

Evaluation Report

As per Rule 35 of PP Rules, 2004

1. Name of Procuring Agency: National Highway Authority
2. Method of Procurement: Single Stage Two Envelope
3. Title of Procurement: **SUPPLY, INSTALLATION, TESTING, COMMISSIONING, TECHNICAL SUPPORT, MANAGEMENT & MAINTENANCE OF AUTOMATIC VEHICLE CLASSIFICATION (AVC) BASED ELECTRONIC TOLL & TRAFFIC MANAGEMENT SYSTEM ON NATIONAL HIGHWAYS (N-5) PACKAGE – I & II**
4. Tender Inquiry No: Nil
5. PPRA Ref No: TS359101E
6. Date & Time of Bid Closing: 15.08.2018 at 1100 Hrs Local Time
7. Date & Time of Bid Opening: 15.08.2018 at 1130 Hrs Local Time
8. No. of Bids Received: 04 (02 bids against each package)
8. Criteria for Bid Evaluation: Single Stage – Two Envelope. As per bidding Documents attached
9. Details of Bid Evaluation: As below

Package-I

| Name of Bidder | Qualification Marks | Technical Evaluation Marks | Quoted Cost | Evaluated Cost | Rule/Regulation/SBD/Policy/Basis for Rejection / Acceptance as per Rule 35 of PP Rules, 2004. |
|----------------------------|---------------------|----------------------------|---------------|----------------|---|
| M/s ZTEsoft-TolLink (JV) | 100 | 840 | 1,012,947,140 | 986,326,036 | Lowest |
| M/s Sh. Iqbal Akhtar & Co. | 85 | 975 | 1,031,422,553 | 1,031,422,553 | |

Lowest Evaluated Bidder: M/s ZTEsoft-TolLink (JV)

Package-II

| Name of Bidder | Qualification Marks | Technical Evaluation Marks | Quoted Cost | Evaluated Cost | Rule/Regulation/SBD/Policy/ Basis for Rejection / Acceptance as per Rule 35 of PP Rules, 2004. |
|----------------------------|---------------------|----------------------------|---------------|----------------|--|
| M/s ZTEsoft-TollLink (JV) | 100 | 840 | 1,039,031,746 | 942,184,606 | |
| M/s Sh. Iqbal Akhtar & Co. | 85 | 975 | 1,031,585,018 | 883,140,435 | Lowest |

Lowest Evaluated Bidder: M/s Sh. Iqbal Akhtar & Co.


Signature: _____

Official Stamp

Salahuddin
General Manager Revenue
NHA, H.Q Islamabad

NATIONAL HIGHWAY AUTHORITY

Office of Deputy Director (ETTM-II/MIS)/ITS Focal Person

Subject: **2nd Pre-Bid Meeting**

SUPPLY, INSTALLATION, COMMISSIONING, TECHNICAL SUPPORT, MANAGEMENT AND MAINTENANCE OF AVC BASED ETTM SYSTEM ON NATIONAL HIGHWAY N-5 PACKAGE-I, PACKAGE-II

A second pre-bid meeting was held on 06.08.2018 at 1200 Hrs in the conference room of Member (Finance). Following bidders participated:

- a. M/s National Engineers
- b. M/s TolLink Pakistan-ZTE (JV)
- c. NADRA-ORAS
- d. M/s Sheikh Iqbal Akhtar & Co
- e. M/s Technoflux

| Sr. | Bidder Name & Participant | Query | Response |
|-----|---------------------------|---|--|
| 1. | M/s NADRA-ORAS (JV) | Eligibility Criteria Fifty (50) marks have been earmarked for local experience. The foreign participation should be encouraged and more marks should be given to foreign experience. | Refer to PPRA rule 15 and 29 Evaluation Criteria wherein procuring agencies are authorized to formulate appropriate evaluation criteria. Request was considered but not accepted to keeping in view the scope of work given in the RFP. Criteria will remain unchanged. |
| 2. | M/s ZTE-TolLink (JV) | In order to establish the lowest financial bid, will the NHA establish lowest bid per package or combined? | The bids (Technical & Financial) have been sought for both the packages independently. Evaluation of bids will be carried out package-wise irrespective to each other. |
| 3. | M/s ZTE-TolLink (JV) | In case of the OPS center, if one party wins both packages, how many OPS centers will be required? Clarification is required because OPS center equipment forms a major part of the financial proposal. | As detailed in bidding documents. |
| 4. | M/s ZTE-TolLink (JV) | In case two separate parties win one package each, which party will provide the primary OPS center? Clarification is required because the data will need to be made interoperable in order to accommodate and facilitate cashless transactions. | Ensuring inter-operability will be the responsibility of the bidder securing the contract for any of the packages. Issuance of successful installation & commissioning letter will be subject to this interoperability. |

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8/8/18

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Addendum No. 01

**SUPPLY, INSTALLATION, COMMISSIONING, TECHNICAL SUPPORT,
MANAGEMENT AND MAINTENANCE OF AVC BASED ETTM SYSTEM
ON NATIONAL HIGHWAY N-5, PACKAGE-I AND PACKAGE-II**

The following amendments have been made to Bidding Document under this Addendum which shall be read & construed as an integral part of Bid Document and shall take precedence in case of conflict / ambiguities in the Bidding Document and other provisions of the Bidding Documents.

- i. Refer to page 11, Bid Data Sheet, item no. 4, Bid Security amounts are amended as:

“Rs. 7.0 million for Package-I and Rs. 7.0 million for Package-II”

- ii. Refer to page 8, Section B.3.3 Language is amended as:

“All proposals shall be presented in the Urdu or English language.”

X...X...X...X



NATIONAL HIGHWAY AUTHORITY

Office of Deputy Director (ETTM-II/MIS)/ITS Focal Person

Subject: **SUPPLY, INSTALLATION, COMMISSIONING, TECHNICAL SUPPORT, MANAGEMENT AND MAINTENANCE OF AVC BASED ETTM SYSTEM ON NATIONAL HIGHWAY N-5**
Minutes of Pre-Bid Meeting

| No. | RFP Ref. # | Query | Response |
|-----|--|--|--|
| 1 | A(2)-16 Page 6 | The provision of Electricity Connection & Transformer etc. (where not available) at Toll Plaza will be the responsibility of Bidder. We request the client to keep the provision of Electricity connection & transformer under client scope only | The OMC shall bear the cost for provision of Electricity connection (if not available) at site. NHA site staff will assist the application process. |
| 2 | Form F-1 Page 24 | The International Company must have a local office along with letter of confirmation/board resolution allowing the company to enter into JV. We request the client to kindly amend the same as follow: "The International company shall have a local office registered within 30 days of award of the project" | Not Agreed. |
| 3 | General | Please share the scope of Central Clearing House (CCH) | As detailed in the Bidding Documents. |
| 4 | General | We request the client to please share the proposed lane and plaza architecture. | Technical specifications have been included in the bidding documents. |
| 5 | E.3 Technical Evaluation Criteria | It is felt that some of the parameters mentioned in the technical criteria are critical for successful & smooth operations by NHA. Partial compliance or non-compliance to these parameters from any bidder can have serious consequences for NHA. As the tender is based on single stage two envelop procurement, where the technical marks are not being added to the financial marks, we suggest that the critical parameters mentioned in the technical evaluation criteria must be grouped together & bidders should be expected to "must comply" with them. | Please refer to notes under ITB, E.3, Technical Proposal Evaluation Criteria, item ii, iii & iv. Provide data sheets with online international verifiable references. Data sheets without proper referencing shall not be acceptable. |
| 6 | Bid Data sheet, Bid Security | Bid Security per package is Rs. 10 Million. Previously, the same have been Rs. 05 Million for Sindh package and Rs. 07 Million for the Punjab package. | Refer to Addendum-I. |
| 7 | Page-41 Section 3.5 | Payment Methods and Identification "E-Tag & Dedicated Short Range Communication (DSRC) transponder with 5.8 GHz frequency" Should ETC lane be able to handle both E-Tag (assuming it will be ISO18000-6C) and 5.8GHz DSRC transponder or can the bidder propose only E-Tag (ISO18000-6C) | ETC lane should be able to handle both technologies as stated in the Bidding Documents. |
| 8 | Page-41 Section 3.5 | Payment Methods and Identification "E-Tag & Dedicated Short Range Communication (DSRC) transponder with 5.8 GHz frequency" If as per above query 5.8GHz DSRC is mandatory then there are different 5.8GHz ETC technologies in the market: ARIB DSRC, CEN DSRC and Chinese national DSRC, which one should be used for the proposal | The 5.8 Ghz DSRC technology will have 1024kbps bit rate operated in active mode. The corresponding OBU shall support Built-in battery supports solar Charging with optional operation over car battery as well. The proposed OBU unit must have unique Identification as security feature. Dip cards must be supported with separate chip security features. |



NATIONAL HIGHWAY AUTHORITY

Office of Deputy Director (ETTM-II/MIS)/ITS Focal Person

Subject: **SUPPLY, INSTALLATION, COMMISSIONING, TECHNICAL SUPPORT, MANAGEMENT AND MAINTENANCE OF AVC BASED ETTM SYSTEM ON NATIONAL HIGHWAY N-5**
Minutes of Pre-Bid Meeting

| | | | |
|----|-------------------------------|--|---|
| 9 | Page-106 Section 1.2(m) | Scope of Services Online CCTV Cameras at toll plazas to be connected with Operations Centre, NHA HQ for live display of toll plaza operation with independent power backup supply; so as in case of complete failure of ETTM system due to reasons beyond control, it can function and record the traffic data. Most of Plaza mention in both Package already have CCTV System installed and also connected to NHA-HQ for live monitoring. Do we still need to supply CCTV solution for existing installed CCTV on these plaza's | Bidder is required to install CCTV solution only where not installed previously. The same is stated in Minimum Schedule of Requirement in the Bidding Documents. The bidder shall ensure compatibility of the installed CCTV system with proposed system. |
| 10 | Page-17 1.14 | Technical Proposal Evaluation Criteria Reversible lane (Interface) Reversible lane interface is required but the quantity of reversible lanes at each plaza is not specified | Only interface is required at this stage. |
| 11 | Page-8 Section B.3.3 | Language All proposals shall be presented in the Urdu and English language. Please Clarify? | Refer to Addendum-I |
| 12 | Page-44 6.1.6.3 | Maintainability Maintainability of Source Code, please clarify? | As detailed in bidding documents. |
| 13 | Page-56 12.4.6 | Load Shift has been Activated Please Clarify Load shift detector function | As detailed in bidding documents. |



**GOVERNMENT OF PAKISTAN
MINISTRY OF COMMUNICATIONS
NATIONAL HIGHWAY AUTHORITY**



REQUEST FOR PROPOSAL (RFP)

FOR

**SUPPLY, INSPECTION, INSTALLATION, TESTING, COMMISSIONING,
TECHNICAL SUPPORT, MAINTENANCE AND MANAGEMENT**

OF

**AUTOMATIC VEHICLE CLASSIFICATION (AVC) BASED
ELECTRONIC TOLL & TRAFFIC MANAGEMENT (ETTM) SYSTEM
ON TOLL PLAZAS OF
NATIONAL HIGHWAYS
N-5
PACKAGE-I & II**

ISSUED TO: M/S _____

ISSUED BY: _____ **DATE:** _____

RECEIVED BY: _____ **DATE:** _____

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Letter of Invitation (LOI)

To **ALL BIDDERS**

Subject: **SUPPLY, INSPECTION, INSTALLATION, TESTING, COMMISSIONING, TECHNICAL SUPPORT, MAINTENANCE AND MANAGEMENT OF AUTOMATIC VEHICLE CLASSIFICATION (AVC) BASED ELECTRONIC TOLL & TRAFFIC MANAGEMENT (ETTM) SYSTEM ON TOLL PLAZAS OF NATIONAL HIGHWAYS (N-5)**

PART I: INTRODUCTION

National Highway Authority (NHA) hereby invites all interested companies/ firms/ joint ventures to submit Technical and Financial Proposal to compete for the Supply, Installation, Commissioning of Automatic Vehicle Classification (AVC) based Electronic Toll & Traffic Management (ETTM) system on following Toll Plazas of N-5 and Centralized Data Collection Center at NHA-HQ alongwith Technical Support & Maintenance of Toll Plazas & Data Collection Center for a period of three (03) years after completion of Defect Liability Period from the date of commencement of each toll plaza:-

Package – I

| Sr. | Toll Plaza | Lanes |
|------------|--------------------------------|--------------|
| 1 | Iqbal Shaheed (Mullah Mansoor) | 8 |
| 2 | Harro | 8 |
| 3 | Sangjani | 12 |
| 4 | Mandra | 8 |
| 5 | Tarraki | 8 |
| | Total (A) | 44 |

Package – II

| Sr. | Toll Plaza | Lanes |
|------------|-------------------|--------------|
| 1 | Jehlum | 8 |
| 2 | Chenab | 8 |
| 3 | Gujranwala | 12 |
| 4 | Harrappa | 8 |
| 5 | Khanbela | 8 |
| | Total (B) | 44 |

Total (A+B) = 88

General Manager (Revenue)
NHA HQ

INSTRUCTIONS TO BIDDERS

A. DESCRIPTION OF THE PROJECT

A.1. Background

To strengthen Toll operations NHA envisaged Installation, Technical Support & Maintenance of Electronic Toll & Traffic Management (ETTM) system based on Automatic Vehicle Classification (AVC) on Toll Plazas of National Highways.

With the growth in traffic over the past years, and the anticipated increase of traffic volume in the coming years, a system needs to be implemented that will achieve the following:

Improve traffic throughput by moving from traditional manual toll collection to electronic toll collection having various transaction modes available like cash and cashless payment. Improving NHA's controls over its toll operations with tools to monitor the performance of its operators.

However, the Toll Collection on Toll Plazas shall be auctioned separately by NHA and the bidder shall have no concern with Toll Collection.

A.2. Scope of the Project

1. Supply, Inspection, Installation, Testing, Commissioning, Technical Support, Maintenance and Management of Electronic Toll & Traffic Management (ETTM) system along with hardware/software as per requirement of Automatic Vehicle Classification (AVC) which will become the property of NHA and bidder will be bound to hand over the same in a properly maintained and operational condition at the end of Technical Support & Maintenance period (Minimum specs as defined in Technical Specifications).
2. Technical Support & Maintenance of ETTM system to keep it operational for a period of two (02) years after completion of Defect Liability Period of each toll plaza.
3. Establishment & Maintenance of Control centers at each toll plazas within NHA's land.
4. Establishment, Maintenance of Operations Centre at NHA, HQ connecting all ETTM established toll plazas (under this contract) with it, where real time view of all toll plazas sites shall be ensured. Provision of Data Transfer medium (preferably optical fiber) through reputable Internet Service Provider (ISP) shall also be the responsibility of Bidder. However, where Fiber is not available any other reliable medium with minimum latency may be proposed.
5. Provide backup power supply system (e.g. generators, solar system, UPS along with batteries etc) to keep the system operational round the clock.
6. To provide Incident Cameras for the ETTM system including live surveillance cameras on each toll plaza which includes lane cameras in each lane and one (01) PTZ camera at each bound of toll plaza and its connectivity with Operations Centre at NHA HQ.
7. To provide all necessary spare parts during Technical Support & Maintenance contract period for three (03) years starts after completion of defect liability period as & when required (With no cost

- in the 1st year Defect Liability Period and thereafter as per the price given in the financial proposals and to expensed out of provisional sum fixed for spares). Spares shall be kept in stock locally so that the same may not hinder the operations.
8. Subsequent to the award of contract, the contractor will be required to submit to NHA for review and approval of Detail SOP for Operation & Maintenance of ETTM system.
 9. Pictures of incidents shall be stored for three (03) months.
 10. Traffic transaction data at toll plaza site shall be retained for six (06) months
 11. Traffic Summaries (Class wise and Payment wise i.e. either exempt, cash, cashless, local & etc.) data shall be retained at Operation Centre for Five (05) years.
 12. The proposed system should have web based remote connectivity.
 13. Surveillance Videos of the traffic shall be stored for two (02) months.
 14. The specifications in the RFP are the baseline specifications/ minimum requirements, in case of anything better being offered, marks will be awarded according to proportional ratio.
 15. In order to ensure the spirit of fair competition and to provide a level field to the prospective bidders, the exemption of the taxes shall be entertained as per following;
 - a. The firms must provide the exemption certificates along with financial proposal.
 - b. The financial bid amount of such firms will be escalated according to the prevailing laws of taxes at the time of evaluation of financial proposals in order to bring all financial proposals at par.
 16. The provision of Electricity Connection & Transformer etc. (where not available) at Toll Plaza will be the responsibility of Bidder. However, concerned DD (Maintenance) of NHA will coordinate the process.

A.3. Feasibility Study

The bidders must inform themselves by carrying out feasibility study of the toll plazas prior to proceeding for submission of their financial proposals to ascertain the ground realities for offering a realistic financial bid according to the site conditions like traffic mix, volume and other traffic affecting factors.

A.4. One Bid per Bidder

Each Bidder shall submit only one bid per package, either by himself or as a partner in a joint venture. A bidder who submits or participates in more than one bid/ proposal per package will be disqualified and bids/proposals submitted by him shall not be considered for evaluation & award. The bidder must offer only One (01) complete solution with Version/Model/Part No. and year of Manufacture/Development. Software versions and date of release must be provided. The technical proposal(s) with alternate solution(s) shall be treated as non-responsive.

A.5. Disclaimer

All information, assumptions and projections contained in the Bidding Documents are indicative only and are provided solely to assist in a preliminary assessment of the Project. Nothing in the Bidding Documents or elsewhere shall create any contractual relationship between the NHA and any Bidder, nor shall it commit the NHA to any policy described in the Bidding Documents or elsewhere and neither the NHA nor any of its consultants or advisers will have any liability or responsibility if the information, assumptions and projections contained herein or otherwise in respect of the Project prove to be incorrect. It is the responsibility of the Bidder to verify the information, assumptions and projections contained in the Bidding Documents or otherwise.

A.6. Bribery & Collusion

The NHA shall be entitled to terminate the Contract and recover from the successful Bidder the amount of any loss resulting from such termination if the successful Bidder shall have offered or given to any person any gift or consideration of any kind as an inducement or reward for doing, or forbearing to do, any action in relation to obtaining, or in the execution of the Contract or any other contract with the NHA, or for showing favour to any person in relation to the Contract with the NHA, or if any of the like acts shall have been done by any person employed by the successful Bidder or acting on its behalf (whether with or without the knowledge of the successful Bidder), or if the successful Bidder shall have come to any agreement with another Bidder or number of Bidders whereby an agreed quotation or estimate shall be offered as a Bid to the NHA by one or more Bidders.

B. PROPOSAL SUBMISSION PROCEDURES

B.1. Introduction

This Request for Proposals (RFP) invites Companies/Firms & JVs (among PEC registered firms/companies) to submit Technical including Qualification Documents and Financial Proposals to compete for the Project. Each of the Bidders may associate a sub-contractor/manufacturer for specialized input under a valid agreement.

B.2. General

B.2.1 Cost of Bidding

The Bidder shall be responsible for all fees, costs and expenses incurred in preparing any proposal submitted by it, and the NHA shall under no circumstances become liable to reimburse any Bidder for any such fees, costs or expenses regardless of the conduct or outcome of the bidding process.

B.2.2 Site Visit

The Bidder is advised to visit and examine the site of the Works, its surroundings, to obtain for him any and all information that may be necessary for preparing the Bid at its own cost/responsibility.

B.2.3 Addendum of Bidding Documents

At any time prior to the Bid Submission Date, the NHA may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Documents by addendum.

The addendum will be notified in writing or by e-mail, telex or facsimile to all prospective Bidders who have purchased the Bidding Documents, and will be binding upon them.

In order to afford prospective Bidders reasonable time in which to take the addendum into account in preparing their Bids, the NHA may, at its discretion, extend the deadline for the submission of Bids.

B.3. Preparation of Bid

B.3.1 Proposal Validity Period

One Hundred Eighty (180) calendar days from the submission date.

B.3.2 Single stage - two Envelope procedure of Tendering

NHA will separately 1st evaluate all Technical proposals and Financial proposals of technically qualified bidders only will be opened. Therefore Bidders are required to submit their Technical (including Qualification documents) and Financial Proposals in two separately sealed "envelopes." The NHA requires the first envelope, marked **TECHNICAL PROPOSAL**, to contain the **original and one set of copy of the Bidder's technical proposal**. The NHA requires the second envelope, marked **FINANCIAL PROPOSAL**, to contain the **original and one set of copy of the Bidder's Financial proposal**. Bidders are cautioned to ensure that their Technical and Financial proposals are contained in separately sealed envelopes clearly marked as indicated above. The NHA requires Bidders to submit the separately sealed envelopes in one bound package. In the event of any discrepancy between the original and copy, the original shall govern.

The original and copy of the Bid shall be typed or written in indelible ink and shall be signed by a person or persons duly authorised to bind the Bidder to the offer. Proof of authorisation shall be furnished in the form of a written Power-of-Attorney, which shall accompany the Bid. All pages of the bid shall be initialled by the person or persons signing the Bid.

The complete Bid shall be without alterations, interlineations or erasures, except as necessary to correct errors made by the Bidder, in which case such corrections shall be initialled by the person or persons signing the Bid.

B.3.3 Language

All proposals shall be presented in the Urdu and English language.

B.3.4 Conformity with the bidding documents

The Bidder must submit a Conforming (Bona Fide) Bid that conforms in all respects with the requirements of the Bidding Documents.

B.3.4.1 Conforming Bids

A Conforming Bid is a bid that conforms in full, both in engineering and operational terms with the NHA's Conforming Scheme, and in financial, organisational and obligation terms with the draft Agreement, except for minor departures that do not materially affect the design, construction method or operational characteristics of the Project or the financial, organisational or obligation regime under which the contract will be conducted. All such minor departures, if they exist, must be clearly identified and fully described in the Bid, and in particular the financial, programming and any other practical implications of a departure must be explained. If the Bid contains no deviations from the Conforming Scheme a positive statement to this effect must be made.

The NHA reserves the right to determine whether a Bid is a Conforming (Bona Fide) Bid. The NHA's decision will be final and not subject to appeal. The NHA will not be required to give reasons for its decision.

B.3.4.2 Non-Conforming Bids

Alternative designs and alternative proposals in relation to financial, organisational and obligational aspects, which differ in whole or part from the requirements of the Bidding Documents, shall not be considered.

B.4 Processing of Proposals before Evaluation

- (a) The NHA intends to facilitate and sustain an environment of competitiveness, transparency and fairness in the procurement process by, among other means, fairly and impartially processing and evaluating Bidder's technical and financial proposals in accordance with the procedures and pre-established evaluation criterion specified in this RFP.
- (b) The NHA shall receive and keep secure all proposals submitted before the date and time specified. Any and all proposals received by the NHA after the stipulated date and time in Bid Data Sheet for Proposal Closing will be returned unopened to the submitting Bidder/representative.
- (c) The NHA shall maintain, secure and unopened, all timely submitted proposals until the date and time announced for Proposal Opening, at which time technical proposals will be opened in front of bidders/representatives who choose to attend.
- (d) The Bidders/representatives who attend shall sign a register evidencing their attendance. The NHA will examine the proposals to determine whether they are complete, whether the requisite Bid Securities have been furnished, whether the documents have been properly signed, and whether the proposals are generally in order.
- (e) First technical proposals shall be opened by the Tender Opening & Evaluation Committee and after evaluation/Qualification of eligible bidders; the financial proposals of only technically qualified bidders shall be opened on the date announced latterly whereas the financial proposals of not qualified bidders shall be returned unopened.
- (f) The Bidder's name, bid withdrawals (if any), the presence of the requisite Bid Security, Price of Bids on opening of Financial Proposals

and rebate for award of multiple contracts (if any) and such other details which NHA at its discretion, may consider appropriate will be announced at the Bid Opening.

- (g) The NHA shall separately, and confidentially, evaluate each Bidder's Technical and Financial proposals in accordance with the evaluation criteria detailed in this RFP.
- (h) From the date and time of Proposal Opening until the time the Contract Agreement is awarded, any Bidder wishing to contact the NHA on any matter related to this tender must do so in writing at the NHA's address noted above. Any effort by any Bidder to influence the NHA in its evaluation of technical and/or financial proposals shall be a violation and may result in the rejection of the Bidder's proposal.

B.5 Conflict of Interest

The **Applicant must give an undertaking along with Proposal on Company/Firm's letter head that they (including all members of a joint venture)** shall not be one of the following:

- (a) The bidder of ETTM installation shall not participate in the toll collection contract for the same toll plazas, whereas, toll collection operators are not allowed in the contract for supply and installation of ETTM system.
- (b) A firm or an organization, which has been engaged by the Employer to provide consulting services for the preparation related to procurement for or implementation of this project.
- (c) Any association/affiliates (inclusive of parent bidder) of a firm or an organization mentioned in subparagraph (a & b) above; or
- (d) A firm or an organization who lends, or temporarily seconds its personnel to firms or organizations which are engaged as above.

BID DATA SHEET

1.1 The name of the Assignment:

**SUPPLY, INSPECTION, INSTALLATION, TESTING, COMMISSIONING,
TECHNICAL SUPPORT, MAINTENANCE AND
MANAGEMENT OF AUTOMATIC VEHICLE CLASSIFICATION (AVC) BASED
ELECTRONIC TOLL & TRAFFIC MANAGEMENT (ETTM) SYSTEM ON
FOLLOWING TOLL PLAZAS OF NATIONAL HIGHWAYS (N-5)**

Package – I

| Sr. | Toll Plaza | Lanes |
|------------|--------------------------------|--------------|
| 1 | Iqbal Shaheed (Mullah Mansoor) | 8 |
| 2 | Harro | 8 |
| 3 | Sangjani | 12 |
| 4 | Mandra | 8 |
| 5 | Tarraki | 8 |
| | Total | 44 |

Package – II

| Sr. | Toll Plaza | Lanes |
|------------|-------------------|--------------|
| 1 | Jehlum | 8 |
| 2 | Chenab | 8 |
| 3 | Gujranwala | 12 |
| 4 | Harrappa | 8 |
| 5 | Khanbela | 8 |
| | Total | 44 |

Notes:

1.2 Name and address of the Employer:

Chairman
National Highway Authority.
27-28 Mauve Area, G-9/1
Islamabad.

1.3 The names and addresses of the Employer's Representative for Monitoring and Implementation.

General Manager (Concerned)

2.0 The Documents are:

- i. Letter of Invitation
- ii. Bid Data Sheet
- iii. Minimum contractual (technical) requirements
- iv. Minimum Financial requirements
- v. Evaluation Process Criterion and procedures
- vi. Financial Bid Form

- vii. Technical Specifications
- viii. General Conditions of Contract
- ix. Particular Conditions of Contract
- x. Appendices & Sample Forms

3.0 The number of copies of the Proposal/Documents required:

- i. Qualification Document (One Original & one copy)
- ii. Technical Proposal (One Original, one Hard & Soft copy)
- iii. Financial Proposal (One Original & one copy)

3.1 The address for seeking clarification and writing on the proposal:

General Manager (Revenue)
National Highway Authority
27-28 Mauve Area, G-9/1, Islamabad.
Phone: 051-9260190

3.2 (a) The date and time of submission of Technical and Financial Proposals: at 11:30 hours on _____

- (b) The Technical Proposal shall be opened **on _____ at 1130 hours** in NHA's Auditorium, Islamabad in presence of bidder or authorized representative who wishes to attend.

- (c) The date of opening of Financial Proposals shall be communicated later on to only those bidders who qualify.

4. Bid Security

Each proposal (technical) shall be accompanied by a bid security (as referred in E.6 below) in the form of demand draft/pay order or Bank guarantee from scheduled bank for an amount of

Rs. 10.0 million for Package-I
Rs. 10.0 million for Package-II

in favor of "National Highway Authority – Road Maintenance Account, Islamabad".

Validity Period is 180 days

5. Venue, time and date of the pre-bid conference:

NHA's Auditorium
28-Mauve Area, G-9/1
Islamabad.

Date: _____ **2018 at 1100 Hrs**

6. Standard form and amount of Performance Security acceptable to the Employer as referred in GCC, 5:

Equivalent to 10% of accepted bid amount

- Form: Pay order/Demand Draft in the name of Employer OR

Bank Guarantee / Insurance Guarantee as per attached format

- In the event that there is any delay in the period of completion of the, for any reason whatsoever, the validity of the performance security shall be extended to any further period.

7. Supply, Installation & Commissioning Period

Six (06) months from the date of handing over of each site.

8. Defect Liability Period including Technical Support & Maintenance

One (01) year after the date of commissioning of each site.

9. Technical Support & Maintenance Period (Operations Facilitator)

Two (02) years from the date of completion of Defect Liability Period for each site further extendible subject satisfactory performance and mutual consent.

10. Maintenance time for Lane Area/AVC

A maximum time of 30 minutes is allowed for the maintenance of lane as per standard procedure of the maintenance.

11. Technical Support and Maintenance Costs

In any case, all the costs related to performing the services throughout the contract as per conditions stipulated in this agreement likely but not limited to maintenance of system, payment of all applicable government taxes, salaries and other applicable benefits of the staff, operational expenses including office stationery, printer cartridges, conveyance and accommodation, etc. shall be borne solely by the Bidder.

The contractor will be required to meet the needful requirements of the employer during the contract period with regards to operational and reporting requirements.

12. Integration of Plazas/Lanes

If the additional ETTM equipment/lane(s)/ plazas are to be added during currency of contract on the subject jurisdiction, the revised financial term for the additional scope shall be worked out with mutual negotiations.

C. MINIMUM CONTRACTUAL AND TECHNICAL REQUIREMENT

C.1 Executive Summary

A cover letter identifying the company, firm(s), joint venture or consortium, the relationship of the parties, joint venture agreement or intent of joint venture agreement the lead and associated firms and an Executive Summary of the Bidder's Technical Proposal.

C.2 ETTM Deployment Plan

A narrative and graphic presentation of the ETTM system and its deployment.

C.3 Preliminary Design Drawings

Preliminary Design Drawings shall be developed based upon the Contractor's Feasibility Study. Preliminary Design Drawings shall, among other topics, include the requisite information but not limited to following:

- i. Layout of toll plazas & traffic lanes.
- ii. Layout of cash & cashless lane, ETC lane and AVC installations
- iii. Layout of control rooms, if required.
- iv. Backup power arrangement to be used on the Project.
- v. Layout of centralized data centre arrangement.

