart Card would be Rs.1000/- only.

8.4 **Minimum Value Require to enter in Metro System:** - A minimum balance of Rs 50/- is required to enter in paid area and for travel.

8.4.1 A Key Chain Smart Card having balance of Rs 50/- or more is allowed enter in paid area of a station. A Key Chain Smart Card having balance below Rs 50/- found in paid area will be treated as without ticket and shall have to exit using Paid Exit Token.

8.5 **Period of Validity of Electronic Value of Store Value Smart Card:** - Electronic Value of Store Value Smart Card will have a validity of three year from the date of last Add Value Operation. The Validity of Store Value Smart Card extends to further three year from last Add Value Operation date.

8.5.1 After expiry of Validity of Electronic Balance of the Key Chain Smart Card, the Electronic Balance of these Smart Cards is non-refundable. On demand of Key Chain Smart Card holder, these cards shall be revalidated after initialization from AFC department from OCC/SHPK only. During revalidation passenger has to repay activation charges.

8.6 **Discount:** - A discount of 10% will be given on every journey made by the passenger on Base Fare Table. The discount is not applicable, if passenger enters and exit from same station.

8.7 **Refund of Key Chain Store Value Smart Cards:** - The Smart Cards are non-refundable. However, if the Key Chain Smart Card becomes unreadable, only the
electronic balance (excluding bonus) is refundable if customer is ready to submit his/her Key Chain Smart Card with DMRC.

8.8 **Sequence of use of Smart Card:** - The sequence permitted will be that of Entry-Exit. Every entry will have to be followed by a valid exit. Mismatch for the permitted sequence will be penalised at CCC as per penalty procedure of DMRC, except in case of exit having been made due to emergency/incident.

8.9 **Penalties and Surcharges on Key Chain Smart Cards:** The penalties and surcharges on Key Chain Smart Cards will be same as mentioned for SV-2 Smart Cards.

8.10 **Error on Key Chain Smart Cards:** - The Errors on SV-6 Key Chain Smart Cards will be managed according rules mentioned in Para 6.10 for SV-2 Smart Cards.

9 **Tourist Cards (Smart Cards with unlimited rides):** -

9.1 **Issue of Tourist Smart Cards:** - The Tourist Cards can be issued from CCC of Stations.

9.1.1 Two types of tourist Smart Cards shall be available with unlimited rides based on validity period. One Day Validity Tourist Card is valid for one day and Three Day Validity Tourist Card is valid for three days from the date of sale. Security deposit for tourist card shall be Rs.50/- (Refundable).

9.1.2 Value of Tourist Card for One Day Validity Tourist Card shall be Rs.150/- and for Three Day Validity Tourist Card shall be Rs.300/- including security deposit amount.

9.2 **Refund:** The Tourist Smart can be refunded from CCC only. Only the security deposit is refundable after issue of any of the Tourist Smart Cards. If the tourist Smart Cards could not be refunded through system then in such cases the refund may be given manually with the consent of Revenue Cell and the outstanding amount thus created may be waived off after approval of the competent authority.

9.2.1 **Sequence of use of tourist Smart Cards:** - The sequence permitted will be that of Entry-Exit. Every entry will have to be followed by a valid exit.

9.2.2 **Penalties and Surcharges on Tourist Smart Cards:** - No penalty/surcharge is to be taken in case of mismatch at entry/exit and excess time. However, it must be assured that one tourist smart card is valid for one person at one time.

9.2.3 **Errors on Tourist Smart Cards:** - The Errors on Tourist Smart Cards will be managed according to rules mentioned in Para 6.10 for SV-2 Smart Cards.
10 **Fare of children below 3 (three) feet (90cms) height:** - In a family, two children below 3 feet (90cms) are allowed to travel free at a time. Children above 3 feet (90cms) will be charged normal fare.

11 **Luggage Limit:** - Luggage upto a maximum weight of 15Kg and dimensions of upto 60cms (long) X45cms (breadth) X 25cms (height) is permitted. If the weight or the dimensions exceeds this limit then action under the DMRC’s (O&M) Act-2002 will be taken.
12 **Rules for Special Fare Modes:**

12.1 Special Fare Modes are provided to manage abnormal conditions developed at station due to accumulation of excess crowded, disruption in train services, emergency etc.

12.2 Special Fare Mode can be set by Station staff only if control message is given by OCM/Chief Controller.

12.3 In case of disruption of train services, token will be refunded in incident mode only. Concern Station Managers will immediately inform the RCC regarding the number of tokens and amount refunded in incident mode.

12.4 In case there is a fault with all AFC gates at a station then passengers having tokens and cards may be allowed entry through side gates. This information will immediately be relayed by concerned SM/SC to OCM, Chief Controller/OCC who will relay this information to whole system. Now the tokens (having errors) of the passengers coming from that station where the incident took place will be adjusted to zero and fare as per the Fare Chart (minus minimum fare value) will be charged in case of Smart Card holders.

12.5 The Features and applicability of Special Fare Modes are explained below:

<table>
<thead>
<tr>
<th>Fare Modes</th>
<th>Activate from</th>
<th>Set by</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Entry/Exit override</td>
<td>GRCU/SC/CC</td>
<td>Station controller/CCC Operator</td>
<td>• Entry/Exit mismatch check is bypassed at gate.</td>
</tr>
<tr>
<td>b) Time-Mode override</td>
<td>GRCU/SC/CC</td>
<td>Same as above</td>
<td>• Overstay check is bypassed at gate.</td>
</tr>
<tr>
<td>Fare Modes</td>
<td>Activate from</td>
<td>Set by</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>---------------</td>
<td>--------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| c) Emergency | Emergency switch/ GRCU/ SC/CC | Same as above | • Should be used in case of fire, explosion or any other occurrence of extreme emergency/consequences.  
  i) Gate flaps become open by this mode.  
  ii) Passenger can rush out from open gates without validating cards/tokens.  
  iii) Waiver date can be defined in the system for date of emergency.  
  iv) Patron having token pertaining to waiver date can perform one full journey.  
  v) All cards affected by emergency mode (with recorded entry but no exit recorded) pertaining to waiver date will be accepted by gates at next entry and 'no money' will be deducted for incomplete journey. |
| d) Incident | GRCU/SC/CC | Same as above | • Used in case of disruption/ delay in train services or any other incident.  
  i) Token is captured at exit gate as in normal mode. Exit checks are bypassed.  
  ii) Passengers who wish can take full refund for |
<table>
<thead>
<tr>
<th>Fare Modes</th>
<th>Activate from</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>tokens, from CCC (paid area side). After refund they can insert their token in exit gate and go out. iii) Such refunds are recorded in the system. To account for precise refunds made during incident mode, CCC operator should open a new shift during the period of incidence.. iv) No money is deducted from smart card at exit gate.</td>
</tr>
</tbody>
</table>
IV. **Rules Pertaining to Cash Collection of Non-AFC items**

13 **Manual Refund of Unreadable Smart Cards:**

In accordance to Para 6.8.2, following procedure should be followed for proper accountal of Manual Refund in system:

1. The receipt book of Manual Refund will be kept in Station Control Room.
2. On duty Station Controller on behalf of Station Manager is authorized to refund after making proper entries in Manual Refund Receipt Book. No staffs below the rank of on duty Station Controller is authorized to make refund of Unreadable Cards.
3. It is mandatory to mention address and phone number of passenger on receipt foil. While filling receipts, good quality carbon should be used. Incomplete foils will attract disciplinary action against errant staff.
4. Receipt book is having three foils (Finance Foil, Record Foil & Passenger Foil).
5. **Finance Foil:** This foil will be submitted to Accounts at the End of Every Month, through Revenue Cell along with Balance Sheet & Returns.
6. **Record Foil:** This foil will be kept at respective station granting Manual Refund.
7. **Passenger Foil:** This foil will be given to passenger after refund of amount and taking proper signature at nominated space.
8. Refund of Unreadable CSC is only possible from the same station where it was originally submitted and after producing Unreadable Receipt Memo.
9. Station Controller will refund the Amount after judging the genuineness of the passenger and as per details of Balance of unreadable CSC.
10. After refund, Station Controller will issue Passenger Copy of Refund Memo and collect the Unreadable Receipt Memo from passenger.
11. Unreadable Receipt Memo should be kept in Station Record duly mentioning amount, Refund Memo receipt number and date of refund. The unreadable Receipt Memo will be pasted on the back of Record foil of Manual Refund Memo foil.
12. In case of cancellation of Receipt Foil, Station Manager will personally give remarks on all the foils. The finance copy and passenger copy shall be sent to Revenue Cell with balance sheet.
13. Station Manager will prepare a concise list of Manual Refunded in format enclosed at Annexure “E”, and sent to Revenue Cell at the end of every month along with Balance Sheet and through E-Mail addressed to “revenue_cell@dmrc.org”.

