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**GOVERNMENT OF ASSAM
ENVIRONMENT & FOREST DEPARTMENT
OFFICE OF THE DIVISIONAL FOREST OFFICER,
EASTERN ASSAM WILDLIFE DIVISION, KAZIRANGA TIGER RESERVE, BOKAKHAT**

**TENDER DOCUMENT
FOR**

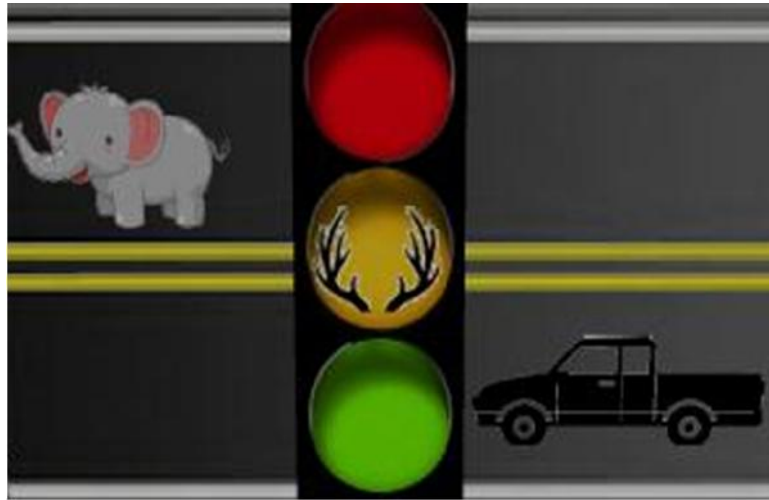
**Affixing an Automatic Operation and Control System
Consisting of
Animal Sensors
and
Other Requisite Equipment and Software
on the
NH37 at one of the Specified Sections,
About 300-500 m in Length and 12-15m in width
2 Lane Highway
for
Tracking and Signaling
for
Stoppage of Vehicular Traffic
on
Either Side of the Road
When Animals are about to cross it across the Corridor**

2016



CHAPTER I

TENDER NOTICES





**OFFICE OF THE DIVISIONAL FOREST OFFICER, EASTERN ASSAM
WILDLIFE DIVISION, KAZIRANGA NATIONAL PARK, BOKAKHAT**

SHORT TENDER NOTICE

Sealed tender affixing non-refundable court fee stamp of a minimum value of Rs. 8.25 (Rupees eight and paise twenty five) only are invited from eligible registered Supplier/Firms for supply, installation and commissioning of various articles for affixing an automatic operation and control system consisting of animal sensors and other requisite equipment and software on the NH37 at one of the specified sections, about 300-500 m in length and 12-15m in width 2 lane highway for tracking and signaling for stoppage of vehicular traffic on either side of the road when animals are about to cross it across the corridor. The detailed tender notice can be seen at www.assamforest.in. Interested bidders are required to procure the tender document by paying an amount of Rs. 5,000.00 (Rupees five thousand) only, being non refundable tender fee in cash or a demand draft drawn in favor of the Kaziranga Tiger Conservation Foundation payable at Bokakhat. The tender document can be purchased from the office of the undersigned till 4.00 PM of 29th July, 2016 and or can be downloaded freely from the website and submitted along with a demand draft of of Rs. 5,000.00 (Rupees five thousand) only. Tenders will be received upto 3.00 PM (IST) on the 10th August, 2016 at the office of the undersigned. The undersigned reserves the right to cancel or reject any or all tenders without assigning any reasons.

Sd/-

Divisional Forest Officer,
Eastern Assam Wildlife Division, Bokakhat

Memo No. B/WLG/NGT/5772

Dated Bokakhat 14th July, 2016

Copy to the Director of Information & Public Relation, Assam, Dispur, Guwahati– 06 along with 5 (five) copies of the “Notice” with a request to publish the same in at least two local dailies of the State. This may kindly be published immediately for wide publicity.

Sd/-

Divisional Forest Officer
Eastern Assam Wildlife Division
Bokakhat

Memo no. A/WLG/NGT/3215

Dated Bokakhat 14th July 2016

Copy to the Director, Kaziranga National Park, Bokakhat for favour of his kind information.

Sd/-

Divisional Forest Officer.
Eastern Assam Wildlife Division
Bokakhat



**OFFICE OF THE DIVISIONAL FOREST OFFICER, EASTERN ASSAM
WILDLIFE DIVISION, KAZIRANGA NATIONAL PARK, BOKAKHAT**

SHORT TENDER NOTICE

Sealed tender affixing non-refundable court fee stamp of a minimum value of Rs. 8.25 (Rupees eight and paise twenty five) only are invited from eligible registered Supplier/Firms for supply, installation and commissioning of various articles for an automatic operation and control system consisting of animal sensors and other requisite equipment and software on the NH37 at one of the specified sections, about 300-500 m in length and 12-15m in width 2 lane highway for tracking and signaling for stoppage of vehicular traffic on either side of the road when animals are about to cross it across the corridor. The detailed tender notice can be seen at www.assamforest.in. Interested bidders are required to procure the tender document by paying an amount of Rs. 5,000.00 (Rupees five thousand) only, being non refundable tender fee in cash or a demand draft drawn in favor of the Kaziranga Tiger Conservation Foundation payable at Bokakhat. The tender document can be purchased from the office of the undersigned till 4.00 PM of 29th July , 2016 and or can be downloaded freely from the website and submitted along with a demand draft of of Rs. 5,000.00 (Rupees five thousand) only. Tenders will be received upto 3.00 PM (IST) on the 10th August, 2016 at the office of the undersigned. The undersigned reserves the right to cancel or reject any or all tenders without assigning any reasons.

Divisional Forest Officer,
Eastern Assam Wildlife Division, Bokakhat



GOVERNMENT OF ASSAM
OFFICE OF THE DIVISIONAL FOREST OFFICER::EASTERN ASSAM WILDLIFE
DIVISION
KAZIRANGA NATIONAL PARK::BOKAKAHT

Tender No. KNP/02/2016

Dt. 14th July, 2016

NOTICE INVITING TENDER

Sealed tender affixing non-refundable court fee stamp of a minimum value of Rs. 8.25 (Rupees eight and paise twenty five) only are invited from eligible registered Supplier/Firms for supply, installation and commissioning of various articles for affixing an automatic operation and control system consisting of animal sensors and other requisite equipment and software on the NH37 at one of the specified sections, about 300-500 m in length and 12-15m in width 2 lane highway for tracking and signaling for stoppage of vehicular traffic on either side of the road when animals are about to cross it across the corridor. The detailed tender notice can be seen at www.assamforest.in. Interested bidders are required to procure the tender document by paying an amount of Rs. 5,000.00 (Rupees five thousand) only, being non refundable tender fee in cash or a demand draft drawn in favor of the Kaziranga Tiger Conservation Foundation payable at Bokakhat. The tender document can be purchased from the office of the undersigned till 4.00 PM of 29th JULY, 2016 and or can be downloaded freely from the website and submitted along with a demand draft of of Rs. 5,000.00 (Rupees five thousand) only. Tenders will be received upto 3.00 PM (IST) on the 10th AUGUST, 2016 at the office of the undersigned. The undersigned reserves the right to cancel or reject any or all tenders without assigning any reasons. The bids may be submitted by registered Suppliers/Firms or prospective eligible and qualified suppliers / Firms, as per the eligibility and qualification terms and conditions given below, bidders who are a company registered under the Registration of Companies Act, 1956, or a proprietary firm in business in India or an authorized agent of a company registered abroad, or an authorized agent of any one of the Govt. of India, Ministry of Defence PSUs, namely BEL, ECIL etc, or other Govt of India PSUs or OEMs in India or abroad and or their authorised distributors in India manufacturing or dealing or having experience in animal sensors/ electronic sensor and control systems for at least five financial years i.e since 1st April, 2010, having an average turn over of Rs. 3.00 (Three) crore for the financial years 2013-14 , 2014-15 and 2015-16 **hereinafter called bidder**, for supply, installation and commissioning of various articles as mentioned in the table below for a pilot project for affixing an automatic operation and control system consisting of animal sensors and other requisite equipment and software on the NH37 at one of the specified sections, about 300-500 m in length and 12-15m in width 2 lane highway for tracking and signaling for stoppage of vehicular traffic on either side of the road when animals are about to cross it across the corridor. The animals could range from snakes and reptiles to bigger animals such as tigers and other cats, civets, deer, rhino, buffalo, elephants etc. On signalling, traffic control lights should go red at the either end of the marked crossing zone which could be 300-500m long stretch on the highway. If the pilot is successful, it would be replicated in other stretches of the fragmented corridors of the Kaziranga National Park along the NH37. The tentative estimated list of equipment and sensors is given below:-

No.	Item Description	Estimated Qty
1.	Optical Camera with IR/ Night Vision capability	12
2.	Thermal Cameras	02
3.	Traffic Lights	02
4.	Traffic Barrier	02
5.	Radio / Wireless system for Data Transfer & Communication	01
6.	Poles	15
7.	Intrusion Cable/PIR/Laser Sensors Assembly System/ Radar	Adequate quantities to cover 300m stretch on either side of the road based on technology used
8.	Adequate battery bank for back up power up to 4 hours	
9.	Solar panels of adequate capacity to power all field equipment including control room cabin (NO ELECTRICITY SUPPLY AVAILABLE)	
10.	Software COTS/Customized including Operating systems (preferably on GNU/Linux) for controlling and operating the sensor systems and other devices/ data storage & archival/ operation console	
11.	Storage Devices (1 month video storage / Servers / PCs/ L2/L3 Switches/ Racks etc with redundancies	
12.	Low power D.C. Display panels	
13.	Miscellaneous items i.e. signages (electronic and others) cables, Nut Bolt, clamps, mounts etc.	
14.	Civil Work	
15.	Onsite Control Room Cabin	01
16.	Installation, commissioning & training and running & fine-tuning the sensor system against false alarms for at least 6 months with onsite manpower support	
17.	5 years on site warranty support	

The bidder shall have to submit an Earnest Money Deposit (EMD) of 2% (two percent) value of the estimated total cost quoted by the bidder including all taxes, levies and duties for the items mentioned in the table above, in form of Bank Guarantee/ Fixed deposit/ Demand Draft in favour of Kaziranga Tiger Conservation Foundation payable at Bokakhat of any nationalized bank in India.

Eligibility and Pre-Qualification:

(I) The bidder should be a company registered under the Registration of Companies Act, 1956, or a proprietary firm in business in India for at least three years i.e since 1st April, 2010, or an authorized agent of any one of the Govt. of India, Ministry of Defence PSUs, namely BEL, ECIL etc, or other Govt of India PSUs or OEMs in India or abroad and or their authorised distributors in India manufacturing or dealing or having experience in animal sensors/ electronic sensor and control systems for at least five financial years i.e. since 1st April, 2010, having an average turn over of Rs. 3.00 (Three) crore for the financial years 2013-14, 2014-15 and 2015-16.

(II) The bidder must have valid Income Tax PAN, Service Tax registration, VAT registration, IEC Code for import/ export (applicable only for any items to be directly imported by the bidder. In case, the bidder

is only an agent acting on behalf of an OEM, the IEC code of the OEM must be quoted).

(III) For providing after sales service, the bidder must have office/ agent at Guwahati, or Golaghat, or Bokakhat or Nagaon or Jakhlabandha.

(IV) The bidder should have appropriate ISO certification for quality management.

(V) The bidder should not be blacklisted by the Govt. of India or the Govt. of Assam.

(VI) Further, In case the product/ brand/ model quoted by the bidder meets the criteria of number/ value/ specifications, and the bidder, otherwise qualifying, quotes such a product, proof of sale of the product by OEM must be furnished by the bidder. OEM, Original Equipment Manufacturer, being defined here as the entity who is either directly manufacturing the product in a facility in India or abroad, or is a sole authorized agent of such an OEM of a product manufactured outside India, or the Principals of the product in India. OEM/Principals have together been addressed as OEM in this NIT. In all cases, the bidder must submit OEM authorization):-

Eligibility Criteria	Demo/Technical Presentation
<ul style="list-style-type: none"> The bidder must have supplied successfully with customer satisfaction to the Govt. of India or Govt of Assam or any other State Govt. in India or any Govt. agency equipment such as camera, controllers, sensors, RF equipment, traffic control system etc. goods in last five years i.e. from 1st April, 2010 till date of a minimum order value of Rs. 50.00 (Fifty) lakhs 	<p>Demonstration/ technical presentation of the proposed animal sensor system by the bidder is a must on the date specified for the purpose. The bidder may be rejected at the presentation level itself if its is found that the bidder's presentation is not upto the mark or lacks coherence and technical details, and he is not able to answer all the questions or meet the technical challenges on the ground such as thick fog, high floods, false alarms, interference from cattle and humans walking on the road or any other challenge or if the technology is found deficient and unfit for deployment.</p>

Dates and Timelines:

As the Hon'ble National Green Tribunal has directed for immediate installation of animal sensors on the corridors of the Kaziranga National Park on the NH37, the time-lines have been kept very slim and would be strictly adhered to. Bidders who are confident of meeting the specifications, qualifications and eligibility criteria within the specified time period only need apply. No request for change of dates etc. shall be entertained, unless the Park authorities decide otherwise due to any contingent situation. The brief of the time-lines etc. is given below:-

Event	Date and Time, Place and Address
NIT No. Tender No. KNP/02/2016	
Date of start of Sale of Tender Document	15 th July, 2016
Date of stop of Sale of Tender Document at the office of the DFO, Eastern Assam Wildlife, Division, Bokakhat	29 th July, 2016 4.00 PM
Venue of Sales	Office of the Divisional Forest Officer, Eastern Assam Wildlife Division, Bokakhat, Distt. Golaghat Assam PIN: 785612 Email: dfo.eawl@gmail.com Phone: +91- 3776-268095
Timings of Sales	11.00 AM to 4.00 PM on all days including holidays
Cost of Tender Document	Rs. 5,000.00 (Rupees five thousand only)
Mode of payment	Cash/ DD/ Banker's Cheque drawn in favour of the Kaziranga Tiger Conservation Foundation payable at Bokakhat
Last date of submission of Queries and Clarifications (in writing by letter or email)	1 st August, 2016 4.00 PM
Last date of issuance of clarifications	3 rd August, 2016
Onus of collection of clarifications	Solely on the bidder
Soft copy of the bid	Available at www.kaziranga.assam.gov.in
Last date of submission of bids	10 th August, 2016 3.00 PM
Venue of Bid Submission	Same as Venue for Sales
Date and Time of Opening of the Pre-Qualification	10 th August, 2016 4.00 PM
Opening of Technical Bids	11 th August, 2016, 11.00 AM
Demo/ Presentation by Bidders	17 th August, 2016, 11.00 AM
Opening of Financial Bids	19 th August, 2016, 11.00 AM
The Bidding System	Three Part QCBS: Pre-Qualification, Technical Bid and Commercial Bid, with 60:40 marking on the Technical

	and Commercial Bid respectively, as per the World Bank procurement procedures.
Submitting Envelops	The bidder must enclose the Pre-Qualification, Technical and Financial Bids in three separate envelopes and seal them individually. The bidder must clearly mention on the envelopes in capital letters “ PRE-QUALIFICATION ”, “ TECHNICAL BID ” or “ FINANCIAL BID ”. All the three sealed envelopes then, must be put in an outer envelop . The outer envelop must also be sealed . Each envelop, whether inner or outer must contain clearly the name and address of the Bidder. All the envelopes, whether inner or outer, must also clearly mention the Tender No. KNP/ 02 /2016 Dt.14 July, 2016 .
Mode of EMD Payment	Bank Guarantee/ Fixed Deposit/ Demand Draft drawn in favour of the Kaziranga Tiger Conservation Foundation valid for 90 days payable at Bokakhat of any nationalized bank in India
Bid validity	180 days
Documents	All documents in support of the claim of the bidders must be submitted.
Signing of Tender Document	Each page of the tender document and all other documents, other than printed material (meaning printed/ published brochures in hard copy format), including Internet based material and their print outs must be signed in ink/ball point pen by the authorized signatory on behalf of the bidding entity, affixing the company seal and signature of the authorized person.
Authorized Signatory	The bidder must submit the authorization of the individual appending his/her signature on the tender document as authorized signatory on behalf of the bidder. The same must be signed either by the proprietor (or one of the Proprietor, in case of a joint partnership Firm), and the chartered accountant of the Firm (with the code of the CA) or by one of the directors and the Company Secretary in case of a company registered under RoC Act, 1956.
Part No, Model and Make	The bidder must mention explicitly the Part No/ Model No. /Make and Brand of the products quoted in the technical bid, and all technical product brochure
Automatic Sensor System Information and Flowchart	The bidder must submit a comprehensive technology for operation and control of the sensor system for the animal sensor system proposed by the bidder and must include flowcharts for operation, trigger & alarm sequences, vandal proof and safe against animals such as monkeys

GENERAL NOTICE:

The bidders may note that **Office of The Divisional Forest Officer, Eastern Assam Wildlife Division, Kaziranga Tiger Reserve Bokakhat, Assam** SHALL NOT BE HELD RESPONSIBLE FOR LOSS/DELAY IN RECEIVING TENDER OR FOR ANY ACT BEYOND THE CONTROL OF KAZIRANGA TIGER RESERVE.

Interested bidders are required to procure the tender document by paying an amount of Rs. 5,000.00 (Rupees five thousand) only, being non refundable tender fee in cash or a demand draft drawn in favor of the Kaziranga Tiger Conservation Foundation. The tender document can be purchased from the office of the undersigned till 4.00 PM of 29th July, 2016; and and or can be downloaded freely from the website and submitted along with a demand draft of of Rs. 5,000.00 (Rupees five thousand) only ; and the tenders will be received upto 3.00 PM (IST) on the 10th August, 2016 at the office of the undersigned. The undersigned reserves the right to cancel or reject any or all tenders without assigning any reasons thereof.

Sd/-

Divisional Forest Officer,
Eastern Assam Wildlife Division, Bokakhat

CHAPTER 2
UNDERTAKING OF THE TENDERER
TO BE SUBMITTED WITH TECHNICAL BID

I/We have read carefully and examined the notice inviting tender, schedule, General Rules and terms and conditions of the contract, special conditions, Schedule of Rates and other documents and Rules referred to in the tender document.

I/We hereby tender my rates for the execution of the work as specified within the time stipulated in the schedule in accordance with all aspects with the specifications, designs, drawings and instructions with such conditions so far as applicable.

A sum as per the EMD requirement indicated in the tender is hereby forwarded as earnest money in the form of crossed demand draft/Bank Guarantee/ Fixed deposit in favour of the Kaziranga Tiger Conservation Foundation payable at Bokakhat. If I/We, fail to commence or complete the work ordered in specified time I/We agree that the Department of Forest, Government of Assam, shall, without prejudice to any other right or remedy, be at liberty to forfeit the said Earnest Money absolutely.

The said Earnest Money shall be retained by Department of Forest, Government of Assam, towards security deposit to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to therein and to carry out such deviations as may be required by Department of Forest, Government of Assam; and would be in addition to, in event of becoming a successful bidder, the Performance Bank Guarantee of 10% of the award that I/We shall submit.

I/We hereby declare that I/We shall treat the tender documents, specifications and other records connected with the work as secret/confidential and shall not communicate information derived there-from to any person other than a person to whom I/We have authorized to communicate the same or use the information in any manner prejudicial to the safety of Department of Forest, Government of Assam/the State Govt.

I/We shall abide to all the laws and shall be responsible for making payments of all the taxes, duties, levies and other Govt. dues etc. to the appropriate Govt. departments.

Our Service Tax Registration No. is _____ and CST registration No. _____ . The PAN No. under the Income Tax Act is _____ TIN NO. _____ I/We shall be responsible for the payment of the respective taxes to the appropriate authorities and should I/we fail to do so, I/we hereby authorize Department of Forest, Government of Assam, to recover the taxes due from us and deposit the same with the appropriate authorities on their demand.