C.4 Supply, Installation & Commissioning Program

The bidder shall clearly explain its supply & installation methodology, time period, state of the art practices, tentative plans, and associated equipments of the project. The methodology shall be clearly elaborated in layout plans.

C.5 Defect Liability & Technical Support and Maintenance Period

The bidder shall be responsible for Three (01 DLP + 02 TS&MP) year replacement of defective parts and maintenance of ETTM system equipment at site free of cost during defect liability period including software, hardware and other allied facilities/services from the date of commissioning of each site. Charges against technical support & maintenance of ETTM system shall be payable as per bid offered by the bidder under Financial Bid Form part B from the date of completion of DLP.

Retention money shall be reduced to OPEX after successful completion of Defect Liability Period. The cost of spares shall be charged from provisional sum as given in Financial Bid Form with rates of spares as locked with the Financial Bid.

C.6 Technical Support and Maintenance Period (TS&MP)

During the Operation Facilitation phase (Three years after commissioning i.e. 01 DLP + 02 TS&MP) of the Project, the NHA shall measure the contractor's compliance with technical support and maintenance standards included in a Technical Support and Maintenance Manual. For the Technical proposal, Bidders must include a narrative of the contents of a Technical Support and Maintenance Manual the Bidder will prepare, subject to NHA approval, for the Project, as well as a narrative and graphic presentation of the Bidder's proposed organization and

approach to implement the Technical Support and Maintenance requirements for the Project.

C.7 Project Implementation Timetable

A narrative and graphic presentation of the Bidder's proposed Implementation Timetable. Bidders are cautioned that material negative deviations from the NHA estimated timetable shall be a cause for a determination of non-responsiveness.

C.8 Innovation

Bidders may propose innovations to help to enhance the facilities with the respect to the road users' facilitation and assurance of traffic data and toll revenue.

C.9 Training

Bidder shall provide a detail training plan about the ETTM system comprising on three (03) phases of the project i.e. Pre-Installation, during Installation & Operation to the NHA and toll operator staff on its functions and software understanding without any cost compensation. Bidder shall also arrange orientation visit for Three (03) NHA's officers per package to the manufacturer country of ETTM system equipment for a period of Two (02) weeks including return ticket, boarding/lodging, food and all other associated expenses. The cost so incurred shall be part of Financial Proposal.

D. MINIMUM FINANCIAL INFORMATION

1. The minimum financial information the NHA requires each Bidder to submit in its financial proposal to be considered responsive should be according to the financial forms given in the RFP.
2. Bidders are required to express all financial calculations in **Pakistani Rupees**.

E. EVALUATION PROCESS, CRITERION AND PROCEDURES

E.1 The Overall Evaluation Process

The NHA shall evaluate responsive proposals in accordance with the evaluation criteria detailed here under.

The NHA shall first review the qualification documents according to the qualification criteria. In the event bidder score is less than seventy (70), then the technical proposal of the respective bidders shall not be evaluated. Further in case any bidder achieve less score than seventy percent (70%) in the evaluation of technical proposal, their financial bid shall not be opened and financial proposal of only Technically Qualified bidders shall be opened and put to financial evaluation.

E.2 Qualification Criteria

The **Qualification Criteria*** for intended bidders is as under:

(*A valid PEC certificate is obligatory)

| Sr. No. | Description of Requirements | Max. Score | |
|---------|---|------------------|----------|
| i. | Bidder's information and PEC certificate valid for year 2018 in Constructor/Operator category at least having one of the fields of specialization out of EE Category Minimum PEC O-3/C-3 or above. (F-1) *Joint Venture allowed upto two parties | Must Meet | |
| ii. | Average Net Worth => 200 million supported by Audit Reports for the last three (03) years by Chartered Accountant signed by the Bidder (F-2) (** Joint venture criteria of financial qualification i.e. total of all the JV Partner) | Must Meet | |
| iii. | Average Annual Turn Over => 400 million for the last three (03) years supported with Audit Reports for the last three (03) year by the Chartered Accountant signed by the Bidder. (**Combined turnover for all the JV partners) F-3 | Must Meet | |
| iv. | Bidder's Organizational Setup (F-1) | 20 | |
| | Govt. or Semi-Govt. Organization / Company | | 20 |
| | Firm | 15 | |
| v. | Bidder's relevant (Transportation related systems) local experience (F-4 & F-4/A) Give details of project cost and scope of work (10 Marks per project) | 30 | |
| vi. | Bidder's specific (AVC based systems) experience (F-4 & F-4/A) | 20 | |
| | For similar projects in Pakistan Provide Number of Cash and Cashless Lane(s), Details of Ops Centre | | 20 |
| | <ul style="list-style-type: none"> ➤ Supply & installation of similar systems ➤ Supply of similar systems ➤ Installation of similar systems | | 10 10 |
| | For Supply & installation of similar projects in last five (05) years (Manufacturer's Experience). Provide Nos. of Cash and Cashless lanes (10 marks per 50 lanes), Details of Ops Centre with verifiable references. | 30 | |

Note: **Minimum Qualifying marks = 65**

- i. The qualification score shall not be considered for technical & financial evaluation.
- ii. The Technical Proposals of only those bidders, who scored the minimum qualifying 65 marks in the Qualification evaluation, will further be evaluated.

E.3 Technical Proposal Evaluation Criteria

The Technical Proposal shall be evaluated as per following criteria:-

Technical Evaluation (Total Marks 1000)

Provide data sheets with international verifiable references. Data sheets without proper reference shall not be acceptable.

| Description | | Min. Requirement | Max. Marks |
|-------------|---|--|--------------|
| 1.0 | LANE EQUIPMENT INCLUDING AVC Automatic Vehicle Classification (AVC) based system with integration/ combination of intrusive & non-intrusive sensors. (e.g. Optical Sensors & Treadle) | Must Meet Requirement | (500) |
| 1.1. | Tamper Proof Housing Should generate alarm on tempering attempts with log for sensors and control units | Required. Details to be provided. | 25 |
| 1.2. | Frequency of periodic calibration of sensors | To be provided In axle count | 20 |
| 1.3. | Frequency of replacement of sensor parts Intrusive & Non-intrusive | To be provided In axle count \geq 05 Million | 20 |
| 1.4. | Classification Accuracy (Relaxed upto 95% for non-tolled classes i.e. Animal Carts, Bikes, Rickshaw to be separately classified) | \geq 98%. | 20 |
| 1.5. | System uptime/availability | \geq 99%. | 25 |
| 1.6. | Processing power | Core i5, 04 GB RAM, SSD storage or better | 15 |
| 1.7. | Detection Accuracy | \geq 99%. | 25 |
| 1.8. | Operating Temp. | 0°C to 60°C | 15 |
| 1.9. | Life Expectancy of whole system (years) | Minimum 07 years | 20 |
| 1.10. | Average cash transaction time (excl. barrier opening) | \leq 4 Seconds | 20 |
| 1.11. | Average cashless transaction time (excl. barrier opening) | \leq 3 Seconds | 15 |
| 1.12. | Integrated Lane Camera (night vision) | Required | 10 |
| 1.13. | Automatic Number Plate Recognition (ANPR) System must have interface. Installation to be decided later. | Required | 10 |
| 1.14. | Reversible lane (Interface) | Required | 10 |
| 1.15. | Toll collector input unit module/ keystroke life Must be certified Industrial Grade | \geq 10 Million per Key | 25 |
| 1.16. | Multi transactions like cash, RFID, prepaid/ smart card (Balance on card), credit card (at Plaza POS) etc. | Required & details to be provided by bidder | 20 |
| 1.17. | Central clearing house for RFID, prepaid/ smart card, credit card etc. Payments | -do- | 20 |
| 1.18. | Tailgating detection in meter(s) for vehicle separation along with Hitch detection. | $<$ 0.5 Meter | 20 |
| 1.19. | Generate log for open & closed lanes | Required | 10 |
| 1.20. | Classification speed | $<$ 3 Seconds | 20 |
| 1.21. | Toll barrier safety | Required | 10 |
| 1.22. | Toll barrier open & close time (01 complete loop) | $<$ 2.0 Sec | 20 |
| 1.23. | Lane Integrated backup UPS for AVC classification during down time (in minutes) | 30 Minutes backup | 15 |
| 1.24. | Vehicle separation detection features Details of Light curtain for vehicle profiling | Mention Sensors, placing & Height | 15 |
| 1.25. | Lifecycle (number of vehicles read) of AVC | 10 Million Axles | 15 |

| | | | |
|----------------------------|--|---|--------------|
| 1.26. | System Air Conditioning Requirement (watts/ hours per lane and per plaza) (Min. Power shall be preferred) | Requirement to be provided by bidder. | 20 |
| 1.27. | Images/video clips for every processed vehicle For inside booth and outside booth (Vehicle) | Required & details to be provided by bidder | 20 |
| 1.28 | Dedicated Short Range Communication (DSRC) transponder with 5.8 GHz frequency | Required & details to be provided by bidder | 20 |
| 2. | TOLL SYSTEM FEATURES AND SPECIFICATIONS | | (300) |
| 2.1. | Software architecture details alongwith detail of database platform and application environment for all system levels | Details to be provided by bidder | 35 |
| 2.2. | Data redundancy (05 number of levels) AVC, Lane, Plaza, Ops Centre and Disaster Recovery site | -do- | 30 |
| 2.3. | Raw Data Concentration System - To Collect raw AVC classification data at Ops Centre for audits | -do- | 25 |
| 2.4. | Number & type of reports Reports are required to give summarized as well as detailed traffic and revenue with calendar and operational days, time and shifts. | -do- | 50 |
| 2.5. | Financial management Controls (Shift & month closings and audits etc.) | Required | 40 |
| 2.6. | User management parameters | Required | 30 |
| 2.7. | Toll customer care portal (Web Based) | Required | 25 |
| 2.8. | Toll lane status monitoring (Web Based) | Required | 25 |
| 2.9. | Audit trails for database and application level depicting user login timestamp and activities performed with change timestamp. | Required | 40 |
| 3. | MISC. FEATURES AND SPECIFICATIONS | | (200) |
| 3.1. | Future add-ons without any change/ cost to the offered equipment | Details to be provided by bidder | 40 |
| 3.2. | Interface for police fine collection | -do- | 40 |
| 3.3. | BACKUP POWER i. Type (Solar/Generators) ii. Capacity iii. Fuel Consumption per hour | -do- | 30 |
| 3.4. | Provision of preliminary design, drawings and specifications | Required | 30 |
| 3.5. | The system should display real time processing in lanes i.e. class, toll received, payment type, time & date stamp | Required | 30 |
| 3.6. | Capability for interfacing or software output to third party application if required in future | Required | 30 |
| Maximum Total Marks | | | 1000 |

- Notes: I. **Minimum Qualifying marks** of technical Proposal = 70%. Any bidder having score less than 70% in technical proposal shall not be eligible & their financial bid shall be returned unopened.
- II. Any proposed aspect having less specs than Minimum Specified may be disqualified for further processing of proposal.
- III. The aspects where Minimum requirements are not specified than best proposed aspects shall be marked maximum and other proposed aspects shall bear proportionate marks.
- IV. Any major deviation from specifications may lead to non-responsiveness of the bids.

E.4 Final Evaluation Results

Financial Bids of all the technically qualified firms will be announced and put to comparison process for award of contract on open competition basis, whereas, the financial proposals of the rest of the firms will be returned un-opened.

The financial proposals of the qualified firms shall be opened in the presence of their representatives, who choose to attend. The Employer shall inform the Date, time and address for opening of financial proposals. The quoted bid amount with major components of each proposal shall be publically announced to the attending representative of the firms. The evaluation committee shall determine whether the financial proposals are complete and without any computational errors.

E.5 Clarification

- (a) Clarification of proposals: A comparison of the ratings assigned by each member often brings to light ambiguities in the proposal which should be clarified by the Bidder:
 - (i) The NHA may ask Bidders for clarifications of their proposals in order to assist in the examination, evaluation and comparison of proposals. No change in a matter of substance in the proposal, including changes in price and changes aimed at making an unresponsive tender responsive, shall be sought, offered or permitted.
 - (ii) When clarification of proposals is required, the NHA shall maintain a written "Minutes of Clarification" report. Adequate notice should be given to the Bidder prior to conducting the meeting. The location and setting of the meeting should be conducive to professionally discussing all issues leading to a resolution of the matter to be clarified.
- (b) It may be necessary for the NHA to reject all proposals:
 - (i) NHA may reject all proposals at any time prior to the award. The NHA shall upon request communicate to any Bidder that submitted a proposal, the grounds for its rejection of all bids, but is not required to justify those grounds.
 - (ii) Notice of the rejection of all proposals shall be given to all Bidders that submitted proposals.

E.6 Bid Security

To be responsive to the NHA's requirements and to be considered for an award, each Bidder provides as a part of its Technical Proposal a Bid Security for the amount as specified in Bid Data Sheet. The Bid Security shall be in the form of a bank draft, pay order or a guarantee from a scheduled bank. The Bid Security shall be valid for a period of at least 180 days from the date of submission of bid. The NHA shall return Bid Securities of all Bidders after the successful Bidder has signed the Contract Agreement or in the event the NHA has rejected all proposals.

Bid Security of any bidder who is not qualified shall be returned alongwith his sealed Financial Proposal before evaluating the other bids. The Bid Security may be forfeited if the Bidder withdraws its proposals during the period of bid validity

or, if the successful Bidder fails to provide the required Performance Security. The format of the Bid Security shall be in accordance with the sample Bid Security Form. No other format shall be accepted. Any proposal not accompanied by Bid security shall be treated as non-responsive.

E.7 Award and Notice to Proceed

The NHA shall recommend the Bidder submitting the lowest financial proposal as the Contractor.

Upon approval of lowest financial proposal, a letter of acceptance shall be issued to the successful bidder, who shall be invited for contract agreement.

General Manager (Revenue)

COMPLIANCE SHEET
(Must be filled by bidder)

| Information Required | Information Provided | Flag/Page No |
|--|-----------------------------|---------------------|
| Covering Letter | | |
| PEC Certificate (C-3/O-3 to C-A/O-A) | | |
| Bidders Organization Setup (Company/ Firm/ Sole-Proprietor) | | |
| Last Three (03) Years Audit Reports | | |
| Last Three (03) Years Average Turnover (Audit Reports) | | |
| Bidders relevant Experience | | |
| Bidders Specific Experience | | |
| Similar projects in last five (05) years (Manufacturer's Experience) | | |
| Completed Project in Pakistan with Number of Lane & Cost of Contract | | |
| ongoing Project in Pakistan with Number of Lane & Cost of Contract | | |
| Manufacturer's Authorization | | |
| Power of Attorney to sign the contract | | |
| Integrity Pact | | |
| Joint venture agreement, if any | | |

COMPLIANCE OF EQUIPMENT

| Description | | Specs Offered | Proof at Flag/page |
|--------------------|---|----------------------|---------------------------|
| 1.0 | LANE EQUIPMENT INCLUDING AVC Automatic Vehicle Classification (AVC) based system with integration/ combination of intrusive & non-intrusive sensors. (e.g. Optical Sensors & Treadle) | | |
| 1.28. | Tamper Proof Housing Should generate alarm on tempering attempts with log for sensors and control units | | |
| 1.29. | Frequency of periodic calibration of sensors | | |
| 1.30. | Frequency of replacement of sensor parts Intrusive & Non-intrusive | | |
| 1.31. | Classification Accuracy (Relaxed upto 95% for non-tolled classes i.e. Animal Carts, Bikes, Rickshaw to be separately classified) | | |
| 1.32. | System uptime/availability | | |
| 1.33. | Processing power | | |
| 1.34. | Detection Accuracy | | |
| 1.35. | Operating Temp. | | |
| 1.36. | Life Expectancy of whole system (years) | | |
| 1.37. | Average cash transaction time (excl. barrier opening) | | |
| 1.38. | Average cashless transaction time (excl. barrier opening) | | |
| 1.39. | Integrated Lane Camera (night vision) | | |
| 1.40. | Automatic Number Plate Recognition (ANPR) System must have interface. Installation to be decided later. | | |
| 1.41. | Reversible lane (Interface) | | |
| 1.42. | Toll collector input unit module/ keystroke life Must be certified Industrial Grade | | |
| 1.43. | Multi transactions like cash, RFID, prepaid/ smart card | | |

| | | | |
|-----------|--|--|--|
| | (Balance on card), credit card (at Plaza POS) etc. | | |
| 1.44. | Central clearing house for RFID, prepaid/ smart card, credit card etc. Payments | | |
| 1.45. | Tailgating detection in meter(s) for vehicle separation along with Hitch detection. | | |
| 1.46. | Generate log for open & closed lanes | | |
| 1.47. | Classification speed | | |
| 1.48. | Toll barrier safety | | |
| 1.49. | Toll barrier open & close time (01 complete loop) | | |
| 1.50. | Lane Integrated backup UPS for AVC classification during down time (in minutes) | | |
| 1.51. | Vehicle separation detection features Details of Light curtain for vehicle profiling | | |
| 1.52. | Lifecycle (number of vehicles read) of AVC | | |
| 1.53. | System Air Conditioning Requirement (watts/ hours per lane and per plaza) (Min. Power shall be preferred) | | |
| 1.54. | Images/video clips for every processed vehicle For inside booth and outside booth (Vehicle) | | |
| 1.28 | Dedicated Short Range Communication (DSRC) transponder with 5.8 GHz frequency | | |
| 2. | TOLL SYSTEM FEATURES AND SPECIFICATIONS | | |
| 2.1. | Software architecture details alongwith detail of database platform and application environment for all system levels | | |
| 2.2. | Data redundancy (05 number of levels) AVC, Lane, Plaza, Ops Centre and Disaster Recovery site | | |
| 2.3. | Raw Data Concentration System - To Collect raw AVC classification data at Ops Centre for audits | | |
| 2.4. | Number & type of reports Reports are required to give summarized as well as detailed traffic and revenue with calendar and operational days, time and shifts. | | |
| 2.5. | Financial management Controls (Shift & month closings and audits etc.) | | |
| 2.6. | User management parameters | | |
| 2.7. | Toll customer care portal (Web Based) | | |
| 2.8. | Toll lane status monitoring (Web Based) | | |
| 2.9. | Audit trails for database and application level depicting user login timestamp and activities performed with change timestamp. | | |
| 3. | MISC. FEATURES AND SPECIFICATIONS | | |
| 3.1. | Future add-ons without any change/ cost to the offered equipment | | |
| 3.2. | Interface for police fine collection | | |
| 3.3. | BACKUP POWER i. Type (Solar/Generators) ii. Capacity iii. Fuel Consumption per hour | | |
| 3.4. | Provision of preliminary design, drawings and specifications | | |
| 3.5. | The system should display real time processing in lanes i.e. class, toll received, payment type, time & date stamp | | |

Note: The completion of check list is must. In case of blank check list negative marking (2% of marks achieved against technical proposal) shall be given to the respective bidder.

QUALIFICATION FORMS

Notes:

- a. The information as required must be written on the sample forms provided herewith along with attachments of relevant documents. **In case the information has not been written in the forms and only documents are attached then the same shall not be considered for evaluation.**
- b. The applicant is expected to examine all instructions, forms and terms in the RFP and is required to furnish all information, documentation in a properly bound form, sealed and signed/ stamped by the applicant. No loose paper will be accepted & No claim in this regard shall be entertained later. The documents must have page numbers & containing a proper index at the start.
- c. All forms should be signed, stamped, dated with the signatory name.

BIDDER'S INFORMATION AND PEC REGISTRATION

[The Bidder shall fill in this Form in accordance with the instructions indicated below. No alterations to its format shall be permitted and no substitutions shall be accepted.] Date: [insert date (as day, month and year) of Bid Submission]

Page _____ of _____ pages

| | |
|---|---|
| 1 | Bidder's Legal Name |
| 2 | JV - legal name of each party |
| | a) |
| | b) |
| | c) |
| 3 | Firm's Country of Registration: |
| 4 | Bidder's Year of Registration |
| 5 | Bidder's Legal Address in Country of Registration |
| 6 | Bidder's Authorized Representative Information |
| | Name CNIC Number and address |
| | Telephone/Fax numbers |
| | Email Address |
| 7 | Attached are attested copies of original documents of: |
| | Articles of Incorporation, Registration of firm, NTN Registration named in 1, above. |
| | a. In case of JV both local partners must be registered with PEC, the JV agreement should be duly notarized. |
| | b. The International Companies (not registered locally), can only participate provided they form a JV with a local PEC registered firm. The International Company must have a local office along with letter of confirmation/board resolution allowing the company to enter into JV. The JV agreement should be duly notarized. |
| | In case of government owned entity, documents establishing legal and financial autonomy and compliance with commercial law. |
| | CNIC of the Owner, Directors and of each partner. |
| 8 | Registration Certificate with Pakistan Engineering Council. |
| | Category _____, Validity Till _____ (expired shall not be accepted) |

FINANCIAL POSITION OF THE FIRM

Financial Situation

[The following table shall be filled in for the Applicant and for each partner of a Joint Venture]

1. Financial data

| Financial information | Historic information for previous years (Rupees in millions) | | |
|-----------------------------------|---|---------|---------|
| | 2016/17 | 2015/16 | 2014/15 |
| Information from Balance Sheet | | | |
| Total Assets (TA) | | | |
| Total Liabilities (TL) | | | |
| Net Worth (NW) | | | |
| Current Assets (CA) | | | |
| Current Liabilities (CL) | | | |
| Net Working Capital. | | | |
| Information from Income Statement | | | |
| Total Revenue (TR) | | | |
| Profits Before Taxes (PBT) | | | |

Attach audited financial statements for the last three years duly signed and stamped by a chartered accountant, registered with ICAP (for individual applicant or each partner of joint venture) duly supported by copies of tax returns of the respective years

[In case of foreign firms, if audits are not required by the laws of their countries of origin, they may submit their balance sheets of last three years along with turnover certificate from the respective bank certified by a registered accountant and supported by copies of tax returns].

Average Annual Turnover

[The following table shall be filled in for the Applicant and for each partner of a Joint Venture]

Annual turnover data

| Year | Amount and Currency | Rupees in million |
|---------|---------------------|-------------------|
| 2014/15 | | |
| 2015/16 | | |
| 2016/17 | | |

Average
Annual
Turnover *

* Average annual turnover calculated as total certified payments received for works in progress or completed, divided by the number of years specified.

Specific proposed sources of financing to meet the cash flow of the Contract.

| Source of Financing | Amount (Pak Rs or equivalent) |
|---------------------|-------------------------------|
| 1. | |
| 2. | |
| 3. | |

* Attach audited financial statements for the last three years duly signed and stamped by a chartered accountant, registered with ICAP (for individual applicant or each partner of joint venture) duly supported by copies of tax returns of the respective years

[In case of foreign firms, if audits are not required by the laws of their countries of origin, they may submit their balance sheets of last three years along with turnover certificate from the respective bank certified by a registered accountant and supported by copies of tax returns].

BIDDER'S REFERENCE

Relevant / Specific Services

Using in the format below, provide information on each reference assignment for which your firm, either individually as a corporate entity or as one of the major companies within a consortium, was largely contracted. (Preferably Performance Certificate issued by the relevant clients are to be attached.)

| | | |
|--|-------------------------------|--|
| Assignment Name: | | Country: |
| Location within Country: | | Professional Staff provided by your Organization (at additional sheet if required): |
| Name of Client: | | No. of Staff: |
| Address of the Client with name of contract person with telephone, mobile and e-mail: | | No. of Staff Months: |
| Start Date (Month/Year): | Completion Date (Month/Year): | Approx. Value of Services (in Current Rs.) |
| Name of Associated Firm (s)/Sub-Contractor, if any: | | Type of Services Provided: (i) Equipment/machinery (ii) Details of Technical Support (iii) Detail of Professional/Technical Staff (iv) No. of man-months by professional/technical staff |
| Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed: | | |
| Narrative Description of Project | | |
| Description of Actual Services Provided by Your Organization on the Project including the following:- (i) Type & description of equipment/machinery used, brand name, manufacturer & etc. (ii) Technical Support Services including maintenance and repair services for specified duration and year. | | |

Firm's Name: _____

Experience Record of the Firm

A-General Experience Years

| S. No. | Project | Nature of Assignment | Starting Date | Completion Date | Name of Client | Cost of Services | No. of Staff months |
|--------|---------|----------------------|---------------|-----------------|----------------|------------------|---------------------|
| 1- | | | | | | | |
| 2- | | | | | | | |
| 3- | | | | | | | |
| 4- | | | | | | | |
| 5- | | | | | | | |

B- Specific Services (Supply installation, commissioning and technical support of Intelligent Transportation System (ITS)/ AVC based ETTM equipment) carried out in Pakistan.

Select and mention specific projects from A here.

| S. No. | Project | Nature of Assignment | Starting Date | Completion Date | Name of Client | Cost of Services | No. of Staff months |
|--------|---------|----------------------|---------------|-----------------|----------------|------------------|---------------------|
| 1- | | | | | | | |
| 2- | | | | | | | |
| 3- | | | | | | | |

C- Two reference with address and Telephone numbers

(1) _____

(2) _____

Following are qualified for reference:

- Head of the organization where he worked
- Person In charge of the client concerned
- Any other reference who is renowned in the field and the concerned has worked with or under him for a period more than 6 months.

TECHNICAL PROPOSAL FORMS

Notes:

- a. The information as required must be written on the sample forms provided herewith along with attachments of relevant documents. **In case the information has not been written in the forms and only documents are attached then the same shall not be considered for evaluation.**
- b. The applicant is expected to examine all instructions, forms and terms in the RFP and is required to furnish all information, documentation in a properly bound form, sealed and signed/stamped by the applicant. No loose paper will be accepted & No claim in this regard shall be entertained later. The documents must have page numbers & containing a proper index at the start.
- c. All forms should be signed, stamped, dated with the signatory name.

Deployments of Proposed ETTM System

Using in the format below, provide information on each reference deployment of your proposed system.

| | | |
|--|-------------------------------|---|
| Assignment: | | Country: |
| Location within Country: | | Professional Staff provided by your Firm, if any. |
| Name of Client: | | Supply date: |
| Address: | | No. of Lanes: |
| Start Date (Month/Year): | Completion Date (Month/Year): | Control Centers & Operations Centre. If any. |
| Name of Associated Firm (s), if any: | | |
| Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed with contacts: | | |
| Narrative Description of Project | | |
| Description of Actual Services Provided by Your Firm, if any. | | |

Firm's Name: _____

APPROACH PAPER AND SOPs for ETTM SYSTEM

Describe here in detail the approach, sketches, specifications of ETTM system keeping in view scope of services and general conditions covering the following aspects along with check lists of items to be performed and how these are planned to be performed.

Also attach data sheets of equipments.

- a) Details of AVC elaborated on the layout plans & its Specification
- b) Detail of Toll Plaza Control Systems & Specification
- c) Detail of Operations Centre & Specification
- d) Audit & Control parameters of proposed system
- e) Traffic Transactions Management Reporting Procedure
- f) Details of Online CCTVs cameras for display of toll plaza operation at Operations Centre NHA HQ
- g) Arrangement of Back-up power supply to keep the system up for 24-hours during Load-Shedding.

METHODOLOGY & PROPOSED STAFFING PLAN

For following:

1. Supply, Installation & Commissioning of ETTM System
2. Technical Support & Maintenance of the ETTM system for the contract period of three (03) years
3. Operations Centre, NHA HQ.

Describe here the approach on methodology plan for performing the subject assignments along with the total man months trade wise & logistics details to be provided at the project-site keeping in view scope of services and general conditions along with a check list of items to be performed and how these are planned to be performed from overall perspective for the ETTM System.

TF-3A

FORMAT OF CURRICULUM VITAE (CV) FOR KEY STAFF

Proposed Position: _____

Name of Firm: _____

Name of Staff: _____

Profession: _____

Date of Birth: _____

Years with Firm: _____

Nationality: _____

Membership PEC: _____

9. Detailed Tasks Assigned on the Project: _____

10. Key Qualifications:

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

11. Education

[Summarize college/university and other specialized education of staff member, giving names of institutions, dates attended and degrees obtained].

12. Employment Record

[Starting with present position, list in reverse order every employment held. List all positions held by staff member since graduation, giving dates, names of employing organizations, title of positions held and location of assignments. For experience in last ten years, also give types of activities performed and Client references, where appropriate].

13. Languages

[Indicate proficiency in speaking, reading and writing of each language: excellent, good, fair, or poor].

- 14. Computer skills
- 15. Trainings/Courses
- 16. Assignment/Positions, completed/held with the Company
- 17. Certification

I, the undersigned, certify that to the best of my knowledge and belief, these bio-data correctly describe myself, my qualifications and my experience.
I confirm that I will be available to carry out the assignment for which my CV has been submitted in accordance with the implementation arrangements and schedule set out in the Proposal.

Date: _____

Signature of Staff Member

Day/Month/Year

Verified by:

Authorized official from the firm

Minimum Support Staff Requirement

For Technical Support Period

A. Level-I Support Staff per Site (Or as per Requirement)

| <u>Designation</u> | <u>Requirement</u> |
|------------------------------|---------------------------|
| Site Support Incharge | 01 per 02 plazas |
| MIS Supervisor | 01 per 02 plazas |
| Senior Technicians | 01 per 02 plazas |
| Technician | 03 per plaza |
| Spare Technician (relievers) | 01 per 02 plazas |

B. Staff at NHA HQ (Will be stationed at NHA HQ or as per directions)

0800 Hrs to 1600 Hrs

| <u>Designation</u> | <u>Staff</u> |
|---------------------------|---------------------|
| Technical Managers | 02 |
| Support Engineers | 04 |
| MIS Supervisors | 04 |
| Computer Programmers | 02 |
| | <u>12</u> |

All staff mentioned above at (B) will report to DD (MIS/ETTM)

Note:

- I. All manpower will be registered on Biometric Attendance machines provided by TSP and all the attendance will be reported to NHA HQ in real time.
- II. NHA representatives will be part of Recruitment process.

TECHNICAL SPECIFICATION

TECHNICAL SPECIFICATION

1. Introduction

This technical specification for Electronic Toll and Traffic Management (ETTM) System for closed loop on Motorways will provide a comprehensive overview of the requirements for a toll system. The proposed toll system must be efficient, dynamic and flexible to cater for the constant changing needs of the National Highway Authority (NHA) and the technology markets.

