# Press Release

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## Notice Inviting Tender

**NIT No.:** 05-269/2025-777 **Dated:** 04-11-2026

The Transport Department, Government of Bihar invites proposal for "***Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems (ITMS) at identified high-risk and risk density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis***"

The tender document will be available on e-Tendering website (https://eproc2.bihar.gov.in). The bidders are requested to submit the requisite Tender Fee, Tender Processing Fee and EMD along with the proposal through online (https://eproc2.bihar.gov.in) on or before the last date of bid submission. The tender fee and tender processing fee shall be non-refundable. Important dates of this RFP are mentioned below:

| Important Dates | | |
|---|---|---|
| 1. | Date of uploading N.I.T. & other Documents (online) (Date of Publication) | 04-11-2026 |
| 2. | RFP download Start Date (online) and Time | 04-11-2026 |
| 3. | Method of Selection | L1 basis technical cutoff of 70 marks |
| 4. | Last Date and Time of sending the Pre-bid queries/clarifications (only through e-mail) | 13-11-2026 by 05:00 PM |
| 5. | Date of Pre-bid Meeting (offline only) | 19-11-2026 at 03:00 PM |
| 6. | Last Date & Time of submission of proposals | 04-12-2026 by 04:00 PM |
| 7. | Date & Time of opening Pre-Qualification & Technical proposal(s) (online) | 04-12-2026 by 05:00 PM |
| 8. | Date & Time of Proof of Concept (PoC) | To be notified later |
| 9. | Opening of Financial proposals (online) and declaration of result | To be notified later |
| 10. | Email ID | stcbihar@bihar.gov.in |
| 11. | For any queries regarding Bid submission | Toll Free No. 1800 572 6571<br>Email – eproc2support@bihar.gov.in |
| 12. | Contact person for any Clarification regarding this Tender | Executive Officer, Mob:8292909493<br>Bihar Road Safety Council,<br>Transport Department, Govt. of Bihar. |

Transport Commissioner,
Government of Bihar.




## Tender Name:

# Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis

# Part I

**Tender Notification No:** 05-269/2025-777
**Date**: 04-11-2026

## Issued By

Transport Department, Government of Bihar
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# Confidentiality

This document has been designed for limited circulation only, amongst the interested parties (Bidders) who have requested for RFP for "Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis". Information shared with Bidders through this document, and any subsequent written document or verbally in this regard is confidential in nature. Any further circulation of this information without prior permission of Bihar Transport Department is prohibited and shall attract punishment / penalties.

# Disclaimer

Bihar Transport Department (hereinafter referred to as "BTD") has issued this Request for Proposal (hereinafter referred to as "RFP") for "Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis" on such terms and conditions as set out in this RFP document, including but not limited to the Functional and Technical Specifications and requirements set out in different parts of this RFP document.

This RFP has been prepared with an intention to invite prospective Bidders and to assist them in making their decision of whether or not to submit a proposal.

It is hereby clarified that this RFP is not an agreement, and the purpose of this RFP is to provide the bidder(s) with information to assist them in the formulation of their proposals. This RFP document does not purport to contain all the information bidders may require. This RFP document may not be appropriate for all persons, and it is not possible for BTD to consider the investment objectives, financial situation and particular needs of each bidder. BTD has taken due care in preparation of information contained herein. However, this information is not intended to be exhaustive. Interested parties are required to make their own inquiries and respondents shall be required to confirm in writing that they have done so, and they do not solely rely on the information contained in this RFP in submitting their proposal. This RFP includes statements, which reflect various assumptions and assessments arrived at by BTD in relation to the project. Such assumptions, assessments and statements do not purport to contain all the information that each Bidder may require.

This RFP is not an agreement by and between BTD and the prospective bidders or any other person. The information contained in this RFP is provided on the basis that it is non–binding on BTD, any of its authorities or agencies, or any of their respective officers, employees, agents, or advisors. BTD makes no representation or warranty and shall incur no liability under any law as to the accuracy, reliability or completeness of the information contained in the RFP document. Each Bidder should conduct its own investigations and analysis to check the accuracy, reliability and completeness of the information in this RFP Document, and where necessary, obtain independent advice from appropriate sources. Each Bidder is advised to consider the RFP document as per his understanding and capacity. The bidders are also advised to do appropriate examination, enquiry and scrutiny of all aspects mentioned in the RFP document before bidding. Bidders are encouraged to take professional help of experts on financial, legal, technical, taxation, and any other matters / sectors appearing in the document or specified work.

Bidders are also requested to go through the RFP document in detail and bring to notice of BTD any kind of error, misprint, inaccuracies, or omission in the document. BTD reserves the right not to proceed with the project, to alter the timetable reflected in this document, or to change the process or procedure to be applied. BTD also reserves the right to decline to discuss the Project further with any party submitting a proposal.

No reimbursement of cost of any type shall be paid to persons, entities submitting a Proposal. The Bidder shall bear all costs arising from, associated with or relating to the preparation and submission of its Bid including but not limited to preparation, copying, expenses associated with any demonstrations or presentations which may be required by BTD, or any other costs incurred in connection with or relating to its Bid.

Issue of this RFP does not imply that BTD is bound to select and pre-qualify Bids for Bid Stage or to appoint the Agency for the project and BTD reserves the right to reject all or any of the Bids without assigning any reasons whatsoever. BTD may, in its absolute discretion but without being under any obligation to do so, update, amend or supplement the information, assessment or assumptions contained in this RFP.

The information contained in this Request for Proposal ("RFP") Document or subsequently provided to Bidder, whether verbally or in documentary form by or on behalf of the BTD or any of their employees is provided to the Bidder on the terms and conditions set out in this RFP Document and any other terms and conditions subject to which such information is provided.

The BTD, their employees and advisors make no representation or warranty and shall incur no liability under any law, statute, rules, or regulations as to the accuracy, reliability or completeness of the RFP Document. The Government Representatives may in their absolute discretion, but without being under any obligation to do so, update, amend or supplement the information in this RFP Document.

# Structure of the RFP

This RFP is meant to invite proposals from interested bidders capable of delivering the services described herein. This Request for Proposal document consists of following parts viz:

**Part I:**

**Part IA: Instruction to Bidders**
Part IA of this RFP details out clear instructions to the bidders for the bidding process requirements in addition to selection process and criteria for selection of MSI

**Part IB: Scope of Work**
This part gives detail requirements of the project including the scope, project activities and timelines, technical requirements, integration requirements, and specifications with respect to the project.

This part also describes various phases of the project and roles and responsibilities of the Agency during the entire project duration including the implementation stage under Part A Work Order and the Operations and Maintenance stage under Part B Work Order.

Various administrative aspects including timelines are also described in this part.

**Part II: Draft Agreements**

This part of the RFP provides various Terms and conditions of the contract, Draft Agreements format such as Draft Non-Disclosure Agreement, Draft Master Service Agreement etc. which would be entered into between the BTD and the Successful Bidder (MSI) at the start of the project.

This is the **Part I (Part IA and Part IB)** of the RFP document.

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# Glossary

| Terms | Meaning / Full form |
|---|---|
| **AAA** | Authentication, Authorization, And accounting |
| **AC** | Alternative Current |
| **Agency** | Selected Vendor / Successful Bidder |
| **ARP** | Address Resolution Protocol |
| **BTD** | Bihar Transport Department |
| **B.E.** | Bachelor of Engineering |
| **B. Tech** | Bachelor of Technology |
| **BG** | Bank Guarantee |
| **BIS** | Bureau of Indian Standards |
| **BLC** | Backlight compensation |
| **BoM** | Bill of Material |
| **BoQ** | Bill of Quantity |
| **CBR** | Constant Bit Rate |
| **CCTV** | Close Circuit Television |
| **CE** | European Conformity |
| **CFM** | Cooling Fan Module |
| **CLI** | Command Line Interface |
| **CMMI** | Capability Maturity Model Integration |
| **CMOS** | Complementary Metal Oxide Semiconductor |
| **COTS** | Commercial Off-The-Shelf |
| **CPU** | Central Processing Unit |
| **CS** | Computer Science |
| **CV** | Curriculum Vitae |
| **Db** | Decibel |
| **DC** | Data Centre |
| **DD** | Demand Draft |
| **DDNS** | Dynamic Domain Name System |
| **DDoS** | Distributed Denial of Service |
| **DDR** | Double Data Rate |
| **DG** | Diesel Generator |
| **DHCP** | Dynamic Host Configuration Protocol |
| **DIT** | Department of Information Technology |
| **DLP** | Data loss prevention |
| **DMS** | Document Management System |
| **DMZ** | DeMilitarized Zone |
| **DNR** | Digital Noise Reduction |
| **DNS** | Domain Name System |
| **DoS** | Denial of Service |
| **DPI** | Dots Per Inch |
| **DR** | Disaster Recovery |
| **DSCP** | Differentiated Services Code Point |
| **DVD** | Digital Versatile Disc |
| **DVI-D** | Digital Visual Interface-Digital |
| **eChallan** | One Nation One Challan application of NIC |
| **EE** | Electrical and Electronics |
| **EER** | Energy Efficiency Ratio |
| **EERS** | Electronic Enforcement of Road Safety |

| Terms | Meaning / Full form |
|---|---|
| **EMD** | Earnest Money Deposit |
| **EMS** | Enterprise Management System |
| **EN** | European Standard |
| **EPF** | Employee Provident Fund |
| **EPS** | Events per Second |
| **FAQs** | Frequently Asked Questions |
| **FAT** | Final Acceptance Test |
| **FC/FCC** | Federal Communications Commission |
| **FCoE** | Fibre Channel over Ethernet |
| **FIPS** | Federal Information Processing Standards |
| **Ft** | Feet |
| **FTP** | File Transfer Protocol |
| **GAD** | General Administration Department |
| **GB** | Gigabytes |
| **Gbps** | Gigabytes per second |
| **GIS** | Geographic Information System |
| **GoB** | Government of Bihar |
| **GR** | Government Resolution |
| **GST** | Goods and Service Tax |
| **GUI** | Graphic User Interface |
| **HA** | High Availability |
| **HDD** | Hard Disk Drive |
| **HDMI** | High-Definition Multimedia Interface |
| **HR** | Human Resource |
| **HTTP** | Hyper Text Transfer Protocol |
| **HTTPS** | Hypertext Transfer Protocol Secure |
| **Hz** | Hertz |
| **ICMP** | Internet Control Message Protocol |
| **ICR** | Infrared Cutfilter Removal |
| **ICT** | Information and Communication Technology |
| **IDC** | Internet Data Center |
| **IEEE** | Institute of Electrical and Electronics Engineers |
| **IGBT** | Insulated-Gate Bipolar Transistor |
| **IGMP** | Internet Group Management Protocol |
| **ILL** | Internet Lease Line |
| **INR** | Indian Rupees |
| **IP** | International (or Ingress) Protection |
| **IPS** | In-plane switching |
| **IPSec** | Internet Protocol Security |
| **IPv4/IPv6** | Internet Protocol version 4/ Internet Protocol version 6 |
| **IR** | Infra Red |
| **IRDA** | Insurance Regulatory and Development Authority |
| **IRE** | Institute of Radio Engineers |
| **iSCSI** | Internet Small Computer Systems Interface |
| **ISI** | Indian Standards Institute |
| **ISMS** | Information Security Management System |
| **ISO/IEC** | International Organization for Standardization/International Electro technical Commission |
| **ISP** | Internet Service Provider |
| **IST** | Indian Standard Time |

| Terms | Meaning / Full form |
|---|---|
| **IT** | Information Technology |
| **ITA** | Information Technology Act |
| **ITCC** | Information Technology Coordination Center |
| **ITES** | Information Technology Enabled Services |
| **ITMS** | Intelligent Traffic Management System / Electronic Enforcement System |
| **ITSM** | Information Technology service management |
| **Kbps** | Kilobits Per Second |
| **KPI** | Key Performance Indicator |
| **KVA** | Kilo Volt-Ampere |
| **L2TP** | Layer 2 Tunneling Protocol |
| **LACP** | Link Aggregation Control Protocol |
| **LAN** | Local Area Network |
| **LDAP** | Lightweight Directory Access |
| **LED** | Light Emitting Diode |
| **LLP** | Limited Liability Partnership |
| **LOA** | Letter of Acceptance |
| **LOI** | Letter of Intent |
| **LUN** | Logical Unit Number |
| **M.Tech** | Master of Technology |
| **MAC** | Media Access Control |
| **MAF** | Manufacturer Authorization Form |
| **MBA** | Master of Business Administration |
| **Mbps** | MegaBits Per Second |
| **MCA** | Master of Computer Applications |
| **MCSE** | Microsoft Certified Solutions Expert |
| **MD5** | Message Digest Algorithm 5 |
| **MIS** | Management Information System |
| **Mm** | Millimeter |
| **MP** | Megapixel |
| **MPEG** | Moving Picture Experts Group |
| **MPLS** | Multiprotocol Label Switching |
| **Mpps** | Mega Packet Per Second |
| **MSA** | Master Service Agreement |
| **MSME** | Ministry of Micro, Small & Medium Enterprises |
| **NAS** | Network-attached storage |
| **NAT** | Network Address Translation |
| **NDA** | Non-Disclosure Agreement |
| **NDMP** | Network Data Management Protocol |
| **NEFT** | National Electronic Funds Transfer |
| **NFS** | Network File System |
| **NOC** | Network Operation Center |
| **NSIC** | National Small Industries Corporation |
| **NTP** | Network Time Protocol |
| **O & M** | Operation and Maintenance |
| **OEM** | Original Equipment Manufacturer or OEM Authorized Vendor |
| **OIR** | On-line Insertion and Removal |
| **ONVIF** | Open Network Video Interface Forum |
| **OS** | Operating System |
| **OSPF** | Open Shortest Path First |
| **OST** | Offline Storage Table |

| Terms | Meaning / Full form |
|---|---|
| **PAN** | Permanent Account Number |
| **PBG / BG** | Performance Bank Guarantee / Bank Guarantee |
| **PC** | Personal Computer |
| **PDU** | Power Distribution Unit |
| **Ph** | Phase |
| **PMU** | Program Managements Unit |
| **PoE** | Power over Ethernet |
| **PPM** | Page Per Minute |
| **PPP** | Point-to-Point Protocol |
| **PPPOE** | Point-to-Point Protocol over Ethernet |
| **PSU** | Public Sector Undertaking |
| **PWM** | Pulse Width Modulation |
| **QB** | Quarterly Bill |
| **QoS** | Quality of Service |
| **RAID** | Redundant Array of Independent Disks |
| **RAM** | Random Access Memory |
| **RFP** | Request for Proposal (Tender Document) |
| **RIP** | Routing Information Protocol |
| **RMON** | Remote Monitoring |
| **RoHS** | Restriction of Hazardous Substances |
| **ROM** | Read Only Memory |
| **RPO** | Recovery Point Objective |
| **RSVP** | Resource Reservation Protocol |
| **RTGS** | Real Time Gross Settlement |
| **RTO** | Recovery Time Objective |
| **RTP** | Real-time Transport Protocol |
| **RTSP** | Real Time Streaming Protocol |
| **SAN** | Storage Area Network |
| **SAS** | Serial Attached SCSI |
| **SD** | Secure Digital |
| **SDK** | Software Development Kit |
| **SFP** | Small Form-factor Pluggable |
| **SLA** | Service Level Agreement |
| **SMF** | Sealed Maintenance Free |
| **SMPS** | Switched-Mode Power Supply |
| **SMS** | Short Message Service |
| **SMTP** | Simple Mail Transfer Protocol |
| **SNMP** | Simple Network Management Protocol |
| **SOAP** | Simple Object Access Protocol |
| **SOP** | Standard Operating Procedure |
| **SOW** | Scope of Work |
| **SPOC** | Single Point of Contact |
| **SRS** | System Requirement Specifications |
| **SSD** | Solid-State drive |
| **SSH** | Secure Shell |
| **SSL** | Secure Sockets Layer |
| **STP** | Shield Twisted Pair |
| **STQC** | Standardization Testing and Quality Certification |
| **TB** | Terabytes |
| **TCP** | Transmission Control Protocol/Internet Protocol |

| Terms | Meaning / Full form |
|---|---|
| **TEC** | Tender Evaluation Committee |
| **TFTP** | Trivial File Transfer Protocol |
| **TIA** | Telecommunications Industry Association |
| **TMC / CCC** | Traffic Management Center / Command and Control Center |
| **TOS** | Type of Service |
| **TPA** | Third Party Auditing |
| **UAT** | User Acceptance Testing |
| **UDP** | User Datagram Protocol |
| **UHE** | Ultra-High Energy |
| **UHP** | Ultra-High Pressure |
| **UL** | Underwriters Laboratories |
| **UOM** | Unit of Measurement |
| **UPnP** | Universal Plug and Play |
| **UPS** | Uninterruptible Power Supply |
| **USB** | Universal Serial Bus |
| **V** | Volts |
| **VAPT** | Vulnerability Assessment and Penetration Testing |
| **VAS** | Video Analytics System |
| **VBR** | Variable Bitrate |
| **VDS** | Violation Detection System |
| **VESDA** | Very Early Smoke Detection Apparatus |
| **VGA** | Video Graphics Array |
| **VLAN** | Virtual LAN |
| **VMS** | Variable Messaging Sign |
| **ViMS** | Video Management System |
| **VPN** | Virtual Private Network |
| **W** | Watts |
| **WAN** | Wide Area Network |
| **WDR** | Wide Dynamic Range |
| **Wi-Fi** | Wireless Fidelity |
| **XML** | Extensible Markup Language |

# Project Background

The Department of Transport, Government of Bihar (GoB) being a Regulatory Department is responsible for Implementation & Enforcement of various statutory provisions of MV Act,1988, Central Motor Vehicles Rules,1989 & other rules framed thereunder State Taxation Acts etc. to regulate Road Transport, Passengers & Fright Movement. The Transport Department (GoB) is committed to citizen-centric, transparent service delivery through responsive governance, supported by 38 DTOs and 9 RTAs.

In recent years, Bihar has experienced significant growth in vehicular population and road network expansion across urban as well as rural areas. This has led to increased vehicular congestion, traffic violations, and rising concerns about road safety. Transport Department, in collaboration with the Police and other stakeholders, is taking proactive measures to strengthen enforcement mechanisms, improve compliance, and enhance road safety for all road users. The Government of Bihar envisions making its roads safer, more efficient, and more compliant with national standards by leveraging technology-driven solutions. Bihar also experiences safety concerns and fraudulent practices in Mining sector. The implementation of an Intelligent Traffic Management System (ITMS) / Electronic Enforcement Systems for Road Safety aims to transform traditional, manual, and manpower-intensive enforcement into a modern, automated, transparent, and evidence-based process on PPP basis.

**This initiative is aligned with the following key drivers:**

- Enhance road safety by reducing traffic violations and fatalities.
- Improve compliance with traffic regulations through technology-led deterrence.
- Provide accurate & tamper-proof evidence for violations.
- To implement a trigger-based alert system for better traffic incident management.
- Monitoring movements of mining vehicles and drivers.
- Streamline the end-to-end enforcement process — from violation detection to challan issuance and payment collection — with minimal human intervention.
- Integrate multiple stakeholders such as the Transport Department, Traffic Police, NIC, Vahan / Sarathi systems, and payment gateways into a unified platform.

**Compliance with Motor Vehicles (Amendment) Act, 2019:**

The Motor Vehicles (Amendment) Act, 2019 mandates stricter penalties for traffic violations and provides explicit provisions for electronic monitoring and enforcement under Section 136A. The Act encourages State Governments to implement electronic enforcement systems using cameras, sensors, and other technology at high-risk and high-density traffic locations.

**Alignment with MoRTH Guidelines and National Road Safety Strategy:**

The Ministry of Road Transport & Highways (MoRTH) has issued detailed guidelines for the adoption of electronic enforcement systems, specifying minimum technical standards for cameras, sensors, automated number plate recognition (ANPR), violation detection, data storage, and integration with e-Challan systems. The proposed project will be designed and implemented in compliance with these guidelines to ensure interoperability and scalability.

**Long-Term Sustainability and Efficiency:**

By implementing a centralized, automated, and integrated system for electronic enforcement, the State can significantly reduce dependency on manual enforcement, minimize revenue leakages, and ensure a uniform, objective approach to road safety enforcement across all districts. This approach will also enable data-driven decision-making, predictive analytics, and long-term planning for infrastructure improvements based on violation and traffic patterns.

**Objective:**

The objective of this initiative is to establish an advanced, technology-driven traffic enforcement framework to address the high rate of road accident fatalities, which account for over 80% of traffic-related deaths. In compliance with Section 136A of the Motor Vehicles Act, 1988 and Rule 167A of the Central Motor Vehicles Rules, 1989, the project will deploy electronic monitoring and enforcement systems across designated high-risk and high-density corridors. These systems will facilitate real-time data collection, automated violation detection, and evidence-based penalty processing, thereby improving compliance and operational efficiency. The ultimate goal is to create a robust electronic enforcement ecosystem that supports the national mandate to reduce road fatalities by at least 50% by 2030.

**MSI Responsibilities:**

Install electronic enforcement devices on identified high-risk and high-density corridors and critical junctions provided by Bihar Transport Department; Capture traffic violations and send report to the stakeholders as decided by the Bihar Transport Department; Integrate with Vahan and Sarathi. Submit detailed monthly report during O&M for corridor/junction data (coordinates, accident/fatality).

# INSTRUCTIONS TO BIDDERS
# Part 1A

# Instructions to Bidders

## 1. RFP Notice

This RFP Document is being published by the Transport Department, Government of Bihar, for the Project "Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis". The notice inviting tender is published by Bihar Transport Department ("BTD").

## 2. Submissions of Bids

a. A complete set of tender documents is available at ePocurement portal for viewing and download. All the notification & details, terms and conditions regarding this tender notice hereafter will be published online on e-tendering website https://eproc2.bihar.gov.in. The guidelines to download the tender documents and online submission of bids and procedure of tender opening can be downloaded from tendering portal. The bidders are advised to go through the manuals in detail to understand the bid submission process.
b. The bidder needs to submit their bids online on tendering portal. The bidders are required to fill the tender online as per the timelines provided. The EMD shall be paid as Bank Guarantee / DD / FDR and copy of the same uploaded on the e-tender portal, and original EMD submitted as per RFP terms, without which tender will be considered as incomplete and shall be liable for rejection as per **Clause 15** under "Instructions to Bidders".
c. The bidders must make the payments / submit tender online by taking sufficient margin for possible time lags on the portal.
d. The Transport Department, Government of Bihar, reserves the right to accept or reject any or all the tenders without assigning any reason whatsoever.
e. The bidders must possess registered compatible Digital Certificate as per Information Technology Act 2000 using which they can sign their electronic bids.
f. In case bidders need any clarification regarding online participation, they can contact e-Tender Portal's helpline and support on the details available on the portal.

## 3. General Information and Guidelines

a. BTD invites bids for this Request for Proposals (RFP) from eligible bidders as per the scope of work defined in the RFP.
b. Bids must be received not later than the time and date mentioned in the Notice Inviting Tender (or as amended from time to time). Bidder shall not be able to submit bids post Last date (deadline) for submission of bids and hence their bids shall not be considered.
c. While every effort has been made to provide comprehensive and accurate background information and requirements and specifications, Bidders must perform their own research and survey, and form conclusions about the solution needed to meet the requirements.

d. BTD reserves the right to amend, at any given time during the bid process, any terms and conditions in the RFP in larger public interest.
e. All information supplied by Bidders shall be treated as contractually binding on the Bidders, on successful award of the assignment by BTD on the basis of this RFP.
f. No commitment of any kind, contractual or otherwise shall exist unless and until a formal written contract has been executed by or on behalf of BTD. Any notification of preferred bidder status by BTD shall not give rise to any enforceable rights by the Bidder. BTD may cancel this tendering process at any time, prior to a formal written contract being executed by or on behalf of BTD, without assigning any reasons.
g. Any contract that may result from this bidding process shall be effective from the date of Signing of Contract and shall, unless terminated earlier in accordance with its terms, continue for a period till completion of Contract.
h. BTD reserves the right to amend at any given time during the contract period any terms and conditions in the Contract Agreement in larger public interest on mutually agreed terms and conditions between both the parties. BTD's decision shall be final and binding upon the Successful Bidder (Agency).
i. All figures of costs, project values and others shall be mentioned in Indian Rupees only.
j. An identified sub-contractor participating with more than one (1) Bidder shall furnish an undertaking to the effect that there exists no conflict of interest and that any commercial arrangement by and between the concerned Bidders and the identified sub-contractor is purely contractual in nature and there is no undue influence, fraud or anti-competitive activity. BTD bears no responsibility whatsoever, to any such fraudulent activities.

## 4. Completeness of the RFP response

Bidders are advised to study this RFP document carefully before submitting their bids. Submission of a bid in response to this RFP shall be deemed to have been done after careful study and examination of this RFP, a visit to BTD office to understand the requirements, site visits to understand existing systems implemented at the point of interests of the RFP, present civil conditions, expectations, current scenario, processes, and other necessary considerations, in order to assess the efforts required for the project.
Failure to furnish all information required by the RFP or submission of a bid not substantially responsive to the RFP requirement in every respect will be at the bidder's risk and may result in rejection of its bids. For reference, Key documents to be submitted are mentioned in **Annexure Set IV - Annexure I,** which shall be submitted with proper indexing of all submissions with exact page number / file name.

## 5. Bid Preparation Cost

The bidder is responsible for bearing all costs incurred in connection with participation in this process, including, but not limited to, costs incurred in conduct of informative and other diligence activities, participation in meetings, discussions, presentations, demonstration, any lodging and boarding, preparation of bids, in providing any additional information required by BTD to facilitate the evaluation process, and in negotiating a definitive Contract or all such activities related to the bid process. The BTD will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process. This RFP does not commit

the BTD to award a contract or to engage in negotiations. No reimbursable cost may be incurred in anticipation of award. All materials submitted by Bidder shall become property of BTD and may be returned at its sole discretion.

**6. Pre Bid Meeting**

a. BTD will organize a Pre-Bid meeting with all interested Bidders / OEM to answer queries.
b. All the Bidders are requested to submit their list of queries / suggestions / clarifications if any, to the RFP and / or the Draft Contract Agreement only via email and in the format prescribed in **Annexure Set IV - Annexure 4** to **stcbihar@bihar.gov.in**, on or before date specified in "NOTICE INVITING TENDER".
c. BTD will not respond to the queries sent in any other format than prescribed as per **Annexure Set IV - Annexure 4** or queries sent after the stipulated date.
d. BTD shall consider the queries submitted by prospective bidders and may or may not change the tender document / amend the tender document.
e. All such changes or amendments if any will be published online on tendering website and shall be treated as inherent part of the tender requirement.

**7. Amendment to RFP document**

At any time before the deadline for submission of bids, BTD may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the RFP Document by an amendment. All the amendments made in the document would be made available on the e-Tender website. The bidders are advised to visit this website on regular basis for checking necessary updates. The BTD also reserves the rights to amend the dates mentioned in this RFP for bid process. In order to allow prospective Bidders reasonable time to take any such amendments into account in preparing their bids, BTD may, at its discretion, extend the last date for the submission of Bids.

**8. Site Visit**

The Bidder may wish to visit proposed sites of the existing and proposed corridors, junctions and other points of interests etc. to understand the user expectations and obtain for itself, at its own cost, responsibility and risk, all information that may be necessary for preparing the bid and entering the Contract. The assessment of actual costs including designing, engineering, financing, procurement, development, construction, equipment, manpower, software development and IT Infrastructure including hardware and software, services, integration with various external systems, operation and maintenance of the Project will have to be made by the Bidders. The Bidders are invited to examine the Project in greater detail, and to carry out, at their cost, such studies as may be required for submitting their respective Bids. The costs of visiting the proposed site shall be at the Bidder's own expense. BTD will arrange for the Bidder and any of its personnel or agents to gain access to the relevant office / CCC of proposed site and information, provided that the Bidder gives the BTD adequate notice of a proposed visit of Prior to at least Five (5) working days. No site visits shall be arranged or scheduled after the Last Date (deadline) for the submission of the Bids and prior to the award of Contract, unless specifically approved by BTD.

## 9. Termination of RFP process

The BTD may terminate the RFP process at any time in line with relevant provisions prevalent at that time. The BTD makes no commitments, express or implied, that this process will result in a business transaction with anyone. This RFP does not constitute an offer by the BTD. The bidder's participation in this process may result in BTD selecting the bidder to engage towards execution of the contract. In the event of such termination of the RFP Process, EMD of all bidders shall be returned, without any interest.

## 10. Project Phases

Design, Supply, Implement, Integrate and Commission Electronic Enforcement for Road Safety at identified high-risk and risk-density corridors and critical locations for Bihar State shall be bifurcated in two Phase:

| Phase Name | Description | Period |
|---|---|---|
| **Implementation Stage**<br><br>**Part A** | Project Inception and Planning | 1 month |
| | Project Implementation Partial Go Live : Phase 1 | 15 months |
| | Project Go-Live | 20 months |
| | Project Go-Live / Commencement of Operations | Post 20 months |
| **Operations and Maintenance Stage**<br><br>**Part B** | Operation and Maintenance of ITMS project as per requirements and Terms and Conditions. | For 120 Months from the date of Project Go-Live |

Detailed timelines shall be as per Clause 3 under Administrative Aspects of this RFP.

## 11. Engagement Model

The MSI is required to Design, Supply, Implement, Integrate and Commission the ITMS system at its own cost. The MSI shall also be required to operate and the entire system for the entire contract period and shall be responsible for repair, maintenance and all other allied services detailed in the RFP, as per terms, conditions, defined Service Levels and the scope of the RFP for a period of 10 years from the date of Go-Live. **Post Partial Go-live, the MSI shall be paid as per "Per Challan Rate" fixed by the BTD as per RFP, for all the challans as per "Payment Eligibility" as per Clause 13.6.4. below. The payment shall be made on monthly basis, subject to MSI's adherence to the requirement and terms and conditions of the RFP and resultant contract, and the SLAs**. BTD will provide all necessary and administrative support required for erection of poles, fiber / electric cable laying etc. All the coordination for the same, required civil, electrical, and other work, equipment, cameras, command, and control center etc. as detailed in this RFP document shall be responsibility of the Successful Bidder (MSI) including the maintenance of the same for entire contract period.

The ITMS system built and operated by the MSI, shall assist the authorities including the Transport Department, to detect incidents and manage as well as identify and penalise the traffic violators. **BTD will continue to collect such penalty and MSI shall have no role in collection of penalty / any other charges from the citizens.** The MSI shall be required to support the BTD in running various campaigns on the Variable Message Signboards and other such activities as defined in the RFP as per requirement of the BTD to ensure maximum Road Safety awareness and Penalty Collection through the same. MSI shall not be paid for any expense over and above the mentioned terms.

The MSI shall be paid total one-time sum of **30% of CAPEX (i.e. quoted and accepted by BTD) or Rs. 60 Crore**, whichever is lesser as Capital Support as per payment schedule defined in Clause 3 under "Administrative Aspects". The GST will be paid additional as per prevailing rates after necessary deduction as per applicable guidelines. The MSI shall also be paid basis "Per Challan Rate" over and above the Capital Support provided by the BTD during the tenure of the contract post Partial Go-Live as per, for violations detected by the ITMS system and challan generated and approved by the BTD official.

The above terms and conditions shall remain valid for the entire contract period unless explicitly changed by BTD at its sole discretion. BTD reserves the right to modify the engagement model at any given time as deemed fit as per mutually agreed terms and conditions between MSI and BTD in the larger Public Interest. BTD's decision shall be final and binding upon the bidder.

**12. Earnest Money Deposit**

a. **Bidder (Lead Bidder, in case of Consortium)** shall submit an EMD of Rs. 8,00,00,000/- (Rs. Eight Crore Only), along with the bids, which shall be paid in the form of an irrevocable Bank Guarantee (BG) or Fixed Deposit Receipt (FDR) or Demand Draft (DD) drawn in favour of "**State Transport Commissioner, Department of Transport, Bihar**" issued by nationalized or scheduled banks having head office in India, payable at Patna as per the format given in **Annexure Set I – Annexure 10**.
b. The DD / BG / FDR should bear the MICR and IFSC Code Number of the issuing bank.
c. Bidder shall submit the beneficiary account details for EMD refund which shall remain active after award of contract for successful EMD refund. BTD shall not be liable for delays caused in EMD refund due to incorrect/inactive beneficiary account details.
d. **Submission:** The scanned copy of the DD / FDR / BG towards EMD must be uploaded along with technical bids on the e-tendering website. The original FDR or BG shall be sent to " **State Transport Commissioner, Department of Transport, Bihar**" in a sealed envelope super scribing in bold letters the Tender Number. The bidder is requested to get a confirmed acknowledgement from the BTD as a proof of submission of BG / FDR / DD towards EMD to avoid any discrepancy. Further non-receipt of the hardcopy document as per below described schedule would also render the bid non-responsive and be rejected.
e. **Time of submission:** The scanned copy of the EMD has to be submitted along-with the technical bid documents on the e-tendering application. Further, the original EMD document has to be submitted during the period between **Online Submission End Date** and **Opening of Technical Bids** as described in the "NOTICE INVITING TENDER".

f. The details of the DD / FDR / BG instrument, physically sent, should tally with the details available in the scanned copy and the data entered during bid submission time. Otherwise, the bid submitted will be rejected.
g. EMD of non-successful bidder will be discharged / returned as promptly as possible, but not later than 30 days after Signing of the Contract with the Successful Bidder. No interest shall be payable on the EMD whatsoever.
h. The EMD shall be kept valid through the Bid Validity Period.
i. Prior to expiry of the original EMD and Bid validity Period, BTD may request the Bidders to extend the period of validity of both EMD and Bid for a specified additional period. The Bid of any Bidder refusing to extend validity as requested shall not be considered, and its EMD shall be returned within 30 (Thirty) days (with no interest). A bidder agreeing to the request will not be allowed to modify its bid but would be required to extend the validity of its Bid and the EMD, till the extended period and comply with all clauses of this document in all respects.
j. Successful Bidder shall extend the validity of the EMD till the submission of the PBG.

BTD reserves right to forfeit the EMD as per any of the conditions as per clause 15 "**Rejection Criteria**" under "Instructions to Bidders". Decision of the BTD regarding forfeiture of the EMD and rejection of bid shall be final.

## 13. Evaluation Criteria and Requirements

**This tender is based on the Lowest Bid Based Selection for Technically Qualified Bidders.** To participate in Commercial Evaluation Process, Bidder is required to secure at least 70 marks out of 100 in Technical Evaluation and for the next course of action.

The BTD shall appoint a Tender Evaluation Committee (TEC) to scrutinize and evaluate the financial and technical strengths and commercial bids received. The TEC will examine the Bids to determine whether they are complete, responsive and whether the Bid format conforms to the RFP requirements.

a. **Pre-Qualification and Technical Evaluation:** After opening of **Envelop A** (Pre-Qualifications (Annexure Set I) and Technical Bids (Annexure Set II)), the bidders will be evaluated against the Pre-Qualification criteria and Technical Evaluation Criteria set out in the RFP. Bidder securing minimum marks as defined as per requirement shall only be eligible for Commercial bid opening.

b. **Commercial Evaluation:** Bidder shall submit their Commercial Bids in **Envelop B** as per format defined in **Annexure Set III**. Commercial bids of only technically qualified bidders securing minimum marks as defined shall be opened. Of such qualified bidders, the bidder bidding lowest in the Commercial bid may be considered for award of contract.

### 13.1. Definitions for qualification criteria

| # | Term | Definition |
|---|---|---|
| 1 | **Net-worth** | As defined in Companies Act 1956 / 2013 as amended from time to time. |
| 2 | **IT/ITeS** | As defined in Bihar IT Policy of Bihar, 2024 as amended from time to time. |
| 3 | **ICT** | Installation, testing, commissioning of Information, Communication and Technology including IT and / or Telecom and / or Hosting - Infrastructures involving active components. |
| 4 | **Last three financial years** | Any 3 consecutive years from **FY 2022-23, 2023-24, 2024-25 & 2025-26**<br>Financial Year shall mean period between from 1st April of that year to 31st March of immediate next year.<br>**Only the audited Balance sheet will be considered for the evaluation** |
| 5 | **Last five years** | Last five years as on the last day (deadline) of the submission of Bid. |
| 6 | **Last seven years** | Last seven years as on the last day (deadline) of the submission of Bid. |
| 7 | **"Similar Projects" or "ITMS"** | **Design, supply, Development, installation, testing, commissioning, operations and maintenance directly for any end client as Government (State / Central / UT) or its Department, Central or State Public Sector Unit / Defence / Govt. Boards / Urban Local Bodies, with project scope executed as EPC, System Integration, or** |

| # | Term | Definition |
|---|---|---|
| | | **Annuity / BOT / HAM / Concession Contracts including one or more of the below:**<br>a. City or Highway Traffic enforcement / Management System<br>b. Intelligent Traffic Management System including Violation Detection System<br>c. Intelligent Traffic Management Systems, Automatic Number Plate<br>d. Recognition (ANPR) based enforcement systems, e-Challan / Violation Detection Systems, Command & control Center<br>e. Control Centre projects, and comparable Intelligent Traffic System deployments<br>f. Intelligent Traffic Management System including Adaptive Traffic Control System<br>g. Safe City / City surveillance System<br>h. Smart City Projects which should necessarily include any **one or more of the following components will be considered as relevant scope:**<br>i. CCTV based General Surveillance<br>ii. Video Analytics<br>iii. Integrated Command and Control Center Application (ICCC Application)<br>iv. Hosting and / or Network<br><br>**The project cost / locations will be considered only for the above, which will be excluding non-relevant scope such as Smart Parking, Wi-Fi, Smart Street Light, Waste Management etc.**<br><br>**Bidder needs to provide CA certificate on the CA Firm's Letterhead, including valid UDIN, as proof of the project cost (Point e). BTD's decision in this regard shall be final and binding.**<br><br>**Eligible assignments:**<br>Only projects which have attained Project Go-Live and have successfully completed one year of O&M shall be eligible. (For Bidder only) |
| 8 | **OEM** | Original Equipment Manufacturer or OEM Authorized Vendor |

### 13.2. Consortium

The Bidder for participation in the Selection Process, may be a single entity or a Consortium, coming together to execute the project. No member at any given point of time, may assign or delegate its rights, duties or obligations under the resultant Agreement except with prior written consent of the BTD.

**No bidder** applying individually, or as a member of a Consortium, as the case may be, can be member of another consortia bidding for the project. A consortium partner shall only participate in one consortium bid.

In the event the Bidder is a Consortium, it shall, comply with the following additional requirements:

a. Number of members in a consortium **shall not exceed three (3) including the Lead Bidder**;
b. The Lead Bidder shall essentially be the Master System Integrator.
c. Members of the Consortium shall nominate one member as the Lead Member (the "Lead Bidder"); further, the members shall not be a part of more than one consortium.
d. The Lead Bidder shall remain responsible for successful delivery of the project at all times during the term of the resultant contract;
e. The Lead Bidder shall be authorized and shall be fully responsible for the accuracy and veracity of the representations and information submitted by the Members respectively from time to time in the response to this RFP.
f. Members of the Consortium shall enter into a binding Joint Bidding Agreement, for the purposes of making the Application and submitting a Bid and executing the project if declared as Successful Bidder as per Terms and Conditions of the RFP.
g. Subject to the provisions of sub-clause (f) above, the Joint Bidding Agreement shall contain the information required for each member of the Consortium and shall, inter alia:
    i. Undertake that each of the members of the Consortium shall have an independent, definite and separate scope of work which was allocated as per each member's field of expertise;
    ii. Commit to the scope of work, rights, obligations and liabilities to be held by each member; specifically commit that the Lead Bidder shall be answerable on behalf of other members for the performance of obligations under the resultant Agreement, provide a brief description of the roles and responsibilities of individual members; and clearly define the proposed administrative arrangements (organization chart) for the management and execution.
    iii. All Members of the Consortium shall be severally liable for the performance of their respective obligations in relation to the Assignment. The Lead Bidder shall be liable for the obligations of all Consortium Members collectively until the completion of the Assignment in accordance with the terms and conditions of the resultant Agreement. Furthermore, each Consortium Member undertakes to comply fully with all lock-in requirements as set forth in the Request for Proposal (RFP).
    iv. **Undertake**;
        - That notwithstanding anything contrary contained in this RFP or the resultant Agreement, the Lead Bidder shall always be liable for obligations of all the consortium Members i.e. for both its own liability as well as the liability of other Members and all the members of the consortium shall always be liable for obligations limited to their scope of work. However, the members of the consortium shall be severally liable for the completion of the project.
        - That the Lead Bidder shall be liable for the entire scope of work and risks involved and further shall be liable and responsible for ensuring the individual and collective commitment of each of the Members of the Consortium in discharging all of their respective general obligations under the resultant Agreement.
        - Each Member further undertakes to be individually liable for the performance of its part of the obligations without in any way limiting the scope of collective liability envisaged in the resultant Agreement.
        - That the Members of the Consortium shall alone be liable for all obligations of the identified sub-contractor and clearly indemnify the BTD against any losses or third-party claims arising due to the sub-contractor / consortium's default.
        - That the Lead Bidder is liable to manage the complete assignment by taking responsibility of delivery as per scope and maintain transparency around monetary terms.

h. The technical and commercial capacity of the Members shall satisfy the conditions of eligibility as prescribed in this RFP;
i. The nomination of the Lead Bidder shall be supported by a Power of Attorney, as per the format in this RFP signed by the other members of the Consortium. The duties, responsibilities and powers of such Lead Bidder shall be specifically included in the resultant Agreement. It is expected that the Lead Bidder shall be authorized to incur liabilities and to receive instructions and payments for and on behalf of the Consortium. The BTD expects that Lead Bidder shall have maximum responsibility pertaining to execution of project; the Bidder acknowledges and shall agree that the Lead Bidder will bear primary and overarching responsibility for the execution, management, and successful completion of the Project in accordance with the terms and conditions of this RFP.
**No change in the composition of the consortium shall be allowed except in the event of business closure or insolvency of a consortium member. In such cases, the proposed replacement member must independently meet the minimum Pre-Qualification and Technical Qualification criteria required of the consortium member it replaces. Bidder shall obtain prior permission from BTD. BTD shall evaluate the bidder's suggestions, and any decision made by BTD shall be final, conclusive, and binding on the bidder.**
j. The bidder shall not subcontract any part of the scope without prior written consent of BTD. Bidders are allowed to subcontract only certain scope of work as defined in **clause 12** under "Administrative Aspects" of this RFP document.
k. Both during the process of award, and post award of contract, if there is a change in sub-contractors or the activities being sub-contracted, Successful Bidder shall obtain prior permission form BTD. BTD shall review the activities listed for sub-contracting and any suggestions by the BTD shall be agreed upon and binding on the bidder. For any deviation from suggestions made by BTD on Sub-Contracting, BTD reserves the right to disqualify the bidder at any stage.

**Individual Bidder and each member of consortium are required to follow the highest level of work ethics, if any member of the consortium has a Conflict of Interest or indulges in "Corrupt or Fraudulent Practices" as described in Clause 20 and 21 under "Instructions to Bidders" during the tendering process (Selection Process); the whole Consortium is liable to be disqualified.**

### 13.3. Pre- Qualification Criteria

This invitation for bids is open to bidders who are eligible to do business in India under relevant Indian laws as is in force at the time of bidding as per the criteria mentioned in the RFP. The bidder shall submit all the documents as mentioned below and additionally other documents as necessary. Only bids qualifying the criteria below would be eligible for further technical evaluation.