Dated:

Signature

Place: (Name of Tenderer with seal)

Witness

Signature:

Name:

Postal Address:

CHAPTER 3
INSTRUCTIONS TO THE BIDDERS
PART I

1. Department of Forest, Government of Assam invites sealed offers for **“Affixing an automatic operation and control system consisting of animal sensors and other requisite equipment and software on the NH37 at one of the specified sections, about 300-500 m in length and 12-15m in width 2 lane highway for tracking and signaling for stoppage of vehicular traffic on either side of the road when animals are about to cross it across the corridor”**.
2. Tenders should only be dropped in the tender box kept in **Office of “The Divisional Forest Officer, Eastern Assam Wildlife Division, Kaziranga Tiger Reserve Bokakhat, Assam**, on or before 10th August 2016 **till 3.00 PM**. Tenders received after the time and dates shall not be considered. Covers should invariably be super-scribed **“Affixing an automatic operation and control system consisting of animal sensors and other requisite equipment and software on the NH37” & also name of the tenderer in block letters**.
3. **Eligibility and qualification criteria:**
 - A. As mentioned in the Notice Inviting Tender.
 - B. The documentary evidence for meeting the eligibility criteria must mandatorily be submitted along with offer.
4. Bid should be submitted in **Three Cover System** containing three parts as detailed below

Part I: Pre-Qualification bid to be kept in sealed cover marked “Pre-Qualification Bid”

Part II: Technical bid to be kept in the sealed cover marked “Technical Bid”.

Part III: Commercial bid to be kept in the second sealed cover marked “Financial Bid”

Pre-Qualification Bid: The Pre-Qualification shall contain the Annexure-I of the tender Document with all its enclosures including Court Fee Stamp/ EMD/ Proof of the eligibility criteria.

Technical Bid: The Technical bid shall contain the technical specifications / literature/ product brochures/ certifications/ of all the instruments/equipment’s/software/structures which will be used for the **an automatic operation and control system consisting of animal sensors and other requisite equipment and software on the NH37**. The samples etc. need to be submitted separately, as a part of the Tender. It must also contain the Unpriced Bill of Materials (BoM).

Financial Bid: The Financial bid shall contain only the rates offered by the bidders for any one or more categories of goods and services as per the Financial Bid Format. It must also contain the Priced Bill of Materials (BoM).

The Technical Bid will be opened and eligible bidders meeting all the requirements will be short listed. The bidders may be required to give presentation of their solution before the Purchaser. Thereafter, Financial Bid of only short listed bidders will be opened.

Successful Bidder may be required to sign MOU in connection with implementation/Installation of the project and thereafter 6 (six) months of running the project after commissioning and

successful demonstration. The MOU will include availability of Service Centre and Service Engineer, Standard of Performance, Use of Contract Documents, performance contract etc.

Bidders are required to quote rates including all the taxes and duties. Rates should be quoted F.O.R. door delivery basis at the Kaziranga Tiger Reserve Bokakhat – 785612, Assam including installation, testing and warranties. The rate should be written only in prescribed form enclosed with the tender document. No price preference will be given to the bidder for this tender.

5. Account Payee Demand Draft, Fixed Deposit Receipt or Bank Guarantee payable at Bokakhat, Distt Golaghat, Assam (INDIA) on any scheduled bank is to be submitted along with the tender as Earnest Money Deposit (EMD). Unsuccessful bidder EMD will be released after finalization of tender and for the successful bidders EMD will be released after receiving the Performance Security Deposit/ Performance Bank Guarantee.
6. Successful Bidder will be required to submit Performance Bank Guarantee on any scheduled bank @10% of the total price quoted for the items for which he has been short-listed as a Performance Security Deposit/ Performance Bank Guarantee.
7. The bid should reach to the authority within the specified time frame. No bid shall be accepted after the last date and time for receiving the bid.
8. The bid shall be submitted as per the terms and conditions as laid down in the tender document. If any bid found faulty shall liable to be summarily to be rejected.
9. Liquidated damages may be imposed for defaults/inordinate delays on the part of the supplier.
10. No representation shall be accepted after opening of the tender.
11. The Purchaser reserves the right to change the date and time of tender opening.
12. The Purchaser also reserves the right to accept, reject or cancel tender without assigning any reason.

ADDITIONAL SPECIAL CONDITIONS FOR TENDER DOCUMENT RECEIVED BY E-MAIL.

- a) Tenderers may request sending of the Tender Document through Email facility for convenience of Tenderer/s, after depositing the requisite Tender Fee. The Purchaser, however, reserves right to extend this facility for selected works or continue only with direct sale of tender forms. In case of failure or delay or incomplete document download by email/Internet, whatsoever reasons, the Purchaser shall not be responsible in anyway. The Purchaser shall not be responsible for any direct/indirect loss of business/profit resulting from inability to use this facility.
- b) The Tenderer/s shall download & print the Tender document solely for bidding for above work and downloaded document shall not be used, copied or reproduced or shared without authority with others for any other purpose.
- c) The end of tender document is indicated by "End of Tender Document" marker. Tenderer/s should carefully see that above marker appears on the last page of downloaded tender document to ensure that downloaded document is complete. Tenderer is suggested to check the integrity and completeness of document before submission.
- d) The tender document downloaded by email though does not bear signature of Purchaser, it shall have same authority as having directly purchased from the Authority. Tenderers while submitting his offer must sign all pages of the tender document.
- e) The downloaded and printed tender document along with the various other documents should be submitted as per details mentioned in tender document. The Tenderer should clearly write on main tender cover and also on the top of sealed cover "Tender documents downloaded from website/received by Email.
- f) The Tenderers are required to pay non-refundable cost of tender document in the form prescribed in tender notice while submitting their offer. In case they fail to furnish the requisite cost of tender document in prescribed form, their offer shall be rejected. The cost of EMD shall not be merged with cost of tender form and shall be separately furnished.
- g) The Tenderer/s shall maintain the integrity of downloaded tender document and shall not make

any change/addition/deletion/tampering, whatsoever, in the downloaded documents. The Tenderer/s offer shall be rejected and full earnest money shall be forfeited, in case it is detected after submission of offer, that they have made any modification in downloaded documents. In case such modification is noticed even after award of contract, the Purchaser is liable to terminate the contract on contractor's default. In addition, Purchaser reserves the right to take action against the firm as deemed fit, which may include Banning of Business Dealings with the firm and the firm is also liable to be prosecuted as per the law. After award of work, agreement, wherever necessary, will be prepared based on the master copy of tender document available in the Purchaser's office. In case, any discrepancy is noted in tender document submitted by Tenderer, the Master document kept with Purchaser shall prevail and decision of Purchaser thereon shall be final and binding on Tenderer/Contractor.

- h) Tenderer/s shall print the tender document on good quality A4 size paper and printed document shall be clearly legible. The document shall be properly bound and page numbers shall be in serial order as mentioned in downloaded documents. The Tenderer/s shall not be reimbursed with the cost of stationery, printing and binding etc. Offer of Tenderer/s is liable to be rejected by the Purchaser if tender document is not printed or bound as per above instructions. Further, Tenderer shall bear expenses of Internet connection and telephone charges, if any for downloading of tender document.
- i) The Tenderer/s shall keep themselves updated about any modification in tender notice and tender document issued by the Purchaser through newspapers, website or E-mail or any other means and shall act accordingly. It is the responsibility of the Tenderer to check any correction or any modifications published subsequently in Web site and the same shall be taken into account while submitting the tender. Tenderer's offer is liable to be rejected if they have not enclosed all the corrections/corrigendum along with downloaded tender documents.
- j) The "Additional Conditions for Tender Document downloaded from Website/Email" if any must be signed by the Tenderer and enclosed along with the Tender document failing which the tender is liable to be rejected.
- k) Tenderers may carefully note that their Purchase order or Contract Agreement, as the case may be, for this work is liable to be terminated at any time later, in case any of the information furnished by them is found to be untrue or any adverse points come to light subsequently. The decision of the PURCHASER in this regard shall be final and binding.
- l) No Fax or E- mail tender document will be accepted by THE PURCHASER NOR will any reply to these affect be given by THE PURCHASER.

INSTRUCTIONS TO BIDDERS PART II

Essential Terms and Conditions:

1. Scope of Bid : The Purchaser issues these Tender Documents for the supply of Goods and Related Services incidental thereto as specified in Schedule of Requirements.
- 2 All the essential accessories, software etc. required for full functioning of equipment must be included in the basic offer.
- 3 The quoted price should include complete installation, commissioning, demonstration, training and onsite support.
- 4 On-site training on operation of equipment and software should be inclusive in the quoted price.
- 5 The price should include on-site comprehensive warranty for at least one year/ three year period from the date of installation with additional quote for warranty support upto a total of 5 years in all, and should be effective for parts, cost of visit etc. for all the components/systems of the supplied equipment.
6. The quote should provide list of organizations (in India and abroad) to whom such equipment have been supplied in past. This should be part of technical bid.
- 7 Printed information brochure/technical literature giving full details and specifications of the equipment to be supplied must be provided with the offer as part of technical bid. In absence of this the bid is liable to be rejected.
- 8 Future upgrades of firmware/software /drivers required to enhance equipment performance or make it suitable for use with alternate computing machines, should be made available as when released.
- 9 Bids received without requisite EMD prescribed category wise will not be considered and rejected.
- 10 Tender would be based on the three bid system, one on Pre-qualification, one on Technical and the third on Financial. The Pre-Qualification bids will be opened first and examined and if found as per notifications the other bids would be opened
- 11 In the event of any of the above dates being declared as a holiday/closed day for the purchaser, the bids will be sold/received/opened on the next working day at the appointed time.
12. The Purchase will not be responsible for any postal delay, if occurred
13. The Purchase has right to reject/cancel any tender or all tenders without assigning any reason

Amendment of Bidding Documents:

- 1 At any time prior to the deadline for submission of bids, the Purchaser may amend the Bidding Documents by issuing addendum.
- 2 Any addendum issued shall be part of the Bidding Documents and shall be communicated in writing to all who have obtained the Bidding Documents directly from the Purchaser and uploaded on the web site www.assamforest.in.
- 3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their bids, the Purchaser may, at its discretion, extend the deadline for the submission of bids.

Preparation of Bids

1. The Bidder shall bear all costs associated with the preparation and submission of its bid, and the Purchaser shall not be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.
2. The Bid, as well as all correspondence and documents relating to the bid exchanged by the Bidder and the Purchaser, shall be written in the English language. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages into English in which case, for purposes of interpretation of the Bid, such translation shall govern

Documents Comprising the Bid:

The Bid shall comprise the following:

1. Bid Submission Forms and the applicable Price Schedules, in accordance with the formatted provided in the tender. Samples, wherever, requested, shall be submitted along with the bid.
2. EMD or Bid Security, in accordance with the category wise prescribed in the tender.
2. Written confirmation authorizing the signatory of the Bid
- 4 Documentary evidence establishing the Bidder's eligibility to bid.
- 5 Documentary evidence that the Goods and Related Services conform to the Bidding Documents
- 6 Documentary with establishing the Bidder's authority to perform the contract if its bid is accepted; and contract is awarded (OEM/ Distributor authorization)
- 7 Documentary evidence of the Bidder's qualifications to perform the contract shall be to the Purchaser's satisfaction
- 8 Unpriced Bill of Materials (BoM)
- 9 Reports on financial standing of the Bidder such as profit and loss statements, balance sheets and auditor's report for the past three years, bankers certificates, Company's PAN and Income Tax details etc.
- 10 Any other document required in the Bid.

Price Schedules:

1. The Bidder shall submit the Price Schedules for Goods and Related Services, according to their offered product as appropriate, in the format provided in the tender document.
2. Prices shall be quoted as specified in the tender. The dis-aggregation of price components is required solely for the purpose of facilitating the comparison of bids by the Purchaser. This shall not in any way limit the Purchaser's right to contract on any of the terms offered.
- 3 Prices quoted by the Bidder shall be fixed during the Bidder's performance of the Contract and not subject to variation on any account, unless otherwise specified in the bid. A Bid submitted with an adjustable price quotation shall be treated as non-responsive and shall be rejected,
- 4 The Bidder shall quote in Indian Rupees. [The imported items shall also be quoted in US\$]

Bid Prices and Discounts:

- 1 The Bidder shall quote any unconditional discounts and indicate the method for their application in the Bid
3. The price of the Goods quoted (ex works, ex factory, ex warehouse, ex showroom, or off-the shelf, as applicable) will not be considered ,
4. Prices should include all customs duties and sales tax and other taxes already paid or payable on the components and raw material used in the manufacture or assembly of the Goods.
5. Any taxes or government levies that are to be borne by the purchaser has to be clearly mentioned by the bidder in the price schedule or terms of supply.
6. The purchaser will not be liable to pay any taxes or government levies unless that same are mentioned in the price schedule/ terms of supply in the bid. In the event of the any taxes or levies not mentioned in the bid the bidder will not claim nor the purchaser will entertain any such claim.

Period of Validity of Bids:

- 1 Bids shall remain valid for the period **specified in the tender** after the bid submission deadline date prescribed by the Purchaser. A bid valid for a shorter period shall be rejected by the Purchaser as non-responsive.
- 2 Bids shall remain valid for the period **specified in tender** after the bid submission deadline date prescribed by the Purchaser. A bid valid for a shorter period shall be rejected by the Purchaser as non-responsive.
- 3 The purchaser prior to the expiration of the bid validity period, can request bidders to extend the period of validity of their bids. The request and the responses shall be made in writing. Bid Security/EMD shall also be extended for a corresponding period by the Bidder.

Submission, Sealing and Marking of Bids:

1. It is a Three Part Bid comprising:
 - i. Part I: Pre-Qualification Bid
 - ii. Part II: Technical Bid and
 - iii. Part III; Price Bid/Commercial Bid.
2. EMD forms a part of the Pre-Qualification Bid.
3. Proof of payment of Tender document fee is a part of the Pre-Qualification Bid.
4. Pre-qualification, Technical Bid and Price Bid should be in three separate envelopes and the Pre-Qualification, Technical Bid and Price Bid envelopes should in turn be placed in the main envelope.
5. Each Envelope should be clearly Addressed to the Purchaser, with Tender reference, Due date, Category quoted for and the Item numbers.

Deadline for Submission of Bids:

- 1 Bids must be received by the Purchaser at the address and no later than the date and time specified in the tender.
- 2 The Purchaser may, at its discretion, extend the deadline for the submission of bids by amending the Bidding Documents. In which case all rights and obligations of the Purchaser and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.
- 3 The Purchaser shall not consider any bid that arrives after the deadline for submission of bids. Any bid received by the Purchaser after the deadline for submission of bids shall be declared late, rejected, and returned unopened to the Bidder.

Late Bids: Bids received after the deadline for submission shall be termed as late Bids; and shall not be considered for evaluation.

Bid Opening

- 1 The Purchaser shall conduct the bid opening at the address, date and time **specified in the tender**

Evaluation and Comparison of Bids

Confidentiality:

- 1 Information relating to the examination, evaluation, comparison, and post qualification of bids, and recommendation of contract award, shall not be disclosed to bidders or any other persons not officially concerned with such process until the Contract is awarded.
- 2 Any effort by a Bidder to influence the Purchaser in the examination, evaluation, comparison, and post qualification of the bids or contract award decisions may result in the rejection of its Bid.
- 3 From the time of bid opening to the time of Contract Award, if any Bidder wishes to contact the Purchaser on any matter related to the bidding process, it should do so in writing.

Clarification of Bids

1 To assist in the examination, evaluation, comparison and post qualification of the bids, the Purchaser may, at its discretion, ask any Bidder for a clarification of its Bid. Any clarification submitted by a Bidder in respect to its Bid and that is not in response to a request by the Purchaser shall not be considered. The Purchaser's request for clarification and the response shall be in writing. No change in the prices or substance of the Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Purchaser in the Evaluation of the bids,

Responsiveness of Bids

- 1 The Purchaser's determination of a bid's responsiveness is based on the contents of the bid itself and presentation/ demonstration to be made by the Bidder..
- 2 A substantially responsive Bid is one that conforms to all the terms, conditions, and specifications of the Bidding Documents without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that:
 - (a) Affects in any substantial way the scope, quality, or performance of the Goods and Related Services

specified in the Contract; or

(b) Limits in any substantial way, inconsistent with the Bidding Documents, the Purchaser's rights or the Bidder's obligations under the Contract; or

(c) If rectified would unfairly affect the competitive position of other bidders presenting substantially responsive bids.

3 If a bid is not substantially responsive to the Bidding Documents, it shall be rejected by the Purchaser and may not subsequently be made responsive by the Bidder by correction of the material deviation, reservation, or omission.

Nonconformities Errors, and Omissions

1 Provided that a Bid is substantially responsive, the Purchaser at its discretion may waive any non-conformities or omissions in the Bid that do not constitute a material deviation.

2 Provided that a bid is substantially responsive, the Purchaser may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial non-conformities or omissions in the bid related to documentation requirements. Such omission shall not be related to any aspect of the price of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.

Preliminary Examination of Bids

1 The Purchaser shall examine the bids to confirm that all documents and technical documentation requested in tender have been provided, and to determine the completeness of each document submitted.

Examination of Terms and Conditions; Technical Evaluation

1 The Purchaser shall examine the Bid to confirm that all terms and conditions of supply have been accepted by the Bidder without any material deviation or reservation.

2 The Purchaser shall evaluate the technical aspects of the Bid submitted in accordance with tender requirements to confirm that all requirements specified in Tender Documents have been met without any material deviation or reservation

3 If, after the examination of the terms and conditions and the technical evaluation, the Purchaser determines that the Bid is not substantially responsive in accordance with the tender, it shall reject the Bid.

Evaluation of Bids

1 The Purchaser shall evaluate each bid that has been determined, up to this stage of the evaluation, to be substantially responsive.

2 To evaluate a Bid, the Purchaser shall use all the factors, methodologies and criteria, including demonstration, testing etc.

3 Purchaser can award one or multiple items / categories to one or more than one Bidder. The methodology of evaluation to determine the lowest-evaluated, item wise or Category wise or combinations based on the Evaluation and Qualification Criteria.

Comparison of Bids

1 The Purchaser shall compare all substantially responsive bids to determine the lowest-evaluated bid, in accordance with evaluation process/criteria as mentioned below:

40.4 The Purchaser's evaluation of responsive Bids will take into account technical factors, in addition to cost factors. An Evaluated Bid Score (B) will be calculated for each responsive bid using the following formula, which permits a comprehensive assessment of the bid price and the technical merits of each bid:

$$B \equiv \frac{C_{low}}{C} X + \frac{T}{T_{high}} (1 - X)$$

where

- C = Evaluated Bid Price
- C_{low} = the lowest of all Evaluated Bid Prices among responsive bids
- T = the total Technical Score awarded to the bid
- T_{high} = the Technical Score achieved by the bid that was scored highest among all responsive bids
- X = weight for the Price as specified in the BDS

The bid with the highest Evaluated Bid Score (B) among responsive bids shall be termed the Lowest Evaluated Bid and is eligible for Contract award, provided the Bidder was pre-qualified and/or was found to be qualified to perform the Contract. However, the Purchaser reserves the right not to award the tender to the Lowest Evaluated Bid without assigning any reasons thereof, or cancel the tender all together. For the above purposes, the ratio of Technical and Price scores shall be 60:40.

- (d) The Recurrent Costs (R) are reduced to net present value and determined using the following formula:

$$R \equiv \sum_{x=1}^{N+M} \frac{R_x}{1 + I^x}$$

where

- N = number of years of the Warranty Period, defined in SCC Clause 29.4
- M = number of years of the Post-Warranty Services Period, as defined in SCC Clause 1.1.(e) (xii)
- x = an index number 1, 2, 3, ... N + M representing each year of the combined Warranty Service and Post-Warranty Service Periods.
- R_x = total Recurrent Costs for year “x,” which shall be 5.
- I = discount rate to be used for the Net Present Value calculation, as specified in the BDS.