14. Station Manager will ensure that no staff below Station Controller should grant manual refund to the passenger.

**14 Group Booking:** - It can be done if the group exceeds 20 people. No relaxation will be considered for child below the height of 90cms (3feet) and the access of the group into the paid area will be through side gates. Concern SM/SC will ensure proper entry/exit of the group through side gates. Group Booking is presently not handled with AFC system. Time Limit for single journey (one side) will be 180 minutes. Any excess time beyond 180 minutes will be charged at rate of Rs.10/- per hour per person subject to maximum of Rs.50/-.

14.1 If a Group under Group Booking wants to extend its length of journey and reaches the final destination station where the group wants exit, the on duty Station Controller will collect fare from group as per difference of fare through Group Booking Receipt Book duly mentioning “Extension of Group Booking Foil no______ of station_______.(Name of originating Station)”. The same should be reported to Revenue Cell.

14.2 Partial refund of partially used Group Booking is not applicable.

14.3 Return Journey Group Booking is not permissible.

14.4 **Procedure for Group Booking** Following procedure is to be followed for proper accountal of Group Booking done in system:

1. The receipt book of Group Booking is to be kept in Station Control Room.
2. Station Controller on behalf of Station Manager is authorized to permit a group under group booking after making proper entries in Group Booking Receipt Book.
3. It is mandatory to mention address and phone number of Group leader on receipt foil. While filling the receipts a good quality carbon should be used. Uncompleted foils will attract disciplinary action against errant staff.
4. Receipt book is having four foils (Passenger Foil, Station Foil, Finance Foil and Record Foil).
5. **Passenger Foil:** - This foil will be given to passenger as an authority to travel in system.
6. **Destination Station Foil:** This foil is also given to the group leader. Group leader will submit this foil at the destination station at CCC while making Exit.
7. **Finance Foil:** This foil will be submitted to Accounts at the End of Every Month, through Revenue Cell along with Balance sheet & Returns.

8. **Record Foil:** This foil will be kept at the originating station permitting Group Booking.

9. While making Group Booking, on duty Station Controller will inform Station Manager, Destination Station Controller and Revenue Cell regarding details of Group booking. Private No will also be exchanged with Revenue Cell. After exchange of private number, Group Booking cannot be cancelled.

10. Revenue Cell will keep a register regarding details of number of group booking date wise and station wise (based on telephonic information) received from originating/destination station.

11. Station Controller of Destination Station will keep the destination foil as record and a concise list on format enclosed as **Annexure “F”** duly forwarded by Station Manager will be sent to Revenue Cell.

15 **Sale of DMRC archival books:**

At present DMRC is having four archival books for sale among customers. The books and their costs are listed below

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Name of Book</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>A Dream Revisited</td>
<td>Rs.1,000/-</td>
</tr>
<tr>
<td>b)</td>
<td>Images of Urban Transformation</td>
<td>Rs.1,500/-</td>
</tr>
<tr>
<td>c)</td>
<td>A Journey to Remember</td>
<td>Rs.210/-</td>
</tr>
<tr>
<td>d)</td>
<td>Station Surroundings</td>
<td>Rs.100/-</td>
</tr>
</tbody>
</table>

15.1 **Procedure for sale of DMRC archival books**

Following procedure is to be followed for proper accountal of sale of DMRC archival books done in system:

1. The receipt book of Miscellaneous Receipts is to be kept in Station Control Room.

2. Station Controller on behalf of Station Manager is authorized to sale of DMRC archival book after making proper entries in Miscellaneous Receipt Book.
3. It is mandatory to mention address and phone number of customer on receipt foil. While filling the receipts a good quality carbon should be used. Uncompleted foils will attract disciplinary action against errant staff.

4. Receipt book is having four foils (Passenger Foil, Station Foil, Finance Foil and Record Foil).

5. **Passenger Foil:** This foil will be given to passenger as an authority.

6. **Finance Foil:** This foil will be submitted to Accounts at the End of Every Month, through Revenue Cell along with Balance sheet & Returns.

7. **Record Foil:** This foil will be kept at the station.

8. Concise list on format enclosed as **Annexure “G”** duly forwarded by Station Manager will be sent to Revenue Cell.

16 **Sale of Souvenir Tokens:** - The Souvenir Token can be sold from CCC only. The cost of a Souvenir Token is Rs.4/- only. The amount earned through sale of Souvenir Token will be declared and deposited in SCR through SAF.

17 **Penalties:**

17.1 **Penalty for carrying away token without depositing at Exit Gate:** - The token and Rs.200/- (in cash) fine is to be collected from the defaulter caught in unpaid area while exiting with such token. Manual Penalty Receipt to be given by Station Controller.

17.2 **Penalties under DMRC(O&M)Act-2002:** - As per letter no. DMRC/O&M/ Misc / 2008 dated-10.11.2008 and subsequent letter No. DMRC/O&M/Misc./2010 Dated 08.11.2010 of GM/O, Station Manager/Station Controller can realise penalty on offender under DMRC (O&M) Act, 2002. A Penalty Receipt will be issued to passenger. While realisation of penalty, if the ticket/card of the offender has been ceased, the offender will be allowed to exit using Free Exit Token after produce of Penalty Receipt Book. The penalty collected under this article, must be reflected separately. The passenger will be allowed to exit from the station where penalty is imposed.

17.3 Portable Ticket Decoders may be used to penalise the passengers travelling towards the direction of the station from which the token is issued or in case of Smart Card if he is travelling towards the direction of the station from which he has entered in the system. A team of Rs TIA, security Manager/AFC, Revenue Inspector and Security Controller/Security will analyse the Tokens/Smart Cards of the passengers and a penalty of Rs 50/- will be charged for the same. Manual receipt is to be given in such cases. In case the passenger does not pay the penalty then he will be handed over to Delhi police.
17.4 **Procedure order for accountal and remittance of flying squad earning**

1. The following four stations are nominated for deposition and remittance of earning deposited by flying squads:

   Line -1 & 5  Inder lok (L-5)

   Line -2 & 6  Central Secretariat (N)

   Line- 3 (E) & 4  Yamuna Bank

   Line-3 (W)  Dwarka

2. The penalty receipt books for the squad teams will be issued from Revenue Cell and will be kept separately in SCRs at the nominated stations.

3. After end of the business working day of squad teams, the collected amount will be deposited at the nominated stations on the same day.

4. The nominated station will show this amount in earning of station (as mentioned above) under head “other penalties”.

5. The nominated station will send a concise report of the earning at the end of month along with “Finance Copy” with Balance Sheet/Periodicals.

6. The Penalty receipt book issued for this purpose must be kept separately and shouldn’t intermingle with station money value books.

18 **Out-Standing**: Any short cash deposition on account of system failure by any operator will be declared under this head. The short deposition of cash will have to be claimed through Out Standing format placed at Annexure “H”.

18.1 **Procedure for Out Standing claim and clearance**: -

18.1.1 If any operator observes short in cash in his shift due to AFC system problem/any other problem, the same amount in short in cash may be deposited as Outstanding in SCR with his/her written statement on the format (Annexure “H”).

18.1.2 No outstanding or short deposition of cash is permitted without written statement of operator and duly acknowledgement of on duty Station Controller.

18.1.3 The outstanding format must be filled in all respects and properly signed by Operator & forwarded by SM/SC. Any correction must be countersigned by the concern employee with EMP ID.

18.1.4 All outstanding cases must be entered in outstanding register placed in SCR.
18.1.5 The detail of all outstanding cases of the day must be submitted online (http://172.16.10.10/revenue/outstanding/outstandinglist.php) on daily basis without fail. If details are not submitted online on the same day (before relaying night earning report), the consideration of the outstanding will be rejected and the outstanding amount will be recovered from concern SC. The concern station will be responsible for recovery of amount and its submission in station earning.

18.1.6 The outstanding format must reach Revenue Cell within 48 hrs of occurrence.

18.1.7 In case of wrong online submission of outstanding details, immediately contact Revenue Cell for correction.

18.1.8 All the outstanding details received online from stations will be submitted to AFC on the very next day.

18.1.9 After receiving of details, AFC will provide the reply of the cases to Revenue Cell with in 48 hrs.

18.1.10 Based on replies received from AFC, the letters regarding recovery will be sent to Stations on next day.

18.1.11 The letter for the waiver of all genuine cases will be submitted to Accounts Department on every month end.

18.1.12 The Accounts Department will verify the cases and provide their approval for waiver every fortnightly.

18.1.13 If any case rejected by SSA/AFC while verification, said amount must be deposited in Station Earning within 5 days without fail after receiving the letter of rejection. Station Manager will be responsible for recovery.