**Pre- Qualification Evaluation shall be done as per the parameters mentioned in the table below:**

| Sr. | Parameters | Requirement | Supporting Documents |
|---|---|---|---|
| 1. | **Bidder:**<br>**Legal Entity** | **The Bidder (All members in case of Consortium) should be:**<br>A company registered under the Indian Companies Act, 1956 / 2013 OR Limited Liability Partnership firm under LLP Act 2008, both as amended from time to time.<br><br>**Bidder (All members in case of Consortium)** should have been operating for the last **five years** in India (including name change / impact of mergers or acquisitions).<br><br>**Maximum three companies are allowed in a consortium** including the Lead Bidder, subject to compliance to the **clause 13.2** under "Instructions to Bidder". **The Lead bidder** shall be jointly and severally responsible for complete scope, whereas consortium partners shall be severally responsible only for its respective scope.<br><br>**Lead Bidder should the main Technical Member of the consortium to delivery the project.** | • Copy of Certificate of Incorporation Registration under-Companies Act 1956 / 2013 OR Registered Limited Liability Partnership deed as applicable.<br>• Copy of Certificates of incorporation, Articles of Association (AOA) and / or Memorandum of Association (MOA) clearly specifying legal entity & type of business undertaking mentioning the relevant scope.<br>• The last three financial years Income Tax returns along with the copy of PAN Number of the bidder.<br>• Copy of Registration Certificates with the GST Authorities<br>• Documentary proof such as purchase orders or certified true copy of balance sheet and PL statements for last 5 years for operation in India as on the date of publishing of RFP notice. |

| Sr. | Parameters | Requirement | Supporting Documents |
|---|---|---|---|
| 2. | **Bidder Financial:**<br><br>**Turnover** | **The Bidder (Lead Bidder, in case of Consortium)** should have average annual turnover from **IT / ITeS / ICT / ITMS business** in India in last three financial years:<br>Minimum **INR 200 Crore**<br><br>**AND**<br><br>**Other consortium members, in case of Consortium** should each have average annual turnover from **IT / ITeS / ICT / ITMS business/civil / infrastructure works relevant to ITMS (poles, gantries, foundations, trenching, cabling, control-room construction)** in India in last three financial years:<br><br>Minimum **INR 50 Crore** | • Certificate from the Statutory Auditor / Chartered Accountant with valid UDIN.<br>• **Copy of Audited Financial Statements from Any 3 consecutive years from FY 2022-23, 2023-24, 2024-25 & 2025-26. BTD's decision shall be final and binding.**<br><br>• Details mentioned in format as mentioned in **Annexure Set 1 - Format 4 (4.1).**<br>• In case Chartered Accountant certificate is submitted the said certificate also need to be counter signed by Company Secretary / authorized signatory of the bidder. The certificate must have UDIN issued by ICAI)<br>• Balance sheet and PL statements for last three financial year |
| 3. | **Bidder Financial:**<br><br>**Net Worth** | **Bidder (All members in case of consortium)** should have positive net worth as per the audited consolidated financial statements as on 31st March 2025. | • Certificate from the Statutory Auditor / CA with valid UDIN clearly specifying the net worth of the firm.<br>• Audited and Certified Balance Sheet and Profit/Loss Account as on 31st March 2025 should be enclosed.<br>(In case of latest Financial Year Audited statements are not available, bidders shall be required to submit unaudited statements, along with above mentioned certificate. In case the bidder is declared as Successful Bidder, the bidder shall submit the Audited statement before issuance of LOI by BTD. Bidder shall note, the LOI shall be subject to satisfactory submission of the required certificate. BTD's decision shall be final and binding.)<br>• Details mentioned in format as mentioned in **Annexure Set 1 - Format 4 (4.1).** |

<table>
<tr><th>Sr.</th><th>Parameters</th><th>Requirement</th><th>Supporting Documents</th></tr>
<tr><td></td><td></td><td></td><td>In case Chartered Accountant certificate is submitted the said certificate also need to be counter signed by Company Secretary / authorized signatory of the bidder.</td></tr>
<tr><td>4.</td><td>Bidder Technical:<br><br>Similar Project experience</td><td>The Bidder (All Members jointly, in case of consortium) should have experience of executing minimum number of “Similar Project” with a minimum project value as per below table, in India during last 7 years.<br><br>
<table>
<tr><th>Number of similar projects executed</th><th>Minimum Project Value per project, meeting the criteria (in INR)</th></tr>
<tr><td>One Similar Project</td><td>250 Crore</td></tr>
<tr><td colspan="2">OR</td></tr>
<tr><td>Two Similar Projects</td><td>156 Crore</td></tr>
<tr><td colspan="2">OR</td></tr>
<tr><td>Three Similar Projects</td><td>125 Crore</td></tr>
</table>
<br>At least one project meeting the criteria, should be executed by the Lead Bidder, in case of consortium.</td><td>• Bidders shall submit copy of Work Order / Purchase Order / Letter of Award along with the copy of the contract agreement mentioning the relevant Scope of Work and Project Value.<br><br>• Completion Certificate from the client<br>OR<br>• In case of on-going project AND / OR for PPP (including BOOT, BOT etc.), a Go-Live Certificate along with partial completion certificate from the Competent Authority designated by the client mentioning the relevant Scope of Work, having completed at least one year of O&M.<br><br>Details mentioned in format as mentioned in Annexure Set 1 - Format 4 (4.2).</td></tr>
<tr><td>5.</td><td>Bidder Technical:<br><br>ITMS Experience</td><td>The Bidder All members jointly, in case of Consortium) should have experience implementing Minimum Traffic Enforcement Solution (Violation Detection Systems / ITMS) including the Video Analytics Software and ANPR Camera), in any one or more (Maximum 5) “Similar Projects” in India, during last 7 years including at least three of the below:<br><br>• Speed Violation Detection<br>• Red-Light Violation Detection<br>• Stop Line Violation Detection at a junction</td><td>• Bidders shall submit copy of work order along with the copy of the contract agreement mentioning the relevant Scope of Work.<br>• Completion Certificate from the client<br>OR<br>• In case of on-going project, a Go-Live Certificate along with partial completion certificate from the Competent Authority designated by the client mentioning the relevant Scope of Work, having implemented Traffic Enforcement Solution (Violation Detection Systems / ITMS on required number of locations.</td></tr>
</table>

| Sr. | Parameters | Requirement | Supporting Documents |
|---|---|---|---|
| | | • **Wrong Way Driving**<br>• **No Helmet for Driver / Pillion**<br>• **Triple Seat riding violation detection**<br>• **Seat-belt violation detection**<br>• **Mobile phone use violation detection**<br>• **Non HSRP / Non Standard Number plate**<br>• **Lane Violation**<br>• **Parking Violation Detection**<br><br>**Minimum Traffic Enforcement Solution (Violation Detection Systems / ITMS: 200** junctions / locations | • Details mentioned in format as mentioned in **Annexure Set 1 - Format 4 (4.2).** |
| 6. | **OEM Authorization** | **In case the Bidder (All members jointly, in case of consortium)** is not the Solution Provider / OEM of any of the Commercial Off the Shelf (COTS) product, Manufacturer Authorization Form (MAF) from the OEM or Solution Provider shall be submitted including following points:<br>• End-of-Support for the proposed product should not be within next five (5) years, preferably ten (10) years, from the date of publishing the RFP and End of sales during the next 24 months from the date of publishing the RFP.<br>• In case the End-of-Support for the proposed product is less than ten (10) years from the date of publishing the RFP, the bidder / MSI shall ensure necessary replacement of such products and units as required to maintain defined SLA throughout the project period, at no extra cost to BTD.<br>• **OEM shall have existing registered service / support centre in India or shall establish the same within 30 days of the signing of Contract Agreement in India, preferably** | • MAF from the OEM / Solution Provider in the format as per **Annexure Set II – Format 6.**<br>• OEM Incorporation certificate. |

| Sr. | Parameters | Requirement | Supporting Documents |
|---|---|---|---|
| | | **in the state of Bihar. The Bidder shall submit an undertaking from the OEM to that effect.**<br>In case the bidder is the Solution Provider / OEM of the any of the COTS product – MAF and undertaking must be submitted on the letterhead as per the RFP specified format. | |
| 7. | **Experienced Manpower** | **The Bidder (All members jointly, in case of Consortium)** as on date of submission of bid should **have** minimum number of professionals on its **Payroll** in India as below:<br>**ITMS and / or enforcement system and / or Electronic Enforcement and / or IT and / or ITeS and / or ICT**:<br>Minimum 50 | • Declaration from the HR head of the Bidder on company letter head as per **Annexure Set I - Format 7. (**BTD reserves right to ask for EPF payment receipts of all declared employees)<br>• Detailed CV of at least 5 employees, including Project Manager proposed to be deployed as per format in **Annexure Set I– Format 7**. |
| 8. | **Local Office in** Bihar. | **Bidder (Lead Bidder in case of consortium)** should have a local office in Bihar.<br>If Bidder doesn't have local office in Bihar, it should open a local office, preferably in Patna, within 30 days from date of Signing of the contract. | • Proof of the Local Office (Rental Agreement/Utility bill) in Bihar OR Undertaking from authorized signatory to open the local office in Bihar within 30 days from Date of Signing of contract. |
| 9. | **Certifications** | **The Bidder (all members jointly, in case of consortium)** should possess the following Certifications which are valid as on last date (deadline) of bid submission:<br>• ISO 9001:2015 or above<br>• ISO 20000:2018 or above<br>• ISO 27001:2018 or above<br>• CMMI level 3 or above | • Copy of valid certificates on the name of the Bidder.<br>• **The certifications shall need to be kept valid throughout the duration of the contract period.** |
| 10. | **Blacklisting** | **Bidder (all members in case of consortium)** and **OEMs of ITMS and Software, IP Camera, Video Management & Video wall** should not have been blacklisted by any Government (State / Central / UT) or its Department, Central or State Public Sector Unit / Defence / Govt. Boards / Urban Local Bodies in India since last 3 year as on last date of submission of bid. | • Undertaking by authorized signatory of bidder (all members in case of consortium) as per format given in **Annexure Set I - Format 5.**<br>• Undertaking by authorized signatory of respective OEMs |

| Sr. | Parameters | Requirement | Supporting Documents |
|---|---|---|---|
| 11. | **Payment** | • Scanned copy of EMD uploaded & original EMD to be submitted & Bid Submission Cover Letter-**Annexure Set I - Format 1** | |
| 12. | **Additional requirement** | • Board Resolution authorizing a person from Bidder or Power of Attorney to sign / execute the bid as a binding document and execute all relevant agreements forming part of bid.<br>• Power of Attorney to sign / execute the bid as Lead Bidder among consortium, and Joint Bidding Agreement.<br>• Self-Declaration as per **Annexure Set I - Format 8.** | |

### 13.4. OEM Pre-Qualification Criteria

**Below Criteria are to be satisfied by the OEM and not by any authorized vendor:**

| Sr. | Parameters | Requirement | Supporting Documents |
|---|---|---|---|
| 1. | **OEM Criteria:** ITMS | OEM supplying the **Minimum Traffic Enforcement Solution (Violation Detection Systems / ITMS)** to the Bidder should have supplied / operated the **Minimum Traffic Enforcement Solution (Violation Detection Systems / ITMS)** for similar solutions in **any one or more (Maximum 10) operational "Similar Project"** in India during last 7 years.<br><br>**Such systems shall at minimum include at least three out of below violations:**<br>**i. Speed Violation Detection**<br>**ii. Red-Light Violation Detection**<br>**iii. Stop Line Violation Detection at a junction**<br>**iv. Wrong Way Driving**<br>**v. No Helmet for Driver / Pillion**<br>**i. Triple Seat Riding**<br>**vi. Seat-belt violation detection**<br>**vii. Mobile phone use violation detection**<br>**viii. Non HSRP / Non Standard Number plate** | • OEM shall submit Purchase Order and invoice/s raised to the System Integration along with necessary evidence (including Work Order and / or Agreement and / or any other authentic documentary evidence) that the purchase order is against the "Similar Project", executed by the System Integrator, meeting the criteria.<br>• OEM shall submit work completion certificate from end user or respective System Integrator regarding supply / usage of respective product.<br>• BTD reserves right to seek for more evidence as part of clarifications to substantiate the claims of the OEM for the respective criteria.<br><br>Details mentioned in format as mentioned in **Annexure Set 1 - Format 4 (4.3).** |

| Sr. | Parameters | Requirement | Supporting Documents |
|---|---|---|---|
| | | **ix. Lane Violation**<br>**x. Parking Violation Detection**<br><br>**Minimum Traffic Enforcement Solution (Violation Detection Systems / ITMS:** 500 junctions / locations OR **Min. 5000 analytics license (applicable only to the violation mentioned above)** | |
| 2. | **OEM Criteria:** IP Camera | OEM supplying the Cameras to the Bidder, for using video analytics based Electronic Enforcement and Violation Detection System should have supplied **at least 2500 IP Cameras** for similar solutions in **one or more (maximum 5) operational "Similar Projects"** in India during last 7 years.<br>IP Cameras mean all ANPR, Overview / Evidence Camera – Fixed / Bullet, PTZ | |
| 3. | **OEM Criteria:** Video Management System | OEM supplying the Video Management System to the Bidder should have supplied / operated the VMS for at least **1500 IP Cameras** for similar solutions **in one or more (maximum 5) operational "Similar Projects"** with varied model camera OEM in India during last 7 years. | |
| 4. | **OEM Criteria:** Enterprise Management System | OEM supplying the EMS solution to the Bidder should have supplied / operated the EMS System for monitoring & managing at least **1500 end – nodes** (including IT assets – Camera, Switch, server, etc.; Non-IT Assets, JB, KVM etc.) for similar solutions **in one or more (maximum 5) operational "Similar Projects"** in India during last 7 years. | |
| 5. | **OEM Criteria:** Networking Components | The OEM must have a functional R&D Center and TAC (Technical Assistance Center) in India, along with a dedicated toll-free support number.<br>The OEM must have had an established presence in India for at least 15 years. | • OEM shall submit Purchase Order and invoice/s raised to the System Integration along with necessary evidence (including Work Order and / or Agreement and / or any other authentic documentary evidence) that the purchase order is against the |

| Sr. | Parameters | Requirement | Supporting Documents |
|---|---|---|---|
| | | The OEM must have successfully executed at least one large-scale surveillance project deployment in India, which min should include:<br>1) A minimum of 500 field switches, servers, and storage systems for at least 4,000 cameras.<br>2) Associated data center technologies to support the deployment.<br>Relevant completion certificates / documentary proof/ OEM Undertaking must be submitted along with the bid.<br><br>As AI is prevalent and a mandatory requirement for security in the network devices, so OEM's under consideration must be part of Project Glasswing.<br><br>The OEM of Routers must provide two large Service Provider deployment references for the same router series/model/operating system from two different service providers in India or abroad. | "Similar Project", executed by the System Integrator, meeting the criteria.<br>• OEM shall submit work completion certificate from end user or respective System Integrator regarding supply / usage of respective product.<br>• BTD reserves right to seek for more evidence as part of clarifications to substantiate the claims of the OEM for the respective criteria.<br><br>Details mentioned in format as mentioned in **Annexure Set 1 - Format 4 (4.3).** |

**Note:**

1. OEM Criteria shall be complied from the OEM and not by any authorized vendor.
2. Any bid failing to meet the above eligibility criteria shall be disqualified and shall not be considered for further Technical and Commercial Evaluation.
3. **Change in Eligibility Criteria:** If there is a change in the status of the bidder with reference to any of the eligibility criterion specified above (or in the Technical Qualification parameters below), during the bid process till the award of the project, the bidder shall immediately bring the same to the notice of BTD. BTD reserves right to take necessary action as it deems fit in such cases.
4. The bidder shall be disqualified, and its bid shall be summarily rejected if any details related to Commercial Bid are provided in the Technical Bid.
5. **The project value for 'similar projects' as described above shall be considered inclusive of all applicable taxes.**
6. The bidder should on its own meet the technical experience as stipulated in RFP and should not claim to be meeting the technical experience criteria basis its parent, subsidiary, co-subsidiary, associated or other related entity.
7. In case bidder is claiming experience of a project where the bidder is a part of consortium, then bidder has to be Lead Bidder of that consortium **OR** Bidder shall have evidence of clearly defined Role and Responsibility (to match what is asked for) in the said project as part of Master Service Agreement and / or Joint Bidding Agreement.
8. In case bidder is claiming experience of a project where the bidder is a sub-contractor and not the bidder, that experience will not be considered.
9. The OEM can offer its Product / Services to multiple bidders. OEM shall have existing registered service / support centre in India or shall establish the same within 30 days of the signing of Contract Agreement in India (Preferably in the State of Bihar),The Bidder should submit an undertaking from the OEM to that effect.
10. All bidders and OEMs are required to comply to General Financial Rules (GFRs), 2017 (including Global Tender Enquiry Amendment Rule 161(IV) dated 15 May 2020 and Amendment Rule 144 (xi) dated 23rd July 2020), all as amended from time to time. An undertaking from all OEMs and Bidders in this respect shall be submitted.
11. OEM supplying the Cameras to the Bidder should propose Camera models which comply with the latest BIS 13252:2010, BIS 16910:2018 and BIS 16910 (Part 5):2020 standards and detailed specification. Additionally, all CCTV Camera OEM shall be registered and in compliance STQC requirements as per "Electronics and Information Technology Goods (Requirement of Compulsory Registration) Order, 2021, amended vide S.O. 1652 (E) dt. 09 October 2024 - Essential Requirement(s) for Security of CCTV". Relevant documents for the same to be provided before the FAT and supply of the product by the Successful Bidder. In case the Successful Bidder fails to submit the document to the satisfaction of BTD, BTD reserves the right to direct the Successful Bidder to change the Make and/or Model which is equivalent or better, meeting the technical specifications and OEM criteria and all the other requirements as defined in the RFP, and shall be binding.

### 13.5. Technical Evaluation

1. Post Pre-Qualification evaluation, BTD shall conduct Technical Evaluation against the Technical Criteria defined in the RFP. BTD will only consider documents submitted as part of **Envelope A** (including Annexure Set I and Annexure Set II) for Technical Evaluation. No other documents shall be considered for evaluation.
2. This is **Lowest Bid based** Selection of technically qualified bidders.
3. Bidders meeting the pre-qualification criteria and securing a minimum of **35 marks out of 65** in the evaluation process, as per the criteria specified under Clause 13.5, shall be invited to participate in the Proof of Concept (PoC).
4. The Technical Evaluation of Bidders' proposals shall be based on below parameters and the "**Technical Score"** shall be calculated out of 100 marks and shall be evaluated as below:

| Section | Evaluation Criteria | Total Marks |
|---|---|---|
| **A.** | Bidder's Financial Experience | 10 |
| **B.** | Bidder Technical Experience | 35 |
| **C.** | OEM Technical Experience | 20 |
| **D.** | Proof of Concept | 35 |
| | **Overall Technical Score – Total** | **100** |
| | **Minimum Cut Off** | **70 /100** |

### 13.5.1. Technical Qualification Parameters

The Technical Evaluation shall be done as per the parameters and marking system mentioned in the table below:

<table>
<tr><th>Sl.</th><th>Parameters</th><th>Point System</th><th>Max. Marks</th></tr>
<tr><td>A.</td><td colspan="2">Bidder Financial Criteria</td><td>10</td></tr>
<tr><td>1.</td><td>The Bidder (Lead Bidder, in case of Consortium) should have average annual turnover from IT / ITeS / ICT / ITMS business in India in last three financial years:<br>Minimum INR 200 Crore<br>AND<br>Other consortium members, in case of Consortium should each have average annual turnover from IT / ITeS / ICT / ITMS business/civil / infrastructure works relevant to ITMS (poles, gantries, foundations, trenching, cabling, control-room construction) in India in last three financial years:<br><br>Minimum INR 50 Crore</td><td>Bidder (Lead Bidder, in case of Consortium) average annual turnover from IT / ITeS / ICT / ITMS Business in last three financial years<br><br><table><tr><th>Turnover meeting the Criteria</th><th>Marks</th></tr><tr><td>< 200 Cr.</td><td>Disqualified</td></tr><tr><td>>= 200 Cr. and < 300 Cr.</td><td>07 Marks</td></tr><tr><td>>= 300 Cr. and < 400 Cr.</td><td>08 Marks</td></tr><tr><td>>= 400 Cr</td><td>10 Marks</td></tr></table></td><td>10</td></tr>
<tr><td>B.</td><td colspan="2">Bidder Technical Criteria</td><td>35</td></tr>
<tr><td>2.</td><td>The Bidder (All Members jointly, in case of consortium) should have experience of executing minimum number of “Similar Project” with a minimum project value as per below table, in India during last 7 years.<br><table><tr><th>Number of similar projects executed</th><th>Minimum Project Value per project, meeting the criteria (in INR)</th></tr><tr><td>One Similar Project</td><td>250 Crore</td></tr><tr><td colspan="2">OR</td></tr><tr><td>Two Similar Projects</td><td>156 Crore</td></tr><tr><td colspan="2">OR</td></tr><tr><td>Three Similar Projects</td><td>125 Crore</td></tr></table></td><td>Total Project Value of maximum <u>any three projects</u> submitted meeting the Criteria:<br><br><table><tr><th>Total Project Value</th><th>Marks</th></tr><tr><td>< 250 Cr.</td><td>Disqualified</td></tr><tr><td>>= 250 Cr. and < 375 Cr.</td><td>07 marks</td></tr><tr><td>>= 375 Cr. and < 500 Cr.</td><td>08 marks</td></tr><tr><td>>= 500 Cr.</td><td>10 marks</td></tr></table></td><td>10</td></tr>
</table>

<table>
<tr><th>Sl.</th><th>Parameters</th><th>Point System</th><th>Max. Marks</th></tr>
<tr><td></td><td>At least one project meeting the criteria, should be executed by the Lead Bidder, in case of consortium.</td><td></td><td></td></tr>
<tr><td>3.</td><td>The Bidder (All members jointly, in case of Consortium) should have experience implementing Minimum Traffic Enforcement Solution (Violation Detection Systems / ITMS) including the Video Analytics Software and ANPR Camera), in any one or more (Maximum 5) “Similar Projects” in India, during last 7 years including at least three of the below:<br><br>• Speed Violation Detection<br>• Red-Light Violation Detection<br>• Stop Line Violation Detection at a junction<br>• Wrong Way Driving<br>• No Helmet for Driver / Pillion<br>• Triple Seat riding violation detection<br>• Seat-belt violation detection<br>• Mobile phone use violation detection<br>• Non HSRP / Non Standard Number plate<br>• Lane Violation<br>• Parking Violation Detection<br><br>Minimum Traffic Enforcement Solution (Violation Detection Systems / ITMS: 200 junctions / locations</td><td>Total number of Traffic Enforcement Solution (Violation Detection Systems / ITMS implemented in one Similar Project submitted meeting the Criteria:<br><br><table><tr><th>Minimum Traffic Enforcement Solution (Violation Detection Systems / ITMS (junctions / locations)</th><th>Marks</th></tr><tr><td>< 200</td><td>Disqualified</td></tr><tr><td>>= 200 and < 300</td><td>11 Marks</td></tr><tr><td>>= 300 and < 400</td><td>14 Marks</td></tr><tr><td>>= 400</td><td>15 Marks</td></tr></table></td><td>15</td></tr>
<tr><td>4.</td><td>The Bidder (All member Jointly, in case of Consortium) should have experience implementing Traffic Enforcement Solution (Violation Detection Systems / ITMS) including the Video Analytics Software and ANPR Camera), in anyone “Similar</td><td><table><tr><th>Total Project with Go-Live Status meeting the criteria</th><th>Marks</th></tr><tr><td>< 1</td><td>00 Marks</td></tr><tr><td>>= 1 and < 3</td><td>07 marks</td></tr><tr><td>>= 3 and < 5</td><td>08 marks</td></tr></table></td><td>10</td></tr>
</table>

<table>
<tr><th>Sl.</th><th>Parameters</th><th>Point System</th><th>Max. Marks</th></tr>
<tr><td></td><td>Projects” in India, during last 7 years including at least three of the below:<br><br>• Speed Violation Detection<br>• Red-Light Violation Detection<br>• Stop Line Violation Detection at a junction<br>• Wrong Way Driving<br>• No Helmet for Driver / Pillion<br>• Triple Seat riding violation detection<br>• Seat-belt violation detection<br>• Mobile phone use violation detection<br>• Non HSRP / Non-Standard Number plate<br>• Lane Violation<br>• Parking Violation Detection<br><br>Minimum project with Go-Live Status: 1 Project</td><td><table><tr><td>>= 5</td><td>10 marks</td></tr></table></td><td></td></tr>
<tr><td>C.</td><td colspan="2">Technical Criteria - OEM</td><td>20</td></tr>
<tr><td>5.</td><td>OEM supplying the Minimum Traffic Enforcement Solution (Violation Detection Systems / ITMS) to the Bidder should have supplied / operated the Minimum Traffic Enforcement Solution (Violation Detection Systems / ITMS) for similar solutions in any one or more (Maximum 10) operational “Similar Project” in India during last 7 years.<br><br>Such systems shall at minimum include at least three out of below violations:<br>xi. Speed Violation Detection<br>xii. Red-Light Violation Detection</td><td>Total number of junctions / locations supplied / operated meeting the criteria:<br><br><table><tr><th>Minimum Traffic Enforcement Solution (Violation Detection Systems / ITMS)</th><th>Marks</th></tr><tr><td>< 5000 Licenses</td><td>Disqualified</td></tr><tr><td>>= 5000 and < 7500 Licenses</td><td>07 Marks</td></tr><tr><td>>= 7500 and < 10000 Licenses</td><td>08 Marks</td></tr><tr><td>>= 10000 Licenses</td><td>10 Marks</td></tr></table><br>OR</td><td>10</td></tr>
</table>

<table>
<tr><th>Sl.</th><th>Parameters</th><th>Point System</th><th>Max. Marks</th></tr>
<tr><td></td><td>xiii. Stop Line Violation Detection at a junction<br>xiv. Wrong Way Driving<br>xv. No Helmet for Driver / Pillion<br>ii. Triple Seat Riding<br>xvi. Seat-belt violation detection<br>xvii. Mobile phone use violation detection<br>xviii. Non HSRP / Non Standard Number plate<br>xix. Lane Violation<br>xx. Parking Violation Detection<br><br>Minimum Traffic Enforcement Solution (Violation Detection Systems / ITMS: 500 junctions / locations OR Min. 5000 analytics license (applicable only to the violation mentioned above)</td><td><table><tr><th>Minimum Traffic Enforcement Solution (Violation Detection Systems / ITMS)</th><th>Marks</th></tr><tr><td>< 500 Junction / Locations</td><td>Disqualified</td></tr><tr><td>>= 500 and < 750 Junction / Locations</td><td>07 Marks</td></tr><tr><td>>= 750 and < 1000 Junction / Locations</td><td>08 Marks</td></tr><tr><td>>= 1000 Junction / Locations</td><td>10 Marks</td></tr></table></td><td></td></tr>
<tr><td>6.</td><td>OEM supplying the Cameras to the Bidder, for using video analytics based Electronic Enforcement and Violation Detection System should have supplied at least 2500 IP Cameras for similar solutions in one or more (maximum 5) operational “Similar Projects” in India during last 7 years.</td><td><table><tr><th>Total IP Cameras supplied meeting the criteria</th><th>Marks</th></tr><tr><td>< 2500</td><td>Disqualified</td></tr><tr><td>>= 2500 and < 3750</td><td>07 Marks</td></tr><tr><td>>= 3750 and < 5000</td><td>08 Marks</td></tr><tr><td>>= 5000</td><td>10 Marks</td></tr></table></td><td>10</td></tr>
<tr><td>7.</td><td colspan="2">Mandatory Demonstration from Bidders</td><td>35</td></tr>
<tr><td>8.</td><td colspan="2">• Bidders shall be required to submit a document with detailed Approach and Methodology, make and model of all components and software etc. before the Technical Evaluation of the System.<br>• All the costs towards such Technical Evaluation including the preparation, demonstration, manpower, lodging and boarding, travelling, transportation etc. shall be sole responsibility of bidder.</td><td></td></tr>
</table>

<table>
<tr><th>Sl.</th><th>Parameters</th><th>Point System</th><th>Max. Marks</th></tr>
<tr><td></td><td colspan="2">
<ul>
<li>Sample size for below tests shall be as directed by BTD during the demo, until satisfaction of BTD (say minimum of 24 hrs).</li>
<li>Marks for Technical Evaluation of the System shall be given based on the demonstration of the defined functionalities, and mandatory submission of corresponding document, photo, video evidence to be submitted by the bidder.</li>
<li>Any changes in operations, solutions, quality or SOP required by BTD shall be incorporated by the Bidders.</li>
<li>In case of failure of demo during any process until satisfaction of BTD, BTD reserves the right to reject the bid.</li>
<li>Marks shall be allocated as per below for each criteria accurately captured, and output demonstrated (percentage of total sample size considered).</li>
</ul>
<table>
<tr><th>Criteria Category</th><th>Technical Evaluation Criteria</th><th>Marks</th></tr>
<tr><td>Red Light and Stop Line Violation Detection Accuracy (Day)</td><td><ul><li><90% = 00 Marks</li><li>≥ 90% and < 95% = 2 marks</li><li>≥ 95% = 3 marks</li></ul></td><td>03 Marks</td></tr>
<tr><td>Speed Detection Accuracy (Day and Night)</td><td>Measured as ± 2 KMPH for vehicle < 100 KMPH speed:<ul><li><90% = 00 Marks</li><li>≥ 90% and < 95% = 2 marks</li><li>≥ 95% = 3 marks</li></ul></td><td>03 Marks</td></tr>
<tr><td>Two-Wheeler Helmet Detection Accuracy for Rider (Day and Night)</td><td>98+% vehicles to be captured, of which total vehicles to be accurately detected:<ul><li><90% = 00 Marks</li><li>≥ 90% and < 95% = 2 marks</li><li>≥ 95% = 3 marks</li></ul></td><td>03 Marks</td></tr>
<tr><td>Not wearing Seat-Belt Violation (Day and Night)</td><td><ul><li><85% = 00 Marks</li><li>≥ 85% and < 90% = 2 marks</li><li>≥ 90% = 3 marks</li></ul></td><td>03 Marks</td></tr>
<tr><td rowspan="2">ICCC Application Demo</td><td>Not demonstrated</td><td>00 Marks</td></tr>
<tr><td>Define alert type (Accident) and automatic alert and integration with GIS</td><td>01 Mark</td></tr>
</table>
</td><td></td></tr>
</table>

### 13.5.2. Demonstration from Bidders

a. All the qualified bidders as per the pre-qualification criteria shall be asked to demonstrate to the Technical Committee, the complete functioning of the system along with the software deliverables as described in this document (as amended from time to time) during the technical evaluation.
b. The complete working system comprising of all minimum necessary hardware, software, network, accessories, PC / workstation etc. for capturing the output shall be asked to be demonstrated. Such demo / POC will be for one or more junctions as directed by BTD.
c. **All the hardware, software, components etc. of the Demo / POC (under evaluation) shall be of the same make and model, and software version proposed by bidder as per the technical proposal submitted.**
d. **Bidders may be provided with the standardized Demo Script in advance. The demonstration shall be conducted strictly in accordance with the Demo Script shared with the pre-qualified bidders.**
e. The location of the demonstration shall be at one or more locations provided by BTD on any state / national highway in Bihar state as decided by the BTD. The bidder can use the existing Pole and electricity for the Demonstration if available. However, the entire responsibility for the same shall be of the respective bidder. Any additional pole, electricity point or any other arrangements required for the successful demonstration shall be sole responsibility of the respective bidders. All the required permission will be given by BTD upon requests from bidders.
f. All the Bidders shall be given a period of around two week for preparation for the demonstration before the day the demo starts. The demonstration may run for three to five days (or more days) until satisfaction of BTD, to technically assess the systems. The indicative details are provided in the RFP document.
g. The marks for the Demo shall be given based on the demonstration of the defined functionalities, and mandatory submission of corresponding document / photo / video evidence to be submitted by the bidder.
h. Any changes in operations, solutions, quality or SOP required by BTD shall be incorporated by the Bidders.
i. All the costs towards demonstration including the preparation, demonstration, manpower, lodging and boarding, travelling, transportation etc. shall be sole responsibility of bidder.

**In case of failure of demo during any process until satisfaction of BTD, BTD reserves the right to reject the bid.**

### 13.5.3. Proposed Team for the Project

Bidder may propose different people of different skill sets for different responsibilities. Following documentation is expected in this section:

a. Overall Project Team for Project Implementation and for Operations and Maintenance stages as per requirement mentioned in the RFP.
b. Escalation Chart for the entire Project Duration.
c. Summary Table giving Qualification, Experiences, Certifications, Relevance
d. Detailed CVs in the format attached for as per **Annexure Set II – Format 3**.
e. Detailed CVs and the team deployment plan as a part of **Project Plan Document.**

### 13.5.4. Technical Specification Compliance

a. The RFP has specified the benchmark / minimum specifications for various components. Bidders are required to give a comprehensive compliance sheet for the components / application proposed by them, as per **Annexure Set II - Format 7.**
b. Failure to which shall result in disqualification of the bid.

c. If a bidder is not complied with one or more specifications or requirements, BTD reserves right to act such as disqualification of bid and / or forfeiture of EMD or any other action as it deems fit, after reasonable chance to bidder for clarifications. Bidders are expected to submit the reason for non-compliance, if any.
d. Technical Bid should be accompanied by OEM's product brochure / datasheet with complete make, model, version number for all system components, software and applications proposed and all other required and necessary details, along with MAF as applicable.
e. **All the hardware specifications shall be cross referenced with the datasheet.**
f. In case bidder (after declaration of the Successful Bidder, if at all) proposes to change any make or model of any component / equipment / deliverable, the bidder shall provide with reasonable justification along with necessary supporting documents to the BTD as directed by BTD from time to time. BTD reserves right to either approve the change or reject the same and the bidder (Successful Bidder) shall be bound to adhered to the same.
g. BTD may instruct the bidder to change any component or equipment (make and/ or model) found to be non-compliant or unsatisfactory which shall be binding on the MSI. MSI will provide the options which are equivalent or better than the originally quoted.

### 13.5.5. Functional Specification Compliance

a. The RFP has specified the benchmark / minimum specifications and functional requirements for various components, applications and systems. Bidders are required to raise any non-compliance explicitly for the components, systems and application proposed by them, as per Annexure Set II – Format 8, and alternative proposed. **Such alternative shall be at no extra cost to the BTD. All the points not covered in the deviation matrix will be assumed to be all complied with and shall be delivered to the RFP requirements by the Successful Bidder.**
b. **BTD may or may not consider the deviation and alternative proposed at its sole discretion, and it shall be final and binding on the MSI.** In the event, bidder is not complied with one or more specifications or requirements, and BTD is not satisfied with alternative proposed, BTD reserves right to take action such as disqualification of bid and / or forfeiture of EMD or any other action as it deems fit, after reasonable chance to bidder for clarifications. Bidders shall present non-compliance, if any, during presentation.
c. Bid should be accompanied by OEM's product brochure / datasheet with complete make, model, part numbers and sub-part numbers for all equipment / software quoted and all other required and necessary details.
d. For all the point for which non-compliance is not raised, it will be implied that the bidder has complied with all parts of the RFP requirements and shall be able to deliver as per the requirements defined in the RFP. Bidders are encouraged to take undertaking from respective OEMs.

### 13.5.6. Technical Solution Proposed for the Project

**Broad areas to be covered in the Technical Solution documentation are given below:**

a. Bill of Quantity (un-priced commercial bid format): This document shall give indication of all the proposed cost components, without specifying the costs as specified in the RFP. Please note that the bid shall get disqualified if bidder gives price details in the technical document (any Envelope A (Annexure Set I and Annexure Set II) Documents).
b. Describe the proposed Technical Solution for each component such CCTV Camera, Radar, Video Analytics Software etc. in a structured manner. Following shall be captured in the same:

- Detailed description of the design and technical solution and various components and applications including make and model of equipment, sizing of infrastructure (including diagrams and calculations wherever applicable)
- Reasoning for selection of the proposed technology over other options
- Examples of successful implementation and operations
- Extent of compliance to technical requirements specified in the scope of work
- Technical Design and clear articulation of benefits to BTD of various components of the solution vis-à-vis other options available
- Strength of the Bidder and OEMs to provide services including examples or case-studies of similar solutions deployed for other clients

c. Provide detailed Approach and Methodology for Civil Work, Implementation and Operation and Maintenance Phases.
d. Approach and Methodology for Management of SLA Requirements specified in the RFP. Bidder is required to clearly articulate how each SLA requirements shall be adhered to.
e. Detailed Project Plan with timelines, resource allocation, milestones etc. for supply, installation and commissioning of the physical, IT and Non-IT components.
f. Insights into best and latest Industry practices and standards.

Such Technical Solution Document should be brief and to the point, with relevant screenshots of the system, photos etc. and should NOT exceed 30 pages (Additional 5 to 10 pages may be allowed. However, bidders shall ensure the document is concise).

### 13.5.7. Un-Priced Bill of Quantity

a. The bidder shall submit an unpriced BOQ as part of Technical Qualification Bid (Envelop A). Bidders are required to give a quantity of the components / application proposed by them, as per Annexure Set II - Format 2.
b. The Bill of Quantities provided by BTD are high level estimates based on preliminary understanding by BTD and have been provided for reference. The Bidders are encouraged to conduct their own detailed assessment to study and validate the BoQ.
c. The Bidder shall add additional line items and / or modify the quantities of existing line items under BoQ format, in case its study reveals that modifications are required in the prescribed BOQ to meet BTD's requirements and maintain SLAs.
d. The Bidder shall provide detailed explanation as a part of bid justifying the changes made by Bidder in quantities and / or additional line items under BoQ format.
e. Only BTD approved additional line item (proposed by the bidder) during evaluation against qualification criteria shall be considered for the commercial evaluation.
f. BTD reserves the right to reject the bids that are submitted without providing such justification for changes or addition in line items.
g. Any additional quantity proposed by the Bidder / Successful Bidder shall be sole responsibility of the Successful Bidder at no additional cost to the BTD.

All the "Qualified Bidders", qualifying as per qualification criteria and in compliance with all the above points shall be considered for commercial bid opening (Envelop B) and Commercial evaluation.

### 13.6. Commercial Evaluation and Declaration of Successful Bidder

1. The Commercial Bids (**Envelop B**) of all the technically qualified bidders (bidders scoring minimum 70 marks as per Pre-Qualification Criteria and technical evaluation will be opened on the prescribed date. Bidders or their authorized representatives may choose to be present during the bid opening.
2. The Commercial Bid should be in format mentioned in **Annexure Set III**. Any bid which does not conform to the formats prescribed shall be disqualified.
3. The Commercial Sheet consist of:
   i. **Priced BoQ** - of each line item and arrived total project cost.
   ii. **Commercial Bid**

   **The total of Priced BoQ and the Commercial Bid as per Annexure Set III – Envelop B – Format 3 and Format 2 respectively, shall exactly match.**
4. All the prices are to be entered in Indian Rupees ONLY.
5. The bid price should indicate all the applicable all the statutory government taxes and levies separately. **The evaluation shall be done on the "Commercial Bid Total" quoted, all inclusive, excluding of GST.** It is mandatory to provide breakup of all Taxes, Duties and Levies wherever asked for. BTD reserves the right to direct the Bidder to submit proof of payment against any of the taxes, duties, levies indicated.
6. Any conditional bid is liable for rejection.
7. The Commercial Evaluation shall happen as per below table:

| Sr. | Item | Description | in INR | |
|---|---|---|---|---|
| | | | (Up to two decimals only) (all inclusive, excluding GST) | In words |
| 1 | **Part A - Implementation Charges** | **"One Time Capex" as per the BoQ** | E.g. XX. XX | |
| 2 | **Part B - Operations and Maintenance Charges** | **"OpEx for 10 years" as per the BoQ** | E.g. XX. XX | |
| | **Commercial Bid Total (in INR) (all inclusive, excluding GST)** | | | |

8. The commercial bid evaluation will be all inclusive, excluding GST. GST will be paid as per actual rates prevailing at the time of payment.
9. The Bidder needs to account for all Out-of-Pocket expenses like Boarding, Lodging etc. in the bid. No extra payment shall be made by BTD apart from the quoted rates.
10. The quote by the Bidder shall remain firm during the entire contract period and not subject to variation on any account including due to change in any taxes, levies etc. Only change in GST shall be appropriately considered.
11. Bidders shall quote for the entire scope of contract on a "overall responsibility" basis such that the total bid price covers Bidder's all obligations mentioned in or to be reasonably inferred from the bidding documents in respect of providing the product / services.
12. The **Capex shall not exceed 45% of the total project cost**. If the CAPEX exceeds 45% of the total project cost, BTD reserves the right to reject the bid.
13. Prices in any form or by any reason before opening the Commercial Bid shall not be revealed, failing which the bid shall be liable for rejection.
14. The selection is Lowest Bid based selection of technically qualified bidders. The Lowest quoted "**Commercial Bid Total**" will be considered as Lowest Bid.
15. The technically qualified bidder (securing minimum 70 marks) and who quotes lowest "**Commercial Bid Total**" of Annexure Set III – Format 2 may be considered as L1 bidder.

16. The technically qualified bidders with subsequent lowest "**Commercial Bid Total**" will be considered as L2, L3 and so on.
17. In the event of two or more Bidders quoting exactly the same "**Commercial Bid Total**" and are considered for award of contract, then BTD reserves the right to declare the bidder whose technical score is highest, among the bidders who have quoted exactly the same "**Commercial Bid Total**" as preferred bidder/s.
18. In event of two or more Bidders quoting exactly the same "**Commercial Bid Total**" as well as securing exactly same "**Technical Score**" and are considered for award of contract, BTD reserves right to call for Re-Bid from only such bidders for only be for Commercial Bid. However, such revised quotes shall not be greater than the rate quoted earlier by the bidders in the Commercial Bid.
19. Within the bid validity period, if L1 bidder fails to perform the duty up to the satisfaction of the BTD as mentioned in the RFP or is disqualified or not agreeing to undertake the project for any reason or is unable to commence the work in the opinion of the BTD, L2 bidder may be offered to match L1 bidder's Commercial Bid. If L2 bidder fails to match the L1 commercial bid price, or gets rejected or disqualified, then the opportunity of matching may be given to next higher bidders in the order of sequence L3, L4, L5 and so on. Post which, BTD reserves the right to take action as it deems fit.

### 13.6.1. Declaration of Successful Bidder

1. BTD shall issue a Letter of Intent (LoI) to Successful Bidder for which bidder is declared as 'Successful Bidder', as per prevailing guidelines.
2. Within 15 days from date of receipt of LoI from BTD, Successful Bidder shall submit Security Deposit / Performance Bank Guarantee.
3. Within next 07 days from submission of Security Deposit, BTD and the Successful Bidder will sign the contract, and BTD will issue Work Order to the Successful Bidder. The Successful Bidder shall ensure necessary documentation including the stamp paper etc. for execution of the contract.

### 13.6.2. The BTD's Rights to Accept / Reject any or all Bids

The BTD reserves the right to accept or reject any bids, and to annul the bidding process and reject all Bids at any time prior to award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected bidder or bidders of the grounds for the BTD's action. If bids received are deemed as exceptionally unreasonable (unreasonably high or low) as compared to the prevailing market rates, BTD may reject one or more or all the bids or annul the bidding process.

### 13.6.3. Payment eligibility

a. The MSI shall be paid total one-time sum of **30% of CAPEX (i.e. quoted and accepted by BTD) or Rs. 60 Crore**, whichever is lesser as capital support as per payment schedule defined in Clause 4 under "Administrative Aspects".
b. The BTD has fixed **"Per Challan Rate"** at **Rs. 350 + GST.**
c. All bidders must note, that the MSI may be eligible for the payment as per fixed **"Per Challan Rate"** subject to:
    i. For violations listed in the below table as "Yes"; and
    ii. Only if it is Compoundable offense, and
    iii. Only if pushed to NIC ITMS system within 7 days of detection; and
    iv. Detected by the proposed ITMS system installed by the MSI; and
    v. Duly approved by the Enforcement Authorities within seven (07) days from the date of challan received from the MSI at its own discretion, and During Partial Go-live,

upper cap is defined as (5,000 challan per day for 200 no. of junctions), till the period of Full Go-Live. calculated as per MSI quoted (and duly agreed by BTD) project cost (or as duly updated by BTD).

vi. Subject to 2 months of "Waiting Period" as defined under Clause 6 under "Administrative Aspects"

vii. Subject to SLA compliance, validated using automated SLA monitoring tool.

viii. Annual compliances as per RFP and SLA requirements including Security Audit, calibrations, 167A certifications etc.

d. **Following types of violations are envisaged to be captured through proposed systems:**

| Sr. | Type of Violation to be detected | Violation which will be paid for to the MSI | Challan frequency per day |
|---|---|---|---|
| 1. | Over speeding – Spot Speed Detection | Yes | Multiple |
| 2. | Over speeding – Average Speed Detection | Yes | Multiple |
| 3. | Not using seat belt | Yes | Single |
| 4. | Using mobile phone | Yes | Multiple |
| 5. | Wrong Way Driving / Wrong Side Driving | Yes | Multiple |
| 6. | Reverse Driving | Yes | Multiple |
| 7. | Two Wheeler without helmet – only driver | Yes | Single |
| 8. | Two Wheeler without helmet – Pillion rider | Yes | Single |
| 9. | Two Wheeler triple seat riding | Yes | Single |
| 10. | Fancy Number Plate / Non HSRP | Yes | Single |
| 11. | Lane Discipline / Overtaking | No | Multiple |
| 12. | Driving in Wrong Lane | No | Multiple |
| 13. | Unauthorized Parking | Yes | Multiple |
| 14. | Suspected overload vehicle Violation detection | No | Single |
| 15. | Without taillight | Yes | Single |
| 16. | Without reflector | Yes | Single |
| 17. | Passenger vehicle carrying more than defined capacity | No | Multiple |
| 18. | Projection of load | No | Single |
| 19. | eDetection (Expired or Invalid Fitness, Insurance, PUC, Permit, invalid ODC etc.) | Yes | Single for each category |
| 20. | Plying without valid GST | No | Single |
| 21. | Fake/Forge number Plate Detection | No | Single |

e. The Bidder may propose any additional type of sensors, camera or any other system that may be required to capture one or more violations effectively.

f. The above violations shall be paid subject to the terms of the RFP. Nonpayment of any violation does not relieve the MSI from implementing and operating the systems as per RFP requirements.

g. Month wise total cashflow of the MSI is capped at the 20% IRR annually , while making payment to the MSI by BTD as per quoted "Per Challan Rate", excluding GST. The calculations for arriving at IRR will be done monthly, basis the total awarded project cost (quoted and accepted by BTD) as mentioned under Annexure 8. If the invoices submitted by MSI exceeds the 20% IRR cap upto the end of the respective month, the MSI will be paid the amount as per 20% IRR only and the balance amount will be kept reserved. In case the invoices submitted by MSI are less than the 20% IRR cap at the end of the respective

month, MSI will be paid the amount as per invoice submitted along with the balance of the previous month, if any which was kept reserved, subject to the amount equal to the upper cap of 20% IRR upto that respective month. However, 100% of the valid challans should be captured and processed by the MSI without exception.

h. In case, any reserved balance is leftover at the end of the project due to the IRR cap of 20%, the same shall not be paid to the MSI. To prevent any windfall gains to the MSI, the bidder's return shall be capped at an Internal Rate of Return (IRR) of 20% over the project lifecycle.

i. For the purpose of IRR calculations, following will be followed:
    a. Actual challans approved by BTD, meeting the other terms of RFP upto that respective month will be considered.
    b. CapEx cost (i.e. quoted and accepted by BTD) by the Bidder minus the Capital Support amount shall be considered, all inclusive, including GST
    c. OpEx cost of the BTD (yearly OpEx divided in 12 equal parts) shall be considered, all inclusive, excluding GST.
    d. Depreciation, Finance Cost, Discounting Rate etc. shall be considered as defined in Annexure 8 of Annexure Set IV.

### 13.6.4. Priced Bill of Quantity (Priced BoQ)

a. Line items mentioned in the **Annexure Set III – Format 3** are indicative, and bidder may propose any additional technology / solution / line items (with proper justification) to deliver the overall envisaged solution and the functional requirements. Bidders are required to suitably add line items depending upon their proposed solution. BTD shall not pay anything OR shall not consider in the IRR calculations over and above the quoted items. The only exception to the above shall be any change in quantity of locations or need for change in type of mounting infrastructure, which shall be handled as per terms defined in the Clause 6 under "Administrative Aspects" – Change Request Management.
b. These rates shall be termed as discovered rates for any and all components, application or service and shall be valid for entire project duration.
c. In case BTD is not satisfied with the proposed product, it may direct bidder to propose alternate product / component / solution.
d. **No Alternate Proposal:** Bidder shall quote Unit of Measurement (UoM) and unit price for each line item, only from single OEM / Type for hardware, software etc. Any bids, which proposes multiple options in terms of quantity, Unit of Measurement (UoM), OEM / Type and unit price for each line item shall be summarily rejected.
e. Operational Expenditure shall include cost towards repair, replace, operate and maintenance of each item unit, each line item of the BOQ, calculated on annual basis and for entire contract period. The unit cost of each line item for each year shall be calculated by dividing OpEx Cost for that year by the respective quantity.
f. The Bidder shall prepare the bid based on details provided in the tender documents. It must be clearly understood that the Scope of Work is intended to give the Bidder an idea about the order and magnitude of the work and is not in any way exhaustive and guaranteed by the BTD.
g. If during the course of execution of the project any minor revisions to the work requirements like technical specifications, equipment sizing, etc. are to be made to meet the goals of the project, such changes shall be carried out within the proposed price.
h. If any deviation has a major impact on the commercials, BTD's Project Implementation Committee shall take appropriate decision, and such decisions shall be binding on the Successful Bidder (MSI).
i. Such rates for each line item shall be in accordance with the prevailing market rates and comparable with rates of the other bidders. BTD may verify the rates of each line item and if found to be unreasonable compared to prevailing market rates and rates quoted by other

bidders, the BTD reserves right to call for necessary clarifications and may take action as it deems fit, including rejection of the bid.

j. **Errors and Rectification:** If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected. If there is a discrepancy between words and figures, amount in words shall prevail.
k. Prices in any form or by any reason before opening the Commercial Bid shall not be revealed, failing which the bid shall be liable for rejection.
l. The bidder shall submit commercial details in as much detail as possible. All line items shall be clearly defined including manpower, maintenance and all the other costs and there shall be no miscellaneous expenses.

## 14. Bid Submission and Evaluation Process

### 14.1. Tender Evaluation Committee

1. BTD shall constitute a Tender Evaluation Committee (TEC) to evaluate the responses of the bidders.
2. TEC constituted by BTD shall evaluate the responses to the RFP (technical & commercial bids – all Envelops) and all supporting documents / documentary evidence. Inability to submit requisite supporting documents / documentary evidence, may lead to rejection.
3. The decision of the TEC in the evaluation of responses to the RFP shall be final. No correspondence shall be entertained outside the defined process with the Committee.
4. The TEC may seek clarifications on their proposals and may visit Bidder's client site at BTD's own cost to validate the credentials / citations claimed by the bidder.
5. The TEC reserves the right to reject any or all proposals based on any deviations.
6. Each of responses shall be evaluated as per criterions and requirements specified in RFP.
7. The TEC would submit its decision to the competent authority whose decision shall be final and binding upon the bidders.

### 14.2. Language of Bids

The Bids prepared by the Bidder and all correspondence and documents relating to the bids shall be written in the English language. In case of any printed literature is being submitted by the Bidder in any other language, it shall accompany an English translation of such document, and in such cases for purposes of interpretation of the bid, the English translation shall govern.

### 14.3. Bid Submission Format

The Bid shall be strictly as per the format specified in this RFP document. Bids with deviation from format are liable for rejection and EMD may be forfeited at sole discretion of BTD.

1. The bidder shall submit the bid online through state's e-tendering portal.
2. No physical / hard copy is required to be submitted unless explicitly asked by the BTD.
3. BTD may ask for Technical Bid documents as a soft copy in a flash – drive post opening of Technical Bid, which shall be binding on the bidders.
4. All the details including Notice Inviting Tender, RFP Document and its supporting documents, are uploaded on e-tendering portal.
5. The bids submitted by the Bidder shall comprise of the following two envelopes:
   a. **Envelope A:** Tender Fee, EMD, Pre-Qualification Bid and Technical bid. (Annexure Set I and Annexure Set II)
   b. **Envelope B**: Commercial bid (Annexure Set III)

| # | Documents Type | Document Format |
|---|---|---|
| 1. | Tender Fee and EMD | Online / Scanned copy uploaded and original submitted as per requirements. |
| 2. | Pre-Qualification Criteria | The Eligibility Proposal shall be prepared in accordance with the requirements specified in the RFP and in the formats prescribed in relevant sections. |
| 3. | Technical Bid. | The Technical Proposal shall be prepared in accordance with the requirements specified in this RFP and in the formats prescribed in relevant sections. |
| 4. | Commercial Bid | The Commercial Proposal shall be prepared in accordance with the formats and requirements specified in this RFP and in the formats prescribed in relevant sections. |

6. The bidder shall ensure that all the required documents, as mentioned in this RFP are submitted along with the bid and in the prescribed format only. BTD may reject submission of any bid in any manner other than that specified in this RFP. Bid submitted in any other manner shall be treated as defective, invalid, and rejected.
7. The Commercial Bid is to be submitted in **Envelope B** only. The Bidder shall be disqualified if the bidder gives price details in the Technical Documents (**Envelope A (Annexure Set I and Annexure Set II)**) that are submitted online.
8. **Documents submitted for Envelope-A and Envelope-B shall be properly indexed. Each page shall be numbered. In case of multiple documents for same envelope, numbering shall be continuous and not separate for all documents. Index shall be done accordingly.**
9. All the documents, materials, evidence, manuals, technical sheets, data etc. submitted by the Bidders (and Successful Bidder post award of contact) shall be property of the BTD.

### 14.4. Clarifications

1. To assist in the process of evaluation of Bids, the BTD may, at its sole discretion, ask any Bidder for clarification on its Bids.
2. No change in the substance of the Bids would be permitted by way of such clarifications.
3. Any such correspondence shall be by email only to **stcbihar@bihar.gov.in**. BTD's decision in this regard shall be final and binding on the bidders.

### 14.5. Modification or Withdrawal of Bids

1. The Bidder may modify or withdraw its Bids before last date and time of bid submission on the e-tendering website. No Bids shall be modified or withdrawn by the Bidder after the last date and time of bid submission. Modification or withdrawal of Bids during the intervening period between the last date & time of bid submission date and expiration of the Bid Validity Period shall result in forfeiture of the EMD.
2. Prices quoted in the bid must be firm and final and shall not be subject to any upward modifications, on any account whatsoever, unless explicitly mentioned in the RFP.

### 14.6. Tender Opening

1. All Bids (all envelops A and B) received within the prescribed closing date and time shall be opened in presence of bidder representatives (who choose to attend the opening of tender), on the date, time and at the address communicated in the **"Notice Inviting Tender**"
2. Representatives of the bidders shall be advised to carry the identity card and a letter of authority from tendering firms to identify their bonafide for attending opening of the bids.

3. Envelope B containing the Commercial Proposal of only Qualified Bidder shall be opened at a date which will be declared later the e-tendering portal.

### 14.7. Bid Validity

1. The Commercial Bid submitted by the Bidders shall be valid for minimum period of 180 days from the date of Bid opening In exceptional circumstances, the BTD may solicit the Bidder's consent for an extension of the period of bid validity. Any such request by the BTD and the response thereto shall be made in writing and such extension of Bid validity period by the Bidder should be unconditional. A Bidder may refuse BTD's request for such extension. A Bidder accepting the request of BTD shall not be permitted to modify its Bid, and may be required to extend the validity of its EMD.

### 14.8. Bid Rejection Criteria

Rejection criteria are applicable during any stage including evaluation of bids, award of contract, or execution of contract etc. BTD will determine whether each bid, bidder and the execution are as per requirements, terms and conditions of the RFP Document. BTD reserves the right to take necessary action as per below:

**A. Following are the criteria for which Bidder's bid shall be rejected and shall not be considered for further evaluation, and award of contract.**

i. The EMD is not paid as per requirement.
ii. Bid does not contain the information and documents as per formats specified in the RFP Document.
iii. Failure to furnish all information required by the Tender Document or submission of a bid not as per the defined requirements as per the Tender Document in every respect;
iv. Bids are not received within the prescribed time and date for receipt of bids.
v. Bidders not complying with the Eligibility Criteria given in this RFP
vi. There is multiple bidding.
vii. Bids are not submitted with power of attorney / board resolution.
viii. Bid does not provide the information in reasonable detail.
Reasonable Detail means that, but for minor deviations, the information can be reviewed and evaluated by BTD without communication with Bidder. BTD reserves the right to determine whether the information has been provided in reasonable detail.
ix. There are inconsistencies between the Bids and the supporting documents & the Bidder fails to provide clarifications related thereto, when sought.
x. A Bid that has a material deviation or reservation. A material deviation or reservation is one:
    - which affects in any substantial way, the scope, quality, performance of the Project, or
    - which limits in any substantial way, BTD's rights or the Bidder's obligations under the resultant Contract Agreement, or
    - which is substantially inconsistent with the RFP Document, or;
    - Which would affect unfairly the competitive position of other Bidders.