Post qualification of the Bidder:

- 1 The Purchaser shall determine to its satisfaction whether the Bidder that is selected as having submitted the lowest evaluated and substantially responsive bid is qualified to perform the Contract satisfactorily.
- 2 The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder.
- 3 An affirmative determination shall be a prerequisite for award of the Contract to the Bidder. A negative determination shall result in disqualification of the bid, in which event the Purchaser shall proceed to the next lowest evaluated bid to make a similar determination of that Bidder's capabilities to perform satisfactorily.

Purchaser's Right to Accept Any Bid, and to Reject Any or All Bids

1 The Purchaser reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to contract award, without thereby incurring any liability to Bidders.

Award of Contract

Award Criteria:

1 The Purchaser shall award the Contract to the Bidder whose offer has been determined to be the lowest evaluated bid and is substantially responsive to the Bidding Documents, provided further that the Bidder is determined to be qualified to perform the Contract satisfactorily.

Purchaser's Right to Vary Quantities at Time of Award

1 At the time the Contract is awarded, the Purchaser reserves the right to increase or decrease the quantity of Goods and Related Services originally tendered without any change in the unit prices or other terms and conditions of the bid and the Bidding Documents.

Performance Security/ Bank Guarantee

1 Within 7 (seven) days of the receipt of Supply order/Work Order from the Purchaser, the successful Bidder, if required, shall furnish the Performance Bank Guarantee in accordance with the amount/percentage of order value as per the Bank Guarantee format provided by the purchase, which in this case shall be 10% of the award value.

2 Failure of the successful Bidder to submit the above-mentioned Performance Bank Guarantee or sign the Contract shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security. In that event the Purchaser may award the Contract to the next lowest evaluated Bidder, whose offer is substantially responsive and is determined by the Purchaser to be qualified to perform the Contract satisfactorily.

Terms of Purchase: (Commercial Terms)

Bidders should unconditionally accept to all the contract terms of the Purchaser as mentioned in the Tender Document.

1 Prices to be Quoted: In Indian Rupees. [For all imported items, the price must also be quoted in US\$.]

2 **Delivery:** OFFICE OF THE DIVISIONAL FOREST OFFICER,
EASTERN ASSAM WILDLIFE DIVISION, KAZIRANGA TIGER RESERVE, BOKAKHAT

4 Offers will be valid for : 180 days from the date of opening of the tender.

5 Prices quoted will be firm prices and no conditional / variable prices will be accepted.

6 **Warranty:** All supplies shall be with a warrant of One year or higher, which must be explicitly mentioned in the Technical & Financial Bid.

7 **COMMENCEMENT OF WARRANTY PERIOD :** The warranty period of an item shall commence from the date of receipt of the item in good working condition and satisfactory installation / commissioning demonstration at the Kaziranga The warranty period and validity of warranty shall be extended for the period of delay in satisfactory installation and delay in warranty services.

8 **Payment:** Payment shall be made as per schedule given below:

1. 50% payment on delivery of goods at site
2. 25% on commissioning and successful demonstration of the system onsite
3. balance after 60 days of successful operation, trial and running by the Bidder.

9. **Advance Payment:** A maximum of 30% of advance shall be admissible, subject to submission of Bank Guarantees for the amount of advance sought. However, such Bank Guarantee shall be in addition

to the EMD, PBG. The BG shall be released once the value of the advance has either been adjusted against goods/ services delivered, or adjusted otherwise through any other instrument.

CHAPTER 4

GENERAL CONDITIONS OF CONTRACT

A. Definition:

Purchaser means the Kaziranga Tiger Reserve Foundation, which the connotation includes the Kaziranga National Park and the authorities of the Park/ Foundation, and may include the Chief Wildlife Warden, Assam/ Principal Chief Conservator of Forests & Head of the Forest Force, Assam, the Environment & Forest Department, Govt. Of Assam.

Bidder means an entity purchasing this document and desires to participate in the bid for supply of the goods and services mentioned herein.

Bidding Documents/ Tender refers to the collection of documents issued by the Purchaser to instruct and inform potential vendors of the processes for bidding, selection of the winning bid, and Contract formation, as well as the contractual conditions governing the relationship between the Purchaser and the vendor.

Vendor/contractor/ Supplier means the person(s) whose bid to perform the Contract has been accepted by the Purchaser and is named as such in the Contract Agreement/ Work Order/ Purchase Order

Contract means the Contract Agreement/Order entered into the Purchaser and the vendor and /or Purchase/ Supply Order issued from the purchaser to the vendor, together with the Contract Documents referred to therein. The Contract Agreement and the Contract Documents shall constitute the Contract, and the term Contract shall in all such documents be construed accordingly.

Government means the Government of Assam, unless otherwise stated.

OEM means Original Equipment manufacturer company, that is incorporated in India, or abroad, who has management control over the manufacturing/production process, quality assurance, Procurement of Raw Materials/manufacturing process inputs, marketing & warranty services of the resultant products, of at least one manufacturing facility/factory where the manufacturing of equipment, Peripherals and related accessories is carried out; and which has been under continuous production of such devices or peripherals for at least five years as on 31.03.2015.

Brand' means the equipment trade name, trademark, logo etc protected by patent so as to establish proprietary rights analogous to those conveyed by letters patent or a patent, to the OEM of various equipment, Peripherals, and related accessories, and by which such equipment, Peripherals, and related accessories manufactured by the OEM are marketed and excludes the representation of a particular model name and/or number. The brand is displayed prominently on the body of the product in clear legible manner without any disfiguring or tampering.

Supply order' means the order placed by the PURCHASER on the successful bidder(s) for the execution of the works including therein all supply order documents.

Date of Award of Supply/Date of Purchase Order' means the date on which the Purchase Order is awarded to Supplier, as evidenced in the Purchase Order document.

Value of the Purchase Order/ Supply order means the sum negotiated and accepted for work allocated to the supplier, as mentioned in the supply order.

Documentary evidence' means any matter expressed or described upon any substance by means of letters, figures or marks intended to be used for the recording of that matter and produced before a court.

Rates/Prices' means prices of supply of equipment and services quoted by the bidder in the Price bid submitted by him and/or mentioned in the Purchase/ Supply Order.

Certified Copy means photocopy of the original documents duly self certified – signed in ink by the authorized person of the bidder with the seal.

B. Governing Law:

The Contract shall be governed by and interpreted in accordance with the laws of India.

C. Change in Scope of Work:

1. The purchaser may at anytime give written order to the vendor for making variation, amendment and modification in the Supply order in respect of quantity, scope, extent, information, terms and conditions of the order

D. Liquidated Damages:

If the supplier fails to perform his obligations under the supply order, liquidated damages would be levied upon him as stated below:-

Liquidated damages for periods specified hereunder:

- Delay in furnishing the Performance Bank guarantee beyond the stipulated time period shall attract liquidated damages at the rate of ½ (half) percent of the total value of the supply order, per week, upto 2 (two) weeks of such delay period.
- Delay in supply and placement of equipment for final pre handover inspection by PURCHASER at Guwahati/ BOKAKHAT beyond the stipulated 4 (Four) weeks from the issue of the supply order shall attract liquidated damages at the rate of ½ (half) percent of the total value of the supply order, per week, upto 4 (four) weeks of such delay period.
- Delay in replacement of defective equipment within 3 weeks of its rejection at the Final inspection shall attract liquidated damages at rate of 1 (one) percent on the total value of the set of equipment, per week of delay upto 6 weeks of such delay period.
- Delay in delivery & handover of the quality passed equipment to the Purchaser and or its installation and commissioning within the agreed time from the date of issuance of purchase order or any other date(s) specified by the Purchaser shall attract liquidated damages at rate of 0.5% on the total value of the equipment not delivered and handed over, per day of delay upto 60 days of such delay period.
- Delay in replacement of the faulty equipment within 30 days, if in warranty period, as stipulated in the warranty clause stated in the supply order, shall attract liquidated damages at the rate of 1 (One) percent of the value of the set of equipment, per week of delay upto 4 (four) weeks of such delay period.
- Delay in providing for free-of-cost replacement of defective components /parts of the equipment during the warranty period or any other period of comprehensive warranty so specified in the supply order, from the date of supply and commissioning, as stipulated in the warranty clause stated in the supply order, shall attract 1 (one) percent of the value of the set of equipment, per week of delay upto 3 (three) weeks of such delay period.
- Delay in attending to and providing warranty services to the Purchaser, as specified in the

supply order, shall attract 0.5% of the value of the set of equipment, per week of delay upto 3 (three) weeks of such delay period.

Liquidated damages for delays in excess of the period specified herein above:

In the event that the delays/defaults/disruptions mentioned herein above, continue so as to exceed the period(s) so specified hereinabove, for levy of liquidated damages, the supplier in addition to levy of liquidated damages for the entire period(s) of such delays/defaults/disruptions, shall be liable for forfeiture of his Earnest Money Deposit (EMD), invocation of bank guarantee, and other damages, compensation, costs as deemed liable by the Purchaser. The Purchaser, in the event of levy of such damages, compensation, costs shall recover the same from the supplier by way of forfeiture of his Earnest Money Deposit (EMD), invocation of bank guarantee, and other claims of payment as the case may be; and in addition by direct claim of payment from the supplier subject to that such levies and recoveries do not exceed the total value of the supply order.

E. Force Majeure:

“Force Majeure” shall mean any event beyond the reasonable control of the Purchaser or of the Supplier, as the case may be, and which is unavoidable notwithstanding the reasonable care of the party affected and shall include, without limitation, the following:

- (a) war, hostilities, or warlike operations (whether a state of war be declared or not), invasion, act of foreign enemy, and civil war;
- (b) rebellion, revolution, insurrection, mutiny, usurpation of civil or military government, conspiracy, riot, civil commotion, and terrorist acts;
- (c) confiscation, nationalization, mobilization, commandeering or requisition by or under the order of any government or de jure or de facto authority or ruler, or any other act or failure to act of any local state or national government authority;
- (d) strike, sabotage, lockout, embargo, import restriction, port congestion, lack of usual means of public transportation and communication, industrial dispute, shipwreck, shortage or restriction of power supply, epidemics, quarantine, and plague;
- (e) earthquake, landslide, volcanic activity, fire, flood or inundation, tidal wave, typhoon or cyclone, hurricane, storm, lightning, or other inclement weather condition, nuclear and pressure waves, or other natural or physical disaster;
- (f) failure, by the Supplier, to obtain the necessary export permit(s) from the governments of the Country(s) of Origin of the Information Technologies or other Goods, or Supplier’s Equipment provided that the Supplier has made all reasonable efforts to obtain the required export permit(s), including the exercise of due diligence in determining the eligibility of the System and all of its components for receipt of the necessary export permits.

If either party is prevented, hindered, or delayed from or in performing any of its obligations under the Contract by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances of the event of Force Majeure within fourteen (14) days after the occurrence of such event.

The party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such party’s performance is prevented, hindered, or delayed.

The party or parties affected by the event of Force Majeure shall use reasonable efforts to mitigate the effect of the event of Force Majeure upon its or their performance of the Contract and to fulfill its or their obligations under the Contract, but without prejudice to either party’s right to terminate the Contract.

No delay or nonperformance by either party to this Contract caused by the occurrence of any event of Force Majeure shall:

- (a) constitute a default or breach of the Contract;

- (b) give rise to any claim for damages or additional cost or expense occasioned by the delay or nonperformance;

if, and to the extent that, such delay or nonperformance is caused by the occurrence of an event of Force Majeure.

If the performance of the Contract is substantially prevented, hindered, or delayed for a single period of more than sixty (60) days or an aggregate period of more than one hundred and twenty (120) days on account of one or more events of Force Majeure during the time period covered by the Contract, the parties will attempt to develop a mutually satisfactory solution, failing which, either party may terminate the Contract by giving a notice to the other.

Force Majeure shall not include any events caused due to acts/omissions of such Party or result from a breach/contravention of any of the terms of the contract, Bid and/or the Tender. It shall also not include any default on the part of a Party due to its negligence or failure to implement the stipulated/proposed precautions, as were required to be taken under the contract.

The failure or occurrence of a delay in performance of any of the obligations of either party shall constitute a Force Majeure event only where such failure or delay could not have reasonably been foreseen or where despite the presence of adequate and stipulated safeguards the failure to perform obligations has occurred. In such an event, the affected party shall inform the other party in writing within five days of the occurrence of such event. The purchaser will make the payments due for Services rendered till the occurrence of Force Majeure. However, any failure or lapse on the part of the vendor in performing any obligation as is necessary and proper to negate the damage due to projected force majeure events or to mitigate the damage that may be caused due to the above mentioned events or the failure to provide adequate disaster management/recovery or any failure in setting up a contingency mechanism would not constitute force majeure, as set out above.

In case of a Force Majeure all Parties will endeavor to agree on an alternate mode of performance in order to ensure the continuity of service and implementation of the obligations of a party under the contract and to minimize any adverse consequences of Force Majeure.

The selected vendor agency shall advise the purchaser in writing, the beginning and the end of the above causes of delay, within seven days of the occurrence and cessation of the force majeure conditions. Unless otherwise directed by the purchaser in writing the vendor shall continue to perform its obligations under the Contract as far as is reasonably practical and shall seek all prevented by the force majeure event. In the event of a delay lasting for more than one month, if arising out of clauses of force majeure, purchaser reserves the right to cancel the contract without any obligation to compensate the vendor in any manner for what so ever reason, subject to the provision of clause mentioned. Purchaser may terminate this Contract, by giving a written notice of minimum 30 days to the vendor being unable to perform a material portion of the services for a period of more than 60 days However the vendor shall be entitled to receive payments for all services rendered by it under this Assignment.

F. Termination of contract:

The Purchaser may terminate the contract under the following circumstances:

- A. Where it comes to Purchaser's attention that the vendor or his team is in a position of actual conflict of interest with the interests of the Purchaser in relation to any of terms of the Bid, the RFP or this Contract.
- B. Where the Vendor's ability to survive as an independent corporate entity is threatened or is lost owing to any reason whatsoever including inter alia the filing of any bankruptcy proceedings against the vendor, any failure by the vendor to pay any of its dues to its creditors, the institution of any winding up proceedings against the vendor or the happening of any such events that are adverse to the commercial viability of the Vendor. In the event of the happening of any events of the above nature, the purchaser shall reserve the right to take any steps as are necessary to ensure the effective transition of the project to a successor and to ensure business continuity.
- C. Termination for Default: The Purchaser may at any time terminate the Contract by giving 30 days written notice to the vendor without compensation in the Event of Default on the part of the Vendor which may include failure on the part of the vendor in respect any of its commitments with regard to any part of its obligations under its Bid, the Tender or under this Contract. .
- D. Termination for Convenience: The Purchaser may by prior written notice sent to the vendor at least 3 months in advance 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 Purchaser's convenience, the extent to which performance of work under the Contract is terminated and the date upon which such termination becomes effective.

The vendor may terminate the contract under the following circumstances:

1. Where the payment of the vendor is overdue for more than 6 months. Overdue shall start from the last date on which he is entitled to receive such payments.
2. In the event of non provision of dependencies by the Purchaser beyond 6 months from the date the request for such dependencies were raised by the vendor.

G. Consequences of termination of contract:

If the contract is terminated by the Purchaser, the Purchaser can exercise one or more of the following at its discretion:

- Retain such amounts from the payment due and payable by the Purchaser to the vendor as may be required to offset any losses caused to the Purchaser
- Invoke the Performance Bank Guarantee, forfeit the Earnest Money Deposit and recover such other costs/losses and other amounts from the vendor, which may have resulted from such default and pursue such other rights and/or remedies that may be available to the Purchaser under law.
- Blacklist the vendor and cancel the empanelment. However vendor shall not be blacklisted, unless and until such termination is on account of gross negligence or intentional breach of the terms of the Agreement by the vendor.
- Claim compensation from the vendor for any such loss, damages or other costs, incurred by the Purchaser.

H. Settlement of Disputes:

2. Arbitration: In the case of a dispute or difference arising between the parties relating to any matter arising out of or connected with this Contract, such dispute or difference shall be referred to the award of two Arbitrators, one Arbitrator to be nominated by each party to the contract or in case of the said Arbitrators not agreeing, then to the award of an Umpire to be appointed by the Arbitrators in writing before proceeding with the reference, and in case the Arbitrators cannot agree to the Umpire, he may be nominated by the Secretary, Indian Council of Arbitration, New Delhi.
3. The award of the Arbitrators, and in the event of their not agreeing, of the Umpire appointed by them or by the Secretary, Indian Council of Arbitration, New Delhi, shall be final and binding on the parties. The Arbitration and Conciliation Act 1996, the rules thereunder and any statutory modification or reenactments thereof, shall apply to the arbitration proceedings. The venue of arbitration shall be Guwahati, India. The language of arbitration shall be in English. Each party shall bear its own cost of Arbitration.
4. Notwithstanding any reference to the arbitration in this clause-
 1. the parties shall continue to perform their respective obligations under the Contract unless they otherwise agree;
 2. the Purchaser shall pay the vendor any amount due to the vendor.

I. Confidentiality:

Neither the vendor nor the Purchaser will disclose to any third party without the prior written consent of the other party any confidential information which is received from the other party for the purposes of providing or receiving Services. Each party will take measures to protect the confidential information of the other party that, in the aggregate are no less protective than those measures it uses to protect the confidentiality of its own comparable confidential information, and in any event, not less than a reasonable degree of protection. Both parties agree that any confidential information received from the other party shall only be used for the purposes of providing or receiving Services under these Conditions of Empanelment or any other Conditions of Empanelment between the parties. These restrictions will not apply to any information which:

1. Is or becomes generally available to the public other than as a result of a breach of an obligation under this Clause; or
2. Is acquired from a third party who owes no obligation of confidential in respect of the information; or
3. Is or has been independently developed or was known to it prior to receipt.
4. Notwithstanding Clause mentioned above, either party will be entitled to disclose confidential information of the other (1) to its respective insurers or legal advisors on a need-to-know basis and shall ensure that such insurers and legal advisors maintain confidentiality of such information, or (2) to a third party to the extent that this is required by any or where there is a legal right, duty or requirement to disclose where reasonably practicable not less than 2 business days notice in writing is first given to the other party.
5. Without prejudice to the foregoing provision of this clause above selected vendor may cite the performance of the services to clients and projective clients as an indication of its experience.

J. Subcontracting:

The Vendor shall not appoint a subcontractor/affiliate, unless such terms and conditions are mentioned in the Bid, to perform its obligations under this Contract without obtaining prior written approval of the Purchaser. The Purchaser's approval of a subcontractor/affiliate shall not constitute a waiver of any rights it may have based on the vendor's representations and warranties. The vendor will be fully responsible for all acts and omissions of its subcontractors and affiliates. Nothing in this Contract shall be construed to create any contractual relationship between the Purchaser and any subcontractor or affiliate, nor any obligation on the part of Purchaser to pay or to ensure the payment of any money due to any subcontractor or affiliate. However, the Supplier(s) are allowed to leverage their Franchisee/Service provider network for effective supply & services.

K. Purchaser's Property and Third Party Rights:

1. The vendor on delivery of the product shall ensure that it does not and will not infringe any Intellectual property Rights held by any third party and has all necessary rights or has transferred the rights in writing and has the consents to make assignments, licenses and other transfers of all Intellectual Property rights . The vendor shall secure all necessary written agreements, consents and transfers of rights from Its employees and other persons or entities, whose services are used for development of the product.
2. The Vendor shall indemnify Purchaser against all third party claims arising out of a court order or arbitration award for infringement of patent, trademark/ copy right arising from the use of the supplied services or any part there of.