Management information systems, decision support systems, and executive support systems deal with different, though overlapping, informational needs of management. All these parts must be integrated as part of the same system portfolio and should be utilised according to their capabilities.

1.1 Minimum System Requirement:

The minimum technical information, the NHA requires from Bidders to submit in their Technical proposal to be considered responsive to the technical requirements is:

Automatic Vehicle Classification (AVC) System must be an integration/ combination of intrusive & non-intrusive (e.g. InfraRed/Optical Sensors, Treadle & etc. Provide data sheets with international verifiable references

| Description | | Min. Requirement |
|--------------------|---|--|
| 1.0 | LANE EQUIPMENT INCLUDING AVC Automatic Vehicle Classification (AVC) based system with integration/ combination of intrusive & non-intrusive sensors. (e.g. Optical Sensors & Treadle) | Must Meet Requirement |
| 1.1. | Tamper Proof Housing Should generate alarm on tempering attempts with log for sensors and control units | Required. Details to be provided. |
| 1.2. | Frequency of periodic calibration of sensors | To be provided In axle count |
| 1.3. | Frequency of replacement of sensor parts Intrusive & Non-intrusive | To be provided In axle count ≥ 05 Million |
| 1.4. | Classification Accuracy (Relaxed upto 95% for non-tolled classes i.e. Animal Carts, Bikes, Rickshaw to be separately classified) | $\geq 98\%$. |
| 1.5. | System uptime/availability | $\geq 99\%$. |
| 1.6. | Processing power | Core i5, 04 GB RAM, SSD storage or better |
| 1.7. | Detection Accuracy | $\geq 99\%$. |
| 1.8. | Operating Temp. | 0°C to 60°C |
| 1.9. | Life Expectancy of whole system (years) | Minimum 07 years |
| 1.10. | Average cash transaction time (excl. barrier opening) | ≤ 4 Seconds |
| 1.11. | Average cashless transaction time (excl. barrier opening) | ≤ 3 Seconds |
| 1.12. | Integrated Lane Camera (night vision) | Required |
| 1.13. | Automatic Number Plate Recognition (ANPR) System must have interface. Installation to be decided later. | Required |
| 1.14. | Reversible lane (Interface) | Required |

| | | |
|-----------|--|---|
| 1.15. | Toll collector input unit module/ keystroke life Must be certified Industrial Grade | ≥10 Million per Key |
| 1.16. | Multi transactions like cash, RFID, prepaid/ smart card (Balance on card), credit card (at Plaza POS) etc. | Required & details to be provided by bidder |
| 1.17. | Central clearing house for RFID, prepaid/ smart card, credit card etc. Payments | -do- |
| 1.18. | Tailgating detection in meter(s) for vehicle separation along with Hitch detection. | <0.5 Meter |
| 1.19. | Generate log for open & closed lanes | Required |
| 1.20. | Classification speed | <3 Seconds |
| 1.21. | Toll barrier safety | Required |
| 1.22. | Toll barrier open & close time (01 complete loop) | <2.0 Sec |
| 1.23. | Lane Integrated backup UPS for AVC classification during down time (in minutes) | 30 Minutes backup |
| 1.24. | Vehicle separation detection features Details of Light curtain for vehicle profiling | Mention Sensors, placing & Height |
| 1.25. | Lifecycle (number of vehicles read) of AVC | 10 Million Axles |
| 1.26. | System Air Conditioning Requirement (watts/ hours per lane and per plaza) (Min. Power shall be preferred) | Requirement to be provided by bidder. |
| 1.27. | Images/video clips for every processed vehicle For inside booth and outside booth (Vehicle) | Required & details to be provided by bidder |
| 1.28 | Dedicated Short Range Communication (DSRC) transponder with 5.8 GHz frequency | Required & details to be provided by bidder |
| 2. | TOLL SYSTEM FEATURES AND SPECIFICATIONS | |
| 2.1. | Software architecture details alongwith detail of database platform and application environment for all system levels | Details to be provided by bidder |
| 2.2. | Data redundancy (05 number of levels) AVC, Lane, Plaza, Ops Centre and Disaster Recovery site | -do- |
| 2.3. | Raw Data Concentration System - To Collect raw AVC classification data at Ops Centre for audits | -do- |
| 2.4. | Number & type of reports Reports are required to give summarized as well as detailed traffic and revenue with calendar and operational days, time and shifts. | -do- |
| 2.5. | Financial management Controls (Shift & month closings and audits etc.) | Required |
| 2.6. | User management parameters | Required |
| 2.7. | Toll customer care portal (Web Based) | Required |
| 2.8. | Toll lane status monitoring (Web Based) | Required |
| 2.9. | Audit trails for database and application level depicting user login timestamp and activities performed with change timestamp. | Required |
| 3. | MISC. FEATURES AND SPECIFICATIONS | |
| 3.1. | Future add-ons without any change/ cost to the offered equipment | Details to be provided by bidder |
| 3.2. | Interface for police fine collection | -do- |
| 3.3. | BACKUP POWER i. Type (Solar/Generators) ii. Capacity iii. Fuel Consumption per hour | -do- |
| 3.4. | Provision of preliminary design, drawings and specifications | Required |
| 3.5. | The system should display real time processing in lanes | Required |

| | | |
|------|--|----------|
| | i.e. class, toll received, payment type, time & date stamp | |
| 3.6. | Capability for interfacing or software output to third party application if required in future | Required |

1.2 Scope of the Document

It will cover the following functional areas:

- Payment Methods
- Vehicle Classification
- Overall system functionality
- Operations Centre functionality
- Control Centre functionality
- Plaza functionality
- Lane functionality
- Automatic Vehicle Classification functionality

2. PROJECT VISION

With the growth in traffic over the past years, and the anticipated increase of traffic in the coming years, a system needs to be implemented that will achieve the following:

- a. Improve traffic throughput (rate of vehicle processing at toll plaza) by moving from a traditional manual toll collection to electronic toll collection having additional transaction modes available like cash, remote sensing like Touch & Go and express lanes or any other.
- b. Ensure increase in revenue by removing slippages from the system.
- c. Improving NHA's controls over its toll operations with tools to monitor the performance of its operators.

It is anticipated that the system will connect and become part of the already established electronic toll infrastructure on National Highways and Motorways network.

3. Payment Methods and Identification

The system must be able to handle the following payment methods as a minimum. It should however be possible to accommodate and integrate new payment methods as they become available in the market.

3.1 General

National Highway Authority intends to procure a state of the art electronic toll and traffic management (ETTM) system. This toll system shall operate as an open loop system where tolls shall be based on number of crossings at the toll.

This ETTM shall also be able to use a Contactless Smart Card (CSC) as a transit card (referred to as T-CSC) in addition to cash collection.

As a matter of principle, the CSCs being not a consumable item, a real-time inventory of the cards shall be kept up-to-date by the ETTM system.

The system shall enable the toll operator to register any vehicle crossing the toll plaza by keying-in its class. The toll operator shall then use the thermal printer to dispense the receipt to the vehicle's driver.

The equipment shall be able to operate in autonomous mode while controlling the various lane peripherals. It shall interface with the plaza computer system to report the detailed transaction information and toll collector's actions in real time.

3.2 Cash

The cash payment method is limited and refers to the road user paying with notes and coins, when he passes through the toll plaza.

3.3 Cash – Smart Card

This payment method can be linked to a central system; It is also important to note that smart cards can be issued on a permanent basis to a road user. These options are described below.

3.3.1 Smart card issued on a permanent basis to a road user

This payment / identification method works on the same principle as the one discussed above. The commuter will use his own card (issued by the bidder) for toll transaction while crossing the toll plaza.

3.5 E-Tag & Dedicated Short Range Communication (DSRC) transponder with 5.8 GHz frequency

One lane on both sides of toll plazas shall be capable of payment through e-tag (RFID) and DSRC units.

3.6 Violations

Whenever a vehicle exits a plaza, without the toll collector having received payment from the road user, the system must automatically register the transaction as a violation on the system.

3.7 Plaza based ETC

Plaza based ETC refers to the concept where a vehicle is not required to stop in the toll lane for transactions processing. Instead his car is equipped with an infrared transponder or RFID (Radio Frequency Identification) and smartcard that can be read by the toll lane equipment. If the funds on this smartcard are sufficient, the transaction value must be deducted from the card, and the exit barrier opened so that the road user can proceed.

4. Vehicle Classes

4.1 The equipment installed in the toll lanes must be able to classify the following vehicles without human intervention. The determination of the class into which the vehicle falls may be based on the number of axles, distance between axles, height of vehicle, double wheels and etc. The final classification must conform as under:

| Class | Vehicle Type | Toll Classification |
|--------------|---------------------------------|---|
| Class-1 | Car, Jeep | Class-1 |
| Class-2 | Wagons, Hiace, Tractor | Class-2 |
| Class-3 | Tractor with Trolley, | Class-4 |
| Class-4 | Busses, Coaster | Class-3 |
| Class-5 | 2 Axle Rigid Trucks | Class-4 |
| Class-6 | 3 Axle Rigid Trucks | |
| Class-7 | 3 Axle Articulated | Class-5 |
| Class-8 | 4 Axle Articulated | |
| Class-9 | 5 Axle Articulated | |
| Class-10 | 6 Axle Articulated | |
| Class-11 | Any other non-standard vehicles | In case of any un-classified vehicle, it should be recorded in Class-11 with toll rate of class-5 which shall be supervised accordingly with evidence |

5. Data Collection Mode

Although it is preferred that the toll lanes are always operating in normal mode, i.e. the applications are running locally on the toll lane machines and communication to the plaza processing level is up, it is understood that it cannot be guaranteed 100% of the time. As such it is necessary that the toll lanes can also operate in the following modes, in addition to the normal operating mode.

5.1 Local mode

Local mode occurs when the communication between the toll lane machines and the toll plaza server is down. In this mode the lanes must still be able to operate. As communication to the toll plaza processing level is not possible in this mode, all data generated in the lane must be stored locally on the toll booth machine. When the communication is restored, the data must automatically be transferred to the toll plaza processing level. When in this mode, the operator cannot remotely operate the lane.

5.2 Manual mode

This mode is entered into when the system in the lanes is not operational, either due to hardware failures or to other unforeseen software failures (due to reasons beyond the scope of bidder). In manual mode it is vital that the automatic vehicle detection equipment (AVC) be operational, as it is the only mechanism available that will provide the operator with base revenue that can be cross-referenced. In this mode the lanes must be manned and every transaction allowed through the lanes must be complimented by a manual receipt. A duplicate of the receipt must kept by the toll collector for verification purposes and manual card number entry as required. In other words, it must be possible for any transaction generated in manual mode in the lanes to be captured at the toll plaza processing level.

Input into the toll plaza processing level must be a batch process and the system must allow for the validation of captured manual data in the same way as the toll lane processing level.

6.1.1 **Hardware limitations**

Maximum standardization regarding all hardware components including central processors and peripherals, and, wherever possible, with multi-vendor supply options.

6.1.2 **Interfaces to other applications**

The system supplied must be as open-ended as possible to allow the Employer to have access to as many other hardware and software application and support products as possible.

6.1.3 **Audit Functions**

Facilities must be provided which will allow high level access at all times to monitor and trace system usage and system changes regarding hardware and software configurations as well as data contents.

6.1.4 **Operating System**

The workstation operating system should be Microsoft Windows or alternatively a Windows based system.

6.1.5.1 **Database Management System**

The chosen database management system must support the relational database model. It must also be optimised for transaction processing, and must be accessible through ODBC drivers. Data transfer between different databases must be effective and reliable. The DBMS must have its own security system.

6.1.5.2 **Programming Languages**

Any programming language can be used, as long it is a currently supported programming language, and it is not envisaged to become unsupported in the near future.

6.1.5.3 **Peripheral Output Devices**

All visual display units (VDU), printers, swipe card readers and any other peripheral output device must comply with some standard that allows for vendor independence and substitution without program changes.

6.1.5.4 **Hardware limitations**

All software supplied and developed must be portable and executable across hardware platforms employed at lane, plaza level or control centre level.

6.1.6 **Attributes**

6.1.6.1 **Security**

Adequate facilities must be provided to prevent any unauthorized user from:

Obtaining information from a computer system;

Deprive other users from use of the computers; and

Modify information in the system for fraudulent purposes or sabotage.

Security features must be implemented on both the operating system and the database management system. Furthermore, it must be easily maintainable by a system administrator.

In addition to the above mentioned security issues, adequate provision must also be made for security measurement with regard to:

Access control for users;

Access control for programmers;

Information use accountability;

Allow for detail logging of user ID's, plus the duration with start and end time of system usage;

Special precautions must be made against access into the system by means of external communications lines; and

6.1.6.2 **Anti Virus Software**

The operating systems employed must be of such nature that it is either resilient to viruses, or that publicly available antivirus software can be loaded onto the system. The antivirus software must be widely used and antivirus definitions/improvements must be downloadable as soon as they become available.

6.1.6.3 **Maintainability**

Maintainability of source code must be implemented through the development and configuration management methodologies.

The maintainability of the computer systems must be optimized by implementing the following functions wherever possible:

Automatic system administration procedures;

Automatic performance monitoring;

Error recording and traceability; and

Remote diagnostics.

6.1.6.4 **Audit ability**

To guarantee maximum audit ability the following functions must be implemented wherever possible:

Access and usage recording;

Transactions logging for audit purposes;

Access to audit trails through reports; and

Any changes to source data, which is either incorrectly done or corrupted by any person, must automatically be logged in an appropriate audit trail.

6.1.6.5 **Transferability**

All software supplied must be of such a nature that transferability across different computer systems is maximized.

All data and information must be transferable across the various systems.

6.1.6.6 **Availability**

The system availability must be maximized through the implementation of:

Preventative and planned maintenance;

Standby systems and components;

Minimum repair times; and

Minimum interference during system administration activities, so that the normal operational capabilities and performance will not be affected.

6.2 **Equipment**

It must be possible to source equipment locally within the country from reputed vendors.

6.3 **Spares**

On handover of the system to the Employer, the bidder will ensure that sufficient spare parts of the commonly used items to be handed-over to the Employer. During the contract period, it will be the responsibility of the Contractor to ensure that the spares levels are kept up within the required levels. The cost to replace the spares during the contract period will not be carried by the Employer, and will be the responsibility of the Contractor. It is foreseen that most equipment will be installed with a back to back guarantee from the local equipment supplier/vendor.

6.4 **Maintenance**

It must be possible for a local based company / person to perform the specialised and routine maintenance necessary on the system. This includes but is not limited to the hardware maintenance and software support services.

6.5 **Data Retention**

The retention of data at various levels within the system is vital – not only as a means of data duplication in the event of a system crash, but also from a business perspective. The retention levels for the various system levels are as follows:

Lane – A copy of all data generated by the lane application must be stored locally for three (03) months where after it should automatically be removed from the system.

Toll Plaza Processing Level – Data on this level must be available for a period of six (06) months, after which it can be (automatically) removed from the system.

Operations Centre Level – Traffic and revenue must be available for a minimum period of five (05) years. This is necessary to provide more accurate information for traffic / income projections.

It must furthermore always be possible to restore data from archives onto the system information be required for periods no longer available on the system.

6.6 Status Displays, Incident Management and Error Reporting

Real-time displays and error reporting should reflect the information at the occurrence.

7. System Architecture

This section of the document will describe the overall system architecture required for the successful implementation of a toll system.

7.1 Basic Requirements

This section defines the basic requirements that must be provided for the operation and maintenance of the toll system.

1. It must be possible to extend the system and integrate other toll plazas into the same system should the need arise.
2. The system must have the capability to specify different access levels for different users on both day-to-day operating functions and reports.
3. The system must have a user friendly interface to provide efficient performance of host functions with the minimum personnel.
4. The system must improve the transaction processing speed by implementing Electronic Toll Collection mechanisms. Trips done on the route must automatically be deducted from the money on the card.
5. The system must have an interface to a central clearing house for the handling of funds moved from the cards specified in the previous point.
6. The system must generate operational and audit reports which will provide comprehensive traffic and revenue data.
7. The system must provide comprehensive audit trail information on any transaction changes made in the system.
8. The system must provide an interface to extract data from the system into a spreadsheet for analytical needs not provided by the system.
9. The system must provide real time monitoring of transaction and incident data.

10. The system must allow the end-user to manage exceptions such as violations, discrepancies and credit granted transactions within the system.
11. The system must incorporate an automatic vehicle classification (AVC) system capable of detecting/classifying vehicles automatically according to the project needs.
12. The system must capture images / video of all irregularities that occurs based on transaction and incident data. For example, if the toll collector and the automatic vehicle classification system differ, the event capture system must be triggered to capture images / video.
13. The system must be fool proof towards all kinds of toll collections and shall have a minimal level of human intervention.
14. Every lane (Manual, Auto or Mix) is required to be equipped with or IP camera to automatically record a snap/video of every vehicle crossing the toll plaza.

7.1.1 Maintenance

The maintenance must include toll equipment, electronic equipment and software.

7.2.1 Interface

It is important that an up-to-date user interface be used throughout the system. The interface must be a Windows type interface with point-and-click access.

7.2.2 Reliability

Reliability can be divided into two areas, i.e. equipment reliability and software reliability. It is expected of equipment to be functional at all times, except when maintenance is required. The output received from software must be consistent and correct.

7.2.3 Reusability

The application software must be as such that it can be easily customized to cater for any changing needs.

7.2.4 Serviceability

The hardware used must be as such that it will not be a problem to get a vendor to support it.

7.2.5 Language

The system and all output generated from it must be in English.

7.3 Logical Representation

It is possible to divide the system into the following layers:

Lane level
Plaza Control level

Operations centre level

A logical representation and a summary of the functionality on each of the levels follow. It is allowed to combine plaza and control centre level hardware and functionality in the same computer(s). The operations centre server must however be separate in order to have an independent system. This server will typically be housed at operations center of Employer i.e. National Highway Authority.

7.3.1 Lane Level

Every lane must have its own autonomous toll collector system on which the lane software runs. The lane software can run on any operating system, but a Windows operating system is preferred. The main function of the toll lane software is to record all the transactions, incidents, lane sundry payment transactions and lane status information in a defined format, and to transfer this information to the plaza level for further processing. The lane software must also record the information in a persistent manner.

7.3.2 Plaza Centre System

A server at a plaza is connected to a number of toll collector systems in the lanes. The server must run on an established and proven operating system and database to store the data. The server receives transactions, incidents, lane sundry payment transactions and status information from the lane computers, which preferably runs on a Windows operating system. These workstations are to be used to perform all the necessary administrative and supervisory functions needed at the plaza. Data must be summarized and replicated from the plaza system database to the Operation database.

7.3.4 Operations Centre System

The operations centre system forms the high end of the toll system. The server at the operations centre must be connected to all the plaza control centre system servers. The server must run on an established and proven operating system and database to store the data. The main function of the operations centre level software must be to receive summarized data from the various control centre systems into a single database where it is consolidated for management and reporting purposes.

Also connected to the operations centre server must be a number of MIS workstations, which preferably runs on a Windows operating system. These workstations must be used to perform all the necessary administrative, financial, reporting, etc. functions needed at the operations centre.

7.4 Physical Representation

Sharing of data and equipment between systems on different logical levels must be possible in the system.

The configurations as described above, enables sharing of both network and network devices, such as printers. Sharing of equipment and network resources must also be possible between different functional subsystems.

8. Functional Overview

8.1 General

The purpose of this section is to give the reader an overview of the MIS system and does not address the detail functionality.

For the purpose of this section, the functionality of the system is grouped according to the relevancy that it has at any of the following levels, and at which level the system is accessed to use the functionality:

- AVC functionality
- Lane functionality
- Plaza functionality
- Lane Live Monitoring Functionality
- Control centre functionality
- Operations centre functionality

8.2 AVC

The purpose of the AVC must be to accurately detect and classify all vehicles entering or exiting a lane at a Toll Plaza. The AVC is also used to verify the collector's classification. The AVC is installed in the toll lanes and must be responsible for the following:

- Detection of a vehicle in the AVC area,
- Detection of the direction
- Automatic determination of vehicle class.

8.3 Lane Functionality

The main function of the lane computers must be to record the data generated in the lanes in a defined format and transmit this information to the plaza system.

The following basic functionality must be possible:

- Do vehicle logic tracking.
- Control all peripheral equipment.
- Handle any transaction linked to a payment method.
- Interpret all possible situations and generate appropriate incidents.
- Connect to the Automatic Vehicle Classification equipment and combine the received classification with that of the toll collector per transaction.
- Accept all card and parameter lists defined on the plaza system.
- Validate card data without any noticeable delay.
- Issue receipts.
- If the plaza system is down, the lanes must be able to function as normal in local mode.
- Maintenance diagnostic functions.
- Provide maintenance mode operations.
- Accept sundry payments.
- Provide access control to registered users on the plaza system.
- Accept payment from road users for pre-paid debit accounts registered on the plaza.

8.4 Plaza Control Center Functionality

The plaza system must function as a validation and data concentration system for the transmission of data from the lane systems. Inconsistent data must be reported by the system and provide the user with the ability to correct and validate these inconsistencies.

The basic functionality of the plaza level software includes the following:

Bi-directional communication with all toll collection computers in the lanes.

Evaluation and acknowledgement of incidents, as they are received from the various toll lanes. The types of incidents that are reported by the system and the manner in which each incident type are reported and acknowledged must be configurable according to the preference of the toll operator.

The plaza must store all relevant data received from the toll collection computers in a database management system.

The plaza level software must compare the summarized data received from the lanes with the raw transaction and incident data received from the lane, to verify data integrity and completeness. Any discrepancies in the data integrity or data completeness must be detected and reported using appropriate tools and reports.

- Reports based on raw and summarized data.
- A backup facility.
- A float facility to control the hand-over of cash between the collector and the supervisor.
- Cash-up facilities through which the toll collectors and supervisors can declare cash received including cashless transaction(s) and update vouchers.
- A banking facility keeping track of cash declared by collectors as well as bank deposits.
- Maintain card and parameter table data received from the control centers.

8.5 Lane Live Monitoring Functionality

The Lane Live Monitoring must be available. The said program must receive its information only from the lane computers. The data must be displayed in a graphical form to the user.

The following type of information relating to events that happen in the lane must be transferred between the lanes and the Lane Live Monitoring:

- Status of the overhead lane sign, card readers, controllers and all other hardware components connected to the system.
- User logged into the lane.
- Last transaction details.
- Device status.
- Manual and Automatic Vehicle classifications.

Incidents generated in the lane and that are configured to be displayed on the Lane Live Monitoring.

This information must be displayed on the Lane Live Monitoring to keep plaza personnel up to date with the status of events in each toll lane.

8.6 OPERATIONS CENTRE FUNCTIONALITY

The operations centre system forms the high end of the toll system, and must include the following functionality as a minimum:

- Store data received from the various plaza controls centre systems.
- Verify that the data received from the control centre systems is complete. Exception reports must be available on any inconsistencies.
- Maintain account & revenue information.
- Generate integrated reports for the control centre systems connected to the operations.
- Backup facility.

9. ACCESS CONTROL

9.1 Overview

The access system must be used by the system administrator (or user with system administration privileges) to define users on the system together with their menu privileges. This system must be used to globally control all users across all systems. After defining the users via the access subsystem, the new / modified users together with their menu structures must be transferred electronically to all the systems connected together.

It must be possible to run the access system from any workstation connected to the network.

9.2 Users

Any person who has access to the system is a user and must have his own password. The system administrator must be able to add, update and terminate users on the system and define privileges for every possible function that the user can do. The following basic requirements must be adhered to.

9.2.1 Adding a new user

The following information must be maintained per user.

Personal Details

Surname
First Name
Initials
Address
Phone Numbers
Identity Number

Security Details

Personnel Number
User ID (Name to be used during logon) the user ID must be unique
User Group
Password

Number of days before password must be changed
Access card details to link card to user
Date on which user was registered on the system
Termination date

9.2.2 Updating user information

Updates on users allow for spelling mistakes, surname change, address change, card number etc. The only information that is not allowed to be edited is the user ID.

User ID's must be unique across the system so that even after the collector has left the service of the toll operator, the data can still be traced back to him.

9.2.3 Terminating a User

It must be possible to terminate a user by setting a termination date. The following rules must be applied:

- Once the termination date is reached, a user is disabled and inactive.
- The user can be re-enabled by setting the termination date to null or a date in the future.
- A disabled user cannot login into the application, but his information is still available on the system for reporting purposes.
- A user with sufficiently high privileges can make updates on transactions for disabled users. However, no additions can be made for disabled users.

9.2.4 Passwords

The system must ensure that passwords are changed on a regular basis (at least every 45 days, and not exceeding 60 days). Accounts for users whose passwords were not changed in this period must automatically be locked. Only an administrator must be able to unlock the account should it be necessary.

Logging in to the System

9.3.1 Lane system

Access to the lane system must be controlled by only logging the user into the system if a valid access control card was presented to the system together with the associated password.

If a user has been inactive on the system for a period of 15 minutes, the system must automatically log him off. The system must allow simultaneous logins by the same user on more than one toll lane.

9.3.2 MIS system

As this access is in a controlled environment, it is sufficient for the user to give his username and password for access to the system. Once access was gained the system must load the system with the privileges as defined by the system administrator. Privileges for the Operator are defined by NHA and would be

changed or updated from time to time without interfering with the integrity of the system.

10. LANE PROCESSING

The following actions must take place as a minimum at an entry lane in the closed loop system.

1. When a lane is closed, the overhead lane sign (OHLS) installed on the leading edge of the canopy roof must indicate to road users that the lane is closed by showing a red cross.
2. The collector logs into the lane. This must automatically change the OHLS to a green arrow to indicate that the lane is now open for processing.
3. The traffic light (TL) must be red at this moment and should automatically be controlled by the system.
4. When a vehicle approaches the lane, the toll collector must enter the vehicle class and the vehicle registration number into the system via the use of a collectors' keyboard.
5. The road user pay toll and proceed to exit the lane with green signal.
6. When the vehicle passes over the AVC, the traffic light must change to red to indicate that the entry lane transaction was concluded.

11. IMAGE GRABBING SYSTEM

The system will be required to capture images of vehicles based on certain criteria met. This criterion should be based on transaction and incidents data and must be configurable within the system. In other words, for every type of transaction and incident it must be possible to capture a series of images based on the setup criteria.

The image capturing can be done utilising any image capturing technology, be it via a mounted camera in each individual toll lane, or via a global CCTV network installed throughout the toll plaza. The most important requirement is that the images stored must be clear, irrespective of whether it was captured during the day or night. If preferred, video can be stored instead of images. Specific attention should just be given to storage capacity, as the image data must be available for a period of at least three (3) months.

The system employed must allow the Operator to visually determine the vehicle class from the image(s).

In order to ensure that the captured images contain the vehicle in question in them, the following criteria should be investigated.

Number of frames to be captured should be specified per incident / transaction

Time that should elapse before the first image is captured

Delay between frames

The stored images must be linked to the transaction / incident that occurred, and the audit application running on the Management Information System level must be able to view the captured images / video when validating and correcting data.

The system must also be able to display and print the images, should queries from the road user or even internally arise.

12. LANE LIVE MONITORING

12.1 General

It is a Display which should be connected directly to lane computers as well as Management Information System (MIS).

The following type of information relating to events that happen in the lane must be transferred between the lanes and the Monitoring system:

- the changing of the status of the overhead lane sign
- user logged into the lane
- last transaction details
- device status
- incidents generated in the lane and that are configured to be displayed on the monitoring

This information must be displayed on the monitoring to keep plaza personnel up to date with the status of events in each toll lane.

The monitoring system must be a graphical representation or Graphical User Interface (GUI) of the activities in the status of the lanes, and must show all lanes connected to the plaza simultaneously and available at Operations Center.

12.2 Configuration

It must be possible to configure the following items on the monitoring system:

- the lane devices and format of the graphical display
- the lane type, i.e. normal or extra wide lane
- the incidents that must be displayed
- the audible alarm
- the hardware faults that must be displayed
- Incidents that must be displayed for immediate action if more than one plaza is configured on the same system

A user interface must be provided to configure the monitoring system.

12.3 Monitoring System Events

The Monitoring System must display the occurrence of any of the following events in any of the lanes connected to the system per lane:

- Communication Status between Lane and MIS
- If the communications are functioning the status is “normal” and if they are not functioning the communication status is “local”. A separate indicator per lane exists on the Monitoring for this status.

- Communication between the lane and the Monitoring system.

If the communication between the lane and the monitoring system is down for a pre-defined period of time, the complete lane on the monitoring system must indicate a non-active state.

12.4.1 Lane Status

A separate indicator per lane must indicate the status of the lane with respect to the following:

| | |
|--------------------------|---|
| None | The status is normal |
| Interlocked Mode | The reverse interlock of the lane is currently activated |
| Interlocked & Fault Mode | The reverse interlock of the lane is currently activated and a fault exists in the lane |
| Fault Mode | A fault exists in the lane system |
| Manual Mode | The lane is currently in manual mode |
| Manual Mode & fault Mode | The lane is currently in manual mode and a fault exists in the lane |

12.4.2 Panic Button is Pressed

When the panic button is pressed in the lane, a message must be relayed to the Monitoring system and this status must then be reported on the Monitoring System.

The lane island must flash red if the panic button is pressed and this alarm must not stop until acknowledged by the operator of the Monitoring System.

12.4.3 Specific Hardware Faults Occur

Should any of the “System” incidents occur, the relevant information must be displayed on the screen in the hardware fault status block, e.g. if the printer paper low incident is generated, it must show “Paper Low” and should the incident printer paper OK be generated, it must display “Printer Paper OK”. Only the information for the last recorded system incident must be displayed.

On the secondary level of the Monitoring System, the time of the incident detail being displayed must be recorded.

If any of the Monitoring faults occur, the AVC image shall flash red on-screen until the fault is reported to the Monitoring system as rectified.

12.4.4 A Log-in / Log-out has Occurred

The log-in ID of the current operator in the lane must be displayed.

12.4.5 Barrier is Opened / Closed

This indicator must show the status of the Barrier as given by the lane system, either open or closed.

12.4.6 Load Shift has been Activated

This indicator must show the status of the load shift detector as given by the lane system, either activated or not activated.

12.4.7 Overhead Lane Sign (OHLS) Changes Status

This indicator must show the status of the OHLS as given by the lane system, either open (green arrow) or closed (red cross).