**B. Following are the criteria for which Bidder's bid shall be rejected and shall not be considered for further evaluation, and award of contract, as well as EMD may be forfeited at sole discretion of BTD**

i. Bids mentioning Bid validity less than the required time.
ii. If a Bidder withdraws their bid or increases their quoted prices during the period of bid validity or its extended period, if any; or if a bidder submits a non-responsive bid

iii. In case of a Successful Bidder, if Bidder fails to sign the Contract or to furnish Performance Bank Guarantee within specified time and as per **Annexure set IV Annexure 2**
iv. During the bid process, if a Bidder indulges in any such deliberate act as would jeopardize or unnecessarily delay the process of bid evaluation and finalization.
v. During the bid process, if any information found wrong / manipulated / hidden / false / mala-fide in the bid.
vi. During the bid process, if a Bidder (including all consortium members, sub-contractors etc.) indulges in any kind of corrupt or fraudulent practices as defined in clause 21 under "Instructions to Bidders" or any other coercive, undesirable or restrictive practice.
vii. Bidder requesting modification or withdrawal of bid post last date (deadline) of submission of bids or during the period of bid validity or its extended period, if any;
viii. Bid is found to include commercials in the qualification bid (Envelop A) and / or Revelation of Prices in any form or by any reason before opening the Commercial Bid;
ix. Bidders not quoting for the complete scope of Work as indicated in the Tender documents, addendum (if any) and any subsequent information given to the Bidder;
x. Bidders not complying with the Technical and General Terms and conditions as stated in the Tender Documents;
xi. The Bidder not confirming unconditional acceptance of full responsibility of providing services in accordance with the Scope of work and Service Level Agreements of this RFP document
xii. Incomplete Price Bid and Bid does not conform to the RFP commercial Bid format
xiii. If bid costs are found to be unreasonable and / or unjustifiable by TEC.
xiv. Successful Bidder has breached the "Breach Level" as per Service Level Agreement.

**C. Following are the criteria for which Bidder's bid shall be rejected and shall not be considered for further evaluation, and award of contract, as well as EMD shall be forfeited.**

i. If the information provided by the Bidder is found to be incorrect / misleading / fraudulent at any stage / time during the RFP Process.
ii. Bidder indulges in any kind of corrupt or fraudulent practices as defined in **clause 21** under "Instructions to Bidders" or any other coercive, undesirable or restrictive practice.
iii. If it is found that the Demand Draft / BG as above submitted by the bidder Performance Security is False / Forged.
iv. Any effort on the part of a Bidder to influence the bid evaluation, bid comparison or contract award decisions.
v. Is found to canvass, influence or attempt to influence in any manner for the qualification or selection process, including without limitation, by offering bribes or other illegal gratification as per **clause 21** under "Instructions to Bidders".
vi. Has made misleading or false representations in the forms, statements and attachments submitted in proof of the eligibility requirements. In such case, EMD of bidder shall be forfeited.
vii. Bids are found to be Conditional.
viii. Failure of the Successful Bidder to furnish the Performance Guarantee or execute the Agreement within the prescribed time.

Reject and Disqualification of bids or bidder and forfeiture of EMD due to above cited reasons (or any other reasons as BTD deems fit) will be at a sole discretion of BTD. BTD may also consider bidder for blacklisting **after giving atleast 15 days of notice for satisfactory justification**. Decision of the BTD shall be final and binding on the Bidder / Successful Bidder / Agency. The Bidder / Successful Bidder / Agency may approach the Transport Commissioner,

Bihar Transport Department and Transport Secretary, Bihar Transport Department for appeal against any grievance.

## 15. Declaration of Successful Bidder and Award of Contract

### 15.1. Declaration of Successful Bidder

1. The technically qualified bidder with minimum technical score of 70 marks, may be selected as per process defined in clause 13.6 above.
2. On declaration of Successful Bidder by BTD, BTD shall issue Letter of Intent (LoI) of bid to Successful Bidder
3. Within 15 days from date of receipt of LoI from BTD, Successful Bidder/s shall submit Security Deposit / Performance Bank Guarantee.
4. With next 07 days from submission of Security Deposit, BTD and the Successful Bidder/s will sign the contract and BTD will issue Work Order to the Successful Bidder.

### 15.2. Signing of Contract

1. Subsequent to the above, the BTD and the Successful Bidder/s shall execute the Contract Agreement and other agreements.
2. Signing of Contract shall include Contract Agreement, Non – Disclosure Agreement, tripartite agreement etc. as per the requirements of BTD.
3. Failure of the Successful Bidder/s to furnish the Performance Guarantee or facilitate execution of the Agreement including purchase of stamp papers, within the prescribed time shall cause the EMD of the Successful Bidder to be forfeited & the LoI to be withdrawn.
4. The Successful Bidder/s shall be liable to indemnify BTD for any additional cost or expense, incurred on account of failure of the Successful Bidder to execute the Agreement.
5. Notwithstanding anything to the contrary mentioned above, BTD at its sole discretion shall have the right to extend the timelines for execution of Agreement on the request of the Successful Bidder, provided the same is bona fide.

### 15.3. Timelines for Award of Contract

| # | Description | Timelines |
|---|---|---|
| 1 | Declaration of $L_1$ Bidder | $T_0$ |
| 2 | Declaration of Successful Bidder/s and Issue of Letter of Intent of bid by BTD | $T_1$ |
| 3 | Submission of Security Deposit by Successful Bidder | $T_2 = T_1 + 15$ days |
| 4 | Signing of Contract/s and Issuance of Work Order | $T_2 + 07$ days |
| 5 | Implementation and O&M Timelines | As per Clause 3 under "Administrative Aspects" |

### 15.4. Confidentiality and Non-disclosure Agreement

All the material / information shared with the Bidder during the course of tendering process as well as the subsequent resulting engagement following this process with the successful bidder (Agency), whether shared by BTD or any other authority or generated during the project period, shall be treated as confidential and should not be disclosed in any manner to any unauthorized person under any circumstances. Every resource of the Successful Bidder (MSI) associated with this project will have to sign the Non-Disclosure Agreement with the Agency. The Agency shall in turn sign Non-Disclosure Agreement (NDA) with the BTD, while Signing of Contract as per format mentioned in **Part II** of the Tender Document. Successful Bidder shall be liable

for any breach of this clause on behalf of all of its employees, agents, vendors, subcontractors etc.

### 15.5. Term of the Contract Agreement

1. Contract term shall be a period of **140 months** from the date of Signing of Contract including total implementation period 20 Months) and O&M period (120 months from date of Go-Live).
2. In the event of implementation period gets extended beyond 20 months, BTD reserves the right to extend the term of the Agreement by corresponding period to allow validity of contract for 140 months from the date of successful Go-Live.
3. In the event of such an extension, BTD shall not reimburse the bidder for the any expenses incurred, unless explicitly agreed by BTD in writing. BTD's decision in this regard shall be final and binding on the Successful Bidder.
4. BTD may direct the Successful Bidder/s to extend the validity of the Security Deposit / Performance Bank Guarantee and Successful Bidder is bound to accept the same.

## 16. Taxes

1 BTD shall be responsible for deducting / withholding taxes from the amounts due and payable to the Successful Bidder wherever applicable. The Successful Bidder shall pay for all other taxes in connection with the resultant MSA (including SLA, scope of work and any other engagement required to be undertaken as a part of the resultant MSA), including, but not limited to property, sales, excise, value-added, goods and services, consumption and other similar taxes or duties.

2 Unless explicitly provided for, all payment to the MSI shall be deemed to be all inclusive.

3 BTD shall provide Successful Bidder with the original tax receipt of any deducting / withholding taxes paid by BTD on payments under the resultant MSA. The Successful Bidder agrees to reimburse and hold the BTD and any other stakeholder harmless from any deficiency including penalties and interest relating to taxes, which are Successful Bidder's responsibility. Such taxes shall include taxes incurred on transactions between and among the BTD, the Successful Bidder, any other stakeholder department and third-party subcontractors, existing vendors etc.

4 The rates quoted by the Successful Bidder ("Agency") shall remain constant throughout the contract period. Any change in any taxes, levies etc. as per prevailing law, shall be appropriately considered.

5 Both Agency and BTD shall cooperate to enable each other to accurately determine its own tax liability and to minimize such liability to the extent legally permissible. In connection therewith, both Agency and BTD shall provide each other with the following:
   (i) Any resale certificates;
   (ii) Any relevant information regarding out-of-state / out-of-country or use of materials, equipment or services; and
   (iii) Any direct pay permits, exemption certificates or information reasonably requested by the other Party.

## 17. Liability towards BTD

The Successful Bidder's / Bidder's liability under the resultant Contract Agreement shall be determined as per the Law in force for the time being. The Bidder / Successful Bidder shall be liable to the BTD for loss or damage occurred or caused or likely to occur on account of any act of omission on the part of the Bidder / Successful Bidder and its employees, including loss caused to BTD and / or any other stakeholder department or any third party, on account of defect in goods or deficiency in services on the part of Bidder / Successful Bidder or his agents

or any person / persons claiming through or under said Bidder / Successful Bidder. The maximum liability of the Successful Bidder shall be limited to 50% of the total quoted and accepted CAPEX cost, as approved and agreed by BTD.

**18. Performance Security**

**a.** Within **15 days** of the receipt of Letter of Intent (LoI) from the BTD, the Performance Security in the form of BG / DD shall be submitted in the form of an irrevocable Bank Guarantee issued by a Nationalised or Scheduled Bank in favour of "**State Transport Commissioner, Department of Transport, Bihar"** , as per the format set out in as per the format in **Annexure Set IV - Annexure 2** by the **Bidder (Lead bidder in case of consortium).**

**b. The Successful Bidder shall furnish a Performance Security equivalent to five percent (5%) of the total CAPEX value** (as quoted by Successful Bidder and duly agreed by the BTD), valid up to six (6) months after the Complete Project Go-Live date and will be returned only after the submission of O&M performance security.

c. **Upon achievement of Project Go-Live, the MSI shall submit a fresh Performance Security equivalent to five percent (5%) of the total OPEX value** (as quoted by Successful Bidder and duly agreed by BTD), which shall remain valid for the entire duration of the Contract (including any extensions thereof) and for a further period of six (6) months thereafter.

d. The Performance Security shall be from a Nationalized / Scheduled bank having Head Office in India.

e. The Successful Bidder may be asked by the BTD to extend the validity of Performance Security to ensure the Terms and Conditions of the Contract are met with and Successful Bidder is bound to accept the same.

f. The Performance Security shall be discharged to the Successful Bidder 6 months after successful completion of project after deducting penalties if any as applicable. The project will be considered completed when Successful Bidder has discharged of all obligations as per the contract and terms and conditions.

g. The Earnest Money Deposit submitted by the Bidder along with the bid, shall be returned to the Successful Bidder in exchange of Performance Bank Guarantee. No interest shall be payable on the Earnest Money Deposit so returned.

h. Prior to expiry of the Performance Security, within the contract period, BTD may direct the Successful Bidders to extend the period of validity of Performance Security for a specified additional period. The Bidder shall be required to comply with such directions of BTD.

i. No interest shall be payable on any Performance Security whatsoever.

**j. The Performance Security shall be forfeited and en-cashed either wholly or partly, inter alia, in the following cases:**

i. If the Successful Bidder withdraws from the project midway during the project term,

ii. If during the project term, there is any incident of gross professional negligence resulting in delayed service, or adversely affecting the quality of the work.

iii. Any act or acts of the successful bidder which render the project un-operational and BTD establishes sufficient reasons to forfeit the Performance Bank Guarantee.

iv. Successful Bidder defaults on any conditions(s) laid in this document, or breach SLAs as defined in the RFP or violated of any provision of the Contract Agreement.

v. Successful Bidder is found to have made misleading or false representation in the forms, statements and attachments submitted or attached to the bid, or,

vi. The bidder (including all consortium members, sub-contractors etc.) is found indulging in corrupt or fraudulent practices as described in **Clause 21** under "Instructions to Bidders".

vii. If the successful bidder, fails to submit the O&M PBG

## 19. Conflict of Interest

i. A **Bidder (all members in case of consortium)** shall not have a conflict of interest that may affect the Selection Process or the Implementation or Operations process for the entire process (the "Conflict of Interest").

ii. Any Bidder / member found to have a Conflict of Interest shall be disqualified. In the event of disqualification, BTD shall forfeit the EMD / Performance Security for damages payable to the BTD for the time, cost and effort of the BTD including consideration of such Bidder's Bids, without prejudice to any other right or remedy that may be available to the BTD hereunder or otherwise.

iii. BTD requires that the Successful Bidder provides solutions which always hold BTD's interest paramount, avoid conflicts with other assignments or its own interests, and act without any consideration for future work. The Successful Bidder shall not accept or engage in any assignment that would conflict with its prior or current obligations to other clients, or that may place it in a position of not being able to carry out the assignment in the best interests of BTD.

iv. The Successful Bidder shall disclose to the BTD in writing, all actual and potential conflicts of interest that exist, arise or may arise in due course of performing the Services as soon as it becomes aware of such a conflict. Successful Bidder shall hold BTD's interest paramount, without any consideration for future work, and strictly avoid conflict of interest with other assignments

v. Without limiting the generality of the above, a Bidder shall be deemed to have a Conflict of Interest affecting the Evaluation and Selection Process, if:

   i. the Bidder and any other Bidder or have common controlling shareholders or other ownership interest; provided that this disqualification shall not apply in cases where the direct or indirect shareholding or ownership interest of a Bidder, its Member or Associate (or any shareholder thereof having a shareholding of more than 5 per cent of the paid up and subscribed share capital of such Bidder, Member or Associate, as the case may be) in the other Bidder, its Associate is less than 5% (five per cent) of the subscribed and paid up equity share capital thereof. For the purposes of this Clause, indirect shareholding held through one or more intermediate persons shall be computed as:
      - where any intermediary controlled by a person through management control or otherwise, the entire shareholding held by such controlled intermediary in any other person (the "Subject Person") shall be considered for computing the shareholding of such controlling person in the Subject Person;
      - where a person does not exercise control over an intermediary, which has shareholding in the Subject Person, the computation of indirect shareholding of such person in the Subject Person shall be undertaken on a proportionate basis; provided, however, that no such shareholding shall be reckoned under this Sub-clause if the shareholding of such person in the intermediary is less than 26% (twenty six per cent) of the subscribed and paid up equity shareholding of such intermediary; or

   ii. constituent of such Bidder is also a constituent of another Bidder; or

   iii. such Bidder or its Associate receives or has received any direct or indirect subsidy or grant from any other Bidder or its Associate; or

iv. such Bidder has the same legal representative for purposes of this Application as any other Bidder; or

v. such Bidder has a relationship with another Bidder, directly or through common third parties, that puts them in a position to have access to each other's information about, or to influence the Application of either or each of the other Bidder; or

vi. There is a conflict among this and other solution and services assignments of the Bidder (including its personnel and other members, if any) and any subsidiaries or entities controlled by such Bidder or having common controlling shareholders. The duties of the Successful Bidder shall depend on the circumstances of each case. While providing implementation and related solutions to the BTD for this assignment, the Agency shall not take up any assignment that by its nature shall result in conflict with the present assignment; or

vii. A firm hired to provide solution and services for the implementation of a project, and its Members or Associates, shall be disqualified from subsequently providing goods or works or services related to the same project

vi. A Bidder eventually appointed to implement the solutions for this Project, its Associates, affiliates and the Financial Expert, shall be disqualified from subsequently providing goods or works or services related to the implementation and operation of the same Project and any breach of this obligation shall be construed as Conflict of Interest; provided that the restriction herein shall not apply after a period of 12 months from the completion of the contract period; provided further that this restriction shall not apply to solutions delivered to BTD in continuation of this systems implementation or to any subsequent systems implementation executed for the BTD in accordance with the rules of the BTD.

vii. All the Bidders shall give an undertaking as per **Annexure Set I – Annexure 6** for not having any conflict of interest and shall also disclose to the BTD in writing, all actual and potential conflicts of interest that exist, arise or may arise in due course of performing the Services as soon as it becomes aware of such a conflict.

### 20. Corrupt or Fraudulent Practices

The Bidders, Successful Bidder and their respective officers, employees, agents and advisers shall observe the highest standards of ethics during tender submission, evaluation, contract execution and project implementation, operations for the entire contract period. Notwithstanding anything to the contrary, contained in this RFP, the BTD shall reject a Bid or forfeit PBG or/and terminate without being liable in any manner whatsoever to the Bidder, if it determines that the Bidder has, directly or indirectly or through an agent, engaged in corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice (collectively the "Prohibited Practices") in the Selection Process. For the purposes of this provision, the terms are defined as follows:

a. **"*corrupt practice*"** means (i) the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the action of any person connected with the Selection Process (for avoidance of doubt, offering of employment to or employing or engaging in any manner whatsoever, directly or indirectly, any official of the BTD who is or has been associated in any manner, directly or indirectly with the Selection Process or the LOI or has dealt with matters concerning the Agreement or arising there from, before or after the execution thereof, at any time prior to the expiry of one year from the date such official resigns or retires from or otherwise ceases to be in the service of the BTD, shall be deemed to constitute influencing the actions of a person connected with the Selection Process); or (ii) save as provided herein, engaging in any manner whatsoever, whether during the Selection Process or after the issue of the Letter of Intent or after the execution of the Agreement, as the case may be, any person in respect of any matter relating to the

Project or the LoI or the Agreement, who at any time has been or is a legal, financial or technical consultant / adviser of the BTD in relation to any matter concerning the Project;

b. ***"fraudulent practice"*** means a misrepresentation or omission of facts or disclosure of incomplete facts, in order to influence a procurement / selection process or an execution of a contract to the detriment of the BTD, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the BTD of the benefits of the free and open competition.
c. **"*Coercive practice*"** means impairing or harming or threatening to impair or harm, directly or indirectly, any persons or property to influence any person, participation or action in the Selection Process;
d. **"*Undesirable practice*"** means (i) establishing contact with any person connected with or employed or engaged by BTD or other relevant stakeholders including the Smart City, Traffic Police, or any existing service providers to the BTD, with the objective of canvassing, lobbying or in any manner influencing or attempting to influence the Selection Process; or (ii) having a Conflict of Interest; and
e. **"*Restrictive practice*"** means forming a cartel or arriving at any understanding or arrangement among Bidders with the objective of restricting or manipulating a full and fair competition in the Selection Process.

The BTD will reject a bid for award if it determines that the bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the said project. In such an event, the BTD shall, without prejudice to its any other rights or remedies, forfeit and appropriate the Bid Security (EMD) or Performance Bank Guarantee as mutually agreed genuine pre-estimated compensation and damages payable to the BTD for, inter alia, time, cost and effort of the BTD, with regards to the RFP, including consideration and evaluation of such Bidders Bids.

Without prejudice to the rights of the BTD under Clause above and the rights and remedies which the BTD may have under the LOI or the Agreement, if an Bidder or Implementation Agency (Agency), as the case may be, is found by the BTD to have directly or indirectly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice during the Selection Process, or after the issue of the LOI or the execution of the Agreement or implementation of the project, such Bidder or Successful Bidder (Agency) may not be eligible to participate in any tender or RFP issued by the BTD during a period of 2 (two) years from the date such Bidder or Successful Bidder (Agency), as the case may be, is found by the BTD to have directly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice, as the case may be.

# SCOPE OF WORK
# Part IB

# Scope of Work

Bihar state, and major cities in particular identified under Rule 167A of CMVR 1989, amidst its rapid urbanization, has witnessed a substantial increase in both population and vehicular traffic over the past few decades. Also, in rural areas of the state, the traffic norms are not much followed due to lack of awareness, and insufficient resources for enforcement. The increase in population has been accompanied by a substantial rise in the number of vehicles on the road. The rapid urbanization, low awareness and vehicular growth have led to increased traffic congestions, longer commute times, and greater demand for efficient traffic management solutions. Additionally, vehicles from outside state including commercial vehicles from other states ply throughout the day from key highways and roads. The state has challenges with regard to mining vehicle's nuisance which ply on the road with non-compliance, the drivers which are not authorized to drive hazardous vehicles, as well as challenges with regard to tax theft through these vehicles.

To counter these challenges, the authorities in Bihar State have started planning better Traffic Management in the city by leveraging latest technologies. The Bihar Transport Department has envisioned a project "Electronic Enforcement of Road Safety (EERS) / Intelligent Traffic Management System (ITMS)" for the city. It is an endeavour for integrated approach for traffic enforcement in the state. The ITMS project envisions to implement fresh traffic enforcement infrastructure in the city and on the Highways in the district of Bihar State and connect them with central server for implementing centrally controlled ITMS system. The project also intends to cover major junctions, and road of the city and State Highways with Violation Detection Systems for automatic enforcement such as Red-Light Violation, Speed Violation, No Helmet, Triple seat riding, Seat-belt detection, mobile phone detection, document related violations etc.

Certain area of these district and cities are equipped with CCTV Cameras, and other traffic infrastructure. The Bihar Transport Department envisages to co-use maximum possible infrastructure such as Standard and Cantilever Poles, Gantries as well as CCC etc. so as to maximize the utilization of existing Non-IT assets, saving on the cost. However, the MSI shall note that entire IT infrastructure such as Camera, Radar, Switches, Servers etc. shall be freshly deployed under this project, unless explicitly approved otherwise in writing by BTD.

The selected Master System Integrator (MSI) shall be responsible for the design, supply, installation, commissioning, integration, operation and maintenance of a comprehensive Intelligent Traffic Management System across identified locations in the State of Bihar.

**The functional scope (irrespective of MSI Payment Eligibility) shall cover the following components:**

- Automated Violation Detection (speed, No-helmet, seatbelt, triple riding, mobile usage, wrong-lane driving, suspected overload vehicles etc.).
- Automatic Number Plate Recognition (ANPR) with high accuracy integrated with NIC's Vahan portal.
- Detection of ANPR and cross-checking with Mining Department database for registered vehicles.
- Verification of valid e-Way Bill with the help of ANPR
- Identification and Cross validation of vehicle associated with valid e-Way Bill for authorized vehicle.
- Integration with NIC's e-Challan System for auto-generation and processing of challans.
- Implementation of other components such as Public Announcement System, Variable Message Signboards etc.

- Evidence Management System for secure storage and retrieval.
- Incident detection and integration with existing systems of the state including Dial 112.
- Central Command & Control System with dashboards, analytics, and reporting.
- Multiple Viewing Centres across the state (at least one per district)
- User Interfaces & Web portals for Department, Police and citizens.

The total minimum quantity of field components is indicatively defined in the RFP. MSI shall conduct a survey on all the identified locations and submit a report with proposed locations, identified solution and implementation and operations plan, keeping the total quantity as per BoQ. MSI shall not restrict its offering to the total quantity / type of components / system and may propose any other solution beyond the proposed BoQ and RFP scope. MSI shall ensure all the recommendations of the BTD are incorporated and only after approval from the BTD, shall commence the work. All the required and necessary civil work, infrastructure, cameras, sensors, network, video analytics application etc. as detailed in this RFP and required for the project, shall be the responsibility of the Successful Bidder.

The project shall connect all the field locations, CCC and Viewing Center with a robust network, either through MPLS or ILL. In case the MPLS / ILL lines are not available at any particular location, MSI may propose optical fibre /wireless /Broadband / 4G / 5G or mix connectivity..

The project shall connect all the field locations, CCC and Viewing Center with a Grid Power Line for electricity. In case the grid power line is not available at any particular location, the Bidder may opt for using Solar power. Such locations may not be more than 10% of total locations and shall be only after explicit approval of BTD.

The MSI shall provide necessary manpower, tools and accessories to maintain the system as per requirement of the RFP and to maintain the SLA throughout the contract period. MSI shall provide all the services related to hosting, electricity (as applicable), network and security and ensure to clear all the third-party utility bills on time. The MSI shall be responsible for Training & Capacity Building for officials and staff. The MSI shall ensure compliance with Motor Vehicles (Amendment) Act, 2019, MoRTH guidelines, and relevant standards.

The RFP document details the scope of work for the MSI and the functional and non-functional requirements. However, these details are indicative and in no manner be treated exhaustive. The MSI shall be responsible for all the necessary equipment, accessories, components, software, hardware, manpower etc. required for the successful implementation of the project, irrespective of whether it is defined in this RFP document or not. This project will integrate various subsystems (Surveillance Camera, Variable Message Signs, Public Announcement System etc.) in a coherent single interface to provide real-time data on the same. Thus, a system such as ITMS shall aim to help police /other stakeholder departments to take proactive/ reactive measures and ensure a safe & smooth environment on road.

## 1. Brief scope of Work

The Successful Bidder shall be the Master System Integrator for the Designing, Supplying Implementation, Integration of the systems in the state under the Project. The Successful Bidder shall also operate and maintain the same for a period of 10 years from date of Complete Project Go-Live. All the required hardware and software solutions to keep the ITMS system secured and operational shall form part of the scope of the MSI. The MSI shall be responsible for Procurement (including packing, transportation, insurance, custom clearance, port clearance and handling, inland transportation, inland transit insurance and delivery to site), Installation, integration, commissioning, operations, and maintenance of:

| Type of Work | Indicative Minimum Scope for the MSI |
|---|---|
| **Field Components, and Civil Infrastructure** | • The MSI shall be required to execute below activities for various components such as various Violation Detection System (VDS), Surveillance System, verification of valid e-way bills, Variable Message Signboards, Public Announcement systems etc.<br>• Conduct Field Surveys, installation of cameras, other sensors, LPUs, ANPR systems, provisioning of electricity (power), electric cabling, network cabling, UPS, junction box, required civil infrastructure like Poles, cantilever, gantries and other non-IT components etc.<br>• The minimum indicative list of the components for the project are defined in the subsequent sections. |
| **Integrated Traffic Management Center** | • The entire ITMS system be integrated, managed, and monitored through Integrated TMC by hosting various applications, including network monitoring systems.<br>• Integration with existing equipment and components like video wall, workstations, network etc.<br>• Installation of other components like printers, workstations etc. |
| **Viewing Center** | • The BTD envisages to establish multiple small Viewing Centres across the state with one / two LED Screens and One / Two Workstations as per detailed provided in the RFP. |
| **Software and Security** | • Development, Installation, Integration, and commissioning of various applications including TMC Application, Video Management & Analysis applications, Asset Management, Network Monitoring, SLA Management, Security applications etc. with integration capabilities with 3rd party systems such as Vahan, Sarathi, eChallan, GST, CCTNS, Dial 112, SMS, email gateway etc.<br>• Applications for data backup and recovery, access control, analytical tools, dashboards, data and network management tool etc.<br>• Detailed and summary reports including usage of all systems, components, network, DC and DR, collection, authorized usage etc. |
| **Data Center and Data Recovery Centre** | • The MSI will be responsible for hosting all the application and data center either on-premise or on Cloud as per requirements defined in the RFP. For the on-premise DC, BTD shall provide space as-is where-is basis anywhere in state of Bihar.<br>• Establishment of complete Data Center with primary power, HVAC, access control, DG Set, UPS, networking components, bandwidth provision etc., including any civil works such as false flooring, false ceiling, partitioning, furniture, access control etc. shall be sole responsibility of the MSI.<br>• The available physical space is limited and hence MSI (during bidding) is expected to visit the site and understand the ground situation before |

| Type of Work | Indicative Minimum Scope for the MSI |
|---|---|
| | proposing any solution.<br>• The DR is proposed to be on the cloud in India in different seismic zone through MeITY empanelled cloud service provider complying with all guidelines of the country and the state.<br>• MSI shall be responsible to ensure timely and adequate Backup, conduct DR Drill, Security of the data and applications hosted and other operational requirements with respect to DC-DR. |
| **Repair, Maintenance and Upgrade** | • MSI shall ensure that during the entire contract period all equipment are well maintained and are supported by OEM warranty support. **Any equipment approaching end of life cycle as per its OEM's policy, should be replaced with new equipment, at no extra cost to BTD as per terms defined in the RFP.** Any technology upgrade, replacement of hardware, software etc. required for the same, shall be provided by MSI at no extra cost to BTD.<br>• Provide regular preventive maintenance and corrective maintenance of all the hardware, software, solutions, components, cables, security components, network components, civil and infrastructure etc.<br>• Provide replacement of any component if not repairable and keeping stock of minimum number of spare components as described.<br>• Necessary manpower and tools for repair and maintenance.<br>• Add components, equipment and other ancillary hardware and integrate with the current system in case of system upgrade.<br>• Manage the co-used components to clearly divide the responsibility and the costs towards repair and maintenance of the same throughout the contract period. |
| **Manpower** | • Deploy required manpower for implementation, installation, commissioning, operations, and maintenance etc.<br>• Manpower indicatively includes operators for TMC, viewing center operators, repair & maintenance staff, field technicians, including technical and managerial staff as detailed in the RFP document for the entire project period. |
| **Capacity Building and Knowledge Transfer** | • Train the authorities and officials from time to time for effective usage of system, mobile app and various other solutions and applications.<br>• To provide all manuals, data sheets, technical sheets, technical manuals, maintenance and repair manuals, spare part manuals etc. to the BTD in soft and hard copies in English language.<br>• To ensure complete knowledge transfer of operations, repair, and maintenance to the BTD and its nominated agency from time to time and at the completion of the project. |

## 2. Solution Scope

MSI shall be responsible to implement various components and solutions for ITMS Project. Following table indicates broad level Solution Requirements with respect to ITMS project.

| Solution | Indicative Solutions / Components | Broad Level Solution Requirements |
|---|---|---|
| **Traffic Enforcement** (Violation Detection and Management) | • Speed Violation<br>• Red Light Violation and Stop Line<br>• Seat Belt and Mobile Phone violation<br>• Wrong Way Driving<br>• Triple Seat Driving<br>• Without Helmet Driving<br>• Non-standard number plate<br>• Fitness expire, tax due, Insurance, PUC, permit non valid etc.<br>• Other violations as defined in the RFP | • Ability to capture number plates and detect numbers automatically.<br>• Ability to define various violations in the system with multiple parameters.<br>• MSI must detect all such violations through technologies like Video Analytics etc., and it should have manual intervention only for verification and approval by the Enforcement Authorities. MSI is not expected to deploy people to validate the violations generated by the system and maintain the SLA requirements of the automatics violation detection systems.<br>• Appropriate alarm at the TMC, responder's mobile app etc.<br>• Ability to define SOP and take appropriate actions.<br>• Ability to gather evidence, integrate with NIC's ITMS and eChallan systems for issuance of challan and maintain records of violation, penalty and realization etc. |
| **e-Way Bill Verification System with ANPR** | • Lane-wise vehicle identification<br>• Real-time e-Way Bill verification<br>• Evidence capture and storage<br>• Alert generation to TMC and respective enforcement squads | • To Automate identification of goods-carrying vehicles at highway check posts<br>• Ability to verify valid e-Way Bills for vehicles crossing multiple state boundaries and internal checkpoints.<br>• Ability to Detect and act upon tax evasion and non-compliance<br>• Enable real-time enforcement without stopping traffic<br>• Create evidence - based audit trails for legal and revenue actions<br>• Provide centralized visibility at the TMC. |
| **Traffic Violation Penalty Collection** | • NIC's ITMS and eChallan system | • Ability push the details of approved violations to NIC's ITMS system to generate challans along with photo / link evidence. |
| **Ancillary Components** | • Variable Messaging System (VMS) | • Deployment of VMS at defined locations<br>• Provide static and dynamic messages to the commuters based on any incidents, violation etc. (modalities to be defined at later date) |

| Solution | Indicative Solutions / Components | Broad Level Solution Requirements |
|---|---|---|
| | | • Provision for publishing Road Safety messages, ground traffic conditions updates on VMS boards.<br>• Provision to run commercial ads and revenue generation. |
| | • Public Announcement System | • Provide interface at TMC to make necessary announcement to the citizens remotely.<br>• Capable for announcing pre-recorded as well as live messages |
| **Officer's Interface** | • Traffic Control Center (TMC / ICCC)<br>• Web-portal<br>• Mobile App for Officials | • Ability to view video feeds on the Video Wall as well as Workstations and web-portal in various formats & combinations<br>• Ability to select a particular sensor or camera for detailed view from the list or from the GIS based map and drop down menu.<br>• Define SOP, take actions as per the requirements<br>• Zoom into the video, control of cameras.<br>• Monitor all the assets, resources, system user logins, infrastructure including field components, network, DC-DR etc. for appropriate actions.<br>• Monitor entire system for security aspects and take appropriate action.<br>• Display web-based dashboard with various reports, MIS in tabular, graphical and multiple other manner, with ability to select parameters dynamically.<br>• Manage incidents through mobile app. |
| **Supporting Infrastructure** | • Hosting and Storage<br>• Network and Bandwidth<br>• Security Infrastructure and IT Audit<br>• Electricity Supply and Power back up Requirements<br>• Poles and Gantries<br>• Signboards | • The MSI shall host the ITMS solution at on-premise Data Center (and DR on the Cloud) as per the system architecture prepared by MSI and approved by BTD.<br>• All the timely payments of the utilities and recurring services, SLA requirements, sizing, hosting procedure, DR Drill, backup, security and all other operational aspects shall be responsibility of MSI.<br>• MSI shall provide for connectivity, including last mile connectivity for all the component, to the city-wide network backbone.<br>• MSI shall provide bandwidth for various services, including network at TMC, network for DC-DR connectivity etc.<br>• All the security components for protecting entire ITMS system against |

| Solution | Indicative Solutions / Components | Broad Level Solution Requirements |
|---|---|---|
| | | any threats in the form of any software, hardware, regular updates and patches shall be responsibility of MSI.<br>• All the scope related to provisioning for electricity (power) to all the devices, equipment, wiring, cabling, earthing requirements for ITMS system shall be sole responsibility of MSI as per terms defined in RFP.<br>• Provisioning for power backup for all field components through UPS, and TMC through UPS, DG Set etc. shall be sole responsibility of MSI.<br>• Erection of all the poles, cantilever poles, gantries shall be responsibility of MSI. |
| **External Integrations Capabilities** | • NIC's eChallan<br>• Vahan and Sarathi Integration<br>• Integration with emergency vehicles<br>• SMS integration<br>• Integration with Mining Department database.<br>• Integration with Bihar e-Way Bill Portal<br>• Integration with Dial 112<br>*Entire responsibility of the integration shall be of the MSI.* | • The VDS system shall be integrated with eChallan application.<br>• The ITMS system shall be integrated to capture location related details of emergency vehicles.<br>• MSI shall provide capabilities to integrate with various other 3rd party applications such as SMS gateway, IM (e.g. WhatsApp) etc.<br>• MSI shall carry out such integration with any 3rd party app and department's database (like mining and Bihar e-way bill portal) as and when directed by BTD at no extra costs.<br>• The scope of such integration shall be defined by BTD on case-to-case basis. |
| **Software Applications** | • Command and Control Center Application (at TMC) with geo-mapping.<br>• ITMS application<br>• Video Management Software (VMS) and Recording Server<br>• Video Analytics Software (VAS)<br>• Enterprise Management System including Alarm Management, Assets Management, SLA Management etc.<br>• Network and Security Management<br>• Server and Storage Management | • A Video wall and operator terminals for centralized monitoring, controlling, and managing all ITMS project related activities in real time and taking various decisions during project execution.<br>• Ability to view, record, perform operations like zoom, cut, save etc. on live video or recorded.<br>• Ability to automatically perform video analysis to detect violation, incidents etc. generate alert and provide for appropriate actions like messages, dispatch etc.<br>• A centralized dashboard for depicting updates of ITMS project.<br>• A centralized interface for monitoring Network, Hosting (DC and DR) and Security aspects of the project.<br>• A centralized interface for monitoring all applications and services for the ITMS. |

| Solution | Indicative Solutions / Components | Broad Level Solution Requirements |
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| | • Web Portal and Mobile App | • A centralized interface for all project metric, trend analysis etc. |
| **MIS and Reports** | • Tabular, Graphical and various other formats<br>• Static pre-defined as well as dynamic reports<br>• Export options in various formats (BTD design requirement for PDF, CSV and Spreadsheet etc.)<br>• Reports of multiple parameters | • The MSI shall provide various Management Information System reports, pre-defined and dynamically generated reports as per requirements of BTD from time to time.<br>• Such reports shall be in various required format such as tabular, graphical etc.<br>• Reports shall be about various parameters such as vehicle counts, violation count, challans generated, payment received, ITMS project's assets and resources report, and other reports as per requirements of BTD from time to time.<br>• Such reports shall be available on various platforms such as web portal, at TMC, mobile app for responders etc. as directed by BTD from time to time. |

## 3. Violation Detection System (VDS)

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| **Functional Requirements** | • All the Violation Detection System shall be fully encrypted and non-intrusive. The system shall have appropriate certified technology with proper test reports, certificates. **The MSI shall clearly propose the system as a part of Technical Bid.**<br>• System shall be able to detect violations as per defined rules.<br>• The system shall have provision at Traffic Management Center (TMC) to centrally define the criteria such as minimum speed, maximum allowed speed etc. for alert on speeding which shall be configurable for all or specific set of systems. All vehicles passing through the control section at a speed greater than a determined speed limit, by a specified margin, shall be detected as violation.<br>• The system shall allow speed limit / threshold configuration for different lanes, different time of the day or any other parameter as per requirement of the BTD or Traffic Police.<br>• The system shall have capability of capturing multiple infracting vehicles simultaneously, irrespective of class of vehicle.<br>• System shall automatically detect the lane on which vehicle is driven.<br>• System shall be able to classify between **minimum 6 types of vehicles** (Light Motor Vehicle - Car, Heavy Motor Vehicle - Truck, Light and Medium Vehicle Truck, Bus, Two-Wheeler, Three-Wheeler etc.)<br>• **Multiple Violation**<br>o Multiple violation on same vehicle on the same day shall be highlighted on the portal for BTD / Traffic Police officials to verify. This will assist the officials to check the same and decided whether or not given exemption (e.g. if challan for no-helmet is issued on same day earlier, re-detection may not need new challan)<br>o Multiple violations of same type on same vehicle may be exempted.<br>o Multiple violation of different type on same vehicle may need to be captured under same Challan in NIC's system.<br>• All the Violation Detection System along with its cameras etc. shall be able to maintain same accuracy of detection and evidence during the nighttime as daytime. For ANPR, accuracy during the nighttime shall be as defined in the RFP. All necessary IR, lighting requirement shall be sole responsibility of the MSI, at no additional cost to BTD.<br>• VDS shall be coupled with Automatic Number Plate Recognition (ANPR) System which shall help determine registration number of the vehicle for issuance of challan and any other purpose.<br>• In case the ANPR fails to recognize the registration number, it must be possible to manually enter the registration number of the violating vehicle, validated by two matching images of registration plate.<br>• The system shall capture, and process registration number of each vehicle identified for violation using ANPR system.<br>• The system should ensure maximum violation detection rate also for vehicles plates that are not readable with ANPR systems, for example broken plates, dirty plates, other languages, nonstandard plates.<br>• The violation detection and accuracy should not vary on the basis of the type of plate, height of plate, nature of plate etc. The systems would have proper simulators to cross check the system during tests.<br>• **The system shall have image processing abilities to:** |

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| | ○ match registration plates for all types of vehicles, independent of ANPR, and thus providing very high detection rate.<br>○ Highlight the vehicle on which the challan is issued.<br>○ blur certain parts of the image for privacy reasons, such as the registration plate of any other vehicle.<br>○ ensure clear images including illumination of registration plate<br>○ capture the violation image under low light and low visibility conditions and night-time, irrespective of weather conditions, using IR illuminator and / or any other technology.<br>• The system should be equipped with a camera system to record a digitized image and video frames of the violation, covering the violating vehicle with its surrounding.<br>• System shall produce minimum **two to three images** relative to any vehicle in violation along with video evidence.<br>• Basic image viewing tools (Pan, zoom etc.) should be provided for the displayed image without edit options.<br>• The system shall be equipped with IR Illuminator and / or any other technology to ensure clear images including illumination of the registration plate and capture the violation image under low light and low visibility conditions and at nighttime. The system should perform in rain, bad weather & day and night conditions.<br>• Each location shall have two or more (at least two) necessary signboards such as "you are under surveillance", "<defined speed limit>" for the stretch of road etc.<br>• Image should have a header and footer depicting the information about the site IP and violation details like date, time, equipment ID, location ID, GPS, Unique ID of each violation, lane number, Registration Number of violating vehicle & violation type of violating vehicle etc.<br>• System shall also have provision to define SOP dynamically, for different CoVs, corridors or for any other parameter including providing exemption in certain cases.<br>• System shall provide for setting thresholds for a violation, setting up exemptions for certain vehicles or type of road or at certain time of day.<br>• Seamless integration with the NIC's eChallan Application for vehicle and driver info and challaning.<br>• As per the criteria, the system shall alert the TMC operators to validate and book a violation against a vehicle based on an approved SOP.<br>• Shall have provision to automatically, or if directed by BTD / Traffic Police, manually (after confirmation from official) confirm the violation and share the details with the NIC's eChallan App (or NIC's ITMS app) for further processing of challan.<br>• BTD may direct the MSI to provide Auto- Authentication of captured suspected violations (along with number plate) based on AI enabled system confidence check to reduce efforts of TMC operators. MSI shall ensure to implement the same as per requirement of BTD anytime during the contract period.<br>• Ability to auto generate reports as per requirements.<br>• System will be synced using NTP (or GPS if NTP unavailable for a particular location) time synchronization for accurate readings.<br>• Violation detection systems shall be in line with road safety standards complying with norms of road safety regulations and enforcement standards (which can stand in court of law in India) |

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| | • **CE and homologation certificate from Ministry of Transport / ARAI / ICAT/ VRDE / GARC / OIML D11 / IEC / OIML R91 etc. or equivalent department from respective country of origin (in English) or Certificate from internationally accredited organization (approved for speed calibration and for India) shall be submitted.**<br>• System must be approved by relevant authorities such as traffic or infrastructure department and provided with proper test and calibration reports & certifications that can stand in court of law in India.<br>• **MSI shall be required to coordinate with Transport Department and Traffic Police to obtain appropriate certification under Rule 167A. Electronic Monitoring and Enforcement of Road Safety, CMVR, 1989 as amended from time to time.**<br>• Certain locations in the state are already equipped with similar systems like VDS. BTD may direct the MSI to integrate such system to manage the maximum challans per day to the same vehicle. However, any challans generated by such pre-existing integrated systems shall not be eligible for the payment to the MSI.<br>• MSI shall ensure adherence to NHAI Policy Circular No. 11.53/2023 dated 10 Oct 2023, as amended from time to time. |

### 3.1. Speed Violation Detection System

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| **Business Requirements** | • BTD envisages to implement speed enforcement at identified locations, generally mid-block locations on highways, or certain sections of the city (such as flyover), where there is a possibility of over speeding of the vehicles.<br>• The speed enforcement shall be spot speed detection systems as well as Average Speed Detection at the location specifically identified for over speeding.<br>• Certain Spot Speed Detection System and other violation Detection systems as per requirement of the BTD, and quantity as defined in the BoQ shall also capture average speed of all the vehicles.<br>• MSI shall be responsible to do the road marking (lane markings paint) at all locations on all lanes upto 100 meters regularly throughout the project period, as per scope defined in the Clause 11 under “Project Activities”. |
| **Functional Requirements** | • The Spot Speed Detection System shall be used to determine speed of a vehicle at a given spot. Radar based speed detection is envisaged for the project.<br>• The system shall be able to detect an over-speeding or under-speeding vehicle and perform action as per the defined SOP.<br>• All vehicles passing through the control section at a speed greater than a specified limit, by a specified margin, shall be detected as violation.<br>• The system should be equipped with a camera system to record digitized images and video frames of the violation, covering defined lanes on each approach arm at any point of time simultaneously with relevant data about the offence, violating vehicle with its surrounding.<br>• The system shall have capability of capturing multiple infracting vehicles simultaneously, with vehicle detection rate, accuracy etc. as defined in the SLA even at speeds up to 150 kmph, under all light, weather, and other adverse conditions. |

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| | • **System shall have provision for setting speed thresholds by classification of vehicles**. The system shall have provision at TMC to define the criteria such as minimum speed, maximum allowed speed etc. for alert on speeding which shall be configurable for all or specific set of systems. The criteria can be pre-defined as well as should be able to define dynamically, for different speed limits, different class of vehicle, or for any other parameter, solely at the discretion of the BTD.<br>• The system shall be able to detect speed of a vehicle which is over-speeding even for vehicle changing lanes and shall be irrespective of class of vehicle, height of vehicle etc.<br>• The system shall capture complete lane wise junction behaviour viz. Speed of violating vehicle, notified speed limit, defined speed threshold condition, Speed Violation with ANPR system.<br>• The system shall allow speed limit / threshold configuration for different lanes, different time of the day or any other parameter as per requirement of the BTD and Traffic Police.<br>• Speed data, image proof, location and exact position should be properly encrypted and all data including photo & video should be watermarked.<br>• **Average Speed Detection:**<br>o The system shall be able to detect vehicles' average speed, between two locations or for a stretch of the Highway or between two junction.<br>o The average speed detection system shall capture location, time and registration plate **of each passing vehicle**. For each vehicle, the system shall capture average speed with multiple camera between two defined locations. In case any violation is detected, appropriate alerts may be generated as per requirements and defined SOP at CCC. In case there is no violation detected for a particular vehicle till the end of the journey, the data shall be deleted as per general and defined SOP.<br>o The average speed detection system should be synced using NTP/GPS time synchronization for accurate readings.<br>o System shall be able to detect average speed of each vehicle, irrespective of class of vehicle, height, location, time etc. |
| **Accuracy** | • **Spot Speed Violation Detection System Accuracy (Day and Night):**<br>$\pm$ 2% for < 100 KMPH<br>$\pm$ 5% for > 100 KMPH<br>for at least 98% vehicles passed through the system. |
| **Speed Display**<br><br>(envisaged at certain locations as per BoQ) | • MSI shall be required to supply, install and commission Speed Display signboards for all lanes at some of the identified Spot Speed locations, as per minimum specifications mentioned in the RFP.<br>• Such system shall be able to display at least 2.5-digit whole number speed of the vehicles passing by, which should be legible and visible from a distance of 50 meters as well.<br>• The display shall be able to show message such as maintain speed limits / slow down / happy or sad faces etc.<br>• The display shall have an enclosure with necessary text message printed acting as a signage board, as per requirement of BTD.<br>• The system shall display higher speed in case of two or more vehicles approaching are detected simultaneously. The interval of speed and message display shall be configurable centrally, which may be different for different locations depending on the average speed of the stretch of the road. |

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| | • Message Signs shall be based on LED technology possessing a proven track record suitable for this application. The LED technology shall not require external or supplementary illumination.<br>• The speed text must be readable even in broad daylight. The system should allow to set the brightness dynamically for day light or low light and low visibility conditions.<br>• Auto dimming feature to adjust to ambient light level with brightness control for each VMS controlled from TMC. The displayed image shall not appear to flicker to the normal human eye.<br>• Any new similar speed displays procured separately by BTD, MSI shall integrate the same with the larger system for all the above functionality anytime during the contract period as per directions from BTD. |

### 3.2. Red Light Violation and Stop Line Violation Detection System

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| **Business Requirements** | • Certain locations are junctions with signals and are prone to Red Light and Stop Line Violations. Some of these junctions are three arms, four arm etc. as tentatively detailed in the RFP.<br>• Some of the junctions in the city are already equipped with RLVD etc. Systems will run independently, & no integration / co-use is envisaged.<br>• System under this project, will capture the violation when a vehicle has violated the stop line / zebra crossing or the Red-light signal.<br>• The MSI shall ensure necessary field of view the signals to capture the red light while detecting the violations.<br>• MSI shall be responsible to do the road marking (Stop line and Zebra crossing paint) on the roads on all arms regularly throughout the project period, as per scope defined in the Clause 11 under "Project Activities". |
| **Functional Requirements** | • System shall capture the violation when a vehicle has violated the stop line/zebra crossing or the Red-light signal.<br>• Cameras shall record a digitized image and video frames of the violation covering defined junctions on each approach arm at any point of time simultaneously with relevant data about the offence.<br>• System shall take necessary evidence of the violating vehicle along with photo and video of traffic light being red (colour evidence).<br>• MSI shall ensure the RLVD is also detected during the nighttime.<br>• The system shall be able to detect Red Light and Stop Line violation irrespective of whether the vehicle is taking a left turn, right turn or a u-turn. Placement of the RLVD camera shall ensure all such vehicles are captured without any exception on any lane of the arm.<br>• MSI may opt to connect system with signals, however, red-light status shall be detected with or w/o any physical connection to traffic light.<br>• **The evidence camera shall clearly capture the Traffic Signal status along with the violating vehicle in the single frame.**<br>• The MSI shall give provision for defining approach for a particular junction in the system, including that for any free left turns. There would be different combinations of the junctions at different locations. System shall have modular settings to allow such configuration.<br>• Such rules can differ for different locations or corridors, and hence the rules shall be configurable for one or group of systems. |
| **Accuracy (day and night)** | • **Red Light Violation Detection System Accuracy (Day and Night):** RLVD detection for at least 90% vehicles passing through the junction.<br>• **Stop Line Violation Detection System Accuracy (Day and Night):** Stop Line detection for at least 90% vehicles passing through the junction. |

### 3.3. Seat Belt and Mobile Phone violation

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| **Business Requirements** | • It is mandatory for all the commuters to wear seat-belts, on the front seat, as well as the rear seat.<br>• The ITMS system shall be capable of detecting commuters not wearing seat-belt, at least for the front-seat and driver using mobile phones at all the ITMS project locations wherever system is installed. |
| **Functional Requirements** | • The cameras deployed at all the locations for any violation detection system under the ITMS project. MSI may achieve this for all desired locations for all lanes). MSI may achieve this either through RLVD ANPR Camera and / or Spot Speed VDS ANPR Camera or any other camera at the location covering all arms and lanes, at junctions / locations as per defined BoQ quantity. The system shall be built with intelligence to automatically detect whether commuters are wearing seatbelt and whether using mobile phones.<br>• **It is envisaged to provide these analytics on the Evidence Camera covering entire arm, or all the ANPR camera covering all the lanes of the arm, at no extra cost.**<br>• In case a seat-belt violation or mobile phone violation is detected, TMC operator may be (as per requirements) provided with a video and photo/s of commuter zoomed to the inside of the vehicle and the vehicle registration number shall be captured as evidence, along with other details such as time, location etc.<br>• Suspected violation may be considered as violation and TMC operator shall be given provision to process it further as per pre-defined SOP.<br>• Any extra analytics license required shall be in the scope of the MSI. |
| **Accuracy** | • More than **90% vehicle** detection accurately of the total vehicles violated (or passed) as applicable, during the daytime, and 75% during night time. |