L. Acceptance of Deliverables:

The equipment delivered by the vendor which is subject to the mutually agreed acceptance criteria shall be inspected and accepted by the Purchaser within a period of thirty days from the date of delivery. The review comments shall be provided within a period of Thirty working days from the date of delivery. All Deliverables will be deemed to be accepted by the Purchaser on successful closure of all review comments. If no review comments have been provided, the deliverable will be deemed to be accepted by the Purchaser after 60 days from the date of delivery of the deliverable.

M. Jurisdiction:

All legal proceedings, if necessary arising to be instituted by any of the parties shall have to be lodged in courts situated in Guwahati and not elsewhere.

CHAPTER 5 SPECIAL CONDITIONS OF CONTRACT

1. The Supplier/ Bidder agrees to supply spare parts required for the operation and maintenance of the System, as stated below, for *a period of 5 (five) years including the period of warranty*. Moreover, the price of such spare parts shall be those specified in the **spare parts price schedule submitted by the Suppler as part of its bid**. These prices shall include the purchase price for such spare parts and other costs and expenses (including the Supplier's fees) relating to the supply of spare parts. However, such costs shall not be part of the evaluation.
2. The Supplier/bidder agrees to provide adequate training/ demonstration/ capacity building of the staff. If need be the Bidder may propose ToT from among the selected staff of the Park or

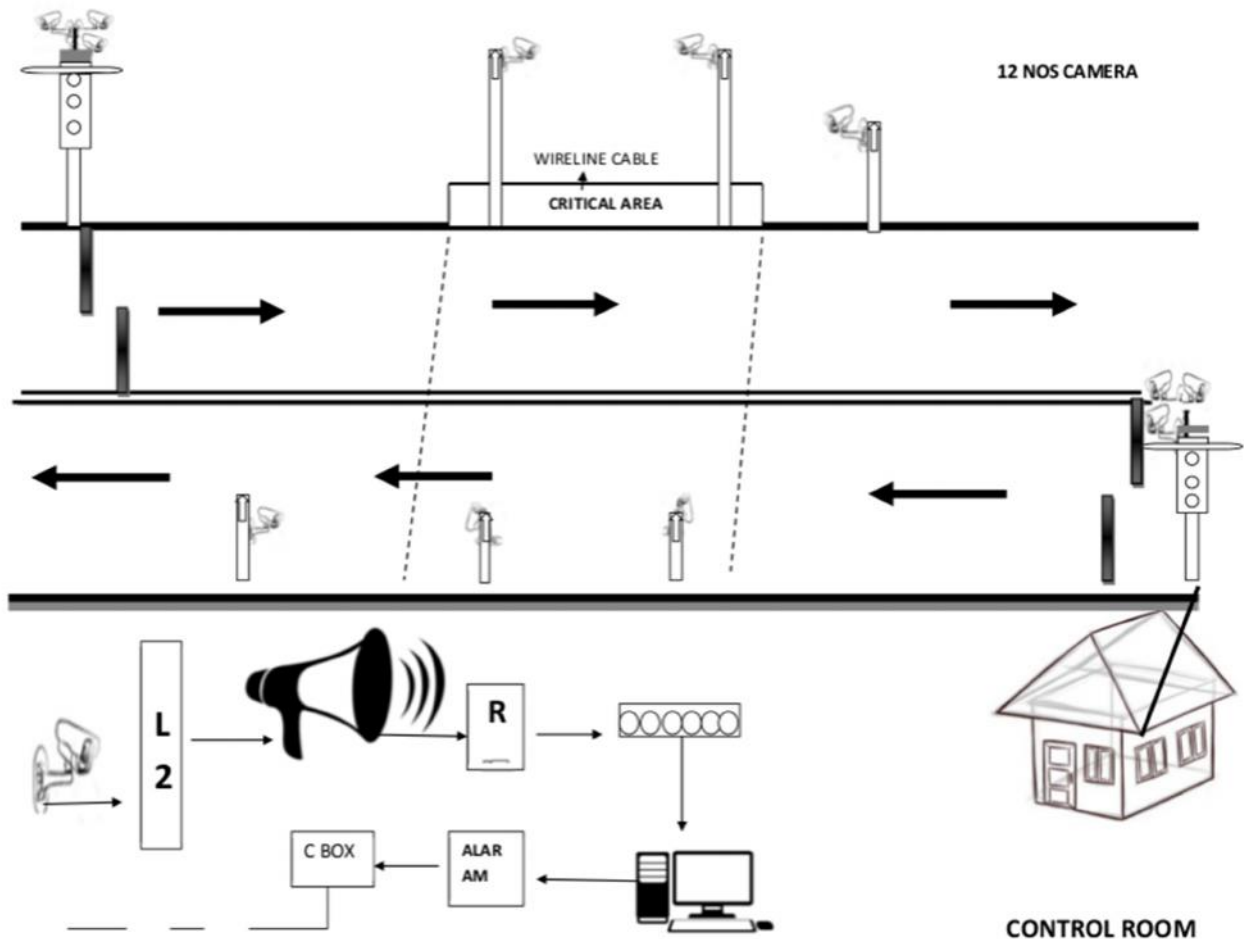
personnel appointed/ nominated for the purpose by the Park authorities. Such training shall be a part of the cost quoted, which must be delivered during the warranty period. Thereafter, if further trainings are required, the bidder may quote a price, if he thinks fit. However, such trainings shall be at the discretion of the Park authorities, and subject to availability of funds. However, such costs shall not be part of evaluation.

3. Complete Systems Integration, if required by any product/ solution quoted by the Bidder/ Supplier, must be part of the cost, and must include customization in software/ systems/ BIOS / or any hardware level customization for power supplies, connectors, cables, ports, panels, solar panels, batteries, poles, masts etc as per the requirements of the Park Authorities.
4. All the licenses for wavelength/ frequency, Software, or any other product/ service procured exclusively under this Tender shall be in the name of the “Director, Kaziranga National Park, Bokakhat”. Any product for which the Supplier/ Bidder wants to retain exclusive IPR, and grant the Park Authorities only access for use, must be exclusively mentioned, and the cost of usage of the license must be quoted as a part of the Techno-Commercial Bid. It must find mention in the Unpriced and Priced Bill of Materials.
5. The Bidders must submit the Unpriced Bill of Material (BoM) giving Category, Item, Make/Model/ Part No. And Specification In the Technical Bid; and the Priced Bill of Materials (BoM) in the Commercial Bid. A separate Unpriced BoM must also be included in Technical Bid for spares and consumables, and Priced BoM of spares/ consumables be included in the Commercial Bid. The BoM must clearly mention at the top “SPARES & CONSUMABLES”. In case the spares and consumables are available from open market, the same may be mentioned.
6. In case any format is not available in the Tender Document, the Bidder may submit the same in Tabular format/ or otherwise for easy understanding.
7. The Supplier may be required to pay royalties to the Purchaser when it licenses third parties to use the Custom Software developed exclusively for the Purchaser. This is intended to protect the Purchaser’s competitive edge and to allow the Purchaser to share in future profits made by the Supplier through exploitation of the Custom Software. Royalty arrangements will have to be backed up by obligations to report to the Purchaser regarding future sales of products to which royalties apply and audit rights of that the Purchaser can check that the Supplier’s reports are accurate, if necessary, by making royalty arrangements between the two.
8. Any “Brand Name” developed during or after execution of the works shall be the property of the Purchaser, and the Supplier would require explicit permission, and may have to pay royalty charges to the Foundation in order to use the Brand so developed.
9. ***No software escrow contract is required for the execution of the Contract.***
10. The Software license, if so required, shall permit the Software to be used or copied for use or transferred to a replacement computer anywhere within the jurisdiction of the Purchaser/ Govt. provided the replacement computer falls within approximately the same class of machine and maintains approximately the same number of users, if a multi-user machine. In case extra licenses per user are to be paid by the Purchaser, the same must be mentioned in the Unpriced and Priced Bill of Materials (BoM) for the “SPARES & CONSUMABLES”. In every such case, the original number of permitted users must be mentioned in the main BoM.

11. Depending upon the nature of the category/ product quoted by the Bidder/ supplier, the following information must be accompanied in the Technical Bid:
 1. Project Organization and Management Plan;
 2. Delivery and Installation Plan
 3. Training Plan
 4. Pre-commissioning and Operational Acceptance Testing Plan (if any)
 5. Warranty Service Plan
 6. Task, Time, and Resource Schedules
 7. Post-Warranty Service Plan (if applicable)
 8. Technical Support Plan (if applicable)
 9. Service Level Agreements (SLA)
12. The Supplier may have to “Brand”/ emboss/ print/ screen print / or display the name of the Purchaser, to be so specified by the Purchaser, on any of the equipment purchased by the Purchaser at no extra cost. This may be applicable to Site Installations, Wearable Products by the Field Staff, Custom Software etc. The branding may include using Logo/ name/ authority’s name or any combination thereof, with one or multiple, displays at Site or on the product. Such a mark/ sign must be clearly visible from a distance and must be of good quality.
13. The Bidder must also submit all drawings/ charts/ Standard Operating Procedures (SOP) for the products and installations in the Technical Bid. The Bidder must be prepared to alter / customize such documents based on the actual requirements of the Purchaser and the field conditions without any extra cost.
14. The specifications provided in the Tender Document are indicative; and if the Bidder has better product/ specification to offer almost within the same cost, the Bidder may so mention that the product/ solution offered is better than that asked for. However, in case, such a solution becomes beyond the purchasing power of the Purchaser, the same may not be purchased.
15. The Bidder may also provide alternate products/ solutions. However, in all such cases, the Bidder must clearly mention that it is an alternate solution and justify as to how it is better and/or more cost effective than that asked for in the Tender. The Purchaser, if finds the technology suitable, may evaluate it further.
16. All such alternate and/or higher specification products also must be clearly a part of the Price Bid, and the prices along with spares and consumables must be mentioned in the Price Bid. The bidder must also indicate the same to be “ALTERNATE” or “HIGHER SPECIFICATION” solution both in the Technical Bid as well as Commercial Bid.
17. “Exempted Items” are **** DELETED*****

CHAPTER 6 TECHNICAL SPECIFICATIONS

A. Schematic of the Site Plan for installation and operation of the automatic animal sensors



B. Project Overview:

1) Project Objective:

This project intends to implement holistic and integrated surveillance, intruder alarm to have alarm of animals crossing the National Highway NH37 along-with traffic control system which includes establishment and commissioning of Command and Control Centre (Video surveillance room with control over traffic of identified stretch of high Way as Pilot trial) at Kaziranga National Park, with a mix of technologies as an AUTOMATED ANIMAL SENSOR SYSTEM.

[The Bidders can obtain more details about the Kaziranga National Park from the official portal <http://kaziranga.assam.gov.in> and links provided therein.]

The system shall help:-

- To allow safe passage to wildlife to cross the highway without getting hit by vehicles
- Support Forest Administration to maintain & bring down the accident at minimum and zero level.
- To help in investigation of incident of hit and run case of wildlife
- Help in preventing, detecting and dealing with criminal activities with minimum turnaround time
- To provide alerts and video analytics
- To monitor suspicious people, vehicles, objects etc. with respect to protecting & preserving rights of animals.

To continuously monitor the location for keeping eye on regular activities & for emergency support. The proposed system may deploy VMS and Video analytics. This system should provide Alerts/ feedback to the park authorities/ Forest Department about movements etc. of wildlife on the corridor. Better Management of Security breaches based on alerts received from system
Improved turnaround time in responding to any investigation case, faster access to evidence in case of security breach, law violation in the prescribed areas.

2) SYSTEM COMPONENTS:

The automatic animal sensor system proposed here may consist of the following components. However, bidders are free to suggest better and more economical ways to implement the automated animal sensor system on NH37. All such proposals should be marked as “**ALTERNATE TECHNICAL SOLUTION**” in the Technical Bid, and a separate “**ALTERNATE TECHNOLOGY PRICE BID**” should be submitted in the Price Bid.

While quoting the sensor system, the bidders may offer options, say OPTION 1, OPTION 2 OPTION 3 ... For each sensor or combination thereof option, the Unpriced and Priced Bill of Materials must be submitted in the Technical and Financial bids separately, along with the offer for common items.

The proposed components are:

1. SENSOR SYSTEM consisting of one or more (combination) sensors based on the following technologies capable of covering 300-500 m length on one side. :
 - i. Area based systems with Passive IR sensor system deployment
 - ii. Area based systems with Microwave system deployment
 - iii. Break-The-Beam technology with LASER deployment
 - iv. Break-The-Beam technology with Active IR deployment (NOT PREFERRED)
 - v. Break-The-Beam technology with Microwave deployment
 - vi. Buried cable pair technology with EM canopy
 - vii. Ground Surveillance Radar system
2. Thermal Imaging Camera system for detection of presence of wildlife in 50-500 m distance
3. Optical camera systems with night vision capability for monitoring and event/ traffic recordings
4. ANPR
5. Traffic lights with RED-AMBER-GREEN LED lights (one on each lane at the two end)
6. RF communication system for transfer of data and signals
7. Automatic Weather Stations to measure temperature, pressure, humidity, wind velocity, insolation, rain gauge etc. in order to assess actual ground conditions and sensor behaviour. (Atleast one AWS)
8. CONTROLLER SYSTEM to detect breach in the line, and trigger appropriate traffic lights, recording of events
9. Lightning Arrestor with 500-900m radius range to be mounted above tree height
10. Video Analytics and Video Management Software
11. Determination of speed of vehicles beyond the prescribed limits.
12. Control Room with display panels to view camera outputs and triggers
13. Accessories & Fixtures

4) REVIEW OF ANIMAL SENSOR TECHNOLOGIES, THEIR IMPLEMENTATION IN KAZIRANGA NATIONAL PARK CORRIDORS AND CHALLENGES THEREOF.

Snapshot of Issues of Road Kill on NH37 Corridors of Kaziranga National Park

- Kaziranga National Park, situated on the floodplains of the Brahmaputra, consists primarily of grassland ecology interspersed with woodlands and waterbodies. Kaziranga has a unique ecology sustained by the annual floods of the Brahmaputra.
- Rise of floodwater 3-4 m above the ground level is common
- Animals migrate to the hills of Karbi Anglong on the South for safety and food.
- Animals move to and fro during other seasons also.
- Animals generally take some specific routes of migration. There are 6(six) animal corridors identified. Another corridor on the western side of Kaziranga National Park is to be added. However, off corridor movement also takes place.
- The Hills of Karbi Anglong and the grass land of KNP cannot be separated for sustenance of the national park.
- What is paramount is a contiguous forest connecting the grassland and the foothills of Karbi Anglong.
- Protection on the Karbi Anglong side is also very important, and effective conservation measures need to be taken in the entire watershed areas next to Kaziranga National Park.
- Animals meet with accidents while crossing the National Highway during migration.
- About 25 animals get killed in road accidents on an average annually. The on-corridor and off-corridor road kill has a ratio of about 55:45
- The type of animal killed is STREAKING animals like dears, wild boars.
- Traffic management can bring down the incidence of road kill as can be seen from the result of 2014-15 which shows a drastic reduction to just 4 road kills due to stringent traffic management interventions.
- Traffic management is difficult for the entire stretch of 56 KM of the NH-37 passing along the Kaziranga National Park especially convoys and barricades.
- The traffic management plan should include NO STOPPAGE, NO CHAOS, NO NOISE, NO POLLUTION, NO ENCOURAGEMENT TO COMMERCIAL ACTIVITIES while controlling speed.
- Proper corridor management plan is of paramount importance.
- Also important is encouraging animals to take the specified corridors only for movement for safety and for precluding man-animal conflict.

Overview of the Proposed Immediate and Short Term Measures

- a. Clearing animal corridors of unauthorized settlements.

- b. Traffic management on the animal corridor
- c. Controlling speed to 30 KMPH
- d. No overtaking
- e. No horn
- f. No stoppage
- g. For traffic management
- h. Rumble strip with conspicuous marking during day and night as per IRC codes
- i. Proper Road signs with retro-reflective paint
- j. Installation of unmanned speed cameras with system to measure not only the instantaneous speed but also the average speed of vehicles in the corridor. Photographs (day and night) will be captured for penalizing erring vehicles.
- k. Animal sensors will be placed on the animal corridors. The technology will be chosen to select the most suitable sensor for KNP environment. Sensors which will be able to see 360 degree and unhindered by obstacles like trees will be chosen.
- l. The signals from the animal sensors will be integrated with the speed control system.
- m. Animal sensors will trigger flashing beacons to warn drivers of animals approaching or on the road.

Review of Animal Sensor Technologies:

Several animal detection sensor systems have been deployed across the western world. Certain studies are available which indicate the effectiveness of these systems. One such study was conducted by the Western Transportation Institute, Montana State University, USA led by Marcel P. Huijser et al in 2003. He along with colleague Patrick t. McGowen studied 16 animal detection and warning systems deployed across 16 locations in the western world such as:

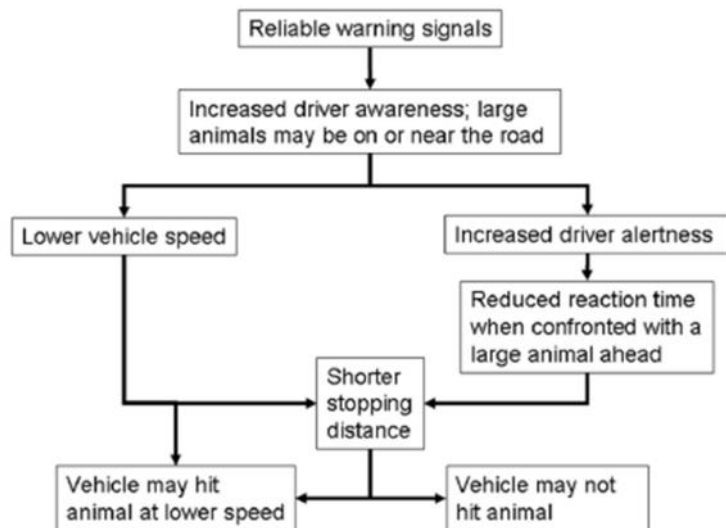
- | | |
|----------------|-------------|
| 1. USA | 7 locations |
| 2. Canada | 2 locations |
| 3. Switzerland | 2 locations |
| 4. Finland | 2 locations |
| 5. Germany | 1 location |
| 6. Netherlands | 1 location |
| 7. Sweden | 1 location |

The systems above could be categorized in five classes as given below:

1. Area cover systems (5 locations)
2. Break the Beam system (8 locations)
3. IR Thermal imaging sensor customized for large animal body heat
4. Detection of radio-collared animals near the highway
5. Alert the animals by sound when a vehicle approaches

The study also covered 5 planned sites in USA including the Preacher canyon Elk crossings in Arizona, and 15 planned sites in Germany. The authors concluded that “ animal detection and animal warning systems have the potential to be an effective mitigation tool. However, animal detection and animal warning systems are not the perfect solution for every location. They are one tool in the transportation professional’s arsenal and should be implemented only in situations where they are more desirable than other mitigation techniques. In addition, further research and development is needed before animal detection and animal warning systems can be applied on a wide scale.”

Another such study was again conducted by the Western Transportation Institute, Montana State University, USA led by Marcel P. Huijser et al in 2009-10. The team compared 11 sensor systems deployed across various parts of the USA. The systems were categorized variously depending upon signal type (IR – active/ passive, Laser, Microwave, EM Field) and system used (area cover, break-the-beam, buried cable) etc. The algorithm of the sensor networks was as depicted in the diagram below:



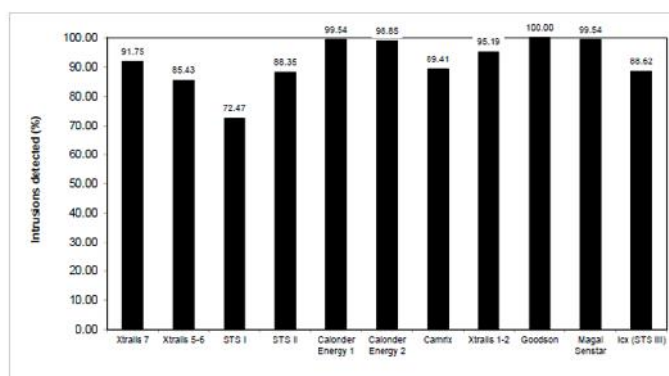
The comparative chart of the systems studied are given in the diagram below. The systems shown in red were installed in Colorado and California in USA as an experiment of a set of new and old technologies. The new technology was built around a buried cable providing an electromagnetic canopy overground. The other technology was conventional microwave line of sight break-the-beam system.