18.1.14 Intimation Letter must be sent by Stations to Revenue Cell for every recovery and all of the waived off of Outstanding Amount should be reflected in current periodical & Balance Sheet.

18.1.15 In case of any discrepancy, it must be reported to Revenue Cell immediately.

19 Procedure order for handling Money Value Books at Stations.

19.1 Each Money Value Book for a Station must be received by concern Station Manager. It is the sole responsibility of Station Manager to keep proper record of Money Value Books at Station in Money Value Record Register.

19.2 During receiving of Money Value Book, Station Manager must ascertain that the provided Money Value Book is proper and no discrepancy has been found. In event of any discrepancy, the same immediately be informed to Revenue Cell, and the Book would not be used in Money Transactions.

19.3 After through check of the Money Value Book during receiving, Each Station Manager has to verify on the back of first Station Record foil that “This book consist of serial number from ___ to ____ is checked and is found correct”.

19.4 Each Money Value Book at Station should be kept in custody of on duty Station Controller and should be handed over and taken over during change of shift.
19.5 Each Money Value Book should be supervised by concern Station Manager on daily basis and signed on the last issued money valued foils.

19.6 The money transaction though Money Value Receipt Book must be done by on duty Station Manager/Station Controller.

19.7 Each cancelled Foil should be verified by concern Station Manager with justified reason.

19.8 All copies of the canceled foils except station record foil must be sent to Revenue Cell with Balance Sheet of every month.

19.9 During money transaction, a good quality carbon should be used so that proper impression will appear on carbon copies.

   a. In all money value Receipts Books printed, the first copy should be record copy, second copy should be Passenger copy, third should be accounts copy and fourth copy should be destination station copy (applicable for Group Booking book only).

   b. If any record foil is kept blank the highest possible value may be debited against the station.

   c. One manual receipt is to be issued for one case only.

19.10 Finance Copy of every Money Receipt Foils used during the month must be sent to Revenue Cell along with Balance Sheet.

19.11 For loss of each foil, highest possible value will be recovered from responsible staff. The recoverable amount per foil is listed below:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Money Value Book</th>
<th>Recovery amount @ per foil</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Manual Refund Book</td>
<td>Rs 850/-</td>
<td>Equivalent to Highest store value limit Rs. 800/- + Security Deposit Rs.50/-</td>
</tr>
<tr>
<td>2.</td>
<td>Penalty Receipt Book</td>
<td>Rs 500/-</td>
<td>Equivalent to highest possible penalty</td>
</tr>
<tr>
<td>3.</td>
<td>Miscellaneous Receipt Book</td>
<td>Rs 500/-</td>
<td>Equivalent to highest possible penalty</td>
</tr>
<tr>
<td>4.</td>
<td>Group Booking Book</td>
<td>Rs (50 X Maximum fare of system)</td>
<td>Considering group of 50 peoples with maximum fare of system.</td>
</tr>
<tr>
<td>5.</td>
<td>Sale of Forms/Books etc.</td>
<td>Rs 1500/-</td>
<td>Highest value of a Book is Rs 1500/-</td>
</tr>
</tbody>
</table>

20 **Revenue Reports:** - The Balance Sheet, Periodical Report, Manual Receipts, Stock reports and defective/defaced cards/tokens will be submitted to Revenue Cell as per given schedule:-
Table A:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Report Particulars</th>
<th>Report to be submitted to</th>
<th>Deadline for submission</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Revenue Cell As a</td>
<td>Accounts As a</td>
</tr>
<tr>
<td>1</td>
<td>Periodical Returns (1-10th)</td>
<td>Print</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Periodical Returns (11th-20th)</td>
<td>Print</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Periodical Returns (21st-31st)</td>
<td>Print</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>All Periodical Returns for the month</td>
<td></td>
<td>E-mail</td>
</tr>
<tr>
<td>5</td>
<td>Balance Sheet for the month</td>
<td>Print</td>
<td>Print &amp; E-mail</td>
</tr>
<tr>
<td>6</td>
<td>Summary of unreadable card manual refund.</td>
<td>Print &amp; E-mail</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Summary of other money value receipt.</td>
<td>Print &amp; E-mail</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Details of add value in citi bank cards. (Wherever applicable)</td>
<td>Print &amp; E-mail</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Stock report of Money value items.</td>
<td>Print &amp; E-mail</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>CSC/CST Returned to Revenue cell.</td>
<td>Print</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Finance copy of all money value receipts.</td>
<td>Finance Copy</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Revised Balance Sheet &amp; Periodical of previous month.</td>
<td>Print</td>
<td>Print &amp; E-mail</td>
</tr>
</tbody>
</table>

All the E-mails should be sent by 2nd of every month and hard copies (as print) as per below schedule for every month till 16.00hrs.

Table B:

<table>
<thead>
<tr>
<th>STATIONS/SECTIONS</th>
<th>No of Stations</th>
<th>Sr.No</th>
<th>Date of submission in Revenue Cell</th>
<th>Date of submission in accounts through E-Mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSG – KE (Exc KGR) incl ILOK L5</td>
<td>17</td>
<td>Sr 1 to 2</td>
<td>11th &amp; 21st of every month</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sr 3 to 12</td>
<td>2nd of every month</td>
<td></td>
</tr>
<tr>
<td>PTP - RI &amp; APMN-MUDKA (incl Sat Guru Ram Singh)</td>
<td>18</td>
<td>Sr 1 to 2</td>
<td>11th &amp; 21st of every month</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sr 3 to 12</td>
<td>3rd of every month</td>
<td></td>
</tr>
<tr>
<td>UDB – GE</td>
<td>15</td>
<td>Sr 1 to 2</td>
<td>11th &amp; 21st of every month</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sr 3 to 12</td>
<td>4th of every month</td>
<td></td>
</tr>
<tr>
<td>Service Code</td>
<td>Sr 1 to 2</td>
<td>Sr 3 to 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>-----------</td>
<td>------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SKRB - HCC, NCC – AKDM, Vaishali &amp; Kaushambi</td>
<td>11&lt;sup&gt;th&lt;/sup&gt; &amp; 21&lt;sup&gt;st&lt;/sup&gt; of every month</td>
<td>5&lt;sup&gt;th&lt;/sup&gt; of every month</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KHMT - BAPU</td>
<td>11&lt;sup&gt;th&lt;/sup&gt; &amp; 21&lt;sup&gt;st&lt;/sup&gt; of every month</td>
<td>6&lt;sup&gt;th&lt;/sup&gt; of every month</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MN - DS-21</td>
<td>11&lt;sup&gt;th&lt;/sup&gt; &amp; 21&lt;sup&gt;st&lt;/sup&gt; of every month</td>
<td>7&lt;sup&gt;th&lt;/sup&gt; of every month</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JGPI-CTST (Incl KGR, KGM &amp; RCK)</td>
<td>11&lt;sup&gt;th&lt;/sup&gt; &amp; 21&lt;sup&gt;st&lt;/sup&gt; of every month</td>
<td>8&lt;sup&gt;th&lt;/sup&gt; of every month</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AVIT – YB-KNR</td>
<td>11&lt;sup&gt;th&lt;/sup&gt; &amp; 21&lt;sup&gt;st&lt;/sup&gt; of every month</td>
<td>9&lt;sup&gt;th&lt;/sup&gt; of every month</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

20.1 The finance copy of used receipt foil during month, with concise details, must be submitted at Revenue Cell along with Balance Sheet of every month till 16.00hrs at Rev/cell.

20.2 A concise list, in enclosed format at Annexure “E”, Annexure “F” Annexure “I” & Annexure “G”, of money receipts through Money Value Books (Manual Refunded, Group Booking, Penalty Receipt & Shops – Kiosk Receipt) should be submitted to Revenue Cell through E-Mail addressed to “Revenue_cell@dmrc.org” by 2<sup>nd</sup> of every month.

20.3 Each cancelled Foil should be verified by concern Station Manager with justified reason.

20.4 All copies of the canceled foils except station record foil must be sent to Revenue Cell with Balance Sheet of every month.

20.5 In case of any clerical mistake in Periodicals and Balance Sheet, a revised copy of the same should be submitted to Revenue Cell and Accounts (hard as well as soft copy) on next day of schedule time of station duly mentioning “Revised Copy Dated- ________” on top right corner.

20.6 Every copy of Balance sheet, Periodical returns, stock sheet and other than required copy to be dully sign by concern Station Manager/Asstt Station Manager/Station In charge with station stamp.