### 3.4. Wrong Way Driving and Reverse Driving

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| **Business Requirements** | • Many vehicles including Two-wheelers ply on the wrong side of the road. This may happen at the junction or any other point on the corridor.<br>• The system shall be able to detect such Wrong Way Driving, wrong way Entry / Exits, illegal u-turns (wherever applicable) etc. |
| **Functional Requirements** | • All the ITMS project locations wherever ANPR system is installed shall have capability to automatically detect the direction of a vehicle.<br>• **It is envisaged to provide these analytics on the Evidence Camera covering entire arm, or ANPR camera covering left most lane on the arm, at no extra cost.**<br>• The system shall have provision to define different parameters for particular junction or a corridor or a group of them for different types of violations.<br>• System shall allow defining usual and acceptable direction of vehicles on a particular lane or arm from time to time.<br>• In case any vehicle is observed plying in the opposite direction or taking illegal u-turn (wherever possible), the system shall alert the TMC operator as per requirements.<br>• Suspected violation may be considered as violation and TMC operator shall be given provision to process it further as per pre-defined SOP.<br>• System shall also be able to capture registration number automatically. |

### 3.5. Two Wheeler Violations

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| **Business Requirements** | • Two-wheeler Riders (driver & pillion) are required to wear helmet.<br>• Also, there must be maximum two people riding on a two-wheeler.<br>• Any two-wheeler plying with more than two riders or without helmet, shall be captured and penalized. |
| **Functional Requirements** | • All the ITMS project locations wherever ITMS system components are installed shall have capability to automatically detect helmet and violation of more than two riders for two-wheeler vehicles.<br>• **It is envisaged to provide these analytics on the Evidence Camera covering entire arm, or all the ANPR camera covering all the lanes of the arm, at no extra cost.**<br>• The system shall allow defining parameters for such detection.<br>• The system shall alert the TMC operator as per requirements for the detection possible violation.<br>• Suspected violation may be considered as violation and TMC operator shall be given provision to process it further as per pre-defined SOP. |
| Helmet Detection Accuracy | • More than **95% vehicle detection accurately** of the total vehicles violated (or passed) as applicable during day and night time. |

### 3.6. Non-Standard Number Plates

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| **Business Requirements** | • All the new vehicles registered in India from 1st April 2019 are required to be affixed by High Security Registration Plate (HSRP). Additionally, Bihar state has mandated HSRP on all old vehicles as well. Accordingly, all the vehicles in the city are required to be affixed with HSRP.<br>• Various vehicles are plying on the road with non-standard number plate in different font and style (Fancy Plate) which makes it difficult for the Enforcement agencies as well as ANPR systems to recognize number plate properly.<br>• Any vehicle plying with non-standard number plate (Fancy Plate), or dilapidated number plate shall be detected and shall be captured by the system with necessary evidence. |
| **Functional Requirements** | • All ANPR cameras deployed at all the locations for any violation detection system under the ITMS project shall have capability to automatically detect these violations for all types of vehicles.<br>• **Non-Standard Number plate:** The accuracy of capturing such violation should not vary on the basis of the type of plate, height of plate, nature of plate, type of vehicle, plate colour, varying contrast, language of plate, Double row plate etc.<br>• **Dilapidated number plates / no plate:** The system shall accurately identify and generate alerts whenever broken plate, Dirty / disfigured plate, dilapidated number plates are captured. The system shall capture other attributes of the vehicle (such as colour, class, make etc. as defined in the RFP) which will help in identification of the vehicle.<br>• The system shall allow defining parameters for such detection.<br>• The system shall have self-learning provisions to ensure different types of non-standard number plates are recognised.<br>• Wherever possible, vehicle number shall be captured automatically. |

### 3.7. Lane Discipline Violation

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| **Business Requirements** | • The BTD envisage to setup a Lane Violation Detection System to detect any violation related to lanes as described in the RFP.<br>• The violation shall include Driving in Wrong Lane (applicable for 3 or more lanes only) and overtaking from the left. |
| **Functional Requirements** | • The MSI shall give provision for defining lane rules in the system dynamically. The system shall be able to detect violations as per define rules.<br>• All three lane roads will have defined lane wise rules, e.g. Heavy vehicles must ply on the left most lane, right most lane is only for overtaking, and not for plying vehicles etc.<br>• Additionally, overtaking any vehicle form the left is an offense.<br>• The system shall automatically detect the lane on which vehicle is driven and the class of the vehicle for capturing above mentioned violations.<br>• Such rules can differ for different locations or stretch, and hence the rules shall be configurable for one or group of camera.<br>• Classify between minimum 5 types of vehicles (Light Motor Vehicle - Car, Heavy Motor Vehicle Truck, Light and Medium Vehicle Truck, |

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| | Bus, Two Wheeler etc.) The system shall have provision for defining the classification of vehicle based on various parameters dynamically.<br>• The system shall have capability of capturing multiple infracting vehicles simultaneously.<br>• The system shall capture, and process registration number of each vehicle identified for violation using ANPR system.<br>• System shall produce minimum two images relative to any vehicle in violation, one for each lane detection point with other details.<br>• The photograph acquired at two or more locations by the system only for lane discipline violation vehicles shall be stitched together based on matched plates. |

### 3.8. Unauthorized Parking

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| **Business Requirements** | • There are certain spots on the highway, especially near the junctions and approaches where the parking / stoppage is not authorized, and it leads to serios traffic conditions. Such spots are shortlisted and are envisaged to be equipped with systems to capture violations.<br>• However, the system should be able to assess whether the vehicles are parked or are broken down. The BTD shall define specific rules such in terms of minimum time of stoppage, people gathering near parked vehicle etc. |
| **Functional Requirements** | • The system shall have provision to define parameters on which a vehicle can be tagged as illegally stopping and an alert may be generated to CCC operator. The system shall have provision to define type of illegal stoppage, based on which the violation can be detected.<br>• The TMC operator shall be provided with the video feeds of the camera which detected the violation. Operators shall check whether the vehicle has wilfully stopped illegally or there is a breakdown.<br>• Unauthorized parking detection is envisaged to be at all junctions and certain critical locations such as road mergers etc. |

### 3.9. Suspected Overload Goods Vehicles

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| **Business Requirements** | • BTD envisage to check heavy vehicles for overloading at the toll plazas through the weighbridge API shared by the NHAI.<br>• This mainly pertains to any goods transport vehicles which carry more load than they are permitted to carry as per the design capacity of the vehicle, which reduces their speed, pick-up as well as brake capacity.<br>• The MSI shall integrate with ICCC platform / ITMS application with the weighbridge API provided by the NHAI. |

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| **Functional Requirements** | • **The SOP for checking of the overloading of a vehicle is as follow:**<br>  ○ The system shall integrate with the weighbridge API and calculate whether that vehicle is overloaded and how much is the overloaded weight.<br>  ○ A test report with all the details shall be shared with relevant enforcement agencies<br>• The system shall then send all the relevant details to the CCC for further process and reporting.<br>• The system shall be capable of sharing the data of overloaded vehicles, real-time with any other system as directed by BTD.<br>• The system shall provide ability to define expected 'allowed weight range' for each class of vehicle or group of vehicles as per requirement (till such time integration with Vahan is not completed or in case vehicle data not available in Vahan database)<br>• BTD shall not entertain any claim for losses resulting from delays in integration, non-availability, or downtime of the weighbridge API provided by NHAI. |

### 3.10. Passenger Vehicles carrying more than defined carrying capacity

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| **Business Requirements** | • The system shall automatically detect passenger vehicles carrying occupants more than the permissible seating capacity as per Vahan or State Transport database or as defined by the BTD for each class of vehicle (CoV).<br>• The System shall improve highway passenger safety by discouraging overloading practices.<br>• Violation evidence shall be legally admissible for e-Challan issuance and court proceedings.<br>• The system shall integrate with TMC and state e-Challan platforms.<br>• The system shall support vans, shared taxis and auto-rickshaws etc. |
| **Functional Requirements** | • The system shall classify vehicles as passenger vehicles using vehicle classification.<br>• The system shall retrieve vehicle seating capacity from Vahan or State Transport database or as defined by the BTD for each class of vehicle (CoV).<br>• The system shall estimate number of occupants inside vehicle using AI-based computer vision techniques.<br>• The detected passenger count shall be automatically compared with permissible capacity.<br>• The system shall automatically generate violation event when detected count exceeds permissible limit.<br>• For each violation, system shall capture high-resolution images as well. |

### 3.11. Carrying passenger in goods vehicle

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| **Business Requirements** | • The system shall automatically detect goods vehicles carrying unauthorized passengers in cabin or cargo area.<br>• The system shall enable non-intrusive, 24x7 automated enforcement without stopping vehicles.<br>• The system shall reduce fatal accidents involving laborers and illegal passenger transport in freight vehicles.<br>• Violation evidence shall be legally admissible for e-Challan and prosecution under Motor Vehicles Act.<br>• The system shall support enforcement for trucks, LCVs, tractor-trolleys and other goods vehicles. |
| **Functional Requirements** | • The system shall classify vehicle as goods vehicle using vehicle classification.<br>• The system shall detect human presence inside driver cabin beyond permitted occupants using AI-based vision.<br>• The system shall detect human presence in cargo/body area of goods vehicles where passenger travel is prohibited.<br>• The system shall use AI-based human detection, posture and silhouette recognition algorithms.<br>• The system shall generate violation if any passenger is detected in cargo area or excess persons in cabin.<br>• The system shall capture high-resolution zoomed images of cabin and cargo area along with front and rear vehicle images.<br>• The system shall support thermal or low-light camera integration where visibility is poor. |

### 3.12. Other Violations

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| **Business Requirements** | • The BTD envisages to detect commercial vehicles plying without reflectors and all vehicles without taillight during the night time.<br>• The system shall be capable of detecting such vehicles along with the number plate. |
| **Functional Requirements** | • Any commercial vehicle plying without reflector is a violation. Ideally the vehicle is expected to apply the reflector on all sides of the vehicle, however violation detection system shall be able to capture at least 2 side of the vehicle for detecting reflector.<br>• All vehicles are expected to turn on taillight, especially during night time. The system shall be able to detect such vehicles from the rear side along with clear evidence of no tail-light, and clear number plate. |

### 3.13. Vehicle document related violation

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| **Business Requirements** | • Vahan system maintains records of Vehicle Fitness, Tax Paid Upto, Permit Validity, Insurance and PUC, non-use etc.<br>• Any vehicle plying with any of the below listed violations, the system shall be capable of checking such violations and capture the same with necessary evidence.<br>  ○ Expired Fitness<br>  ○ Expired Insurance<br>  ○ Expired PUC<br>  ○ Non-Use<br>  ○ Without Valid Permit<br>  ○ Without Valid ODC Permission<br>  ○ Time Restriction (Eg. Heavy vehicles not allowed between 8 am to 11 am)<br>  ○ Wanted Vehicle Detection<br>• The system shall be able to detect Forge Number plate by matching Class of Vehicle, colour, make, model or any other details of the vehicle on the road against the Vahan record.<br>• As per requirement of BTD and Traffic Police from time to time. BTD will support for necessary integration with NIC. MSI shall ensure to make available / consume APIs as per requirement of NIC for the integration.<br>• BTD may reserve right to increase detection of any other type of violation wherein the details are fetched directly from Vahan portal (e.g. Age of vehicle using vehicle registration date), i.e. the violation is vehicle document related, anytime during the contract period, MSI shall incorporate necessary changes in the system to ensure the same at no extra cost. |
| **Functional Requirements** | • All the ANPR cameras shall have capability to automatically detect registration number plate of all the vehicles plying through the system.<br>• The system shall allow defining parameters for such detection.<br>• **The system shall allow filtering by type of vehicles. (Eg. In case BTD decides to only do such detection at certain locations and / or for only certain class of vehicles, or only for commercial vehicles).**<br>• The system shall maintain the database of the vehicles for which details fetched from the Vahan portal and shall filter them if same vehicle is detected on same day, or during the defined time period as per requirement of BTD.<br>• The system shall be integrated with Vahan system and shall be able to confirm for all the above parameters (and any other parameters as per BTD and Traffic Police requirements from time to time) for any violation.<br>• The system shall alert the TMC operator as per requirements for the detection of the violation.<br>• Suspected violation may be considered as violation and TMC operator shall be given provision to process it further as per pre-defined SOP. |

### 3.14. Violation Detection System Accuracy

- Unless otherwise specified for a particular system component / violation detection system, the violation detection system shall have accuracy as defined below:
  More than **90% vehicle detection accurately** of the total vehicles violated (or passed) as applicable.

## 4. Incident Detection and Management

| | |
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| **Business Requirements** | • Systems under ITMS project at certain locations shall be capable of detecting any incidents such as<br>  o Traffic accidents involving one or more vehicle.<br>  o Unusual Traffic Congestion Detection<br>  o Unusual objects / abandoned object / unidentified object on road and footpath (as per field of view)<br>  o cattle on the road<br>  o Detection of uncovered debris in good vehicles<br>  o Goods coming outside of goods vehicles<br>  and raise an alert to the TMC operator for necessary action.<br>• Minimum details such as Type of incident, Date and Time, Location, Photo / video of the vehicle unit/s involved in the incident, Status of response to the incident etc. about the incident shall be captured in a standard format. |
| **Functional Requirements** | • TMC operators shall be able to verify whether the incident has happened, or it was a false alarm. MSI shall ensure minimum false alarm in the system.<br>• The TMC operators shall be given an interface to define various action Standard Operating Process (SOP) based on type of the incident, and as per the incident priority, after due approvals from relevant authorities.<br>• In certain cases, based on the SOP, once the incident is detected, the same shall be transferred to the Dial 112 system. The integration shall be two-way, to get the status update (ATR – Action Taken Report) on the pushed incident.<br>• In case of any incident not automatically detected, but under the purview of the BTD, the same shall also be managed through the same incident management system.<br>• **Such action may include**<br>  o Intimation to the relevant stakeholders for necessary action.<br>  o SMS and mobile app notification to the stakeholders.<br>  o Display of message on the nearby VMS Boards for citizens such as “Slow Down”, “Accident Ahead”, “Traffic Ahead”, “Low Visibility Ahead.<br>  o Assisting for dispatch of emergency response vehicles (if integrated)<br>• The system shall provide consolidated view during an incident management and include all the details of the incident like location, type, live video stream of cameras covering the incident area, location of responders (if available) the defined SOPs and live video stream from citizens.<br>• The system shall allow to update the incident for all stages till the closure of the incident, and revert necessary actions taken.<br>• The system shall be capable of performing trend analysis based on past incident data and identify high incident / accident prone zone.<br>• The system should allow to search for a vehicle/s involved in the incident, detected in other camera system on the route to study the behaviour. Once identified, these video clips shall also form part of the incident evidence, if required.<br>• The system shall allow to export the case with all the details including the photo / video of the incident, with a format that shall be acceptable in Indian court of Law. |

## 5. e-Way Bill Verification System

<table>
<tr><td>Business Requirements</td><td>
<ul>
<li>Identify every goods-carrying vehicle passing through the defined location.</li>
<li>Verify e-Way Bill validity in real time against database of GST and with state Bihar Government system</li>
<li>Classify vehicle type and correlate with declared goods</li>
<li>Capture legally admissible evidence for violations</li>
<li>Detect discrepancies automatically</li>
<li>Generate real-time alerts to TCC and field officials</li>
</ul>
</td></tr>
<tr><td>Functional Requirements</td><td>
<ul>
<li>System shall be able to automatically capture vehicle classification and number plate using AVCC and ANPR or similar setup. The proposed method should be non intrusive.</li>
<li>The monitoring shall be done lane wise for high accuracy and while the vehicle is in motion, even at 80 to 100 KMPH.</li>
<li>The system shall detect the vehicle class (LMV, HMV, MCV, Trailer, Container, etc.) and number plate, filter basis the existing rules, SOP and database (eg. only for heavy commercial goods vehicle registered in Bihar and Jharkhand).</li>
<li>The System should integrate with e-way bill portal of Government of Bihar / GST portal.</li>
<li>The system shall allow defining rules and threshold for raising alert at the TMC and the field officials.</li>
<li>The system shall capture the evidence in the form of Image and video along with date and time stamp, geo-coordinates etc.</li>
<li>The system shall allow real time vehicle detection and tracking</li>
<li>The system should be operational in low latency, reduced bandwidth usage and during network outage.</li>
<li>The System should have verification parameters like e-Way Bill existence, Validity period, Vehicle number mapping, Origin–Destination state compliance and Goods category vs vehicle class</li>
<li>System should follow discrepancy detection with the following scenarios:
<table>
<tr><th>Scenario</th><th>System Action</th></tr>
<tr><td>No e-Way Bill found</td><td>Flag discrepancy</td></tr>
<tr><td>Expired e-Way Bill</td><td>Flag discrepancy</td></tr>
<tr><td>Vehicle type mismatch</td><td>Flag discrepancy</td></tr>
<tr><td>Route/state mismatch</td><td>Flag discrepancy</td></tr>
<tr><td>Manual watchlist match</td><td>Priority alert</td></tr>
</table>
</li>
<li>The system should capture evidence with Number plate image, Full vehicle image, Timestamp, GPS location, e-Way Bill verification response and Discrepancy reason</li>
<li>The system dashboard should have feature of Live check post monitoring, flagged vehicle queue, Evidence viewer, e-Way Bill verification status, Search & analytics and Audit trail & reports</li>
<li>The system should have role-based access to Administrator, Enforcement Officer, Audit & Review Authority.</li>
</ul>
</td></tr>
</table>

| | |
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| | • The system should be complied with Data encryption at rest & transit, Role-based access control, system logs & audit trails and Compliance with Government IT & GSTN guidelines.<br>• The system should have a scalability of multi-state e-Way Bill integration, RFID / FASTag correlation, Predictive analytics for tax evasion, Integration with VAHAN & GSTN and AI-based goods type recognition. |

## 6. General Surveillance

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| **Business Requirements** | • Apart from Incident Detection system and Violation detection system, BTD also envisage to implement General Surveillance System at certain locations under the project.<br>• Dedicated CCTV Cameras for General Surveillance are proposed at certain locations. However, all the other non-dedicated General Surveillance cameras shall, in combination, handle the Surveillance function. |
| **Functional Requirements** | • The system shall be able to record video feeds form all the dedicated General Surveillance cameras and other VDS evidence Cameras, in day as well as night time with minimum quality compromise. The camera shall detect and alert in case of low visibility, however shall be able to capture video feeds in low visibility by filtering out the fog.<br>• The video feeds from cameras shall be recorded, stored and viewed at high quality as per specifications and requirements defined.<br>• These video feeds shall be visible at TMC, viewing center, on the mobile app of the responders etc. by selecting one or more camera on the map or from the list.<br>• The camera shall be capable of capturing images along with video feeds<br>• The system shall be able to detect any unusual activity by any vehicle, person, cattle or object.<br>• The system shall be capable of searching for a vehicle by selecting any parameter dynamically. Parameters such as<br>o Colour of the vehicle<br>o Make of the vehicle<br>o Vehicle with a specific sticker or mark on it<br>o Vehicles with broken number plates<br>o Heavy vehicles, light vehicles and two wheelers etc.<br>• The system shall allow defining these parameters dynamically.<br>• The system shall have provision to view all the results of all the cameras at the CCC. In case of any incident is suspected or recorded, the system shall allow to send the details along with photo and video evidence to the responders on the fields for the further necessary action. |

# 7. Field Components of the ITMS System

## 7.1. CCTV Camera

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| **Business Requirements** | • CCTV cameras are used to monitor traffic flow conditions and verify traffic congestion and incidents in real time.<br>• All camera systems shall be installed at various strategic locations including junctions in order to capture all the necessary video feeds as per project requirements, such as traffic volume, class of vehicle, and traffic violations such as red-light, speed, no helmet, triple seat riding etc. Exact locations at each point of interest will be decided during the survey by MSI, as directed by BTD.<br>• The CCTV Camera shall play an important role in the entire ITMS system for better accuracy, better evidence capture.<br>• The MSI shall ensure the CCTV Camera shall be installed and commissioned in a manner to cover maximum field of view covering multiple lanes or a long stretch as per ground requirement.<br>• **MSI shall note that inability of CCTV camera not to be able to cover entire required field of view due to proposed design or proposed technical specifications, shall be immediately corrected as per directions of BTD, and at no extra cost to the BTD.** |
| **Functional Requirements** | • The camera shall cover an enough distance to compliment enforcement sensors / system with HD video, typically 100 to 150 meters as per site conditions, and site requirements.<br>• Such camera shall be powered with edge based or server application based Advanced Video Analytics, as per requirement of the project.<br>• CCTV cameras shall provide visual images to aid operations center personnel in determining and verifying causes of congestion, such as collisions, vehicle breakdown, load spills, construction/maintenance activities, police/fire operations, or heavier than usual traffic.<br>• Cameras shall be mounted on a pole or a cantilever as per requirement, its height, field of view etc. shall be decided by the MSI as per ground requirement on case-to-case basis. However, any directions from BTD shall be final and binding on the MSI.<br>• The video feeds from cameras shall be recorded, stored and viewed at High resolution as per minimum specs defined in the RFP.<br>• If any configuration settings for the CCTV camera to meet the project objectives, irrespective of any direct / indirect impact on any cost component, shall be adhered to, by the MSI, at the directions of BTD and at no extra cost.<br>• The CCTV camera shall have certain inbuilt analytics such as ability to raise alarms in case of any tampering, alert in case of sudden change in field of view etc.<br>• All the proposed camera shall be ONVIF compliant. **The proposed systems shall be compliant with ONVIF Profiles S, G, T, and M** |

## 7.2. PTZ CCTV Camera

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| **Business Requirements** | *(in addition to above points in 7.1)*<br>• A PTZ camera has been proposed at some location, where there is a need to have a multi-angle view such as for General Surveillance, at few entry and exits etc. |

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| | • PTZ Camera shall enable view on two, three or all sides as per the location requirements.<br>• In case any violation or unusual activity is detected, automatically or manually, the PTZ camera shall assist in getting a better view of the ground using Pan, Tilt or Zoom feature. |
| **Functional Requirements** | • Ability to define schedule for a PTZ camera for constantly rotating in a pattern.<br>• Ability to manually rotate the camera, zoom or tilt wherever required.<br>• Ability to track motion for all or particular angle, and break the schedule in case of motion is detected.<br>• Shall provide a powerful zoom with a range as specified in the Technical requirements with a clear image even for the objects that are very far from the camera<br>• Ability to auto focus for all angle and zoom levels<br>• Ability to raise alarms in case of any pre-defined motion is detected at a particular angle<br>• Supports Region of Interest (ROI) for which 4 regions can be divided. |

### 7.3. Automatic Number Plate Recognition System

BTD envisage to setup Automatic Number Plate Recognition system to read vehicle registration plates. ANPR system shall enable capturing number plate of all the passing vehicles. There are multiple Violation Detection System and other CCTV Camera systems proposed for different purpose in the state. All the Violation Detection System shall be coupled with ANPR system for recognizing the vehicle registration plate along with photo. This ANPR camera shall also support to track the route of any particular vehicle search with vehicle number. MSI shall ensure storing of vehicle number of all the passing vehicles for a minimum period as defined in the RFP. Vehicle number of specific tagged vehicles, violating vehicles etc. shall be stored for the period as defined in the RFP.

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| **Business Requirements** | • System shall support real-time detection of registration plate of a vehicle at deployed locations and looking up database from the central server (ITMS database & Vahan Database) and triggering alerts based on SOP defined in near real-time basis, as defined in the SLAs.<br>• ANPR system shall cover at least 1 lane having width of min 3.5 meters.<br>• **In case number of lanes for a particular arm is say 1.5 lanes, or 2.5 lanes etc., the ANPR shall be configured in a manner to capture all the traffic passing through the respective arm, including vehicles taking left turn. The same shall be achieved within BOQ defined number of ANPR camera. In case any additional number of ANPR camera required to cover any particular arm completely (because of any reason including design fault of the MSI), the same shall be at no extra cost to the BTD.** |
| **Functional Requirements** | • The automatic number plate recognition feature may be part of the supplied camera (Edge based) or can be at LPU level (Local Processing Unit) only.<br>• Accuracy of ANPR for both day and night time, for standard and non-standard plates shall be as per technical specifications and the SLAs defined in the RFP.<br>• The accuracy of ANPR should not vary on the basis of the type of plate, height of plate, nature of plate etc. |

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| | • **The linking / matching of images** would not depend on ANPR data but would be based on plate matching so that all types of vehicles, irrespective of nature of plate captured and coupled without dependencies on plate type and colour, varying contrast, characters, number, broken plate, Dirty/disfigured registration plate, language of plate, Double row plate etc.<br>• The system shall be robust to variation in registration plates in terms of font, size, contrast and colour and should work with good accuracy.<br>• All ANPR system should be able to capture both "Retro reflective" and "Non-reflective" type of registration plates found commonly in India.<br>• The ANPR system shall be able to capture the registration plate and convert them into alphanumeric text.<br>• Registration plate of all vehicles irrespective of class of vehicle like cars, buses / HMVs etc. should be readable automatically by the software. Provide role-based UI for simultaneous manual authentication, correction & saving for BTD & Traffic officials.<br>• ANPR system shall provide an option of searching registration plates with partial number plate, colour, class of vehicle, junction, time and location etc.<br>• **Geo-tracking of a vehicle based on ANPR detection in real-time on GIS map. The system shall enable search of a vehicle using number plate across the city and enable exporting a route on which the vehicle has travelled within the ANPR vicinity.** MSI may also propose solution for prediction of projected route / area based on past trajectory.<br>• Ability to provide illumination for night-time scenarios using IR illuminators or any other technologies for registration plate to be captured with very high accuracy.<br>• Ability to input certain registration numbers according to the black-listed categories like "Wanted", "Suspicious", "Stolen", "Retrieved" etc. by authorized personnel and generate automatic alert at TMC for operator for further action, in the event of detection of any such vehicle.<br>• Ability to mark vehicle as whitelisted only after written approval from BTD. In case of identification of whitelisted vehicles, no challan and penalty shall be accounted for.<br>• Ability to generate automatic alarm to alert the TMC on successful recognition of registration plates on the basis of pre-defined rules.<br>• System shall capture all vehicles passing through the installed location. All vehicle images and numbers shall be kept in database for real time alerts / search for crime analysis. Vehicle images should be captured even if the registration plate is not automatically detected. |
| **ANPR Accuracy** | • It is the percentage of total number of vehicle registration plates automatically captured and recognized without any character errors by ANPR system (X), against the total number of vehicle passing (Y).<br>ANPR Accuracy = (X / Y) * 100<br>• ANPR accuracy should be maintained for English language, for standard number plates and HSRP Plates.<br>• **Minimum ANPR Accuracy:** Day Time: 95%+ and Night-time 90%+<br>• ANPR accuracy for non-standard, irrespective of vehicle registration plate's orientation & size, font type & font size, speed of the vehicle (within the defined requirements) shall be: Day Time: 75%+ and Night time 70%+ |

### 7.4. Infrared Illuminators

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| **Business Requirements** | • ITMS system shall be capable to capture video and images with high clarity even at the night-time and during low light & visibility condition<br>• The ITMS system also shall be capable to clearly detect the registration plate of a vehicle with same accuracy even in the night-time, low light and low visibility conditions for at least 100 to 150 meters |
| **Functional Requirements** | • The IR Illuminators shall be coupled with all the CCTV video cameras inbuilt or externally, for indoor and outdoor both to capture clear images of the vehicle, object, people etc. even during the night-time.<br>• The system shall be capable of switching IR illuminators on / off automatically depending on the light conditions, as well as manually directly controlled from the TMC and even from the IR device itself.<br>• The IR illuminator shall be affixed with white LED flash of low intensity to influence the driver behaviour, however, not to dazzle the driver. |

### 7.5. Intelligent Traffic Sensor - Radar

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| **Business Requirements** | • A single radar shall be sufficient to cover one or more lanes per particular arm / corridor.<br>• Capability of detecting and classifying at least 100 objects at a time along with their position and speed covering 3 to 5 lanes of 3 to 3.5 mtr each. |
| **Functional Requirements** | • A wide field and degree of view (for curved road), and good detection range, with 1 or more detectors as required.<br>• Based on position (x,y) elevation along with speed parameter in order to provide high-resolution capability in scenarios where many vehicles are closely spaced, i.e. in many lanes, dense traffic, traffic jams, stop and-go situations<br>• Detect moving and stationary traffic.<br>• Capable of detecting vehicle speed moving above 120 to 150 kmph along with other parameters.<br>• Performance and functioning for all weather conditions (rain, smog, fog, low light, low visibility, night, dust, high temperature) at the same level of accuracy and should be low maintenance, i.e., it should not require frequent cleaning. MSI shall ensure proper and regular calibration of the system to ensure accurate readings.<br>• Shall have minimum IP protection and the ability to work in extreme temperatures.<br>• Possibility of installation of sensors on the roadside, at the corner of intersections, at the median of a road/highway or on a gantry, with best results and without any risk of obstruction.<br>• Provide information on incident, queue, wrong direction, counting, classification and traffic status with gap, headway at minimum for a particular stretch of at least 150 mtrs.<br>• **The sensor shall also provide driving behaviour & speed, lane changes which may indicate possibility for incidents.**<br>• Minimum refresh time for quick information processing and action.<br>• The system shall negate any interference from the environment, other metal bodies or any other object for accurate reading. |

### 7.6. Variable Messaging System (VMS)

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| **Business Requirements** | • BTD envisage to setup VMS at certain selected locations across the state and operate them through common platform. APIs for the same will be made available to MSI.<br>• The VMS shall be used for communicating with the citizens, informing citizens about traffic information, awareness, vehicle speed limits etc. VMS can be used to provide dynamic, real-time traffic related information, traffic notifications, event messages, vehicle speed, warnings messages, details of violating vehicles, traffic advice, route guidance and emergency messages etc. to commuters at strategic locations and main entrance roads. There could be separate message on one or more of the VMS, which can be for a specific time.<br>• The VMS may also be proposed to be used to display commercial advertisement to generate revenue for the BTD.<br>• The locations for the new VMS shall be finalized by the MSI in consultation with BTD and Traffic Police.<br>• VMS shall be capable of rendering any number of messages and are located within the corridor in view of key motorist decision points, such as interchanges.<br>• **VMS software application shall provide the TMC operator to publish predefined sets of messages (textual, HD images, HD GIF and HD videos). The application shall also provide an option to write in free-text mode.**<br>• The VMS can be proposed to be installed on a pole or cantilever as per locations defined in this document. |
| **Functional Requirements** | • The VMS shall consist of variable message signboard with local controller, and a power backup with UPS along with other power and network components.<br>• VMS application shall be provided to the TMC operators for message preparation, monitoring and control of the VMS through network.<br>• VMS shall be based on Light Emitting Diode (LED) technology possessing a proven track record suitable for this application. LED technology shall not require external or supplementary illumination.<br>• The message (text) on the VMS must be readable even in broad daylight. The system should allow to set the brightness dynamically for day light or low light and low visibility conditions.<br>• Auto dimming feature to adjust to ambient light level with brightness control for each VMS controlled from TMC. The displayed image shall not appear to flicker to the normal human eye.<br>• VMS software application shall allow an operator to seamlessly toggle between multiple VMS points at each workstation in order to send specific messages to specific locations (one or more), as well as sending common message to all VMS. Software should be GUI based, and capable to handle multiple VMS.<br>• It shall be capable of setting an individual VMS or group of VMSs to display either one of the pre-set messages or symbols entered the computer via the control computer keyboard or by another means.<br>• The system shall also give provision to set the way a message is displayed including more than one message for pre-defined time, in scroll fashion, or flashing or multi-line etc. configurable at TMC. |

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| | • VMS should display text (multilingual – Hindi & English) and graphic messages using Light Emitting Diode (LED) arrays.<br>• The VMS controllers should continuously monitor the operation of the VMS via the provided communication network.<br>• **The VMS controller shall be able to detect one or more LED of the VMS board is non-functional and shall raise appropriate alert immediately. MSI may propose any method as per their solution to detect the same.**<br>• If the controller is unable to connect to the server for the next message, it shall not display the old message, which has passed its expiry time. Instead, it shall be programmed to display a default message.<br>• The system shall maintain history of message achieved for future reference and analysis.<br>• System should have a report generation facility for individual / group / all VMSs with date and time which includes summary of messages, dynamic changes, fault / repair report and system accessed logs, link breakage logs, down time reports or any other customized report.<br>• System shall be able to integrate with any third-party VMS. All above functionalities shall also be possible for external VMS. |

### 7.7. Public Announcement System

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| **Business Requirements** | • The ITMS project envisage to deploy Public Announcement System at certain strategic locations to remotely manage the traffic and crowd in certain cases.<br>• The PA system shall allow the TMC operators to broadcast message to one or group or all Public Announcement Systems.<br>• It may also be possible to either broadcast pre-recorded messages saved in the system or live announcement.<br>• It shall also be possible to use the PA system as Siren as per requirement. |
| **Functional Requirements** | • The PA system shall be installed at one of the poles used under the project to erect other components.<br>• The system shall be able to be loud and clear enough for citizens to clearly identify the sound and the message.<br>• It shall have multiple speakers in all the necessary 2 / 3 directions for clear and loud output, as per specifications defined.<br>• Public Address system shall be used at intersections, public places, market places or those critical locations as identified by BTD to make important announcements for the public.<br>• It shall be able to broadcast messages across all PA systems or specific announcement could be made to a particular location supporting single zone / multi zone operations.<br>• The system shall also deliver pre-recorded messages to the loudspeakers attached to them from CD/DVD Players & Pen drives for public announcements.<br>• The system shall contain an IP based amplifier and uses PoE power that could drive the speakers. The system shall also contain the control software that could be used to control/monitor all the components of the system that includes Controller, Calling Station & keypad, Amplifier (Mixing & Booster). |

## 8. Indicative Components Details

a. MSI shall be required to conduct a survey on the field to study the proposed tentative locations and shall suggest for any updates or changes considering better proposed solution and / or any practical challenges for implementation. The overall BoQ of the project shall remain as per RFP irrespective of any change in location. The updates, if any in the proposed location and technical solution shall be submitted and approved by BTD along with other **Implementation and Operations Plan Document**, post which the MSI shall implement the solution.
b. BTD reserves the right to change to location of any component before the commencement of implementation on field, which shall be final and binding on the MSI, at no extra cost to BTD.
c. The upward / downward variation in the total proposed locations, and respective quantity and total proposed technical solution and its updates shall be allowed with prior approval of BTD and the cost for the same shall be adjusted in the IRR calculations in accordance to change request management as detailed in the RFP.
d. In case where a pole is proposed, and instead a cantilever or gantry is required to be installed, or in case where cantilever is proposed and pole or gantry is required to be installed, the same shall be dealt under change request management as detailed in the RFP.
**e. Any upward variation with regards to technical solution, any additional requirement of any component / equipment to meet the RFP functionalities at any identified location shall be sole responsibility of the MSI and at no extra cost to BTD.**
f. Any upward variation with regards to the location and respective quantity, i.e. any new location identified by BTD anytime during the project period, shall be dealt in accordance with the Clause 6, Change Request Management under Administrative Aspects.
g. Any change of make or model from the submitted bid shall be allowed as per discretion of the BTD. MSI may propose any such change with reasonable justification, which may or may not be accepted by the BTD, subject to the SLAs. The decision of BTD shall be final and binding.
h. All location shall implicitly have required junction box, electric and networking components, cabling, civil components necessary for sturdy erection of the poles, cantilevers, gantries and components on the poles and gantries etc. and will be powered by the Electricity with necessary backup. BTD shall not pay anything over and above the quoted rates for any upgradation of any of the component required by the virtue of design of the project by the bidder, which may be over the above technical specifications provided in the RFP. The MSI is expected to provide necessary component, over and about the defined quantity and defined minimum specifications to meet the requirements.

## 9. Traffic Management Center and Viewing Center

a. MSI shall setup Traffic Management Center (TMC) and Viewing Centres at the pre-defined location, some of them within the existing Command and Control Room as detailed in the **Annexure Set IV – Annexure 7**. **There is 1 central TMC envisaged under the project, and about 37 Viewing Centres.**
b. For all the locations (TMC and Viewing Centres), the BTD shall provide physical space on as-is where-is basis. All the necessary civil works such as partitioning, false ceiling, false flooring, furniture, internal cabling / wiring for power and network etc. shall be sole responsibility of the MSI, at no additional cost. **The bidders are expected to conduct site visit before bidding for the project** to understand the current status.
c. BTD reserves right to change this location to any other suitable location as it deems fit which shall be final and binding on the MSI.
d. The TMC under the ITMS project shall be required to monitor, manage, control, analyse, and communicate to and fro regarding operations and management, respond to daily scheduled activities, events and incidents of the activities under ITMS scope.
e. The TMC shall be integrated with all the components of the Intelligent Traffic Management System (ITMS) Project and enable the operators to carry out the coordinated response plan effectively.
f. The solution shall allow BTD and TMC operator to monitor the video feeds from cameras and inputs from other sensors, dissect and disseminate information and make actionable recommendations.
g. The Traffic Management Center at the heart of the system will comprise of the TMC Application which have important features such as the incident management and reporting system, Standard Operating Procedures (SOPs) for pre-defined events such as traffic violation and systems for interaction with citizens etc.
h. The TMC shall provide situational awareness of the traffic and security situation across the city. This shall enable the BTD, other stakeholders and TMC operators to take coordinated and planned response actions.
i. The system shall provide configurable rules with tailored alerts, dashboard visualizations, intelligent role based workflow, response tools and situation collaboration.
j. TMC will comprise of various terminals dedicated for specific purposes and a centralized dashboard with all real-time data available on fingertips.
k. The Viewing Centres shall be able to assist the field staff to view, and manage the videos, evidence, and alerts and act as per defined SOP, right from the Viewing Centres.

**l. Traffic Management Centre's key objective:**

- To serve as a unified monitoring and decision-making hub for Traffic Enforcement, Traffic Management and General surveillance
- To serve as Network Operations Center (NOC) for the project.
- To monitor the city for any traffic violation, its details and act as per defined SOP.
- To serve as a Centralized Operating Centre for surveillance in the city, monitoring all the sensors and camera feeds, health of all components, network etc.
- To serve as central information, communication, incident management, and decision-making hub including interface with other government and external agencies.
- To provide real time information update to Bihar Transport Department and Traffic Police etc.
- To facilitate decision making process by leveraging detailed view and analytics.
- To be self-maintenance system and alert upon malfunctioning of any of the components
- To be scalable and be future ready for external integration and scope upgradation.

### 9.1. TMC Components

MSI shall be responsible for setting up new TMC at the provided location. The scope shall include setting up of Video Wall, workstations, power and networking components, UPS, DG Set, internet bandwidth provisioning, furniture, central air conditioning, false flooring and ceiling, step seating arrangements etc. as defined in the RFP**. All the components at TMC and Viewing Centres shall be newly installed under the project.** The MSI shall provide workstations, and LED screen at all Viewing Centres.

**Following are the setup requirements:**

a. Detailed plan of the CCC setup shall be prepared by MSI on project initiation. MSI shall set up state of the art, well connected, secure, centralized TMC.
b. MSI shall be responsible for planning, procuring, commissioning, and setting up the TMC area including all the hardware, software, network (Establishment of LAN and WAN connectivity as required), electrical, furniture etc., upon appropriate approvals from BTD.
c. MSI shall ensure CCC area has rodent repellent provision with periodic pest control activity, fire proofing provisions, Fire Safety System with Alarm and smoke detection system (VESDA System - Very Early Smoke Detection Apparatus system) etc. The entry of Rodents and other unwanted pests shall be controlled using non-chemical, non-toxic devices. Ultrasonic pest repellents shall be provided in the false flooring and ceiling to repel the pests without killing them.
d. All the infrastructural requirements and civil work, i.e. air conditioning requirement, seating arrangement, Office Workstations (Furniture and Fixtures), chairs, tables, false flooring, false ceiling, step seating arrangements, painting, aesthetics, partitioning, electricity (power), electrical cabling and necessary illumination devices etc., needed to build the Command and Control area shall be responsibility of MSI as per the layout provided by the MSI based on approval by BTD.
e. MSI shall install separate sub-meter for electricity. The connection till the premises shall be provided by BTD, however, all internal wiring, cabling, any equipment etc. shall be sole responsibility of MSI. All the Workstations, Video wall etc. shall be coupled with UPS and battery backup for minimum period, as described in the technical requirements. The MSI shall also setup automatic DG Set to provide for power backup for minimum period as described in the technical requirements. **The fuel for the DG set shall be responsibility of MSI.**
f. The TMC Center shall be manned 24 x 7 x 365 by the MSI, i.e. CCC operators. The CCC shall be supervised by the BTD officials, and other designated authorities.
g. MSI will ensure that the existing facility is used and maintained well by its operators and representatives and no damage to the existing facility during the implementation as well as operations and maintenance activities.
h. The TMC shall be connected to the Local Area Network (and on-premise DC). Any additional and separate requirement of cabling, CAT5/6, routers, switches, WiFi modules, any other networking components, internet connection etc. shall be sole responsibility of the MSI.

**TMC and Viewing Center shall have multiple components including but not limited to:**

| Sr. | Component | Indicative Requirements | Quantity |
|---|---|---|---|
| **1.** | **Workstations** | • A workstation shall enable the users to view and control various applications, control cameras views, define rules, control view of the video wall etc., and for managing, controlling, monitoring, reporting the operations and taking appropriate actions.<br>• These workstations will also be used by the Traffic Police and BTD officials. | **20 Workstations with 3 screens each.**<br><br>**01 Workstations with two screens each, at each Viewing Center** |
| **2.** | **Network Printer** | • MSI shall be required to install new Network Colour Printers as per quantity and specs defined in the RFP document.<br>• These network printers shall be coupled with all workstations as well as terminals for Traffic Police for printing | **01 printer**<br><br>Along with all consumables for entire project period. |
| **3.** | **Video Wall** | • A video wall shall depict visualizations, real-time view, analytics, reports and flashing alerts to highlight where attention is required.<br>• The Video Wall shall be configurable to display rotating views.<br>• Video wall shall be used to display following combination of things<br>o Live and recorded feeds of video cameras across the city<br>o Centralized dashboard for all the monitoring and management.<br>• Any necessary integration with the system of existing SI as required to connect the complete video wall and operator terminals shall be responsibility of the ITMS MSI. Necessary and reasonable support will be provided by BTD. | **TMC:**<br><br>**8x6 matrix of 55" each screen**<br><br>**Viewing Center:** NA |
| **4.** | **55" LED Screens** | • LED Screen shall be used to display following combination of things:<br>o Live and recorded feeds of video cameras across the city<br>o Centralized dashboard for all the monitoring and management.<br>o Review and approve the Challans | **TMC: NA**<br><br>**Viewing Center: 1 at each VC** |
| **5.** | **Other Components** | • MSI shall be responsible for providing other necessary and required components like KVM Switch, active and passive network components such as switches and routers etc.<br>• Command Center is equipped with Fire Detection and Control system, CCTV etc. which shall be responsibility of the existing SI, and not in the scope of ITMS MSI. | • As per site requirement |
| **6.** | **Access Control** | • At existing CCC which is converted to TMC, is Access Controlled and registered MSI personnel shall be allowed access. | • NA |

### 9.2. TMC Use Cases

a. TMC operators shall operate the controls of the Traffic Management Center under supervision of the Bihar Transport Department officials and respective Traffic Police and other stakeholders.
b. TMC operators shall not perform any action without consent of the BTD Officials and Traffic Police as per SOP defined by direction from BTD.
c. This list is an indicative list and not exhaustive list. MSI shall be required to ensure to serve any other use cases that may be required from time to time.

**d. Following use cases are expected to be operated at the TMC:**

| Sr. | Solution | Integration and operation brief |
|---|---|---|
| **1.** | Traffic Management | • All the ITMS cameras at the junctions will be equipped with sophisticated video analytics based traffic density estimation system.<br>• The system will be capable of calculating traffic density in real-time and provide necessary feedback to the TMC.<br>• The TMC ITMS application will be Machine Learning and AI based application which will be capable of detect unusual traffics, usual traffic, maintain and self-learn traffic logs at each junction, detect incidents and raise appropriate alerts.<br>• The system shall also allow defining SOP for various typical events expected at a points of interests under the project.<br>• In case of unusual traffic at junction or mid-block, the system shall be able to raise an alert and display relevant video feeds to the TMC operators and authorities for necessary action. |
| **2.** | Violation Detection System | • Multiple Violation Detection System including Speed Detection system, Red Light Violation detection system, and other violation detection systems setup as part of this project shall be integrated with the TMC.<br>• The system detects any vehicle violating the traffic laws as per defined parameter.<br>• The system shall allow to define parameters for detection of violation.<br>• The system shall provide for interface for the operator to take appropriate action as per defined SOP.<br>• The system shall allow defining of SOPs<br>• All the traffic violations and the false alarms shall be recorded for generating appropriate reports.<br>• Authorities shall be able to view and verify violations captured by the system, verify the registration number captured by the ANPR system, violation evidence and other details, and manually override the entry in case of any issues using standard Web browsers.<br>• An audit trail would be maintained to record such editing activities.<br>• No deletion / addition without validation through authorized user. |
| **3.** | Incident Detection | • All the ITMS systems shall be capable of detecting any incidents such as traffic accidents, unusual traffic, cattle on the road, unattended goods on road etc. and raise an alert to the TMC operator for necessary action.<br>• Minimum details such as Type of incident, Date and Time, Location, Photo / video of the vehicle unit/s involved in the incident, Status of response to the incident etc. about the incident shall be captured in a standard format by the TMC operator. |

| Sr. | Solution | Integration and operation brief |
|---|---|---|
| **4.** | Variable Messaging System | • TMC shall be integrated with Variable Messaging System to publish specific messages, general information and alerts to the commuters.<br>• VMS shall include both the new under the scope of MSI and the existing VMS which MSI shall integrate, with same functionalities.<br>• TMC operator shall be able to select and / or type the message and select the manner in which message is displayed.<br>• Message can be for one or more VMS. Provision to select VMS from list or location wise or on geo-map shall be made available. |
| **5.** | TMC Applications | • TMC operator shall be able to manage the entire project using software applications installed at the TMC including Command and Control Center Application along with Geo-mapping, Video Management Software, Video Analytics Software, Traffic Management Software, Asset Management, Network Management, Storage and Server Management, System Security Management etc. and shall jointly perform required operations of Traffic and Violation Management.<br>• All of these applications shall be able to integrate with each other for smooth flow of information.<br>• The TMC operators, BTD Officials, Traffic Police and all other stakeholders shall be given a common user interface to access all of these applications and shall have user based restricted access with logins. All the interfaces for Government officials including BTD and Traffic Police shall have single sign-on.<br>• All applications shall be hosted at hosting infrastructure created by the MSI for this project.<br>• Functional and Technical Requirements of all the applications shall be as defined in RFP.<br>• Any other applications and functionality not explicitly mentioned in the RFP document but are required for the smooth and entire functioning of the ITMS project requirements, shall also be supplied by the MSI as per standards and requirements set out in the RFP.<br>• TMC shall get integrated with third party apps as described in RFP. |

### 9.3. Viewing Centers

a. BTD envisages to setup multiple Viewing Centres (37 VCs) at field offices.
b. The viewing centre shall have one workstation with one LED display each as per defined specifications.
c. **These viewing centre shall be manned by MSI for initial one year** from the date of Project Go-Live and supervised by officers. These centres will act as additional monitoring centre for field officers, to manage emergency service vehicles, manpower and other resources more effectively.
d. BTD may direct the MSI to extend the services of Viewing Center operators beyond initial one year at one or more or all viewing centres as per requirements. The same shall be as per BoQ rates on pro-rata basis.
e. The viewing centres shall have provision to display video feeds from the selected cameras as well as other necessary data.
f. The viewing centre shall enable to manage incidents and dispatch emergency vehicle etc.
g. The violations for review shall be allocated as per defined jurisdiction of the Viewing Center.
h. The viewing centre shall be continuously connected with the CCC, and all the activity of the viewing centres shall also be monitored and recorded at the CCC.

i. The viewing centres shall continuously be monitored using CCTV camera.
j. **The furniture (chair, table, desk etc.), networking components required (routers, switches etc.), air conditioning system, fire safety system with alarm, and all other necessary apparatus for the viewing centre shall be responsibility of the MSI.**
k. Necessary electrical cabling and the necessary UPS backup for workstations and LED Screen, and other components (excluding AC) as defined in the Technical Requirements shall be responsibility of MSI. The MSI shall submit detailed layout of both the viewing centres and shall design the same after due approval from BTD.
l. **Internet connectivity shall sole responsibility of the MSI throughout the project period.**
m. **Recurring electricity charges will be borne by the BTD.**

## 10. Software Applications

It is necessary for complete ITMS system to have a wide range of software technologies across platforms and systems, capable of working together to deliver complex systems and solutions.

**Consequently, ITMS needs robust and resilient software technologies that:**

1. Facilitate heterogeneous ICT-systems of different make and model to work together
2. Allow for greater automation to enable the core function to be delivered reliably and transparently.
3. Facilitate instrumentation through the use of multiple types of devices for sensing, capturing, storing, and utilizing data from multiple sources, fixed as well as mobile.
4. Make data exchange fluid and rapid between different types of devices, applications and network topology using different types of communication and transmission.
5. Facilitate use & aggregation of data by systems & services even if generated by other systems
6. Allow for data to be presented in a variety of formats, depending on the context and the person or the technical system needing it, allowing it to be analysed, visualized, accessed, and acted upon more easily.