The

System #	Manufacturer and system name	ID #	System type	Signal type	Maximum range	Installation date
1	Xtralis (ADPRO)	7	Area cover	Passive IR	500 ft (152 m)	21 Sep 2006
2	Xtralis (ADPRO)	5-6	Area cover	Passive IR	200 ft (61 m) (one detector on each side)	21 Sep 2006
3	STS (ICx radar systems) (RADS I)	1	Break-the-Beam	Microwave radio (\pm 35.5 GHz)	¼ mi (402 m)	19 Oct 2006
4	STS (RADS II)	2	Break-the-beam	Microwave radio (\pm 35.5 GHz)	Well over ¼ mi (402 m)	19 Jul 2007
5	Calstrom GmbH CAR92_LS-WS -WE 45	1	Break-the beam	Laser	984 (built-up areas) -1148 ft (open areas) (300-350 m)	21-22 Sep 2006
6	Calstrom GmbH (CAR92_IR-204-319/M3)	2	Area cover	Passive IR	326 ft (100 m)	21-22 Sep 2006
7	Camrix (A.L.E.R.T.)		Area cover	Passive IR	300 ft (91 m)	19-31 Oct 2006
8	Xtralis (ADPRO)	1-2	Area cover	Passive IR	200 ft (61 m) (2 detectors, one facing each way)	8 Aug 2006
9	Goodson		Break-the-beam	Active IR	90 ft (27 m)	Dec 2006
10	Magal Senstar Perimitrax		Buried cable	Electromagnetic field	About 0.1 mi (161 m)	11/12 Aug 2009
11	STS (RADS III)	3	Break-the-beam	Microwave radio (\pm 35.5 GHz)	About 1/2 mi (804 m)	16 Dec 2009

effectiveness of the systems as studied is shown below:

Intrusions detected (%)



The finding of the study are enumerated below:

1. 6 out of the 11 systems only met the reliability norms. The installations which met the reliability norm were mainly four types namely:
 - i. Area based systems with Passive IR deployment (3 nos)
 - ii. Break-The-Beam technology with LASER deployment (1 nos)
 - iii. Break-The-Beam technology with Active IR deployment (1 nos)

- iv. Buried cable technology with EM canopy (1 nos)
2. Reliability is dependent upon local environmental conditions
3. There is no “One System Fit All” technology, therefore, a mix of technologies required for high reliability.

Issues and Challenges in the Animal Sensor Deployment on NH37:

Before shortlisting suitable technologies for deployment on the NH37, it would be worthwhile to examine the challenges involved vis a vis the deployments in the western countries. Some of the major issues and risks that such systems would face on the NH37 are enumerated below:

1. Unlike the highways abroad, the immediate challenge for the sensor systems would be to filter human and cattle which continue crossing the road at almost all points from dawn to dusk. Unlike the highways abroad where animal sensors are deployed, the corridors on the NH37 are fragmented and full of structures and human activities which may span from early mornings to late into the night.
2. Unlike the systems abroad where the biodiversity of fauna is very low and the sensor systems are designed specifically for certain body mass and size of animals, Kaziranga is a biodiversity hot spot and the animals crossing the NH37 range from snakes and reptiles to large mammals such as rhinos, buffaloes and elephants. Further, the scenario on the NH37 gets more complicated due to crossing by carnivores such as tigers, leopards, civet cats and the lesser cats which cannot be easily detected, as they keep themselves mostly camouflaged under cover. A single sensor system is bound to fail on the NH37.
3. The stretch of the NH37 in the Burapahar section from east of Jakhlabandha to Kanchanjuri is very sensitive and prone to intrusion and attack from poachers and extremists who sneak into the forest from the NH37 at odd hours and indulge in rhino poaching. Any system deployed on this stretch must take into account this phenomenon and must address the same, else we may be able to stop road accidents, but poaching in the area would continue unabated.
4. The local environmental conditions along the NH37 and the Kaziranga National Park vary considerably throughout the year. It gets very thickly foggy from end November to end February. The period from middle March to April is dominated by storms and cyclones. The period from mid may to October is often rainy. The humidity and moisture levels rise as high as more than 90%. The environment, overall should be termed dusty. Further, during July to October, medium to high flood conditions exist, and during the high floods, part or whole of the highway may be under water. This calls for strict IP67 compliance. If the area is submerged for more than 2-3 days, even this rating may fail miserably for installations/ equipment placed at road level or below.
5. The NH37 in the stretches from Jakhlabandha to Bokakhat is having at most places raised embankment of varying heights, the average of which may be taken as 1.8 to 2 m. The slope of the embankment is 1:2. To detect small bodied animals at the foot of the embankment would need specially designed provisions.
6. During floods it is observed that the smaller animals often come near the highway, but

may not cross. This would give rise to a lot of false positives during the rainy season. During peak flood periods, systems warning the animals not to cross, especially when the convoys are moving, may be more effective for the smaller animals who continue to dwell on the highway, but have no intentions or need to cross, and may become a victim due to panic reaction from an approaching vehicle.

7. The stretches of the highway are not straight, but zig-zag and the corridor is broken at several places. Therefore, identifying exactly the start or end of corridor may not be possible at this stage. The corridors would require removal of encroachment/ structure and then retrofitting, and only then start and end concept can be strictly implemented.
8. During floods, animals also functionally use the areas such as agricultural fields etc. to cross the highway. These locations are outside the identified corridors, but fall all along the NH37. Therefore, sensor systems must be designed to be placed all along the NH37 from Jakhlabandha to Bokakhat.
9. Animals, especially the elephants may tamper with the roadside installations. The installations must be robust and elephant tamper proof for long term maintenance free functioning. So are the moneys and roosting birds.

Site Specific Limitations on NH37:

Based on the discussion of the site specific issues in implementation of a sensor based network on the NH37, the following points need to be kept in mind while shortlisting and implementing technologies:

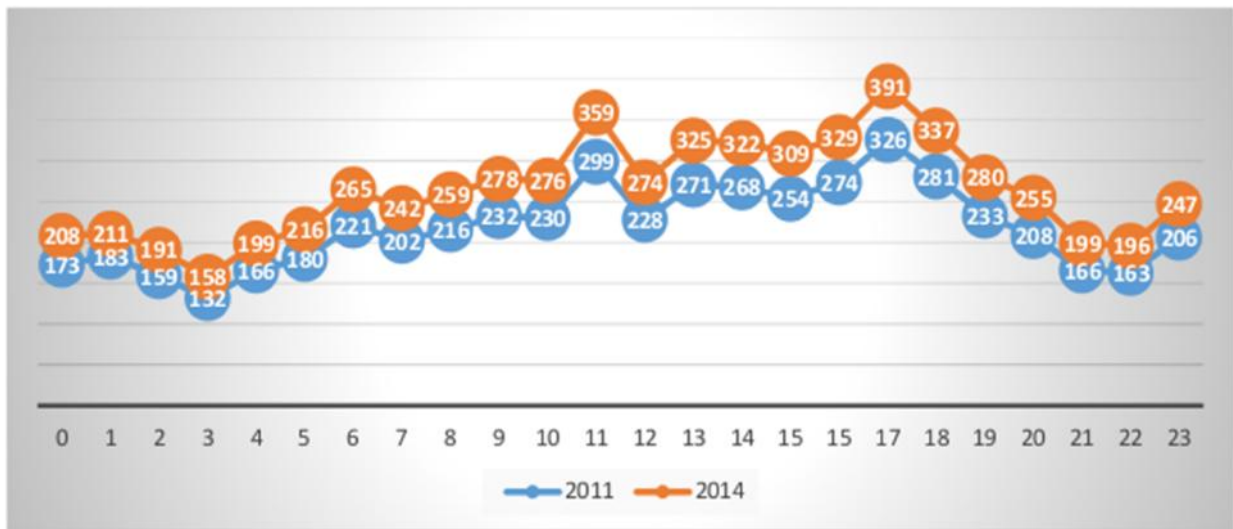
1. Multiple technologies need to be deployed in a given stretch.
2. Strong gantries/ posts need to be erected along the road side to house equipment, sensor, communication devices, power units and solar panels, and traffic control systems.
3. It has been observed that most systems need control rooms for observation and monitoring. On the NH37, at least 3-5 control rooms may be required to be set up.
4. All installations should be elephant tamper proof, above HFL and must avoid false positives from humans and cattle.
5. Installation of automated sensor based system may actually fail, if not implemented properly, given the complexity of the variation in animal sizes, large number of biotic interference and variation of environmental conditions. Automation, at the first go itself, may lead to a large number of false positives. Therefore, local squads may be deployed at the various points on the NH37 with suitable equipment and towers to observe the road side and operate signals on a 24x7 basis.
6. The short term measures cannot, in any way, replace the long term measure of fly-overs and tunnels on the NH37.

Issues in Installation of Automated Animal Sensor Barriers: Automated Sensor based animal barriers are used nowhere in the world. Most of the animal sensor systems activate various kinds of electronic signages either put up all along the road sides or embedded on the pathways to alert motorists of impending animal crossing. There are also sound alerts

as well. In Indian conditions, especially in Kaziranga, it is more difficult to establish and operate automated animal sensor barriers for the following reasons:

- a) Automated electro-mechanical gates takes several seconds to operate
- b) The NH37 is a very busy highways which has heavy traffic almost on 24X7 basis.
- c) Such barriers are operated best on narrow lanes and toll gates, and often in combination with automated bollards to stall slow moving vehicles for under belly scanning.
- d) Sudden closing with a barrier will lead to serious accidents on the highway
- e) False alarms (which is unavoidable) from the animal sensors is quite common and takes considerable R&D to minimize. Such false alarms will lead to chaos if the automated barriers were to be operated purely based on signal intelligence.
- f) Detection of grazing wild animals by the side of the road with no intention of crossing will keep the gates closed for a long time until the animal moves away, or driven manually.
- g) During floods, animals, human beings and wildlife all share the highway as a highland. In such conditions, the automated barriers would become dysfunctional.
- h) In long animal corridors such as Amguri-Deosur and Kanchanjuri which run into kilometers, the location and number of barriers cannot be fixed as animals can be detected at any point in the long corridors. These corridors additionally have blind turns/ sharp turns which would make automated barriers ineffective most of the times. Such long corridors would invariably require manual operation on shift basis.

TRAFFIC VOLUME ON NH37: The Wildlife Institute of India, Dehradun carried out a study of the traffic on the NH37 between Jakhlabandha and Bokakhat in January, 2014. According to their finding, On an average 264 vehicle/hour use this road with a minimum of 158 vehicle /hour use and maximum of 391 vehicle /hour. There is increase of 20% traffic volume on NH 37 from 2011 to 2014. The traffic on hourly basis was also mapped from 00 Hrs to 23 Hrs. The outcome is depicted below:



Therefore, any design of the automated animal sensor should take into account the traffic volume, and challenges associated with it. Else the system may fail.

Shortlisting of Technologies for Deployment on NH37: Several studies by Marcel P. Huijser [2010], Mary Gray [2011], Report submitted to the US Congress by the Federal Highway Authority [2008] extensively list the various technologies deployed in animal detection systems along the highways. Based on extensive literature review, it is seen that there are several technologies deployed in various parts of the world which can be classified as below:

1. Area cover with Passive IR and Microwave technologies
2. Break-The-Beam system deployed with LASER beam
3. Break-The-Beam system deployed with Active IR beam
4. Break-The-Beam system deployed with microwave beam
5. Underground cable system with EM canopy
6. Ground Surveillance Radar systems
7. Geophones
8. Thermal Sensors
9. Thermal Imaging Camera systems with Video analytics software
10. Optical PTZ Imaging Camera systems with Video analytics software
11. Radio collaring with geo-fencing
12. Ultrasound (low/high frequency) to warn animals

The technology deployment at any particular site may use any of the above or a mix bag of technologies depending upon the site specific requirements. Beam based systems are ruled

out, as sensors need to be placed low, and may be damaged by elephants and would go under water during floods for long periods. The systems would be mostly unavailable during the floods. Systems based on Passive IR would be total wash out in fog, smog and rain. Microwave based systems do not get affected in the lower frequencies, but system design faults may lead to strong attenuation of signals leading to wash out in inclement weather conditions. Radar using Ku Band such as in Ground Surveillance Radars are useful in detecting objects small and large at distances varying from as close as 20m to as far as 3.5 km or more. Geophones pick up ground vibrations and may be useful only for detection of large animals, and there would either a large number of false positives or false negatives. Thermal and optical imaging systems with video analytics software are also reliable system. Radio collaring technologies are not applicable in the wild, and hence out rightly ruled out. Systems issuing warning to animals to keep off the road when the traffic is in convoy and well regulated could be effective, if the animals hover around the highway most of the time without wanting to cross. Based on the site limitations on the NH37, the following technologies are suggested:

1. Underground cable system with EM canopy
2. Thermal/ Optical camera systems with video analytics
3. Ground Surveillance Radar systems

These technologies often need to be implemented in conjunction with a host of support technologies such as:

1. Trigger systems coupled with video recording
2. Rain and humidity sensors (Automatic Weather Station)
3. Warning lights displays and signages
4. Wireless communication system
5. Solar power/ Battery back up (As NO ELECTRICITY SUPPLY AVAILABLE)
6. Control Rooms

In the context of the NH37 deployments, additionally the following requirements would have to be factored in the systems to be designed:

1. Vehicle speed detection system
2. Check posts for fine collection from vehicles over speeding
3. Interceptor vehicles
4. Placement of manpower on 24X7 basis
5. Gantry Structures/ Watch Towers/ tall tubular structures with foundation
6. Walkie-talkie communication between stations
7. Powerful search lights
8. Improved Time Card system

9. Reflective jackets for the man-power deployed on the NH37
10. Hand Held Thermal Scanners and Night Vision Devices to locate animals manually at night

11. Available Technologies, Deployment and Phasing:

Animal detection systems are not off the shelf products custom made to any specific species or a range of animals. The deployment of the system has to be site specific and tailor made. Narrowing of false positives and negatives may take a long time. Other systems such as area coverage based on IR sensors and / or Break-the-beam technologies based on microwave/ Active IR also may have to be introduced to reduce false positives and negatives. There are several standard core equipment available which may need to be integrated together to get a reliable system. Some of the proven products are mentioned below:-

1. Senstar OmniTrax Buried cable sensor system, Canada
2. Intrepid MicroTrack Buried cable sensor system, Arizona, USA
3. SCANTER 1002 Ground Surveillance Radar (GSR) from Terma A/S, Denmark
4. SQUIRE GSR, Thales, Netherlands
5. Blighter GSR, Essex, UK
6. Radar based Large Animal Detection System (LADS), Augsignals, Canada
7. FLIR Thermovision IRMV 320V camera system
8. Bosch MIC 612 Thermal PTZ camera system

5). INDICATIVE SPECIFICATIONS OF SOME SELECT EQUIPMENT:

Bidders are to quote the minimum configurations given in the paragraphs below or provide higher specifications. In case of similar or equivalent specification, please comply by marking “**COMPLIED**” or “**YES**”. In case of higher specifications, please indicate by saying “**HIGHER**” or “**BETTER**”. If not complied, please say “**NO**”.

3.1 Mega Pixel Outdoor Vandal proof Network Box Camera:

Functional Specifications	<p>The Outdoor network box camera shall offer multiple simultaneous video streams with 3.1 megapixel (Mpxl) 2048 x1536 resolution @30 IPS, auto iris and megapixel varifocal lens or higher.</p> <p>The Outdoor network box camera shall provide a removable, local storage medium (Micro SD) to capture video clips of varying lengths upon camera sabotage, motion, or relay alarm.</p> <p>The Outdoor network box camera shall support H.264 High or Main profiles, or MJPEG.</p> <p>The Outdoor network box camera shall support configurable frame rates, bit rates for additional bandwidth administration.</p> <p>The Outdoor network box camera shall be conformant to the ONVIF Profile S</p> <p>The Outdoor network box camera shall offer local storage capture of 10-second</p>
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	<p>video clips on camera from alarms created by sabotage, motion detection, or alarm inputs.</p> <p>The Outdoor network box camera shall provide 15-50mm Auto Iris Megapixel Vari-Focal capabilities</p> <p>The Outdoor network box camera shall provide simple motion detection to detect motion within a user-defined field of view or within a user specified rectangular zone. Such behaviours shall trigger an alarm.</p> <p>The box camera shall provide inbuilt camera sabotage analytics to detect Tampering, Tripzone, Audio Detection. Incase its not available in the camera then additional analytics software may be provided for the same.</p>										
	1/2.8", 3.1 Megapixel (2048 X 1536) progressive SCAN CMOS with minimum 2 MP										
	Minimum illumination: 0.3 LUX										
	DC drive auto iris lens										
	Wide Dynamic Range – up to 65 Db										
	White Balance Range –Auto										
	Day/Night ICR Cut Filter										
	Multiple simultaneous streams with up to 3 different configurations plus service stream; the second stream is variable based on the setup of the primary stream										
	Available Resolutions 2048x1536, 1920 x 1080, 1280 x 720, 704x480, 352x240										
	Video Format- Support for H.264 and MJPEG stream										
	Frame Rate: Minimum 25 fps										
	Bit Rate Control										
	Supported Protocols - TCP/IP, RTP, RTSP, HTTP, RTP, RTSP, UDP, HTTPS, FTP, SNTP, SMTP, UPnP IP Rating : Minimum IP66										
	<table border="0"> <tr> <td>Network Port</td> <td>RJ-45 for 100Base-TX</td> </tr> <tr> <td>Cable Type</td> <td>Cat5 cable or better for 100Base-TX</td> </tr> <tr> <td>Input Power</td> <td>PoE (IEEE802.3af, Class 2); 24 VAC</td> </tr> <tr> <td>Local Storage</td> <td>Minimum 32GB on Micro SDHC /SDXC card</td> </tr> <tr> <td>Interface</td> <td>Ethernet 10/100</td> </tr> </table>	Network Port	RJ-45 for 100Base-TX	Cable Type	Cat5 cable or better for 100Base-TX	Input Power	PoE (IEEE802.3af, Class 2); 24 VAC	Local Storage	Minimum 32GB on Micro SDHC /SDXC card	Interface	Ethernet 10/100
Network Port	RJ-45 for 100Base-TX										
Cable Type	Cat5 cable or better for 100Base-TX										
Input Power	PoE (IEEE802.3af, Class 2); 24 VAC										
Local Storage	Minimum 32GB on Micro SDHC /SDXC card										
Interface	Ethernet 10/100										
Certification	UL, CE & FCC										

IP 66 Certified Enclosure for Box camera:

Sl. No.	Detail	Requirements
	Make	PI specify
	Model	PI specify
	Manufacturer's Authorization	Attachment file name.....
	Technical Literature/Brochure	Attachment file name.....
1	Features	Power Supply - . 100 to 240 V AC Input or 12 V DC Material - Aluminum Housing Color - White IP66 certified for weatherproof and dust proof operation should

		be of same make as camera brand
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Automatic License Plate Recognition System (ANPR)

INTRODUCTION

The Contractor shall design, supply and install an outdoor IP based Automatic License Plate Recognition system which captures the vehicle images, detects and process the license plate and provides the license plate number.

SYSTEM DESCRIPTION:

Automatic License Plate Recognition System

The system shall be high resolution IP camera based with environmental housing for outdoor road side operation.