20.7 Check list for submitting Balance Sheet at Revenue Cell:

1. Balance Sheet
2. Last Periodical of the Month
3. CSC Stock Position
4. Money Value Items Stock Position
5. Concise list of money receipts through Money Value Books
6. Defective CSC (if any)
7. Defective CST (if any)
8. Defaced CSC (if any)
20.8 E-mail should be done at the following email ID’s:-
Revenue cell – revenue_cell@dmrc.org
Account Dept - dolly.bharadwaj@dmrc.org,
## CODES AND STANDARDS

<table>
<thead>
<tr>
<th>Code/Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS EN 60529:1992</td>
<td>Degrees of protection provided by enclosures (IP code).</td>
</tr>
<tr>
<td>BS 5493: 1977</td>
<td>Codes of practice for protective coating of iron and steel structures against corrosion.</td>
</tr>
<tr>
<td>BS 4536 : Part 2 : 1970</td>
<td>Fittings and Components</td>
</tr>
<tr>
<td>BS 4752:</td>
<td>Specification for switchgear and control gear for voltages upto and including 1000 V a.c. and 1200 V d.c.</td>
</tr>
</tbody>
</table>
Appendix 4

(To be finalized during design stage)

Report List

Media wise Report:

TVM should generate media wise Stock report i.e. Card and Token

Currency Wise report: It should clearly indicate type of coin/note, no of Coins/note, its value and total amount

Diagnostics Report
Upon request from authorized maintenance personnel via the internal maintenance keyboard, the TVM shall poll all device modules and interfaces, and issue a Diagnostics Audit Report containing data regarding the current status of the TVM and all components.

Recovered Money Reports
Any money found loose in the TVM by authorized personnel shall be inserted by such personnel into the TVM coin or bill slot. The TVM shall record the value of the money inserted as “recovered

Collection Reports
Each time a money container is removed or inserted by authorized revenue service personnel, a Collection Report shall be issued by the TVM. The Collection Report shall, at a minimum, provide the following information:

(a) Clear indication of whether the container was “removed” or “inserted” into the TVM
(b) Container type (i.e., hopper, coin vault, bill vault) and identification number
(c) Coin quantity and value resident in the container by coin type
(d) Bill quantity and value resident in the container by bill type
(e) Total coin revenue in the container
(f) Total bill revenue in the container

Event Report
When in maintenance mode, and on request from service personnel, the TVM shall print a Diagnostics Report on receipt stock. The report shall be organized by event code and provide stored alarm event data. Personnel shall be able to select the day or series of days (up to 10 days) of event data to be printed. The data presented in the diagnostics report shall be detailed enough for service personnel to view the nature of historical failure events down to the subcomponent level.
List of Tools

(List of Tools to be proposed by contractor in the attached Performa)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of Tool</th>
<th>Make/Manufacturer</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
BILL OF QUANTITY
### Details of Bill of Quantities and Activities

<table>
<thead>
<tr>
<th>S.no</th>
<th>Description</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Supply of TVM</td>
<td>300</td>
</tr>
<tr>
<td>2</td>
<td>Supply and installation of AVM cum TR</td>
<td>150</td>
</tr>
<tr>
<td>3</td>
<td>Supply of TVM Central Computer (TVM CC) along with required OCC level networking, cabling and accessories</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Supply of Power cable (for 50 stations)</td>
<td>50</td>
</tr>
<tr>
<td>5</td>
<td>Supply of LAN cable CAT-5 (for 50 stations)</td>
<td>50</td>
</tr>
<tr>
<td>6</td>
<td>Installation, Testing &amp; Commissioning of TVM Central Computer (TVM CC) along with required OCC level networking, cabling and accessories</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Installation Testing and Commissioning of TVM</td>
<td>300</td>
</tr>
<tr>
<td>8</td>
<td>Installation Testing and Commissioning of Power cable</td>
<td>50</td>
</tr>
<tr>
<td>9</td>
<td>Installation Testing and Commissioning of LAN cable</td>
<td>50</td>
</tr>
<tr>
<td>10</td>
<td>Installation Testing and Commissioning of Installation, Verification and Partial Acceptance Test System Acceptance Test</td>
<td>300</td>
</tr>
<tr>
<td>11</td>
<td>Installation Testing and Commissioning of System Acceptance Test</td>
<td>300</td>
</tr>
<tr>
<td>12</td>
<td>Integrated Testing and commissioning of Integrated testing and commissioning</td>
<td>300</td>
</tr>
<tr>
<td>13</td>
<td>Design and Application engineering of submission of complete design documents- Prelim design, Final Design, Drawings, Interface application engineering configuration data, O&amp;M Manuals etc.</td>
<td>300</td>
</tr>
<tr>
<td>14</td>
<td>Design and Application engineering Project Management</td>
<td>300</td>
</tr>
<tr>
<td>15</td>
<td>Local transportation and insurance of all offshore equipment inclusive of Any other item for completion of the work</td>
<td>300</td>
</tr>
<tr>
<td>16</td>
<td>Spare modules, spares and consumables Spare Parts- 5% of total supply quantity</td>
<td>As per Appendix 2.2</td>
</tr>
</tbody>
</table>
CHAPTER 16

INTRODUCTION

1.2 GENERAL

1). Delhi Metro Rail Corporation Ltd. (DMRC) has implemented Automatic Fare Collection system (AFC) for the Phase-I & Phase-II system. Phase-I & Phase-II consists of 6 lines with 137 stations:

<table>
<thead>
<tr>
<th>Line</th>
<th>Section</th>
<th>No. of Stations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dilshad Garden – Rithala</td>
<td>21</td>
</tr>
<tr>
<td>2</td>
<td>Huda City Centre – Jahangirpuri</td>
<td>34</td>
</tr>
<tr>
<td>3</td>
<td>Noida City Centre – Dwarka Sec 21</td>
<td>44</td>
</tr>
<tr>
<td>4</td>
<td>Yamuna Bank – Vaishali</td>
<td>09</td>
</tr>
<tr>
<td>5</td>
<td>Inderlok –Kirti Nagar - Mundka</td>
<td>16</td>
</tr>
<tr>
<td>6</td>
<td>Central Secretariat - Badarpur</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td><strong>137</strong></td>
</tr>
</tbody>
</table>

2). Delhi Metro Rail Corporation (DMRC) has implemented the AVM Top Up in CSC at the following stations:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Station</th>
<th>No. of AVMs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dilshad Garden</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Shahdara</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Welcome</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Seelampur</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Shastri park</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>Pragati Maidan</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Karkarduma</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>Nirman Vihar</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>Laxmi Nagar</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>Barakhamba Road</td>
<td>3</td>
</tr>
<tr>
<td>11</td>
<td>RK Ashram Marg</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>Jhandewalan</td>
<td>4</td>
</tr>
<tr>
<td>13</td>
<td>Rajendra Place</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td><strong>39</strong></td>
</tr>
</tbody>
</table>
1.4 RELEVANT DOCUMENTS

4). This Particular Specification (PS) shall be read in conjunction with the Condition of Contract (COC) and any other document forming part of the contract. In the event of a conflict between the PS and other documents, the requirements of the PS shall prevail.

5). Notwithstanding the precedence specified in above paragraph, the Contractor shall always immediately seek advice from the Employer's engineer in the event of conflicts between specifications.

1.5 SYSTEM DESCRIPTION

3). Delhi Metro AFC system uses recyclable contactless smart token (CST) as single journey ticket and contactless smart card (CSC) for multiple journey.

4). The Add Value Devices will be used for reading CST/CSC information as well as add Value on CSC after making payment through Internet.

5). The Web Top Up process helps the passenger to complete the Add Value Transaction in advance by making payment through their Credit Card/ Debit Card/ Net Banking at the DMRC Website. After doing this, the passenger can tag the Card on the Add Value Machines to complete the Transaction. The Add Value Machines send the Transaction data to AVM CC for updating the system, end-of-day processing and generating revenue and traffic reports. This data is further uploaded on CCHS through AVM CC as per CCHS Interface document.

6). CCHS system is the highest level in the above mentioned DMRC system hierarchy. CCHS is used for integrating data of AFC systems for DMRC Phase-I & II and coming Phases and provide required interfaces.
CHAPTER 17

SCOPE OF WORKS

2.1. SCOPE

The scope of the works includes:

2.1.1. Design, manufacture, supply, Installation, Testing and Commissioning of 150 TR cum AVM (Ticket Reader cum Add Value Machines) and spares for stations of Phase I, II & III.

2.1.2. Interface with existing AVM Server and Web Server to meet Employer's requirement.

2.1.3. Supply, installation, testing and commissioning of a Data Base Server.

2.1.4. All connectivity with AVM CC and CCHS.

2.1.5. Station wise list of equipments are given in Appendix ‘2.1 & 2.2’. The delivery includes all the items which have not been included in this list but are part of proposed solution and are required for implementation at all levels: Central level, Station or Equipment level.