The implementation also envisions adhering to guidelines and standards set by guiding government bodies of Government of Bihar and Government of India. The requirements are designed to ensure adequate availability & sustainability of the software application during the contract period and beyond the contract period.

a. The software for the system shall be designed and developed for adequate scalability of existing system functionality, addition of new functionality and easy maintainability.
b. Software development methodology used shall ensure the development of modular software.
c. The MSI shall ensure that the development and testing environment is adequately maintained during the contract period to ensure adequate support for the maintenance of the software under use and further additions / modifications to its functionality as may be required.
d. All documentation, diagrams (including software schematics or automated tool output) and specifications, shall be produced to recognize standards, shall use conventions, symbols and terminology defined as per international standards.
e. The MSI shall hold at least two sets of all operational programs including, wherever appropriate, site-specific data and programs held in appropriate media.
f. Enough and sufficient trained resources, and knowledge to modify and customize the COTS application as per requirement of BTD.
g. All programs being deployed shall be clearly identified and include appropriate issue details and date, and license to use submitted to BTD for all such applications.
h. The documentation copy shall be submitted to the BTD by MSI as a part of **Project Implementation Plan and documentation**. It shall be annotated with issue number, date and section reference including:
    i. A concise description of the overall function of the software.

ii. Compliance and challenges against the RFP requirements.
iii. Details of the hardware of the system, on which the software is installed, and any proprietary software products used, including databases, OS and their version/issue, License details etc.
iv. A complete list of all modules with their functional description and cross interactions.
v. Clear operating instructions.

**i. MSI shall note that all Functional Requirements mentioned in the RFP shall be met in totality by MSI, by combining one or more solutions. MSI may choose to deliver certain functionality using another module in an integrated fashion, as long as the envisaged purpose is achieved. MSI may propose the solutions accordingly.**

j. All the software systems must have built-in fault tolerance, load balancing and high availability & must be certified by the OEM.
k. All the software system shall be network and protocol agonistic and provide option to connect legacy system through API's and be able to integrate with any type of sensor platform being used irrespective of the technology used.
l. All the software system must provide a comprehensive API (Application Program Interface) or SDK (Software Development's Kit) to allow interfacing and integration with third-party systems.

### 10.1. Control Center Application for TMC

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| **Business Requirements** | • The application shall provide the TMC operator a unified user interface for various sub-systems such as the Violation Detection System, Video Management System, Video Analytics System, Violation Detection and Management, Asset monitoring, VMS, Dashboarding, etc.<br>• The TMC application shall allow to define standard Operating Procedures (SoPs) with an option to modify and define the unlimited SOPs dynamically.<br>• The application shall support the UTF-8 encoding standard, which adds multi-lingual capabilities to the user interface. Standard Operating Procedures (SoPs) shall be presented in vernacular languages for the operator to understand the actions to be taken.<br>• The user interface shall include a cutting-edge UI and UX. The architecture, internal layouts and menu operations shall supply fast and intuitive UI for quick and efficient Traffic, incident and violation management and other features of the ITMS system, offering operators one-click access to flows / tools that help them complete tasks faster and more efficiently.<br>• Various users should be able to access the system using single sign on and should be role based. Different roles which could be defined (from time to time) could be Administrator, Supervisor, Officer, Operator, etc.<br>• The CCC system shall have provision for integration with Public Announcement Systems for broadcasting of pre-recorded voice messages. There should be provision to switch on and switch off the audio from centralized application. |
| **Functional Requirements** | • The user interface (UI) to present customized information in various preconfigured views in common formats. All information to be displayed through easy-to-use dashboards.<br>• Control Center Application should be able to correlate two or more events coming from different subsystems (incoming sensors) based on time, place, custom attribute and provide correlation notifications to the |

operators based on predefined business and operational rules in the configurable and customizable rule engine.

- The system shall provide supervisors with a KPI driven dashboard that measures the quality of service of the control centre. The dashboard shall include counters and graphs displaying number of alarms and incidents as well as graphical representation on a map.
- The system will be designed so as to provide the authorized users to view key performance indicators, standard operating procedures, notifications, and reports, spatial-temporal data on a geospatial map, or view specific details that represent a road or stretch of it, or an area of the state, either on a location map, or in a list view.
- The system shall include an advanced rule engine layer in order to correlate and match information from different data sources, sensors, analyse them for detection of pre-defined activities, suspicious & unusual activities etc. and produce smarter and more accurate alerts for the operators and other concerned dynamically.
- Data sources and parameters that can be defined in a rule shall include correlation with historical data retained in the system, external data sources, events from physical devices connected to the system, distance between events, time between the events.
- The rule engine automatically creates incidents that may be automatically executed and managed by the system to save time and increase efficiency. The rule engine will be designed to send the relevant alarms to the 3rd party systems. As an example, send the alarm to the VMS to pop up the relevant message or send mobile notification to citizens, display relevant video on the video wall etc.
- The Control Center Application will be integrated with all the other systems, field components, third party applications etc.
- TMC Operator shall be provided with functionality to select desired location in geo-map, and this should enable user to see the live status of field components such as Camera, VDS, Traffic and VMS etc.
- The Control Center Application will comprise of a comprehensive view of the incident or a group of related incidents as on a specific date and time which should include but not be limited to the following:
  - Tasks assignment and their status
  - Responders involved
  - Resources deployed
  - Incident status across relevant parameters of the incident e.g. traffic condition due to an incident
  - Timeline view of the situation suggested actions from the system with their status
- SOP Tool should have capability to define the following activity types
  - **Manual Activity -** An activity that is done manually and provide details in the description field.
  - **Automation Activity -** An activity that initiates and tracks a particular standard operating procedure and select a predefined SOP from the list.
  - **If-Then-Else Activity -** A conditional activity that allows branching based on specific criteria. Either enter or select values for Then and Else.
  - **Notification Activity -** An activity that displays a notification window that contains an email template for the activity owner to complete, and then sends an email notification.

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| | ○ **SOP Activity** - Activity that launches another SOP.<br>• When a condition is triggered, the operator shall be presented with a list of possible actions to take based on past activities and defined SOP.<br>• **Key Performance Indicator:** TMC Control Center Application should be able to facilitate measurement or criteria to assay the condition or performance of departmental processes & policies.<br>○ Green indicates that the status is acceptable, based on the parameters for that KPI, no action is required.<br>○ Yellow - caution or monitoring is required, action may be required.<br>○ Red indicates - status is critical and action is recommended. |
| **Alarm Management System** | • The alarm management system shall allow for continuous monitoring of the operational status and event-triggered alarms from various system servers, cameras, and other devices.<br>• The alarm management system shall provide a real-time overview of alarm status or technical problems while allowing for immediate visual verification and troubleshooting.<br>• The alarm management system shall provide interface and navigational tools including;<br>○ Graphical overview of the operational status and alarms from servers, network cameras and external devices including access control systems.<br>• Intuitive navigation using a map-based, hierarchical structure with hyperlinks to other maps, servers and devices or through a tree- view format.<br>• Accept third party generated events / triggers.<br>• Display alarm condition through visual display and audible tone.<br>• **The alarms may be triggered by the following events:**<br>○ Motion (or lack of motion) in camera view<br>○ Any of the Video Analytics event such as unusual density of vehicles at the junction, or any traffic violations<br>○ Text data string (SMS text, text from mobile app etc.)<br>○ Digital input signal (or loss of signal) from an external device<br>○ Failure of one or more system from hosting infrastructure or network<br>○ Custom event from 3rd party application such as any<br>• Simultaneously handle multiple alarms from multiple workstations.<br>• Automatically prioritize and display multiple alarms and status conditions according to pre-defined parameters such as alarm type, location, sensor, severity, etc.<br>• Alarm Filtering Option shall be made available. It shall be possible to “silence” alarms for a desired time period Ranging from 5 Minutes till 24 Hours or more. This is useful if alarms are unintentionally active all the time, e.g., due to adverse environmental conditions such as heavy wind or rain or a camera is down and maintenance in progress.<br>• Should have details of alarm including<br>○ Severity, time/date, description and location<br>○ Captured video image snapshots<br>○ The alarm shall be raised with necessary details including photo and video evidence (indexed video) wherever required.<br>○ Relevant sensor data<br>○ Response instructions<br>○ Alarm activities (audit trail) |

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| | • The system will also allow following functionalities<br>  ○ viewing of historical alarms details even after the alarm has been acknowledged or closed.<br>  ○ Sort alarms according to date/time, severity, type, and sensor ID or location.<br>  ○ Generate an alarm incident package including the full incident report and exported camera / sensor data from the incident in a specific folder location.<br>  ○ Apply any alarm policy to one or more camera / sensor, or road / corridor or area without having to reapplying the policy multiple times.<br>  ○ Create batch-wise rules and process them<br>  ○ Assign specific actions for each alarm<br>  ○ Activate or deactivate alarms as required<br>  ○ Ability to create exceptions<br>• Alarm management will support the following automatic responses:<br>  ○ Pre- and post-recording of video for desired time period.<br>  ○ Opening an alarm camera window (real-time or playback) on the workstation screen<br>  ○ Displaying the alarm on the alarm list<br>  ○ Activating a digital output<br>  ○ Sending an alarm e-mail message<br>  ○ The alarm management will be able to acknowledge alarm automatically or manually.<br>  ○ Any other actions as per defined SOP.<br>• Alarm management will support the following alarm viewing features:<br>  ○ Display the highest priority alarm and associated data / video in the queue as default, regardless of the arrival sequence<br>  ○ It would allow pass the specific alarms to specified users rather than sending all alarms to every user.<br>  ○ Users in same user group would see and be able to manage received alarms assigned for the same user group. All users would see the alarm status in real time.<br>  ○ System would have single alarm stack for entire ITMS System<br>• View historical alarms details even after the alarm has been acknowledged or closed.<br>• Sort alarms according to date/time, severity, type, and sensor ID or location.<br>• Generate an alarm incident package including the full incident report and exported sensor data from the incident in a specific folder location.<br>• Apply any alarm policy to one or more monitoring area(s) or zone(s) or Field Component(s) without having to reapplying the policy multiple times.<br>• Create batch-wise rules and process them<br>• Assign specific actions for each alarm<br>• Activate or deactivate alarms as required<br>• Ability to create exceptions<br>• Support creation of rules and responses based on digital or contact closure input events from external devices, such as Critical infrastructure-related events, network connection failures, fatal errors, hard disk failures, software service down, video encoder failures, security-related events, digital input pin change, video loss and onscreen alarms etc. |

### 10.2. Geo-Map Services

This can be a separate Licensed product, or may be part of proposed ICCC application, as per bidder solution to meet the below requirements.

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| **Business Requirements** | • The MSI shall provide geographical map services to map physical location of all the field components, location of incidents, violations, locating site of faulty devices (through EMS) and corresponding geographic analysis etc. of the ITMS system.<br>• MSI shall leverage industry leading Maps and geo-services related Shared Services for integration with ITMS system.<br>• MSI shall check the source and reliability, position, accuracy, attribute, authenticity, and methods have to be advised to reduce the error to carry out the seamless integration to ensure ease of use of the system in Control Centres by TMC operators, BTD and other stake holders.<br>• It should also help higher management of BTD to analyse the events on a spatial perspective.<br>• **The system, procurement / creation of Latest Satellite Imagery, vector data, base map etc. shall be sole responsibility of the MSI. The Satellite Imagery shall be of minimum 30 cm resolution. The base map shall be created with scale of 1:1000 for entire Bihar State.**<br>• Details of available layers related to administrative boundaries may be provided by BTD, however otherwise it is sole responsibility of the MSI. Ground truthing on new Satellite Imagery shall be sole responsibility of the MSI. The Satellite Imagery shall be made available in required format for any other use by BTD.<br>• The base map shall also include rivers, water bodies, contour, slope, land use, land cover, Transport network (Rail and Road), Administrative boundaries (districts, city, wards) and any other base which may be required for better understanding of the system on geo-maps as per BTD's requirement for entire Bihar state and Area of interest under this project.<br>• MSI is required to update maps (including the additional layers of data as required for proposed solution) from time to time.<br>• Necessary vector data, mapping of ITMS assets, and any relevant existing assets of the state on separate layers shall be sole responsibility of the MSI.<br>• MSI shall ensure that application is integrated with Video Management System to support the TMC personnel to navigate on the map and use it for better spatial understanding.<br>• Use of tool which allows easy map editing for wide area monitoring.<br>• The system shall allow to define user and user groups and corresponding permissions.<br>• The System shall provide an interface to the system admin for system configuration and day-to-day administration of the system.<br>• The System shall support different logs related to the ITMS system. |
| **Functional Requirements** | • The MSI shall accurately map the spatial attributes such as resources, objects, sensors and elements etc. on the map. |

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| | • The system shall be integrated with VMS to support the Control Centre and TMC operator to navigate on the map and use it for better spatial understanding.<br>• All the CCTV camera, and other sensors locations shall be mapped on to the geospatial map as a separate layer.<br>• Operator shall be able to see the video feed and other output from specific camera(s) / sensors by clicking on the camera icon on the geospatial map of TMC client interface.<br>• The system shall have provision to visually display an alarming sensor on map and visually differentiate sensor alarm severities on map through different colour and icon identifiers.<br>• The TMC operator shall have provision to view alarm details (including description, video, etc.) and investigate the alarm from the map<br>• The system shall have provision view project component, sensor and related name from the displayed map. The operator shall be able to choose sensors from map to view live video and the data and it should allow to redirect to respective application for further operations such as take live video image snapshot and save to file, play, pause, stop, fast-forward, rewind, and play recorded video from pre-set time, take recorded video image snapshot and save to file or print from any live or recorded video.<br>• The system shall also display city wide network on the map. It shall allow to select one or more ring at any level, such as ward level, zone level etc. As per selection, the filter shall be applied, and respective ring shall be visible.<br>• The system shall allow map information to be displayed / hidden on the map including but not limited to<br>o Sensors type and name<br>o Sensor range (e.g. camera – orientation, range, field of view angle)<br>o Locations and zones<br>o Perimeter ranges<br>o Resource tracks<br>o Allow Authorized user to zoom in/out on different regions of map graphic<br>• The system shall have provision to have multiple layers on the map including but not limited to<br>o Sensors, Cameras, VMS etc.<br>o Power and Network cabling and RoW<br>o Black Spots and accident-prone zones<br>o Incident intensity map in the city<br>o Violation intensity map in the city<br>o High Traffic Density map in the city<br>o Filters for incidents / violation / traffic by road type, date, time, type, reason etc. on the Map<br>o Major Buildings / Structures / Roads / intersections<br>o Uptime and downtime of network, devices, sensors etc.<br>• Such layers are indicative and BTD may direct the MSI to add / edit one or more layers anytime during the project period, which MSI shall implement as per the requirements, at no extra cost.<br>• Should support Geo Spatial Standards like GML & KML/KMZ etc.<br>• BTD may direct the MSI to incorporate other information available with the BTD to map it on the GIS map, such as mapping of all the road infrastructure, inventories on the road, entire Right of Way etc. |

### 10.3. Network Management System (NMS)

The MSI may opt to provide functionality of NMS (this clause 9.3) and EMS (below clause 9.4) as a single application, or separate, as per bidder solution, to meet the RFP functionality in totality.

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| **Business Requirements** | • The NMS system shall be able to monitor all the nodes and links, at all levels, Cloud to Core Switches at Data Center to field components. All the active components shall be onboarded on the system. The system shall allow depicting the network in the exact same manner as it is installed on the ground.<br>• It shall act as Fault Management System for all network nodes, including city wide network backbone, last mile connectivity, and any other network / ISP / TSP services availed for the project by MSI.<br>• Shall have a pre-integrated network fault and performance management module, so that it allows us to monitor all the networking equipment which constitutes the backbone network.<br>• The NMS shall seamlessly integrate with and monitor network devices and field components deployed.<br>• The NMS shall be able to provide information on performance of Network segments, including capacity utilization and error statistics for the segment and the top-contributing hosts, track network uptime, downtime, speed, package loss & other parameters.<br>• The NMS comprises of network hardware and software components.<br>• Solution should provide IT operations team a single, analytical driven tool to proactively manage heterogenous network equipment in the ITMS system by continuously monitoring their essential resources, detecting bottlenecks and potential problems, while proactively responding to network based incidents. |
| **Functional Requirements** | • Shall run continuously at a low overhead, to monitor all the network components and discover any new devices or components.<br>• Shall consolidate the management of various IT devices e.g. networks, security, storage, application & showcase the impact of one on another. Support industry standard discovery & communication protocols.<br>• Shall be capable to discover manageable elements / devices connected to the infrastructure and showcase logical and physical connectivity between them.<br>• The NMS shall provide discovery & inventory of physical network devices like Layer-2 & Layer-3 switches, Routers and other IP devices and shall provide mapping of LAN & WAN connectivity.<br>• Shall provide topology in a single view, including on geo-spatial map / GIS.<br>• Shall be able to work in a distributed environment.<br>• Solution must support highly scalable distributed architecture and provide efficient, centralized management of distributed systems. It should also provide proactive and automatic detection of events and alert before they can affect the whole network.<br>• Shall be capable to detect and report about networked end devices connection and identify the associated location.<br>• Shall suppress events for all the network components that are down for routine maintenance, to prevent flooding of non-relevant console |

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| | messages. Should have the provision of appropriating parent-child relationship between all the networking devices in the network.<br>• Shall support application-based failover, over the network infrastructure by rerouting network traffic.<br>• Shall have support for SNMPv1, v2, v3 & traps, IPv6 or above, including dual stack IPv4 and IPv6 or above.<br>• Shall have capacity for upward and downward compatibility.<br>• Shall be able to provide performance monitoring of physical network and assets (devices, sensors and equipment of Field Layer) per upper and lower threshold values as defined by MSI to meet the SLAs.<br>• Shall detect and report compliance violations, changes, failures arising from network hardware, software configuration changes.<br>• Shall monitor and report network latency, packet drop, jitters etc.<br>• Shall monitor all network device bandwidth, data transfer volume etc.<br>• Shall monitor trace route of AP node and wired network etc. Shall have provision to take snapshots of trace route at set interval(s).<br>• Shall support rollback of device configuration changes, software upgrades and point patches across all network devices.<br>• Communication between NMS and field level network infrastructure must be controlled, secure, based on standard communication protocols, and support acknowledgement from field components.<br>• Shall immediately discover and determine the impact of any node, port, and device failure.<br>• Shall constantly monitor and report Quality of Service (QoS) (throughput, error rates, bandwidth, jitter, availability, etc.)<br>• Shall provide highly customizable and dynamic reporting module for capturing and analysing data collected from the entire network.<br>• Solution should depict the device status with different colours where each colour will be an indicator of the current state. Eg. Red for Critical, Yellow for Warning etc. Real time details and historical details should also be provided in form of chart/report for the selected time period.<br>• Trend analysis and instant drill down capability to know peaking issues, which could hurt the operations of ITMS system at any point of time.<br>• Reports shall be generated to be viewed and mailed directly in .txt, .csv, or .pdf formats from the solution. |

### 10.4. Enterprise Management System (EMS)

The MSI may opt to provide functionality of EMS and NMS as a single application, or separate, as per bidder solution, to meet the RFP functionality in totality.

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| **Business Requirements** | • The system shall enable proactive monitoring and reporting of any and every issue faced with any asset of the project, including at field, at TMC, DC, DR including the network backbone. Necessary integration shall be in the scope of MSI.<br>• The EMS system shall be able to record and report all the SLAs as defined in Service Level Agreement.<br>• It shall provide the ability to monitor and manage servers; including temperature, fans, power supply, disks, swap space, CPU utilization, memory capacity, and file systems and generate log reports of on-premise or the cloud based DC and DR and any other servers. Any such reporting dashboard of the Cloud Service Provider shall be available in |

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| | an integrated manner, with the EMS and the SLA monitoring tool for centralised monitoring.<br>• The system should allow the user to manage the productivity of the asset by capturing its lifecycle.<br>• System shall provide an easy method of searching and locating assets.<br>• All access controls shall be provided to designate BTD and nominated officials. |
| **Functional Requirements** | • MSI is expected to provide EMS encompassing but not limited to the following functions:<br>o Configuration Management<br>o Fault Management<br>o Incident, Problem and Change Management<br>o Asset Management<br>o Remote Control<br>o SLA Management & Monitoring<br>o Performance Management<br>o Monitoring Backup and Management<br>o Event Management<br>o Server, Storage and other Infrastructure Management<br>o Monitor network components of the LAN & WAN<br>o Network Link Monitoring<br>o Other modules as required by MSI to meet the requirements of the RFP, and as per directions of BTD.<br>• The EMS shall provide ability to monitor and diagnose OS and application behaviour in real-time on production systems and be tuned in the exact same environment in which they are running in production.<br>• The EMS shall include the ability to monitor and visualize a virtualized system infrastructure by discovering and monitoring virtual machines and providing ability to depict the logical relationships between virtual servers and virtual machines.<br>• The EMS shall have the ability to collect data from the virtual systems without solely relying on SNMP.<br>• EMS can be configured to set customizable thresholds (lower and upper) for all system parameters, compare performance with threshold, and send notifications and appropriate alarms, if the system parameters either exceed the upper limit or fall below the lower limit of the threshold.<br>• EMS shall monitor applications and processes for detecting issues, bugs, abnormal trends, threshold breaches & respond as per user defined SOPs & provide early warning to reduce or mitigate impact.<br>• EMS shall monitor end-to-end transaction and performance of resource heavy applications, failed transactions, database errors etc., and automatically generate respective reports.<br>• Shall monitor end-to-end transaction and performance of resource heavy applications, failed transactions, database errors etc., and automatically generate respective reports.<br>• Operator at the TMC shall get an alarm of any possible fault(s) (failure or tempering) at the field (e.g. equipment failure, camera / sensor / controller failure, failure of linkage with DC-DR and TMC, connectivity failure etc.).<br>• The EMS shall be capable of providing early warning signals to the TMC operators on the performance issues, if any. |

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| | • EMS shall maintain count & monitor the spare IT project assets in accordance with the agreed arrangement so as to maintain the required SLA levels.<br>• System should showcase which asset is getting maximum number of incidents to provide visibility of the performance.<br>• EMS shall establish communication to IT assets through Simple Network Management Protocol (SNMP) or equivalent technology and will be required to be setup in a high availability mode.<br>• The EMS shall support SNMPv3-based network discovery and management in-built or using any external third-party modules to meet the RFP defined functionalities.<br>• The EMS shall support multiple types of discovery like IP range discovery – including built-in support for IPv6, Seed router based discovery and discovery whenever new devices are added with capability to exclude specific devices / IPs.<br>• The discovery shall be able to identify make, and model of the equipment. The EMS shall able to perform real-time or scheduled capture of device configurations. It shall also provide features to capture, view & upload network device configuration.<br>• The EMS shall also support single pane / dashboard with visibility across multiple areas of applications for monitoring.<br>• EMS shall be integrated with geo-map services for location wise health of all assets.<br>• EMS shall detect, track, monitor and manage all IT (IP based), active and protocol based, and critical assets as described in scope of ITMS project. EMS shall also have provision to add non-IP based devices and sensors to the centralized asset repository.<br>• EMS shall have provision to view all assets implemented by MSI for execution of the ITMS Project as well as existing Co-Used assets.<br>• EMS shall enable the management of IT assets in terms of their physical, financial and contractual aspects (commissioning, lifetime etc.), thereby ensuring optimum utilization of assets and reducing compliance risks.<br>• EMS shall create and store asset information including, ID, serial number, version, commissioning date, last maintenance date, status, license, user or user group etc.<br>• The system should allow the user to track assets at any time to know the status of an asset – location, using by whom, contract renewal for maintenance etc.<br>• EMS shall be configured to perform periodic checking of inventory and generate reports/alerts comparing current status and original inventory stock. EMS shall able to store historical device configurations captured in the database and thereby enable comparison of current device configuration against a previously captured configuration as well as compare the current configuration against any user-defined standard baseline configuration policy.<br>• EMS shall display configuration changes differences, and able to identify user wise changes / modifications made to device configurations.<br>• EMS shall also intelligently determine which ports are operationally dormant.<br>• The EMS shall determine device availability and shall exclude outages from the availability calculation with an option to indicate the reason. |

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| | • The system shall support the correlation between two or more asset group elements to avoid multiple alarms on same issue.<br>• Ability to define down time for Assets to conduct Maintenance activity<br>• EMS shall track user rights towards using hardware & software licenses.<br>• Shall manage inventory for individual or bulk items, set priority based reordering levels, price of each asset, transaction history, Maintenance history, Warranty, expiry date etc.<br>• Shall keep details of components internal to the asset like RAM, CPU, disk, chassis, switch types, warranty etc.<br>• Shall provide information on all software packages with respect to version changes and upgrade<br>• EMS shall have capability to generate a report detailing all maintenance and other works carried out on any asset over any specified period.<br>• The EMS shall provide a detailed asset report, organized by vendor / OEM name and device, listing all ports for all devices.<br>• EMS shall provide sufficient reports that identify unused ports in the managed network infrastructure that can be reclaimed and reallocated.<br>• The EMS shall provide sufficient reports pertaining to asset and change management, alarms and availability of critical network resources as well as network response times for critical links. |

### 10.5. Video Management Software (ViMS) and Recording Server

Video management system shall constitute of a platform which will be designed for viewing, recording and replaying acquired video as part of overall project solution. This platform will be based on the Internet Protocol (IP) open platform concept. Major functionalities are as under:

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| **Business Requirements** | • ViMS shall be used for centralized management of all field camera devices, video servers and client users under ITMS project.<br>• ViMS will be primarily responsible to manage all the video storage and management of all the video feeds, index the videos by pre-defined relevant tags such as date – time, location, junction, incident id / violation id, etc.<br>• Video feed from ITMS Evidence cameras should be made available at TMC for live-viewing and recorded 24 x 7, retained at the for minimum duration as specified at a minimum resolution of 2 MP (FHD) with 18-24 FPS, in VBR using H.264/H.265 compression.<br>• ViMS shall support inbuilt mechanism for high availability and failover.<br>• ViMS shall be supported for fully distributed solution for monitoring and control function, designed for limitless multi-site and multiple server installations requiring 24/7 surveillance with support for devices from different OEMs.<br>• ViMS shall be enabled for any standard storage technologies and video wall system integration.<br>• ViMS shall also enable viewing of camera feeds on any device such as desktops, video walls, smart phones etc. to limited access-controlled login as may be required. Shall have client / viewer that runs on any PC, tablet and mobile with unlimited licenses at extra no cost to BTD.<br>• The module shall include flexible access rights and allow each user to be assigned several roles where each shall define access rights to cameras. |

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| | • The solution shall capture, store, and analyse digital video, images & recordings to enable central monitoring, increase operational efficiency with near zero false alarms.<br>• ViMS shall allow play, fast-forward, rewind, pause, and specify time to play recorded video.<br>• ViMS shall make continuous recording of all cameras and output from all other sensors, equipment etc. and store for the number of days as decided, at the specified resolution. (Shall be site configurable per camera for lesser or more days also). Number of days a video feed may be required can be customized for different locations from time to time.<br>• Apart from videos, system shall also store meta-data of all the vehicles with vehicle number, make, vehicle classification, for the number of days as decided.<br>• The solution design for the ViMS shall provide flexible video signal compression, display, storage and retrieval.<br>• MSI is also required to prepare the guideline document to be followed by the BTD, Traffic Police and MSI personnel for the retrieval of Video / images from the CCTV System so as to maintain integrity of the evidence. Such a guideline document should include methods of retrieval of data, checklist to be followed and flowchart of the entire process to be followed.<br>• ViMS shall be enabled for integration with any external Video Analytics Systems both server & edge based.<br>• ViMS shall have an administrator interface to set system parameters, manage codecs, manage permissions and manage storage.<br>• ViMS shall provide an administrator interface for day to day control of cameras and monitoring on client workstations.<br>• ViMS shall have ability to allow the administrator to distribute camera load across multiple recorders and shift from one recorder to another.<br>• ViMS system should ensure that once recorded, the video, images and any other information cannot be altered, ensuring the audit trail is intact for evidential purposes. |
| **Functional Requirements** | • The proposed system shall be flexible, open video, over IP architecture built on accepted industry standards that facilitate integration with varied IT infrastructure / applications / systems.<br>• Shall have the facility of collaborative monitoring, ability to import videos, export and save video files, access videos from 3rd party app like mobile app etc.<br>• The ViMS shall support field sensor settings. Each channel configured in the ViMS shall have an individual setup for the following settings, the specific settings shall be determined according to the encoding device:<br>The ViMS shall support the following operations:<br>o Adding / Updating / removing an IP device<br>o Updating basic device parameters<br>o Adding / Updating / Removing / enabling / disabling an IP channel<br>o Refreshing an IP device (in case of firmware upgrade)<br>o Multicast at multiple aggregation points<br>• Shall have provisions for a flexible rule-based system for time / schedule-based recording, continuous 24-hour recording, event triggered recording (i.e. motion detection triggered recording), manual recording, etc. |

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| | • ViMS shall be capable of displaying videos in multiple monitors and video wall simultaneously.<br>• Shall enable playback of audio along with video wherever available. The monitor will enable the user to work with multiple Audio layouts containing collections of audio clips.<br>• All CCTV cameras' locations shall be overlaid in graphical map in the Graphical User Interface (GUI). The ViMS will have simple yet comprehensive dashboard for cameras selection for viewing through a list / click on the map.<br>• The nomenclature of the camera shall be such to identify a particular camera type, junction name, arm name and lane number immediately. The camera shall be added in a tree structure for proper indexing.<br>• VMS shall show a dashboard with feeds from all cameras, or in any combination as selected, give other facilities such as (digital) zoom, crop, focus etc. from the software, on live and on recorded video or from media storage, for all cameras and save them in a separate file. The use of digital zoom, crop etc. shall have no effect on recording, or other users.<br>• ViMS shall rotate through multiple video views based on predefined video camera sequence and duration.<br>• It shall be possible to use multiple screens as well as floating windows for displaying different views simultaneously.<br>• It shall be possible to quickly substituting one, or more of a view's cameras with other cameras.<br>• It shall be possible to view images from several cameras in sequence.<br>• It shall be possible to create and switch between an unlimited number of views, each able to display video from up to 100 cameras from multiple servers at a time. The system shall allow views to be created which are only accessible to the user, or to groups of users based on different layouts optimized for 4:3, 4:3 Portrait, 16:9 and 16:9 Portrait display ratios etc.<br>• The ViMS shall have a facility to create CDs or other storage media for submission to Judiciary, which can be treated evidence for legal matters. Such storage media creation should be tamper proof, encrypted, password protected with provisioning of watermarking and MSI to provide appropriate technology so that integrity and quality of evidence is maintained as per requirements of the judiciary.<br>• The ViMS shall support bookmarking the videos. Thus, allowing the users to mark incidents on live and/or playback video streams.<br>• ViMS shall have provision for video replay on the GUI for general review and also for pre-and post-alarm recording display, even in case of false alarm.<br>• ViMS shall have ability to define a virtual camera that focuses on the part of camera view be it live or playback using Virtual Cameras one can view chosen parts of the full recorded Camera View in a Separate Window. View Specific Area of interest in a virtual camera and choose per virtual camera for zooming, View, Aspect Ratio and resolution. System shall allow multiple such Virtual camera can be made from one single camera view.<br>• Shall have specific features like Motion & Blackout masking, perspective settings, environment selection, map configurations etc. |

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| | • Motion search of recorded video & highlight motion in the playback bar and also as motion event based thumbnails to navigate straight to that event in recording shall be provided.<br>• The ViMS shall be capable of supporting dual streaming of live or recorded video to all the locations in different resolutions or frame rates or any and other related parameters of each camera to be configured independently for recording to ensure bandwidth optimization as well as meeting the requirements. The same shall be configurable by the administrator in order to provide for network constraints. The system shall allow the user to configure groups of cameras with the same frame rate, bit rate and resolution for efficient set-up of multiple cameras simultaneously.<br>• ViMS should support Scalable Video Quality Recording to record high-quality video to edge storage, while a low-quality reference video stream can be recorded centrally in the recording servers.<br>• The ViMS shall also support failover recording. ViMS should consist of only Base license and Channel Licenses. ViMS should be provided with required number of Failover Servers and Failover Camera Licenses. **The failover recorder would act as a hot standby**, ready to take over the functions of a primary recorder. No action from the user should be required. This should be supported for on-premise, cloud or hybrid infrastructure.<br>• ViMS shall support manual failover for maintenance purpose.<br>• Edge storage shall secure that when a lost or broken connection is back up, the data stored on the camera's internal storage shall be retrieved and stored in the media database.<br>• Edge storage shall secure that after recovery from a malfunction it shall be possible to play back and view the video, and audio recorded by the device, while the malfunction persisted.<br>• The ViMS shall also support dual recording and redundant recording which covers continuous recording during a recorder server failure (and access to recorded video) and/or recording in two different locations to address a catastrophic event by providing a simultaneous recording by two recorders, with independent (non-shared) video storage, including the redundant storage.<br>• The ViMS would prevent the loss of video during network / recorder breakdown by retrieving video from the redundant storage along with the following functionalities:<br>o Automatic gap detection of missing video<br>o Automatic retrieval of the missing video from the camera edge storage upon reconnection between the camera and the recorder<br>o Retrieved video transferred and saved on the recorder using the recorder original file format<br>o Seamless playback of retrieved video, without extra retrieval time upon query<br>o Network/Recorder management to avoid congestion or video overflow into the recorder<br>o Shall work in conjunction with Recorder Failover mechanism.<br>• The ViMS shall support long-term or off-site storage.<br>• The VMS system shall be compatible to single and multiple processor servers, on cloud, on premise or hybrid. The server processor & hardware shall be optimized in all cases. |

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| | • The ViMS shall be designed to dynamically delete (groom) extraneous video from hard drives to make space for newer incoming video in a FIFO manner, based on specific pre-defined retention parameters, while recognizing and preserving video clips marked by the system as important, such as evidence for violation, incident video etc.<br>• The ViMS shall move files based on schedule and classification of video files (event video vs. all video)<br>• The ViMS shall be capable of seamlessly locating any requested video stored on recorders' disks servers, from any workstation.<br>• The ViMS shall intelligently manage videos and store them in order of priority as per defined rules, perform simultaneous tasks such as digitizing and compressing video, writing video to files on local hard disks / server and maintaining an accurate index of the stored video files, deleting older video files as needed, transferring recorded video to long-term storage media.<br>• Violation retrieval could be sorted by date, time, location and vehicle registration number. MSI shall ensure proper indexing for the same.<br>The system should be capable of pushing the Violation ID to External Challan Generation Application (e.g. NIC ITMS Applications etc.) The user shall be able to use Violation ID to locate the specific violation within the ITMS application and review the respective Snapshots and Video clips. (This feature is envisaged to support the Operators to re-verify any Violation event at the time of violation review and approval before challan generation)<br>• A strong adaptive remote viewing capability shall also form part of the ViMS solution, including:<br>o Support logon using the user name and password credentials.<br>o Viewing of live and recorded videos<br>o Concurrent playback for user of multiple recorded videos with date, alert sequence or time searching.<br>o Dynamic transcoding mechanism<br>o Server side scaling and zooming<br>o Bandwidth priorities<br>o Predefined video quality (frame rate and resolution), compromise based on available bandwidth<br>o Real-time remote camera control even at very low bandwidth connection.<br>o Efficient H.265 or better transcoding<br>• The ViMS shall support view, import and export multiple video formats such as AVI, M-JPEG, MPEG- 4, MP4 Export or Latest etc.<br>• The ViMS shall include a stand-alone viewer application to be included with video exported from the client viewer application. The viewer application shall allow recipients of the video to browse and playback the exported video without installing separate software on their computers.<br>• System shall ensure that once recorded, the video, images and any other information cannot be altered, ensuring the audit trail is intact for evidential purposes.<br>• ViMS shall be able to accept alerts from video analytics built into the cameras, other third party systems, sensors etc. |
| **Technical Requirements** | • All the offered ViMS and cameras must have Open Network Video Interface Forum (ONVIF) compliant. |

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| | • The CCTV camera offered shall be compatible with the ViMS to deliver all the functionality of ViMS mentioned above. BTD reserves the right to reject either CCTV or ViMS or both, if any of the functionality is not delivered due to limitation of either CCTV Camera or ViMS or both.<br>• The ViMS shall be built on the open standards and shall be compatible with products from all industry leading ONVIF complaint internet protocol (IP) cameras manufacturers. ViMS to be ONVIF compliant. The proposed systems shall be compliant with ONVIF Profiles S, G, T, and M.<br>• ViMS shall have the ability to operate in a STQC / CERT-In / FIPS 140-2 compliant mode.<br>• The ViMS shall be capable of supporting the attachment of external storage devices via SAN, NAS, SAS, iSCSI or Fiber Channel etc.<br>• The ViMS shall support any central disk storage device, including disk arrays with iSCSI connectivity and Storage Area Network (SAN) devices. |

### 10.6. Video Analytics System

Video Analytics system can be same as ITMS system or different, as per Bidder Solution to meet the RFP requirements.

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| **Business Requirements** | • Software shall be flexible and easily scalable with multiple types of devices, cameras. Support input video of various formats from cameras.<br>• Perform video analytics based on pre-defined policies. These policies may be added, edited, deleted or disabled and enabled anytime during the operations.<br>• Provide graphical tool to create, delete, disable, configure, and modify user or user-groups and corresponding rights.<br>• All the proposed camera shall be ONVIF compliant. |
| **Functional Requirements** | • Shall be able to run different types of analytics on all the cameras as per requirement of the project.<br>• Allow flexible use of Rule based Analytics on any fixed camera under the project<br>• Able to filter large amounts of video and focus on vehicular behaviour at junctions or otherwise appropriately.<br>• Provide the number of vehicles infracting simultaneously in each lane. The vehicles will be clearly identifiable and demarcated in the image produced by the camera system.<br>• Shall have the facility to select a camera and select a range or draw a line for analysing vehicular density, intrusion detection or illegal stoppages or any other application which can be dynamically defined through TMC.<br>• Support display of timeline, customizable site map, live video, video playback, integrated site map, remote live view, multi-site capability, encryption, watermarking and event based recording and various other features important to the project.<br>• Intelligent object tracking in adverse weather condition and poor visibility.<br>• Detection zone can also be a line, which can have one or many segments.<br>• System shall allow multiple detection zones that are polygonal with a variable number of vertices so that any shape can be supported. |

- **Have real-time video analysis features (either through Video Analytics or any other system in totality):**
  - Vehicle Classification and Counting including density for all Vehicle Detector Cameras
  - Traffic accidents involving one or more vehicle for all arms and junctions with one or more camera.
  - Traffic Congestion Detection for all Vehicle Detector Cameras
  - Unusual objects / abandoned object / unidentified object on road and footpath as per field of view for all cameras.
  - Event based search (Vehicle stoppage / accident, Class of Vehicles etc.) for all arms and junctions with one or more camera.
  - Abrupt change in Field of View due to vibration/ Scene change detection for all cameras.

It should have capability to raise above as an incident to the ICCC / Alarm Management System for further necessary action.

- Video and Image should have a header/footer depicting the information about the site IP and violation details like date, time, equipment ID, location ID, Unique ID of each violation, lane number, Vehicle registration number of violating vehicle and actual violation of involved vehicle etc.
- **Filters and Functions**
  The System shall support various filters and functions as per requirement of the RFP including but not limited to the following:
  - **Presence:** Detects when an object or vehicle is inside or crossing a zone or a line **for Evidence cameras**.
  - **Density:** Detects the count and density of the vehicle within the area of interest and increase and decrease of the same over a period of time **for all Evidence cameras..**
  - **Camera Tampering**: Detects moving, defocusing or covering of the camera, Scene changes detection **for all cameras under the project.**
  - **Enter and Exit Detection:** An "object entered" alarm is raised when an object crosses from the outside to the inside of a detection zone. Conversely, an "object exited" alarm is raised when an object crosses from the inside to the outside of a detection zone **for all arms and junctions with one or more camera.**
  - **Stopping and Dwell Detection:** Vehicle that are stopped inside a zone for longer than the defined amount of time will trigger the rule and raise an alarm **for all arms and junctions with one or more camera.**
  - **Directional Detection:** Vehicles that travel in the configured direction (within the limits of the acceptance angle) through a zone or over a line trigger the rule and raise an alarm for all arms and junctions with one or more camera **for all arms and junctions with one or more camera.**
  - **Object Classification:** Able to perform object bifurcation once the camera has been calibrated. Object classification is based on properties extracted from the object including object area and speed **for all arms and junctions with one or more camera.**

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| | ○ **Objects Counting:** At least 30 counters linked to the detection rules, provide counting of all detection objects **for all arms and junctions with one or more camera.**<br>○ **Camera shake cancellation:** object tracker works even if the camera is on a swaying pole **for all cameras under the project.**<br><br>• Video Analytics System shall have provision to define SOP such as Alarm I/O (relay), Email, SMS etc.<br>• Automatically track and classify objects such as cars and people and should be capable of real-time analysis of connected cameras in order to detect abnormal activity and threats. The information so generated may be pushed to authorities as required.<br>• Offer a suite of search options in the range of motion and non-motion behaviours of vehicles retroactively. The user shall be able to define various parameters regarding the search of interest and receive matching search results within seconds, enabling rapid access to specific video segments. The search option shall be individual or in combination including but not limited to:<br>○ Target Type – vehicles or static objects<br>○ Event Type – moving, stationary, crossing a line, occupancy, density<br>○ Search by colour, class / type of vehicle<br>○ Search within defined time frames<br>○ Search on selected cameras or group of cameras (for e.g. of a particular corridor / junction/s)<br>• Search for similar targets<br>• Support integration with other online and offline video analytic applications. Offline video analytics refers to running of video analytics of any video which is not streaming live, but also on recorded video which can be imported, and analytics can be run on the same as per requirement on case to case basis. |

### 10.7. SLA Management System

The SLA Management System along with the and Network Management System (NMS) and Enterprise Management System (EMS) will enable Bihar Transport Department and other authorities to capture all the System based Service Level Agreements as agreed between the BTD and the MSI while entering into the contract. The system will assist BTD to automatically calculate the downtime and penalty.

Measuring service performance requires incorporation of a wide variety of data sources of the project. The SLA Management System shall be required to support the collection data from various sources in order to calculate Uptime / Performance / Security SLAs.

**MSI shall note, without delivering SLA Management Tool as per RFP requirements, the project will not be declared Go-Live.**

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| **Business Requirements** | • The SLA Management System should enable to capture all the System based SLAs defined in the RFP and any other parameters as directed by BTD from time to time and calculate penalty automatically.<br>• Should support the collection data from various sources in order to calculate Uptime / Performance / Security SLAs. |

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| | • The system shall be capable of monitoring functional SLAs as well as technical SLAs.<br>• The system shall have provision to define various SLA parameters and their respective penalties as defined in the SLA in this document.<br>• System shall work in conjunction with the EMS and ensure capturing all the details of the asset to calculate SLA.<br>• The system must support technical audit of the complete IT system |
| **Functional Requirements** | • Must centrally monitor all IT assets (including field components, on-premise / cloud DC / DR, network equipment etc.)<br>• Shall have role based security model to provide access to only authenticated users.<br>• Should accept Data from a variety of formats; provide pre-configured connectors and adapters.<br>• Must support Service Level Agreements & Lifecycle Management including Version Control, Status Control, Effectively and audit Trail to ensure accountability for the project.<br>• Must have the ability to define and calculate key performance indicators from an End to End Service delivery perspective.<br>• Shall show real-time status of all events, incidents, issues lodged.<br>• Should support SLA alerts escalation process.<br>• Shall capture, monitor and track all the system-based SLAs from all components and systems and calculate penalties accordingly<br>• Support for defining and calculating payment due and penalty based as per defined SLAs.<br>• Shall have an integrated, highly customizable single-view dashboard listing and co-relating all contract parties, service type, SLA performance, violations, penalties incurred etc.<br>• Shall support root cause analysis to clearly define the type and severity of SLA failure.<br>• Must have integrated dashboard providing view of non-performing components and assets / issues with related to service on any active components.<br>• Must have facility to display all the SLAs being triggered in case of multiple SLAs and select event that triggered the delay to drive the penalty calculations.<br>• Should be pre-configured so as to allow the users to generate timely reports (daily, weekly, monthly, quarterly etc.) on various parameters.<br>• Shall be able to generate web based SLP reports highlighting violations, penalty, action taken, frequency of occurrence etc.<br>• **Reports (Indicative but not limited to):**<br>o Ability to generate reports on payment due and penalty, to check on non-compliance of SLAs for the project.<br>o Monetary penalties to be levied for non-compliance of SLA, thus the system must provide Service Level Performance Report over time, contract, service and more.<br>o Historical and concurrent service level reports for the project in order to ensure accountability of the MSI's performance.<br>o Automatic Report creation, execution and Scheduling, must support variety of export formats including Spreadsheet, Word/Docs, Adobe PDF etc. |

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| | ○ Templates for report generation, Report Filtering and Consolidation and Context sensitive Drill-down on specific report data to drive standardisation and governance of the project<br>○ Drill-down capabilities in dashboard reports ensuring visibility for only relevant personnel of the project.<br>• The system shall be designed to capture downtime incident with relevant details of the downtime. It shall allow authorized users of BTD to tag any particular downtime as "no-penalty" or "partial penalty", which has arisen due to reasons not completely attributable to the MSI. Some examples includes downtime for the network due to un-informed construction works in the City. The BTD's decision shall be final and binding.<br>• Must follow governance, compliance, and content validations to improve standardization of service level contracts.<br>• Should support requirements of the auditors requiring technical audit of the whole system. |
| **Incident Ticketing System Requirements** | • The MSI will have supply and commissioning of an automated system for Incident Ticketing in its scope, which shall be able to automatically track SLAs of all ITMS project components and automatically generate logs as per predefined events and corresponding norms for SLA tracking.<br>• Support the creation, modification and closure of Incident records for both IT & Facility Infrastructure. Tool should be capable to log the Incidents both automatically (on threshold breach) and manually (by the service personnel)<br>• This automated mechanism of triggering SLA and reporting shall be configured in tool as automated ticket logging, the time of occurrence of such an event shall be considered as the time of incident logging, and time required for resolution shall be considered as SLA closure.<br>• In case there are events that cannot be logged automatically, provision will be given to TMC operators, BTD officials and other authorities for raising the ticket.<br>• Incident should record the source of reporting of the incident (such as Alarm trigger, Email, person or group, Phone etc.).<br>• Incident records shall be classified according to Impact, Urgency, Priority.<br>• Incident can be linked to another Incident, parent child relation between Incidents should be defined.<br>• Support creation and access of a knowledge base for closed incidents and use of the knowledge base to resolve recurring incidents.<br>• Tool should be capable to update on incident resolution progress.<br>• Restrict the ability to open, modify and close Incident records to authorized staff only.<br>• Facilitate flexible report generation based on selected filtering parameters such as location, incident type, priority, escalation, SLA breach and enable reports to be viewed, printed or exported to other file formats.<br>• Solution should facilitate the production of management reports from historical Incident records and analysis of Incident to identify trends.<br>• Ability to generate reports for the IT equipment's on which maximum number of incidents have been logged. |

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| | • The calculations of response time and resolution time shall be counted from the time of call logging and shall be pre-configured in the tool as per the SLAs agreed between the MSI and BTD. |

### 10.8. Web Portal

The ITMS project envisages to design a web portal for the Officials and the Citizens of the Bihar state providing real-time information about the traffic, and other important traffic updates. A Web Portal is also envisaged for the authorities with all the information about the project, all reports, and ability to dynamically generate reports about the project. Such web-portal may be separately hosted on a dedicated domain, procured by MSI, in the name of BTD, and linked from BTD website.

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| **Business Requirements** | • **Web Portal for the Authorities:**<br>The web portal shall give remote access to various users of BTD to access at least the following information:<br>o Video feeds from all the cameras<br>o Sensor data<br>o Video and Data analysis performed by the system<br>o Details of violations and incidents and their corresponding details<br>o Corresponding reports<br><br>• **Web Portal for Citizens**<br>o Information on Motor Vehicle Acts<br>o Type of offences and its fine amount<br>o Link to check pending offences for a Vehicle/Licensee<br>o Link for payment of pending challans and information on other locations for payment of challans<br>o Link for online payment gateway integration for payment of pending challans (NIC's eChallan link)<br>• System shall have a robust user management and security management features including password policies, user reminder settings and complete login security procedures, and facility to assign role-based rights.<br>• The web portal shall also have an open interface for citizens and 3rd party viewers with basic information and access to restricted reports and MIS. Such restriction shall be defined by BTD at later date.<br>• Provide a Portal, Content Management System (CMS), Workflow Engine and Document Management System (DMS) as a single unified system.<br>• May be COTS or Enterprise Edition Open Source solution supported by a reputable OEM having Support Centre in India.<br>• The domain of the web portal shall also be responsibility of MSI, however the domain name shall be selected by BTD and in the name of BTD. |
| **Functional Requirements** | • The Platform should have fully featured CMS abilities such as content authoring and publishing, dynamic content targeting for different audiences, personalization and site management.<br>• It will provide all such details in a report format which can be drilled down to the last level, to officials and citizens as per user access decided by BTD. |

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| | • Provision to organize users by business-defined categories such as geographies or offices, as well as by cross-departmental teams and workgroups. Each department and site can inherit or define its own permissions and administer user, group and role management for the various applications it chooses to include.<br>For e.g., the BTD ward offices will be able to view traffic conditions and video feeds from the respective jurisdiction. System shall have ability to assign access rights accordingly.<br><br>**The Portal Platform's capability**<br>• Support integration with all the systems proposed under ITMS project.<br>• Should be natively integrated with Document Management System for storing all the underlying documents required in process.<br>• **The DMS**<br>o Should be able to address both structured and unstructured sources of data like email, scanned images, portal & mobile.<br>o Should have facility for viewing documents from the platform.<br>• Should have visual components that integrate directly with the development environments for Android and iOS.<br>• Support for push notifications to mobile apps with Portal Platform.<br>• MSI shall develop and maintain the web portal, update the contents, include any newly developed reports and MIS, and make changes as directed by BTD from time to time. |

### 10.9. Mobile App for Responders

The MSI shall be required to develop and maintain the mobile app for stakeholders as per below indicative requirements. The MSI shall submit at least three designs for the functional flow, application GUI etc., and get it approved from BTD. The application shall to be adding more services as and when required by the BTD.