The System should be able to detect a vehicle approaching or leaving the designated location even at speeds up to 100kmph.

The system should be able to configure for capturing vehicle front or back license plate accurately.

The system should be able to support capturing of vehicle license plates up to four lanes simultaneously.

The system should have robust vehicle detection technology to avoid any sort of false triggers caused due to motion other than vehicles.

The system should be compatible to capture images of its License Plate & optionally the vehicle, Driver images and store in central database.

System should be able to detect license plate within an image irrespective of its position, skew & size accurately.

System should Perform OCR [Optical Character Recognition] for the standard license number plate (only English alpha numeric plates) of vehicles entering or leaving from the designated locations.

System should be able detect accurately any non standardized license plate (not as per Indian RTO standards such as, Different fonts, size, special characters, etc) & extract portion of the license plate image & store to the central database.

System should be able to detect and recognize the English alpha numeric License plates of two wheelers or four wheelers & above.

The system processing should be able to detect & recognize all vehicle license plates in real time.

The system should be able to detect & recognize all vehicle license plates in single or dual row.

The system should be able to capture multiple images per vehicle and select the best result.

The system shall provide the validation algorithm to detect the number from multiple snaps.

System is robust to variation in License Plates in terms of font, size, contrast and color and should work with reasonable accuracy.

The system should support customization of vehicle license plates

to different formats for each type of plate (eg. 6Char or 8Char per license plate).

The system should be able generate real time alarms to alert the control room for vehicles which have been marked as “wanted”, “Suspicious”, “Stolen”, “Expired” upon successful recognition of the number plate. [These categories can be added and expanded as per customer requirement].

The system should have required interface to support vehicle access barriers to prevent any escape of “wanted”, “Suspicious”, “Stolen”, “Expired” vehicles.

The system should be able to overlay data such as Lane info, Junction details, Time stamp, etc on to the License plate image for storing into central database.

System should provide an option for advanced users to tune the system parameters according to the location.

The system should be able to work seamlessly with wired or wireless networks.

The system should support digital water marking of captured images to avoid any sort of tampering & automatically sent to command control back office server via wired or wireless networks.

The system should support real time status update to central command control.

The System should work in both day and night conditions even at pitch dark.

The system should enable easy and quick retrieval of license plate image / data for post incident analysis and investigations.

The back office server software should support license plate data mining & generate suitable reports that will provide meaningful data to concerned authorities.

The system design should be based on scalable open architecture platform for seamless integration with similar surveillance systems in use or likely to be used by the customer.

The system support users with different access types.

The system should manage the vehicle search list and be able to upload to all the clients from centrally.

The System should support interface to control boom barrier optionally.

The system should be rugged & be able to work under all weather conditions.

The system should have built-in Normal, HD video recording capability.

The system should have option to clip & associate a pre & post recording of a license plate capture as per the defined time interval by the user.

The system should support license plate recognition under free flow traffic with or without induction loops support for vehicle detection.

The system should support client server architecture to have

multiple ALPR view stations at different location.

The System should be based on client server architecture and the servers should be placed in the control room. There should be no field equipment except cameras and UPS for support.

Should have inbuilt VMS functionality in software for recording Auxiliary cameras and should have functionality to integrate to UVSS at critical locations

The camera should have following minimum specification	
Camera Interface	IP
Resolution	2.0Mpxl
Shutter Speed	1/50 – to 1/10000 or better
Operating Temperature	0 deg c to +45 deg c
Frame Rate	25/30 fps
Varifocal Lens	5 – 50 mm or better
Electronic Iris Control	DC Type
Mount	C/CS
Image Format	¼, 1/3, ½
Wavelength	850nm (Semi Covert)
IR Illuminator	Suitable for capture of number plates in night conditions up to 50 meters
Environment Protection	IP65/IP66
Filter	IR Filter
Camera Housing Protection	IP65/IP66
Speed Limit	40Km/Hr
Installation & Mounting	Pole Mounted
Integration	Should be capable of integration with overall architecture of Surveillance

Video Management Software and System :

NAS based storage + software based management and analytics to cater upto 30days of storage

Functional Specifications	<p>The IP video management system software shall consist of base software with individual, non-expiring licenses in the required quantity.</p> <p>The IP video management system software updates shall be downloadable from a publicly available website.</p> <p>The IP video management system shall support recording of JPEG, MPEG-4 and H.264 IP streams.</p> <p>The IP video management system shall also support third-party H.264 Megapixel video streams up to 10 Megapixel resolution</p> <p>The IP video management system shall have a fully open architecture with support for both IP-specific camera as well as cameras with ONVIF compliance.</p> <p>The IP video management system shall support automatic detection of IP cameras. Third-party IP cameras shall be automatically detected dependent on IP driver versions and manufacturers specifications.</p>
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The IP video management system shall support an unlimited number of systems connected over a network. Each system shall contain two 1GB network ports; one for IP camera/encoder data, and one to connect to a network for client computer access.

The IP video management system shall be viewed, managed, and played back through a single user interface simultaneously with client software

The IP video management system shall remote surveillance of live video and remote playback of video recordings

The IP video management system shall support real time notifications of detected events and remote monitoring of event videos.

The IP video management system shall start panic recording of live videos and playback of panic recordings.

The IP video management system shall support registration of upto 1024 devices.

The IP video management system shall allow simultaneous remote software upgrades and multi play system setup.

The IP video management system shall be capable of continuous scheduled alarm/event and motion recording. Pre- and post- alarm recording shall also be available and shall be fully programmable on a per channel basis.

The IP video management system shall allow archival of video data to computers or SAN storage devices over a network connection with the optional Archive Utility. The archival schedule shall be either automatic at user-defined intervals or manual and shall be configurable per connected camera.

The IP video management system shall display device system logs

The IP video management system shall monitor live emaps

The IP video management system shall support SSL for security

The IP video management system shall support authority settings by user groups for security.

The IP video management system shall support intuitive and user friendly GUI

Support SD Card Playback

The IP video management system shall support5 all live viewing, searches, emaps, and condition monitoring can be executed simultaneously by supporting multi docking of screens.

Should support the following Video Analytics: Audio Detection, Tampering and Trip zone per channel. as standard supply.

Storage System with 16 TB HDD Storage

Hardware Features	Rack Mount Type
	Supports RAID Levels 0,1+5
	Support minimum 4 HARD DRIVE Bay X 1 Bays: 3.5" Internal, SATA II – Up to 4 TB capacity for each disk.
	Maximum of 3.0G Gbps transfer rate (SATA II)
	Easy expandibility to large storage pool
	Should be supplied with 16 TB Internal HDD
	Connectivity through 1Giga Lan Port or eSATA
	Seamless connectivity to Network Video Recorder and Video Management System
	External Power Supply 100-240VAC
	CE, FCC

POE Switch:

Sl. No.	Detailed Technical Specifications	Complied (Yes / No)
1	Minimum 24 ports of 10/100/1000 base-T PoE and 2 SFP+ uplink ports (populated with required modules).	
2	1 U Rack mountable and should provide stacking of minimum 8 switches with 40Gbps of dedicated stacking bandwidth (All required accessories, licenses to be provided).	
3	88 Gbps or higher Backplane capacity and minimum 65 Mpps of forwarding rate for both IPv4 and IPv6	
4	The switch should support internal/ external RPS	
5	Should support Non-blocking and distributed forwarding hardware architecture	
6	All interfaces should provide wire speed forwarding for both Fiber and copper modules	
7	Support for at least 4000 VLANs & 16k MAC address	
8	It should support IGMP snooping v1 & v2	
9	It should have static IP routing and RIP from day 1	
10	Should be upgradable to OSPF, OSPFv3, RIPng, PIM, MLD in future	
11	Switch should support 8 hardware queues per port	
12	Dynamic Host Configuration Protocol (DHCP) snooping	
13	Switch should support LLDP and LLDP-MED capabilities	
14	Should support IP source guard & DAI	
15	Should support Secure Shell (SSH) Protocol and Simple Network Management Protocol Version 3 (SNMPv3).	
16	Switch needs to have console port for administration & management	

17	Management using CLI, GUI using Web interface should be supported	
18	FTP/TFTP for upgrading the operating System	
19	IEEE 802.1x support	
20	IEEE 802.1D Spanning-Tree Protocol	
	IEEE 802.1p class-of-service (CoS) prioritization	
	IEEE 802.1Q VLAN	
	IEEE 802.3 10BASE-T specification	
	IEEE 802.3u 100BASE-TX specification	
21	Switch should support redundant power supply.	
22	Switch should able to support management via CLI, Web interface	
	SNMP v1,v2,v3	
	Switch should be manageable through both IPv4 & IPv6.	
	Switch should be FCC Part 15, ICES-003, VCCI Class A, EN 55022, EN 55024, EN 300386, CAN/CSA 22.2 No.60950-1, IEC60950-1, Reduction of Hazardous Substances (ROHS) 6 certified	
	Should have modular OS and should support configuration roll back to recover mis-configured switch to last known good configuration	
23	The switch should be EAL3/NDPP certified from Day 1 for the quoted products and should be of same series	

Desktop PC:

S.N o.	Features	Detailed Technical Specifications	Complied Yes / No
1	Processor	Intel® Core™Intel Core i3-4130 (3.4GHz, 3MB) or equivalent of AMD processor or Higher	
2	Chipset	Intel H81 express/ AMD chipset or higher	
3	Motherboard	OEM motherboard	
4	System Memory	8 GB DDR3-1600MHz RAM upgradeable up to 16 GB or more with minimum 2 DIMM slots	
5	Slots	3 PCIe express or above	
6	HDD	500 GB or higher SATA III 6.0Gb/s HDD 7200 RPM	
7	DVD	DVD RW Drive	
8	Ports	1 serial,1 parallel, 6 USB 2.0/3.0 with at least 2 USB 3.0 ports, VGA, DVI-D/Display Port, Internal Integrated Speakers (Desktop/Monitor), Microphone, PS/2,	
9	Graphics	Intel HD Graphics	
10	Audio	• Integrated Audio Controller	
11	Monitor	21" Or higher "TFT OEM color monitor. TCO Monitor. Same brand as Desktop	
12	Keyboard	104 Keys, USB keyboard,	

13	Mouse	2 button Optical scroll Mouse	
14	Ethernet Port	<ul style="list-style-type: none"> Embedded Auto Sensing gigabit LAN with WOL & PXE 	
15	Operating System	<ul style="list-style-type: none"> GNU/LINUX Preferred. (Microsoft Windows 8 Professional downgrade to Windows Pro 7 optional) 	
16	Power	<ul style="list-style-type: none"> 320 W or less, 80 PLUS 	
17	Certifications:	<ul style="list-style-type: none"> UL, ROHS, EPEAT Gold, Energy Star 	

UPS:

Detailed Technical Specifications		Complied Yes / No
Technology	True On Line UPS with double conversion technology	
	Rectifier and inverter should be based on IGBT	
Power Rating Input	3000 VA / 2400W or as per requirement	
Voltage Range	160 VAC – 300 VAC @ 100% Load, 110 VAC – 300 VAC @ 50% Load	
Frequency	40/70 Hz	
Power Factor	0.95	
Output - Voltage Range	220/230/240 VAC +/- 3%	
Output - Voltage Distortion	3% (Linear Load) 6% (non Linear Load)	
Frequency	47.5 ~ 52.5 Hz	
Power Factor 0.8	0.8	
Crest Factor	03:01	
Inverter Overload		
Inverter Overload - Transient Response	Less or equal to 3% for 100% nonlinear load (Battery mode)	
Battery Type	Sealed Maintenance Free, Valve Regulated Lead Acid	
Battery cell rating	Battery cell of 12V	
Rated Voltage	Minimum 96 VDC	
Backup Time	30 min 2496 VAH	
Protection	Inbuilt protection for surge suppression and EMI/RFI filter provided as well as The unit shall have Surge Current Capacity of min. 10kA with two mode of protection & <0.5 ns Response time. UPS shall be provided with only externally connected SPD as per IEEE Standard 1100-2005	
Environmental and Other		
Audible Noise	Less than 45dB at 1 meter	

Operating temp & Humidity	20 – 90%RH @ 0 – 40°C (non condensing)	
LCD Display	UPS Status, Load level, Battery level, Input/Output voltage, Discharge Timer & Fault conditions	
Management		
SMART RS 232	Supports Windows, Linux	
SNMP	Power Management from SNMP manager and web browser option should be present	
Credentials	Manufacturer Should be ISO 9001:2000 certified Manufacturer Should be ISO 14001 certified	
Additional	Power Outlet: Should have programmable power management outlet for independent control of load segment.	
Additional	OEM should provide Type Test Certificate (TTC) from Government laboratory/ Government Approved laboratory ETDC Mohali	

CAT 6 Cable:

All necessary electrical and network cables to complete the installation and commissioning is to be provided. Also, required PoE switches and routers to be provided.

S.No	Detailed Technical Specifications	Complied Yes / No
	UTP Outdoor Cat 6 Cable, TIA-568C.2, Outer Sheath LSZH, Category-6 (305 Mtrs./1000 feet per Box)	
1	Minimum Specifications:	
1.1	Shall be of 4 twisted pairs of 23 AWG solid conductors	
1.2	Shall support network line speeds up to 1 gigabits per second.	
1.3	Shall be 4-pair Unshielded twisted pair with a cross filler/ divider/ isolator, meeting Category 6 tested to 250 MHz or more as per TIA-568C.2.	
1.4	Shall support 1000Base -TX and Video, Voice and have NVP of 69 - 70% or more	
	Conductor Resistance : < 9.38 Ohm/100 m & Mutual Capacitance : < 5.6 nF/100m	
1.5	Inner Sheath Material – PE	
1.6	Insulation – High Density Polythene and cable should be in Black color.	
1.7	Cable diameter shall be less than 7.2 mm and the pulling force exerted on the cable shall not exceed 14 Kg.	

1.8	The Category 6 Solution shall fully comply with the link segment specifications for 1000 Base-TX in addition to the ANSI/TIA and ISO/IEC Category 6 requirements.	
1.9	Shall have the length printed on the outer jacket of the cable after every meter.	
1.10	The cable shall be IP 65 rating	
1.11	Operating Temperature shall be in the range: -20 deg. to +70 deg.	
1.12	Shall be RoHS Compliant All cat 6 Information Outlet with Enclosure & Cat 6 patch cords Shall be IP 65 compliant to prevent from water and dust	

Optical Fibre Cable:

Sr.No.	Detailed Technical Specifications	Complied Yes / No
1	Fiber Optic Cable shall be ISO/IEC-11801-9/125 μ , OS2 Indoor/Outdoor, IEC 60332-3, IEC 61034, IEC 60754-1, and Non-Metallic armour with water blocking Gel.	
2	Fiber Patch Panel should be Front & Rear mountable with splice tray and loaded connection	
3	Fiber Joint Closure and fiber patch cords should be IP rated.	

LED panel based Integrated Data Wall System(4 numbers):

S. No.	Features	Detailed Technical Specification	Complied Yes / No
1.	LCD technology	SPVA	
2.	Resolution	Full HD (1920 x 1080) or higher	
3.	Backlight	Direct LED	
4.	Aspect Ratio	16:9	
5.	Pixel density	40 dpi	
6.	Refresh rate	60 Hz	
7.	Luminance	700 cd/m ² (typ.) or higher	
8.	Contrast	3500:1 (typ.) or higher	
9.	Viewing angle	H 178° V 178°	
10.	White point	10,000 K	
11.	Color depth	10 bits	
12.	Calibration	Built in automatic color and brightness calibration- without using external color meters/sensors	

13.	Precision	Internal 10 bit processing	
14.	Backlight lifetime	60,000 h (typ)	
15.	MTBF	100,000 h (half brightness)	
16.	Cooling	Ultra low noise fans	
17.	Screen haze	44%	
18.	Dimensions	1213 x 684 x 98.2 mm 47.8" x 26.9" x 3.87"	
19.	Active screen diagonal	32" DC Panel	
20.	Active screen area	1210 mm x 680 mm 47.63" x 26.79"	
21.	Weight	29.2 kg	
22.	Bezel width	3.5 mm 0.14" or smaller	
23.	Display port 1.1	1 input, 1 output or more	
24.	Ethernet port	2	
25.	HDCP	Yes	
26.	HDMI 1.4a	1 input or more	
27.	USB	1 input (USB 2.0)	
28.	DVI	2 inputs or more	
29.	Remote Control	External dongle with approx. 1m 3.5mm Stereo Male to IR Receiver	
30.	OPS Open Pluggable Specification	Yes	
31.	Energy Star	Yes	
32.	AC input voltage	100-240 VAC, 50-60 Hz	
33.	Power consumption	290 W (max) 180 W (typ)	

10 / 100 Single Media Converter

Sl. No.	Features	Detailed Technical Specification	Complied Yes / No
1	Physical Interface:	It shall support media conversion between 10/100BASE-TX and 10/100BASE-FX It shall support auto negotiation of duplex mode on twisted-pair port It shall support auto MDI/MDIX for twisted-pair port	

2	Distance	It shall support Maximum fiber cable distance is 30 Km.	
3	Features	It shall support modified Cut-through frame forwarding packet forwarding system. It shall support link fault pass through function (LFP) It shall support far end fault function	
4	Wavelength	It shall support wavelength 1310nm	
5	Temperature	Operating Temperature: 0 - 70 C Storage Temperature: -45 - 80 C	
7	Certification	FCC, IP 30 rating, Safety UL 508, cUL, CE EN60950-1 (LVD) Class I, Division 2, Groups A, B, C, Hazardous Locations Stability IEC60068-2-32 (Free fall) IEC60068-2-27 (Shock) IEC60068-2-6 (Vibration)	
8	Warranty	3 year Standard Warranty	

Wireless Point-to-Multipoint Base Station Radio

Sl. No	Features	Detailed Technical Specification	Complied Yes / No
1	Frequency	Radio should operate in 2.4Ghz or 5.8Ghz as per ISM Band of India WPC.	
3	Channel Bandwidth	System must support 5/10/20/40MHz Channel Bandwidth	
4	Channel Spacing	In 5MHz channel steps	
5	Max Output Power at	Base Station: Max Tx Power is 25dBm and can be changed in steps of 1dBm	

	Antenna port	CPE: Max Tx Power is 21dBm and can be changed in steps of 1dBm (No ATPC supported)	
6	Modulation	2x2 MIMO-OFDM (BPSK/QPSK/16QAM/64QAM) with Forward Correction (FEC)	
		Should support automatic adaptive modulation, separated per CPE per direction for maximum performance	
7	Architecture	60° / 90° Antenna	
10	CPE Isolation	System should have the capability to isolate one CPE from other CPE for better security	
12	Mac Address Learning Capability	System should support minimum 4000 MAC address learning to minimize broadcast in network	
13	Diagnostic	Bandwidth Test, Telnet, Antenna Alignment, Spectrum analyzer for 5 MHz, 10MHz and 20 MHz	
14	Error correction	3/4 Reed Solomon Forward Error Correction coding and ARQ	
15	Auto Firmware Upgradation	Scheduled upgrade can be done from Base Station	
16	Distance Coverage	Min 20-25 Km from Base Station	
17	Number of CPE per Base station	Device should have the support of 30 CPE with Data Encryption	
18	Vlan Support	VLAN support based on IEEE 802.1Q	
19	Security	128 bit AES authentication, FIPS 197 Certified	
21	Throughput	System must deliver actual/usable throughput of minimum 112.5 Mbps with 20 MHz Channel Width	
20	Encription effect on thoughtput	Throughput capacity should not be reduced when using AES encryption	
22	Spectral Efficiency	System should have spectral efficiency of 5.63bits/Hz for 20 MHz, 5 bits/Hz for 10 MHz and 3.68 bits/Hz for 5 MHz Channel Bandwidth	