2.1.6. System shall meet existing DMRC business rules and shall be designed keeping in view future Business Rules expansion/modification requirements.

2.1.7. The Contractor shall follow the schedules of works and supply and shall complete the sections of the works by the key dates set out in the tender document.

2.1.8. Supply, installation and commissioning of all the networking equipments and cables for station LAN, OCC LAN and for the connectivity with the communication backbone of existing AFC system.

2.1.9. In DMRC system, CSC Top Up through Internet (Credit /Debit Cards, Net Banking) is working on stations. The interface document between AVM and AVM Server to be provided. In case any modification is required at AVM, it is to be carried out by contractor.

2.2. General Requirements-

2.2.1. The TR cum AVM shall be designed to attain the Employers requirements as required in this Specification.

2.2.2. The system shall be designed to process Type A Contact less Smart Cards and Tokens.
2.2.3. Seamless integrated system design & functioning with the existing AFC system with respect to operational, maintenance, future expansion and modification requirements.

2.2.4. The proposed solution (hardware and software) will ensure:

- Vendor-independent delivery of modules / equipments as far as possible. Use of Standard Commercial off the Shelf products and software, encouraging use of non-proprietary items.
- Proven hardware platform.
- Current/Latest operating System and COTS to be used.

The Design should be flexible avoiding fixed specifications in a cost effective manner so as to connect AVMs supplied by other vendor in future.

2.2.5. Contractor shall highlight above aspects in his technical offer.

2.2.6. The attainment of the reliability, availability, maintainability and safety requirements of the system will be verified by analysis, testing and system demonstrations as required in the Specifications.

2.3. **System and Equipments**:

2.3.1. The scope of supply shall include all necessary hardware / equipments, software, accessories, materials, documentation and facilities necessary to meet all requirements.

2.3.2. The TR cum AVM shall be similar to that being provided already in DMRC, as far as possible. The exact design shall be approved by the Employer.

2.3.3. The contractor shall transfer to DMRC all requirements specifications, design documents, interface specifications etc. Blank SAM shall be provided by the Contractor as per CCHS SAM specifications for initialization at CCHS (Hardware specifications of SAM).

2.3.4. **Services**:

The Services to be performed by the Contractor shall include, but not limited to, the following:

a) Design, manufacture, delivery and assurance of integrated AVM Central System.

b) Design, manufacture, supply, Installation, testing and commissioning of the TR cum AVMs for Phase I, II & III stations.
c) Presentations, meetings, reviews and audit support as specified in the Specification.

d) Project management of the implementation of the system.

e) Overall site supervision and management.

f) Decommissioning, removal and disposal of Temporary Works, if any.

g) Operation and maintenance support services during DLP period.

h) Contractor shall ensure system security from fraud possibilities, falsification of data, computer virus etc during DLP.

i) Preparation and submission of documentation (hard / soft copy).

j) Interface management.

k) Training.

l) Any other work to meet the Employer’s requirements.

2.3.5. Interface Documents:

DMRC will provide detailed Interface Specification Documents for the following Interfaces-

a) AVM to AVM CC

b) Database Server to DMRC AVM CC
CHAPTER 18
OPERATIONAL REQUIREMENTS

3.1. General:

This chapter describes basic operational requirements, which will govern the AVM system.

3.2. Tickets:

3.2.1. All CSCs issued from DMRC CCHS should be acceptable in the system supplied by the AVM contractor.

3.2.2. Data on the tickets shall include all the parameters as in currently issued tickets in DMRC AFC system.

3.2.3. Types of Fare Media - AVM system shall use following type of recyclable tickets:

c). Contactless smart token (CST Type A)
   For Ticket Analysis
   Mifare Ultralite (64 bytes)/My-D Move (Infineon) (ISO 14443)

d). Contactless smart card (CSC Type A)
   For Ticket Analysis and Add Value
   Mifare Desfire (4 KB) EV1 or equivalent(ISO 14443)

3.2.4. Types of Fare Products- AVM shall use the following types of Fare Product of the existing DMRC AFC System:

   a) Single Journey Token
   b) Paid Exit Token
   c) Free Exit Token
   d) Stored value CSC

3.2.5. Contactless Smart Token-

   Ticket Analysis of Contactless Smart Token shall be possible at TR cum AVM.

3.2.6. Contactless Smart Card-

   Stored Value Card (SV)

   a) There shall be provision of not less than sixteen (16) SV ticket types. Each SV type shall be allocated a set of fares and shall be capable of change by means of downloadable parameters.
b) SVs shall have an expiry date (after last top-up) determined by an DMRC ticket sales parameter at CCHS.

3.3. Blacklisted tickets

3.3.1. Ticket Blacklisting shall be done at CCHS. These tickets IDs shall be downloaded to the AFC equipment at stations from CCHS as blacklist parameter.

3.3.2. Blacklisted tickets shall be rejected/ blocked by AVMs when the Card is presented for doing ADD Value.

3.4. CONFIGURATION PARAMETERS

3.4.1. For exact parameter exchange, contractor shall interface with existing DMRC CCHS/AVM CC and take Employer’s engineer approval. Also, the contractor shall provide a document having the list of all configuration parameters at CC whether downloaded from CCHS including DMRC and CCHS global parameters or System level control parameters.

3.4.2. The operating features of the system shall be fully parameterized to provide flexibility for modification of operational parameters / conditions. Such changes shall be done at the CCHS and downloaded to the CC and then to the equipment to be effective at a future date. An acknowledgement from the equipments should be sent to CC and then to CCHS for the acceptance and validation of new EOD parameters.

3.4.3. System will accept global EOD parameters from CCHS and implement at station level to ensure smooth operation as regards system performance, design functionality, passenger traffic etc.

3.4.4. Configuration parameters downloaded from CCHS system shall be acceptable in the design. Any clarification in this regard can be had from CCHS contractor as part of interface co-ordination during design / execution phase. The Contractor shall obtain the latest Business rules from the Employer’s engineer during design phase.

3.4.5. The total time required to download from CC to all devices shall be maximum 30 minutes. During the download the device shall be able to operate normally and the time elapse to switch to new operational parameters shall not affect the normal operation.

3.4.6. Parameters can be downloaded at all equipments from OCC at the End Of the day during operation time without affecting the normal operation of equipments. The parameters once downloaded from CCHS to CC shall be distributed on all
equipments without a change in the meaning and as per CCHS Interface specifications. However, the distribution shall be controlled at CC level to be done automatically or manually and also to be done Equipment wise, station wise or at all equipments/stations at once.

3.4.7. The station equipment shall maintain at least two versions of configuration parameters. It shall be possible to switch back to previous version of EOD.

3.4.8. Operating day

For revenue reconciliation, a distinction shall be made between the consecutive operating days (extends from midnight to midnight).

3.4 BUSINESS RULES

The fare media is processed as per Business Rules defined by DMRC in the application software at the equipments.

Existing AVM Business Rules are attached at Appendix ‘3.2’ of this PS. DMRC business rules are attached only for reference purpose only. Such rules are subject to change as per future operational requirements of DMRC and CCHS interface requirements.
CHAPTER 19

Functions of AVM with AVM server

4.1. FUNCTIONS

4.1.1. Data Management -

4.1.1.1. Data Categories

a) Data to be transmitted from TR cum AVM to CC and CCHS shall be divided into the following categories.

| iv). Transaction Data | CSC usage transactions like Add value EFT, CSC blocked etc. |

b) Data will be transmitted from TR cum AVM to CC shall be divided in the following

| i). Audit Data/Cut-off Data | Details of audit data/cut-off data of each machine including data of non-resettable registers |
| ii). Status Data | Status data including faults, maintenance alerts, mode of operation Alarms, Events and Warnings data etc. |

c) Data will be downloaded from the CCHS to CC facility. This data will be operational and security data such as:

| Operational Data | EOD such as date and time synchronization data |
| Security Data | Security data will include keys and list of blacklisted tickets. |
| Control data | Modes of operation of equipment and station |
| Maintenance data | Maintenance of equipments. |

d) Data format and transfer of Transaction Data from CC to CCHS shall be as per requirements of CCHS.

e) System should have inbuilt process to ensure completeness of data from different levels.

f) There shall be a provision to download new version of Station Level Equipments and other device related software from CC. This download shall be configurable at CC and to be applied equipment wise or on a group of equipment category wise or station wise or on all equipments at once.