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| Business Requirements | • BTD envisage to develop a mobile app for responders, i.e. all the stakeholders like Traffic Police, RTO officials including restricted access to the drivers of the emergency service vehicles, as a part of the ITMS system. The mobile app shall be Android as well as iOS based.<br>• The app shall be adaptive to screen of any size.<br>• The MSI shall submit at least three designs for the functional flow, application GUI etc., and get it approved from BTD.<br>• All the rights for the mobile app shall be of BTD. |
| **Functional Requirements** | • **Alert on the mobile app as defined in the SOP, in case of any incident detected on the expressway, along with location of incident for information to the field officers.**<br>• App shall also have feature of reporting an incident which will be directly monitored through TMC. Responders shall be given feature to record video or and upload photo of incident, which will be geo-tagged by mobile app as evidence and sent to the operators of TMC.<br>• Link to check recorded violations along with necessary details.<br>• Mobile app for responders shall have feature to relay real-time information about time and location of responders to the TMC and web portal for monitoring by senior authorities against the pre-set parameters. |

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| | • BTD may direct MSI to develop more features over the period of contract, which MSI shall develop and deliver in time bound manner at no extra cost to BTD.<br>• Feature to relay real-time information about time and location of responders to the TMC and web portal for monitoring by senior authorities against the pre-set parameters. |
| **Technical Requirements** | • **The app shall be integrated with the other components of the ITMS project and other system through open standards.**<br>• **Compatibility**<br>  o Shall be developed on Android and iOS platform. App must be compatible with all versions of OS released after Jan 2025.<br>  o The app must be responsive in nature, i.e. it should be compatible with any screen size and screen colour resolution with smart phones, phablets and Tablets, PDAs etc. Also, the app must be orientation independent<br>  o App must be compatible with all major brands of mobile phones in the market with above OS.<br>  o All the above compatibility should be designed without changes to underlying business logic.<br>  o The platform shall be deployed in English and Hindi<br>• **Mobile App and Phone**<br>  o The app must ask for permissions for only the necessary pre-installed applications of the phone (e.g. GPS, Phone, Camera etc.) These permissions must be revocable from the mobile app.<br>  o **Power and Data**: The app must consume less power and should be on standby mode when not used. The data usage of the app should be minimum.<br>• **Mobile App and Backend System**<br>  o The mobile app and backend system shall be able to share data with other components of the ITMS System and other integrated systems. Hence standardization of data fields etc. has to be taken care along with development of APIs.<br>• **Security**<br>  o **Citizen's Data:** Data of the citizens such as their personal information, photographs etc. must be tightly secured and by no means should be shared or leaked.<br>  o **Data encryption:** All the data flowing in and out of the mobile and mobile app through whichever medium must be securely encrypted.<br>  o **Unauthorized Access:** Permission based access to various applications and data of mobile such as camera, gallery, phone etc.<br>  o All the guidelines / checklist for secure application development & secure IT Infrastructure of Government of India's Ministry of Communication, Department of Telecommunications, dated 25/July/2017 as amended from time to time shall be met.<br>  o **System Modification:** No parameters of the system shall be modified without clear permission wherever necessary.<br>  o The app shall be designed to support HTTPS protocol on Secure Socket Layer (SSL).<br>• Any additional security features such as session handling, authentication and authorization as per latest OWASP Top 10 vulnerabilities must be responsibility of MSI. |

### 10.10. Manpower Management

- The TMC shall also have a manpower management module to manage day to day activities, scheduling of resources, attendance and other parameters related to the manpower
- Such details shall be pulled from Access Control Software, HRMS of MSI or any such system deployed by the MSI.
- There is no access control system and attendance system envisaged for Viewing Center.

### 10.11. Contact Center Software

| | Minimum requirement | Compliance (Yes/No) |
|---|---|---|
| 1 | The bidder shall provide a Contact Center Solution fully integrated with the proposed IP-PBX system and shall comply with the following minimum functional specifications. | |
| 2 | Automatic call distribution | |
| 3 | No of call centre supervisor license: 5 Scalable to 50 | |
| 4 | No of call centre agents/ operators: 5 Scalable to 100 | |
| 5 | Automatic identification of incoming number based on landline and mobile number mapping | |
| 6 | Call recording mapped to incident tickets | |
| 7 | Customizable agent and supervisor desktop layout | |
| 8 | Inbound and outbound capability | |
| 9 | Call control | |
| 10 | Live data reporting gadgets | |
| 11 | Phone book | |
| 12 | Speed Dial in IP phones | |
| 13 | Citizen automated centre should be integrated with UP Dial 100 1090 Voice and other platforms using H.323 or SIP. | |
| **Automatic Call Distribution (ACD):** | | |
| 1 | Should be highly available with hot standby and seamless failover in case of main server failure. There should not be any downtime of Contact Centre in case of single server failure. | |
| 2 | Should support skill-based routing and it should be possible to put all the agents in to a single skill group and different skill groups | |
| 3 | ACD support routing of incoming calls based upon caller input to menus, real- time queue statistics, time of day, day of week, ANI, dialled number etc. | |
| 4 | ACD should support call routing based on longest available agent, circular agent selection algorithms | |
| 5 | ACD should support the playing of customizable queuing announcements based upon the skill group that the call is being queued to, including announcements related to position in queue and expected delay | |
| 6 | Agents should be able to chat with other Agents or supervisor from the Agent desktop software | |

| | Minimum requirement | Compliance (Yes/No) |
|---|---|---|
| 7 | Supervisor should be able to see the real-time status of agents, supervisors should be able to make agent ready or logout from the supervisor desktop | |
| 8 | Should support Queuing of calls and playing different prompts depending on the type of call and time in the queue. | |
| 9 | Platform support rich blending of inbound, outbound and multi-channel contacts in single queue and workflow | |
| 10 | Platform should be capable of wart, real time speech, co browsing features whenever required. | |
| 11 | Platform should be capable to perform contact routing based on previous citizen journey event. | |
| **Interactive Voice Response (IVR):** | | |
| 1 | IVR Platforms should support following standards from Day 1 - VXML, CCXML, SMIL, SRGS/SISR, MRCP, SIP/H.323, WSDL/SOAP, HTML5 | |
| 2 | IVR should play welcome messages to callers Prompts to press and collect DTMF digits | |
| 3 | IVR should be able to integrate with backend database for self-service, as and when required | |
| 4 | GUI based tool to be provided for designing the IVR and ACD call flow | |
| 5 | IVR should support Voice for ASR, TTS, and DTMF call flows | |
| 6 | IVR should be able to Read data from HTTP and XML Pages | |
| 7 | IVR should be able to run outbound campaigns (agentless and agent based) without need of any separate external Outbound dealer solution. | |
| 8 | IVR should support voice, email and SMS channels with two-way communication capabilities and be capable of visual IVR capabilities. | |
| 9 | The solution should have future support without additional cost for "IVR that could stream RTP to external ASR applications, IVR should be able to integrate home automation devices like Amazon Echo and Google home | |
| 10 | The Call centre needs to integrate with Emergency response system of the state / city. For the same, the call centre suggested should have deployment / experience in Emergency like 100/101/108, or similar emergency systems | |
| **Reporting:** | | |
| 1 | System to provide report of IVR Application Performance Analysis, Call by Call details for all the calls, Traffic analysis reports etc. | |
| 2 | Reporting platform to support Agent level reports, Agent login, logout report, report on agent state changes | |
| 3 | Queue reports, Abandon call reports all the reports should be summary, tabular and detailed report format to be available for the agents. | |
| 4 | Reporting platform to support custom reports using a combination of the Crystal Reports Developer's Toolkit and SQL stored procedures. | |

| | Minimum requirement | Compliance (Yes/No) |
|---|---|---|
| 5 | Users of the Historical Reports should be able to perform the following functions View, print, and save reports. Sort and filter reports, Send scheduled reports to a file or to a printer. Export reports in a variety of formats, including PDF, RTF, XML, and CSV | |
| 6 | Administrator should be able to assign one or more email addresses to a single Queue | |
| 8 | Agents should be able to automatically resume of e-mail processing on voice disconnect. | |
| 9 | Agent should be able to save email draft response and resume at a later time | |
| 10 | Agent should be able to re-queue email | |
| 11 | Supervisor should be able to access real-time reporting for Agent E-Mail mail volume by Queue | |

## 11. External Integrations Capabilities

### 11.1. Vahan and Sarathi Integration

a. The entire ITMS system is proposed to be integrated with two core application of the Transport Department, Vahan and Sarathi.
b. Both the applications are developed by National Informatics Center. Vahan application essentially maintains vehicle records whereas Sarathi maintains Driver's records.
c. BTD shall support MSI for study of both the applications and the integration. MSI is expected to design ITMS system to pull and push relevant data to and fro the system.
d. The integration may be for various use cases such as fetching details of the fitness and tax validity of the vehicle identified. Such use cases shall be defined by BTD at the later date and MSI shall ensure to be in compliance with the requirements as directed by BTD.
e. The existing systems are updated from time to time. In case of any modifications which are required to be made in the APIs, it shall be sole responsibility of the MSI.

### 11.2. Integration with NIC's eChallan

a. The MSI shall be required to integrate with NIC's eChallan System (One Nation One Challan system) used in the state of Bihar.
b. The integration shall enable these systems to generate challans and send to the respective vehicle owner.
c. ITMS system shall be capable of sending respective office id, vehicle number, date, time, location, photo / video evidence and other challan & violation details to eChallan system.
d. The offense id shall be as per requirement of existing systems, and hence necessary configuration shall be made in the ITMS system.
e. The system shall also have backward integration of details of challans with action taken, such as challan generated, challan paid, unpaid, challan sent to court etc.
f. Multiple offences on the same vehicle shall be separated automatically and each one is given an additional unique number by the system.
g. The existing systems are updated from time to time. In case of any modifications which are required to be made in the APIs, it shall be sole responsibility of the MSI.

### 11.3. Mining Department's portal

a. The MSI shall be required to integrate with Bihar State's Mining Department database or portal to validate mineral transit, vehicle authorization, and driver credentials against Mining Department records.
b. The system shall establish secure API-based integration with Mining Department portal / database.
**c. The system should have real time validation of:**
   - Vehicle registration linked to mining permit
   - Driver details (name, ID, DL number, face image if available)
   - Mineral type, quantity, source, and destination
   - Permit validity period and trip count
d. The system should fetch blacklisted / violation history of vehicles and drivers, push checkpoint transaction logs back to mining department system and implement role-based access for mining officials.
e. The system shall raise appropriate alert at the CCC and concerned viewing center to taken necessary action as per defined SOP.
f. The existing systems are updated from time to time. In case of any modifications which are required to be made in the APIs, it shall be sole responsibility of the MSI.

### 11.4. GST / State eWay Bill Portal

a. The MSI shall be required to integrate with state GST / State e-way bill portal to verify legality of goods movement and prevent tax evasion using e-Way Bill validation.
b. The system shall establish secure API-based integration with State GST / e-Way Bill system.
c. The system should have real time validation of:
   - e-Way Bill number
   - Vehicle number mapped with e-Way Bill
   - Validity period and route
   - Consignor and consignee details
d. The system shall have automated flagging of expired or invalid e-Way Bills and Vehicle mismatch cases
e. The system should store transaction logs with timestamp and location, provide application interfaces for GST officials to view flagged cases, generate analytics on suspicious movements and repeat offenders and ensure compliance with GSTN data security and privacy guidelines.
f. The existing systems are updated from time to time. In case of any modifications which are required to be made in the APIs, it shall be sole responsibility of the MSI.

### 11.5. Bihar Crime and Criminal Tracking Network & Systems (CCTNS)

a. The MSI shall be required to integrate with Bihar CCTNS (Crime and Criminal Tracking Network & Systems) to identify stolen vehicles, wanted persons, and vehicles & persons linked with criminal cases.
b. The system shall be integrated with CCTNS through authorized APIs / secure network.
c. The System should have real time verification of vehicle against stolen vehicle database and driver identity against wanted / suspect lists.
d. The system should have automated alert generation to local police stations on match detection, secure access controls as per police IT policy, maintain detailed logs of all queries & alerts and provide reporting tools for law enforcement agencies.
e. The existing systems are updated from time to time. In case of any modifications which are required to be made in the APIs, it shall be sole responsibility of the MSI.

### 11.6. Dial 112

a. The MSI shall be required to integrate with Bihar Dail 112 (Emergency Response Team) to enable rapid response to detected violations, accidents, or security threats.
b. System shall establish secure API-based integration with Dial 112 CCC.
c. The system should have Automated generation of incident alerts of location (GPS coordinates), vehicle and driver details and nature of alert (illegal mining, stolen vehicle, accident, etc.)
d. System shall have Two-way communication to receive response status & patrol assignment.
e. The existing systems are updated from time to time. In case of any modifications which are required to be made in the APIs, it shall be sole responsibility of the MSI.

### 11.7. eMail and SMS integration

a. MSI shall integrate with existing Gateway (if any) or otherwise industry leading External Gateways related Shared Services to send bulk and customized SMSs and emails automatically or manually for system notifications, incident notifications, failure notifications, transaction notifications, etc. to system admin, system operators, commuters through ITMS applications.
b. Detail use cases and events to send SMS and email shall be shared with MSI at later date.

However, it shall be including but not limited to below:

- Minimum three SMS to citizens (for challan payment reminder)
- SMS for User Management such as new user registration, and other user management activities for internal system users of BTD, Traffic Police, and other stakeholders as well as MSI.
- SMS based daily, weekly summary report to BTD and Traffic Police.

c. MSI shall ensure to clear payment dues to the SMS service provider to ensure continuity of the service, throughout the contract period.

### 11.8. Data exchange with external systems

a. The entire ITMS system as whole, shall be designed and built on open standards.
b. The ITMS system shall be able to accept data from external systems and shall be able to push data to the third party systems, view, analyse and process. Such data may include meta data, video, images or any other kind of data.
c. MSI shall integrate with such external system using standard formats.
d. The MSI shall be responsible for developing any APIs, web services or any other integration requirement as directed by BTD from time to time.
e. BTD envisages external integration to systems such as (including, but not limited to) IBTMS system, Fire tender GPS, private ambulance and other emergency service vehicles, share traffic details with private operators etc.
f. While exchanging data, the MSI shall adhere to all the guidelines and the requirements of the system and ensure no security compromise while doing so.
g. MSI may also be required to let external system utilise the data, only after due approvals from the BTD.
h. The development time for such integration shall be mutually decided and as agreed between the third party, BTD and MSI. However, MSI shall keep the interest of BTD paramount while integrating with third party systems.
i. Such development, integration, testing with any external systems shall be at no extra cost to the BTD throughout the contract period.

## 12. Supporting Infrastructure

### 12.1. Hosting and Storage

a. It is envisaged the premises / location for the TMC shall also be used for setting up Data Center. MSI shall be responsible for interior civil works such as partitioning, false flooring and false ceiling, electrical, network cabling etc. shall be sole responsibility of the MSI to ensure state of the art. The MSI shall setup the racks, servers, storage etc. as well as access-control, network, power, UPS, DG Set (can be common between DC and TMC) and HVAC etc. The MSI shall ensure that for all the required components / equipment / resources for on-premise DC. It is expected that MSI shall conduct a study and obtain for itself all required information from the proposed locations.
b. The Successful Bidder (MSI) is required to host entire solution including all the applications, video feeds, security applications and all other data, including storage, processing etc. on its hosting Infrastructure.
c. The DR is proposed to be on cloud (in the name of BTD), with one of the MeitY Empaneled Cloud Service Providers (valid throughout the contract period) whose services are STQC audited. The hosting shall be on Government Community Cloud (GCC Cloud), ensuring strict compliance with data localization and security requirements.
d. BTD retains ownership of all virtual machines, templates, clones, and scripts / applications created for the BTD's application. BTD retains the right to request (or should be able to retrieve) full copies of these virtual machines at any time.
e. Payment to the Cloud Service Provider (CSP) shall be directly done by the MSI.

<table>
<tr><th>Sr.</th><th>Type</th><th>Data / Application License</th><th>At Edge storage</th><th>Data Center (Primary Storage)</th><th>Disaster Recovery Center (Including Secondary Storage)</th></tr>
<tr><td>1.</td><td>General Surveillance</td><td>Video Feeds from Evidence Camera and VDC (@2MP, 25 FPS, H.265)</td><td>15 Days</td><td>30 Days</td><td>0 Days</td></tr>
<tr><td>2.</td><td rowspan="2">Analyzed Meta Data</td><td>Video Analytics Data – VDS / ITMS, incidents etc.</td><td>At least until synced at DC</td><td>Permanent</td><td rowspan="2">90 Days<br><br>Analyzed data backed-up from the DC on incremental basis.<br><br>Analysis at DR, whenever DC is down.</td></tr>
<tr><td>3.</td><td>ANPR Events</td><td>At least until synced at DC</td><td>180 Days</td></tr>
<tr><td>4.</td><td>Flagged Video and Meta Data</td><td>Any type of data<br><br>(Video, evidence, analyzed, meta data etc.)</td><td>At least until synced at DC</td><td colspan="2">Permanent for entire project period, unless deleted explicitly</td></tr>
<tr><td>5.</td><td rowspan="3">Application</td><td>ICCC and geo-map services</td><td>NA</td><td>Active</td><td rowspan="2">As per bidder solution</td></tr>
<tr><td>6.</td><td>Video Management System</td><td>NA</td><td>Active</td></tr>
<tr><td>7.</td><td>VA and ITMS</td><td></td><td>Active</td><td>Active</td></tr>
</table>

| Sr. | Type | Data / Application License | At Edge storage | Data Center (Primary Storage) | Disaster Recovery Center (Including Secondary Storage) |
|---|---|---|---|---|---|
| 8. | | EMS<br><br>(including Alarm, SLA, NMS, DC – DR monitoring, Asset Management, etc.) | As per bidder solution | Active | Active |
| 9. | | All other application including Web portal, Mobile App | | Active | As per bidder solution |

f. All the Bidders are required to estimate the sizing requirements for hosting in all respects.
g. The Bidder must consider the size of the application, quality of the video, number of days the video is required to be stored, data from other sensors and components, computing requirements for ITMS, ANPR, video management and video analytics along with all the other applications and systems while arriving at the sizing requirements. Bidders shall independently estimate calculation of the camera storage and bandwidth requirement and computing hardware requirement such as management servers, recording servers, enterprise servers etc. Bidders shall submit their respective rationale, vetted by the camera and other respective OEMs, for the said calculations as a part of Technical Proposal. The bidder & the OEM shall justify the rationale in the "Technical Solution Proposed Document" as per clause 13.4.6 under "Instructions to Bidders".
h. The entire responsibility of hosting shall be with the MSI.
i. The Cloud Service Provider would be required to agree to additional terms and conditions, reporting requirements, SLAs etc. as may be required and defined in the tender document.
j. The MSI shall also ensure to adhere to the SLAs of the Project.
k. The MSI may be required to sign tripartite agreement with BTD and MSI / Authority of existing projects for DC and with BTD and Cloud Service Provider for DR, if directed by BTD. However, MSI shall be the sole responsible agency for all claims arising from the liabilities statutory or otherwise, concerning the sub-contractors with respect to hosting, storage etc. The MSI shall be required to undertake to indemnify BTD, existing project authorities or its nominated agencies, its MSI from any claims.
l. Storage, computing and network etc. needs to be scalable with a provision to add at later period. MSI shall submit usage details of all the components on monthly basis to the BTD.
m. The hardware and software components configured for the computing and data processing systems must support latest computing standards for security, multicore architecture, parallel processing, distributed computing, and fast real-time processing.
n. The proposed DC/DR solution must adhere to all regulatory and security standards with for hosting Government services as directed in the guidelines of Government of India (GoI) and Government of Bihar.

**All software application licenses required for entire hosting infrastructure arrangements shall be perpetual and / or lifetime license and should be procured on the name of BTD.** All software updates and patches shall be sole responsibility of the MSI.

## 12.2. Data Center and Data Recovery Center

a. DC and DR shall be in different seismic zone in India only.
b. MSI shall plan the DC to be Tier III compliant. If there are any gaps with respect to the scope of existing project to achieve the objective, the MSI shall submit a report for changes required. However, with respect to scope of MSI, the MSI shall ensure the DC is Tier III compliant ready, at no extra cost to BTD.
c. Cloud services should be accessible via internet and MPLS.
d. DC and DR shall be scalable to deploy servers, push configuration and monitoring policies, with no impact on existing data, applications, and storage.
e. **Support at least 20% volume growth (Y-o-Y) in terms of Traffic volume, violation data, data generation due to traffic volume increase etc. during the contract period.**
f. The entire system shall have dynamic load balancing capability.
g. All applications need to have high performance clustering (redundancy) within the Data Centre with heartbeat, automatic fail-over, and redundant data storage is active passive or active-active configuration as per the high availability targets. The data replication should be continuous among all the servers and shared storage should not be used.
h. This is to ensure that all the applications at DR site are available during any major disaster at the primary DC for all the active transactions.
i. However, the MSI shall ensure that all modules are up and ensure SLA compliance and RPO and RTO as per requirements.
j. The Data Center (DC) and Disaster Recovery Center (DR) shall be highly secure, have availability as per requirement defined for hosting ITMS applications, data, and storage.
k. DC shall have built-in redundancy mechanisms for high availability.
l. BTD shall have secured and seamless access to data, applications, services, and storage.
m. MSI shall provide adequate backup mechanism (power, bandwidth, application, data) in DC and DR so as to maintain the defined SLAs.
n. The bandwidth at the DC and DR shall be scalable as per requirement of the ITMS project.
o. The Composite Service Availability shall be as per the defined SLAs. In case of a disaster, when DR is operational**, RTO shall be Maximum 1 hour and RPO shall be Maximum 30 minutes**. MSI shall propose any change in the suggested RPO and RTO as a part of technical solution, to which BTD may approve if found reasonable. The period for full backup shall be proposed by the MSI which shall be as approved by the BTD.
p. The DR capabilities shall be sporadically and periodically validated during project implementation to ensure apt DC to DR interoperability.
q. Data Retention Policy shall be as defined in the RFP document and may change from time to time as per requirement of the BTD. MSI shall make the provisioning of replication of data from DC to DR.
r. During normal operations, the DC Site shall serve the requests. The DR site shall remain on active standby.
s. The application environment shall be installed and ready for use. Database Storage / Storage based replication shall be replicated on an ongoing basis and shall be available in full as per defined RTO / RPO requirements and replication strategy.
t. The MSI shall ensure that the proposed solution under ITMS project should facilitate workflow based, single-click recovery mechanism for single or multiple applications.
u. In the event of a site failover or switchover:
    - The DR site shall take over the active role, and all requests shall be routed through that site, route traffic seamlessly from DC to DR. Application data and application states shall be replicated between DC and DR so that when an outage occurs, failover to the surviving data centre can be accomplished within agreed RTO / RPO.
    - The installed application instance and the database shall be usable and the same SLAs as DC shall be considered. The use of this Compute DR environment can be done for specific periods for the purposes of DC failure or DR Drills or DC maintenance.

- The MSI shall be responsible for sizing the DC-DR replication software to meet RTO/RPO requirements and the SLAs.

The MSI shall deploy solution to point out precise replication details such as which server and which volume has how much data changes in a day, week, month, year etc. and also how much bandwidth is being consumed.

### 12.3. DR Drill

a. The DR drill shall happen at the time of final Go-Live and shall be an acceptance criterion.
b. Post that a DR drill shall happen once 6 months during O&M, manageable from centralised location, preferably TMC. The report for the same shall be shared by MSI to BTD.
c. DR drill shall ensure that in case of a disaster, a smooth and proper transition happens from DC to DR within RTO / RPO timelines.
**d. Following parameters shall be looked into & maintained during a DR Drill:**
   - The transition time between DC to DR shift is maintained as per the RTO.
   - If DR is on low compute, it should be scaled to full compute within the RTO timelines.
   - The network connectivity and traffic re-routing is taken care with in the RTO timelines.
   - The data loss is within the define RPO.
   - Period of DR drill shall as per pre-decided time by BTD, not less than 6 hrs.
e. BTD may engage any 3rd party Audit firm for independent audit tests and security certifications at its own discretion. MSI shall ensure that reasonable access is provided to 3rd Party Auditor for conducting such audits/compliance on approval from BTD.

### 12.4. Storage

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| **Business Requirements** | • The proposed Storage Management Solution shall enable the MSI and BTD to manage all storage related activities, updates, alterations, dynamic allocations, backup, etc. virtually, from the TMC.<br>• The system shall store video feeds and data from all the deployed cameras and other system as described below:<br>• For storage at DR, will be as per Clause 14.1 above<br>• **MSI shall submit the server and storage pre-requisites for all proposed hardware components and software solutions.** |
| **Functional Requirements** | • Monitoring & management of storage resources, status, configuration management, & performance reporting on single centralized interface.<br>• Vendor independent and industry recognized open data standards.<br>• Highly scalable to dynamically accommodate storage requirements.<br>• Ability to auto configure storage based on industry best practices.<br>• Storage consumption reports and patterns, by various users, devices and subsystems, for capacity planning.<br>• Ability to put constraints on storage limits for users and user groups<br>• Logical Unit Number (LUN) management.<br>• Detect & report configuration changes and threshold violations.<br>• Auto archiving & auto recovery of data in case there is a system failure. |

### 12.5. Server

a. The architecture shall accommodate requirements for State-of-the-art database & application workloads. Architectural design points shall emphasize server elements such as Reliability, Availability and Serviceability (RAS), virtualization of resources, scalability of

resources, overall system and I/O performance and investment protection over the life cycle of the data and applications.

b. RAS capabilities, including redundancy (including power redundancy), fault isolation, online maintenance and upgrades, and the health monitoring, detection and self-healing of server failure conditions etc. shall be ensured.
c. The MSI shall design proper VLAN for physical or virtual server for different purpose such as authentication servers, database servers, file servers, DHCP servers, Video Management Server, Video Recording Server, Video Analysis Server, Web Server, Traffic Management Server, Log Server etc. as per requirements.

### 12.6. Backup Management

MSI shall ensure prompt execution of on-demand backups of volumes, files and database applications whenever required by BTD.

**Backup services shall include but not limited to:**

a. **MSI will be expected to work jointly with BTD & its designated agency to:**
   i. Approve Business Continuity Plan (BCP) and backup plan, own storage of backup media and provide authorization of all activities in time.
   ii. Approve policy for configuration on Firewall (Rules creation, filtering and opening of required ports) and access rights for users at all levels.
b. Document, maintain, update and execute approved file and back-up and recovery procedures.
c. Monitoring and enhancement of the performance of scheduled backups, scheduled regular testing of backups and ensuring adherence to related retention policies.
d. Real-time monitoring, log maintenance and reporting of backup status on a regular basis. Prompt problem resolution in case of failures in the backup processes.
e. The backup process should encrypt the backup and store them securely.
f. For every backup, a pre backup test should be used to ensure higher rate of success for the backup.
g. **The backup process should use incremental backup and a full back as per approved plan and policy ensuring faster backup & restoration without compromising on the availability of the backup data.**
h. Initiate and complete required data processing activities concerning data integrity of all processed files.
i. Conduct regular back-up and recovery procedures as agreed in the SOP document designed by MSI and approved by BTD.

### 12.7. Application Availability, Security and Performance in Cloud DR

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| | • Proposed Solution shall include Load Balancer and Web application firewall, SSL VPN, Single-sign-on functionalities. Bidder can propose these functionalities on a single software solution or multiple software solutions from same OEM.<br>• The software solution must support Programmability to support Automation, native integration and orchestration. It should enable declarative provisioning and configuration of the software solution across cloud environments and integration with automation and CI/CD tools including Ansible, Jenkins, and Terraform etc.<br>• The proposed solution should support all popular hypervisors like Nutanix, VMware ESXi, Linux KVM, Hyper-V and Citrix Hypervisor along with public cloud support for all MeITY empanelled Cloud Service Providers. |

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| | • The solution must provide minimum 3 Gbps of L4/L7 throughput and must be scalable in future. The licenses supplied should be portable from one private cloud to another private cloud or public cloud and vice versa. |
| Application Availability and performance Functionality | • Proposed solution must provide below application optimization features:<br>o **TCP Optimization**: Should be able to modify TCP parameters like keep alive interval, maximum RTO, window size, Nagle Algorithm, delay window control, packet loss ignore rate, flow control, congestion control speed etc. on the fly to improve application performance<br>o **Compression**: Solution should be able to provide cost-effective offloading of traffic compression processing to improve page load times and reduce bandwidth utilization.<br>o **Caching**: Solution should be able to do caching to reduce network traffic and increase application performance.<br>• The proposed solution must provide Active-Active DC functionality as defined in above clause 10.1.1, and should provide global server load balancing between DC and DR on-premise / cloud based.<br>• The offered solution should provide Authoritative DNS capability to understand records like A, AAAA, CNAME, DNAME, HINFO, MX, NAPTR, NS, PTR, SOA, SRV, TXT<br>• The proposed software solution must be able to load balance both TCP and UDP traffic from L3 to L7. The proposed solution must have the capability to provide SSL offloading using both RSA and ECC based keys<br>• Supports DNS SEC e.g. digitally sign DNS answers. This enables the resolver to determine the authenticity of the response, preventing DNS hijacking and cache poisoning. These signed DNS responses can be used in conjunction with the dynamic DNS system to enable global server load balancing.<br>• Server Load Balancer should support SQL-based querying for the at least following databases for health checks including but not limited to Oracle, MSSQL, MySQL, PostgreSQL, DB2 etc.<br>• **The proposed solution should provide the application and DNS visibility and reporting with below metrics and entity for each application:**<br>o Client IP addresses and subnets as well as geographical regions<br>o Total DNS transactions as well as Average and Max Transactions/sec<br>o Most commonly requested domains<br>o Server Latency and Page Load times<br>o Virtual Server and Pool server performance<br>o Page Load Time<br>o Response code<br>o OS and Browser<br>• Proposed solution should support dynamically create L4/L7 services on LB systems & load balance network traffic across the services via Monitoring the orchestration API server, service should be able to modify LB system configuration based on changes made to containerized applications. Service should support open-source Container orchestration system such as Kubernetes or Open Shift either CLI/API. |
| Application Security functionality | • The solution should provide OWASP Compliance Dashboard which provides holistic and interactive interface that clearly measures app's compliancy against the OWASP Application Security Top 10 and also |

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| | provide suggestions/shortcuts to address the compliances and configure policies for it.<br>• The WAF solution must support Security Policy to be applied per application, rather than one single policy for an entire system.<br>• The Solution must protect the Application against credential theft from man-in-the-middle (MITM) and MITM browser attacks by encrypting and obfuscating the form parameters. The Solution must be flexible enough to configure the data encryption level, URL list, parameters, etc., to be protected against such attacks.<br>• The Solution must protect against HTTP, HTTPS and Application layer DOS and DDOS attacks including stress-based DOS and Heavy URL attacks. The solution must support all the common web application vulnerability assessment tools (Web application scanners) including Acunetix, Qualys, Rapid 7, IBM Appscan, etc (or) Equivalent Gartner vulnerability assessment tools to virtually patch web application vulnerabilities. Necessary logs to be generated for audit and compliance.<br>• The Solution must detect and mitigate L7 DDoS attacks originating from a bot-net using application based behavioural analysis that learns application level parameters like HTTP request methods, reply types, average object size and more.<br>• The solution should be able to "clock" error responses to hide sensitive server related information in the response body and response headers. It should also facilitate hiding/masking sensitive parameters in logs policy wise. System should support File Upload Violation & scanning for malicious content in Uploads through ICAP integration.<br>• System should support inbuilt ability or integration with any 3rd party solution to encrypt the user credentials in real time at the browser level (data at rest) before the traffic hits the network so as to protect the credentials especially password, vehicle number or any other sensitive parameter to protect from cyber actors, key loggers and credential stealing malware residing in the end user's browsers. Necessary logs to be generated for audit and compliance.<br>• The solution must distinguish between browsers and bots which are able to execute Java script by using advanced techniques such as browser capability challenge and CAPTCHA challenge. Necessary logs to be generated for audit and compliance.<br>• Solution should integrate with BoT prevention solution. All public facing internet-based HTTP (Port 80) and HTTPS (Port 443) applications that are integrated in Antibot Solution shall be routed first to the Anti-bot on the cloud for scanning & only genuine traffic shall be forwarded to app.<br>• Solution should be able to protect specific endpoints across online applications, including websites, mobile apps and APIs.<br>• Solution should provide real-time decision engine to detect and mitigate automated transactions aimed at the protected applications.<br>• Solution should provide hundreds of signals to detect automated behaviour by integration of the network, browser/device, and user interaction. Solution should leverage threat intelligence across a global customer network and use artificial intelligence (AI) to create new countermeasures and stop the most sophisticated attackers. |
| VPN Functionality | • Should support concurrent VPN users as per project requirement from time to time. MSI shall propose the solution to ensure there is no limitation on the same during the entire contract period. The Solution should support both Split Tunnel and Full Tunnel modes. |

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| | • The Solution must provide both Browser and Client based SSL VPN. Solution must support SSL VPN for Windows, MAC OS, Linux, Ubunt, CentOS, Android, and IOS based devices. Must be compatible to common Browsers: IE, Firefox, Chrome, Safari etc.<br>• Should support IPv4 and IPv6. VPN must support automatic IKE (Internet Key Exchange) and manual key exchange. The Solution should support SSL VPN through DTLS (UDP) for improved performance.<br>• The Solution should also support site-to-site IPSEC VPN.<br>• The Solution should be able to support robust endpoint posture inspection and deny access for non-compliance endpoints.<br>• **The Solution must support the following checks:**<br>o Able to perform Antivirus/Malware software checks, including checks for Enabled State, Engine & Database version, Last Scan, and Last Update of the antivirus software.<br>o Able to perform domain check to auto connect to VPN when outside the office network.<br>o Able to perform IP address / Geolocation check to restrict access from unwanted locations.<br>o Able to perform OS, Windows Registry, File or Process checks. |
| Management | • Proposed Solution should be managed from dedicated Central Management solution i.e. Administration / Management / Logging / Reporting, etc., preferable from DC, or from DR.<br>• The proposed Management solution should be capable for backup and restoration of configuration, traffic logs, system logs, etc.<br>• Proposed Solution and Management solution should be accessible through GUI (including TLS 1.0, TLS 1.1, TLS 1.2 or TLS 1.3) & SSH (including V3)<br>• Should have diagnostics capability support (e.g. logs, core dumps, Syslogs, configurations etc.) which can be used to share with Technical support team in case of any malfunctioning by the instances. Should have online vulnerability and configuration diagnosing tool. |
| Certification | • Proposed OEM Should have ISO 9001 and ISO 27001 certificate<br>• Must support IPV6 logo ready, or IPv6 ready.org phase 2 certifications<br>• The Software Solution or its OS shall be tested and certified for EAL 2 / NDPP (Network Device Protection Profile) / NDcPP (Network Device collaborative Protection Profile) or above under Common Criteria program for security related functions or under Indian Common Criteria certifications scheme (IC3S) by STQC, MeITY, Govt. of India. |

### 12.8. Database Administration and Management Services

a. Provisioning of the Data Administration and Management Services will serve as a central platform for all data related activities including data management, aggregation, normalization, and abstraction.
b. There shall be single Data Administration and Management Services even in case of hybrid setup of Hosting Infrastructure.
c. The system shall enable MSI for monitoring and reporting the performance of the database and recommend modifications to improve the database performance.
d. The MSI shall suggest, maintain and implement database backup procedures to recover from a database outage or corrupted databases within time frames specified in the Implementation and Operations Plan Document.
e. The MSI shall manage end-to-end database on an ongoing basis to ensure smooth functioning, including changes to database schema, disk space, storage, user roles.

f. MSI shall be responsible for conducting code and configuration reviews for tuning inputs in order to improve the application performance or resolve bottlenecks if any.
g. The MSI shall be responsible for performance monitoring and tuning of the databases on a regular basis including, preventive maintenance of the database as required. The system shall auto-detect database problems and auto fine tune them to ensure high performance.
h. MSI shall be responsible for management of database upgrade or patch upgrade within 15 days of availability from the OEM with minimal downtime. The MSI shall inform the BTD about the same before updation.
i. MSI shall be responsible for implementing the database encryption solution in high availability mode in DC and Standalone mode in DR to ensure data security.
j. MSI shall provide Licensed RDBMS, enterprise / full version as required for the ITMS project and following all standard industry norms for performance, data security, authentication and database shall be exportable into XML.
k. The data security shall be sole responsibility of the MSI.
**l. The system shall**
    - Optimize performance by identifying resource intensive procedures, generate alerts and take necessary action
    - Monitor key operational activities to identify and report any anomalous behaviour
    - Monitor and frequently generate reports for industry standard KPIs (throughput, CPU utilization, availability of database, daily workload, service fulfilment time)
    - Aggregate and store data from all the filed components, network components, and front end applications
    - Normalize data that is collected from various sources for utilization for computation
    - Abstract the data in a way that it can be leveraged simultaneously by multiple software integration components.
    - Be able to handle large volumes of data without resulting in lags and undue delay.
    - Be able to perform fact based and detailed analysis of various data elements based on historical trends.
    - Be able to generate dynamic reports based on pre-set queries and also be able to generate dynamic reports based on various user defined query parameters. Shall have a highly customizable, powerful reporting engine to create batches for large reports
    - Adhere to latest industry standards related to data privacy and maintain confidentiality of BTD data as well as citizen data.

### 12.9. Hosting Infrastructure Monitoring

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| **Business Requirements** | • MSI shall provide a dashboard view of the entire hosting infrastructure for ITMS project for virtually monitoring and managing all the project related DC and DR activities inclusive of hardware, application, data, bandwidth, manage hosting services, storage etc., directly from the Traffic Management Center.<br>• There shall be single Hosting Infrastructure Monitoring Dashboard even in case of hybrid setup of Hosting Infrastructure (for e.g. On premise DC and Cloud based DR).<br>• System shall provide browser and OS independent console and web interface.<br>• The interface shall provide all configuration, monitoring and reports for all the requirements under this clause 12.1.8.<br>• System shall provide stringent role-based security model to allow only authorized users to access and administer the system. |
| **Functional Requirements** | • Shall provide ability to monitor, manage, control and report performance of project servers and storage. |

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| | • Shall have single dashboard to track DC and DR status of all the applications. System shall be capable of reporting important health parameters like disk space, password changes, file addition/deletion etc.<br>• Shall have storage consumption reports and patterns, trend analysis, by various users, devices and subsystems, for capacity planning.<br>• Shall have virtual server dashboard to monitor and manage capacity of server, utilization, devices and services running on server<br>• Shall allow for easy deployment of servers, operating systems, application and services for integrating and managing such components collectively.<br>• May also provide rack-view monitoring for power consumption, capacity, services deployed, servers up, down and in critical state.<br>• Shall automatically act on policy deployments, pre-configurations, and pre-defined SOPs<br>• Shall provide root cause analysis in case of failures<br>• Shall generate real-time alerts and automatically log incidents.<br>• **Should raise alerts whenever**<br>o The RPO / RTO deviates<br>o There is a failure in the DR process<br>o Replication fails that stops replication<br>• Shall be able to generate automatic and manual notifications, alerts and reports based on performance to the concerned operators/ individuals<br>• Any additional feature with respect to monitoring services that may be required during the project tenure shall be developed / deployed by the MSI as directed by BTD from time to time at no extra cost. |

### 12.10. Network and Bandwidth

a. The entire ITMS system shall be inter-connected through a communication network consisting of the Ethernet, Wi-Fi, Fiber, GPRS or equivalent networks in combination as per requirements.
b. Each of the filed component including all camera, other sensors and edge device, Traffic Management Center (TMC), Viewing Centres (VCs), DC/DR and all other nodes shall be connected with both the network.
c. It is envisaged that MSI shall utilize already laid network across the state by multiple Internet service providers (ISPs) through ILL / MPLS lines. Network with appropriate redundancy to maintain the SLA shall be sole responsibility of the MSI. It is upto MSI to select the service provider, and the network arrangements.
d. **MSI shall provide two connectivity service, Primary and Secondary lines to ensure redundancy. The Primary line shall necessarily by wired (at least 90%, unless approved otherwise by BTD) However, maintaining the SLA shall be sole responsibility of the MSI. The Secondary can be wired / wireless as per bidder solution.**
e. **In case the MSI proposes to connect certain locations through dedicated optical fiber network, the same shall only be with explicitly permission of the BTD. In such case as well, the MSI shall ensure redundancy, either through network topology and architecture, or through ISP / TSP.**
f. Wherever the ILL / MPLS connectivity or dedicated optical fiber network is not possible due to location constraint or any other reasonable justification, such locations may be made operational using M2M 4G / 5G Network with SIM based router or broadband connectivity. This shall be done with explicit written permission from BTD, subject to other terms of this clause and of RFP. However, maintaining the SLA shall be sole responsibility of the MSI.

g. In case of dedicated optical fiber network, all the components including required switches, power, necessary connectors, enclosures etc. shall be sole responsibility of the MSI.
h. It is upto MSI to select the service provider, and the network arrangements. MSI shall be required to use the services of any TRAI approved Internet service providers (ISPs) as per project requirement at one or more junction / location and to meet minimum specifications and the SLAs mentioned in the RFP.
i. All the one-time connection charges for primary and redundant network connectivity including M2M 4G / 5G Sim based router and SIM card connection charges and its maintenance for the entire project period shall be sole responsibility of the MSI throughout the duration of the project including O&M.
j. **4G / 5G power does not relieve MSI from maintaining the SLAs as defined.**
**k. One time connection charges, Recurring charges etc. for the Network connectivity taken on lease for the project to be provisioned by the MSI for the duration of the project including O&M.**
l. MSI is expected to do the site surveys and estimate for the last mile infrastructure and propose suitable network design and network service provider.
m. For the purpose of laying any network cable by MSI / ISP / TSP, MSI shall be required to seek permission for RoW/RI etc. form the BTD and other relevant authorities. The MSI shall provide details regarding same based on the Survey.
**n. Entire responsibility of RoW and restoration / Re-instatement (RI) for network cables shall be responsibility of the MSI.**
o. The MSI shall prepare the network connectivity plan and bandwidth requirement plan for the project, including the plan for deployment of type of network, equipment at the junctions / locations to be connected over network. The network architecture proposed should be scalable and in adherence to network security standards with at least **90 %** of the wired connectivity.

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| **Business Requirements** | • The communications network shall be capable of handling the network traffic that would be produced by field devices including HD video cameras and other sensors, in a way that enables a seamless cooperation with the rest of the ITMS components.<br>• Networking requirements shall also include the LAN creation at CCC, viewing centres. If required, even at Data Center.<br>• MSI shall carry out break fix maintenance of the LAN cabling, passive components, routers, switches including any civil work if required.<br>• Network shall act as a backbone of the ITMS project, hence MSI shall ensure a guaranteed bandwidth / connectivity for the entire system which is secure, fast, robust, reliable and scalable network connectivity.<br>• MSI shall ensure that the failover to the redundant network connectivity is undertaken immediately and seamlessly without any data loss.<br>• As the information generated each moment is important, the packet loss should be minimum. The network system shall be with minimum latency, jitter and Packet Loss, with maximum performance.<br>• Ensure that network is available 24x7x365 as per the prescribed SLAs.<br>• The MSI support and maintain the overall network infrastructure service across all locations for the entire ITMS project.<br>• The actual network and bandwidth requirement to cater the ITMS project and to meet SLAs would be calculated by the MSI and the same shall be clearly proposed in the technical bid with detailed calculations. |
| **Functional Requirements** | • The network shall be configured to support industry leading communication and open data standards and shall conform to latest industry standards for design, implementation, and connectivity. |

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| | • The system shall be designed to create and modify VLAN, assignment of ports to appropriate applications, devices and segmentation of traffic between CCC, DC/DR and Field Components etc.<br>• The network configuration platform shall be modular and scalable to allow multiple types of networks and topologies to be implemented on the same platform. Logical and Physical network topology such as ring technology, double-ring topology, and mesh topology etc. or in combination shall be decided by the MSI as per the solution requirement. The topology should also consider providing redundancy. The topology shall be designed in a manner to allow change / upgrade the components of the ITMS without much required change in the existing network infrastructure.<br>• The system shall enable monitoring of the network 24x7x365 to spot the problems immediately and alert the CCC so as to meet the desired SLAs. The MSI shall attend to and resolve network failures and snags.<br>• System shall provide for necessary protocols for traffic management<br>• The network system shall be scalable to accommodate future / advanced technological integration. **MSI shall provide additional ports on the rugged switches open for future use by any other BTD approved third party agency to add additional elements.**<br>• The architecture should be capable of managing heterogeneous data which would be continuously communicated through numerous devices following different protocols. MSI shall use appropriate protocols in order to ensure that the flow of data between devices does not run into latency issues. |

**Hence the network connectivity preference is as below:**

| Sr. | Type of location | Primary Connectivity | Secondary Connectivity |
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| 1 | Field Components | 90%+ wired<br>i.e. ILL / MPLS or dedicated optical fiber<br><br>**Balance in below preference:**<br>ILL / MPLS or dedicated optical fiber or broadband connectivity or M2M 4G / 5G.<br><br>MSI shall conduct survey and propose the location wise plan. | Any of the below as per bidder solution to adhere to the SLAs and RFP requirements:<br><br>ILL / MPLS or dedicated optical fiber or broadband connectivity or M2M 4G / 5G |
| 2 | TMC | ILL / MPLS line only | ILL / MPLS line only |
| 3 | On-premise Hosting infra | ILL / MPLS line only | ILL / MPLS line only |
| 4 | Viewing Centers | Wired Connectivity only | Wired Connectivity only |

### 12.11. Bandwidth

a. All the field components, Traffic Management Center, Viewing Centers, DC-DR and any other component, shall all be connected through network. Hence, the bandwidth shall be designed to meet the requirements.

b. The MSI shall consider output from all the cameras, sensors etc. as well as TMC, viewing center DC-DR etc. and video compression as per compression technology as defined in the RFP for calculating the minimum traffic for bandwidth requirement calculations.
c. All the field components, CCC, viewing centers etc. shall be connected to both Primary and Secondary lines with same configuration irrespective of ISP lines or dedicated lines or M2M 4G / 5G connectivity.
d. **The actual bandwidth requirement to cater the above-mentioned bandwidth parameters and to meet SLAs would be calculated by the MSI and the same shall be clearly proposed in the technical proposal with detail calculations, which shall be over and above the minimum specified in the RFP.**
e. MSI shall be responsible to ensure monitoring and adherence to all SLAs for bandwidth services by the ISP / Telecom Service Provider as per defined SLAs in this RFP.
f. The MSI / ISP / Telecom Service Provider cannot repurpose the bandwidth provisioned for the project for any commercial usage such as 4G off-loading etc. without prior written consent of BTD. BTD's decision is final and binding on the bidder / MSI.

### 12.12. Security Infrastructure and IT Audit

a. The MSI shall design the entire system to ensure that the system, data, application, all hardware, software, database, network component and everything else that comprises the ITMS system, are secured from internal as well as external vulnerabilities.
b. MSI shall implement the latest, industry and Government of India (GOI) agencies like MeitY, ISO, IEEE, EAL and DIT approved standards, strong, reliable, state of the art, security software(s) that shall monitor and manage the security of the entire system.
c. System shall be able to detect, withstand, and prevent any attacks and threats to the system.
d. Systems like access management system, security of physical and digital assets, data and network security, backup and recovery etc. shall be implemented.
e. Data security, audit controls and integrity must be ensured across the data life cycle management from creation, accessed, viewed, updated and when deleted (or inactivated).
f. MSI shall also deploy solutions with self-healing and self-diagnostic capabilities. The system shall self-learn and update benchmarking configurations for security based upon historic reports on various parameters of attacks, health, performance, security.
g. The system shall be able to detect anomalies in functioning of system and immediately generate alerts.
h. The MSI shall build defenses against possible security vulnerabilities and threats, allowing errors to be corrected and system misuse to be minimized.
i. MSI shall ensure to have relevant systems and checks in place to protect data, application, network and all other components under this project against unauthorized access, denial of service (DDoS) and remediation, both intentional and accidental modification, rouge SSID / rouge code detection etc.
j. At minimum, following should be implemented including proper patches and rules for the ITMS Project including data center and DR:
    - Authentication modules, Web Single Sign-on, Centralized Identity and Access Management System.
    - Behavioral Analysis Systems for Anomaly Detection
    - Correlation Engine
    - Denial of Service Prevention System
    - Enterprise Firewall (Next Generation Firewall) and Web Application Firewalls to prevent threats related to Cross-Site Scripting (XSS) and (Structured Query Language) SQL injection.
    - Intrusion Detection & Intrusion Prevention Systems on the perimeter, key points of the network and host IDS to critical systems etc.
    - Advanced Persistent Threat notification mechanism,
    - Virus protection and vulnerability protection for all workstations and servers etc.

- Encrypted communication channels, virtual tunneling
- Malware detection and prevention capabilities,
- Lockdown Capabilities: Isolate security breaches & attacks, from other systems and not let the threat spread in the system, independently handling resolution.
- Content filtering and blocking to prevent threats from compromised websites to help identify and block potentially risky web pages.
- Anti-spoofing (no one should be able to masquerade for inappropriate access), anti-sniffing (no one should be able get data and interpret it), anti-tampering (no one should be able to put/change data which was not meant to be put/changed) should be taken care for data in transit, as well as data at rest, from internal and external threats.

The system shall assess vulnerability of critical assets OR integrate Vulnerability Assessment solution to import the vulnerabilities identified, i.e. the expected likelihood and consequences of specific types of attacks on specific assets and showcase them in the asset details. It shall also monitor and manage network security, access control and policy, security breaches, detect and prevent any attacks on network.