The OHLS indication on the monitoring system must indicate if the lane OHLS is flashing, or stay static if the lane OHLS is not flashing.

12.4.8 Traffic Light Changes Status

This indicator must show the status of the traffic light as given by the lane system, either red or green.

12.4.9 Collector's Vehicle Classification Occurred

This item must display the Collector's Vehicle Classification done by the operator.

This field must be cleared upon the receipt of a new Collector's Vehicle Classification (and re-populated with the new CVC) or when a log-out occurs. In the event of a run-through this field must be cleared upon the receipt of a new AVC class.

12.4.10 Method of Payment

This item must display the method of payment selected by the operator.

This field must be cleared upon the receipt of a new CVC or when a log-out occurs. In the event of a run-through this value must be populated when the AVC class is received.

12.4.11 Automatic Vehicle Classification has occurred

This item must display the vehicle classification given by the AVC. This field must also be cleared upon the receipt of a new CVC or when a log-out occurs.

12.4.12 Classification / Transaction has been Cancelled

Whenever the Classification Cancelled incident is received the CVC must be cleared and replaced with the Classification Cancelled indication.

The CVC, Method of payment and AVC class fields must be replaced with the Transaction Cancelled indication whenever the Transaction Cancelled incident is received.

13. INCIDENT VALIDATION SYSTEM

The first step towards a successful Management Information Reporting System is to ensure that all data on the system is complete and consistent. This means that all data must have been validated either by the database management system, or via human intervention in the case of inconsistent or incomplete data. The Incident Validation system must be provided to the Operator to ensure this. This sections deals with the requirements regarding this system.

Incidents are generated by the lane application on the occurrence of certain events. It must be possible to enable / disable each of these incidents for acknowledgement by the Operator. The following basic functions must be provided.

- Update incident with relevant details. (Vehicle registration number, correct vehicle class, comments)
- Batch acknowledges a number of incidents.

The following permissions must be implemented per user based on their privilege level given by the operator:

| | |
|--------|---|
| Low | The user cannot acknowledge incidents. |
| Medium | The user can acknowledge incidents and batch acknowledge certain incidents. |
| High | The user can acknowledge and batch acknowledges incidents. |

The Incident Validation system must obey the following basic rules:

1. If an incident has been received from the lane computers which must be acknowledged, it must appear automatically and in real-time on the supervisors Incident Validation system. When the incident is displayed for the first time, the Incident Validation system must beep to attract the attention of the supervisor.
2. When the user clicks on the incident all linked incident details must be displayed on the screen. Depending on the type of acknowledgement, only the fields for updating must be enabled, e.g. the vehicle registration field when a violation incident has occurred.
3. Image(s) is available for the selected incident; the images must automatically be displayed as thumbnails on the screen. Should the user wishes to zoom into an image, he may do so by clicking on the image. This will zoom the image to an appropriate size. By clicking on a zoomed image, the screen must return to the real-time mode, without losing focus of the last selected incident.
4. The incident must be updated with the relevant details received from the user. After the user has updated the incident it should be automatically removed from the display. Should there be a linked transaction, e.g. in the

case of a positive or negative discrepancy, or a no payment incident, the transaction must also be updated with the correct details.

The lane system must follow the following basic rules for completing a default supervisor vehicle classification scheme. If the Collector's Vehicle Classification is absent, the automatic vehicle classification must be used instead. If the automatic vehicle classification is absent the control classification should default to the 'No Class' classification type.

In the case of batch acknowledgement, it must be possible to define certain incidents for exclusion from this function. E.g. for a violation is must be required that a vehicle registration number be entered.

14. INCIDENT AUDIT FUNCTION

After the user has viewed and acknowledged the incidents on the incident acknowledgment screen, these incidents are updated and stored in the database with any changes that was made during incident acknowledgement process.

In order to provide an audit function for later reviewing of the incidents, a facility to review any incident, together with its' associated image/video frames and acknowledgement information must be provided.

The following is the minimum criteria that must be selectable by the user.

| ITEM | DESCRIPTION | SPECIAL CONDITIONS ETC |
|-----------|---|---|
| Plaza | A list of all the plazas available on this system | If no items are selected, the system must default to "all". The user must have the ability to select any combination (one or more) of plazas. |
| Lane | A list of all the lanes available for the plaza(s) chosen above | If a specific plaza was not chosen, all the lanes available on the system must be available for selection If no lanes are selected, the system must default to "all". (where "all" refers to all the lanes available for the selected plaza) If a different plaza is chosen, this list must be refreshed. The user must have the ability to select any combination (one or more) of lanes. |
| From date | Calendar date. All data from this date forward (including this date) must be included in the selection criteria. | A user-friendly "date picker" must be used. The user shall not have to type the date. The default date must be the current date ("today"). |

| ITEM | DESCRIPTION | SPECIAL CONDITIONS ETC |
|-------------------|---|--|
| From time | Calendar time. All data from this time forward (including data at this time) must be included in the selection criteria. | A user-friendly time input mechanism shall be used. It must not be the user's responsibility to enter the time in a specific format. The default time must be zero hours (00h 00m 00s). |
| To date | Calendar date. All data up to and including this date must be included in the selection criteria. | A user-friendly "date picker" must be used. The user shall not have to type the date. The default date must be the current date ("today"). |
| To time | Calendar time. All data up to and including this time must be included in the selection criteria. | A user-friendly time input mechanism shall be used. It must not be the user's responsibility to enter the time in a specific format. The default time must be the end of the day, e.g. 23h59m59s |
| Incident type | A list of all the incident types available on the system. | The incident type code and the incident description must be shown. If no incident type is selected the default value shall be "all". The user shall select the appropriate incident type (it will not be necessary for the user to manually type in the incident type). The user shall only have the facility to select any combination of incidents. |
| Incident sub-type | A List of all the incident sub-types available for the selected incident type. | The incident sub-type code and the incident sub type description must be shown. If no incident sub-type is selected, the default value shall be "all", which will include all the available sub types for the selected incident types. If no incident type was selected, then it will include all the incident sub-types available on the system. The user shall select the appropriate incident sub-type (it will not be necessary for the user to manually type in the incident sub-type). The user shall have the facility to select any combination of (available) incident sub-types. If a different incident type is selected, the incident sub-type list shall be refreshed. |

| ITEM | DESCRIPTION | SPECIAL CONDITIONS ETC |
|-------------------------|--|---|
| Incident number from | The start number for a range of incident numbers. | The number must be typed by the user. The start number must be included in the search. If no number is entered, all incident numbers must be included up to the “end number” specified below. As default no numbers shall be shown (all shall be selected) |
| Incident number to | The end number for a range of incident numbers. | The number must be typed by the user. The end number must be included in the search. If no numbers are entered, all incident numbers must be included from the “start number” specified above. As default no numbers shall be shown (all shall be selected) |
| Transaction number from | The start number for a range of transaction numbers. | The number must be typed by the user. The start number must be included in the search. If no number is entered, all transaction numbers must be included up to the “end number” specified below. As default no numbers shall be shown (all shall be selected) |
| Transaction number to | The end number for a range of transaction numbers. | The number must be typed by the user. The end number must be included in the search. If no numbers are entered, all transaction numbers must be included from the “start number” specified above. As default no numbers shall be shown (all shall be selected) |
| User | A list of all the users on the system. This will refer to the user who was logged into the lane when the incident was generated. (Typically the collector) | The user must be able to select a specific user from a list of all the users on the system. If no selection is made, data for all the users on the system shall be included in the selection. As default no users shall be shown (all shall be selected) |
| CVC | The Collector’s Vehicle Classification | A list of all the CVC available on the system. Multiple selections must be possible. As default no CVC shall be shown (all shall be selected) |

| ITEM | DESCRIPTION | SPECIAL CONDITIONS ETC |
|---------------------------------|---|--|
| AVC | The automatic vehicle classification | A list of all the AVC available on the system. Multiple selections must be possible. As default no AVC shall be shown (all shall be selected) |
| SVC | The corrected supervisor classification | A list of all the SVC available on the system. Multiple selections must be possible. (This must be the updated SVC – after Incident Validation. This might have to be found in the transaction table). As default no SVC shall be shown (all shall be selected) |
| Card/ E-tag/ OBU number | The number of a card/ E-tag/ OBU | If no number is specified, all incidents according to the remainder of the selection criteria must be shown. As default, no card number shall be shown. (All shall be selected). |
| Acknowledged responsible person | The User that acknowledged the incidents. This will be used when all incidents that was acknowledged by a specific supervisor needs to be looked at. | If no user is specified, all incidents according to the remainder of the selection criteria must be shown. As default, user shall be shown. (All shall be selected). |

After performing the query as specified by the query parameters in the query screen, the system must display the output on a screen similar to the current incident acknowledgement screen.

At least the following fields must be displayed:

Plaza
Lane
Date
Time
Incident number
Inc type
Inc sub-type
AVC
CVC
SVC
User (Toll collector)
Transaction number
Card/ E-tag/ OBU number
User who did the acknowledgement (if this incident was acknowledged)
Acknowledgment entered by user (e.g. registration number, comment etc.)

“Audit Check” field. This field must have one of three possible values, not checked, OK and Not OK. A person with “high” privileges can change this field to OK or Not OK. The way in which this is changed must be a user friendly and easy

way, e.g. clicking or double clicking on the field. This field will be used by audit personnel to indicate if they agree with the supervisor acknowledgement.

“Paid” field. This field must have two possible values, empty or Paid. This must be used to indicate if a user has paid in cases where the audit check shows “Not OK”. A person with “high” privileges can change this field. The way in which this is changed must be a user friendly and easy way, e.g. clicking on the field.

It must be possible to order the output by any combination of the following:

- Date
- Time
- Incident number
- Transaction number

For the active row the images must be retrieved from the video capture system and “thumbnail” images must be shown.

15. MIS Traffic (Graphs)

15.1 Overview

Traffic graphs must be included in order to provide the user with a graphical view of traffic volumes over a defined period of time, given certain selection criteria provided by the user. These graphs can be divided into:

- Graphs being updated in real-time to reflect traffic through the plaza (Traffic Volume Monitor)
- Historical traffic data graphs representing data stored in the database over a period of time (Traffic Graphs)

Real-time traffic graphs must be available on the plaza whereas historic traffic must be available across the system. Access must be controlled via the normal user privileges.

It must be possible to print any of the traffic graphs.

The functional requirement of the traffic graphs are described below.

15.2 Traffic Volume Monitoring Activities

This function allows the user to monitor traffic volumes in real-time for fixed intervals as specified by the user.

15.2.1 Select Monitoring Criteria

The user must be able to set a time interval size for updating traffic volumes. The interval size can vary between 30 seconds and 1 hour, increasing in 30-second intervals.

If the Interval criteria are set to zero, all summaries can be cleared, and it is no longer necessary to build the traffic counts.

15.2.2 Graphically View Traffic Volumes

When monitoring starts, the program must build the necessary interval summaries should the user have chosen to do so. These summaries must be displayed from left to right on the screen in a histogram form. The current interval will be updated every minute aligning minute boundaries with the current system clock, e.g. the value on the X axes must reflect the actual time that the traffic volume bar is populated.

The graph must be displayed as a histogram.

The oldest data must be displayed to the left of the screen and must be removed whenever a new interval starts. The remaining blocks must be moved leftward and the new values must be displayed in the rightmost section of the graph.

Filtering must be possible on the following criteria:

- Plaza
- Direction
- Vehicle Group
- Payment Method

15.3 HISTORICAL TRAFFIC GRAPHS

This function allows the user to graphically view traffic figures over an extensive period of time.

15.3.1 Year-by-Year Comparison

This graph must compare traffic on a year-to-year basis. The selection criteria available to the user shall be:

- Plaza
- Start Year (mandatory)
- End Year (mandatory)

The traffic volume must be displayed on the y-axis and the year on the x-axis. The yearly volumes shall be displayed in bar-graph format.

15.3.2 Month-by-Month Comparison

This graph must compare traffic on a month-to-month basis for a given year. The selection criteria available to the user shall be:

- Plaza
- Year (mandatory)

The traffic volume must be displayed on the y-axis and the month on the x-axis. The monthly volumes shall be displayed in bar-graph format.

15.3.3 Daily Traffic Graph

This graph must compare traffic on a day-to-day basis for a given month and year. The selection criteria available to the user shall be:

- Plaza
- Year (mandatory)

- Month
- Direction

The traffic volume must be displayed on the y-axis and the date on the x-axis. The daily volumes shall be displayed in bar-graph format. The format must be similar to that shown in the previous figures.

15.3.4 Hourly Traffic Graph

This graph must compare traffic on an hour-to-hour basis for a given operating day. The selection criteria available to the user shall be:

- Plaza
- Date (mandatory)
- Direction

The traffic volume must be displayed on the y-axis and the hour on the x-axis. The hourly volumes shall be displayed in bar-graph format. The format must be similar to that shown in the previous figures.

15.3.5 Traffic per Class Graph

This graph must compare traffic per vehicle class for a given operating day. The selection criteria available to the user shall be:

- Plaza
- Date (mandatory)
- Direction

The traffic volume must be displayed on the y-axis and the class on the x-axis. The traffic volumes shall be displayed in bar-graph format.

15.3.6 Traffic per Payment Method Graph

This graph shall compare traffic on per payment method for a given operating day. The selection criteria available to the user shall be:

- Plaza
- Direction
- Date (mandatory)

The traffic volume must be displayed on the y-axis and the payment method on the x-axis. The traffic volumes shall be displayed in bar-graph format. The format must be similar to that shown in the previous figures.

16. Sundry Payments

16.1 Overview

This facility allows registration of payments for various types of debts, such as violations, credits granted, toll authority accounts, collector debts, payments received from banks for credit card transactions, payments from the central clearing house etc. Such payments are normally received from either the lane or at designated point of sale terminals at the plaza building. The person who

accepts these payments must complete a cash-up in the same manner as described earlier. The payments must therefore be linked to an operating shift.

Registration of a sundry payment at any point-of-sale terminal (front office or lane) creates a record in the control centre database. A payment received must be allocated to a payment category.

It must only be possible for a user with a high privilege to cancel a sundry payment.

The following functions define the basic requirements for sundry payments.

16.2 REGISTER SUNDRY PAYMENT WORKSTATIONS.

This function must be available only to users with a high privilege. If a workstation is not registered, the user must not be allowed to enter sundry payments on the workstation. Lanes must however fall outside of this category, as they are expected to collect account payments

The following information regarding sundry payment terminals must be captured.

- Workstation ID
- Plaza to which sundry payments must be allocated
- Computer name of the workstation
- Receipt printer name

16.3 SUNDRY PAYMENT RECORD DATA ITEMS

The following items of information must be recorded as a minimum per sundry payment entry:

- System date and time
- Operating date
- Shift id
- Plaza id
- User ID
- Source – To distinguish front office sundry payments from lane sundry payments. If a front office workstation is used, the name of the workstation must be inserted, while if a lane is used, the lane number is inserted.
- Sundry Payment Categories:
 - credit granted account payment
 - frequent user account payment
 - collector debts
 - miscellaneous
 - card transactions claimed from a bank
 - violations
 - account fees
 - etc.
- Sundry payment sequence number – Must start from 1 and incrementing continuously per workstation or lane.
- Account identification, e.g.:

- account number for credits granted payments
 - user id for collector debt payments
 - account number for ETC or toll authority account payments
 - bank ID for bank rollup payments
 - vehicle registration number for violations payments
 - customer name comment for miscellaneous payments
- Receipt number
 - Linked transaction and user ID if sundry payment is cancelled

16.4 ADD A SUNDRY PAYMENT RECORD

The shift in which the person wishes to accept the sundry payment must be specified in the case of sundry payments accepted at points other than the lanes. If a shift is closed, the user must not be able to select it as a valid option. Lane sundry payments are always linked to the shift in which they were received.

All sundry payments accepted in the lane are destined as account payments, and thus no manual input is required other than the amount and the account to which it is linked.

On other point of sale terminals the user must be able to choose a payment category for the sundry payment to be done, e.g. account payment or collector debt etc.

16.5 CANCEL A SUNDRY PAYMENT RECORD

A sundry payment may not be deleted but can be flagged as cancelled so as to keep track of the action. This also facilitates data completion checking since there should be no gaps in the sequence of sundry payment numbers. This can only be done by a user with high access privilege

A cancelling transaction must be generated with the same information, but:

- Different sequence number
- System date and time
- Negative amount to be credited
- Linked transaction, pointing to the cancelled one
- The ID of the user canceling the sundry payment

The cancelled transaction must contain the original Sundry Payment's user id to ensure the negative amount will be against the correct user id. The user cancelling the Sundry Payment must be tracked through the Cancelling Id.

16.6 VALIDATE ACCOUNT IDENTIFIER

The information entered into the account identification field is at the discretion of the cashier. In the case of credit granted and collector debts, the entry must be validated against defined possible values.

If an account number is entered, the account details must be displayed for confirmation from the user to ensure the Sundry Payment is allocated to the correct account. Once accepted the account balance must immediately be rebuilt to reflect the payment received.

16.7 RESET CASH-UP FLAG TO FORCE RE-CASH-UP

After processing a payment, if the cash-up for the relevant shift has already been completed, the cashier must be forced to redo the cash-up.

17. CASH-UP

17.1 Overview

At the end of each shift, toll collectors and any person who has collected cash on the system are expected to individually carry out a final cash-up operation which involves the entry of all the relevant information pertaining to the revenue collected by that person during his/her shift excluding any bleed-offs done during the shift. This section will describe the requirements for this function.

Final cash-up should consist of a four-phase operation, which is carried out for a specified collector, per control centre per shift.

Phase 1 : Validate the collector-shift.

Phase 2 : Update lane vouchers.

Phase 3 : Declare cash collected including cashless transaction(s).

Phase 4 : Print reports.

Some or all of the information for phases 2 and 3 may have been entered through the Incident Validation system or through bleed-off collections, but a final cash-up must be done so as to generate the relevant reports for auditing purposes. This must be designed to be done as quickly and efficiently as possible after a shift is complete or at any time later.

It must also be possible for a user to carry out a partial cash-up before shift end. As far as user interaction with the program is concerned, there must be no difference between a partial cash-up and a final cash-up.

Depending on the privilege level of a user he can either perform a cash-up only for himself, or with sufficient privileges he can also perform this function on behalf of another person. This latter responsibility can only be given to a highly privileged user who can take up the responsibility thereof.

The following paragraphs describe the functions that must take place in more detail.

17.2 SELECTION

The following information must be available on the screen for selection.

- A list of available control centers for which a cash-up can be done.
- A list of available users. (only if internally activated with the relevant privilege, otherwise this selection must default to the user logged in)
- A list of available cash-ups for the selected user and control centre.
- A button to take the user to a screen in which voucher updates can be done.

- A button to take the user to a screen in which he can declare money for a selected currency
- A button to indicate to the system that the user has completed all cash-up information (interim cash-ups included) and wishes to produce the cash-up reports and to flag his cash-up as complete.

17.3 VALIDATION

17.3.1 Validate the collector-shift

Before cash-up can commence, the user has to specify a valid collector-shift by selecting the operating date, shift number, control centre ID and user name / user ID. Look-up facilities must be provided on these fields. Without sufficient privileges, the collector ID is defaulted to the login ID and may not be modified, thus preventing the collector from cashing up for another person. The system must validate the shift ID by searching for a cash-up header record for that collector which is allocated to the defined date and shift. If not found, or the relevant shift is already closed, an error message must be displayed and the user must be asked to enter the information again.

17.3.2 Verify data completion

All the data pertaining to the specified control centre shift should be complete prior to cash-up so as to be auditable. The system must perform a lane data completion check and print an appropriate message on the cash-up report indicating the status. The onus must be on the user to ensure that all lanes in which the collector worked is complete before cashing up. If the relevant data is not all present in the database at cash-up time, it must be possible to update some vouchers and, in addition, the cash-up reports will probably reflect an over-collection. Information about incomplete lane shifts must be obtainable from a problem data report.

17.4 VOUCHERS

17.4.1 Update a lane voucher

Until updated, a voucher by default represents a collector debt. The system must count the number of updated vouchers and the number of unpaid collector debts for the specified collector-shift, and displays this information on the screen.

In the voucher update phase, a list summarizing each voucher must be displayed in chronological order. The user must be able to browse through this list and pick them individually at random for update.

On selecting a voucher for update, the system must bring up the voucher's details. These must include the date and time, lane id, vehicle classification, tariff, card number where applicable.

In addition to the fields contained in a normal lane transaction, a voucher record must also contain the following fields:

- voucher number

- receipt number
- vehicle registration number for violations (including no-payment violations)
- account ID, for credits granted

The vehicle registration and account number fields constitute client "identifier" fields, which must indicate who is responsible for payment of the debt.

Keyed card-number vouchers are not a real debt but a control mechanism designed to detect the unauthorized use of credit card numbers in order to process a cash transaction as if it was a card transaction. However, if the user cannot produce a valid voucher for the transaction it is deemed as a collector debt.

For the various voucher types, the appropriate information must be entered into the vehicle registration or account id fields, as indicated above, or into the receipt number field. In the case of credits granted, the entry must be validated against the credit granted account registration table. If any identifier fields are empty, then the user who originally processed the transaction must be liable for the debt. If the receipt number is undefined, the voucher has not been paid.

17.4.2 Validate a voucher record After completing entry of all the necessary voucher fields, the user must click on a button to acknowledge completion. The system must then validate the record according to the following rules:

- Violations must have a voucher number, and a vehicle registration number or a receipt number.
- No-payments must have a voucher number, and a vehicle registration number or a receipt number.
- Credits granted vouchers must have a voucher number and either a valid account number or a receipt number.
- Keyed card-number vouchers must have a voucher number or a receipt number. A card number is transmitted from the lane.
- Invalid records are rejected with a screen message and the user must enter the missing fields. After successful validation, the record must be saved in the database.

17.4.3 Convert no-payment voucher to a violation

When an updated no-payment voucher is saved, and the receipt number field is filled, its voucher type must be converted to a paid violation. However, if the vehicle registration number is entered, and not a receipt number, the type must remain unchanged and indicates an unmatched no-payment record. This voucher must later be paired off (cancelled) with another no-payment voucher having the same vehicle registration number and representing a passage in another lane attached to the same plaza but in the opposite direction.

17.4.4 End voucher update phase

When the user selects the icon to exit the voucher update phase, the program must return to the parent screen, re-calculates the number of updated vouchers and unpaid collector debts and update the screen fields.

17.5 CASH

17.5.1 Declare cash collected

In the cash declaration phase, the main functionality must be as follows. The user enters a value of cash that is collected during the shift. This value acts as a control total. The user then must enter the number of items of each monetary denomination. The system must tally up the individual denominational values and compares the accumulated value to the control total. No discrepancy must be allowed between the control total and the sum of the individual denominational values. The user must only be able to press the 'OK' button once these two totals match. Finally, a bag seal number must be entered if the money is to be sealed immediately in a bank bag. Otherwise a receipt number must be generated automatically by the system, so that the user can hand the money to the shift supervisor for consolidated banking.

The cash declaration screen must offer the user with the functions to add and update information. The user must be able to add as many cash declarations as desired to make up the total collected during the shift. For example, a partial cash-up could be carried out in the middle of shift, or two bags could be declared because one bag is not large enough to hold all the money.

By any one of the cash-up records, in conjunction with selecting the update option, the user must be able to modify the amount or the bag number. Also, each cash declaration detail record must have a sequence number, which gets incremented automatically every time it is updated.

17.5.2 Save a cash-up record

After clicking on the icon to save the cash declaration information, the system must check whether the cash declared value for the specified currency was modified from its initial value at the start of the phase. If so, a cash-up sequence number must be incremented and the cash-up record must be updated with the relevant information, of which the following must be included as a minimum.

Declared cash:

- cash declared
- cash-up sequence number
- bag receipt number
- bag seal number

Expected cash:

- cash tendered
- value of paid collector debts

- value of unpaid collector debts
- value of PDR
- value of sundry payments

If no cash declared values were changed, only the expected cash summaries need be updated. An appropriate message must be displayed indicating the success or failure of the update operation.

For the first cash-up after shift end, the sequence number must be 1, which is normally where it must remain. Subsequent modifications of the declared value must receive a cash-up sequence number incremented by 1 since the previous cash-up,

17.6 DOCUMENTATION

17.6.1 Print bank deposit slip

When printing a bank deposit slip, the system must display an appropriate message. The information contained on a bank deposit slip must consist of the following:

- a unique print reference number built from the control centre id, the current date and time and the cash-up sequence number;
- the bank name and account number;
- any special text statements as per a normal bank deposit form;
- the value declared for each monetary denomination;
- the total cash value;
- the collector name and id, control centre id, operating date and shift number;
- the bag seal number;
- two annotated fields for the collector's signature and deposit date.

Bank deposit slips may be sent to a dedicated printer loaded with single-part or multi-part forms. This option must be configurable and must include the name of the printer and the number of copies required.

17.6.1.1 Print bag receipt slip

When printing a bag receipt slip, the system must display an appropriate message. The information contained on a bag receipt slip consists of the following:

- a unique print reference number built from the plaza id, the current date and time and the cash-up sequence number;
- the total cash value;
- the collector name and id, control centre id, operating date and shift number;
- the receipt number;
- two annotated fields for the collector's signature and deposit date.

17.6.1.2 Print Cash-up Reports

Upon the user clicking the button to indicate that cash-up is finished, the program must check whether printing of the cash-up reports is enabled

and, if so, automatically print the report. These reports, which consist of the cash-up report, voucher report and the end-of-shift report for this collector-shift, must be printed without the collector needing to enter any selection criteria. A print sequence number must be incremented every time the cash-up report is printed.

First, the expected cash values for each currency must be shown, made up of the totals for the lane cash transactions (referred to as "base income"), sundry payments received and paid collector debts. Collector debts originate from violations and credits granted transactions which cannot be claimed from the road user because the collector did not obtain the necessary details (e.g. vehicle registration number).

The next section must show the declared cash, which is made up of the collector's cash-up amounts and the bag seal numbers. Shortages and over-collections must also be calculated.

Below this, the report must show the total outstanding collector debts and positive discrepancy revenue (PDR), the value of miss-classified vehicle passages attributable to collector error. The transactions, which qualify as PDR, must be identified as follows. Each transaction, for which the tariff according to the collector is less than the tariff according to the lane equipment, must generate an incident that is reported immediately to the supervisor in the control room. In incident acknowledgement the supervisor was expected to examine a video image of the vehicle or the vehicle itself before it leaves the plaza area, and classifies it independently. The supervisor must enter a third vehicle classification into the database, known as the supervisor classification. The value of PDR is then equal to the tariff according to the supervisor classification minus the tariff according to the collector classification.

At the bottom of the report space must be provided for the user (generally a collector) to sign acknowledgement of his/her debts. The supervisor must sign as a witness.

17.7 REGISTER SEALED BANK BAG

After adding or updating a cash-up record in the database, if the record has a bag number, the program must also update the bank deposit information to keep a record of all bank bags, their bag seal number, currency, value and bank deposit batch number.

Should a bag seal number be removed from a cash-up record, then the corresponding bank deposit record must also be deleted. To do this the shift must be open.

Should it be necessary to break the bag seal, a different bag seal number must be entered. The bank deposit information must be updated accordingly.

17.8 END THE APPLICATION

The user may select a button at any time to exit from the cash-up program. All updates done up to that point must be preserved, and, if incomplete, the user may continue with the remainder of the cash-up at a later time. The completion status will be determined by counting the number of incomplete vouchers and the

number of cash declaration (detail) records having a zero cash-up sequence number. If either of these counts are non-zero, the cash-up is considered to be incomplete.

17.9 SHIFT AUDITING

It must be possible to close a shift so that no one can change any data pertaining to that particular shift. In order to close a shift, all data must be complete within the specified period. If all data is not complete, i.e. all data has not been received from the lanes, all cash-ups are not complete or any other activity relating to a shift completion, it must not be possible to close the shift.

Once a shift has been closed, only a user with a high privilege can re-open the shift. Re-opening a shift must force an audit trail to be written.

18. ACCOUNTS SUB-SYSTEM

In order to use a card for passage through the toll plaza, it is necessary that these identifiers be registered for use on the toll system. The information must be captured on both the toll system and the central clearing house.

18.1 DISCOUNTS

The toll system must have the capability to provide the road user with discounted passages. These discounts must be linked to a specific vehicle and card combination, and the discounted tariff must be charged when payment is offered in the lane. This implies that the discount is vehicle class specific, and should the identifier be presented for a different vehicle class, (or on a non linked vehicle) the discount can / should be refused.

The toll system for implementation must be capable of handling the discount requirement described in this section of the document.

It will be the responsibility of the Client to determine the criteria for discount. This should include:

- Who is eligible for discount
- At which plaza the vehicle is eligible for discount
- What should the discounted tariff at the specific plaza be

Discounts can apply to both smart cards and express lanes with an on-card balance. The following basic principles should be followed for the implementation of the discount system.

18.2 TARIFF TO BE CHARGED

It is preferable that the tariff to be charged is not directly linked to the card, but rather that an identification mechanism is used to link the identifier to a discount structure containing the tariffs. This has the following benefits:

- When tariffs are changed, it will be without impact to the road user.
- When a road user is moved from one discount structure to another, only the link to the new discount structure needs to be updated. This is a configuration on the system and shouldn't necessitate any encoding on the identifier.

The drawback for the ETC subsystem is that all identifiers together with the tariff to be charged must be housed in the ETC reader.

18.3 SMART CARDS AND ETC TRANSACTIONS

Smart cards can be presented in both a manned toll lane and an unmanned toll lane. If the lane is manned and the card presented doesn't meet the basic vehicle class requirement, the transaction should be transacted at the nominal tariff. If the transaction was concluded using the correct vehicle class, but a non-registered vehicle was used, it must be possible to override the transaction to be processed at the nominal tariff. This should not be done by the toll collector in the lane, but via an administration function at the higher levels. In order to do this, it will be necessary to have an image from the Image Grabbing System available for verification.

As the system keeps an on-card balance for smart cards, the balance should be rectified and the updated balance should be sent to the lanes as soon as possible and written back to the card.

In an unmanned lane the class stored on the smart card must be compared with the classification given by the AVC. If they differ, the system should assume that the class retrieved from the smart card is the correct class and allow the vehicle passage at the reduced tariff. An image must however be stored by the Image Grabbing System and verified via an administration function at the higher levels. If found that the incorrect vehicle class was used, the clearing house should take the necessary steps to rectify the transaction value based on the Operators' input.