4.1.2. Equipment Management with CCHS

(iii). Contractor follow secure equipment management of all devices including new equipment registration, equipment removal or deletion and blacklist as per CCHS requirement.
(iv). The CCHS shall manage and initialise all equipment and associated SAMs for the metro equipments that shall be further sent to the CC. The CC shall further distribute and manage the SAM for the equipments.

(v). The equipments will be physically managed by the CC whereas the information for all the CC’s equipment will be maintained at the CCHS level. Each equipment will be uniquely identified by equipment ID. Each equipment owner will be allocated a series of IDs from which they will allocate IDs to new equipment. Addition of new equipment or updation of equipment will be done at CCHS level and these additions/changes will be confirmed to CCHS via equipment updation file. CCHS shall receive the file and update the database.

(vi). Identification and blacklisting of fraudulent, stolen / lost equipments and updated information shall be sent to CCHS. Blacklist entry for lost /stolen equipment shall be done at CCHS and distributed as global blacklist parameters.

4.1.3. Security Management

Security requirements: - Security shall cover following aspects applicable to AFC system:

(i). Physical protection of equipment
(ii). Security of data and transactions
(iii). System security
(iv). Protection of revenue
(v). Security of cash through audit trails
(vi). Blank SAM provided by contractor and same will be activated by CCHS for equipment.

4.1.4. Key Management:-

Key management shall be done at CCHS level. The DSM and/or SAM (having Security keys) of all the equipments shall be issued from CCHS. Blank SAM as per CCHS requirement shall be provided by Contractor to CCHS.

4.1.5. Equipment security

(i). The equipments shall resist tamper by either passengers or unauthorized staff of the Employer’s representative or unauthorized access by staff.
(ii). Valid identification shall be required before opening any machine containing cash or tickets.
(iii). All machines shall have locked enclosures to satisfy the overall security requirement.
(iv). All fare media shall be protected from being tampered with during the period that they are being processed within a machine. It shall be impossible to substitute a ticket or card and validate it once a transaction has been initiated.
(v). The contractor shall provide multiple set of keys for each equipment. Similar equipment shall be keyed similarly. The keying arrangement shall be with the approval of the Employer’s engineer.

(vi). Contractor shall also provide metallic stickers for numbering of all the equipments at stations. The numbering arrangement shall be with the approval of the employer’s engineer.

4.1.6. Revenue Security

(v). The equipments and system shall provide a complete audit trail of all transactions.

(vi). The equipment shall be designed with features, which deter possibility of revenue losses from altering, copying or counterfeiting of the tickets.

(vii). Unique ticket id - Fail-safe features shall be incorporated to check that no duplicate ticket ids are introduced in the system, either through hardware or software failures. System shall address any other fraud mechanism for revenue erosion from automatic fare collection and accountal system. Sufficient security shall be provided to prevent an increase in the remaining value of the ticket except at machines having revaluation function.

4.1.7. Data Security

(v). All data and transactions shall be restored in case of power failure or software bug or crash.

(vi). Security of communications between the TR cum AVM, AVM CC and CCHS system shall ensure no loss or tampering of data in transmission, hence providing protection from any falsification of records.

(vii). All transactions shall be initiated and concluded atomically (no tearing of transactions). All data transmission shall be done securely using advanced suitable ciphering techniques, algorithms and protocols.

(viii). All critical alarms shall be transmitted to the CC in real time.

(ix). The communication network shall be equipped with built-in error detection and transmission retries to ensure accuracy and dependability of data transmission.

4.1.8. System Security

(v). System design shall ensure protection from unauthorized access and changes to the systems and software

(vi). All software / firmware supplied by the Contractor shall be free of virus.

(vii). Suitable mechanisms like full proof Antivirus Mechanism to handle any possibility of system being infected by any virus shall be incorporated.

(viii). Upgradation of such measures, from time to time shall be the responsibility of the AVM contractor during DLP period.
4.1.9. **EOD and Configuration Management**

(v). EOD will be as per CCHS Interface Requirements.
(vi). CC shall receive global EOD from CCHS and transfer to equipments through SC.
(vii). EOD parameters shall be common between Phase-I, Phase-II and Phase-III systems.
(viii). In addition, AVM CC shall send other local EOD parameters to equipments as required.

4.1.10. **Software / Document version Mgmt.**

(i). Contractor shall provide utility for managing all submitted documents and installed software versions.
(ii). There shall be a provision to see the Software version status of equipments at CC with exception reports.

4.1.11. **Blacklist Management**

(Refer Ch-3 Operational requirements)

4.1.12. **Alarms, Events & Warnings**

Alarm signals shall be transmitted automatically for display on the CC. All important alarms shall have to be acknowledged. Alarms shall be for:

(viii). Power failure to any machine.
(ix). Communication failure to any machine.
(x). Application program or parameter files download error to any machine.
(xi). Other unwanted events.
(xii). Any tampering activity.
(xiii). Other mechanical and electronic problems or anomalies output from the device’s own diagnostic and condition monitoring system.
(xiv). Encoding errors in equipments.
(xv). Alarms related to Status Monitoring etc.
CHAPTER 20

TICKET READER CUM ADD VALUE MACHINE

5.1. General:

5.1.1. There will be Add Value Machine installed at stations to be used by passengers to know the remaining value of the ticket like Ticket Reader and to add value to CSC after payment through website.

5.1.2.
   a) Analyzing the CSC/CST.
   b) Add value in the CSC after payment through website

5.1.3. It shall be located at concourse in free area and near the customer care in paid area.

5.1.4. The design of AVMs will be as per existing AVM-AVM CC Interface specifications.

5.2. Functions:

5.2.1. Analysis and display shall include (but not be limited to) the following items:
   a). Ticket type
   b). Ticket electronic value / amount, Zone
   c). Ticket sale station / date
   d). Ticket validity duration
   e). Current Date/Time
   f). Ticket usage status
   g). At least last five transactions for CSC
   h). Reject code and message.

5.2.2. For the passengers who have paid for add value through website in advance, the TR cum AVM shall process the add value in the card. This shall include-
   a). Inquire against the CSC physical ID for any pending transaction at AVM Server
   b). Do the Add Value in the Card if the transaction is pending.

5.2.3. For the passengers who do not know how to operate AVM should provide the help menu and instructions.

5.3. Features:

5.3.1. Easily detachable with key lock arrangement. No chances of electric shock to user in any case.
5.3.2. LED & Buzzer (unique tones) for ticket status.

5.3.3. Display - English / Hindi and alphanumeric, minimum two rows of 24 characters, easily visible in the ambient light conditions on the stations.

5.3.4. Size of display should be minimum 7 inch LCD with touch screen.

5.3.5. Provision for software download, upgrade.

5.3.6. Shall have standalone working capability as ticket reader only. It should be able to do the following functions in standalone mode:

5.3.7. Recharge / Remaining Amount Explain in voice (Hindi/English)
5.4. Configuration

Add Value Machine (AVM) consists of the following:

- A compact and highly durable body.
- A proximity contactless card reader/writer.
- A radio-frequency antenna built into the body.
- A TFT LCD display of 7”.
- Pictograms for the user.
- A buzzer.

The AVM validator includes an ISO/IEC 14443 contactless card reader. This reader is a device with a radio frequency interface capable of accessing contactless cards that comply in part or in whole with the ISO/IEC 14443 Standard.

Therefore, the contactless validator will be able to support the reading of Contactless Smart Card (CSC) according to the standards ISO 14443 (CSC Type A) compliant.

The contactless card reader proposed is a high level RFID Controller board suitable for integration into existing or new ticketing element in the proposed system.

5.5. Construction:

5.5.1. Material proposed shall be strong, durable and approved by the Employer’s Engineer.

5.5.2. The methods of construction and installation shall be durable and approved by the Employer’s Engineer.

5.5.3. Design Life

The AVM shall be designed for a minimum service life of 10 years of normal operation. All equipment shall be designed to operate seven days per week, twenty-four hours per day.

5.6. Add Value on DMRC Smart Card (CSC) through TR cum Add Value Machine

5.6.1. The process for doing Add Value on CSC through TR cum AVM is as under-

5.6.2. User will go to existing DMRC website i.e.dmrcsmartcard.com.

a) User will create his account by giving personal information.

b) Name

c) Card engraved ID

d) Email address

5.6.3. After receiving above information, engraved id will be validated at CCHS.
5.6.4. In case, engraved ID is valid, user account will be created at existing DMRC data base server and mail will be sent to user through existing web server for activation of user account.

5.6.5. After activation of account, the information will be updated in the database server.

5.6.6. Now when user wants to do add value in his/her card, he/she will go to DMRC website, login into the system, select the option for payment (Debit card/Credit card/Net Banking/other options).