### 12.13. IT System Security Requirements

While designing the ITMS system, the MSI shall take into consideration the following requirements of the IT System Security points:

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| **Field Component Security Requirements** | • Authentication of sensors, cameras, switches, and controllers etc. should happen at the time of provisioning and adding them into the system. It should be based on physical characteristics of the field components like MAC ID, Device ID etc.<br>• Field Components and other sensors deployed in solutions to set up ITMS should be hardened devices with the ability to be upgraded remotely for firmware through encrypted image files with authentication mechanism.<br>• System shall ensure that once recorded, video shall not be altered or tampered, ensuring that the audit trail is intact for evidential purposes. |
| **Data Exchange Requirements** | • Architecture of Information Technology systems deployed ITMS project need to be open, interoperable and scalable.<br>• All data communications taking place within the network need to be AES (256 bit) encrypted or better, and SSL authenticated or higher, so that any unauthorized access to video data can be prevented.<br>• The message exchange between various applications in the System should be fully encrypted and authenticated. Any external application should talk to the system only through predefined secured APIs.<br>• Shall monitor, manage and authenticate every incoming and outgoing communication to and from the ITMS system.<br>• Adequate security checks and mechanisms like authentication and encryption mechanism be deployed for data exchange between various sensors, cameras, controllers and their management applications to protect data confidentiality breach and unauthorized access. |
| **Network Security Requirements** | • All information that flows on the network should be encrypted to ensure safety and privacy of confidential data.<br>• In case of any challenges due to compatibility issues with any of the existing system and its security features, the MSI shall raise it to BTD, with proposed alternative, which shall be reviewed and may be approved by BTD. The same shall be binding on the MSI. |

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| | • The devices at each endpoint of the network (implemented by MSI under ITMS scope) should be authenticated (using mechanisms based on attributes like passwords etc.)<br>• The authentication system so used on these endpoint devices should ensure that only authorized users are sending data over the network, and there is no rogue data that is sent to the control systems to generate false alarms or sabotage the systems.<br>• All components deployed and integrated as part of ITMS systems should talk only to the authorized wired or wireless network, and do not hook on to rogue networks. MSI shall be responsible to configure any wireless network installed in the project. The wireless network or any hardware shall not be accessible to external network. AAA authentication is also required for all network hardware, in case of wireless network being used.<br>• Wireless layer of the Network may be segmented by using Virtual Private Networks (VPNs), Secure Shell (SSH), forced https, DNSSEC, or separate networks in the wired core, wherever required.<br>• All traffic from the sensors to the application servers should be encrypted Secure SSL & authenticated prior to sending any data.<br>• Provisioning of necessary authentication and encryption should happen at edge device level or for group of devices as required.<br>• Any attempt to connect any new device which is not onboarded through a proper process shall immediately raise an alert to NOC / TMC to ensure no such unrecognized device is connected to the system. |
| **Network Security of Field Components Requirements** | • The security for field components network should include the protection of the data and network connections between the nodes such as protection of fair access to communication channels, concealing of physical location of the nodes, defense against malicious resource consumption, denial of service, node capturing and node injection etc.<br>• MSI shall define and implement counter measures for various types of security issues such as Radio Jamming, Nodes Reporting Wrong Data, Data Aggregation Attacks and Battery Attacks etc.<br>• Shall monitor any system configuration tampering with field components and otherwise of entire ITMS system.<br>• The following guidelines at minimum needs to be considered for security enhancement of field components and their networks:<br>o Use of IP-based network<br>o All the access control & hardware control shall have secure and encrypted password based access.<br>o Protection of field component nodes behind a firewall for carrying out SSL-based application data transfer and mechanism to avoid distributed DoS attacks.<br>o Public-key-based authentication of individual devices to the network and provisioning them for secure communications.<br>o Conformance of the security solution to the standards of IETF, IEC and IEEE to ensure maximum security and interoperability, with support for the following commonly used protocols at a minimum IPSec/IKE, SSH and SSL/TLS. |
| **Data Center and DR Security Requirements** | • Applications hosted in the data center shall support multi-tenancy with adequate authentication and role based access control mechanism.<br>• The data center should be segmented into multiple zones with each zone having a dedicated functionality e.g. all cameras for one |

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| | operational domain can connect to the data center in one zone, and the internet facing side of the data center should be in another zone.<br>• Internet facing part of the data center should have a Demilitarized zone where all public application servers are located. Only these servers can access data from the actual utility appl servers on predefined ports.<br>• The public application servers should be accessed only by the web server that is hosted in a different zone of the data center.<br>• Shall be capable of detecting denial of service (DDoS) and remediation. |
| **Database Security Requirements** | • Adequate data security mechanism shall be in place by the usage of the database encryption and secured data back-up practice.<br>• Data shall be restored without compromising its fidelity or integrity.<br>• Database design must incorporate data integrity requirements. |
| **Application-Level Security Requirements** | • Role based access, encryption of user credentials<br>• Domain level rights and privileges management<br>• Prevent Vulnerabilities such as<br>  ○ SQL Injection for attack on database<br>  ○ XSS Vulnerabilities<br>  ○ Security Misconfiguration<br>  ○ Insecure Cryptographic Storage<br>  ○ Failure to Restrict URL Access<br>  ○ Insufficient Protection Vulnerabilities (enable SSL for all sensitive pages, set the secure flag on all sensitive cookies and secure backend connections)<br>  ○ Id Redirects and Forwards etc.<br>• Validation checks to be incorporated into the application to detect any corruption of information through processing errors or deliberate acts.<br>• Data output from an application should be validated ensuring processing of stored information is correct and appropriate to the circumstances<br>• Should implement secure error handling practices in the application<br>• Secure Authentication and Session Management control functionality shall be provided through a Centralize Authentication and Session Management Controls<br>• MSI shall also be responsible for the creation & maintenance of the directory server integrated with security modules like Authentication, Authorization & Auditing capabilities, OTP management. |
| **Other Security Requirements** | • Controls against command injection, input validation, cross site scripting, directory traversal, buffer overflows, resource exhaustion attacks etc. shall be considered.<br>• OWASP Top 10 standard should be mapped in the secure coding guidelines to cover all major vulnerabilities.<br>• Entire IT infrastructure deployed as part of ITMS should follow latest standards like - ISO 27000, ISO 22301, for Wi-Fi access (if used) - PEAP (Protected Extensible Authentication Protocol), 3rd Generation Partnership Project (3GPP), etc. as appropriate.<br>• Integration with external systems such as with NIC shall be secured. APIs should be published and the IT systems be running on standard protocols like JSON / XML or REST etc.<br>• Ensure vendor compliance to remove any backdoors, BOT, undocumented and hard cored accounts.<br>• Root domain administration by setting the root level security policies such as AAA, authentication mechanisms (single/multi factor), |

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| | password policies such as password length, password complexity, password expiry, account lockout policy, certificate policies, IPSec policies etc. shall be implemented.<br>• MSI shall deploy necessary firewall and other software and hardware to ensure the ITMS system security as per requirements. |

### 12.14. Anti-virus Software

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| **Business Requirements** | • MSI shall install an Anti-Virus at all the end-point nodes of the entire system, at Data Centre and DR and shall be configurable remotely.<br>• The existing end points including the workstations to be provided through existing projects at TMC (Command Center), video wall processor, workstations at Viewing Centres etc. shall also be equipped with Anti-Virus which shall also be sole responsibility of the MSI. |
| **Functional Requirements** | • Scan through several types of compression formats, ZIP, RAR compressed files and TAR archive files etc.<br>• Perform different scan actions based on the virus type (Trojan/Worm, Joke, Hoax, Virus, other)<br>• Scan for HTML, VBScript Viruses, malicious applets and ActiveX controls etc. Scan at least HTTP, FTP traffic (sending & receiving) in real time and protect against viruses, worms & Trojan horse attacks and other malicious code.<br>• Capable to use multiple scan engines during the scanning process.<br>• Support in-memory scanning so as to minimize Disk IO, Multi-threaded scanning, scanning of nested compressed files, heuristic scanning to allow rule-based detection of unknown viruses.<br>• Capable of providing multiple layers of defense.<br>• Facility to clean, delete and quarantine the virus affected files. |

### 12.15. User Security and Monitoring

Data exchange should take data privacy and data protection into consideration. The MSI shall design the system to ensure industry standard security architecture are deployed that protect confidentiality, integrity and availability of information and services for all the stakeholders.

A strong authentication mechanism should be considered to protect unauthorized access to the ITMS project applications. IP restrictions mechanism shall be considered.

- **Levels of Authentication**
  - Applications handling sensitive data: at least one factor authentication.
  - Applications handling highly sensitive data: at least two factor authentication, password with strong complexity rules and OTP which varies for each session.
  - For Single Sign on: At least two factor authentication.
- **Authorization**
  - Authorization of system users and groups shall be enforced by access controls.
  - The system shall keep track of the various functions accessed by any users.

### 12.16. Audit Trail & Audit Log

a. All the Audit trails or audit logs shall be properly stored & archived for future analysis and forensics whenever desired. Log information is critical in identifying and tracking threats and compromises to the environment.

b. All the devices and software should be logged which include hardware & software based firewalls, web servers, authentication servers, central/domain controllers, database servers, mail servers, file servers, routers, DHCP servers etc., as applicable.
c. Audit Capabilities: The system shall provide for a system-wide audit control mechanism that works in conjunction with the Database Management System.
d. Maintaining Date/Time Stamp and User Id: Every transaction, with a date and time and User ID and IP address, shall be captured. The system shall allow generating various audit reports for verification.
e. Following activities and events shall be logged at minimum.
   i. Create, read, update and delete of confidential information;
   ii. User authentication and authorization activities in the system, granting, modification or revoking of user access rights;
   iii. Network or service configuration changes;
   iv. Application process start up, shutdown or restart, abort, failure or abnormal terminations, failure of network services;
   v. Detection of suspicious activities such as from Intrusion Detection and Prevention system, anti-virus, anti-spyware systems etc.

### 12.17. Maintenance and Updates

a. Solution shall support multiple remote installations even for field components.
b. The MSI shall design the system to update for virus definitions, program updates, patches, fixes etc. (automatic periodically and in push-updates in case of outbreaks) without bringing server off-line, remotely over network / internet.
c. MSI shall ensure security policies is maintained and updates to the same are made regularly.
d. MSI shall protect all the IT assets to prevent any known & unknown attacks by maintaining an updated knowledge base of all the published security vulnerabilities and virus threats.
e. MSI shall define process to tune, update, and monitor IDS information.
f. MSI shall ensure patches for identified vulnerabilities are patched/blocked immediately.
g. MSI shall respond to security breaches or other security incidents and coordinate with respective OEM/service provider in case of a new threat is observed to ensure that patch is made available.
h. MSI shall ensure OS security through appropriate configuration and patch updates.
i. Updates shall be capable of being rolled back, if required.
j. MSI shall plan system maintenance only in accordance with schedule pre-defined and approved by BTD.
k. MSI shall obtain permission from BTD and other stakeholders before making any changes and / or updates to the production environment.

### 12.18. Security Management and Monitoring

a. Deploy technology to actively monitor and manage perimeter and internal information security of all components of ITMS system and network remotely from TMC.
b. The security system shall be monitored at the TMC with auto alerts in cases such as attempt to gain unauthorized access and provide a facility to virtually isolate the system / solution in case of the breach from other layers of the system.
c. Establish processes for viewing logs and alerts which are critical to identify and track threats and compromises to the environment. The granularity and level of logging must be configured to meet the security management requirements.
d. Provide real-time product Performance Monitor and Built-in Debug and Diagnostic tools and context - sensitive help.
e. Appropriate teams may be set up to monitor cyber incidents and mitigation of same.
f. MSI shall share all the information on incidents regularly with Indian Computer Emergency Response Team (CERT-In) and NCIPC (National Critical Information Infrastructure

Protection Centre) and take help to mitigate and recover from the incidents after prior written approval from BTD.

g. The Network Security system shall seamlessly integrate with, and be able to monitor and manage, networking devices, equipment, components provided by the OEM
h. MSI shall provide a dashboard view with all critical metrics of security in a single consolidated window.
i. System shall be capable of recognizing network and other vulnerabilities and immediately send alerts to the TMC and dynamically fix them and send intimations to the TMC.
j. Shall support various types of reporting formats such as CSV, HTML and text files.
k. The system shall address the complete network managem
l. nt of the Project. It shall monitor and report, performance, utilization, status, vulnerabilities and failures in the network in real time.
m. Shall be able to detect and prevent intrusions, security failures, rogue local hot-spot creation by device, unauthorized access. Shall perform self diagnostic to identify any malware or Trojans injected in the network.
n. Shall support dynamic provisioning of devices through virtualization.
o. The system shall undertake proactive monitoring and management of all the IT assets like all the hardware, sensors, software applications (its patches), mobile app etc. and its parameters like uptime, downtime, health of IT assets, any vandalism or tempering act reported, in case of breakdown / downtime, identify the probable location and issue.
p. Shall generate real time automated notifications whenever any asset goes faulty, is tampered with, or is missing.

### 12.19. IT system Audit

**a. MSI shall perform comprehensive Application Security, IT Infrastructure Audit and Vulnerability Audit including review of Security Controls for the complete ITMS Project from a Cert-In empaneled agency / STQC third party auditor.**

b. In case of any major changes in the system, BTD may direct MSI to get the audit done again of such application or all applications from CERT-In empaneled agencies. MSI is bound to accept the same, till the points all the identified points are resolved.
c. Entire IT infrastructure of the On-premise Data Center will be audited along with the ITMS project applications. All "applications" and "apps", whether COTS or bespoke, will undergo static and dynamic security testing before deployment and be tested with respect to security on regular basis at least once in a year.
d. In case of COTS application, every version update will also undergo Security Audit. In case the OEM has got the Security Audit done for the same version earlier, the same may be accepted by BTD, at its own discretion, else BTD may direct for a separate Security Audit for the project. BTD's decision shall be final and binding.
e. Such audit also includes integration audit with the existing systems.
f. The Audit shall be performed for all critical project components but not limited to all the software application, hardware, Mobile app etc.
g. The cost towards all the above audits shall be responsibility of the MSI.
h. Upon successful completion of the Audit, MSI is required to share the Audit Completion Certificate with adequate validity along with copies of all communication, written or otherwise, issues list, bug report, etc. **and corrective / compliance measures taken by MSI taken thereof on the Audit observations.**

**i. <u>The Audit shall be done in following Phases</u>**

- **<u>Implementation Phase: Prior to Go-Live</u>**
- **<u>O & M Phase: At the End of every O & M Year</u>**

j. The assessment shall be performed in line with defined policies and procedures, international standards, Government of India guidelines and Regulations. The assessment will include the following:
    - Security network architecture

- High Level Design (HLD) and Low Level Design (LLD) documents
- Zoning and network segregation
- Vulnerability assessment and penetration testing of the setup
- Security operations review including change management, incident management, back-up management
- Configuration review of servers, databases, and network devices
- Compliance to Regulatory and requirements and various other guidelines (as amended from time to time) mentioned in the RFP and below:
    i. Applicable Rules and Procedures for IoT System Certification Scheme (including CCTV as per ERs) by STQC
    ii. Government of India guidelines on Data Security
    iii. IT Act 2008
    iv. CERT-IN guidelines / Guidelines on Information Security Practices for Government Entities by CERT-IN
    v. Model RFP for ICCCs / ICT projects
    vi. CMP guidelines on countering cyber-attacks
    vii. International standards including ISO 27001
    viii. NIST Cyber Security Framework

Independence shall be maintained during the assessment, and the team carrying out the assessment exercise shall be different from the implementation team. Systematic actionable need to be derived post assessment and necessary changes shall be performed to enhance the cybersecurity maturity.

k. BTD reserves right to get the audit done by any other third-party agency as it deems fit. MSI shall provide all the necessary access to the auditor as directed by the BTD.

### 12.20. Electricity Supply and Power back up Requirements

a. All the field components and other equipment deployed at Traffic Management Center by the MSI, data center and DR etc. as a part of ITMS project should be power efficient.

b. **MSI shall ensure power to provide primary power supply for all the field components, TMC etc.** This includes Energy Meter (any charges associated with the same), cabling including any cables, piping, trenching etc. from the nearest available supply. MSI is expected to conduct its own survey and understand the availability and efforts required for the same.

*Notwithstanding anything contrary to the below clause in the RFP:*

| | One time connection charges for power at the nearest available point | Last Mile Connectivity and Internal Cabling | Recurring charges | Maintenance of all the components, cabling | Power Backup (In the scope of MSI) |
|---|---|---|---|---|---|
| **Field Components** | **MSI** | **MSI** | **MSI** | **MSI** | **UPS** |
| **TMC** | **BTD** | **MSI** | **MSI** | **MSI** | **UPS and DG set connectivity** |
| **Data Center** | **BTD** | **MSI** | **MSI** | **MSI** | |
| **Viewing Center** | **BTD** | **MSI** | **BTD** | **MSI** | **UPS** |

c. The recurring expense for primary power consumption for Viewing Center may be borne by BTD throughout the contract period and shall be paid to the electricity board directly. However, cabling, its maintenance and replacement as per requirement shall be sole responsibility of the MSI.
d. MSI shall also be required to deploy sub-meter to understand power consumption as per directions from BTD from time to time. All meter connections shall be in name of BTD.
e. Cabling, earthing and all the equipment related to power supply, including installation and commissioning shall be sole responsibility of the MSI.
f. Apart from primary supply, power backup such as UPS, DG Set etc. as specified in the tender document and as necessary shall also be responsibility of the MSI.
g. The MSI shall also ensure cabling for backup power supply such as UPS and DG set etc.
h. The MSI shall submit the Plan for laying of all the Electric cables required for the Project "**Cable Plan**", which shall be approved by the BTD.
i. The surge arrestor shall be provided to protect all electrical, digital and data devices from voltage spikes, and the proposed surge arrestor shall meet IEC 61643-1 standards.
j. In case of power failure, the system shall be capable of automatically resuming operations once power resumes.

### 12.21. Specific Solar Power Requirements

a. At certain location, there is a possibility of grid power supply not being available, especially at the remote highway locations. For such location, BTD envisages to implemented Solar based power supply. **Overall, not more than 10% locations shall be on Solar Power.**
b. **Solar based power does not relieve MSI from maintaining the SLAs as defined.**
c. MSI shall ensure installation of Solar Panel at each such locations with the surface area sufficient to meet the power requirement of all the components for minimum backup of 48 hours, including during the no / less ambient sun light.
d. Presently, at different locations, as per ITMS solution requirements, Pole or Cantilever Pole or Gantries are proposed. The MSI shall be required to mount the Solar Panels on the same Pole / Cantilever / Gantry. MSI may propose to install cantilever in place of Pole, or Gantry in place of Pole / Cantilever in case required to mount the Solar Panels, such upgradation shall be at no extra cost to the BTD, and only after written approval from the BTD.
e. MSI shall ensure installation of sturdy Pole / Cantilever / Gantry to carry the weight of the Solar Panels and battery as per bidder solution and site requirements.
f. MSI may propose to install solar panels on the ground. In such case the RoW shall be sole responsibility of the MSI.
g. In either case, the security, safety from the natural wear and tear, road accidents etc. shall also be sole responsibility of the MSI. Any additional structure required for the same (eg. Porta Cabin) may be proposed by MSI. The required RoW / space for the same shall be sole responsibility of the MSI and shall install only after written approval from the BTD.
h. The solar unit shall be designed as per the power requirements of components.
i. The Solar unit shall comply to MNRE and ROHS certification
j. Monocrystalline solar plates should be preferred for low sunlight conditions.
k. The MSI shall provide for necessary tool to capture the Solar Power generated, utilized, power consumption, and battery life. The data shall be available at CCC for review and monitoring on continuous basis.
l. However, MSI shall ensure the SLA requirement of the RFP shall be strictly adhered to

### 12.22. UPS

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| **Business Requirements** | • All the field components installed under ITMS project (violation detection system, variable message signage etc.) shall be coupled with sufficient capacity of the power backup through Uninterrupted Power Supply.<br>• UPS sets shall also be required for all the components in Traffic Management Center. All the installed components at TMC, DC etc. by the MSI, shall be coupled with UPS and DG set.<br>• UPS sets shall also be required for all the components at all Viewing Center for LED Screen and Workstation.<br>• UPS shall be installed for each set of systems for proper protection against power surges and ensure power stabilization to the equipment. |
| **Functional Requirements** | **UPS shall Protect components against:**<br>• Power Failure by providing immediate backup power when the input power source fails<br>• Voltage spike or sustained overvoltage<br>• Momentary or sustained reduction in input voltage<br>• Voltage sag<br>• Noise, Harmonic distortion<br>• Instability of the mains frequency |

### 12.23. DG Set

a. The Traffic Management Center and on-premise Data Center shall and all components / equipment also be coupled with additional power back up in the form of Diesel Generator Set (DG Set).
b. Meeting the SLAs shall be sole responsibility of the MSI.
c. The MSI shall ensure the DG set is always ready including the fuelling requirements for any unforeseen power failures at TMC and DC.
d. Fuelling and Re-fuelling of the DG Set setup by MSI, throughout the contract period shall be sole responsibility of MSI.
**e. The power uptime at Traffic Management Center and On-premise Data Center is required to be 100% (24x7) without an exception.**
f. The Technical Specifications of the DG set shall be as per defined in the RFP.

### 12.24. Junction Box

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| **Business Requirements** | • The project may need junction box for network components, for power components and for ITMS / VDS components.<br>• The MSI may opt to provide one or more Junction Box as per requirement of the project and after clearance from the respective OEM. Any extra junction box required at any of the location of interest shall be sole responsibility of the MSI.<br>• The quantity of the Junction box mentioned in the RFP document is indicative. MSI may propose higher number of Junction Box as per requirement of the project at its own cost.<br>• The respective junction box shall be sized at least 50% more than the actual requirements considering scalability to accommodate future requirements.<br>• The junction box should be designed in a way that, separate compartment will be available for separate system (i.e. VDS LPU, |

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| | Active component, UPS etc.). Each compartment shall have lock & key facility and a proper separate compartment as necessary. There should be provision made to integrate the systems if required.<br>• In addition, the junction box design shall be modular, and each component shall be well organized and clamped inside to ensure components do not heat up or fall out on opening.<br>• Any separate junction box required for electric / power supply shall be in the scope of the MSI.<br>• The placement of Junction Box shall be explicitly discussed with the BTD authorities for each location before finalization. In case the JB is blocking the way for pedestrian / vehicular traffic, the BTD and MSI shall mutually discuss other possibility of the location to ensure minimum hinderance to the traffic. |
| **Functional Requirements** | • Junction box shall be protected from dust, environment and other external factors, lockable / sealable with rack, and shall be installed appropriately sized for housing the power supply, Energy meter, power cable, earthing cable with chemical earthing strips, UPS (including isolations) & required communication equipment.<br>• The electrical & the data cabling at the field location shall be done as per the relevant ISO/IEC guidelines for outdoor cabling.<br>• The aim will be to protect the cable from Mechanical damages, Rodents, moisture ingress & Electronic Magnetic Induction (EMI).<br>• All outdoor field equipment shall be suitable for outdoor use under harsh environmental conditions (including heavy monsoons, 95% relative humidity & corrosive environment).<br>• All junction box should be equipped with cooling fans so as to avoid increase in air temperature inside the junction box.<br>• The Junction Box shall be placed appropriately and securely, if required with necessary concrete base as per bidder solution. |

Any other Junction Box, DB Box, Termination Box, UPS and Battery Box shall be accounted by the bidder as per bidder solution at no extra cost to BTD.

### 12.25. Last Mile Cabling Infrastructure

a. The MSI shall provide standardized cabling (for electric power and network) for all devices and subsystems in the field and TMC.
b. All work under passive cabling shall be governed by a set of standards that specify wiring electric, data or voice communications, using category 5 (CAT 5E) category 6 cable (CAT 6), category 6A (CAT 6A) and category 7 (CAT 7) and modular sockets. All material used shall be conforming to relevant standard as per ISO.
c. The proposed cables shall meet the valid directives and standards (including BIS).
d. MSI shall ensure the installation of all necessary cables and connectors between the field components, junction box and other equipment of the system.
e. The MSI shall ensure that the cable layouts are neat and distinguishable. The termination of cables needs to be planned for future expansion of scope.
f. For pole mounted field components, the cables shall be preferred to be routed down the inside of the pole and through underground duct to the outstation cabinet. MSI shall submit details about pole (and cantilever as applicable) and the cabling plan.
g. All cables shall be clearly labelled with indelible indications that can clearly be identified by maintenance personnel.
h. All cabling shall be documented in a Cable Plan by the MSI.
i. The MSI is required to follow the industry standards for any PVC Conduits and Wiring work to be carried out under the scope of ITMS project. The PVC conduits shall comply

with I.E.E regulations and all materials used shall conform to relevant standard as per BIS and shall carry ISI mark.

j. All electrical components shall be design manufactured and tested in accordance with relevant Indian Standard IECSs.
k. Electrical components shall be of minimum standard ANSI TIA 568 C for all structured cabling components. OEM Certification and Warranty of 10-15 years as per standards.
l. The cable laying should be a depth of minimum 500 mm and width of trench should not exceed 300 mm. Before using the machinery for trenching in the junction, proper marking to be done to ensure MSI complies to aforementioned requirement.

### 12.26. Earthing System

a. All electrical components are to be earthen by connecting two earth tapes from the frame of the component ring and will be connected via several earth electrodes.
b. Cable arm will be earthen through the cable glands. Entire applicable IT infrastructure i.e. field components or TMC shall have adequate earthing. Further, earthing should be done as per Local - state - national standard in relevance with IS standard.
c. Earthing should be done for the entire power system and provisioning should be there to earth UPS systems, Power distribution units, AC units, etc. so as to avoid a ground differential. BTD shall provide the necessary space required to prepare the earthing pits. The details for the same shall be submitted by MSI in the Cable Plan.
d. All metallic objects on the premises that are likely to be energized by electric currents should be effectively grounded.
e. There should be enough space between data and power cabling and there should not be any cross wiring of the two, in order to avoid any interference, or corruption of data.
f. The earth connections shall be properly made.
g. A complete copper mesh earthing grid needs to be installed for the server farm area, every rack needs to be connected to this earthing grid. A separate earthing pit needs to be in place for this copper mesh.
h. Provide separate Earthing pits for Servers, & UPS as per the standards.
i. MSI shall follow required earthing standards (e.g. IS-3043) carrying ISI mark and ensure that pole /cantilever and edge level components are protected against lightning.

### 12.27. Lightning-proof measures

a. MSI shall comply with lightning-protection and anti –interference measures for system structure, equipment type selection, equipment earthing, power, signal cables laying. MSI shall describe planned lightning-protection & anti –interference measures.
b. Corresponding lightning arrester shall be erected for the entrance cables of power line, video line, data transmission cables. All crates shall have firm, durable shell. Shell shall have dustproof, antifouling, waterproof function & should capable to bear certain mechanical external force. Signal separation of low and high frequency; equipment's protective field shall be connected with its own public equal power bodies; small size/equipment signal lightning arrester shall be erected before the earthling.
c. The Internal Surge Protection Device for Data Line Protection shall be selected as per zone of protection described in IEC 62305, 61643-11/12/21, 60364-4/5.
d. Data line protection shall be used for security system, server data path and other communication equipment.
e. Data line protection shall be installed as per zone defined in IEC 62305.

### 12.28. Pole, Cantilever and Gantries

a. All the field components of the ITMS project are required to be erected on the field at various squares and roads of the city, or at a midblock on the highway, or any intersections.

b. Poles, Cantilever and Gantries have been proposed at multiple locations for erection of sensors and camera-based system across the state as per site conditions. It is a tentative list and quantity. The MSI shall be required to conduct survey and propose exact type of structure required as per site conditions.
c. These field components are to be erected at certain height for optimum results.
d. MSI will be required to provide the Pole and Cantilever with necessary height as per site conditions as directed by BTD on case to case basis, at no extra cost to BTD.
e. Any requirement of closing the lanes during the installation and Maintenance of the field components shall be avoided.
f. BTD will support for acquiring necessary permissions for erection of such infrastructure.
g. The poles and cantilever are required to be sturdy enough to withstand the extreme environment conditions and high wind speeds in the city as **per IS 875-Part 3** and protect the field components as well against the same for entire project period.
h. MSI shall ensure minimum clearance from RTL of **5.5 / 6.1 mtrs** based on the road type, as per requirement of BTD at different site locations. MSI shall seek approval before FAT, supply and installation for each location as part of the junction plan.
**i. The MSI has to provide structural safety certificate from qualified structural engineers approved / certified by Govt. Agency, before installation for each unique design (size / shape etc.) and immediately post installation for all the structures. This is one of the major criteria for declaration of project Go-Live.**
j. Structure shall be painted with one coat of primer and two coats of PU paint. MSI shall apply paints at least once each year as part of the maintenance, for the entire contract period.
k. The equipment including poles, mountings should have an aesthetic feel keeping in mind the standards road Infrastructure (e.g. Poles, Navigation boards etc.) currently installed at these locations. The equipment should look "one" with the surroundings of the location and not look out of place.
l. The MSI shall be required to submit a detailed **Implementation and Operations Plan Document** and get it approved from BTD.
m. The MSI shall also submit a detailed installation report post installation of all equipment at approved locations. The report shall be utilized during the acceptance testing period of project to verify actual quantity of equipment supplied and commissioned under the project.
n. The BTD may direct MSI to allow re-use infrastructure of project for other purposes. The design life of Pole and cantilever shall be minimum of 25 years from the date of Installation.

### 12.29. Inspection Vehicle

MSI shall purchase inspection vehicles in the name of BTD (unless agreed otherwise by BTD in writing), and provide the same for the use of the BTD and its appointed agency which shall include the cost for vehicle, drivers, fuel, operation, maintenance, repairs, insurance, etc. as per below:

| Sr. | Description of vehicle | Quantity | |
|---|---|---|---|
| | | Implementation Period | O&M Period (till end of contract period) |
| 1 | EV Vehicle | 3 vehicles for entire implementation period<br><br>Avg. 50 km per day run | 3 vehicles for entire O&M period post Go-Live for entire project period<br><br>Avg. 30 km per day run |

## 13. User Management

The system shall give users, user specific, role-based, and secure access to all the applications, services and information with a full-fledged Role Based Access Control (RBAC) model. User shall also be configurable as per jurisdiction.

### 13.1. User Requirements

a. The system shall have provision to organize users by business-defined categories such as enforcement officials, incident management officials, jurisdiction wise such as traffic police chowky / Zone jurisdiction, RTO jurisdiction and municipal jurisdiction etc. Each stakeholder department can inherit or define its own permissions, group and manage roles for the various applications it chooses to include.
b. System users include all the authorised employees of the BTD and Traffic Police.
c. These users would be accessing the system based on the roles and responsibilities. These set of users are based on current assessment and can be further extended / modified. Based on the type and role of user the system will provide the proper accessibility level.
d. System shall grant suitable viewing / data editing rights to various users through Active Directory, LDAP, or other security source

### 13.2. Guest Users / Citizens

a. Guest users shall not be required to login and shall not be allowed to modify any system data. All the information stored in the system shall not be available to the Guests users. The information in the public domain will be restricted and the fields that will be visible to the public shall be finalised by BTD during the SRS stage.
b. The modules and functionalities to be made available to public users shall be decided later by BTD which shall form part of Project Plan Document and SRS Document.

### 13.3. Admin User

a. The system shall provide for minimum one admin user for the entire proposed system for the BTD, which shall manage the user logins, passwords, sessions, role assignment, hierarchy etc. for entire ITMS system.
b. Shall allow admin to monitor and provide access to other stakeholders such as BTD officials, Traffic Police officials, MSI personnel, consultant personnel, etc. who would be undertaking projects on behalf of Departments BTD.

### 13.4. User Registration and Access Control Management

Identity, Access management, Single-Sign-On (SSO) and Role based access would be achieved through the identity assertion, credential management and directory services components.

**Single Sign on**: The system should enable single-sign-on for multiple similar applications so that any user once authenticated and authorized by system is not required to be re-authorized for completing any of the services in the same session. MSI shall provide browser-based application accessed on the internet, through single-sign-on mechanism, will provide access to all the services of the system, based on their pre-defined roles and responsibilities.

**Master Data Manager**: System shall create few “Master Data Manager” users and allow only such users to modify the master data in the database directly in case of any correction required at the later date.

**Hierarchy:** The role and the hierarchy of the user groups which are allowed to use the system functions, modify the data, manage other users, responsible for attaining to complaint, incident etc. shall be as per requirement of BTD which shall be finalise during the SRS stage.

**The system shall:**

a. Support Authorization, Authentication and Auditing of users
b. Provide default password on email, renewal, expiry, security and authentication as required.
c. Allow a valid user to store his preferred email ID and mobile number in the system securely for receiving alerts.
d. System shall support Single-Sign-On, security on all levels of entry / exit / access to systems without the inconvenience of re-prompting users.
e. Enforce the password restrictions, which include the criteria and limitations that can be placed on passwords to increase security including features such as minimum password length, periodic forced changes, not reusable, hard to guess, mixed characters, etc.
f. Password shall be changed at a pre-defined frequency.
g. Use the technologies like captcha, OTP for increased security.
h. Lock the session after a specified number of authentication failures.
i. Not allow concurrent sessions for the same user
j. Support common authentication mechanism and standards
k. Confidential information like passwords and other user information shall be stored and transmitted in a secure and encrypted manner
l. Log the successful / unsuccessful user login requests and other user activities for investigative purposes in case of a security breach.
m. Be capable of secure, tamper proof auditing and logging
n. Provide the Security & User administration GUI for system admin to enable management of access rights and privileges of users.
o. Have ability to define access to specific menus, specific data, specific files etc. set by user groups
p. Should provide support for X.500 naming standards
q. Should support that user account creation/deletion rights within a group or groups can be delegated to any nominated user.
r. Should support directory services integrated DNS zones for ease of management and administration/replication.
s. Provide the ability to map and link together two sources of user information. For eg. LDAP for static data about users and RDBMS for Dynamic data.
t. Have the ability to send e-mail, SMS notifications to the BTD and Traffic Police official/s (case to case or bulk as per requirements) responsible for a given activity or assigned work and send reminder alerts at pre-defined interval and based on deadlines / timelines for taking action and any other reminder set up by the user. Maintain log of SMS Alerts, Email sent to the users.

## 14. MIS and Reports

a. The entire ITMS Bihar State will generate a lot of data every moment. It is hence imperative to have a strong, well-designed reporting system which will auto generate reports as per pre-defined parameters and allows user to derive desired customized reports based upon the selection of any available parameters from the system through web portal.
b. To effectively analyse various information related to ITMS project, commuters, vehicles, assets, systems etc., MSI shall utilize web-based Analytics services and provide dashboard views at the Traffic Management Center and on the web-portal to the authorized users.
c. These analytics services shall help perform various types of predictive analysis and assessments like vehicle trend analysis, Traffic Analysis, incident and incident trend analysis, violations and violation trend analysis, revenue projections, seasonal escalations and downfalls etc.

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| **Business Requirements** | • Dashboard based reports, using different visual elements including tables, charts, maps, calendars, gauges, images, visual and textual lists.<br>• Such reports shall be screen friendly irrespective of size of the screen and shall have ability to convert into printer friendly reports.<br>• Display information in an easy-to-understand format and use intuitive and interactive visualization to enable users like TMC operators, BTD, Traffic Police etc. to quickly navigate, understand, and investigate data elements to make informed decisions.<br>• Run mathematical, statistical, and analytical operations on available data and allow multiple visual elements to be laid out on same display.<br>• All the reports shall be made available online, accessible at the TMC, through a web portal and mobile app with restricted access.<br>• BTD may also ask to allow public access to a few reports on the website as may be required.<br>• Indicative list of required report is provided, however MSI shall develop reports for any additional requirements from time to time throughout the contract period, as directed by BTD at no extra cost. |
| **Functional Requirements** | • Display a huge amount of data in a clear and organized view<br>• Ability to define multiple day types for the entire calendar year or a specified period for weekdays, Public Holidays, festival season, vacation, Saturdays, Sundays and any other combination of days (like 2nd Saturday) etc.<br>• Ability to set other parameters and constants through data entry such as targets, past data before the ITMS project as benchmarking etc.<br>• Have view-management tools, allowing user to move, reorder, enlarge, shrink, open, and close visual elements with intuitive interaction.<br>• Have zero-programming mashup capability that allows the user to configure queries and data mashups visually through drag-and drop functionality.<br>• Have provision to drill down and search through the large amounts of data easily and quickly by time periods and other search criteria defined by the user.<br>• Support security for drill-down capabilities in dashboard reports, ensuring visibility for only authorized users.<br>• Have provision for intuitive visual filtering, focusing, and selection of the displayed data and information.<br>• Have provision to search, filter and sort the presented data based on a number of multiple attributes simultaneously including the time period or on multiple attributes simultaneously.<br>• Shall allow conditional formatting, based on thresholds or data ranges, for any cell/object in the report<br>• Have provisions to hide or show parts of the data<br>• Have provision to search through visual elements that display numerous data entries such as tables and lists.<br>• Understand different types of structured data including numbers, percentages, fractions, general text, coordinates, and objects<br>• Provide historical and concurrent reports for various systems.<br>• Compute trends and projections from data based on available historical data and based on data from external systems to enable informed decision-making |

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| | • Have Provision to graphically define complex queries that contain multiple parameters and span different data sources.<br>• **Have provision to save the current queries, filters, and selection parameters and to save custom reports for subsequent use.**<br>• Have the ability to allow the user to create, load, modify, delete, and save report templates graphically.<br>• Ability to display the list of available report templates, saved reports, and recently used report templates when the user logs in.<br>• Have data-pivoting capabilities<br>• **The System shall enable BTD to configure the grouping, filtering, and delivery of the system generated reports to predetermine email addresses, network file directory, ftp sites, and/or printers.**<br>• The system shall allow reports to be generated and published on an ad-hoc or scheduled basis with the ability to predefine type of reports, parameters and a list of recipients, schedule etc. through a GUI.<br>• Support real-time reports (like at-a-glance status) as well as Historical analysis reports (like Trend, Top 10 etc.)<br>• Shall have provision to extract reports in various formats such as PDF / HTML / XML / CSV / MS-Word / MS-Excel etc. Exact requirements of types of reports, columns required, filters required, total row etc. will be discussed with Successful Bidder during implementation.<br>• The system shall have the ability to Configure KPIs for user, operation, sub-system etc. and display single dashboard view of the results against the KPIs with different colour coding. |

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| **Indicative Types of Reports** | **Vehicle flow Reports:** Report of vehicle flow, and for the selected categories at each of the installed locations for Last Day, Last Week and Last Month.<br>• **Violation Reports:** Absolute numbers, percentage, corresponding revenue and percentage contribution, class of vehicle wise, location, date or time wise, type of violation wise etc.<br>• **Fine Collection Report:** Total violations, expected and realised challan revenue, pending payment, court memos, payment mode etc.<br>• **Incident Reports:** Total incidents, types of incidents, date and time wise, location wise, action taken wise, time taken for action, reason and severity of incident etc.<br>• **Location Setup Reports:** Number of violations and incidents detected through that sensor / camera, at respective location, date and time wise, accuracy of violation and incident alarms, false alarms, fine collection corresponding to the location etc.<br>• **Asset Reports**: Asset mapping location wise, type of asset, make - model wise, date of installation, repair and maintenance reports, health of asset reports etc.<br>• **Maintenance and Repair Reports:** Issue log reports**,** type of issue, date and time, resolution type, time taken for resolution, scheduled maintenance date and time reports, issue reported and corrected reports, spare parts or spare component replacement reports etc.<br>• **System Transaction Reports:** Transaction-level reports such as system logs of changes in the parameters, security scanning and action reports etc.<br>• **Network Reports:** Utilization, uptime and downtime, primary and redundant line reports, location wise network traffic report, date and time wise network report.<br>• **Server and Storage Reports:** Server and storage capacity utilization report, uptime and downtime reports, DR drill reports, DC failure and RTO and RPO reports, system wise utilization details etc.<br>• **Manpower Reports:** MSI manpower attendance reports including operators, repair and maintenance staff etc.<br>• Trend analysis of the data over a period of time for all of the above reports. |

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| **Challan Reporting requirements** | **Reporting requirements**<br>○ The ITMS system shall provide comprehensive MIS of the challan and their status. The system shall also allow viewing of these challans for all the stakeholders.<br>○ The system shall be able to generate dynamic reports as per the user's requirement fields as well as MIS Reports, statistical report.<br>○ The system shall allow automatic creation and printing of records of unpaid challans for further action at specified periods, (weekly or bi-weekly, etc.)<br>○ System should be capable of generating various reports as desired by the authorities.<br>○ The system should have the additional functionality to send Day end reports to all the authorities via SMS and email.<br>○ **Day end report**<br>▪ Total number of challans<br>▪ Total number of cases<br>▪ Total fine amount collected<br>▪ Different type of challans generated and its total number<br>○ **Dashboard:** Dashboard for authorities should reflect data as per their jurisdiction. The dashboard should contain the following information<br>▪ Challans generated<br>▪ Type of challans generated<br>▪ Total cash collected<br>▪ Top offences<br>▪ Top performers location (camera locations)<br>▪ Least performers location (camera locations)<br>○ **Proactive Analytics:** The system should be able to analyses the challan data over a period of time and help the authorities with the following information<br>▪ Repeat offenders area<br>▪ High violation detecting areas<br>▪ Least violation detecting areas<br>▪ Comparison of vehicular population and violation detection<br>○ Automatic creation and printing of records of unpaid challans for further action at specified periods, (weekly or bi-weekly etc.)<br>○ **Other Reports**<br>▪ Historical cases report, Repeat offenders<br>▪ Area wise, Station wise, RTO wise report<br>▪ Offence details report, Consolidated collection<br>▪ System wise report<br>○ **Login report.** |

## 15. Requirements for the ITMS Project

The MSI shall strictly adhere to the standards set by the BTD. The MSI shall ensure that he is solely implementing the project and shall not franchise / sublet / subcontract it to any third party under any circumstances without prior written consent of BTD.

i. MSI shall be responsible for procurement of all required hardware, software, network infrastructure and all other components as defined in the BoQ sheet. The MSI shall be responsible for end-to-end implementation and shall consider and provide / supply any items not included in the BoQ but required for commissioning of the ITMS project and meet the requirements of the proposed ITMS System. MSI shall submit the same as part of technical proposal. BTD shall not pay for any of the equipment not part of BoQ but are required for successful completion of the project. However, the same has to be supplied by the MSI without any additional cost to BTD.

ii. The specifications provided in this RFP are minimum and indicative and carry guiding rule. The MSI is free to offer products and solutions which meet requirements of the RFP focusing on the outcome, future scalability, security, reliability and adherence to specified SLA under this RFP, in line with applicable standards & best practices adopted in the industry. The MSI is encouraged to design an optimized solution which is technically superior, innovative, proven, better in terms of functionality and is cost effective. Any specified parameters mentioned in the scope/technical requirement in the RFP may be considered if it is required for meeting current & future requirements during the contract period. Necessary justification should be given in technical solution accordingly. The MSI is fully responsible for the specified outcome to be achieved. BTD shall not pay anything over and above the quoted rate for any solution upgradation and / or any extra component required to ensure the requirements as defined in the RFP are met.

iii. The specifications mentioned for various IT / Non-IT components are minimum and indicative requirements and should be treated for benchmarking purpose only. Each such component shall meet or exceed the minimum technical specifications defined in the RFP document in the Annexure Set II – Format 7.

iv. MSIs are required to undertake their own requirement analysis and may propose higher specifications that are better suited to the requirements, and the deployed systems shall exactly meet the Technical Specifications, make and model proposed by the MSI while bidding and agreed by the BTD. In case of deviation, a detailed explanation from the bidder shall be expected, one which written approval from the BTD may be given as BTD deems fit. MSI shall adhere to the same.

v. The MSI would be required to install and configure / integrate every component and subsystem component, required for functioning of the ITMS System.

vi. All hardware procured for the project shall be as per the latest industry standards and brand new with warranty as per defined specifications in the RFP, replacement, software assurance and shall not have end-of-support as defined in the RFP.

vii. Any components / equipment approaching end of life cycle as per its OEM's policy, should be replaced with new equipment, at no extra cost to BTD. Any technology upgrade, replacement of hardware, software etc. required for the same, shall be provided by MSI at no extra cost to BTD. MSI shall submit the proposal to the BTD with reasonable justification and proposed alternative (preferably same make) which may or may not be considered by BTD. BTD's decision shall be final and binding on MSI. If so directed by BTD, MSI will be required to replace the product / solution with an equivalent or better product / solution and meeting the Minimum Specifications of the RFP, at no extra cost to BTD.

viii. Any software upgradation or its replacement required to meet SLA requirements and / or to meet requirements of change in applicable Government Guidelines, and / or Change in Law as defined in **Clause 10** under "Administrative Aspects", and / or to ensure continuous Technological Improvement, over and above minimum functional requirements specified in the RFP shall be provided by the MSI at no additional cost to BTD anytime during the contract period (including last effective date of the contract).

ix. Any hardware upgradation or its replacement required to meet SLA requirements, over and above minimum functional requirements specified in the RFP shall be provided by

the MSI at no additional cost to BTD anytime during the contract period (including last effective date of the contract).

x. Any hardware upgradation or its replacement required due to any change in applicable Government Guidelines, and / or Change in Law as defined in **Clause 10** under "Administrative Aspects" and /or to ensure continuous Technological Improvement, over and above minimum requirements specified in the RFP shall be provided by the MSI as per requirements and directions of the BTD. Any additional cost with regard to the same shall be dealt in accordance with the provisions under the **Clause 7** under "Administrative Aspects."

xi. MSI shall ensure investment protection of the system under ITMS Project. MSI shall ensure compatibility of applications across OS releases and version releases and generations of system technology and upgrades. OEM shall be required to ensure for binary compatibility / interoperability of applications across release of the operating system and architectural generations of CPU and system platforms; for entire project period for the server architecture and other IT systems under ITMS project including the applications, data, operational management, people skills etc.

xii. In order to decrease the workload for operation and maintenance, each component / equipment shall be supplied just once or shall be from the same batch so that calibration and verification has high probability of success (any deviation shall be discussed with BTD and MSI shall proceed only after written approval from BTD).

xiii. The proposed software, solutions, and applications shall not be proprietary, support open data standards, be secure, bug free, crash resistant, modular, and provide interfaces for various shared services. Overall and individual solutions proposed by the MSI shall have open data standards for interoperability and 3rd party integrations and shall not get limited due to proprietary issues.

xiv. Database structure (including of the bespoke solution) should be according to open standards.

xv. Architecture of the systems deployed for the project need to be open, interoperable and scalable. Data interoperability shall be ensured.

xvi. All the software licenses shall be non-exclusive, perpetual, fully paid up and irrevocable, valid throughout Bihar, with required technical support from the OEM for the project period and shall have software assurance and in the name of the BTD, on or before Go-Live of the project.

xvii. MSI shall procure all hardware, software etc. in the name of BTD, which are free from any financial obligations etc.

xviii. Any customized application / module developed for BTD, the source code for the same shall be shared with BTD and the said application / module shall be property of the BTD. All components should be in code level and not in binded form like a DLL or exe. Software assets along with codebase like - sliced html, GUI assets, etc. For COTS product, all the licenses shall be perpetual and in the name of BTD as per RFP terms.

xix. Also, such customized application / module shall be developed without use of any external services support, and in case if external services are used, the said application / module shall be available perpetually independent of such external services irrespective of external services support availability. No COTS component should be a part of bespoke solution.

xx. MSI shall remotely update and upgrade all the software applications as and when updates are available (or developed as a part of requirements). Such updates shall be only after due approvals from BTD. MSI shall maintain version control for any and all such updates and upgrades.

xxi. The OEM Software license / subscription shall allow the software to be deployed on physical, virtual or cloud based servers.

xxii. The MSI shall be responsible for any copyright infringement. BTD bears no responsibility towards the same or towards any consequence resulting from non-conformance or non-compliance.

xxiii. **No Vendor lock-in and Replaceability:** Specific OEM products may only be used when necessary to achieve scale, performance and reliability. Every such OEM component/service/product/framework/SI pre-existing product or work must be wrapped in a vendor neutral API so that at any time the OEM product can be replaced without affecting rest of the system. In addition, there must be at least 2 independent OEM products available using same standard before it can be used to ensure system is not locked in to single vendor implementation.

xxiv. Since the applications and its data generated and being dealt with is sensitive in nature, the MSI shall provide robust network and system security features. All the data created / captured under this project shall also be the property of the BTD only. MSI, under no circumstances shall use, distribute, sell, and extract the data.

xxv. The system shall give users, user specific, role-based, and secure access to all the applications, services and information with a full-fledged Role Based Access Control (RBAC) model. System shall grant suitable viewing / data editing rights to various users through Active Directory, LDAP, or other security source using single sign on.

xxvi. All devices, components, hardware, software, equipment etc. shall be synced to a common time – Network Time Protocol (NTP).

xxvii. The indicative architecture of the system is given in this volume. The Successful MSI must provide the architecture of the solution it is proposing.

xxviii. The system architecture should be built on sound architectural principles enabling fault-tolerance, high-performance, availability and scalability both on the software and hardware levels through load balancing and "fail-over" mechanisms.

xxix. The system shall be able to independently test the signal to simulate self-test measurements such as camera calibration, power supply to all connected equipment etc.

xxx. The proposed system (infrastructure, hardware, software, communication, network, equipment etc.) shall not be exposed due to any single point of failure. In case of any failure have redundancy built into the system to bring the overall system back up in the minimum amount of time.

xxxi. The communication between the field systems, LPU / processors at Junction box shall be through appropriate secured technology.

xxxii. The system should have the capability to transfer the data to TMC through proper encryption in real time and batch mode for verification of the infraction and processing of data. Call forwarding architecture shall be followed to avoid any data loss during transfer. In the event that the connectivity to the TMC is not established due to network / connectivity failures, then all data pertaining to the infraction shall be stored on site and will be transferred once the connectivity is re-established automatically. There shall also be a facility of physical transfer of data on portable device whenever required. There should be a provision to store minimum one week of data at each site on a 24x7 basis.

xxxiii. MSI shall be fully responsible for maintaining these components as per the Warranty and BTD Clauses and shall be fully accountable for the same for entire project period. The MSI must pass on the standard OEM's warranty which comes bundled with proposed or purchased OEM solutions. In addition, MSI has to provide documentary evidence for back-to back support agreement with proposed OEM, as applicable.

xxxiv. MSI shall ensure all components are duly covered with IRDA approved Insurance Company for entire duration of contract period as detailed in the RFP.

xxxv. MSI shall supply all the installation material / accessories / consumables (e.g. screws, clamps, fasteners, ties anchors, supports, grounding strips, wires etc.) and proper casing and mounting, necessary for the installation and operation of all the hardware, components, NOC hardware, and network components etc. forming part of the Project.

xxxvi. Materials, fixings and fastenings used shall be inherently corrosion resistant.

xxxvii. All the hardware, software, and network components may have adequate spare during entire project duration to maintain the SLA.

xxxviii. All the components of the Technical Architecture which should comply with the published eGovernance standards, frameworks, policies and guidelines available on http://egovstandards.gov.in, MeITY guidelines for state data center and leading industry standards.

xxxix. In addition to above, the proposed solution should comply with industry standards (their latest versions as on date) wherever applicable. Listed below is for reference and is not to be treated as exhaustive.