23	Bandwidth	System should be able to configure symmetric & asymmetric bandwidth. Upload and download percentage should be user configurable in steps of 1 %	
24	MIMO-B	System must have the support for 2 x 2 MIMO-B technology to increase the throughput	
25	Avoid Collision	System should not use CSMA-CA	
26	Interference mitigation	System carry small Radio data packet to combat interference without impacting performance	
28	Management	System should have support of IPv4, IPv6 dual stack, UDP, TCP, IP, ICMP, Telnet, SNMPv1, v3, HTTP, FTP	
		System should have support of Network Management with, Telnet, SNMP	
29	Management VLAN	System should have the support of VLAN 802.1ad (DVLAN Q-in-Q), 802.1Q with 802.1p priority,	
31	Ethernet Latency	Average latency of a heavily loaded (85% of link capacity) one way trip must not exceed 14 ms Max (regardless of packet size)	
32	Subcarrier	System should support minimum 64@20MHz, 128@40MHz subcarrier to support superior performance in NLOS condition	
33	Surge Protection	System should have inbuilt surge protection mechanism according to EN 61000-4-2 (ESD) standard	
34	GPS synchronization	System should support GPS synchronization technique to eliminate UL and DL interference in addition system should support Ethernet based synchronization	
35	Colocation of Sectors	Co-located radios using adjacent channels on a common plane must not require a guard band for optimal performance	
36	Synchronization Redundancy	Should support external GPS and in case of external GPS system should support free run mode	

37	MTBF	More than 40 Years	
38	Operation Temp.	40°C to 55°C Outdoor	
		20°C to 40°C Indoor	
39	Protection	IP 66 or better	
40	WPC Approved	System must be approved from WPC	
41	Certification	EN 302 502 v1.2.1 (5.8 GHz)	
		FCC: 47 CFR Part 15	

Remote Station Unit (CPE Unit) -

Sl. No.	Features	Detailed Technical Specification	Complied Yes /No
1	Frequency	Radio should operate in India ISM Band (5.8GHz) as per WPC Regulation	
2	Band Support	Radio Must support 5.8GHz Multi-Band	
3	NLOS,nLOS operation	Must support 64@20MHz, 128@40MHz subcarrier to support superior performance in NLOS ,nLOS conditions	
4	Channel Bandwidth	5 / 10 / 20 /40 MHz with 5MHz steps	
5	Max Output Power at Antenna port	Base station: Max Tx Power is 25dBm and can be changed in steps of 1dBm CPE: Max Tx Power is 21dBm and can be changed in steps of 1dBm (No ATPC supported)	
6	Modulation	2x2 MIMO-OFDM (BPSK/QPSK/16QAM/64QAM)with Forward Error Correction (FEC)	
		Should support automatic adaptive modulation, separated per CPE per direction for maximum performance	
7	Architecture	Integrated, minimum 17dBi, Must support H and V polarization patch	
		Single Cable between IDU & ODU	
8	Distance Coverage	Minimum 20-25 Km from Base station	
9	External Gain	CPE must have option of ordering connectorized version for using external antenna for covering large range	
11	MIR/CIR	Should support the MIR configuration to ensure SLA	
13	Ethernet Latency	Average latency of a heavily loaded (85% of link capacity) one way trip must not exceed 14ms (regardless of packet size)	

16	Broadcast Rate Limit	System must be able to limit broadcast	
19	Management of Video Traffic	Please describe how your radio system is designed to accommodate traffic of burst nature, such as real time video surveillance traffic	
20	Link Test Utility	Should support the inbuilt link test utility to calculate the throughout and efficiency of link	
21	VLAN Support	VLAN support based on IEEE 802.1Q	
22	Security	128 bit AES authentication, accepted by NIST	
23	Throughput	20 Mbps and software configurable more than 50 Mbps without changing the hardware	
24	Spectral Efficiency	Should be greater than 5 bps/Hz for access	
25	Bandwidth	System should be able to configure symmetric & asymmetric bandwidth. Upload and download percentage should be user configurable	
26	MIMO-B	System must have the support for 2 x 2 MIMO-B technology to increase the throughput	
27	Avoid Collision	System should not use CSMA-CA	
28	Interference mitigation	System carry small Radio data packet to combat interference without impacting performance	
29	LAN Interface	System must have 100Base(T) Half/Full Duplex, rate auto negotiated (802.3 compliant)	
30	Management	System should have support of IPv4/IPv6 (Dual stack), UDP, TCP, IP, ICMP, Telnet, SNMPv1, v3, HTTP, FTP	
		System should have support of Network Management with Telnet, SNMP	
31	Management VLAN	System should have the support of VLAN 802.1ad (DVLAN Q-in-Q), 802.1Q with 802.1p priority,	
32	QoS	Must support 802.1P and Diffserve QoS	

33	Error Correction	3/4 Reed Solomon Forward Error Correction coding and ARQ	
34	Alignment	SNR bar or beeper based alignment option on outdoor radio unit for antenna alignment	
35	Antenna Gain	Should have provision to increase the gain of integrated antenna up to 12 dBi	
36	Antenna Beamwidth	Antenna Beam width must be 30° azimuth, 15° elevation (both H&V)	
37	Operation Temp.	40°C to 55°C Outdoor 20°C to 40°C Indoor	
38	Protection	IP66 or better	
39	WPC Approval	System must be approved from WPC	
40	Certification	EN 302 502 v1.2.1 (5.8 GHz)	
		FCC: 47 CFR Part 15	

INDICATIVE SPECIFICATIONS OF IP THERMAL CAMERA WITH INTEGRATED FIXED ENCLOSURE

1. The fixed thermal IP and analog system shall provide an integrated thermal imaging device in an environmental enclosure.
2. The fixed thermal IP and analog system shall provide a native digital image from the image sensor to the IP video stream.
3. The fixed thermal IP and analog system shall consist of an uncooled, sun-safe amorphous silicon microbolometer, long-wavelength infrared (LWIR) camera capable of 640 x 480 and 384 x 288 and 240 x 184 resolution formats.
4. The fixed thermal IP and analog system shall provide a temporal Noise Equivalent Temperature Difference (NETD) below 50mK at f/1.0. It shall be capable of the multiple display formats including white hot, black hot, and rainbow.
5. The fixed thermal IP and analog system shall be conformant to the ONVIF v1.02 and support open architecture best practices with a published API available to third-party network video recording and management systems.
6. The fixed thermal IP and analog system shall offer input voltage of 24 VAC and 24 VDC.
7. The fixed thermal IP and analog system shall provide a built-in heater/defroster and sun shroud. It shall meet NEMA Type 4X and IP66 standards.
8. Thermal Camera Optics
 1. Detector Sun-safe, uncooled microbolometer,

	amorphous silicon
2. Sensor	1/2/5" CMOS, 5MP, Progressive Scan or better
3. FPS	Minimum 9 FPS
4. On Board Storage Minimum	32 GB
5. Interface	Ethernet 10/100
6. Array Format	640 x 480 or 384 x 288 or 240 x 184
7. Effective Resolution	307,200 (640 x 480); 110,592 (384 x 288); 19,200 (240 x 184)
8. Spectral Response	7.5 to 13.5 μ m, LWIR
9. Normalization Source video	Internal shutter (offset only), 0.3 second freeze during shutter wink
10. Temporal NETD	50mK at f/1.0
11. Display Formats	White hot, black hot, and rainbow
12. Video Output	NTSC/PAL, IP

9. The fixed thermal IP and analog system shall support two simultaneous, configurable video streams. MJPEG, JPEG and H.264 compression formats shall be available for primary and secondary streams with selectable Unicast and Multicast protocols. The streams shall be configurable in a variety of frame rates, bit rates, and group of pictures (GOP) structures.
10. The fixed thermal IP and analog system shall use a standard Web browser interface for remote administration and configuration of camera parameters.
11. The fixed thermal IP and analog system shall provide a 100Base-TX network port for live streaming Fto a standard Web browser.
12. The fixed thermal IP and analog system shall support standard IT protocols.
13. The fixed thermal IP system(Minimum IP 66) shall provide integrated video analytics with the ability to provide hardware and software alarms based on the analytic behaviors.
14. Analytics shall include:
 1. Adaptive Motion: Detects and tracks objects that enter a scene and then triggers an alarm when the objects enter a user-defined zone. This behavior is primarily used in outdoor environments with light traffic to reduce the number of false alarms caused by environmental changes.
 2. Camera Sabotage: Detects contrast changes in the field of view. An alarm is triggered if the lens is obstructed with spray paint, a cloth, or a lens cap. Any unauthorized repositioning of the camera also triggers an alarm.
 3. Loitering Detection: Identifies when people or vehicles remain in a defined zone longer than the user-defined time allows. This behavior is effective in real-time notification of suspicious behavior around ATMs, stairwells, and school grounds.
 4. Object Counting: Counts the number of objects that enter a defined zone or cross a tripwire. This behavior might be used to count the number of people at a store entrance/exit or inside a store where the traffic is light. This behavior is based on tracking and does not count people in a crowded setting.
 5. Stopped Vehicle: Detects vehicles stopped near a sensitive area longer than the user-defined time allows. This behavior is ideal for airport curbside drop-offs, parking enforcement, suspicious parking, traffic lane breakdowns, and vehicles waiting at gates.

15. The fixed thermal IP and analog system shall meet or exceed the following specifications:

16. Video Specifications

1. Video Encoding H.264 High, Main, or Base profiles; MJPEG, and JPEG
2. Video Streams Up to 2 simultaneous streams; the second stream is variable based on the setup of the primary stream
3. Frame Rate Up to 30, 25, 24, 15, 12.5, 12, 10, 8, 7.5, 6, 5, 4, 3, 2.5, 2, 1 (dependent upon stream configuration)
4. Available Resolutions 640 x 480 and 384 x 288 and 240 x 1084
5. Supported Protocols TCP/IP, UDP/IP (Unicast, Multicast IGMP), UPnP, DNS, DHCP, RTP, RTSP, NTP, IPv4, IPv6, SNMP, QoS, HTTP, HTTPS, LDAP (client), SSH, SSL, SMTP, FTP, and (EAP) 802.1x
6. Users
7. Unicast Up to 20 simultaneous users depending on resolution settings (2 guaranteed streams)
8. Multicast Unlimited users H.264
9. Security Access Password protected
10. Software Interface Web browser view and setup
11. Open API API or ONVIF v1.02

17. Electrical Specifications

1. Port RJ-45 connector for 100Base-TX, auto
2. MDI/MDI-X
3. Cabling Type Cat5 or better for 100Base-TX
4. Input Power 24 VAC or 24 VDC
5. Input Power Range +15%, -20%
6. Power Consumption
7. 24VAC 1.51 A, 39.90 VA (35 W)
8. 24VDC 1.26 A, 86.10 VA (85 W)
3.21 A (85 W)
9. Current Consumption <750 mA nominal; <1.2 A maximum
10. Local Storage Micro SD
11. Alarm Input N.O. switch, N.C. switch, or 1 kohm; supervised
12. Alarm Output 0 to 32 VDC maximum, 100 mA maximum
13. Audio Bidirectional, half duplex; line level/external microphone input; 600 ohm differential, 1 Vp-p maximum signal level
14. Compression G.711 PCM, 64 kbps

18. Physical Specifications

1. Construction Aluminum
2. Finish Gray polyester powder coating
3. Environment Indoor/outdoor
4. Operating Temperature -40° to 50°C (-40° to 122°F)
5. Latching 2 captive Torx™ screws

6. Cable Entry		2 adjustable 0.5-inch NPT liquid-tight glands
7. Lens Specifications		Lens (mm) F-Number FOV (H/V/D)
8. 640 x 480	35	1.4 18° x 13° x 22°

19. Certifications/ Ratings / Patents

1. CE, Class A
2. FCC, Class A
3. UL Listed
4. C-Tick
5. Meets NEMA Type 4 and IP66 standards
6. Shock and Vibration, Meets NEMA TS 2; IEC613736-8,-9,-10
7. ONVIF

TRAFFIC LIGHT

LED based traffic control light with Red, Amber and Green colours.

TRAFFIC BARRIER

- a). Option 1: Light Curtain type
- b) Option 2 : Bollard or other physical device (100% solar powered)

POLES AND FIXTURES(2 -6 SETS)

All necessary poles for installation to be provided

LIGHTENING ARRESTOR(1SET)

Sufficient lightening arresting equipment to be provided to safeguard all installations against lightening to be effective in atleast 200-500meter radius including mast for its installations.

CONNECTIVITY (1 IOT)

- a) OFC based connectivity between equipment and control room.
- b) Dual band wireless connectivity also to be provided as standby.

CONTROL ROOM

Prefabricated/Onsite fabricated room to function as control room to house required equipment with two persons seating arrangement

ELECTRONIC SIGNAGES

Sufficient electronic signage to be provided

ALL WEATHER STATION(1 NO)

Station to detect and record temperature, humidity, rain, insolation, wind direction etc

POWER AND POWER BACK UP

All power arrangements to be 100% solar or renewable energy sources only.

OTHER INDICATIVE FEATURES OF THE ANIMAL SENSOR SYSTEM:

The contractor shall supply a PIR/microwave/Laser/EM Cable Perimeter Intrusion Detection System (PIDS).

The PIDS shall detect intruders attempting to cross the detection zone in any manner including walking, running, crawling, rolling, and jumping.

REGULATORY REQUIREMENTS

A. The system shall be FCC certified.

B. The system shall comply with CE regulations as a Class 1 device and bear the CE mark.

SYSTEM MANUFACTURING QUALITY REQUIREMENTS

A. The manufacturer's quality management system shall be certified as conforming to ISO 9001:2008.

B. All microwave units shall be conformal coated and units shall be tested during manufacture over their entire operational temperature range on a sample basis.

SENSOR UNITS:

A The sensor units shall have the following detection capabilities:

1. Process the signal received at the receiver to detect animals attempting to cross
2. Use digital signal processing techniques
3. Utilize rule-based algorithms in the detection process to optimally discriminate
4. At ranges up to 200m the system shall detect a 35kg. (77 lbs)
5. At ranges up to 150m the system shall detect a 35kg. (77 lbs)
6. At ranges up to 100m the system shall detect a 35kg. (77 lbs)
7. Detect intruders with velocities between 3 cm/sec to 15m/sec (0.1 ft/sec to 50
8. Probability of Detection (PD) shall be 99% with a 95% confidence factor when the system is installed in accordance with the manufacturer's recommendations

False Alarm Rate

The maximum rate for alarms generated by internal electronic processes of a the detection zone between actual animal crossings and environmental activity such as rain running or vegetation disturbance, human, hands and knees crawling or jumping running, crawling, rolling.

Standalone Processor Alarm Outputs

1. The EM receiver shall have a minimum of two Form C relay outputs to indicate sensor alarm and system alerts. Each relay shall be rated to at least 1A at 30V. For each relay it shall be possible to assign one or more conditions under which the relay will activate from the following list:

- a. Sensor alarm
- b. Enclosure tamper on either receiver or transmitter
- c. Loss of received microwave signal or transmitter mismatch
- d. Receiver input power fail
- e. Internal hardware fault on either receiver or transmitter
- f. Fail safe

2 The EM transmitter shall have a minimum of two Form C relay outputs to indicate system alerts. Each relay shall be rated to at least 0.5A at 30V. For each relay it shall be possible to assign one or more conditions under which the relay will activate from the following list:

- a. Enclosure tamper on transmitter
- b. Transmitter input power fail
- c. Internal hardware fault on transmitter
- d. Fail safe

3 It shall be possible to adjust the relay hold time from 0.125 to 10 seconds.

Calibration and Diagnostic Capabilities

For calibration and diagnostic purposes the microwave receiver and transmitter shall each provide a standard USB connector for attachment of a laptop (GNU/LINUX preferred).

It shall be possible to adjust the receiver detection threshold to adapt to the zone length and site characteristics.

It shall be possible to view and record real-time sensor response data

Each of the transmitter and receiver shall maintain a log of up to 1,024 events such as sensor alarms and diagnostic alerts

It shall be possible to upload all configuration settings to a file and to download a previously saved configuration

It shall be possible to remove the cover to gain access to the USB connector without affecting the unit's alignment

Automatic Gain Control

The EM sensor system shall incorporate automatic gain control (AGC) to adjust receiver gain as required for different transmitter-receiver spacing and for environmental effects such as rain, snow or fog.

Transmitter-Receiver Wireless Communications Link

The EM sensor system shall include a transmitter-receiver wireless communications link that communicates complete transmitter status to the receiver including tamper status, input voltage, operating temperature, and internal voltage rail levels.

Anti-Spoofing

To protect against deliberate spoofing or an unintended Tx-Rx pairing the EM receiver shall be configured during installation with the serial number of the transmitter that it is intended to be paired. The receiver shall generate a transmitter mismatch status alarm if it receives a microwave signal from a transmitter with a different serial number.

Operating Channels

There shall be 10 field-selectable operating channels provided.

Channel isolation shall be sufficient to allow a transmit-receive pair to operate successfully when the receiver is within the transmit beam of one or more other transmitters operating on different channels.

Stacking

It shall be possible to stack multiple EM units without any further mechanical or electrical adjustments other than selecting different operating channels – it shall not be necessary to use different polarizations or use microwaves of different frequency bands (i.e., K and X).

It shall be possible to co-locate all the receivers of a stacked zone at one end of the zone, with the transmitters at the other end of the zone.

Mounting Provisions

The microwave units shall be provided with a universal mounting kit that can be used on poles sizes from 5 to 11.4 cm. (1 7/8 to 4 1/2 in.) and be capable of being used for wall mounting.

Environmental Operating Range

The system shall operate within specifications under the following environmental conditions:

Temperatures between -40 C (-40° F) and 70° C (158° F)

Relative humidity between 0 and 95%, non-condensing

Standalone Processor Input Power

The microwave receiver and transmitter when used in a standalone mode (no network) shall accept DC power ranging from 12 to 48VDC and require less than 2.0 watt each.

Processor Reliability and Maintainability

Each of the microwave transmitter and receiver shall have a predicted mean time between failures (MTBF) of greater than 100,000 hours when calculated per Telcordia Reliability Prediction Procedure, Parts Count Method, at 70°C. The processor shall have a mean time to replace (MTTR) of less than 15 minutes.

Lightning Protection

The processor shall provide both transorb and gas discharge devices on all inputs and outputs including power. All the installations shall be protected from Lightning.

Ease of Installation

The system shall be simple to install and shall have the following characteristics as a minimum:

Configuration and calibration shall be accomplished via a software tool with an intuitive graphical user interface, preferably on GNU/LINUX

Other than the laptop configuration software, installation shall not require any special tools

All electrical connections to the sensor units shall be made with screw-terminals on removable connectors

Cable ingress/egress shall be accommodated by cable glands that require no additional sealing compounds to provide an environmental seal

It shall be possible to store processor configuration and calibration settings to a computer file for record keeping and to use the stored file to configure other processors and/or a replacement processor

Networking Capabilities

When a network-capable system is required the requirements of this section shall apply.

The EM receivers shall be capable of communicating alarm, status, and configuration information to and from a central location over an integrated sensor network.

Multi-Sensor Compatibility

The network supported by the EM receiver shall be one that is common to a family of sensors including a buried cable sensor, fence sensor, and electrostatic sensor.

Redundant Network Communications

The sensor network shall be capable of being connected in a loop configuration and of being polled from both ends of the loop to provide redundant communications paths to each processor.

Network Management

The system shall include network management software to manage the communications over the sensor network. The network management software shall be capable of running on a standard PC (running on GNU/LINUX).

Network Management Software Interfaces

The system's network management software shall provide the following interfaces:

A TCP/IP-based interface for communicating alarm, status, and configuration data to and from security management systems. The system supplier shall furnish a complete Software Development Kit (SDK) to facilitate integration with the security management system. The SDK shall include as a minimum complete documentation of the interface, simulator software to create interface messages equivalent to those created when connected to actual microwave units, and example software code

A TCP/IP-based interface to be used by the system's PC-based software calibration and configuration tool

Centralized Calibration and Diagnostics

Once the device address is set at the microwave receiver all further calibration and diagnostics can be performed from one central location using the same Windows-based tool as used when directly attached to the processor through USB.