18.4 MINIMUM BALANCE WARNING

Whenever the balance of a road users' account become less than a specified value, he must automatically be warned in the lane that the funds in the account is low. The determination of when this warning is to be given to the road user should be configurable per account and should be done based on number of trips left against the registered identifier before passage is refused on it.

18.5 HOT LISTING

The system must have a means of hot listing smart cards. This should form part of both an automated process and an administrative function. This can be explained as follows:

Whenever the balance of a road user reaches its minimum value, it should automatically be added to the hotlist until such time that the balance is above the minimum threshold. If as part of the administration function it is found that a card is being abused, it must also be possible to add that identifier to the hotlist.

18.6 ACCOUNT PAYMENTS

Payments, together with the transactions made against identifiers forms the backbone of the accounts module on the system. This function will be performed at point of sale terminals where equipment is installed that is capable to update the balance on the cards.

18.7 ACCOUNT TERMINATION

The option to terminate an account at any time must be provided. Once the account has been successfully terminated the remaining balance can be refunded. This function must also be handled by the central clearing house, who will in turn update the plaza system with the information.

18.8 MONTHLY STATEMENT

It will be the responsibility of the central clearing house to provide the road user with a detailed monthly statement. However, the toll collection system must be able to provide the user with a detailed list of all transactions made on the route for verification purposes.

18.9 EXEMPT USERS

The control of exempt vehicles is an important function and the system must provide adequate reporting facilities to indicate the movement on these cards. Images must be captured automatically for all exempt transactions, and reported together with the relevant transaction information to the plaza personnel for verification. This function should be performed on a continuous basis by the plaza personnel.

18.10 LINK TO CENTRAL CLEARING HOUSE

The system must provide all functionality required to interface to a central clearing house. This includes everything required from NHA's perspective to make the system operational and functional. All on-card balance identifiers will be processed in this manner.

19. SYSTEM MAINTENANCE

This section defines the requirements for backing up, archiving and deleting data. It also adds the requirement for disaster recovery.

Backups refer to a procedure where data is backed up on a daily basis for disaster recovery purposes. Archiving refers to the extraction of specific data from the system for purposes of extended storage.

19.1 Backups

It is the responsibility of the system Contractor to ensure that an adequate backup strategy is in place so that the Operator doesn't lose any data. In order to recover from a system crash these backups needs to up to date.

19.1.1 Archiving

Data across the system must be archived on a monthly basis. The purpose behind this is to satisfy both legal accounting requirements as well as giving the Operator the opportunity to restore deleted data at a point in time. The archive need only contain the data for the selected month.

19.1.2 Restoring

The system must provide the Operator with a function to restore Archives made from the system. The data must not be restored in the live database, but rather on a separate database.

19.1.3 Data Deletion

The system must provide the Operator of the system with the functionality to remove data which has been archived from the system. This should preferably be done via an interface where the user is presented with either operating days or operating months. Data must always be deleted starting at the oldest period available.

The system should prevent the user from deleting data from the system that has not been archived.

20. AUDIT TRAILS

As a minimum, the following audit trails must be implemented.

- Any changes to system environment / setup tables. [This includes items such as fare tables, issuer lists, incident rules, lane operating rules etc.]
- Any changes made to transactions at any stage in the system.
- Any changes to cash-up information once it has been entered into the system.
- Any changes to users and their corresponding information, including passwords.
- Any access gained to the system.

21. REPORTS

The system must have a consistent reporting interface for all reports.

As a minimum requirement, the system must contain the following reports.

1. Accounts

1.1 Account Details

- Provides detailed information relating to every account holder, together with the details of all transactions, discounts, sundry payments and account balances.
- Used as an account statement that can be handed to the client, or used internally when investigating the client's account queries.
- Provides the breakdown of the detail used for the account summaries on the Account Summary Report

1.2 Account Management

- Obtain statistics on all accounts. Determine the number of registered accounts per account status per account group.
- Determine the number of registered identifiers per account status per account group.
- Determine the ratio of the above mentioned account groups in relation to the total number of accounts and identifiers that are registered on the system.

1.3 Account Registration Details

- To confirm the correct registration of an account.
- To investigate problems regarding registered details on an account

1.4 Account Registration List

- Verify accounts registered during a specific period.
- Print a list of existing accounts on the system.

1.5 Account Status

- To identify terminated, pending terminated, newly registered, active, suspended, etc accounts.
- To verify account statuses after termination.

1.6 Account Summary

- Used to monitor accounts
- Used to determine the breakdown of total Toll Authority Card usage in the different methods of payment
- Used to determine the discount allocated to Toll Authority Card users
- Used to determine the pre-payment amounts received for a specific period
- Used to identify accounts with balances less than a chosen value
- Used to determine usage trends
- Used to verify the correctness of accounts pending termination

1.7 Account Termination Transaction Details

- The report provides details of terminated accounts, including contact names, addresses, account status and registration/termination dates.

1.8 Account Usage Trend Report

- To determine the usage trends per account and identifier that falls within the parameters as specified in the selection criteria.
- To identify accounts or identifiers that is inactive.

- 1.9 Identifier Exception Report

- To identify excessive usage of an identifier per collector, per lane, per vehicle class/group or per identifier type.
- To do fraud detection on exceptional usage of identifiers.
- To determine trends regarding the usage of identifiers. and
- To identify misused identifiers.

1.10 Identifier Registration List

- Verify identifiers registered during a specific period.
- Print a list of existing identifiers on the system.

1.11 Identifier Status

- To identify terminated, pending terminated, newly registered, active, suspended, etc identifiers
- To verify identifier statuses after termination

1.12 Identifiers to Expire

- To identify identifiers that will expire and must be re-issued.
and
- To ensure expired identifiers are not used.

2 Cards/ E-Tag/ OBU

2.1 Details

- To list all the detailed transactions per card.
- Used to validate the details included into a summarized transaction included in a roll-up.
- Used to handle queries from customers and banks.

2.2 Processing Status

- Used as a control document to list all the credit card roll-up operations during the operating year.
- Used to indicate the status of each credit card roll-up operation.

2.3 Merchant File Summary

- Used to list all the card summaries included in a roll-up batch.
- Used to provide a breakdown of a merchant summary.
- Used as an audit trail for the merchant file that is sent to the bank.

2.4 Merchant File Details

- Used to provide information per bank per roll-up operation.
- Used to compare the credit card information on the comprehensive report to ensure that all credit card transactions are included in merchant files.
- Used to identify cards that could not be allocated to known banks and is a potential loss of income.
- Used to control amounts owed by banks.
- Used to provide the commission amounts that the banks are supposed to invoice for processing the card transactions.

3 Cash-up

3.1 Bank Deposit Slip

- The report is used as control document when cash is handed over from the toll collector to either the bank teller or a plaza cashier.

3.2 Cash-up Report

- This report is used after the toll collector cash-up to finalize the shift revenue for a toll collector.
- The toll collector has to sign the report as verification that the information is correct and that responsibility is taken for the outstanding amounts.

3.3 End-of-Shift Incidents

- The report lists incidents that have been configured to appear normally the incidents that have a financial or operational implication that required an action from the toll collector, e.g. positive discrepancies.
- The report is used as a control document for the toll collector to see what the supervisor entered as acknowledgement during the shift.
- The report is used for audit purposes since all incidents that the toll collector has additional actions or has to account for are grouped together.

3.3.1 End-of-Shift Transactions

- Reports all transactions done by the toll collector

3.4 Voucher Details

- The report provides the breakdown of the summary amounts on the summary reports, e.g. collector cash-up.
- The report is a control document to verify the correctness of the collector input during cash-up.

4 Maintenance

4.1 AVC Accuracy Report

- Evaluate the collector and AVC discrepancies,
- Evaluate the accuracy of the AVC equipment, and
- Monitor the type of incorrect classifications made by the AVC or collector.

5 Raw Data

5.1 Incident Details

- The report is used on an ad-hoc basis for:
- Investigations.

- Determining the detail of an amount on a summary report. and
- Audit purposes

5.2 Transaction Details

- The report is used on an ad-hoc basis for:
 - Investigations.
 - Road user queries on card transactions that have not yet been processed for banking.
 - Determining the detail of an amount on a summary report. and
 - Audit purposes.

6 Receipts

6.1 Sundry Payments

- Used as control document to ensure that the summary amount on, e.g. the Daily / Monthly Cash Reconciliation Report is correct.
- Used to determine the breakdown of payments received for different categories, e.g. collector debts, miscellaneous.
- Detail list of transactions for audit purposes.

7 Operating Environment

7.1 Issuer Lists

- Used to display set-up information for the issuer numbers on the system.

7.2 Lane Parameters

- Used to display set-up information for the lanes configurations.

7.3 System Configuration

- Used to report on the plaza, control centre and operations centre parameters.

7.4 Sundry Payment Categories

- Used to report on all the registered sundry payment categories.

7.5 Tariffs

- Reports on all the tariffs (and their associated discounts) active in the system.

8 Shift / Daily / Monthly Details

8.1 Acknowledged Incidents

- Used to evaluate the supervisor performance with regards to acknowledge times.

- Detail list of financial and operational incidents for audit purposes.

8.2 Cash Reconciliation Report

- The report can be used to determine the actual cash received at the plaza on a specific shift and day.
- Used to control cash revenue declared by the toll collectors.
- Used as a control document to verify the correctness of the shift revenue i.e. net float, sundry payments, lane cash revenue and cash declared.
- Used to determine the detail of the summary amounts that appear on the Monthly Cash Reconciliation Report.
- Used to determine total amounts of sealed and unsealed cash declared

8.3 Cash-up Register

- The Cash-up Register Report is used by the supervisory / administrative staff and managers to do the following:
- Used as control report to verify the correctness of cash-ups per shift.

8.4 Credit Granted

- Used as a control report to verify the correctness of the voucher updates.
- Used as a control report to verify the correctness of the summary reports, e.g. Comprehensive Report.
- Used to obtain the total of credit granted to a specific Credit Granted account or registration number.
- Used as a control report to determine which transactions are not allocated to an account or registration number.

8.5 Daily Cash

- The report can be used to determine the actual cash received at the plaza on a specific shift and day.
- Used to control cash revenue declared by the toll collectors.
- Used as a control document to verify the correctness of the shift revenue i.e. net float, sundry payments, lane cash revenue and cash declared.
- Used to determine the detail of the summary amounts that appear on the Monthly Cash Reconciliation Report.

- Used as a control document to verify the correctness of the shift revenue i.e. net float, sundry payments, lane cash revenue and cash declared.

8.6 Discrepancy Details

- Used as control document to verify the correctness of the supervisor classification.
- Used as control document to verify the correctness of the summary amount on other reports, e.g. Collector Cash-up Report, Excess Income Report.
- Detail list of transactions for audit purposes

8.7 Exempt Report

- Used as control document to ensure that the summary amount on the Comprehensive Report is correct.
- Detail list of transactions for audit purposes.

8.8 Sundry Payments

- Used as control document to ensure that the summary amount on, e.g. the Daily / Monthly Cash Reconciliation Report is correct.
- Used to determine the breakdown of payments received for different categories, e.g. collector debts, miscellaneous.
- Detail list of transactions for audit purposes.

8.9 Unacknowledged Incidents

- Used as a control document to indicate all the incidents that still need to be acknowledged.

8.10 Violations

- Used as control document to ensure that the summary amount on the Comprehensive Report is correct.
- Used to ensure that all the Violation transactions have been updated correctly.
- Detail list of transactions for audit purposes.

9 Shift / Daily / Monthly Summaries

9.1 Cash Banked

- Used as a control document to verify the correctness of the banked amounts.

- Used as a control document to indicate when money was moved to the bank.
- Detail list of cash-up amounts for audit purposes.

9.2 Collector Performance

- Used to evaluate collector performance.
- It can also be used to determine the amount owed by the toll collector.

9.3 Comprehensive Report

- Used to determine the theoretical income at the plaza.
- Used to determine the composition of income and traffic.
- Used as substantiating document for monthly reporting on plaza income.

9.4 Excess Income Report

- Used to determine the additional income received at the plaza.
- Used to evaluate collector performance.
- Used as substantiating document for monthly reporting on excess income.

9.5 Month Audit

- Provides detail of the eight validation statuses that must be met before a month can be fully closed.
- Used as a control document to obtain confirmation that the operating month is consistent and fully closed.

9.6 Monthly Cash Report

- The report can be used to determine the actual cash received at the plaza on a specific day, for a period during the month or for the month.
- Used to control cash revenue.
- Used to evaluate collector performance and to view the detail regarding the collector shortage /over summary amounts on other reports e.g. collector shortages report.
- Used as substantiating document for monthly reporting on plaza revenue.

9.7 Shift Audit Report

- Used as a control document to identify what is outstanding on the MIS shift work.
- Used as a control document to verify that the shift has been closed.

10 Traffic

10.1 Hourly Traffic

- Used for traffic projections especially when planning for manning levels.
- Used to determine the peak hours of the shifts

10.2 Daily Traffic

- Used for income projections, e.g. implementing a new tariff structure.
- Used for traffic projections especially when planning for manning levels.

10.3 Monthly Traffic

- Used for traffic projections.
- Used for comparisons of actual traffic against budget figures used in the financial model

11 Other

11.1 User Listing

- This report prints per user, all details as entered on the MIS system upon registration of the user e.g. personal details, Address Details of the user

Disclaimer:

NHA has tried to use generic terms and language as acceptable in the industry. Any abbreviations/terms etc. are not be considered proprietary to a particular brand.

However, where required, certain brand names may be used for clarification only, are not to be construed in any other manner.

GENERAL CONDITIONS OF CONTRACT

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|---|--|
| <p>1. Definitions</p> | <p>1.1 The following words and expressions shall have the meanings hereby assigned to them:</p> <ul style="list-style-type: none"> a. “Contract” means the Contract Agreement entered into between the Employer and the Contractor. b. “Contract Documents” means the documents listed in the Agreement, including any addendum thereto. c. “Contract Price” means the price payable to the contractor as specified in the Agreement, subject to such additions and adjustments thereto or deductions there from, as may be made pursuant to the Contract. d. “Day” means calendar day. e. “GCC” means the General Conditions of Contract. f. “PCC” means the Particular Conditions of Contract. g. “Subcontractor” means any natural person, private or government entity or a combination of the above, including its legal successors or permitted assigns, to whom any part of the Goods supplied or services to be provided are subcontracted by the Contractor. h. “The Site” where applicable, means the place named in the PCC. |
| <p>2. Governing Law</p> | <p>The Contract shall be governed by and interpreted in accordance with the laws of the Pakistan, unless otherwise specified in the PCC.</p> |
| <p>3. Settlement of Disputes</p> | <p>If any dispute or difference of any kind whatsoever arises between the Contractor and the NHA in connection with or arising out of the Agreement or performance of the job whether during the progress of the job or after its completion or after its termination, abandonment or breach of the Agreement, it shall in the first place be referred to:</p> <ul style="list-style-type: none"> a. The Dispute Resolution Committee composed of General Manger (Revenue), General Manger (Finance) and General Manger (Region) NHA in accordance with Article-XI. Section 11.2 the said notice/reference shall contain the cause of action, mentioning facts of the case and relief sought. The Dispute Resolution Committee shall decide the dispute within twenty eight (28) days of the receipt of such notice. b. If the contractor is dissatisfied with the decision of the Dispute Resolution Committee or if the decision of the Dispute Resolution Committee is not forthcoming within the stipulated or extended period, the contractor may within two (02) weeks from the receipt of the decision of the Dispute Resolution Committee or expiry of twenty eight days time refer the matter to a Members’ |

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| | <p>Committee composed of Member (Administration), Member (Finance), and Member (Zone) along with the cause of action, mentioning facts of the case and relief sought. The Members' Committee will act as an Adjudication Board and shall decide the matter within twenty eight (28) days from the date of submission.</p> <p>c. The contractor, if dissatisfied with the decision of the Adjudicator shall have the right to serve Notice for Intention to commence arbitration within twenty eight (28) days of receipt of the Adjudicator's decision or within twenty eight (28) days after the expiry of the period stipulated herein above for decision of the Adjudicator in case he fails to give decision. The Arbitration shall take place at Islamabad under the Pakistan Arbitration act of 1940 as amended from time to time. The arbitration proceedings shall take place at Islamabad and shall be conducted in the English language. The Award of the Arbitrator shall be final and binding upon both parties.</p> <p>Provided however, that the parties shall have the right at resolution of disputes amicably within fifty six (56) days of service of Notice for Intention to commence Arbitration and the Arbitration shall commence in case of failure of amicable settlement.</p> |
| 4. Taxes and Duties | <p>4.1 For Goods and services supplied from outside the Pakistan, the Contractor shall be entirely responsible for all taxes, import or other duties, license fees, and other such levies imposed.</p> |
| | <p>4.2 For Goods and services supplied from within the Country, the Contractor shall be entirely responsible for all taxes, duties, license fees, etc. as per prevailing laws of Govt of Pakistan.</p> |
| 5. Performance Security | <p>5.1 The Contractor shall, within fourteen (14) days of receipt of letter of acceptance, provide a Performance Security for the due performance of the Contract in the amounts and currencies specified in the Bid Data Sheet.</p> |
| | <p>5.2 The proceeds of the Performance Security shall be payable to the Employer as compensation for any loss resulting from the Contractor failure to complete its obligations under the Contract.</p> |
| | <p>5.3 Performance Security shall be reduced down upto the 10% of the value of Technical Support (OPEX) bid amount after completion of the defect liability period of the equipment and pre-installation civil work. Performance Security for OPEX shall be released after successful completion of the contract period of each site.</p> |
| 6. Copyright | <p>The copyright in all drawings, documents, and other materials containing data and information furnished to the Employer by the Contractor herein shall remain</p> |

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| | vested in the Employer, or, if they are furnished to the Employer directly or through the Contractor by any third party, including contractors of materials, the copyright in such materials shall remain vested in Employer. |
| 7. Confidential Information | 7.1 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 completion or termination of the Contract. Notwithstanding the above, the Contractor may furnish to its Subcontractor such documents, data, and other information it receives from the Employer to the extent required for the Subcontractor to perform its work under the Contract, in which event the Contractor shall obtain from such Subcontractor an undertaking of confidentiality similar to that imposed on the Contractor. |
| | 7.2 The Contractor shall not use such documents, data, and other information received from the Employer for any purpose other than the design, procurement, required for the performance of the Contract. Software of ETTM / AVC system shall be the property of Employer during and after completion of project. |
| | 7.3 The obligation of a party under GCC Sub-Clauses 7.1 and 7.2 above, however, shall not apply to information that: <ul style="list-style-type: none"> a. The Employer or Contractor need to share with the Employer or other institutions participating in the financing of the Contract; b. now or hereafter enters the public domain through no fault of that party; c. 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; or d. otherwise lawfully becomes available to that party from a third party that has no obligation of confidentiality. |
| | 7.4 The above provisions of GCC Clause 7 shall not in any way modify any undertaking of confidentiality given by either of the parties hereto prior to the date of the Contract in respect of the Supply or any part thereof. |
| | 7.5 The provisions of GCC Clause 7 shall survive completion or termination, for whatever reason, of the Contract. |

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| 8. Subcontracting | The Contractor shall notify the Employer in writing of all subcontracts awarded under the Contract if not already specified in the Bid. Subcontracting shall in no event relieve the Contractor from any of its obligations, duties, responsibilities, or liability under the Contract. |
| 9. Specifications and Standards | <p>9.1 Technical Specifications and Drawings</p> <p>a. The Contractor shall ensure that the Goods comply with the technical specifications and other provisions of the Contract.</p> <p>b. The Goods supplied under this Contract shall conform to the standards mentioned in the Schedules to Bid and, when no applicable standard is mentioned, the standard shall be equivalent or superior to the official standards whose application is appropriate to the country of origin of the Goods.</p> |
| | <p>9.2 Wherever references are made in the Contract to codes and standards in accordance with which it shall be executed, the edition or the revised version of such codes and standards shall be those specified in the Schedules to Bid. During Contract execution, any changes in any such codes and standards shall be applied only after approval by the Employer and shall be treated in accordance with GCC.</p> |
| 10. Packing and Documents | <p>10.1 The Contractor shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the Contract. During transit, the packing shall be sufficient to withstand, without limitation, rough handling and exposure to extreme temperatures, salt and precipitation, and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the final destination of the Goods and the absence of heavy handling facilities at all points in transit.</p> |
| | <p>10.2 The packing, marking, and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the Contract, including additional requirements, if any, specified in the PCC, and in any other instructions ordered by the Employer.</p> |
| 11. Insurance | <p>11.1 Unless otherwise specified in the PCC, the Goods supplied under the Contract shall be fully insured, in a freely convertible currency from an eligible country, against loss or damage incidental to manufacture or acquisition, transportation, storage, and delivery, in accordance with the applicable Inco terms or in the manner specified in the PCC.</p> |

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| 12. Inspections and Tests | 12.1 The Contractor shall at its own expense and at no cost to the Employer carry out all such tests and/or inspections of the Goods as and when required by the Employer. |
| | 12.2 The inspections and tests may be conducted on the premises of the Contractor or its Subcontractor, at point of delivery, and/or at the final destination of the Goods, or in another place in the Employer's country. Subject to GCC Sub-Clause 12.3, If conducted on the premises of the Contractor or its Subcontractor, all reasonable facilities and assistance, including access to drawings and production data, shall be furnished to the inspectors at no charge to the Employer. |
| | 12.3 The Employer or its designated representative shall be entitled to attend the tests and/or inspections referred to in GCC Sub-Clause 12.2 without any cost. |
| | 12.4 Whenever the Contractor is ready to carry out any such test and inspection, it shall give a reasonable advance notice, including the place and time, to the Employer. The Contractor shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Employer or its designated representative to attend the test and/or inspection. |
| | 12.5 The Employer may require the Contractor to carry out any test and/or inspection not required by the Contract but deemed necessary to verify that the characteristics and performance of the Goods comply with the technical specifications, codes and standards under the Contract, provided that the Contractor's reasonable costs and expenses incurred in the carrying out of such test and/or inspection shall be added to the Contract Price. Further, if such test and/or inspection impede the progress of manufacturing and/or the Contractor's performance of its other obligations under the Contract, due allowance will be made in respect of the Delivery Dates and Completion Dates and the other obligations so affected. |
| | 12.6 The Contractor shall provide the Employer with a report of the results of any such test and/or inspection. |
| | 12.7 The Employer may reject any Goods or any part thereof that fail to pass any test and/or inspection or do not conform to the specifications. The Contractor shall either rectify or replace such rejected Goods or parts thereof or make alterations necessary to meet the specifications at no cost to the Employer, and shall repeat the test and/or inspection, at no cost to the Employer, upon giving a notice pursuant to GCC Sub-Clause 12.4. |

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| | 12.8 The Contractor agrees that neither the execution of a test and/or inspection of the Goods or any part thereof, nor the attendance by the Employer or its representative, nor the issue of any report pursuant to GCC Sub-Clause 12.6, shall release the Contractor from any warranties or other obligations under the Contract. |
| 13. Liquidated Damages | <p>13.1 Except as provided under GCC Clause 18, if the Contractor fails to satisfactory install and commission all of the Goods within the period specified in the Contract, the Employer may without prejudice to all its other remedies under the Contract, deduct from the Contract Price, as liquidated damages, a sum specified hereunder for each day of delay until actual performance, up to a maximum deduction as specified hereunder. Once the maximum is reached, the Employer may terminate the Contract pursuant to GCC Clause 21.</p> <p>13.2. The liquidated damage shall be 2% per week of the value of goods undelivered, maximum upto 5 weeks, thereafter, performance security shall be forfeited.</p> <p>13.3 In case of delay in installation/ Civil works the liquidated da mage shall be 2% per week of the value of goods to be installed, maximum upto 5 weeks thereafter, performance security shall be forfeited.</p> |
| 14. Warranty | 14.1 The Contractor warrants that all the Goods are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract. |
| | 14.2 Subject to GCC Sub-Clause 9.1, the Contractor further warrants that the Goods shall be free from defects arising from any act or omission of the Contractor or arising from design, materials, and workmanship, under normal use in the conditions prevailing in the country of final destination. |
| | 14.3 Unless otherwise specified, the warranty shall remain valid for minimum twelve (12) months after the Goods, or any portion thereof as the case may be, have been delivered to and accepted at the final destination after installation and commissioning. |
| | 14.4 The Employer shall give Notice to the Contractor stating the nature of any such defects together with all available evidence thereof, promptly following the discovery thereof. The Employer shall afford all reasonable opportunity for the Contractor to inspect such defects. |
| | 14.5 Upon receipt of such Notice, the Contractor shall, within the period 30 days, expeditiously repair or |

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| | <p>replace the defective Goods or parts thereof, at no cost to the Employer.</p> |
| | <p>14.6 If having been notified, the Contractor fails to remedy the defect within the period as specified above; the Employer may proceed to take within a reasonable period such remedial action as may be necessary, at the Contractor's risk and expense and without prejudice to any other rights which the Employer may have against the Contractor under the Contract.</p> |
| <p>15. Patent Indemnity</p> | <p>15.1 The Contractor shall, subject to the Employer's compliance with GCC Sub-Clause 15.2, indemnify and hold harmless the Employer and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of any nature, including attorney's fees and expenses, which the Employer may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright, or other intellectual property right registered or otherwise existing at the date of the Contract by reason of:</p> <ul style="list-style-type: none"> a. the installation of the Goods by the Contractor or the use of the Goods in the country where the Site is located; and b. the sale in any country of the products produced by the Goods. <p>Such indemnity shall not cover any use of the Goods or any part thereof other than for the purpose indicated by or to be reasonably inferred from the Contract, neither any infringement resulting from the use of the Goods or any part thereof, or any products produced thereby in association or combination with any other equipment, plant, or materials not supplied by the Contractor, pursuant to the Contract.</p> |
| | <p>15.2 If any proceedings are brought or any claim is made against the Employer arising out of the matters referred to in GCC Sub-Clause 15.1, the Employer shall promptly give the Contractor a notice thereof, and the Contractor may at its own expense and in the Employer's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.</p> |
| | <p>15.3 If the Contractor fails to notify the Employer within twenty-eight (28) days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Employer shall be free to conduct the same on its own behalf and at the cost of the Contractor.</p> |
| | <p>15.4 The Employer shall, at the Contractor's request, afford all available assistance to the Contractor in</p> |

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| | <p>conducting such proceedings or claim, and shall be reimbursed by the Contractor for all reasonable expenses incurred in so doing.</p> |
| | <p>15.5 The Employer shall indemnify and hold harmless the Contractor and its employees, officers, and Subcontractors from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of any nature, including attorney’s fees and expenses, which the Contractor may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright, or other intellectual property right registered or otherwise existing at the date of the Contract arising out of or in connection with any design, data, drawing, specification, or other documents or materials provided or designed by or on behalf of the Employer.</p> |
| 16. Limitation of Liability | <p>16.1 As per governing law of Government of Pakistan.</p> |
| 17. Change in Laws and Regulations | <p>17.1 Unless otherwise specified in the Contract, if after the date of the Invitation for Bids, any law, regulation, ordinance, order or bylaw having the force of law is enacted, promulgated, abrogated, or changed in the place of the Employer’s country where the Site is located (which shall be deemed to include any change in interpretation or application by the competent authorities) that subsequently affects the Delivery Date and/or the Contract Price, then such Delivery Date and/or Contract Price shall be correspondingly increased or decreased, to the extent that the Contractor has thereby been affected in the performance of any of its obligations under the Contract. Notwithstanding the foregoing, such additional or reduced cost shall not be separately paid or credited if the same has already been accounted for in the price adjustment provisions where applicable, in accordance with GCC Clause 29.</p> <p>Any change in law and regulation of Govt. of Pakistan during currency of contract shall be applicable.</p> |
| 18. Force Majeure | <p>18.1 The Contractor shall not be liable for forfeiture of its Performance Security, liquidated damages, or termination for default if and to the extent that it’s delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.</p> |
| | <p>18.2 For purposes of this Clause, “Force Majeure” means an event or situation beyond the control of the Contractor that is not foreseeable, is unavoidable, and its origin is not due to negligence</p> |

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| | <p>or lack of care on the part of the Contractor. Such events may include, but not be limited to, acts of the Employer in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes.</p> |
| | <p>18.3 If a Force Majeure situation arises, the Contractor shall promptly notify the Employer in writing of such condition and the cause thereof. Unless otherwise directed by the Employer in writing, the Contractor shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.</p> |
| <p>19. Change Orders and Contract Amendments</p> | <p>19.1 The Employer may at any time order the Contractor through Notice in writing, to make changes within the general scope of the Contract in any one or more of the following:</p> <ul style="list-style-type: none"> a. drawings, designs, or specifications, where Goods to be furnished under the Contract are to be specifically manufactured for the Employer; b. the method of shipment or packing; c. the place of delivery; and d. Any other |
| | <p>19.2 If any such change causes an increase or decrease in the cost of, or the time required for, the Contractor's performance of any provisions under the Contract, an equitable adjustment shall be made in the Contract Price or in the Delivery and Completion Schedule, or both, and the Contract shall accordingly be amended. Any claims by the Contractor for adjustment under this Clause must be asserted within twenty-eight (28) days from the date of the Contractor's receipt of the Employer's change order.</p> |
| <p>20. Extensions of Time</p> | <p>20.1 If at any time during performance of the Contract, the Contractor or its Subcontractors should encounter conditions impeding timely delivery of the Goods pursuant to Bid Data Sheet clause-7, the Contractor shall promptly notify the Employer in writing of the delay, its likely duration, and its cause. As soon as practicable after receipt of the Contractor's notice, the Employer shall evaluate the situation and may at its discretion extend the Contractor's time for performance, in which case the extension shall be ratified by the parties by amendment of the Contract.</p> |
| | <p>20.2 Except in case of Force Majeure, as provided under GCC Clause 18, a delay by the Contractor in the performance of its Delivery and Completion obligations shall render the Contractor liable to the imposition of liquidated damages pursuant to GCC Clause 13, unless an extension of time is</p> |