5.6.7. After selection, the user will make the payment through Payment Gateway. Now bank server will send this information (engraved id and add value amount) to existing database server which will set the flag against this card.

5.6.8. Now user will go to any AVM installed at any DMRC station and show the card in front of Add value machine and press OK & this information will go to database server through online inquiry application at the AVM CC.

5.6.9. The CSC physical id will be cross checked from database server & if any transaction is pending, AVM will do the Add value on the card & reset the flag.

5.6.10. AVM will send this transaction to AVM CC and accordingly update the AVM CC. CC will also send this transaction to CCHS as per CCHS Transaction format.

5.6.11. The TR cum add value machine shall also be used as ticket reader to check the balance/validity of CSC and CST and last five transactions on CSC.

5.6.12. For this whole process, the AVM has to interface with existing AVM CC, so that the whole process can be done in 5 second.

5.6.13. In offline mode, AVM should only perform the ticket enquiry function.
ANNEXURES (1 TO 11)
TENDERER’s FINANCIAL OFFER

Financial Rates statement for the Bill of Quantities and activities required.

<table>
<thead>
<tr>
<th>S.no</th>
<th>Equipment/Item Supply</th>
<th>Qty</th>
<th>Unit</th>
<th>Unit Price (FC)</th>
<th>Total Price (FC)</th>
<th>Unit Price (INR)</th>
<th>Total Price (INR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Supply of TVM</td>
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<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Supply of AVM cum TR</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Supply of TVM Central Computer (TVM CC) along with required OCC level networking, cabling and accessories</td>
<td>1</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Supply of Power cable (for 50 stations)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Supply of LAN cable CAT-5 (for 50 stations)</td>
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<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Installation, Testing &amp; Commissioning of TVM Central Computer (TVM CC) along with required OCC level networking cabling and accessories</td>
<td>1</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Installation Testing and Commissioning of TVM</td>
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<td>No</td>
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<td></td>
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<td></td>
</tr>
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<td>Installation Testing and Commissioning of AVM cum TR</td>
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<td></td>
<td></td>
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<td>9</td>
<td>Installation Testing and Commissioning of Power cable</td>
<td>50</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Installation Testing and Commissioning of LAN cable</td>
<td>50</td>
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<td></td>
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<td></td>
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<tr>
<td>11</td>
<td>Installation Testing and Commissioning of Installation, Verification and Partial Acceptance Test System Acceptance Test</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Installation Testing and Commissioning of System Acceptance Test</td>
<td>300</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Integrated Testing and commissioning of Integrated testing and commissioning</td>
<td>300</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Design and Application engineering of submission of complete design documents-Prelim design, Final Design,</td>
<td>300</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drawings, Interface application engineering configuration data, O&amp;M Manuals etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------------------------</td>
<td>---</td>
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<td>---</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Design and Application engineering Project Management</td>
<td>300</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Any other item required for completion of the above work</td>
<td>300</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Spare modules, spares and consumables as per Appendix 2.2</td>
<td>5% of installed quantities</td>
<td>LS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GRAND TOTAL**

*Above rates are inclusive of all taxes and duties for supply, installation, testing and commissioning of items at DMRC site.*

Date : .............................. Signature)...........................
Place : .............................. Printed Name----------
Designation---------- Common Seal--------
ANNEXURE 2

DELETED
DELETED
ANNEXURE-3
(Please see clause- 501(b) of ‘Instructions to Tenderers’)

PROFORMA OF BANK GUARANTEE FOR TENDER GUARANTEE
(ON NON-JUDICIAL STAMP PAPER OF RS. 100, WITH STAMP OF BANK)

Ref. ..................................................  Date ..................................................

Bank Guarantee No...........................

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

To,

Delhi Metro Rail Corporation Ltd.
Metro Bhawan, Fire Brigade Lane,
Barakhamba Road,
New Delhi-110001

Dear Sir,

In accordance with your invitation to tender No. ........................................ M/s .......................................................... hereinafter called the tenderer with the following Directors on their Board of Directors/ Partners of the firm:

1. ..................................................
2. ..................................................
3. ..................................................
4. ..................................................
5. ..................................................
6. ..................................................
7. ..................................................
8. ..................................................
9. ..................................................
10. ............................................... 

Wish to participate in the said tender for the supply of .........................

As a Bank Guarantee against Bid Guarantee for a sum of .......................... (in words & figures)

valid for (180) one hundred and eighty days from the date of opening of the Tender  viz ..................................................

is required to be submitted by the tenderers as a condition for the participation, this bank hereby guarantees and undertakes during the above said period of (180) one hundred and eighty days to immediately pay, on demand by the General Manager or Financial Advisor & Chief Accounts Officer, Delhi Metro Rail Corporation Ltd., NBCC Place, Bhishma Pitamah Marg, New Delhi-110003, INDIA in writing the amount of .................................................. (in words & figures) to the said General Manager or Financial Advisor & Chief Accounts Officer, Delhi Metro Rail Corporation Ltd., New Delhi, INDIA, and without any reservation and recourse, if :-
(i) the tenderer after submitting his tender, modifies the rates or any of the terms and conditions thereof, except with the prior written consent of the purchaser; or

(ii) the tenderer withdraws the said bid within 180 days after opening of bid; or

(iii) the tenderer having not withdrawn the bid, fails to furnish the Contract Performance Guarantee within the period provided in the Conditions of Contract.

This guarantee shall be irrevocable and shall remain valid upto 4.00 P.M. on ……………… If further extension to this guarantee is required, the same shall be extended to such required periods on receiving instructions from M/s ………………………
…………………………………………..on whose behalf this guarantee is issued.

Date ……………………… Signature …………………………………

Place ……………………… Printed Name ……………………………

Witness :

1. …………………………………. …………………………………….. (Designation)

…………………………………………

(Bank’s Common Seal)
ANNEXURE-4

PROFORMA FOR AUTHORITY FROM MANUFACTURERS

No. ..................................................  Date ..........................................

To

Dy. Controller of Stores,

Delhi Metro Rail Corporation Ltd.
Metro Bhawan, Fire Brigade Lane,
Barakhamba Road,
New Delhi.110001

Dear Sir,

Sub :-

We ............................................................., an established and reputable
manufacturers of .................................................. having factories at
.................................................. and offices at ..................................................
do hereby authorise M/s ............................................... (Name and address of Agents) to
represent us, to bid, negotiate and conclude the contract on our behalf with you against Tender
No. ..........................................

No company/ firm or individual other than M/s ............................................... are
authorised to represent us in regard to this business against this specific tender.

Yours faithfully,

(NAME) for & on behalf of M/s .................

(Name of Manufacturers)

Note : This letter of authority should be on the Letter-Head of the manufacturing concern and
should be signed by a person competent and having the power of attorney to bind the
manufacturer.
ANNEXURE-5
(Please see clauses -0606
of ‘Instructions to Tenderers’)

PROFORMA FOR STATEMENT OF DEVIATIONS
FROM TENDER CONDITIONS

The following are the particulars of deviations from the requirements of the Instructions
to Tenderers and Conditions of Contract :-

<table>
<thead>
<tr>
<th>CLAUSE</th>
<th>DEVIATION</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(including justification)</td>
</tr>
</tbody>
</table>

………………………………..

Signature and seal of
the Manufacturer/ Tenderer.

NOTE : Where there is no deviation, the statement should be returned duly signed with an
endorsement indicating “No Deviations”.

Page 188 of 196
PROFORMA FOR STATEMENT OF DEVIATIONS
FROM COMMERCIAL TERMS/TECHNICAL SPECIFICATIONS

The following are the particulars of deviations from the requirements of the Technical Specifications:

<table>
<thead>
<tr>
<th>CLAUSE</th>
<th>DEVIATION</th>
<th>REMARKS (including justification)</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

Signature and seal of
the Manufacturer/ Tenderer

NOTE: Where there is no deviation, the statement should be returned duly signed with an endorsement indicating “No Deviations”.
ANNEXURE-7
(Please see clause-0900 of ‘Conditions of Contract’)

PROFORMA OF BANK GUARANTEE FOR CONTRACT

PERFORMANCE GUARANTEE BOND

Ref .......................................................... Date ........................................
Bank Guarantee No. ..............

To
Delhi Metro Rail Corporation Ltd.
Metro Bhawan, Fire Brigade Lane,
Barakhamba Road,
New Delhi.