Network Manager Tools

The system's network management software shall provide the following tools to facilitate system commissioning and trouble-shooting:

System status tool that provides a visual display of the status of all processors in the system

System event log tool that provides a searchable log of system events

System plot tool that can display, store, and recall the real-time response data for all networked sensors and

display a plot of the real-time response for a minimum of 8 sensor zones simultaneously

Networked Processor Dry Contact Inputs

In networked mode the EM receiver shall provide a supervised general-purpose dry-contact input and the state of the dry contact inputs shall be communicated over the network.

Networked Processor Relay Outputs

In networked mode the processor relay outputs shall function as general-purpose outputs and the state of the relay outputs shall be controlled via the network.

Networked Processor Input Power

The processor when used in networked mode (with network card installed) shall accept 12 to 48V DC and require less than 2.5 watt.

Site Assessment

Before installation begins, the installation contractor shall provide a report to the Owner documenting any site conditions that may prevent the system from operating satisfactorily. Examples of such conditions include uneven terrain, tall vegetation in the detection zone, and loose fencing.

System Installation

The system shall be installed in accordance with the manufacturer's recommended procedures as defined in the manufacturer's Product Guide for the system.

System Calibration

The installation contractor shall calibrate the system in accordance with the manufacturer's recommended procedures as defined in the manufacturer's Product Guide. The installation contractor shall submit to the Owner the calibration and configuration settings for each microwave unit in the system. For each microwave zone in the system the installation contractor shall submit to the Owner a number of representative response plots showing the sensor real-time response when the detection field is crossed.

Training

The installation contractor shall train the Owner's maintenance personnel in the calibration and system maintenance procedures as given in the manufacturer's Product Guide.

Onsite Manpower Support:

The Bidder shall provide adequate onsite manpower support for training, running, trouble-shooting of the entire animal sensor system including all assemblies, sub assemblies hardware, software, network and data management support, including debugging the system and reducing the false triggers and alarms to almost zero level within 6 months of commissioning of the system.

DELIVERY SCHEDULE:

The following delivery schedule shall be adhered by the successful bidder for supply, installation & commissioning of the Automated Animal Sensor System:-

- | | |
|--|----------|
| 1. Issue of L.O.I is to be taken as | Zero Day |
| 2. Submission of PBG by the successful bidder: | 7 days |
| 3. Agreement signing/ PO: | 3 days |
| 4. Supply of equipment onsite: | 45 days |
| 5. Installation | 15 days |
| 6. Testing & Commissioning | 5 days |
| 7. Training, running & fine tuning | 180 days |

CHAPTER 7
ANNEXURE-I
FORMATS FOR FURNISHING INFORMATION
1. PRE-QUALIFICATION BID FORM

To
The Divisional Forest Officer,
Eastern Assam Wildlife Division,
Bokakhat, Distt. Golaghat, Assam
PIN:785612

Sir,

I/ we the undersigned bidder / Consortium bidders do hereby submit our best offers in response to your Tender No. KNP/01/2016 Dt. 2nd January, 2016, and that our offer is valid for 180 days from the date of submission of the offer, and in case if required, we shall have no objection in extending the validity of our offer for another 180 days or any suitable period required by you. During the bid process period, we shall not withdraw our offer.

Further, we understand that the bid can be cancelled in full or part without assigning any reason thereof; and that you may place the order, in event of our bid being successful, in full or part, or may not place an order without assigning any reason.

Further, I/ we submit particulars as below:-

1. General Information of the BIDDER (To be filled by every bidder, including details of the wherever relevant member of the Consortium Bid)

SI. No.	Particular	Details
a	Nature of Bid (Single/ Consortium) If Consortium, then Name of other member of the Consortium. Name of Lead Bidder Whether enclosed Pre-Qualification Bid Form for the other Member	
b	Name of the Bidder	
c	Registered address	
d	Telephone / Fax no	
e	Web site Email id	
e	Legal status (Company/Firm/Partnership Firm) with Proof of Registration to be submitted.	

f	Date of Establishment	
g	Service Tax Registration No.	
h	PAN No.	
i	VAT / CST Registration No.	
j	ISO certificate nos. With details	
k	IEC Number	
l	Contact Person Details: Name Designation E-mail Phone	
m	Group/SubGroup for which this Bid is applicable	
n	EMD Details (Bank Draft number, date, value, Bank Name, Branch name)	

2a. Details of bidder's organisation/associates including the present business in the last five (5) years

Sl no	Core business & sector	Revenue from Core business	Non core business & sector	Revenue from Non-Core business	No of employees & no of employees in North East	Any other remarks

2b. Details of office/representative/agent of the Bidder at Guwahati/ Golaghat/ Bokakhat/ Nnagaon/ Jakhlabanda:

3. Brief financial details (as on 31st March for the last three years)

Particulars	2012-13 (In Rs.)	2013-14(In Rs.)	2014-15(In Rs.)
Turn Over			
Net Income			
Net Profit			
Net Worth			

4. EMD Draft details (Amount, Number, Date, Bank on which drawn)

EMD Details (Add row for another entry):

SI no	Amount	DD no:	Bank & Branch

6. Particulars of similar in nature implemented (Add row for more categories)

Category	Goods/ Services provided including Supply, erection, commissioning, warranty support/ annual maintenance. (Please mention the names of items involved with quantity)	Client address & work order value (Attach copies of work orders)	Time period of execution	Status of the project	Any other remarks
1	2	3	4	5	6

6. Any other document enclosed as proof of eligibility etc.

7. Undertaking by the authorized representative of the firm/Power of attorney /Company Secretary that the bidder was not blacklisted either by Govt. of Assam/its agencies or by any Security agencies of Govt. of Assam/Central Govt. in the last five years for breach of trust , fraudulent, & corrupt practices.

8. Enclosure To be submimted with Pre-Qualification Bid:

1. Pre-Qualification Form duly filled for the bidder (including a separate form duly filled by the Consortium Bidder partner)
2. EMD in a sepoarate sealed envelop with "EMD" inscribed on the top of the envelop
3. Court Fee Stamp of Rs. 8.25 or more on the first page of the tender document purchased by the bidder.
4. Money Receipt (Copy) of Rs. 5000.00, as a proof of purchase of the document
5. Tender document (In original) signed and stamped in ink by the authorized signatory of the bidder
6. Authorization/ Authority Letter of the "Authorized Signatory"
8. Consortium agreement (in case of consortium bid)
9. Balance Sheet/ Profit & Loss/ Income & expenditure Statements duly signed by Auditor & Company Secretary, as the case may be, for three years.
10. Copies of PAN Card/ VAT/ Sales tax/ Service Tax registration/ IEC number
11. Incorporation certificate
12. Memorandum of Assocaition/ Partnership Deed of the company together with any orders from the Hon'ble High Court for merger/ split/ acquisition etc., or similar orders of change of ownership of the

company etc from appropriate authority.

13. Documentary proof of experience in each category

14. Undertaking that the firm is not black listed

I further undertake to abide by the Terms and Conditions of the Tender Documents, which I have carefully read and understood.

Yours faithfully,

Signature (Power-of-attorney)

Seal of the bidder

**CHAPTER 7
ANNEXURE-2
FORMATS**

2. TECHNICAL BID FORM (SINGLE FORM TO BE SUBMITTED BY THE BIDDER INCLUDING A CONSORTIUM)

1. Name of the Bidder: (NO CONSORTIUM BID ALLOWED)

Bidder/ Prime/Lead Bidder	Consortium Partner (If Consortium Bid)

2. Sensor Technologies Quoted (Mention OPTION 1, OPTION 2 OPTION 3 with brief details serially, if quoted. If an Option deploys more than one sensor or a combination of sensor technologies, mention each sensor type as Sensor Type1, Sensor Type2, Sensor Type3 etc.)

Sl. No.	OPTION No	Sensor Type 1	Sensor Type 2	Sensor Type 3	Sensor Type 4	Range of Operation	Power Required	Remarks
---------	-----------	---------------	---------------	---------------	---------------	--------------------	----------------	---------

3. Technologies Other than Sensor system quoted. (For any item not mentioned in the Table below, insert additional rows)

Category (Sensor/ Camera/ Thermal/ RF/ Traffic Control/ IT/ Fixtures/ Others)	Item Name	Brand/Make/Model/Part No.	Utility in the Automated Animal Sensor System	Salient Features/ Specs in brief	Reference Page No. in the Bid
1	2	3	4	5	6
Optical camera					
Thermal camera					
AWS					
RF Equipment					
TRAFFIC Controller					
Video Analytics/ VMS					
Storage/ Server/ PC/Laptop					
Network Switches					

Lightning Arrestor					
Electronic Signages					
ANPR					
Solar panels					
Battery bank					
UPS					
Inverter					
Display Panels					
Other utility Software					
Network Manager					
Masts/ Poles					
Fixtures					
Others					

4. Authorization/OEM certificate for the products quoted

Category (Sensor/ Camera/ Thermal/ RF/ Traffic Control/ IT/ Fixtures/ Others)	Item Name	Brand/Make/ Model/Part No.	OEM Name/ Address	Authorization Letter No. Date	Reference Page No. in the Bid
1	2	3	4	5	6

5. Existing Supply/installation / Erection of the products quoted

Category (Sensor/ Camera/	Item (Exact or similar nature)	Brand/Make/Model/Part No. of the product	Name of product already deployed in the	Documentary proof (Mention here page
---------------------------	--------------------------------	--	---	--------------------------------------

Thermal/ RF/ Traffic Control/ IT/ Fixtures/ Others)		quoted	field (in case the product in the column 3 is of recent origin) [In case if there are LOIs against the product, the same should also be mentioned in Column 5]	numbers in the bid for reference)
1	2	3	4	5

6. Certifications/Standards/TEC/STQC/IMD or approvals against the products quoted, if applicable, by any other authority:

Category (Sensor/ Camera/ Thermal/ RF/ Traffic Control/ IT/ Fixtures/ Others)	Item	Brand/Make /Model/Part No. of the product quoted	Agency	Certificate Name	Documentary Proof (Page number of the document in the Bid)
1	2	3	4	5	6

7. AMC and maintenance Infrastructure in Assam (Guwahati/ Golaghat/ Bokakhat/ Nagaon/ Jakhlabandha) against the product quoted*

Category (Sensor/ Camera/ Thermal/ RF/ Traffic Control/ IT/ Fixtures/ Others)	Items (May club several items together, or all)	Brand/Make /Model/Part No. of the product quoted	Name of Agency Responsible for AMC/ maintenance	Contact Details including name & address, Phone No. (If applicable)	Nature of relationship/ Own center/ Franchisee / Call Center/ FMS/ Off shore support etc.	Time in hours for providing the support / troubleshooting
1	2	3	4	5	6	7

* Call centre/ Offshore support from outside Assam, if any should also be mentioned along with time-lines to be shown in Column 7

8. Warranty & AMC of the products quoted (Separate Table for each category):

Category (Sensor/ Camera/ Thermal/ RF/	Item	Brand/Make/Model/Part No. of the product quoted	WARRANTY PERIOD	Proposed Number of years as AMC

Traffic Control/ IT/ Fixtures/ Others)				(Maximum 5 years)
1	2	3	4	5

9. Details of samples submitted (If any):

Category (Sensor/ Camera/ Thermal/ RF/ Traffic Control/ IT/ Fixtures/ Others)	Item	Brand/ Make	Model No	Qty
1	2	3	4	5

10. Installation/ Erection sites, if applicable, for site verification:

Category (Sensor/ Camera/ Thermal/ RF/ Traffic Control/ IT/ Fixtures/ Others)	Item	Name of Owner	Date of Supply / Erection	Address of Site
1	2	3	4	5

Signature (Power-of-attorney)

Seal of the bidder

FORM II

11. Format of Technical Compliance Statement:

(It is Mandatory to submit technical compliance for every offered item)

TECHNICAL COMPLIANCE STATEMENT

**Category
Item No:**

Offered Make :

Model:

Feature Asked For	Requested Specifications	Offered Specifications	Complied/ Deviation (If deviation or enhancement/ alternate/ additional solution, please fill Form No. III at Serial 10 on the next page)
--------------------------	---------------------------------	-------------------------------	--

ForName of the Bidder

**Company Seal & Signature
(Name and Designation of the signatory)**

12. FORM III
Technical FEATURE Statement Deviation/Enhancements ETC.
Category

Item Name _____
(FORM TO SUBMITTED CATEGORY WISE ONLY / ITEM WISE)

Features/ Specification Requested	Feature Quoted	Deviation/Enhancement/ Additional features/ Alternate Proposal or Specification with specific mention of technical superiority/ or likely savings in costs
1	2	3

ForName of the Bidder

Company Seal & Signature
(Name and Designation of the signatory)

Chapter 7 Annexure-III Financial Bid (Format for quoting price bid in INR. Separate print may be used & attached with tender document)
(Format of Price Schedule)

PRICE SCHEDULE

Bidder Name and Address	To Purchaser Name and Address	Date: _____ Tender Ref: _____ Category No.: _____
-------------------------	-------------------------------	---

1	2	3	4	5	6	7	8	9	10	11
Item No	Description of Goods	Make and Model/ part No. offered	Delivery Date	Quantity	Freight	Unit price	Taxes VAT/CST	Other Taxes/Govt Levies if any	Total Price per Unit Excluding Taxes (Basic cost + Freight)	Total Price per unit incl Freight and Taxes
<i>[insert number of the item]</i>	<i>[insert name of good]</i>	<i>[insert make and model of the Good]</i>	<i>[insert quoted Delivery Date]</i>	<i>[insert number of units to be supplied] The number of units may vary at the time of supply without notice</i>	<i>Insert freight to place of delivery)</i>	<i>[insert price per unit) [Imported items must also show prices in US\$] in this column separately</i>	<i>[insert applicable taxes)</i>	<i>[insert the corresponding price per item]</i>		<i>[insert total price of item]</i>
Warranty: AMC : (percentage of total offered price) Year 1 Year 2 Year 3 Year 4									Total Price	

Name of Bidder [insert complete name of Bidder]

Witness 1.

Witness 2

(Certified that I/ we are authroised to sign for and on behalf of)
Signature of Bidder [signature of person signing the Bid]

Important Note:

Supply, Installation, and Commissioning & Training:

All related and relevant costs like civil works, accessories, ancillaries, labour costs, training etc have to be clearly mentioned in the offer along with the requisite details on the scope and extent of the requirements

CHAPTER 7
ANNEXURE-IV
PERFORMANCE BANK GUARANTEE FORMAT

(To be submitted on award of Supply order)
(To be signed and executed in Non judicial stamp paper of value Rs. 100/-)

Ref.

Bank Guarantee No.

Date :

To
The Divisional Forest Officer,
Eastern Assam Wildlife Division,
Bokakhat
Distt. Golaghat
Assam
PIN:785612

Dear Sirs,

In consideration of the Divisional Forest Officer, Eastern Assam Wildlife Division, Bokakhat, representing the Kaziranga Tiger Conservation Foundation, in short kown hereinafter as the Foundation which expression shall unless repugnant to the context or meaning thereof include its successors, administrators & assigns) having awarded to M/s _____ with its Registered/Head Office at _____ (hereinafter referred to as the 'Supplier' which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns) a Supply order by issue of Foundations's Letter of Intent No. dtd. and the same having been unequivocally accepted by the Supplier, resulting in a supply order bearing No. dtd. valued at Rs. for _____ *scope of supply order*) and the supplier having agreed to provide a Project Performance Bank Guarantee for the faithful performance of the Supply & allied services under the Supply order and allied matters equivalent to 5%). (Five percent) of the said value of the Supply order to the Foundation.

We. (Name and Address of Bank, Tel. No. Fax. No., responsible person). having its Head Office at and a branch of the Bank in Guwahati at (Name and Address of Bank, Tel. No. Fax. No., responsible person) thereinafter referred to as the 'Bank', which expression shall, unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assign) do here by guarantee and undertake to pay the Foundation, on demand, any and all monies payable by the Supplier to the extent of as aforesaid at any time upto (days/months/years) without any demur, reservation, supply order, recourse or protest and/or without any reference to the Supplier. Any such demand made on the Bank shall be conclusive and binding notwithstanding any difference/dispute between the Foundation & the Supplier or any dispute pending before any Court, Tribunal, Arbitrator or any other authority. The Bank undertakes not to revoke the guarantee during its currency without, previous consent of the Foundation and further agrees that the guarantee herein contained shall continue to be enforceable till the Foundation discharges this guarantee.

The Foundation shall have the fullest liberty without affecting in any way the liability of the Bank under this guarantee, from time to time to extend of the time for performance of the supply order by the Supplier. The Foundation shall have the fullest liberty, without affecting this guarantee, to postpone from time to time the exercise of any powers vested in them or of any right which they might have against the

Supplier, and to exercise the same at any time in any manner, and either to enforce or to forbear to enforce any covenants, contained or implied, in the supply order between the Foundation and the Supplier or any other course or remedy or security available to the Foundation. The Bank shall not be released to its obligation under these presents by any exercise by the Foundation of its liberty with reference to the matters aforesaid or any of the or by reason of any other act of omission or commission on the part of the Foundation or any other indulgences shown by the Foundation or by any other matter or thing whatsoever which under law would, but for this provision have the effect of relieving the bank

The Bank also agrees that the Foundation at its option shall be entitled to enforce this guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Supplier and not withstanding any security or other guarantee the Foundation may have in relation to the Supplier's liabilities.

Notwithstanding anything contained herein above our liability under this guarantee is restricted to and it shall remain in force upto and including and shall be extended from time to time for such period, as may be required, by _____ on whose behalf this guarantee has been given.

Any such demand of payment made on the Bank by the Foundation under this Bank guarantee, shall be in the form and manner made by the Foundation, and such demand of payment shall be paid to the Foundation within 3(three) working days of service of the notice.

Notwithstanding anything contained herein :

3.Our liability under this bank guarantee shall not exceed Rs.(Rupeesonly).

4.This bank guarantee shall be valid upto

And

3.Our liability to make payment shall arise and we are liable to pay the guarantees amount or any part thereof under this Guarantee, only and only if you serve upon us a written claim or demand in terms of the guarantee on or before

Dated this day ofat

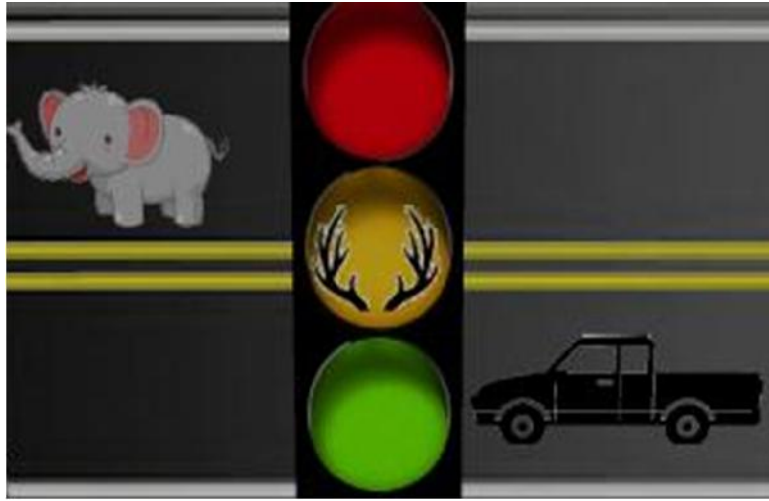
Signature of Authorized person of the Bank with seal

NOTE :

*This sum shall be Thirty percent (30%) / Ten percent (10%) of the Supply order value.

** The date will be(as specified in the Supply order).

*** **The Stamp Papers of appropriate value shall be purchased in the name of issuing bank**



"End of Tender Document: Number of Total Pages 85"