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| <p>21. Termination</p> | <p>agreed upon, pursuant to GCC Sub-Clause 20.1.</p> <p>21.1 Termination for Default</p> <p>a. The Employer, without prejudice to any other remedy for breach of Contract, by Notice of default sent to the Contractor, may terminate the Contract in whole or in part:</p> <p>(i) If the Contractor fails to deliver any or all of the Goods within the period specified in the Contract, or within any extension thereof granted by the Employer pursuant to GCC Clause 20; or</p> <p>(ii) If the Contractor fails to perform any other obligation under the Contract.</p> <p>b. In the event the Employer terminates the Contract in whole or in part, pursuant to GCC Clause 21.1(a), the Employer may procure at risk and cost of the contractor, upon such terms and in such manner as it deems appropriate, Goods or Related Services similar to those undelivered or not performed, and the Contractor shall be liable to the Employer for any additional costs for such similar Goods. However, the Contractor shall continue performance of the Contract to the extent not terminated.</p> <p>c. If the Contractor, in the judgment of the Employer has engaged in corrupt and fraudulent practices, as defined in Public Procurement Rules 2004, in competing for or in executing the Contract.</p> <p>21.2 Termination for Insolvency</p> <p>The Employer may at any time terminate the Contract by giving Notice to the Contractor if the Contractor becomes bankrupt or otherwise insolvent. In such event, termination will be without compensation to the Contractor, provided that such termination will not prejudice or affect any right of action or remedy that has accrued or will accrue thereafter to the Employer. All available guarantees of the contractor shall be called for encashment to recover any monies due from the contractor in such an event.</p> |
| | <p>21.3 Termination for Convenience</p> <p>a. The Employer, by Notice sent to the Contractor, may terminate the Contract, in whole or in part, at any time for its convenience. The Notice of termination shall specify that termination is for the Employer's convenience, the extent to which performance of the Contractor under the Contract is terminated, and the date upon which such termination becomes effective.</p> |

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| | <p>b. The Goods that are complete and ready for shipment within twenty-eight (28) days after the Contractor's receipt of the Notice of termination shall be accepted by the Employer at the Contract terms and prices. For the remaining Goods, the Employer may elect:</p> <p>i. To have any portion completed and delivered at the Contract terms and prices; and/or</p> <p>ii. To cancel the remainder and pay to the Contractor an agreed amount for partially completed Goods and for materials and parts previously procured by the Contractor.</p> <p>c. In no event shall Termination for Convenience be deemed a default by NHA under this Contract Agreement.</p> |
| 22. Assignment | 22.1 The Contractor shall not assign, in whole or in part, its obligations under this Contract, except with prior written consent of the Employer. |
| 23. Operation and Maintenance Manuals | 23.1 Before the Works are taken over in accordance with Clause 23 the Contractor shall supply operation and maintenance manuals together with drawings of the Works as built. These shall be in such detail as will enable the Employer to operate, maintain, adjust and repair all parts of the Works. |
| | 23.2 Unless otherwise stated, the manuals and drawings shall be in the ruling language (English), and in such form and numbers as stated in the Contract. |
| | 23.3 Unless otherwise agreed, the Works shall not be considered to be completed for the purposes of taking over until such manuals and drawings have been supplied to the Employer. |
| | 23.4 The Contractor shall furnish to the Employer six (6) copies and one (1) reproducible of approved quality of all "As-Built" drawings. |
| 24. Taking Over | 24.1 The Works shall be taken over by the Employer when they have been completed in accordance with the Contract, except in minor respects that do not affect the use of the Works for their intended purpose, have passed the Tests on Completion and a Taking-Over Certificate has been issued or deemed to have been issued in accordance with Sub-Clause 24.2. |
| | <p>24.2 Taking-Over Certificate</p> <p>The Contractor may apply by notice to the Employer representative for a Taking-Over Certificate not earlier than 14 days before the Works will in the Contractor's opinion be complete</p> |

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| | <p>and ready for taking over after Technical Support & Maintenance period under Sub-Clause 24.1.</p> |
| | <p>The Employer Representative shall within 28 days after the receipt of the Contractor's application either:</p> <ol style="list-style-type: none"> a. Issue the Taking-Over Certificate to the Contractor with a copy to the Employer stating the date on which the Works were complete and ready for taking over, or b. Reject the application giving his reasons and specifying the work required to be done by the Contractor to enable the Taking-Over Certificate to be issued. c. If the Employer Representative fails either to issue the Taking-Over Certificate or to reject the Contractor's application within the period of 28 days he shall be deemed to have issued the Taking-Over Certificate on the last day of that period. d. If the Works are divided by the Contract into Sections the Contractor shall be entitled to apply for separate Taking-Over Certificate for each such Section. |
| | <p>24.3 Use before Taking Over The Employer shall not use any part of the Works unless a Taking-Over Certificate has been issued in respect thereof.</p> <p>If nevertheless the Employer uses any part of the Works, that part which is used shall be deemed to have been taken over at the date of such use. The Employer Representative shall on request of the Contractor issue a Taking-Over Certificate accordingly. If the Employer uses any part of the Works before taking over the Contractor shall be given the earliest opportunity of taking such steps as may be necessary to carry out the Tests on Completion.</p> |
| | <p>24.4 Interference with Tests on Completion</p> <p>If the Contractor is prevented from carrying out the Tests on Completion by a cause for which the Employer or other Contractors employed by the Employer are responsible, the Employer shall be deemed to have taken over the Works on the date when the Tests on Completion would have been completed but for such prevention. The Employer shall issue a Taking-Over Certificate accordingly.</p> <p>The Works shall not be deemed to have been taken</p> |

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| | <p>over if they are not substantially in accordance with the Contract.</p> <p>If the Works are taken over under this Clause the Contractor shall nevertheless carry out the Tests on Completion during the Defects Liability Period. The Employer shall require the Tests on Completion to be carried out by 14 days notice.</p> |
| <p>25. Defects after taking over</p> | <p>25.1 Defects Liability & Maintenance Period Where any part of the Works is satisfactorily commissioned and taken over separately, the Defects Liability Period for that part shall commence on the date it was taken-over. Defects Liability & Maintenance Period will be One (01) year from the date of commissioning of ETTM system.</p> <p>25.2 Making Good Defects The Contractor shall be responsible of making good any defect in or damage to any part of the Works which may appear or occur during the Defects Liability & Maintenance Period and which arises from, either:</p> <ul style="list-style-type: none"> a. any defective materials, workmanship or design, or b. any act or omission of the Contractor during the Defects Liability & Maintenance Period. <p>The Contractor shall make good the Defects or damage as soon as practicable and at his own cost.</p> <p>25.3 Notice of Defects If any such defect appears or damage occurs, the Employer shall forthwith notify the Contractor thereof.</p> |
| | <p>25.4 Extension of Defects Liability & Maintenance Period</p> <p>The provision of this Clause shall apply to all replacements or renewals carried out by the Contractor as if the replacements and renewals had been taken over on the date they were completed.</p> <p>The Defects Liability & Maintenance Period for the Works shall be extended by a period equal to the period during which the Works cannot be used by reason of a defect or damage. If only part of the Works cannot be used by reason of a defect, the Defect Liability Period shall be extended only for that part.</p> <p>25.5 Failure to Remedy Defects</p> <p>If the Contractor fails to remedy a defect or damage within a reasonable time fixed by the Employer, the Employer may fix a final time for remedying the defect</p> |

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| | <p>or damage. If the Contractor fails to do so, the Employer may:</p> <ol style="list-style-type: none">a. Carry out the work himself or by others at the Contractor's risk and cost, provided that he does so in a reasonable manner. The costs properly incurred by the Employer in remedying the defect or damage shall be deducted from the Contract Price, but the Contractor shall have no responsibility for such work, orb. Require the Contractor to grant the Employer a reasonable reduction in the Contract Price to be agreed or fixed by arbitration under Clause 3, orc. If the defect or damage is such that the Employer has been deprived of substantially the whole of the benefit of the Works or a part thereof, he may terminate the Contract in respect of such parts of the Works as cannot be put to the intended use. The Employer shall be entitled to recover all sums paid in respect of such parts of the Works together with the cost of dismantling the same, clearing the Site and returning Plant to the Contractor or otherwise disposing of it in accordance with the Contractor's instructions. |
| | <p>25.6 Removal of Defective Work</p> <p>If the defect of damage is such that repairs cannot be expeditiously carried out on the Site, the Contractor may with the consent of the Employer remove from the Site for the purposes of repair any part of the Works which is defective or damaged.</p> <p>25.7 Further Tests on Completion</p> <p>If the replacements or renewals are such that they may affect the performance of the Works the Employer may request that Tests on Completion be repeated to the extent necessary. The request shall be made by notice within 28 days after the replacement or renewal.</p> <p>25.8 Right of Access</p> <p>Until the Final Certificate of Payment has been issued, the Contractor shall have the right of access to all parts of the Works and to records of the working and performance of the Works.</p> <p>Such right of access shall be during the Employer's normal working hours at the Contractor's risk and cost. Access shall also be granted to any duly authorized representative of the Contractor whose name has been communicated in writing to the Employer Representative.</p> |

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| | <p>Subject to the Employer Representative's approval, the Contractor may also at his own risk and cost make any tests which he considers desirable.</p> |
| | <p>25.9 Contractor to Search</p> <p>The Contractor shall, if required by the Employer Representative in writing, search for the cause of any defect, under the direction of the Employer Representative. Unless the defect is one for which the Contractor is liable under this Clause, the cost of the work carried out by the Contractor in searching for the cause of the defect shall be added to the Contract Price.</p> <p>25.10 Defects Liability Certificate</p> <p>When the Defects Liability Period for the Works or any part thereof has expired and the Contractor has fulfilled all his obligations under the Contract for defects in the Works or that part, the Employer Representative shall issue within 28 days to the Employer and the Contractor a Defects Liability Certificate to that effect.</p> <p>25.11 Exclusive Remedies</p> <p>Except in the case of Gross Misconduct, the Employer's remedies under this Clause shall be in place of and to the exclusion of any other remedy in relation to defects whatsoever.</p> |
| <p>26. Safety Precautions</p> | <p>Safety Precautions</p> <p>The Contractor shall observe all applicable regulations regarding safety on the Site.</p> <p>Unless otherwise agreed, the Contractor shall, from the commencement of work on Site until taking over provide:</p> <ul style="list-style-type: none"> a. fencing, lighting, guarding and watching of the Works, and b. temporary roadways, footways, guards and fences which may be necessary for the accommodation and protection of owners and occupiers of adjacent property, the public and others. <p>In order to provide for the safety, health and welfare of persons, and for prevention of damage of any kind, all operations for the purposes of or in connection with the Contract shall be carried out in compliance with the safety requirements of the Government of Pakistan with such modifications thereto as the Employer Representative may authorize or direct and the Contractor shall take or cause to be taken such further</p> |

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| | <p>measures and comply with such further requirements as the Employer may determine to be reasonably necessary for such purpose.</p> <p>The Contractor shall make, maintain, and submit reports to the Employer concerning safety, health and welfare of persons and damage to property as the Employer may from time to time prescribe.</p> |
| 27. Detail of shipment/ goods supply | <p>Details of shipping and other documents to be furnished by the Contractor for the goods imported:</p> <p>Upon shipment, the Contractor shall notify the Employer the full details of the shipment, including Contract number, description of Goods, quantity and usual transport document. The Contractor shall mail the following documents to the Employer:</p> <ul style="list-style-type: none"> (i) Copies of the usual transport document (for example, a negotiable bill of lading, a non-negotiable sea waybill, an inland waterway document, an air waybill, a railway consignment note, a road consignment note, or a multimodal transport document) which the buyer may require to take the goods; (ii) Copies of the packing list identifying contents of each package; (iv) Manufacturer's or Contractor's warranty certificate; (v) Inspection certificate, issued by the nominated inspection agency (if any), and the (vi) Contractor's factory inspection report; and (vii) Certificate of origin. (viii) Operating & Maintenance Manuals (where applicable) (ix) List of Tools Required for Routine Maintenance (where applicable) |
| 28. Payment of invoices | 28.1 The contractor's request for payment shall be made to the Employer's representative (GM Revenue) accompanied by invoices describing as appropriate, the goods/services delivered by the document through the field staff and upon fulfillment of all the obligations stipulated in the contract. The same shall be forwarded to GM (Revenue) HQ for release of payment from RMA Account. |
| | 28.2 Payment shall be made by the employer not later than 30 days after submission of an invoice or request for payment by the contractor & the employer has accepted it. |
| | 28.3 If accepted & verified invoice amount has not been released within the allowed period than contractor shall be entitled to claim delay charges for the delay period of such amount at 8% per annum. |
| | 28.4 Payment Schedule |

Accepted bid amount shall be released to the Contractor as per following payment schedule after satisfactory completion of work duly certified by the Employer's field office representative in conformity to the contract conditions, specification & drawing complete in all respects.

A. Payment for Goods supplied:

Payment shall be made in Pak. Rupees in the following manner:

- (i) **Advance Payment:** Twenty (20) percent of the cost of CAPEX shall be paid upon submission of invoice and a bank guarantee for equivalent amount valid until the Goods are delivered and in the form provided in the bidding documents or another form acceptable to the Purchaser:
- (ii) **On Delivery of Equipment:** Forty (40) percent of the cost of CAPEX shall be paid on delivery and upon submission of invoice duly supported by the following documents.
 - a. Certificate of Origin
 - b. Certificate of Manufacturer that Goods supplied under packing list are in conformity with the technical specifications as given in the Contract Agreement.
 - c. Packing list certified by the Manufacturer.
 - d. Certificate issued by the Purchaser regarding the delivery of Goods.
- (iii) **On successful Installation & Commissioning:** Thirty (30%) percent of the cost of Equipment and services Installed shall be paid on completion of the assignment in all respect and taking over certificate from the representative of the Purchaser.
- (iv) **On successful completion of Defect Liability period of One (01) year:** Ten (10%) percent of the cost of CAPEX shall be paid on satisfactory completion of Warranty Period of each installation in all respect after certification from the representative of the Purchaser.

| | |
|---------------------------|---|
| | <p>B. Payment for Pre-Installation Civil Works:</p> <p>Payment shall be made in Pak. Rupees in the following manner:</p> <ul style="list-style-type: none"> (i) Upto Ninety (90%) percent payment shall be made on submission of IPCs (ii) Ten (10%) percent payment shall be made upon completion of One (01) year defect liability period <p>28.5 Payment Schedule for Technical Support</p> <p>FM&MC / OF <u>will submit its invoice on monthly basis by the 5th of successive month to the office of GM Revenue, NHA HQ</u> alongwith satisfactory performance report from Incharge ETTM Operations Center, NHA HQ/ designated NHA Official for its claim pertaining to service charges. All payments due to "FM&MC" will be paid by NHA within 30 days of receipt of Invoice after making any adjustment under the provisions of this contract agreement. In the event of failure of the NHA to make payment within the stipulated time, FM&MC may claim interest at the prevailing commercial rate accrued on payment certificate.</p> |
| 29. Contract Price | 29.1 The contract price shall be as specified in the agreement, subject to any addition and adjustments thereto, or deductions there from, is may be made pursuant to the contract. |
| | 29.2 This is a fixed price/rate contract and no escalation shall be admissible at any stage. |

PARTICULAR CONDITIONS OF CONTRACT
INCLUDING ARTICLES I TO XI

ARTICLE I

1.0 INSTITUTIONAL ARRANGEMENTS

Employer: The National Highway Authority (referred as “NHA” hereinafter)

Employer’s Representative: General Manager (Revenue) NHA HQ
Through General Manager (Region) NHA

1.0.1 The Employer’s Representative And Objectives

- To provide overall guidance to the Contractor keeping within the policy framework approved by the Employer.
- Responsible to ensure implementation of Technical and Financial criteria and the operating systems to manage the system to an optimal level and in most efficient and effective manner within framework of contract agreement.

1.0.2 Service Provider’s Role And Objectives

- The Contractor shall carry out all the works in line with the overall policy of the Employer and in accordance with the agreed programs, jointly developed with Employer Representative within the provision of the contract.
- The Contractor’s Scope of Services related to various aspects of the contract is given in more detail in the Agreement and Appendices.

1.1 Scope of Services

Contractor shall provide all management, supervision, labor, materials and administrative support necessary to perform the services described in the scope of services, all in accordance with the criteria set forth in the provisions of this agreement, including all schedules / appendices.

1.2 The scope of the project and the obligation of Contractor shall include but not be limited to the following:

- a. Supply, Inspection, Installation, Testing, Commissioning, Technical Support, Maintenance & Management of Electronic Toll & Traffic Management (ETTM) system along with hardware / software as per requirement of Automatic Vehicle Classification (AVC) which will become the property of NHA and bidder will be bound to handover the same in a properly maintained and operational condition.
- b. Technical Support & Maintenance for ETTM system during Operations as Operations Facilitator (OF) for contract period.
- c. Establishment & maintenance of Control centers at each toll plaza.

- d. Establishment & maintenance of centralized data collection centre at NHA HQ connecting all ETTM established toll plazas with it, where real time view of all toll plazas sites shall be ensured and providing data transfer medium as well.
- e. The space for operation centre at HQ and Control centers at each toll plazas shall be provided by NHA whereas the equipments in connection with the ETTM system shall be the responsibility of bidder.
- f. To provide all the necessary spare parts during Operation & Maintenance during contract period and sufficient spare parts shall be kept in store for the commonly used items to keep the system up which will be the property of NHA. The expense of such spares after defect liability period, shall be paid separately out of provisional sum.
- g. Subsequent to the award of contract, the contractor will be required to submit to NHA for review and approval of Detail SOP for Operation & Maintenance of ETTM system.
- h. Pictures of incidents shall be stored for three (03) months, whereas, traffic transaction data at toll plaza site shall be retained for six (06) months and at Operation Centre for contract period.
- i. The proposed system should have web based remote connectivity.
- j. Surveillance Videos of the traffic shall be stored for three (03) months.
- k. **Toll collection shall not be responsibility of ETTM system provider under this contract** as toll collection on respective toll plazas shall be auctioned separately by NHA to operators.
- l. Subsequent to the award of contract, the contractor will be required to submit to NHA for review and approval of Detail Design, SOP for Operation, and Technical Support & Maintenance of ETTM system.
- m. Online CCTV Cameras at toll plazas to be connected with Operations Centre, NHA HQ for live display of toll plaza operation with independent power backup supply; so as in case of complete failure of ETTM system due to reasons beyond control, it can function and record the traffic data.
- n. Contractor shall transfer the project site in all the project equipment to the NHA upon expiry or on the termination of this agreement.
- o. Provision of first aid facilities to the staff at project site.
- p. In case of damage to NHA assets due to negligence on part of contractor or his assignee(s), Contractor shall be responsible for bearing all the costs pertaining to the repair of assets and bringing it into the excellent condition for operations. The contractor shall maintain the insurance of ETTM system equal to CAPEX during the course of contract period.
- q. Contractor shall provide the necessary furniture/fixtures required for the ETTM system operational staff.
- r. System parts rated as damaged upon completion of contract shall be replaced and handed over to NHA in operational condition.

1.3 THREE LEVELS OF CONTRACTOR'S RESPONSIBILITIES AS OPERATIONS FACILITATOR

Three levels of Services are described in details to highlight the services to be performed under each tier. Description of these support levels is defined below;

- 1.3.1 Level-I: This includes the following functions to be provided by the On-site including Operations Center support engineer on 24x7 basis;
- a. Perform 1st line of diagnostics on any maintenance requirements that might appear from time to time. This includes but is not limited to the installed AVC based toll collection systems, UPS systems, backup power supply etc.
 - b. Routine maintenance of AVC Based ETTM lane and control room equipment involving fixing, reconnection, or reinstallation of OS, Application software, general software/driver etc.
 - c. Routine calibration of the Automatic Vehicle Classification Systems deployed on the site, on a monthly basis. or;
 - d. Incidental calibration of the Automatic Vehicle Classification Systems deployed on the site, following a support request generated by the O&MC/ NHA.
 - e. Any and all electrical mechanical and electronic repairs/ replacements required to bring the toll collection system to an operational state in case of malfunction of equipment.
 - f. Preventive maintenance and monitoring of the installed equipment. This includes but is not limited to the routine maintenance of Air Conditioning units, electronic traffic barriers, traffic lights, power distribution and switches etc.
 - g. Will ensure that all the anti-virus software deployed are kept up to date as a preventive measure to minimize the risk of OS level data corruption.
 - h. Supervision and monitoring of generator operations. This includes ensuring that the generators are kept in good working condition and that the said generators are started in time to provide backup power supply in case of power outages.
 - i. Maintain logs for generator operation and maintenance.
 - j. Close coordination with concerned WAPDA authorities to resolve routine matters related to the power supply to the toll plaza.
 - k. Maintain record of support request generated at site by the O&MC/ NHA.
 - l. Function as the main source of information regarding the respective site for Ops Center and the Level-II support personnel for the respective site.
- 1.3.2 Level-II: This advance level team is to be strategically deployed at

locations that can provide online/ on call services and reach at the required location including Operations Center in Three (03) hours, if required. Services include the following;

- a. Supervise the support activities being carried out at the site by the Level-I support team.
- b. Provide assistance to Level-I team for maintenance requests that cannot be resolved at the site.
- c. Routine maintenance of Plaza Servers and associated hardware/software/equipment as and when required.
- d. Maintaining the Database backups, monthly archiving of data and configuration of the servers/systems/modules.
- e. Perform the month audit function on the system for the toll collection activities by the O&MC.
- f. Provide repair facility and services for all the repairable toll equipment including computers, servers, electronics, classification system (AVC) and local area network equipment.
- g. Monitor the quality of communication media from the toll plaza to the Ops Center and provide recommendations to the NHA in case NHA is required to intervene to ensure cooperation from the service provider.

1.3.3 Level-III: This is highest level of service to be provided on as needed basis through the OEM and/ or the authorized representative of the OEM. The services include but are not limited to;

- a. Provide online support/walk-through services using VPN or other contemporary advanced tools.
- b. Provide on-site help when imminent.
- c. Any and all 3rd party parts acquired for replacement be OEM specified for use with the system and will need to be quality approved by the concerned NHA official prior to installation at the site to ensure smooth functioning of the system.

1.4 In carrying out its obligations, **Contractor represents and covenants** that:

- a) The Project Sites, ETTM system installed in all its lanes will be kept operational non-stop for twenty four (24) hours a day throughout the contract period;
- b) Contractor shall, within 14 days from the date of commencement, provide the Employer with a list of names and details of its entire staff. The Contractor shall provide revised lists in the event of any change;
- c) No person other than the list provided to NHA shall be allowed to access or stay at NHA facilities and will be taken as un-authorized;

- d) NHA has the right to enter upon the facilities and inspect the assets and personnel any time;
- e) Contractor is bound to immediately remove any un-authorized person at the directions of NHA;
- f) All employees deputed by Contractor at the Project Site shall at all times be in proper uniform;
- g) Work timings for the Project Site staff shall be eight (08) hour/shift;
- h) The Project Site along with its equipment and structure shall be kept and maintained in good and clean condition at all times;
- i) Suitable and well-organized security arrangements shall be provided at the Project Site and its surrounding area for the safety of NHA assets and commuters;
- j) That no attempt of tempering with ETTM system like blocking the sensors, placing any metal object on loops etc will be made. In case, any complaint received in this connection then contractor will be responsible for the same.
- k) That close liaison with the WAPDA authorizes will be maintained and persisted during currency of contract to precisely know about schedule of load shedding, if any.
- l) That the toll operation staff deputed on toll plaza by NHA will be given free and unhindered access in lanes, toll booths and control room round the clock.
- m) All incidents generated in the system due to some discrepancy shall be accurately and diligently cleared by Contractor staff.
- n) All operational expenses shall be borne by the Contractor for carrying out technical support, management and maintenance services under the provisions of this contract agreement.

1.5 Cooperation With Other Contractors

- (a) From time to time during the Term, NHA may award or execute other contracts relating to its ownership, toll collection, operation or maintenance of the facilities on same toll plaza. Contractor shall fully cooperate with the NHA and the parties to such other contracts shall adjust scheduling to the extent reasonably possible; and shall diligently endeavor to perform its Services in a manner that will promote integration, synergism and efficiency.
- (b) Among Contractor, NHA and the other contractors. Contractor shall not commit nor permit any action on the part of its employees or agents that might unreasonably interfere with the performance of work by any other contractor of NHA.

1.6 Confidentiality Of Data

All Information generated in connection with this Agreement shall be the property of NHA. Contractor shall not transfer, disclose or otherwise use such information for any purpose other than in performance of its duties hereunder without NHA's prior written consent.

ARTICLE II

PERFORMANCE INDICATORS AND PENALTIES

2.1.1 Performance Indicators:

The following performance indicators are being established, in which the performance of Contractor shall be monitored by NHA:

- (1) 24 hours a day, 365 days a year, round the clock ETTM system shall be kept operational. No system in lane(s) shall be closed for more than fifteen (15) minutes per day for maintenance purposes and schedule maintenance a manual shall be planned and got approved from NHA.
- (2) Well trained and qualified staff will be provided for performing the services.
- (3) Errors generated and recorded in the ETTM system due to sensors blockages and placing some metal object on magnetic loop in lanes like AVC sequence error, Roll Back error and any other foul play with the system to make it faulty or non functioning with deliberate effort etc will be taken as tempering with ETTM system for which the contractor shall be held responsible.
- (4) All incidents generated in ETTM system will be accurately and promptly cleared by the Contractor staff.
- (5) In case of an unexpected breakdown of power generation, backup power supply shall be ensured through any alternate source by the Contractor at its own cost.
- (6) Healthy and safe working environment shall be ensured in and around the toll plaza Control Center.
- (7) All staff on duty shall wear a proper uniform.
- (8) All facilities of system shall be kept in tidy condition all the times.
- (9) Insurance coverage shall be properly maintained by the Contractor against any loss except exclusions.
- (10) Health Insurance of the Employees.
- (11) Fire Safety Insurance coverage for the NHA Assets.

2.1.2 Asset Inventory

The Contractor and NHA shall jointly develop detailed asset inventory at the expiry of contract period and Contractor shall replace the furniture/fixtures

equipments, and parts of system rated as damaged upon handing over without any cost to the Employer.

2.1.3 Technical Support

Contractor shall ensure:

- a) The management and technical support to be available at site at all times throughout the year during the “OF” contract period.
- b) Preparations, updating and keeping of documentations/record and operating strictly in accordance with the contract conditions.

ARTICLE III **PERFORMANCE INDICATORS AND PENALTIES**

3.0 Penalties

Failure of Contractor to comply with the requirement as indicated in the Scope of Services and Article II of Contract Agreement more particularly as per established performance indicators shall make him liable to the penalties as stated below:

- i. A penalty of Rs. 0.5 Million shall be imposed if, a lane remain closed due to any reason (Load shedding & unexpected failures) for an hour beyond maintenance period of 15 min, to be recovered from the Contractor’s invoice automatically. After continuous 6 hours closure of any lane, will cause major default and Employer is entitled to either impose a major penalty of Rs. 1.0 million or could terminate the contract.
- ii. Initial tempering in any form with ETTM sensors/ equipment, it will be treated as **non-curable** event. Three (03) black dots will be recorded and a penalty of Rs. 0.5 million will automatically become affective for each occurrence.
- iii. For non performance with respect to any of the performance indicators as set out above and service levels defined in Scope of Services, the Contractor shall be fined Rs. 50,000/- per occurrence and a **black dot will be recorded at every curable event.**
- iv. Accumulation of 15 black dots will also cause major default and contract shall be liable for termination at Contractor cost.

3.1 PERFORMANCE INDICATORS

- 3.1.1. If the FM&MC fails to start within specified time/ maintain the generators installed at site as per the following, it shall be done at the risk and cost of FM&MC by NHA designated official and a penalty of Rs.100,000/- with one black dot shall be imposed per occurrence.
Replacement of Generator Consumables and Services

- i. Mobil Oil (Delo Gold 15W40) Every 250 Hours.

- ii. Oil Filter (Cummins or Equivalent) Every 250 Hours.
- iii. Fuel Filter (Cummins or Equivalent) Every 250 Hours.
- iv. Radiator Coolant Every 250 Hours.
- v. Air Filter (Cummins or Equivalent) Every 1000 Hours.
- vi. Batteries As required.

3.1.2. In case of violation to the Scope of services, penalty of Rs.50,000/- shall be imposed per occurrence and a black dot shall be recorded of every successive occurrence.

3.1.3. Absence of any staff during the course of contract period shall lead to the following: -

- i. Cash Penalty of Rs.50,000/- per absente
- ii. on 2nd to 4th absentees, warning shall be issued along with penalty and on 5th absente the contract shall be terminated immediately with black listing of firm from NHA and shall not be prejudice in the Court of Law.

3.1.4. Down time of server penalty of Rs. 50,000/- starts after 3 hours of down time. A black dot shall also be recorded. (In case of a hardware fault that is beyond reasonable control of FM&MC, report from OEM service center to be provided. In such case, no penalty will be imposed).

3.1.5. Unavailability of reports due to technical issues penalty of Rs. 10,000/- per day.

3.1.6. Use of unapproved spare/ parts penalty of Rs.100,000/- per occurrence and a black dot shall also be recorded.

3.1.7. Non wearing of uniform by duty staff penalty of Rs.5,000/- per occurrence per person.

3.1.8. Non availability of maintenance record at site penalty of Rs.10,000/- per occurrence.

3.1.9. Deployment of Nonqualified Staff penalty of Rs.10,000/- per occurrence and a black dot shall also be recorded.

3.1.10. Non Compliance to the Support Request of O&MC/ NHA, a penalty of Rs.50,000/- per occurrence and a black dot shall also be recorded.

3.1.11. Non maintaining of minimum stock of spare parts penalty of Rs.25,000/- per occurrence.

3.1.12. Bogus reporting penalty of Rs.100,000/- per occurrence.

3.1.13. Interruption/ failure in power supply penalty of Rs.25,000/- per occurrence. In case of extended unplanned power outage from WAPDA (excluding planed load shedding), the relevant NHA personnel shall be informed accordingly.

3.1.14. Refuse/ Fail to give training to O&MC/ NHA staff penalty of Rs.25,000/- per occurrence and a black dot shall also be recorded.

3.1.15. After receipt of request from O&MC/NHA, failure to resolve discrepancies timely and preparation of management report, penalty of Rs.10,000/- per occurrence.