1. Against contract vide Advance Acceptance of the Tender No.................................................. dated ...................................covering supply of...............................................................(hereinafter called the said contract’) entered into between the General Manager, Delhi Metro Rail Corporation Ltd., Delhi (hereinafter called the Purchaser) and ...............................................................(hereinafter called the “Contractor”), this is to certify that at the request of the Contractor we, ............................................................... Bank, Ltd., are holding in trust in favour of the Purchaser, the amount of ............................................................... (write the sum here in words) to indemnify and keep indemnified the Purchaser against any loss or damage that may be caused or likely to be caused to or suffered by the Purchaser (India) by reason of any breach by the Contractor of any of the terms and conditions of the said contract and/or the performance thereof. We agree that the decision of the Purchaser, whether any breach of any of the terms and conditions of the said contract and/or in the performance thereof has been committed by the Contractor and the amount of loss or damage that has been caused or suffered by the Purchaser shall be final and binding on us and the amount of the said loss or damage shall be paid by us forth with on demand and without demur to the Purchaser.

2. We, ............................................................... Bank Ltd., further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for satisfactory performance and fulfilment in all respects of the said contract by the Contractor i.e. till ............................................. (viz the date upto 12 months after the date of last shipment/ delivery of the goods ordered) hereinafter called the ‘said date’ and that if any claim accrues or arises against us, .........................Bank Ltd., by virtue of this guarantee before the said date, the same shall be enforceable against us.............................. Bank Ltd., notwithstanding the fact that the same is enforced within six months after the said date. Payment under this letter of guarantee shall be made promptly upon our receipt of notice to that effect from the Purchaser.
3. It is fully understood that this guarantee is effective from the date of the said contract and that we, ………………………………………Bank Ltd., undertake not to revoke this guarantee during its currency without the consent in writing of the Purchaser.

4. We, ………………………………………Bank Ltd., further agree that the Purchaser shall have the fullest liberty, without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said contract or to extend time of performance by the Contractor from time to time or to postpone for any time or from time to time any of the powers exerciseable by the Purchaser against the said Contractor and to forbear or enforce any of the terms and conditions relating to the said contract and We…………………………….Bank Ltd., shall not be released from our liability under this guarantee by reason of any such variation or extension being granted to the said Contractor or for any forbearance and or omission on the part of Purchaser or any indulgence by the Purchaser to the said Contractor or by any other matter or thing what-so-ever, which, under the law relating to sureties, would but for this provision have the effect of so releasing us from our liability under this guarantee.

5. We, ………………………………………Bank Ltd., further agree that the guarantee herein contained shall not be affected by any change in the constitution of the said Contractor.

Date  …………………………….  Signature…………………………

Place……………………………..  Printed Name …………………

Witness : ………………………………..  ………………………………..

(Designation)

……………………………..  ………………………………..

(Bank’s Common Seal)
ANNEXURE-8

IMPORTANT NOTICE

(A) The following check list is intended to help the tenderers in submitting offer which are complete. An incomplete offer is liable to be rejected. Tenderers are advised to go through the list carefully and take necessary action.

(B) Tenderers are also required to submit copy of the checklist, duly marked, alongwith their offer.

CHECK LIST

1. Have you submitted a complete offer?
   It should consist of followings :
   (a) Quotation in prescribed Performa Submitted / Not Submitted
       Annexure 1.
   (b) Letter of Authority if required - . Submitted / Not Submitted
       Annexure-4
   (c) Tender Guarantee if required – Submitted / Not Submitted
       Annexure-3.
   (d) Statement of Deviations from Tender Conditions Submitted / Not Submitted
       Annexure-5
   (e) Statement of Deviations from Tech. Spec.- Submitted / Not Submitted
       Annexure-6
   (f) Annexure to Technical Specifications Submitted / Not Submitted
       Tender Documents duly filled in.

2. Have you submitted other supporting documents to establish your eligibility?
   It may consist of the followings :
   a. Certificate from the user as per Submitted / Not Submitted
      Para 401 (b) of Instruction to Tenderers
   b. Banker’s Report – Para 0401 (c) Submitted / Not Submitted
      of ‘Instructions to Tenderers’
   c. Income Tax Clearance Certificate Submitted / Not Submitted
   d. Commercial Details and Performance Statement Submitted / Not Submitted
   e. Statement of Equipment & Quality Control Submitted / Not Submitted
f. Clause wise comments on Technical Specifications, Clause 0202 “Instructions to Tenderers”

Submitted / Not Submitted

g. Any other document asked by the purchaser if submitted, specify the Documents

Submitted / Not Submitted

OR

Any other document which the tenderer Considers relevant

3. DELETED

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

Signature & Seal of the Manufacturer/ Tenderer
PERFORMA OF FORMAT UNDER WHICH BILLS FOR STORES SUPPLIED IS TO BE USED

Name and Address of the Firm ..............................................................................................................
.................................................................................................................. Bill No. .............................. Dated ..................

Purchase Order ......................................................... No. .................................................. Dated ............

Name and address of the consignee ....................................................................................................
..............................................................................................................................

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Authority</th>
<th>Description</th>
<th>Number</th>
<th>Rate</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>for Stores or quantity</td>
<td>Purchase</td>
<td>Rs. P.</td>
<td>per</td>
<td>Rs. P.</td>
</tr>
<tr>
<td></td>
<td>Amount</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total

1. C.S.T./Sales Tax Amount
2. Freight (if applicable)
3. Excise Duty (if applicable)
4. Packing and Forwarding charges (if applicable)
5. others (Please specify)
6. PVC Amount (with calculation sheet enclosed)

--------------------------------------------------------------------------------------------------------------------
7. (--)deduction / Discount
--------------------------------------------------------------------------------------------------------------------
8. Net amount payable

(In words Rs.)

Despatch detail RR No./other proof of dispatch .................................................................

Dated ...........................................(enclosed)

Inspection Certificate No. ................................................. Dated ..................(enclosed)

Income Tax Clearance Certificate No. ..................Dated..................(enclosed)

Modvet Certificate No. .........................................................(enclosed)

Excise Duty Gate Pass .........................................................(enclosed)

Place and Date

Received Rs. ...........................................................(Rupees)..........................................

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

Revenue Stamp
Signature and Stamp of Supplier
ANNEXURE-10

PROFORMA OF TEST CERTIFICATE TO BE ISSUED BY THE CONSIGNEE AFTER SUCCESSFUL COMMISSIONING OF MACHINE/EQUIPMENT

M/s

Sub:- Certificate for commissioning of Machine/equipment

This is to certify that the machine as detailed below has been received in good condition alongwith all the standard and special/optional accessories and same has been installed and commissioned.

1. Purchase order No.:-
2. Description of Machine:-
3. Machine S.No.:-
4. Quantity:-
5. Bill of Lading No.& date:-
6. Name of Vessel:-
7. Railway receipt no.& date:-
8. Name of consignee:-
9. Date of receipt of machine:-
10. Date of call to the supplier after site/foundation etc. is ready:-
11. Date of commissioning:-
12. Details of accessories/ spares not yet supplied & recoveries to be made on this account:-

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Description</th>
<th>Amount to be recovered</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Signature------------------------

Name -------------------------

Designation ------------------
Annexure-11

Payment terms

The standard payment terms subject to recoveries, if any, by way of Liquidated Damages will be as under:

<table>
<thead>
<tr>
<th>S.N</th>
<th>Activities</th>
<th>Documents required for release of payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Detailed Design Finalisation(Submission) and approval by DMRC</td>
<td>10% Payment will be made against certificate from DMRC regarding design acceptance complying all requirements of Schedule of requirement</td>
</tr>
<tr>
<td>2</td>
<td>Start of Trial for TVM in Delhi and Integration of TVM CC with CCHS, Integration of TVM with TVM CC, Integration of DMRC SAM with TVM card Reader, Integration of Credit/debit card reader with TVM</td>
<td>25% Payment will be made against certificate from DMRC regarding successful completion of Installation complying all the requirements of Schedule of requirement on proportionate basis.</td>
</tr>
<tr>
<td>3</td>
<td>TVM equipments shipment</td>
<td>50% Payment will be made after certificate from DMRC regarding successful completion of Testing and commissioning complying all the requirements of Schedule of requirement on proportionate basis</td>
</tr>
<tr>
<td>4</td>
<td>Commissioning of TVM at all Stations</td>
<td>10% Payment will be made after certificate from DMRC regarding successful completion of Testing and commissioning complying all the requirements of Schedule of requirement on proportionate basis</td>
</tr>
<tr>
<td>5</td>
<td>DLP (Defect Liability Period)</td>
<td>5% Payment will be made after certificate from DMRC regarding successful completion of DLP</td>
</tr>
</tbody>
</table>

Payment should be followed strictly as per terms and conditions of Tender Documents. Payment in foreign currency shall be made through direct remittances. Bank charges for payment in foreign currency outside in India shall be on beneficiary account.

Above payment will be made after deducting Work Contract Tax (WCT) and Tax Deduction at Source (TDS) as applicable in India.