- 3.1.16. Fails to timely inform NHA regarding breakdown in communication medium of toll plazas with NHA HQ, penalty of Rs.10,000/- per occurrence.
- 3.1.17. Fails to maintain backup of databases penalty of Rs.250,000/- per occurrence per site. In case of any data loss due to the same, an additional irrevocable penalty of Rs.2,500,000/- per occurrence per site, shall be imposed. Furthermore, a minimum of five (05) black dots will be recorded.
- 3.1.18. Fails to maintain the cleanliness of site and systems penalty of Rs.25,000/- per occurrence.
- 3.1.19. Disclosure of NHA data to unauthorized person(s) penalty of Rs.1,000,000/- per occurrence and three (03) black dots shall also be recorded.
- 3.1.20. Fails to ensure display of employee card on staff uniform penalty of Rs.10,000/- per occurrence per person.
- 3.1.21. Fails to illuminate the toll plaza penalty of Rs.50,000/- per occurrence.
- 3.1.22. Failure to submit calibration certificate (quarterly) with corresponding month invoice, a cash penalty of Rs. 50,000/- per site shall be imposed and the invoice shall remain retained till provision of the same.
- 3.1.23. On occurrence of provision of non-genuine Toners / stationery items, a penalty of Rs.50,000/- per occurrence along with one black dot.

3.2 KEY PERFORMANCE INDICATOR

The following key performance indicators are being established, in which the performance of FM&MC shall be monitored by NHA:

3.3 General

- 3.4.1 24 hours a day, 365 days a year, round the clock ETTM system and other facilities and toll lanes shall be kept operational. No lane(s) shall be closed for more than two (02) hours in twenty-four (24) hours for routine maintenance, provided that prior information is given to NHA for necessary repairs, if need to be carried out.
- 3.4.2 Well trained and qualified staff will be provided for performing the services.
- 3.4.3 Ensure system availability for all shifts to be closed in ETTM system promptly upon completion.
- 3.4.4 Healthy and safe working environment shall be ensured in and around the toll booths, toll lanes and support offices.
- 3.4.5 All staff on duty shall wear the uniform duly approved by NHA.
- 3.4.6 The name, CNIC numbers of STAFF and contact numbers of key administrative staff of FM&MC and NHA officers will be displayed at site office locations of the FM&MC and also provided to NHA.
- 3.4.7 All facilities in the charge of the FM&MC shall be kept in tidy condition all the times.
- 3.4.8 Insurance coverage as required under this agreement shall be properly maintained by the FM&MC against any loss except

exclusions.

- 3.4.9 Canopy lights, Road Lights fixed on entry/exit ramps will be kept operational by the FM&MC and shall be maintained in operational condition all the times.
- 3.4.10 Safety measures will be ensured in case of fog and in hours of low visibility.
- 3.4.11 Energy conservation policy of Government of Pakistan as conveyed from time to time will be followed in true spirit.

3.4 ASSET INVENTORY

The contractor and NHA shall jointly develop detailed asset inventory and its current value and condition. Contractor will adjust value of asset with every improvement or further additions to the asset.

Contractor shall maintain the toll plaza facility and administrative control buildings and other assets of NHA in optimum condition.

3.6 MANAGEMENT OF TOLL PLAZA

Contractor shall ensure:

- 3.4.1 The Level-I maintenance team is available at site at all times throughout the year.
- 3.4.2 Preparations, updating and keeping of documentations/record and performing services strictly in accordance with the conditions contained herein.

3.7 MAINTENANCE:

- 3.4.1 The FM&MC shall maintain all toll plaza ETTM systems and facilities as per agreed equipment and services list documented in this document.
- 3.4.2 The FM&MC shall beautify the premises by landscaping & maintain such beautification throughout the year ensuring healthy environment.

ARTICLE IV REMOVAL/REASSIGNMENT

4.1 Removal

Promptly upon instructions to such effect from NHA, the Contractor shall remove from activities associated with or related to the performance of this Agreement any employee whom NHA considers (for any reason whatsoever and in NHA's sole discretion) unsuitable for such work. Such employee shall not be reassigned to perform any work relating to the Services except with the express written consent of the NHA. No compensation in any form shall be paid to Contractor by the NHA in consideration for the right of removal described in this paragraph or in consideration of an exercise thereof.

4.2 Reassignment

Contractor shall structure its relationship and procedures with its employees so that the employees may be assigned to, reassigned or transferred from one toll collection location to any other location without impediment.

4.3 Drug-Free Workplace Requirements

Throughout the Term, Contractor shall provide a drug-free workplace (within Toll plaza) by establishing a drug-free workplace and program in compliance with NHA policy.

4.4 Compliance With Workplace & Labor Laws

- (a) Throughout the Term, while performing under this Agreement, the Contractor, its agents and employees shall observe and fully comply with all laws, ordinance and regulations that may be in force and effect from time to time hereafter and in particular all applicable labor laws.
- (b) It is hereby acknowledged that the Contractor's employees and agents and subcontractors, shall at all times remain its employees, agents and subcontractors, as the case may be, and are not employees, agents or subcontractors of NHA and that Contractor will not be acting as NHA's agent or on its behalf for purposes for complying with laws and regulations pertaining to workplace safety, labor and employment.
- (c) Social Security and requirements of EOBI

4.5 Mandatory Equal Employment Opportunity

Contractor shall follow the Minimum Wage Rate Policy of Government of Pakistan during the currency of contract as amended from time to time. In this regard, NHA shall not bear any liability.

4.6 Notification Of Conviction Of Crimes

Contractor shall notify the NHA of disciplinary action taken against its employees, if convicted of any crime, according to the rules and regulations.

ARTICLE V

ASSIGNMENTS OF AGREEMENT; SUBCONTRACTS

5.1 Assignments Rights And Limitations

- (a) NHA has selected Contractor to perform the Services based upon characteristics and qualifications personal to the Contractor and its employees. Therefore, Contractor may not assign, delegate or subcontract its rights or obligations under this Agreement. Any attempt by Contractor to assign or subcontract any performance of this Agreement without such consent shall be null and void and shall, at NHA's option, constitute a default under this Agreement.

ARTICLE VI
TAX LIABILITIES

6.1 Pakistan Tax Liabilities

All taxes including Income Tax/Sales Tax/Surcharge or any other Levy imposed by the Government of Pakistan shall be paid by the Contractor according to prevailing laws of income tax in Pakistan during the currency of contract. All personnel and corporate taxes will be paid by the Contractor or his personnel.

ARTICLE VII
INDEMNIFICATION AND LIABILITY

7.1 Contractor's Responsibilities

- (a) Contractor shall take all reasonable precautions in the performance of the services and shall cause its employees to do the same. Contractor shall be solely responsible for the safety of, and shall provide protection to prevent damage, injury or loss to:
- (i) All employees of Contractor and other persons who are on or about the Plazas or would reasonably be expected to be affected by the performance of the services;
 - (ii) Other property of Contractor and its employees and officers and all other persons for whom Contractor may be legally or contractually responsible or adjacent to the Plazas or other areas upon which services are performed;
 - (iii) Members of the public who may be traveling through the toll plaza and their vehicles, assets and personality during the installation and maintenance period of ETTM.
- (b) Contractor shall comply, and cause its employees and officers and all other persons for whom Contractor may be legally or contractually responsible, with applicable laws, ordinances, rules, regulations and orders of public authorities relating to the safety of persons and property and their protection from damage, injury or loss.
- (c) Contractor shall be responsible for all damage and loss that may occur with respect to any and all property located on or about the Plaza or in any way involved in the provision of services by Contractor, whether such property is owned by Contractor, NHA or brought about by the acts or omission of Contractor or its employees or officers or any other persons for whom Contractor may be legally or contractually responsible.
- (d) Contractor shall ensure that all of its activities and the activities of its employees and officers and all other persons for whom Contractor may be legally or contractually responsible are undertaken in a manner that will minimize the effect on surrounding property and the public.

7.2 Indemnifications By Contractor.

- (a) Contractor shall defend, indemnify and hold harmless NHA and each of the individuals that is now (or may in the future become) a member of NHA successors and assigns, and the officers, directors, agents, consultants and employees of any of the foregoing (collectively referred to as the “Indemnified Parties”) from and against any and all claims, causes or action, suits, legal or administrative proceedings, damages, losses liabilities, response costs, costs and expenses (including, without limitation, attorneys’ and experts witness fees and costs that may be incurred in connection with the enforcement of this paragraph) arising out of, relating to or resulting from:
- (i) The performance by Contractor (or its employees, officers or any other persons for whom Contractor may be contractually or legally responsible) of the services or other duties or obligations set forth in this agreement or the failure to perform the services in the manner herein required;
 - (ii) The failure of Contractor (or its employees or officers or any other persons for whom Contractor may be contractually or legally responsible) to comply with any applicable law, rule, ordinance, regulation or statute in performing the services or other duties or obligations set forth in this agreement.
 - (iii) Any alleged patent or copyright infringement or other allegedly improper appropriation or use of trade secrets, patents, proprietary information, know-how, copyright rights or inventions in performance of the services or other duties or obligations set forth in this agreement;
 - (iv) Any act or omission of Contractor (or its employees or officers or any other persons for whom Contractor may be contractually or legally responsible), including, but not limited to, any act or omission that may cause, result in, or contribute to the injury to or death of persons, or the damage to or loss of property;
 - (v) The assertion by any Contractor or other person that inconvenience, disruption, delay or loss has been cause all or in part by actions or interference of Contractor (or its employees, officers or any other persons for whom Contractor may be contractually or legally responsible) to cooperate reasonably with such contractors, subcontractors, or other persons.
- (b) Except to the extent permitted by law, the provisions of this Paragraph 7.2 shall not inure to the benefit of an Indemnified party so

as to impose liability on Contractor for matters caused by the negligence of NHA, or so as to relieve NHA of liability for the consequences of its own negligence or the negligence of its employees, officers or any other persons for whom the NHA may be contractually or legally responsible.

- (c) If any claim shall be filed by an employee of Contractor (or anyone for whose acts they may be liable), the indemnification provisions set forth in this Paragraph 8.2 shall not be limited, as to the amount or type of damages, compensation or benefits payable by or for Contractor or otherwise, under the terms of or as a consequence of any workers' compensation, as per the existing rules of Contractor.

7.3 No Effect On Other Rights

The foregoing obligations shall not be construed to negate, abridge, or reduce other rights or obligations that otherwise would exist in favor of a party indemnified hereunder.

ARTICLE VIII **SECURITIES AND INSURANCES**

8.1 Issues Of Securities And Insurance

Contractor shall arrange securities and insurances acceptable to NHA as described herein and shall maintain such securities and insurance in full force and effect throughout the Term in the manner specified herein.

INSURANCE COVERAGE INSURANCE COMPANIES ON APPROVED NHA'S PANEL

8.2 Forms Of Insurance Coverage And Minimum Limits

Contractor shall maintain insurance policies throughout the Term with the following coverage and minimum limits:

- (a) The Contractor shall obtain and maintain during the currency of contract period, insurance for all assets including system & equipments against loss & damage due to any reason except exclusions listed in clause 8.7 at replacement value plus 25%.
- (b) Contractor shall obtain and maintain comprehensive health insurance for all it's staff working on project site.
- (c) Contractor shall obtain and maintain during the currency of contract, insurance for all its employees working on project site against injury or death having a minimum coverage of Rs.500,000/- in case of death and Rs. 200,000/- for each case of injury/disability with unlimited number of incidents.
- (d) Contractor shall obtain and maintain during the currency of contract, insurance for any loss in an amount adequate to cover as NHA will not entertain any claim in this regard.
- (e) The premium for such insurances shall be paid by the Contractor.

8.3 Damage To Persons And Property

The Contractor shall, except if and so far as the Contract provides otherwise, indemnify the Employer against all losses and claims in respect of:

- (a) death of or injury to any person, or
- (b) loss of or damage to any property, which may arise out of or in consequence of the execution and completion of the operations, and against all claims, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

8.4 Third Party Insurance (Including Employer's Property)

The Contractor shall, without limiting his or the Employer's obligation and responsibilities under Clause 8.5, insure, in the joint names of the Contractor and the Employer, against liabilities for death of or injury to any person or loss of or damage to any property (other than the Works) arising out of the performance of the Contract.

8.5 Evidence And Terms Of Insurances

The Contractor shall provide evidence to the Employer prior to the commencement of works at the Project Site that the insurances required under the Contract have been affected and shall, within 84 days of the Commencement Date, provide the insurance policies to the Employer. Such insurance policies shall be consistent with the general terms agreed under this contract agreement. The Contractor shall affect all insurances for which he is responsible with insurers and in terms approved by the Employer.

8.6 Adequacy Of Insurances

The Contractor shall notify the insurers of changes in the nature, extent or programme for the execution of the Works and ensure the adequacy of the insurances at all times in accordance with the terms of the Contract and shall, when required, produce to the Employer the insurance policies in force and the receipts for payment of the current premiums.

8.7 Remedy On Contractor's Failure To Insure

If the Contractor fails to effect and keep in force any of the insurances required under the Contract, or fails to provide the policies to the Employer within the period required by Clause 8.7, then and in any such case the Employer may effect and keep in force any such insurances and pay any premium as may be necessary for that purpose and from time to time deduct the amount so paid from the securities of the Contractor.

8.8 Compliance With Policy Conditions

In the event that the Contractor or the Employer fails to comply with conditions imposed by the insurance policies affected pursuant to the Contract, each shall indemnify the other against all losses and claims arising from such failure.

8.9 Compliance With Statutes, Regulations

The Contractor shall conform in all respects, including by the giving of all notices and the paying of all fees, with the provisions of:

- (a) any National or State Statute, Ordinance, or other Law, or any regulation, or bye-law of any local or other duly constituted authority in relation to the execution and completion of the Works and the remedying of any defects therein, and
- (b) the rules and regulations of all public bodies and companies whose property or rights are affected or may be affected in any way by the Works, and the Contractor shall keep the Employer indemnified against all penalties and liability of every kind for breach of any such provisions. Provided always that the Employer shall be responsible for obtaining any planning, zoning or other similar permission required for the Works to proceed and shall indemnify the Contractor.

ARTICLE IX

DEFAULT REMEDIES

9.1 Default By Contractor

Default by Contractor is hereby categorized as under:-

- 1) Non Curable Default:** Event(s) of Default which will not be granted a cure period upon occurrence and can result in immediate termination of contract without any recourse and will result forfeiture of Performance security.
- 2) Curable Default:** Event(s) of Default which will require grant of cure period at the assessment of Employer at its sole discretion, not exceeding 30 days after issuance of such Notice from the Employer. Failure of Contractor to cure such Default during the cure period shall result termination on Default by Contractor and forfeiture of Performance security.

9.2 Events of Default

Following are events of Default by Contractor:-

- (i) Imposition of cumulative 15 black dots under clause 3.8 Conditions of Contract Article-III (**Non Curable**);
- (ii) Delay in commencement or discontinuance by Contractor in the performance of the Services being rendered pursuant to this Agreement (**Curable**);
- (iii) Failure by Contractor to comply with its duties and obligations under this Agreement (**Curable**);

- (iv) Failure of Contractor to secure or maintain insurance coverage of the types and with the coverage's herein required **(Curable)**;
- (v) Dishonesty, embezzlement or false reporting of financial information by Contractor or any Key Personnel, willing or knowing participation by Contractor in a fraud **(Curable)**;
- (vi) Lack of financial responsibility evidenced by failure to promptly reimburse NHA for any loss or damage to NHA or its property **(Curable)**;
- (vii) Conviction of any employee or affiliate of Contractor of a public entity crime, or placement of the names of Contractor or any employee or affiliate of Contractor on the convicted vendor list **(Curable)**;
- (viii) To extent allowed by law, filing by Contractor of a petition in bankruptcy or for reorganization or for an arrangement pursuant to any federal or state bankruptcy law or any similar federal or state law: adjudication of Contractor as a bankrupt or insolvent; assignment by Contractor for the benefit of creditors; admission in writing by Contractor of its inability to pay its debts generally as they become due filing of a petition or answer proposing the adjudication of Contractor as bankrupt or insolvent pursuant to any bankruptcy law or similar in any court, and failure of Contractor to discharge such petition or answer within ninety (90) days after the filing thereof **(Non Curable)**;
- (ix) Attempt by Contractor to assign its rights or delegate its obligations in contravention of the terms of this Agreement or execution by Contractor of a Subcontract in violation of the terms of this Agreement **(Non Curable)**;

9.3 Rights Of NHA Upon Occurrence Of Event Of Default By Contractor

- (i) In case of occurrence of Non Curable Default by Contractor, NHA shall terminate this Agreement on Default of Contractor and take over possession of all the facilities forthwith from the Contractor and without any recourse. Performance securities shall also be forfeited by the Employer.
- (ii) In case of occurrence of Curable Default by Contractor, NHA will issue **Notice of Default** specifying the Cure Period. If the Cure of such Event of Default is not accomplished by the Contractor with in Cure Period, NHA will take over possession of all the facilities from Contractor without any recourse. Performance security shall also be forfeited by the Employer.

ARTICLE X
OBLIGATIONS OF THE PARTIES UPON TERMINATION
OR EXPIRATION OF THIS AGREEMENT

10.1 Transfers Upon Early Termination Or Expiry

Upon early termination or expiry of this Agreement in accordance with the terms and conditions set out herein, Contractor shall immediately cease to perform the Services on the Project Site and shall remove all its workmen, employees, servants, agents and contractors, vacate the Project Site immediately on the date on which the termination or expiry takes effect and hand over the same to the NHA or a duly nominated representative thereof, in a properly maintained and operational condition.

The NHA shall, inspect the Project Site and assets thereon including all civil works, installations, equipments and facilities and shall issue a transfer certificate to Contractor specifying the condition of the Project Site and the assets thereon and whether Contractor has failed to abide by any of its obligations under the Agreement.

Upon early termination or expiry of this Agreement, the rights and entitlements of Contractor pursuant to this Agreement shall revert to, vest in or remain vested in the NHA, as the case may be.

Contractor shall ensure that the Project Site and the assets thereon upon the date of early termination or expiry are free of all liens and charges.

Notwithstanding any dispute between the Parties or any claim against the NHA, Contractor shall hand over vacant and peaceful possession of the Project Site and the assets thereon to the NHA in accordance with the terms and conditions as set out in this Agreement. Any dispute between the Parties or any claims of Contractor against the NHA shall not in any case entitle Contractor to refuse or delay the transfer of the Project Site to the NHA. Failure by Contractor to so transfer the Project Site to the NHA in accordance with the terms and conditions of this Agreement shall be treated as encroachment and unauthorized occupation by Contractor and may be dealt with by the NHA under Section 12 of the National Highway Authority Act, 1991.

10.2 Continuing Liability

Termination of this Agreement or any portion thereof, shall not relieve Contractor of its responsibilities of the completed portions of the Work, nor shall it relieve CONTRACTOR's surety, if any, of its obligation for and concerning any claims arising out of the work performed.

10.3 Completion Of The Services

If the Contractor commits an Event of Default hereunder, NHA may appropriate any or all materials and equipment on site and may enter into an agreement with any other party for the performance of services under the Agreement or may use other methods which, in the opinion of NHA are required for the performance of the Services in an acceptable manner, without recourse to legal remedies.

ARTICLE XI
MISCELLANEOUS PROVISIONS

11.1 Waiver

This Agreement may not be amended, modified, altered, or changed in any respect whatsoever, except by a further agreement in writing duly executed by the parties hereto. No failure by either party to insist upon the strict performance of any covenant, duty, agreement or condition set forth in this Agreement or to exercise any right or remedy upon a breach thereof shall constitute a waiver of any such breach or of such or any other covenant, agreement, term or condition. Any party hereto, by notice, may, but shall be under no obligation to, waive any of its rights or any conditions to its obligations hereunder, or any duty, obligation or covenant of any other party hereto. No waiver shall affect or alter this Agreement, but each and every covenant, agreement, term and condition of this Agreement shall continue in full force and effect with respect to any other then-existing or subsequent breach thereof.

11.2 Variations In Writing

This Agreement may be varied or amended only by the mutual consent of the Parties. All such variations and amendments shall be binding only if they are in writing and are signed by duly authorized representatives of the Parties.

11.3 Successors And Assigns

This Agreement shall be binding upon and inure to the benefit of NHA and its successors, permitted assigns and legal representatives, and shall be binding upon an inure to the benefit of Contractor and its permitted successor, assigns and legal representatives. In the event of any assignment of this Agreement in whole or in part by NHA, the term "NHA" as used in this Agreement shall be deemed to mean the assignee of NHA, and as such, the assignee shall have all rights accorded to NHA.

11.4 Designation Of Representatives; Cooperation With Representatives

- (a) NHA and Contractor shall each designate an individual (or individuals) who shall be authorized to make decisions and bind the parties on matters relating to the effectuation of the Agreement and the operations and maintenance required hereunder. The designated individuals shall not have the right to make decisions inconsistent with the Agreement, or make amendments thereto or take any action or make any decision that are not allowed under applicable law. Designations of representatives may be changed by a subsequent writing delivered to the other party. The parties may also designate technical representatives who shall be authorized to investigate and report on matters relating to the Services and negotiate on behalf of each of the parties but who are not authorized to bind NHA or Contractor. Such representatives shall attend any settlement conference conducted in accordance with Paragraph 10.5.
- (b) Contractor shall cooperate with NHA and all representatives of NHA. Contractor shall provide such data, reports, certificates, and other

documents or assistance reasonably requested by NHA. The provision of such information shall not in any manner diminish Contractor's rights or obligations under any other provision hereof.

APPENDIX – A

GLOSSARY OF TERMS

Wherever in the Scope of Services or in other documents pertaining to the Contract, the following terms appear, their intent and meaning shall, unless specifically stated otherwise, be interpreted as shown herein.

Authority: National Highway Authority

AVC: Automatic Vehicle Classification system.

Conditions of Contract: Requirements of Employer for performing the services as set out in contract documents.

Day: Every day shown on the calendar, ending and beginning at midnight.

Employer: Chairman, National Highway Authority, 27-Mauve Area, G-9/1, Islamabad, Pakistan.

ETTM: Electronic Toll & Traffic Management System, a computerized data collection and processing complex, consisting of the necessary hardware and software to accurately and efficiently collect, process report, and archive traffic, toll revenue, system maintenance activity etc.

Emergency Power: Standby Power

Contractor: Service Provider/Operator also responsible for supplying, installing, commissioning and maintaining the ETTM system under this contract.

Performance Evaluation Committee: The committee designated by the Employer to monitor and evaluate the CONTRACTOR's performance.

PEC: Pakistan Engineering Council

FORM OF CONTRACT AGREEMENT

THIS CONTRACT AGREEMENT (hereinafter called the "Agreement") made on the day of ____ (month) 20____ between _____ (hereafter called the "Employer") of the one part and of the other part (called the "Contractor")

WHEREAS the Employer is desirous that certain Services/Works, viz ____ should be executed by the Contractor and has accepted a Bid by the Contractor for the execution and completion of such Services/Works and the remedying of any defects therein.

NOW this Agreement witnessed as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
2. The following documents after incorporating addenda, if any except those parts relating to Instructions to Bidders shall be deemed to form and be read and construed as part of this Agreement, viz:
 - a) Contract Agreement.
 - b) Letter of Acceptance.
 - c) Bid Data Sheet.
 - d) General and Particular Conditions of Contract.
 - e) Articles of Contract.
 - f) Technical Specifications
 - g) Financial Form comprising Financial Bid.
 - h) Technical Form comprising Technical Bid
 - i) Technical Specifications.
 - j) Appendices.
3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Services/Works and remedy defects therein in conformity and in all respects with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor, in consideration of the execution and completion of the Services/ Works as per provisions of the Contract, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS WHEREOF the parties hereto have caused this Contract Agreement to be executed on the day, month and year first before written in accordance with their respective laws.

Signature of the Contractor

Signature of the Employer

(Seal)

(Seal)

Signed, Sealed and Delivered in the presence of:

Witness:

Witness:

(Name, Title and Address)

(Name, Title and Address)

**FORM OF PERFORMANCE SECURITY
(Bank Guarantee)**

Guarantee No. _____ Executed on _____ Expiry date _____

[Letter by the Guarantor to the Employer]

Name of Guarantor (Bank) with address: _____ Name of Principal (Contractor) with address: _____ Penal Sum of Security (express in words and figures) _____

Letter of Acceptance No. _____ Dated _____

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bidding Documents and above said Letter of Acceptance (hereinafter called the Documents) and at the request of the said Principal we, the Guarantor above named, are held and firmly bound unto the _____(hereinafter called the Employer) in the penal sum of the amount stated above for the payment of which sum well and truly to be made to the said Employer, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has accepted the Employer's above said Letter of Acceptance for _____(Name of Contractor) for the _____(Name of Project).

NOW THEREFORE, if the Principal (Contractor) shall well and truly perform and fulfill all the undertakings, covenants, terms and conditions of the said Documents during the original terms of the said Documents and any extensions thereof that may be granted by the Employer, with or without notice to the Guarantor, which notice is, hereby, waived and shall also well and truly perform and fulfill all the undertakings, covenants terms and conditions of the Contract and of any and all modifications of said Documents that may hereafter be made, notice of which modifications to the Guarantor being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue till all requirements of Clause 25, Defects after Taking Over, of Conditions of Contract are fulfilled.

Our total liability under this Guarantee is limited to the sum stated above and it is a condition of any liability attaching to us under this Guarantee that the claim for payment in writing shall be received by us within the validity period of this Guarantee, failing which we shall be discharged of our liability, if any, under this Guarantee.

We, _____(the Guarantor), waiving all objections and defences under the Contract, do hereby irrevocably and independently guarantee to pay to the Employer without delay upon the Employer's first written demand without cavil or arguments and without

requiring the Employer to prove or to show grounds or reasons for such demand any sum or sums up to the amount stated above, against the Employer's written declaration that the Principal has refused or failed to perform the obligations under the Contract which payment will be effected by the Guarantor to Employer's designated Bank & Account Number.

PROVIDED ALSO THAT the Employer shall be the sole and final judge for deciding whether the Principal (Contractor) has duly performed his obligations under the Contract or has defaulted in fulfilling said obligations and the Guarantor shall pay without objection any sum or sums up to the amount stated above upon first written demand from the Employer forthwith and without any reference to the Principal or any other person.

IN WITNESS WHEREOF, the above-bounden Guarantor has executed this Instrument under its seal on the date indicated above, the name and corporate seal of the Guarantor being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

_____ Guarantor (Bank)

Witness:

1. _____

Corporate Secretary (Seal)

Signature _____
Name _____
Title _____

2. _____

Name, Title & Address

Corporate Guarantor (Seal)

(INTEGRITY PACT)

**DECLARATION OF FEES, COMMISSION AND BROKERAGE ETC.
PAYABLE BY THE SUPPLIERS OF GOODS, SERVICES & WORKS IN
CONTRACTS WORTH RS. 10.00 MILLION OR MORE**

Contract No. _____ Dated _____
Contract Value: *[To be filled in at the time of signing of Contract]*
Contract Title: _____

..... [name of Contractor] hereby declares that it has not obtained or induced the procurement of any contract, right, interest, privilege or other obligation or benefit from Government of Pakistan (GoP) or any administrative subdivision or agency thereof or any other entity owned or controlled by GoP through any corrupt business practice.

Without limiting the generality of the foregoing, [name of Contractor] represents and warrants that it has fully declared the brokerage, commission, fees etc. paid or payable to anyone and not given or agreed to give and shall not give or agree to give to anyone within or outside Pakistan either directly or indirectly through any natural or juridical person, including its affiliate, agent, associate, broker, consultant, director, promoter, shareholder, sponsor or subsidiary, any commission, gratification, bribe, finder's fee or kickback, whether described as consultation fee or otherwise, with the object of obtaining or inducing the procurement of a contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP, except that which has been expressly declared pursuant hereto.

[name of Contractor] certifies that it has made and will make full disclosure of all agreements and arrangements with all persons in respect of or related to the transaction with GoP and has not taken any action or will not take any action to circumvent the above declaration, representation or warranty.

[name of Contractor] accepts full responsibility and strict liability for making any false declaration, not making full disclosure, misrepresenting facts or taking any action likely to defeat the purpose of this declaration, representation and warranty. It agrees that any contract, right, interest, privilege or other obligation or benefit obtained or procured as aforesaid shall, without prejudice to any other rights and remedies available to GoP under any law, contract or other instrument, be voidable at the option of GoP.

Notwithstanding any rights and remedies exercised by GoP in this regard, [name of Contractor] agrees to indemnify GoP for any loss or damage incurred by it on account of its corrupt business practices and further pay compensation to GoP in an amount equivalent to ten time the sum of any commission, gratification, bribe, finder's fee or kickback given by [name of Contractor] as aforesaid for the purpose of obtaining or inducing the procurement of any contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP.

Name of Seller/Contractor
Signature:

[Seal]

Manufacturer's Authorization

Date: _____

Bid Reference No.: _____

Invitation for Bid No.: _____

To: _____

WHEREAS _____ who are official manufacturers of _____ having factories at _____ do hereby authorize _____ to submit a Bid in relation to the Invitation for Bids indicated above, the purpose of which is to provide the following Goods, manufactured by us _____ and to subsequently negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with Clause 14 of the General Conditions of Contract, with respect to the Goods offered by the above firm in reply to this Invitation for Bids

Name _____

In the capacity of: _____

Signed _____

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

Date _____

Appendix-5

POWER OF ATTORNEY

A power of attorney, duly notarized, indicating that the person(s) signing the bid has(ve) the authority to sign the bid and thus that the bid is binding upon the Contractor during the full period of its validity.

Appendix-6

JOINT VENTURE AGREEMENT

Joint Venture agreement, duly notarized.

CAMERAS AND ASSOCIATED EQUIPMENT WITH VIDEO ANALYTICS
TECHNICAL SPECIFICATION OF LANE CAMERA

System to be used for identification of
 unauthorized movement/ access in traffic lane area etc.

| S.No. | Description | Specification |
|--------------|-----------------------------|---|
| 1 | Type of Equipment | Outdoor day & night camera With Video Analytics |
| 2 | Smart Detection | Scene change, Face, Intrusion Missing/ Abandoned, Tripwire Audio detect |
| 3 | Megapixel | Minimum 3 megapixel |
| 4 | Scanning System | Progressive |
| 5 | Electronic Shutter Speed | Auto/ Manual, 1/3 to 1/10000s |
| 6 | Min Illumination | May be provided by bidder, the employer shall choose the best |
| 7 | IR LED length | Minimum 10m |
| 8 | White Balance | Auto/ Manual |
| 9 | Privacy Masking | Minimum 4 areas |
| 10 | Focal Length | 3-9mm Motorized |
| 11 | Focus Control | Auto |
| 12 | Compression | H.264, MJPEG |
| 13 | Operating Temperature | -5°C to 60°C 95% humidity |
| 14 | Power Consumption | May be provided by bidder, the employer shall choose the best |
| 15 | Ethernet | Required |
| 16 | Connectivity | At site NVR and with NHA HQ iPhone, iPad, Windows and Android phones |
| 17 | Memory Slot | Minimum 64GB & Extendable |
| 18 | Signal to Noise Ratio (SNR) | Not less than 50dB |
| 19 | Noise Reduction | 3D |
| 20 | Resolution | Minimum 720p with 25fps |
| 21 | ONVIF | ONVIF, PSI, CGI |
| 22 | Ingress Protection | IP65 |

CAMERAS AND ASSOCIATED EQUIPMENT WITH VIDEO ANALYTICS
TECHNICAL SPECIFICATION OF PTZ DOME CAMERA

| S.No. | Description | Specification |
|--------------|-----------------------------|--|
| 1 | Type of Equipment | Outdoor day/ night PTZ dome camera With Video Analytics |
| 2 | Megapixel | Minimum 2 megapixel |
| 3 | Electronic Shutter Speed | 1/50 to 1/100,000s |

| | | |
|----|---|---|
| 4 | Min Illumination | May be provided by bidder, the employer shall choose the best |
| 5 | IR LED length | Minimum 40m Smart IR |
| 6 | White Balance | Auto/ Manual |
| 7 | Focal Length | 3.6mm |
| 8 | Focus Control | Auto |
| 9 | Operating Temperature | -5°C to 50°C 95% humidity |
| 10 | Power Consumption (Power over Ethernet) | May be provided by bidder, the employer shall choose the best |
| 11 | Ethernet | Required |
| 12 | Connectivity | At site NVR and with NHA HQ iOS, Windows and Android phones |
| 13 | Noise Reduction | 2D/3D |
| 14 | Resolution | Minimum 720p with 25fps |
| 15 | Ingress Protection | IP65 |

**CAMERAS AND ASSOCIATED EQUIPMENT WITH VIDEO ANALYTICS
TECHNICAL SPECIFICATION OF NETWORK VIDEO RECORDER (NVR)**

| S.No. | Description | Specification |
|--------------|--------------------|---|
| 1 | IP Camera Input | Minimum 16 Channel |
| 2 | Interface | HDMI, VGA |
| 3 | Resolution | Minimum 720p |
| 4 | OSD | Camera title, Time, Video loss, Camera lock, Motion detection, Recording |
| 5 | Display Split | Minimum 8 |
| 6 | Compression | H.264/MJPEG |
| 7 | Record Mode | Manual, Schedule(Regular(Continuous), MD, Alarm), Stop |
| 8 | Trigger Events | Recording, PTZ, Tour, Alarm, Video Push, Email, FTP, Snapshot, Buzzer & Screen tips |
| 9 | Video Detection | Motion Detection, MD Zones: 396(22×18), Video Loss & Camera Blank |
| 10 | Search Mode | Time/Date, Alarm, MD & Exact search (accurate to second), Smart search |
| 11 | Playback Function | Play, Pause, Stop, Rewind, Fast play, Slow play, Next file, Previous file, Next camera, Previous camera, Full screen, Repeat, Shuffle, Backup selection, Digital zoom |
| 12 | Backup Mode | USB Device/Network/Cloud |
| 13 | Network Function | HTTP, TCP/IP, IPv4/IPv6, UPNP, RTSP, UDP, SMTP, NTP, DHCP, DNS, IP Filter, PPPOE, DDNS, FTP, Alarm Server, IP Search |
| 14 | Max. User Access | Provided by bidder. |
| 15 | Smart Phone | iPhone, iPad, Android, Windows Phone |
| 16 | Storage | Should be able to store 24x7 video streams from connected cameras for in 720p HD quality as a minimum for 03 months |

Appendix -8

Bank Guarantee for Advance Payment

To: Chairman,
National Highway Authority
27 – Mauve Area, G-9/1
Islamabad, Pakistan.

SUPPLY, INSPECTION, INSTALLATION, TESTING, COMMISSIONING, TECHNICAL SUPPORT, MAINTENANCE AND MANAGEMENT OF AUTOMATIC VEHICLE CLASSIFICATION (AVC) BASED ELECTRONIC TOLL & TRAFFIC MANAGEMENT (ETTM) SYSTEM ON TOLL PLAZAS OF NATIONAL HIGHWAYS (N-5) PACKAGE-I OR PACKAGE-II

In accordance with the payment provision included in the Special Conditions of Contract, which amends Clause 16 of the General Conditions of Contract to provide for advance payment, [name and address of Supplier] (hereinafter called “the Supplier”) shall deposit with the Purchaser a bank guarantee to guarantee its proper and faithful performance under the said Clause of the Contract in an amount of [amount of guarantee in figures and words].

We, the [bank or financial institution], as instructed by the Supplier, agree unconditionally and irrevocably to guarantee as primary obligator and not as surety merely, the payment to the Purchaser on its final demand without whatsoever right of objection on our part and without its first claim to the Supplier, in the amount not exceeding [amount of guarantee in figures and words].

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

This guarantee shall remain valid and in full effect from the date of the advance payment received by the Supplier under the Contract until [date].

Yours truly,
Signature and seal of the Guarantors

[name of bank or financial institution]

[address]

[date]

Minimum Schedule of Required Equipment

To facilitate the bidders, a minimum Schedule of Required Equipment at lane, plaza and Ops Centre levels have been prepared as under. This schedule may require tailoring as per requirement of proposed solution, however, supporting equipment details and specs may remain the same.

Lane Level:

1. Toll Receipt printer
2. Electronic User Fare Display
3. Electronic Overhead lane sign
4. Lane Control system
5. Automatic Vehicle Classification system with sensors (Combination/Integration of Intrusive & Non-Intrusive Sensors) :
 - a. Treadle, Loops and other (if any).
 - b. Light curtain / Vehicle Tailgating Detection
 - c. Non-Intrusive Sensors
6. Cameras for:
 - a. Incident Image Grabbing
 - b. Automatic Number Plate Recognition
 - c. Lane Live Video Surveillance (**Where not installed**)
 - d. Live in Booth / Toll Collector Surveillance
7. Toll Barrier (Min. 01 per lane or as per system requirements)
8. Fog light / LED flasher
9. Air Conditioners (0.75ton in each lane)
10. Toll Collector input unit
11. Violation Siren
12. Cashless payment mechanism (with proper indication for commuters at toll plaza)
 - a. Indoor SMART card reader (all lanes)
 - b. Outdoor SMART Card Reader (Touch & Go) 02 Lanes per Bound per plaza
 - c. RFID & DSRC equipment in addition to cash (One per bound)
13. Booth furniture (Table, Chair & Cash Tray)
14. Pre-Installation Civil and Electrical Works to make the site receptive for the equipment
15. Man-holes (Where required)
16. Necessary Software Licenses

Plaza Level:

Control Room:

1. Live Monitoring computer for lane equipment, classifications and processes
2. Computer Tables x2 (5' x 2.5' x 3')
3. Incident display & acknowledgement Machine with peripherals
4. Two (02) Management Information System (MIS) clients for cash-up & reporting
5. Enterprise printer (Duplex-Network) with 40ppm, having minimum 150,000 paper duty cycle (HP / Epson / Panasonic or better brand)
6. Business Printer with 40 ppm – minimum 50,000 paper duty cycle
7. Air conditioners
8. 01 LED Screen for surveillance cameras (40"- Samsung / Sony or better)

9. 01 LED Screen for In-Booth cameras (40"- Samsung / Sony or better)
10. Equipment associated for Data Management & Communication
11. Necessary Software Licenses

Credit Card / Debit Card Reader for recharge / Sundry Payments (At RFID POS)

Plaza server machines must meet following minimum specifications:

1. Intel XEON Generation 9 processor or similar/better
2. At least 16GB RAM or better
3. Redundant (1+1) Power Supply

Server Room:

- a. Network Rack 42Ux2
- b. Servers for (As per requirement of the proposed solution):
 - i. Traffic, Revenue & Payment Data
 - ii. Video storage & Management
 - iii. Incident Images
 - iv. Any other Requirement
- c. NVR (As per requirement of the proposed solution)
- d. Redundant (1+1) UPS (APC, MGE, Emerson or better)
- e. Network Switches for Data, Images and Videos as per requirement of proposed solution (Must be PoE, Managed Mac bound)
- f. Air Conditioner (1+1)
- g. Dehumidifier
- h. PWM based Automatic Voltage Regulator (If not covered in UPS)
- i. Branded Good quality Tool kit for all plaza equipment
- j. Necessary Licenses

Lane Area Overall View:

PTZ Camera (01 per bound at each plaza)

Cash-Up Room:

Cash-up Counter (Minimum 04)

Earthing Pit:

Less than 01 ohm

Generator & Distribution Box:

- a. CUMINS / Perkins / SIEMEN or other renowned EU brand (Must be with MODBUS & SNMP Modules).
- b. Dedicated distribution box for equipment ONLY (Including ATS and Manual WAPDA / Generator change over)

Storage Capacities:

Minimum Data Retention at specific levels

Lane Level 01 Year

Plaza Level 05 Years

Ops Centre 07 Years

Video Plaza 03 Months 720p HD quality

Images Plaza 06 Months

Storages must comply RAID 10 redundancy with 15K RPM drives.

Ops Centre Level at NHA HQ:

1. Renovation, Interior Decoration, Painting, Electrification of room provided by NHA
2. Lane Live monitoring to show processes, equipment status, classifications
3. Latest wireless Multimedia projector with screen (Sony/Panasonic or better)
4. Network Racks 42Ux2
5. Servers for (As per requirement of the proposed solution):
 - a. Traffic, Revenue & Payment Data
 - b. Video storage & Management
 - c. Incident Images
 - d. Any other Requirement
6. 50,000 RFID Tags, 100 OBU, 50,000 Touch & Go Cards to be provided
7. Redundant (1+1) UPS (APC, MGE, Emerson or better)
8. Network Switches for Data, Images and Videos as per requirement of proposed solution (Must be PoE, Managed Mac bound)
9. Air Conditioners (n+1)
10. Glass Separation of Server room and network racks from the rest area
11. Enterprise printer (Duplex-Network) with 40ppm, having minimum 150,000 paper duty cycle (HP / Epson / Panasonic or better brand)
12. Business Printer with 40 ppm – minimum 50,000 paper duty cycle
13. PWM based Automatic Voltage Regulator (If not covered in UPS)
14. Branded Good quality Tool kit for all equipment
15. 5x Supervisor Machines Core i7, 1TB, 19" LED screens, Wireless Keyboard & Mouse with platforms/tables and good standard revolving chairs
16. Conference table with 5x good standard revolving chairs
17. Cupboards with locks (Properly labelled)
18. 2x 1TB External Drives (Western Digital or better)
19. 2x Core i7, Gen 6, 1TB, 8GB Dell Inspiron or better laptop
20. Equipment associated for Data Management and Communication on Fiber Optic
21. Necessary Licenses

Generator & Distribution Box:

- a. CUMINS / Perkins / SIEMENS or other renowned EU brand (Must be with MODBUS & SNMP Modules).
- b. Dedicated distribution box for equipment ONLY (Including ATS and Manual WAPDA / Generator change over)

*Notes: All the connections for the equipment at all levels (Lanes, plazas & Ops Centre) must be properly labelled and Wiring/Cabling layouts, connection drawings be provided to NHA in four (04) copies at the time of Installation.



**GOVERNMENT OF PAKISTAN
MINISTRY OF COMMUNICATIONS
NATIONAL HIGHWAY AUTHORITY**



**FINANCIAL PROPOSAL FORMS
(must be filled and sealed in separate
envelope) for**

**SUPPLY, INSPECTION, INSTALLATION, TESTING, COMMISSIONING,
TECHNICAL SUPPORT, MAINTENANCE AND MANAGEMENT**

OF

**AUTOMATIC VEHICLE CLASSIFICATION (AVC) BASED
ELECTRONIC TOLL & TRAFFIC MANAGEMENT (ETTM) SYSTEM
ON TOLL PLAZAS OF
NATIONAL HIGHWAYS
(N-5)**

PACKAGE-I

ISSUED TO: M/S _____

ISSUED BY: _____ DATE: _____

RECEIVED BY: _____ DATE: _____

Financial Bid Form

1. Having examined the bidding documents, the receipt of which is hereby duly acknowledged, we, the undersigned offer the following bid in conformity with the bidding documents which will include the cost of:

A. Supply, Installation, Commissioning of ETTM System on under mentioned toll plazas/traffic lanes along with Control Centers, Operations Center NHA HQ and allied civil works related to the system i.e. Pre-Installation works.

Rs. _____/-
(In words _____)

B. Technical Support & upkeep of ETTM Systems at toll plazas sites, control centre, operation centre as well as technical support for a period of three (03) years effective after successful commissioning.

Rs. _____/- per month x 36 months = Rs. _____/- (03 years Technical Support)

G. Total (A+B) = Rs. _____/- (Bid Breakup at FF-1(A&B), 2, 3, 4 & 4A)
(In words _____)

Package - I

| Sr. | Toll Plaza | Lanes |
|-----|--------------------------------|-----------|
| 1 | Iqbal Shaheed (Mullah Mansoor) | 8 |
| 2 | Harro | 8 |
| 3 | Sangjani | 12 |
| 4 | Mandra | 8 |
| 5 | Tarraki | 8 |
| | Total | 44 |

Notes:

- Invoice for part A of the Bid shall be paid as per Payment Procedure, Clause 28 of GCC.
- Invoice will be raised on monthly basis for part B i.e. Technical Support Period as per actual site requirement.
- All invoices will be in Pak Rupees.
- The bid price shall be inclusive of all taxes.

2. We undertake, if our Bid is accepted, to provide the services in accordance with terms and conditions as specified in the bidding documents.
3. If our Bid is accepted, we will obtain the Performance Guarantee in shape as defined in the bidding documents in a sum equivalent to the **10% of accepted bid amount.**
4. We agree to abide by this Bid for a period of One Hundred Eighty (180) days from the date fixed for Bid opening and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
5. Until a formal Contract is prepared and executed, this Bid, together with your written acceptance thereof and your notification of award shall constitute a binding Contract between us.
6. We confirm, if our Bid is accepted, that all partners of the contract/ joint venture will be liable jointly and severally for the execution of the Contract and the composition or the constitution of the joint venture shall not be altered without the prior consent of the Employer.

Dated this _____ day of Month _____ 20_____.

Signature _____ in the capacity of _____ duly authorized to sign bids for and on behalf of _____

Address:

Witness:

(Signature) _____

(Name) _____

Address: _____

Occupation: _____

FINANCIAL PROPOSAL FORMS

Notes:

- a. The information as required must be written on the sample forms provided herewith along with attachments of relevant documents. **In case the information has not been written in the forms and only documents are attached then the same shall not be considered for evaluation.**
- b. The applicant is expected to examine all instructions, forms and terms in the RFP and is required to furnish all information, documentation in a properly bound form, sealed and signed/stamped by the applicant. No loose paper will be accepted & No claim in this regard shall be entertained later. The documents must have page numbers & containing a proper index at the start.
- c. All forms should be signed, stamped, dated with the signatory name.

**WORK BREAK DOWN OF COSTS
AS MENTIONED IN SCOPE OF SERVICES**

A. (CAPEX)

| Sr. | Description | Qty. | Unit | Cost (Rs.) |
|-------------------|--|-------------|-------------|--|
| 1 | Supply, Inspection, Installation, Testing, Commissioning of ETTM System at Toll Plazas with AVC, complete in all respects including plaza control rooms, if required and all electric features, air conditioners, etc. (Itemized details of cost per lane and per toll plaza to be provided) | 01 | Job | |
| 2 | Establishment & Commissioning of Control Centers per Plaza. (Itemized details of cost per lane and per toll plaza to be provided) | 01 | Job | |
| 3 | Establishment of Operation Center at NHA HQ along with connectivity with sites. (Itemized details of cost per lane and per toll plaza to be provided) | 01 | Job | |
| 4 | Supply of Power-Backup System & Electric Connection (Detailed cost per lane and per toll plaza to be provided) | 01 | Job | |
| 5 | Connectivity Medium and its Installation between each toll plaza and NHA HQ (Itemized details of cost per lane and per toll plaza to be provided) | 01 | Job | N/A Already arranged by NHA. |
| 6 | Supply of Spare Parts required for regular repair/maintenance. (Itemized details of cost per lane and per toll plaza to be provided) | 01 | P.S. | Provisional Sum (P.S.) Rs. 100 Million |
| 7 | Online Surveillance System for each toll plaza at NHA HQ (Itemized details of cost per lane and per toll plaza to be provided) | 01 | Job | Where Applicable |
| 8 | Any related civil works required for the installation of ETTM system like cutting of road, ducting, fixers, fitting & electric connections etc complete in all respect as per requirement of the site conditions. (Itemized details of cost per lane and per toll plaza to be provided) | 01 | Job | |
| 9 | Supply of Corolla 1300cc or Equivalent Car with Registration and one year comprehensive insurance. | 01 No | | |
| 10 | Any Other Capital Expenditure (Itemized details of cost per lane and per toll plaza to be provided) | 01 | Job | |
| Totals (A) | | | | Rs. _____/- |

B. (OPEX)

| Sr. | Description | 1st yr | 2nd yr | 3rd yr |
|-------------------|--|--------------------------------|--------------------------|--------------------------|
| 1 | Technical Support & Maintenance of ETTM systems at sites & AVCs including staff etc. (Itemized details of cost per lane and per toll plaza to be provided) | | | |
| 2 | Connectivity Charges (Itemized details of cost per lane and per toll plaza to be provided) | N/A Already arranged by NHA | | |
| 3 | Upkeep of Centralized Data Centre at NHA HQ including staff (Itemized details of cost per lane and per toll plaza to be provided) | | | |
| 4 | Any other Operational Expenditure (Itemized details of cost per lane and per toll plaza to be provided) | | | |
| Sub Total | | | | |
| Totals (B) | | | | |
| | | | | |

Miscellaneous Costs (for Out-Station Visits)

For out-of-station visits throughout Pakistan as and when ordered by NHA, the staff shall be entitled to the following fixed payments/reimbursements by the NHA from Provisional Sum, without production and submission of any bills, except for the original air ticket and POL receipts:-

- a. Daily Allowance

| | |
|--------------------|------------|
| Technical Managers | Rs. 3500/- |
| Support Engineers | Rs. 2500/- |
- b. Boarding Allowance

| | |
|--------------------|------------|
| Technical Managers | Rs. 3500/- |
| Support Engineers | Rs. 2500/- |

BREAKDOWN OF RATES FOR STAFF

Project: _____ Firm: _____

| Position | Qualification | Basic Salary per Cal. Month | Social Charges (%age of 1) | Overhead (%age of 1+2) | Sub-Total (1+2+3) | Fee (%age of 4) | Rate per Month for project Office | Field Allow. (%age of 1) | Rate per Month for Field Work |
|----------|---------------|-----------------------------|----------------------------|------------------------|-------------------|-----------------|-----------------------------------|--------------------------|-------------------------------|
| | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Notes:

- Item No. 1 Basic salary shall include actual gross salary before deduction of taxes.
- Item No. 2 Social charges shall include Client’s contribution to social security, paid vacation, average sick leave and other standard benefits paid by the company to the employee.
- Item No. 3 Overhead shall include general administration cost, rent, clerical and junior professional staff and business getting expenses, etc.
- Item No. 5 Fee shall include company profit and share of salary of partners and directors (if not billed individually for the project) or indicated in overhead costs of the Company.
- Item No. 7 Normally payable only in case of field work under hard and arduous conditions.

Note: The minimum percentage of item (1) should be preferably 50% of (8).

Full Name: _____
 Signature: _____
 Title: _____

ESTIMATED SALARY COSTS/ REMUNERATION

| Sr. No. | Position | Minimum Qualification | Nos. | Man-Months | Monthly Remuneration Rate | Total Estimated Amount (Rs.) |
|---------|----------|-----------------------|------|------------|---------------------------|------------------------------|
| | | | A | $B=A*12$ | Rs. | Rs. |
| | | | | | | |
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DIRECT (NON-SALARY) COSTS

| Sr. No | Head | Unit | Qty. | Unit Price | Total Amount | Remarks |
|---------------|---|-------------|-------------|-------------------|---------------------|----------------|
| 1. | | | | | | |
| 2. | | | | | | |
| 3. | | | | | | |
| 4. | | | | | | |
| 5. | | | | | | |
| 6. | | | | | | |
| 7. | | | | | | |
| | TOTAL: (to be carried to Form FF-5) | | | | | |

COST OF O&M ACTIVITIES AS MENTIONED IN
SCOPE OF SERVICES
(LUMP SUM MONTHLY COSTS)

| Sr. No. | Description | Amount (Rs.) |
|--------------------|--------------------|---------------------|
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| | | |
| | Total | |



**GOVERNMENT OF PAKISTAN
MINISTRY OF COMMUNICATIONS
NATIONAL HIGHWAY AUTHORITY**



**FINANCIAL PROPOSAL FORMS
(must be filled and sealed in separate
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**SUPPLY, INSPECTION, INSTALLATION, TESTING, COMMISSIONING,
TECHNICAL SUPPORT, MAINTENANCE AND MANAGEMENT**

OF

**AUTOMATIC VEHICLE CLASSIFICATION (AVC) BASED
ELECTRONIC TOLL & TRAFFIC MANAGEMENT (ETTM) SYSTEM
ON TOLL PLAZAS OF
NATIONAL HIGHWAYS
(N-5)**

PACKAGE-II

ISSUED TO: M/S _____

ISSUED BY: _____ DATE: _____

RECEIVED BY: _____ DATE: _____

Financial Bid Form

1. Having examined the bidding documents, the receipt of which is hereby duly acknowledged, we, the undersigned offer the following bid in conformity with the bidding documents which will include the cost of:

A. Supply, Installation, Commissioning of ETTM System on under mentioned toll plazas/traffic lanes along with Control Centers, Operations Center NHA HQ and allied civil works related to the system i.e. Pre-Installation works.

Rs. _____/-
(In words _____)

B. Technical Support & upkeep of ETTM Systems at toll plazas sites, control centre, operation centre as well as technical support for a period of three (03) years effective after successful commissioning.

Rs. _____/- per month x 36 months = Rs. _____/- (03 years Technical Support)

G. Total (A+B) = Rs. _____/- (Bid Breakup at FF-1(A&B), 2, 3, 4 & 4A)
(In words _____)

Package - II

| Sr. | Toll Plaza | Lanes |
|-----------|------------|-----------|
| 1 | Jehlum | 8 |
| 2 | Chenab | 8 |
| 3 | Gujranwala | 12 |
| 4 | Harrappa | 8 |
| 5 | Khanbela | 8 |
| Total (B) | | 44 |

Notes:

- Invoice for part A of the Bid shall be paid as per Payment Procedure, Clause 28 of GCC.
- Invoice will be raised on monthly basis for part B i.e. Technical Support Period as per actual site requirement.
- All invoices will be in Pak Rupees.
- The bid price shall be inclusive of all taxes.

2. We undertake, if our Bid is accepted, to provide the services in accordance with terms and conditions as specified in the bidding documents.
3. If our Bid is accepted, we will obtain the Performance Guarantee in shape as defined in the bidding documents in a sum equivalent to the **10% of accepted bid amount.**
4. We agree to abide by this Bid for a period of One Hundred Eighty (180) days from the date fixed for Bid opening and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
5. Until a formal Contract is prepared and executed, this Bid, together with your written acceptance thereof and your notification of award shall constitute a binding Contract between us.
6. We confirm, if our Bid is accepted, that all partners of the contract/ joint venture will be liable jointly and severally for the execution of the Contract and the composition or the constitution of the joint venture shall not be altered without the prior consent of the Employer.

Dated this _____ day of Month _____ 20_____.

Signature _____ in the capacity of _____ duly authorized to sign bids for and on behalf of _____

Address:

Witness:

(Signature) _____

(Name) _____

Address: _____

Occupation: _____

FINANCIAL PROPOSAL FORMS

Notes:

- a. The information as required must be written on the sample forms provided herewith along with attachments of relevant documents. **In case the information has not been written in the forms and only documents are attached then the same shall not be considered for evaluation.**
- b. The applicant is expected to examine all instructions, forms and terms in the RFP and is required to furnish all information, documentation in a properly bound form, sealed and signed/stamped by the applicant. No loose paper will be accepted & No claim in this regard shall be entertained later. The documents must have page numbers & containing a proper index at the start.
- c. All forms should be signed, stamped, dated with the signatory name.

**WORK BREAK DOWN OF COSTS
AS MENTIONED IN SCOPE OF SERVICES**

A. (CAPEX)

| Sr. | Description | Qty. | Unit | Cost (Rs.) |
|-------------------|--|-------------|-------------|--|
| 1 | Supply, Inspection, Installation, Testing, Commissioning of ETTM System at Toll Plazas with AVC, complete in all respects including plaza control rooms, if required and all electric features, air conditioners, etc. (Itemized details of cost per lane and per toll plaza to be provided) | 01 | Job | |
| 2 | Establishment & Commissioning of Control Centers per Plaza. (Itemized details of cost per lane and per toll plaza to be provided) | 01 | Job | |
| 3 | Establishment of Operation Center at NHA HQ along with connectivity with sites. (Itemized details of cost per lane and per toll plaza to be provided) | 01 | Job | |
| 4 | Supply of Power-Backup System & Electric Connection (Detailed cost per lane and per toll plaza to be provided) | 01 | Job | |
| 5 | Connectivity Medium and its Installation between Gujranwala toll plaza and NHA HQ (Itemized details of cost per lane and per toll plaza to be provided) | 01 | Job | Where Applicable |
| 6 | Supply of Spare Parts required for regular repair/maintenance. (Itemized details of cost per lane and per toll plaza to be provided) | 01 | P.S. | Provisional Sum (P.S.) Rs. 100 Million |
| 7 | Online Surveillance System for each toll plaza at NHA HQ (Itemized details of cost per lane and per toll plaza to be provided) | 01 | Job | Where Applicable |
| 8 | Any related civil works required for the installation of ETTM system like cutting of road, ducting, fixers, fitting & electric connections etc complete in all respect as per requirement of the site conditions. (Itemized details of cost per lane and per toll plaza to be provided) | 01 | Job | |
| 9 | Supply of Cultus 1000cc or Equivalent Car with Registration and one year comprehensive insurance. | 01 No | | |
| 10 | Any Other Capital Expenditure (Itemized details of cost per lane and per toll plaza to be provided) | 01 | Job | |
| Totals (A) | | | | Rs. _____/- |

B. (OPEX)

| Sr. | Description | 1st yr | 2nd yr | 3rd yr |
|-------------------|--|--------------------------|--------------------------|--------------------------|
| 1 | Technical Support & Maintenance of ETTM systems at sites & AVCs including staff etc. (Itemized details of cost per lane and per toll plaza to be provided) | | | |
| 2 | Connectivity Charges Gujranwala – NHA HQ (Itemized details of cost per lane and per toll plaza to be provided) | | | |
| 3 | Upkeep of Centralized Data Centre at NHA HQ including staff (Itemized details of cost per lane and per toll plaza to be provided) | | | |
| 4 | Any other Operational Expenditure (Itemized details of cost per lane and per toll plaza to be provided) | | | |
| Sub Total | | | | |
| Totals (B) | | | | |
| | | | | |

Miscellaneous Costs (for Out-Station Visits)

For out-of-station visits throughout Pakistan as and when ordered by NHA, the staff shall be entitled to the following fixed payments/reimbursements by the NHA from Provisional Sum, without production and submission of any bills, except for the original air ticket and POL receipts:-

- a. Daily Allowance
 - Technical Managers Rs. 3500/-
 - Support Engineers Rs. 2500/-
- b. Boarding Allowance
 - Technical Managers Rs. 3500/-
 - Support Engineers Rs. 2500/-

BREAKDOWN OF RATES FOR STAFF

Project: _____ Firm: _____

| Position | Qualification | Basic Salary per Cal. Month | Social Charges (%age of 1) | Overhead (%age of 1+2) | Sub-Total (1+2+3) | Fee (%age of 4) | Rate per Month for project Office | Field Allow. (%age of 1) | Rate per Month for Field Work |
|----------|---------------|-----------------------------|----------------------------|------------------------|-------------------|-----------------|-----------------------------------|--------------------------|-------------------------------|
| | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Notes:

- Item No. 1 Basic salary shall include actual gross salary before deduction of taxes.
- Item No. 2 Social charges shall include Client’s contribution to social security, paid vacation, average sick leave and other standard benefits paid by the company to the employee.
- Item No. 3 Overhead shall include general administration cost, rent, clerical and junior professional staff and business getting expenses, etc.
- Item No. 5 Fee shall include company profit and share of salary of partners and directors (if not billed individually for the project) or indicated in overhead costs of the Company.
- Item No. 7 Normally payable only in case of field work under hard and arduous conditions.

Note: The minimum percentage of item (1) should be preferably 50% of (8).

Full Name: _____

Signature: _____

Title: _____

ESTIMATED SALARY COSTS/ REMUNERATION

| Sr. No. | Position | Minimum Qualification | Nos. | Man-Months | Monthly Remuneration Rate | Total Estimated Amount (Rs.) |
|---------|----------|-----------------------|------|------------|---------------------------|------------------------------|
| | | | A | $B=A*12$ | Rs. | Rs. |
| | | | | | | |
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DIRECT (NON-SALARY) COSTS

| Sr. No | Head | Unit | Qty. | Unit Price | Total Amount | Remarks |
|---------------|---|-------------|-------------|-------------------|---------------------|----------------|
| 1. | | | | | | |
| 2. | | | | | | |
| 3. | | | | | | |
| 4. | | | | | | |
| 5. | | | | | | |
| 6. | | | | | | |
| 7. | | | | | | |
| | TOTAL: (to be carried to Form FF-5) | | | | | |

COST OF O&M ACTIVITIES AS MENTIONED IN
SCOPE OF SERVICES
(LUMP SUM MONTHLY COSTS)

| Sr. No. | Description | Amount (Rs.) |
|------------|--------------|--------------|
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| | | |
| | Total | |