- Guidelines for Indian Government Website https://web.guidelines.gov.in/
- Guidelines from http:// www.cert-in.org.in
- W3C specifications
- Information access/transfer protocols SOAP, HTTP/HTTPS
- MeitY, GoI guidelines on Application Development.
- Latest HTML standards
- Information Security to be ISO 27001 compliant

xl. Any manufacturer and product name mentioned in the RFP should not be treated as a recommendation of the manufacturer / product.

xli. Bidders must ensure that the IT systems in the ITMS infrastructure are open, scalable and interoperable. The deployed systems must operate within 4 layers – Sensory layer, communication layer, data layer and application layer adhering to relevant guidelines.

xlii. The MSI shall design the entire system considering various guiding principles as described below:

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| **Scalability** | Important technical components of the architecture must support scalability to provide continuous growth. The system should also support vertical and horizontal scalability so that depending on changing requirements from time to time, the system may be scaled upwards. There must not be any system-imposed restrictions on the upward scalability in number of cameras, sensors, data storage, data processing. Main technological components requiring scalability are Storage, Bandwidth, Computing Performance (IT Infrastructure), Software / Application performance and advancement in features. |
| **Availability** | Components of the architecture must provide redundancy and ensure that are no single point of failures in the network and key project components. Considering the high sensitivity of the system, design should be in such a way as to be resilient to technological sabotage. To take care of remote failure, the systems need to be configured to mask and recover with minimum outage. MSI shall make provision for high availability for all the system services. |
| **Security** | The architecture must adopt an end-to-end security model that protects data and the infrastructure from malicious attacks, theft, natural disasters etc. MSI must make provisions for security of field equipment, network as well as protection of the software system from hackers and other threats. Using Firewalls and Intrusion detection systems such attacks and theft should be controlled and well supported (and implemented) with the security policy. The virus and worms attacks should be well defended with Gateway level Anti-virus system, along with Servers / Workstation / Desktop level Anti-virus mechanism. There should also be an endeavor to make use of the SSL / VPN technologies to have secured communication between Applications and its end users. Furthermore, all the system logs should be properly stored & archived for future analysis and forensics whenever desired by the BTD. |

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| **Manageability** | Ease of configuration, ongoing health monitoring, and failure detection are vital to the goals of scalability, availability, and security and must be able to match the growth of the environment. |
| **Interoperability Standards** | Keeping in view the evolving needs of interoperability, especially the possibility that the solution shall become the focal point of delivery of services, and may also involve cross-functionality with the e-Government projects of other departments in future, the solution should be built preferably on Open Standards. The MSI shall ensure that the application developed is easily integrated with the other Application. The code should not build a dependency on any proprietary application, particularly, through the use of proprietary stored procedures' belonging to a specific database product. The system should have capability to give cameras feeds, database feeds to any other system outside ITMS Project, without any additional cost.<br>In relation to the server architecture and IT life cycle costs associated to the applications, data, operational management, people skills etc., MSI shall be required to ensure compatibility of applications across OS releases and generations of system technology and upgrades. OEM shall be required to ensure for binary compatibility / interoperability of applications across release of the operating system and architectural generations of CPU and system platforms; today and in the future at least till upto the end of the project. |
| **Integration** | There are multiple ways of integration of the solution with other systems is envisaged. These may be through Web Services, Message Queuing, File based or API based. The integration and data sharing mechanism may be either in Batch Mode or Needs basis (synchronous or asynchronous).<br>**Some of the key considerations of the interface / integration which MSI shall ensure are mentioned below:**<br>• Interface Definition<br>• Interface Owner<br>• Interface Type<br>• Interface Format<br>• Frequency<br>• Source System<br>• API/Service/Store Procedure<br>• Entitlement Service<br>• Consuming System<br>• Interface Layout (or) Schema<br>▪ Should have provision for exceptional scenarios<br>▪ Should have syntax details such as data type, length, mandatory/option, default values, range values etc.<br>▪ Error code should be defined for every validation or business rule<br>▪ Inputs and outputs should be defined<br>▪ Should be backward compatible to earlier datasets<br>▪ Data exchange should provide transactional assurance<br>▪ Response time and performance characteristics should be defined for data exchange<br>▪ The failover scenarios should be identified<br>• Data exchange should be auditable |
| **Data Integrity** | • The MSI has to ensure and comply with Data integrity compliance through the entire contract. |

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| | • Data integrity is a fundamental component of information security. In its broadest use, "data integrity" refers to the accuracy and consistency of data stored in a database, data warehouse, data mart or other construct. The term – Data Integrity - is used to describe a state, a process or a function – and is used as a proxy for "data quality". Data with "integrity" is said to have a complete or whole structure. Data values are standardized according to a data model and/or data type. All characteristics of data must be correct include business rules, relations, dates, definitions & lineage – for data to be compile & process.<br>• Data integrity is imposed within a database when it is designed and is authenticated through the ongoing use of error checking and validation routines. As a simple example, to maintain data integrity numeric columns/cells should not accept alphabetic data.<br>• As a process, data integrity verifies that data has remained unaltered in transit from creation to reception.<br>• As a state or condition, Data Integrity is a measure of the validity and fidelity of a data object.<br>• As a function related to security, a data integrity service maintains information exactly as it was inputted and is auditable to affirm its reliability.<br>• Data undergoes any number of operations in support of decision-making, such as capture, storage, retrieval, update and transfer.<br>• Data integrity can also be a performance measure during these operations based on the detected error rate.<br>• The MSI has to ensure that the Data must be kept free from corruption, modification or unauthorized disclosure to drive any number of mission-critical business processes with accuracy. Inaccuracies should not occur either accidentally (e.g .through programming errors), or maliciously (e.g. through breaches or hacks).<br>• The MSI has to ensure Database security and data integrity, including:<br>o Data encryption, which locks data by cipher<br>o Data backup, which stores a copy of data in an alternate location<br>o Access controls, including assignment of read/write privileges<br>o Input validation, to prevent incorrect data entry<br>o Data validation, to certify uncorrupted transmission |
| Convergence | • The state has already initiated many projects, either at state level or specific city level, which have state of the art infrastructure at field locations deployed under them.<br>• ITMS Infrastructure should be made scalable for future convergence needs.<br>• BTD has envisaged to create a state-of-the-art infrastructure, hence it is imperative that all infrastructure created under the project shall be leveraged for maximum utilization.<br>• Hence the MSI is required to ensure that such infrastructure will allow for accommodation of equipment's being procured under other ICT projects. Equipment like Junction Boxes and poles deployed under the ITMS project at the field locations will be utilized to accommodate field equipment's created under the other projects of |

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| | BTD. The procedure for utilization of the infrastructure will be mutually agreed between the BTD and MSI. |
| Open Standards | System should use open standards and protocols to the extent possible |
| Other principles | Robustness, reliability, resilience, portability, statutory, interoperability, extensibility, compliance, fault-tolerance, & regulatory adherence etc. |

BTD at its discretion, may also engage independent auditors to audit any / some/ all standards / processes. The MSI shall support all such audits as per calendar agreed in advance. The result of the audit shall be shared with the MSI who has to provide an effective action plan for mitigations of observations / non-compliances, if any.

# Project Activities

## 1. Inception Phase

### 1.1. Survey and Inception Report by MSI

The RFP document details the BoQ for each junction and other locations across the city for setting up of Intelligent Traffic Management System (ITMS). However, the requirements and the quantity are indicative. The MSI shall conduct a comprehensive and independent study of all the sites, the existing infrastructure of corridors, junctions /intersections, traffic conditions, re-validate exact locations of the proposed solutions, availability of the electricity, RoW for erection of pole, network etc. estimate exact efforts for the ITMS project. The actual deployment of hardware and software components and the civil work shall be based on the comprehensive field survey to be conducted by the MSI and approved by BTD.

a. **MSI shall conduct a survey of existing traffic operating conditions and movements across all required junctions:**
   - The survey shall cover all the black spots and accident prone areas.
   - The survey shall also cover locations and height of normal poles, cantilever poles, junction box, trenching route and cable routing etc.
   - The MSI shall finalize the location for Variable Messaging Signboards, Public Announcement Systems etc.
   - MSI shall survey the amount and extent of the demolition and site clearance required, identify need for site preparation activities like network laying, erection of poles, cantilevers, gantries, cabling for power and network last mile connectivity, location and direction for installation of camera & other sensors, affixation of TMC components etc.
   - Identify need for signages, lane markings and other necessary site infrastructure.
   - The survey shall also include availability of **electricity supply** at the location, optimized number of solutions, exact location for mounting of pole, cantilever, and gantries etc. **The MSI shall be submit Junction / location Geometry, Junction Plan for installation of VDS components for each junction as part of the report.**
   - The MSI will be responsible to propose transition strategy for dismantling of any existing components which may be required, clearing the site and setting up of new component. The proposed strategy should clearly provide approach and plan for implementing the ITMS components while ensuring minimum disturbance to the road traffic and shall use appropriate static signage designating the work in progress status.
b. Survey of the sites shall be conducted on prior approval from the BTD along with the concerned BTD officials and Traffic Police Officials as directed by BTD for scheduled date, time & other details.
c. The solutions proposed in this RFP are only for suggestive understanding. MSI should not limit its offerings to the functionalities proposed in this RFP and is suggested to propose any functionality over and above what has already been given in this tender document.

d. Anything proposed over and above the requirements shall be submitted as a part of the implementation plan. BTD may approve same, only after which the MSI shall implement the changes.
e. There could be additional variation in the given indicative list as per approvals from BTD and no extra costs to BTD, unless explicitly pre-approved by BTD.
f. The MSI, in consultation with Traffic Police can propose alternate locations apart from the locations mentioned in this RFP for installing the VMS boards, PA system etc., where their effectiveness will be maximized. BTD shall review and approve the proposed locations.
g. All maps, drawings, graphs, information, any other documents shall be submitted along with the Survey Report by the MSI to validate the solution proposed.

### 1.2. Integration Plan

a. The MSI shall study the existing systems implemented through various projects, and propose any need for integration, including that with existing ITMS systems, eChallan and Vahan systems etc. and liaison with their officials, its consultants and the service provider to draw an integration plan of the existing system with ITMS system.
b. All the required APIs, scaling of ITMS system to integrate existing assets shall be sole responsibility of the MSI, at no extra cost to BTD. Payment **towards any extra cost charged by OEM and / or SI of existing components, if any, shall be sole responsibility of the MSI**. In case of failure to integrate with existing components, to meet the RFP functionalities, MSI shall be solely responsible to supply, install, integrate, commission, operate and maintain any additional items (including Controllers) required for the project at no extra cost to the BTD.

### 1.3. Submission of Project Inception Report, Implementation and Operation Plan Document

The MSI shall plan the project implementation in detail and should provide a micro level view of the tasks and activities that they are going to undertake in consultation with the BTD. The MSI shall submit the specifications of the hardware and furniture proposed etc. and a Detailed Technical Architecture as a part of Project Planning document within the timelines specified in the RFP. Any change in the proposed hardware, software or any other component / solutions shall be submitted by the MSI along with reasonable justification. This may be considered by the BTD as it deems fit. Any directions from BTD in this regard shall be adhered to by the MSI. An indicative list of planning related documentation as part of Inception Report that the MSI should make is as described below. Any changes recommended by BTD in the project planning and management document shall be incorporated and adhered to throughout the contract period.

a. The MSI shall submit a detailed Survey Report within the timelines specified in the RFP.
b. MSI shall also submit a detailed report on the Implementation Plan and Operations & Maintenance Plan for the project.
**c. The Implementation Plan shall be comprehensive including, but not limited to:**
   i. Infrastructure requirement analysis
   ii. Junction Geometry, Junction Plan for installation of VDS and other components for each junction / locations.
   iii. Physical infrastructure design for devices on the field.
   iv. Civil work schedule chart and detailed plan
   v. Hardware installation and commissioning plan including the Cable Plan and other permission as may be required. Detail requirement and process of civil work.
   vi. Process, methodology, Make, Model, version of hardware, software etc. along with its license details, to be used in the Project (exactly as submitted by the Bidder during Technical Evaluation).

vii. Corresponding documents of hardware and software, user manuals, SOPs, repair and maintenance manuals, including details of the Equipment Vendor / OEM.
viii. Detailed description of the technology to be used for evaluation of the driving ability of the applicant (exactly as submitted by the Bidder during Technical Evaluation).
ix. Manpower, tools, resources, and raw materials to be used for installation of various components. Qualification and experience of the manpower deployed along with Escalation Chart.
x. Installation and Commissioning Plan, while ensuring minimum disturbance to the existing setup of the site.
xi. Submission of FRS, SRS including Solution Architecture. Application Design Documents (HLD and LLD) of the proposed system and map each of the functional requirements against the system requirements, System UI, configurations required in the COTS systems etc.
xii. Screen Layout, functionalities, wire frames, user interface etc.
xiii. Test Procedure, UAT Test Cases.
xiv. Detailed To-Be designs (Junction layout plans) specifying the following:
    a. Physical infrastructure design for devices on the field
    b. Height and foundation of Cameras, VMS, PA system etc.
    c. Location of Junction Box
    d. Design of Cables, Ducts routing, digging and trenching
    e. Electrical power provisioning.
xv. Logical and physical database design, Data dictionary and data definitions, ER diagrams etc. data modelling documents.
xvi. Backup SOP document, Business Continuity Plan (BCP) and other details for backup, DC-DR etc. designed by MSI and approved by BTD.
xvii. Application flows and logic, GUI design (screen design, navigation, etc.), Database architecture, including defining data structure, data dictionary as per standards laid down by Government of India / Govt. of Bihar.
xviii. Risks anticipated and mitigation plans.
xix. Sizing for hosting infrastructure, storage, any other requirements with respect to hosting and other details about the OEM / vendor and setup, meeting the requirements.
xx. Data Centre Architecture, Network Architecture and Security architecture considering the existing network backbone of the city.
xxi. Bandwidth requirement calculation, primary and secondary network availability plan.
xxii. Power Backup sizing for each component / site including tracks, waiting area, control room etc. and UPS and DG set details accordingly.
xxiii. Capacity Building Material, Content and Plan.
xxiv. Third Party Applications and System integration plan including integration with Vahan, Sarathi., eChallan and One State One Challan applications.
xxv. Timelines for implementation.

d. **The MSI shall submit Operations and Maintenance Plan including, but not limited to**:
i. Final SOP for MSI operational staff, MSI maintenance staff and BTD officials.
ii. Resource deployment plan with qualification, experience and Escalation Chart.
iii. Risk management plan
iv. Repair and Maintenance plan, Plan for spare Components and parts
v. Calibration schedule
vi. Consumables procurement plan
vii. IT system Security plan, Information Security and Business Continuity
viii. Data Backup Plan and Data Recovery architecture with RPO and RTO details.
ix. SLA adherence plan
x. Road Marking and Pole, Cantilever an gantry painting schedules.

e. MSI shall submit any other details and plans as described in the Tender and / or as required by BTD from time to time during the project period, including for the new requirements.

f. All solutions and architecture proposed by the MSI shall be highly scalable to accommodate future requirements. Detailed plan for the same shall also form part of this document.
g. The Survey Report, Implementation plan and O&M plan must be discussed in detail with BTD and subsequently executed as per final approval by BTD.
h. MSI shall also submit names of the Project Team members, their roles & responsibilities and contact details and escalation matrix.
i. The Technical Architecture Document shall take into consideration various guiding principles defined in the RFP.

## 2. Deployment of Manpower

1. The MSI shall deploy required and adequate manpower for various purpose such for Survey, implementation, operating, management and maintenance of all IT and Non-IT Components., minimum as per requirement defined in below Clause 2.3 under Project Phases below.
2. The MSI shall ensure that the resource availability shall be maintained as per requirements defined in the SLA during the entire contract period. MSI may plan alternate trained resource/s to ensure the SLAs are maintained. In case of failure to comply, MSI shall be liable for penalty as defined in the SLA in this document.
3. For all the staff deployed as a part of the project, the MSI shall be responsible to pay the deployed staff and shall meet or exceed the minimum wages as per Minimum Wages Act and comply with labour laws of Govt. of Bihar. The MSI shall also be responsible for ensuring compliance to the provisions of other applicable labour laws, EPF laws and other relevant laws.
4. MSI shall ensure appropriate provisions for safety and security measures of all the personnel deployed on the project. In case of any eventualities (including disability, death etc.) anytime during the contract period including any incidents, accidents with the personnel deployed by the MSI for the project, MSI shall ensure appropriate measure to control the damage, if any and to do good to the personnel or its family as applicable. MSI shall hold BTD indemnified for any claim may be arising out of the same.
5. MSI should at all times indemnify, defend and hold BTD, its officers, employees, agents, consultants, etc. harmless against all claims, liabilities, loss, expenses, damages or compensation under the provisions of Payment of Wages Act; Minimum Wages Act; Employer's Liability Act; The Employees Compensation Act; Industrial Disputes Act; Maternity Benefit Act; or any modification thereof or any other Labour laws relating thereto, and rules made hereunder from time to time. BTD will not own any responsibility in this regard.
6. The MSI shall ensure that the salary of deployed manpower shall be credited directly through online banking mechanisms like ECS / NEFT / RTGS etc. A record of the payments made in this regard should be maintained by the MSI.
7. Manpower is required to be deployed at the TMC and other manpower (may be floating) for the purpose of maintenance of all the hardware, software, and other components and equipment throughout the contract period as per requirements defined in the RFP. However, BTD officials may have special requirements at times, and MSI and its manpower resources shall ensure to meet the requirements as per directions of the BTD.
8. The MSI shall track the attendance of the Manpower deployed at the site and shall also submit log report of the same, on monthly basis to the BTD.
9. The MSI is required to comply with labour law for weekly off and other benefits. It is advised that MSI shall keep adequate stand-by resources all the time over and above minimum requirements to adhere to the SLAs at no extra costs to BTD.
10. MSI shall submit escalation chart for the entire duration of the contract with details like contact details, designation, role for the project etc. of all the concerned persons.

### 2.1. Replacement of Resources

1. BTD may ask the MSI to replace any of its resources on the ground of non-performance anytime during the project period, and MSI shall replace the resource with an equivalent or better resume within two weeks, on approval of BTD.
2. MSI shall provide replacement resource of equal or better qualification and experience. If BTD objects to the appointment, MSI shall not assign the individual to that position and shall seek an alternative candidate.
3. The MSI may request any replacement of resource in writing and replace a resource only upon written approval from BTD.
4. MSI all ensure proper handover of at least one week (considering replacement time period of maximum two weeks) at no extra cost to BTD and shall not make further replacement within minimum six months.
5. MSI shall ensure role of any resource is not vacant at any point during the contract period.
6. MSI may plan adequate extra resources for manning the project as contingency.

### 2.2. Behavior of the project team

1. Manpower resources deployed by the MSI shall not divulge or disclose to any person, any details of office, operational processes, technical know-how, security arrangements and administrative / organizational matters as most are of confidential / secret nature. Each manpower deployed shall be required to sign an NDA with the MSI to this effect.
2. Manpower resources deployed shall be polite, cordial, positive and efficient, while handling the assigned work so that their actions promote. Be it private or public areas, MSI deployed manpower resources shall be liable to be frisked / checked by the security personnel at BTD premises at any time during performance of their duties.
3. MSI personnel shall wear ID card all the time while in TMC premises.
4. MSI shall ensure proper conduct of his personnel in office premises, and enforce strict prohibition of consumption of alcoholic drinks, paan, gutkha, tobacco, smoking, loitering.
5. BTD shall not be liable for any loss, damage, theft, burglary or robbery of any personal belongings, equipment or vehicles of the manpower resources deployed by the MSI.
6. The manpower resources deployed by MSI under this RFP shall not claim nor shall be entitled for any perks and other facilities admissible to regular / confirmed employees of the BTD during or after contractual period. These manpower resources shall not have right to demand for any type of permanent employment with BTD or its allied Offices. These manpower resources shall not claim any benefit / compensation / absorption / regularization of services with BTD. All the resources deployed under this project anytime during the contract period shall be sole responsibility of MSI and BTD shall not be responsible for providing employment of such resources.
7. Manpower can be sub-contracted by MSI if required, only after prior approval of BTD. However, overall responsibility of the project delivery and entire liability including that of sub-contracted staff shall be of the MSI. The MSI shall indemnify BTD from any claims, litigation or disputes from the deployed manpower (own or sub-contracted).
8. MSI shall deploy required manpower with necessary expertise, experience and tools to carry out state of the art installation of the entire ITMS project.
9. Manpower shall include the managerial staff for monitoring the implementation, civil work, installation etc. and report in case of any issues, challenges etc. to the BTD.
10. The MSI shall ensure to deploy adequate manpower on a continuous basis so as to meet the timelines for service delivery, else penalties as per Annexure Set IV – Annexure 3 shall be applicable. The below indicated Manpower is bare minimum, which can be increased as per requirement and the MSI shall be liable to provide the additional manpower for smooth operation of the ITMS Project.

### 2.3. Project Team

| Sr. | Designation | Resources | Qualification | Indicative Responsibility |
|---|---|---|---|---|
| **1** | Project Director<br><br>For Entire duration of the contract, available for key meetings, as per requirement of BTD | 1 | • Minimum Education: MCA / M. Tech / B. Tech / B.E and MBA<br>• Total experience: At least 15 yrs.<br>• Languages known (Read, Write and Speak): Hindi and English,<br>• Prior project management experience of at least 10 years of handling large and complex projects, with at least one large scale similar project with Project Cost of minimum INR 50 crores.<br>• Excellent writing, communication, time management and multi-tasking skills.<br>• Project Experience of managing components of Smart City, ITMS, ITMS | • Shall head the Project Team for the MSI.<br>• Shall act as a single point contact for BTD during the entire contract period.<br>• Shall be present for discussions, important meetings and<br>• Shall serve any communication with BTD. |
| **2** | Project Manager<br><br>For Entire duration of the contract<br><br>Full time deployed during business hours. | 1 | • Minimum Education: MCA / MBA / M. Tech / B. Tech / B.E<br>• Total experience: At least 10 yrs.<br>• Languages known (Read, Write and Speak): Hindi and English,<br>• Prior project management experience of at least 07 years of handling large and complex projects, with at least one large scale similar project with Project Cost of minimum INR 15 crores.<br>• Excellent writing, communication, time management and multi-tasking skills<br>• Project Experience of managing components of Smart City, ITMS | • **A Project Manager shall be deployed at the Traffic Management Center.**<br>• The project manager shall be responsible for overall coordination with respect to the execution and day to day operations with the BTD, Traffic Police and other on-field officers.<br>• Responsible for managing any issues or bugs reported, any security threat reported, any new requirements etc.<br>• Managing other manpower, supporting with stationery and other consumables, attendance and access management etc.<br>• Responsible for coordination with various 3rd party agencies like National Informatics Center for integration of eChallan, Vahan, Sarathi etc.<br>• Shall also be responsible for keeping record of various activities at all locations of the project.<br>**Bidder shall note that Project Manager is very critical resource for the project and BTD shall not allow junior or with irrelevant experience or late deployment of the resources, especially Project Manager.** |

| Sr. | Designation | Resources | Qualification | Indicative Responsibility |
|---|---|---|---|---|
| **Implementation Phase** | | | | |
| **Core Delivery Team for Implementation Phase:** | | | | |
| **3** | • Functional Lead and Technical Lead, along with Subject Matter Expert such as Hardware Experts, Team from OEMs, Security experts, Civil Works expert, Integration expert, Networking Expert, Electricity / Power experts, DC-DR Expert etc. shall be deployed as per requirements.<br>• Such Leads and experts, as well as working staff shall be of adequate experience and qualification to ensure start-of-the-art implementation of the project ensuring timely completion as per Timelines to meet the SLAs.<br>• Shall be responsible for the entire design, development, installation, testing and commissioning of the project.<br>• **Minimum 10 teams to be deployed for installation of poles, cantilevers, gantries, IT components, network etc. Penalty as per SLA shall be applicable in case of non compliance.** | | | |
| **Operations and Maintenance Phase** | | | | |
| **Core Delivery Team for Operations and Maintenance Phase:** | | | | |
| **4** | Lead Traffic Management Center Operator<br><br>Available 24 x 7 | 1<br><br>Per TMC | • Minimum Education: B. Tech / M. Tech / B.E / M.E / BCA / MCA / BSc. / MSc. or Diploma with specialization in computers / I.T.<br>• Total experience: At least 5 yrs.<br>• Languages known (Read, Write and Speak): Hindi and English<br>• Prior Command and Control Center management experience of at least 5 years.<br>• Project Experience of managing components of Smart City, ITMS | • Lead TMC Operator shall be responsible for manning the TMC and perform all the functions<br>• Additionally, the Lead TMC operator shall be responsible for managing the entire other team deployed on the project, day to day activities, attendance, leave management of the staff etc.<br>• Lead TMC operator shall work under supervision of the Program Manager and Project Director. |
| **5** | Traffic Management Center Operators<br><br>Available 24 x 7 | Minimum 9 from 7 am to 11 pm. Minimum 4 from 11 pm to 7 am. As per requirement over and above minimum defined. | • Minimum Education: B. Tech / M. Tech / B.E / M.E / BCA / MCA / BSc. / MSc. or Diploma with specialization in computers / I.T.<br>• Total experience: At least 3 yrs.<br>• Languages known (Read, Write and Speak): Hindi and English<br>• Prior CCC management experience of at least 3 years.<br>• Project Experience of managing components of Smart City, ITMS | • The operators shall be responsible to assist the BTD and Traffic Police to continuously monitor the city.<br>• Operators shall man the workstations and shall be responsible for following the standard operating procedures (SOPs), and coordinate with the authorities for Traffic management, enforcement suspected challan validation, any unusual activities, incidents etc. is detected or predicted.<br>• The operators shall assist authorities to define SOPs, manage videos, cameras, other sensors, network, storage and all other components and solutions of the ITMS system.<br><br>**At least one from each background: ITMS / VDS** |

| Sr. | Designation | Resources | Qualification | Indicative Responsibility |
|---|---|---|---|---|
| **6** | TMC Support Staff<br><br>24 x 7 | Minimum 3<br><br>As per requirement | • MCA / BE / B. Tech / MSc. or Diploma with specialization in computers / I.T.<br>• Total experience: At least 5 yrs.<br>• Minimum three-year experience in either of Security Administration, Database Administration, network administration, server administration, Systems / Software Quality Assurance<br>• Experience in large and complex IT / ITES / Smart City / ITMS / Telecom projects<br>• Shall have relevant industry certifications and OEM certifications.<br>• Shall have knowledge of leading testing tools<br>• Effective verbal communication skills (English and Hindi) | • Timely backup of the data and feeds, deployment of regular application patches, regular updates of anti-virus and other security applications, any customization required by the authorities and any other changes required in the rules, SOP etc. and any other activity that may come up from time to time.<br>• Devising and establishing a project's quality procedures, standards and specifications, increasing operational efficiency, setting up and maintaining controls and standard operating procedures, creating performance matrix and monitoring performance by gathering relevant data and producing statistical reports, etc.<br>• Responsible for maintaining and regular updating the mobile app for various features from time to time. |
| | Viewing Center<br><br>(only for one year post project go-live or any extended period as per BoQ rates as directed by BTD) | Minimum 1 per viewing | • Minimum Education: B. Tech / M. Tech / B.E / M.E / BCA / MCA / BSc. / MSc. or Diploma with specialization in computers / I.T.<br>• Total experience: At least 3 yrs.<br>• Languages known (Read, Write and Speak): Hindi and English<br>• Prior CCC management experience of at least 3 years.<br>• Project Experience of managing components of Smart City, ITMS | • The operators shall be responsible to assist the BTD and Traffic Police to continuously monitor the city.<br>• Operators shall man the workstations and shall be responsible for following the standard operating procedures (SOPs), and coordinate with the authorities for Traffic management, enforcement suspected challan validation, any unusual activities, incidents etc. is detected or predicted.<br>• The operators shall assist authorities to define SOPs, manage videos, cameras, other sensors, network, storage and all other components and solutions of the ITMS system.<br><br>• **At least one from each background: ITMS / VDS** |
| **7** | Repair and Maintenance Staff<br><br>Available 24x7 | As per requirement<br><br>Should be available as per SLA | • BCA / MCA / BSc. / MSc. or Diploma with specialization in computers / I.T.<br>• Minimum 3 years of experience<br>• Effective verbal communication skills (English and Hindi) | • Repair and maintenance of the system and components including CCC, viewing centres, field components, network or power components, etc.<br>• Trained for any eventualities for repair and maintenance of the hardware / network components, technical assistance and coordination with the cloud operators, OEMs etc.<br>• Equipped with necessary tools and spares. |

| Sr. | Designation | Resources | Qualification | Indicative Responsibility |
|---|---|---|---|---|
| | | | • **Shall be well-trained from reputed institutes and from OEM of the component.** | |
| **9** | Menial staff Available 24 x 7 | As per requirement | • Minimum 1 years of experience<br>• Effective verbal communication skills (Hindi) | • Supporting and Menial jobs |
| **10** | Security Guard | Not mandatory | | • MSI may deploy security personnel for safety and security of all the hardware, components and premises of the TMC as per requirements. |

**Note:** The resources deployed by the MSI shall be responsible for various activities as defined in the RFP document. The resources deployed shall strictly work under the supervision of the BTD and Traffic Police officials and their role and responsibility may change from time to time as per requirements of BTD. MSI may propose additional manpower to meet the SLA and to ensure smooth implementation, O&M of the project at no extra cost to the BTD.

## 3. Implementation Phase

a. The MSI shall be solely responsible for entire design, development, construction, procurement, supply, delivery, installation, integration, testing, commissioning, Operation and Maintenance of entire system including all the components, both IT and Non-IT hardware, networking components, and other components at TMC and Viewing Centers, installation of applications, integration of 3rd party applications etc.
b. This would also include necessary junction box, UPS, network components, power requirements, poles, any other civil work on ground including re-furbishing, installation workstations at TMC and Viewing Centers, required furniture, accessories, other components for TMC etc.
c. The MSI shall ensure that the execution shall be strictly as per the BTD approved Implementation Plan. If there is any deviation, MSI shall bring it to the notice of BTD and shall continue execution only upon written approval from BTD.
d. MSI shall be required to ensure that all civil work, systems, network, software applications, hosting infrastructure etc. are working in completeness as required and the system is able to function as desired. During implementation period, in case any camera or any other sensor, pole or any other component is damaged by a vehicular accident or any other incident and needs repair or replacement, then the MSI shall repair / replace with new component within 15 days of the incident. Damages are to be borne by MSI in such cases, through proper insurance or otherwise.
e. Furnish a schedule of delivery of all Central IT/Non-IT Infrastructure items. Bring to the notice of the BTD in case of any delay expected than the schedule of delivery, with reasonable justification of the same.
f. Maintain a proper tracker of all the delivery, activities and other schedules and keep BTD updated on day-to-day basis.
g. BTD reserves the right to direct the MSI to submit the Purchase Orders for the OEM, and commitment from the OEM in writing for delivery as per Schedule.

### 3.1. Civil Works

**All the material, its supply, delivery, all the mixing equipment, earth moving equipment, ladder, manpower etc. required for the works shall be sole responsibility of the MSI.**

a. Ensure that the pole, cantilever and gantries etc. implementation is vibration resistant.
b. Poles, Cantilever and gantries etc. shall have minimum height as per requirement with appropriate vertical clearance under the system from the Road surface to ensure no obstruction to vehicular traffic.
c. MSI shall plan the installation to be capable to withstand high wind speeds, and extreme weather conditions, physical damage due to tampering, vandalism, vehicle accidents or other incidents. Any additional protection required to the cameras, sensor, pole / cantilever / gantries shall be responsibility of the MSI.
d. The MSI has to provide structural safety certificate for structural safety from qualified structural engineers approved / certified by Govt. Agency.
e. MSI shall supply all of the necessary equipment for the operations including poles, cantilevers, gantries, sensor housings and mountings poles and shall make final connections to junction box.
f. The MSI shall be required to abide to the norms of for any civil work to be carried out under the scope of ITMS Project. **BTD may direct the MSI to use the material of pole, cantilever, gantry, concrete etc. as per their norms which shall be binding on the MSI.** Such activities include (but not limited to) Digging, Pole, cantilever & gantry erection, Wirings, laying of Cables, Fencing, Barricading, Markings, Displays, Billboards etc. MSI

has to restore the site with M20 Grade (or better) or as per the standards of the BTD and state PWD.

g. MSI shall be responsible for excavating for Foundation in earth, soil of all types, sand, gravel and soft murum, including removing the excavated material up to a distance of 50m beyond the site area & stacking and spreading as directed, dewatering, preparing the bed for the foundation and necessary back filling, ramming, watering including shoring and strutting etc. (Lift upto 1.5 m) by manual means complete as per directions from BTD.
h. Providing & Laying in-situ cement concrete M-20 (or better) of trap / granite / quartizite / gneiss metal of RCC work in foundations, or bedding work, grillage and footings of RCC columns and steel stachions etc. including bailing out water, formwork, cover blocks compaction and curing roughening the surface if special finish is to be provided (Excluding reinforcement and structural steel) complete, with automatic reversible drum time mixer, with natural sand as per directions from BTD.
i. MSI shall obtain clearance for RoW and RI, and Traffic islands from BTD or relevant stakeholders / road owning agencies before performing any civil work. **The cost towards RoW, if any, shall be borne by BTD. The cost towards RoW permission application, liosoning and RI shall be sole responsibility of the MSI**. The RI shall be as-is state or better. AMC will provide all necessary approvals and support for the required permissions.
j. Ensure minimum hindrance to the on-going traffic by preferring non-peak hours working as per plan finalized with BTD.
k. MSI shall remove debris from the site on timely basis as per directions of BTD.

### 3.1.1. Signboards

a. MSI shall be required to place various signboards for proper guidance of the citizens such as “You are under CCTV Surveillance”, “Don’t overspeed”, “Overspeed detection system ahead” etc. Such sign boards shall be mounted at various relevant locations including the poles.
b. The same shall be as per requirement of BTD and respective Traffic Police and PWD office requirements from time to time. It will be as per relevant IRC guidelines.
c. MSI shall also put warning signboards during the construction and maintenance activities for safety of citizens as well as MSI personnel.
d. The size, design, colour etc. shall be finalized in consultation with the BTD. MSI shall propose design as per guidelines and get it approved from BTD on case to case basis.
e. **Existing signboard**: All existing road signs which are likely to be affected by the works are to be carefully taken down and stored. Signs to be re-commissioned shall be cleaned, provided with new fixings where necessary and the posts re-painted in accordance with BTD guidelines. Road signs, street name plate, etc. damaged by the MSI during their operation shall be repaired or replaced by MSI at no additional cost. MSI has to take necessary step to implement necessary road safety reflectors/traffic signages at junctions / locations For example: Traffic Enforcement system - wrong way, speed limit, RLVD, etc. Necessary road markings (Zebra crossing and Stop line) needs to be done by MSI wherever required

### 3.1.2. Road Marking

a. MSI shall be required to do the road marking at all the junctions, all arms, and all mid-block locations, and all other locations where the systems under ITMS project are installed, throughout the project.
b. Road marking shall include (not limited to) Zebra Crossing, Stop Line and lane marking.
c. The lane marking shall be for minimum entire distance covered in the field of view of the respective camera (Eg. RVLD evidence camera, Speed VDS evidence camera etc.)
d. The MSI shall be required to do the road marking before project Go - Live and at minimum every 6 months for entire project period, and additionally as directed by the BTD.

e. The road marking material shall be as specified in the RFP.

### 3.1.3. Safety Requirements

The MSI shall abide by the job safety measures prevalent in India and will free the BTD from all demands or responsibilities arising from accidents or loss of life, the cause of which is the MSI's negligence. MSI must ensure fitment and regular maintenance of safety equipment and measures like fire extinguishers, emergency exits, and any other such safety measures recommended at the facility. The MSI shall pay all indemnities arising from such incidents and will not hold the BTD responsible or obligated.

MSI shall ensure safety precautions when excavating or working in excavations close to electric cables, working in Public Street and along railway lines, danger from falling material, care when working in Excavations, danger of cave in, protection of Excavations etc.

### 3.1.4. Dedicated optical fiber network and last mile Connectivity

*<the below is applicable to the MSI and any ISP / TSP appointed by the MSI under the project>*

a. **Trenching:**
   i. MSI shall exercise due care that soil from trenching intended to be loose for back filling is not mixed with loose debris.
   ii. **MSI should not cause damage to any underground installations belonging to other project / agencies. Any damage caused be made good at its own cost and expense.**
   iii. The MSI should provide sufficient width in the trench at all such places, where it is likely to cave in due to soil conditions without any extra payment.
   iv. A minimum free clearance of 15 cm. should be maintained above or below any existing underground installations. No extra payment will be made towards this.
   v. In order to prevent damage to HDPE Pipe/PLB Blowing Type/Pre-installed rope over a period of time, due to the growth of trees, roots, bushes, etc., the MSI shall cut them if encountered in the path of alignment of trench without any additional charges and with written permission from BTD.
   vi. In large borrow pits, excavation shall be done not less than 165 cms. In depth and both sides of borrow pit shall be excavated more than 165 cms in depth to keep gradient of bed less than 15 degree with horizontal.
   vii. If not possible as stated in sub clause above, alignment of trench shall be changed to avoid borrow pit completely.

b. **Optical Fiber Cable to be laid through HDPE / PLB HDPE Pipes buried at a nominal depth of 165 cms. The steps involved in OF cable construction are as under:**
   i. Excavation of trench up to a nominal depth of 165 cms, according to Construction specifications in city limits.
   ii. Laying of HDPE / PLB HDPE pipes / coils coupled by HDPE / PLB HDPE sockets in excavated trenches, on bridges and culverts, drawing of 6 mm Polypropylene Para rope (P.P.rope) through the HDPE/PLB HDPE pipes/coils as per Construction Specifications and Sealing of HDPE/PLB HDPE pipe ends at every manhole by HDPE/PLB HDPE end caps of suitable size.
   iii. Providing of mechanical protection by R.C.C. Pipes / GI pipes and / or concreting/chambering according to construction specifications, wherever required.
   iv. Fixing of GI pipes / through with clamps at culvert /bridges and/or chambering or concreting of GI pipes/through, wherever necessary.
   v. Back filling and dressing of the excavated trenches according to construction specification.

vi. Opening of manholes (of size 1 meters x 1 meters x 0.5 meters depth), for ensuring smooth passage for pulling the cable. The size of the manhole may vary depending on site condition. The same shall be dealt on case-to-case basis, as directed by BTD. Pulling of Optical Fiber Cable with proper tools and accessories as per construction specifications. Sealing of both ends of the manholes by hard rubber bush of suitable size to avoid entry of rodents into the HDPE/PLB HDPE pipes, putting split HDPE/PLB HDPE pipes and split RCC pipes with proper fixtures over cable in the manhole to protect the bare cable in the pulling manhole. Back filling and dressing of manholes.

vii. In case MSI is required to pull the fiber connectivity from the nearest available point which is away from the ITMS project point, the MSI shall ensure that it shall dig a pit of the size as required by BTD as per site conditions (The same shall be dealt on case to case basis, as directed by BTD.), for construction of jointing chamber (every ~500 mtr) using bricks and mortar or fixing pre-cast jointing chamber of internal diameter of 1.2 meter filling of jointing chamber with clean sand, placing either pre-cast RCC cover or stone of suitable size on jointing chamber to protect the joint and back filling of jointing chamber with excavated soil.

viii. Digging of pits 1 meter at every manhole and jointing chamber to a depth of 75 cms, fixing of route indictor/joint indicator, concerning and back filling of pits. Painting of route indicators with yellow colour and joint indicator by red colour and sign writing denoting route/ joint indicator number, as per construction specifications.

c. Near Culverts/Bridge, the HDPE Pipe/PLB Blowing Type/Pre-installed ropes shall be laid below the bed at the depth not less than 165 cms. protected by G.I. Pipes and bricks or concrete chamber as decided BTD.

d. Both ends of culverts shall be excavated more than 165cms. in depth to keep the gradient not less than 15 degree with horizon. The bed of trench should be as smooth as possible.

e. **Location and Augmentation of the Trench:** In city areas the trench will normally follow the foot path of the road except where it may have to come to the edge of the carriage way when cutting across road with specific permissions from the authorities responsible for maintenance of that road (such permissions will be obtained from BTD).

f. **Dewatering:** The MSI shall be responsible for all necessary arrangements to remove or pump out water from trench. The MSI should survey the soil condition encountering the section and make his own assessment about dewatering arrangements that may be necessary. No extra payment shall be admissible for this.

g. **Method of excavation:** There shall be no objection to resort to horizontal boring to bore a hole of required size and HDPE Pipe/PLB Blowing Type/Pre-installed rope pushed through it at road crossing or rail crossing or small hillocks etc.

h. **Ducting**

**After completing trenching, HDPE/PLB/GI/ RCC Pipe laying and refilling of section:**

i. For HDPE Pipe in 200 meters section rope is to be replaced by new one.

ii. For pre-installed rope type: - The rope is to be replaced in coil length

iii. PLB Pipe (blowing type) entire length of section allotted to the SI should be checked by passing the mandrel of suitable size from one end of section to other end by blowing the air with the help of compressor of suitable capacity. It is the responsibility of the SI to arrange the compressor and other necessary accessories at his cost.

i. **Laying protection pipes on bridges and culverts**

i. The work involves laying of HDPE pipes /PLB Blowing Type/Pre-installed ropes through GI Pipes of not more than 50 mm dia or GI Troughs of size 50 mm x 50 mm laid on the Bridges/Culverts.

ii. In bridges/Culverts, where proper ducts are already provided, the HDPE Pipe/PLB Blowing Type/Pre-installed ropes will be laid through the ducts.

iii. Normally in the Bridges/Culverts, where there are no ducts and where the cushion on the top of the Arch is 0.5m or thicker the G.I. Pipe/ G.I. Trough carrying HDPE

Pipe/PLB Blowing Type/Pre-installed rope & Cable may be burred on the top of the Arch adjourning the parapet wall, by digging close to the wheel guards.

iv. Where the thickness of the Arch is less than 0.5m, the pipes must be buried under the wheel guard masonry and the wheel guard rebuilt.

v. If any of the above methods is not possible, the G.I. Pipe/G.I. Troughs must be clamped outside the parapet wall with the clamps supplied by the MSI. If necessary, the pipes may be taken through the parapet wall at the ends where the wall diverges away from the road.

vi. In cases where the methods explained in clause c & d above are not possible, the G.I. Pipes/G.I. Troughs can be fixed on the top of the road kerb close to the inside face of the parapet wall by means of clamps, supplied, using rawl plugs & wood screws or small diameter bolts, without damaging concrete & limiting external diameter of the bolts to 7.5 mm. The permission for carrying out this work will be obtained from the Road Authorities by the SI.

vii. Methods cited in clauses above should be carried out under close supervision of the BTD and restoration of any damages to the structures in any of the methods adopted should be done to the entire satisfaction of the BTD.

viii. When HDPE Pipe / PLB Blowing Type/Pre-installed ropes are laid on bridges/culverts as per clause above, except when pipes are clamped outside of the bridge, cement concreting shall be provided over the protection pipes/troughs.

j. **Specifications for concreting:**

i. The nominal dimension of concreting is of 275 mm x 275 mm. section. However, depending on the actual situation, this cross section may be varied to ensure uniformity with any existing structure / base, on which the GI pipes/ GI troughs are placed, as demanded by the road authorities. The work should be carried out at the rates applicable for nominal cross section.

ii. The concreting surface should be thoroughly cleaned and levelled before concreting. Necessary wire mash of adequate size shall be provided as reinforcement for the concrete.

iii. At both the ends of the Bridges/Culverts, where the GI Pipes/Troughs slope down and get buried, the concreting should be carried out to ensure that no portion of the GI Pipe/Trough is exposed and further down as required by the site in charge to protect the Pipe/Trough from any possible damage externally caused.

iv. Any damages caused to the existing structure such as Foot-Path or base of the Parapet or Kerb wall on which GI Pipes/Troughs are placed should be repaired and original condition restored to the satisfaction of respective Road Authorities.

v. Where white wash / colour wash exists on the Bridges/Culverts, the same should also be carried out on the concerted portion to ensure uniformity.

vi. Cement Concrete Mixture used should be of 1:2:4 Composition i.e. 1 Cement: 2 Coarse Sand, 4 graded Coarse Stone aggregate of 20 mm. nominal size.

vii. Smooth finishing of exposed surface should be done with a mixture of 1:3: i.e. 1 Cement: 3 Fine Sand. Portions where cement concreting has been done shall be cured with sufficient amount of water for reasonable time to harden the surface.

k. **Cable Laying**

i. Manholes marked during HDPE pipe/PLB Blowing Type/Pre-installed ropes laying of approx. size of 3m length x 1.0m width x 1.65m depth shall be excavated for pulling the cables.

ii. There may be situations where additional manholes are required to be excavated for some reasons, to facilitate smooth pulling of cable. Excavation of additional manholes will be carried out, without any extra cost.

iii. De-watering of the manholes, if required, will be carried out without any extra cost. De-watering/Degasification of the ducts, if required, will be carried out without any extra cost.
iv. The existing 6mm PP rope shall be replaced by with PP rope of 8mm dia between the two consecutive manholes.
v. This is to ensure that the HDPE pipes/PLB Blowing Type / Preinstalled ropes are cleaned for pulling the cable without exerting undue tension on the OF cable.
vi. While cleaning, excessive pressure should not result in breaking of P.P. rope and which may require opening of additional manholes.
vii. However, in case the cleaning rope gets stuck up during pulling, the location of clogging of HDPE Pipe/PLB Blowing Type/Pre-installed ropes should be measured and located accurately. The trench at that location should be opened and the HDPE Pipe /PLB Blowing Type/Pre-installed ropes should be cleaned properly or if not possible it should be changed by a clean new HDPE Pipe /PLB Blowing Type/Pre-installed ropes to facilitate easy cable pulling at a later stage without any breakage.
viii. If clogging of HDPE Pipe/PLB Blowing Type/Pre-installed ropes is in the location where the pipes are protected either by RCC Pipe /PLB Blowing Type/Pre-installed ropes or by concreting and the protection is broken for cleaning/changing the HDPE Pipe, the protection thus removed should be brought back to normal by the MSI without any extra cost.
ix. However, HDPE Pipes/PLB Blowing Type/Pre-installed ropes, RCC Pipes required for this purpose will be supplied by the MSI.

l. **Jointing/Splicing:** The OFC cable drums are usually of 500 mtr in length hence optical fiber joints will be at every 500 mtr approx.

m. **Construction of Jointing Chamber:**
i. The joint chambers are provided at every joint to keep the O.F.C. joint well protected and also to keep extra length of cable, which may be required to attend the faults at a later date. Jointing chambers are to be prepared normally at a distance of every 500 mtr. Actual location of jointing chamber depends on length of cable drum and appropriateness of location for carrying out jointing work. The location is finalized by Engineer-in-charge. The jointing chambers are constructed either of brick masonry work at site & pre cast RCC slabs for covers or by way of fixing pre-cast RCC chambers and covers as per the instructions from engineer-in-charge.

n. **Joint Chamber:** The joint chamber is provided at every joint normally at a distance of 500 mtr to keep the O.F.C. joint well protected and also to keep extra length of cable which may be required in the event of faults at a later date. The joint chambers are made at site using bricks and mortar or are of pre-cast RCC type.

o. **Marking**
i. The route/ joint indicators are co-located with each manhole/joint chamber. In addition route indicators are also to be placed where route changes direction like road crossings etc. The route/joint indicators made of pre cast RCC should have the following dimensions:
- Base - 250 mm x 150 mm
- Top - 200 mm x 75 mm
- Height - 1250mm

ii. The word ‘BTD OFC’ should be engraved on the route/joint indicators.
iii. The route indicators are painted yellow and the same are placed at 2 ft. away from the center of the trench towards jungle side.

iv. The joint indicators are placed at OFC joints and placed 1 ft. away from wall of the joint chamber and are painted red.
v. The engraved word 'BTD OFC' should be painted in white, on route as well as joint indicators. Numbering of route indicators/joint indicators should also be done in white paint. The numbering scheme for route indicators will be joint No./Route Indicator No. for that joint. For example, 2/6 marking on a route indicator means 6th route indicator after 2nd joint.
vi. Additional joints on account of faults at a later date should be given number of preceding joint with suffix A, B, C, D. Eg. sign writing 2A on a joint indicator means, additional joint between joint No. 2 and 3.
vii. The numbering of existing route/joint indicator should not be disturbed on account of additional joints. Enamel paints of reputed brands should be used for painting and sign writing of route as well joint indicators.

p. **Back Filling**

i. Provided that the HDPE Pipe/PLB Blowing Type/Pre-installed ropes have been properly laid in the trench at the specified depth, the back filling operation shall follow as closely as practicable. The back filling operation shall be performed in such a manner as to provide firm support under & above the pipes and avoid bend or deformation of the HDPE Pipe/PLB Blowing Type/Pre-installed ropes when the HDPE Pipe/PLB Blowing Type/Pre-installed ropes get loaded with the back filled earth. In locations where the back filling is not done properly by the MSI or done unevenly it shall be redressed and back filled properly by the BTD at MSI's expense. No debris shall be allowed in the back fill at any time.
ii. At locations where the back filled material contains hard clods, rock fragments and other materials which may cause injury to HDPE Pipe/PLB Blowing Type/Pre-installed rope & where excavated or rock fragment are intended to refill the trench in whole or in part, the trench should be initially filled, with a layer of ordinary soil or derocked loose earth of not less than 10 cms. above pipes, without any extra cost.
iii. Back filling on public, private roads, railway crossings, and foot paths in city areas shall be performed immediately after laying the HDPE Pipe/PLB Blowing Type/Pre-installed ropes. Back filling at such locations shall be thoroughly rammed, so as to ensure original condition & made safe to traffic. All excess soil/ material left out on road/footpath/railway crossing shall be removed without any extra cost. However, along the highways and cross country, the dug up material left out should be kept as heap above the trench while refilling.
iv. In city limits, no part of the trench should be kept open for more than 50 meters length at any time and in all places where excavation has been done, no part of the trench should be kept open over-night to prevent any mishap or accident in darkness.

q. **Other Backfilling**

i. Every layer of backfill about 25 to 30 cm should be compacted with sufficient quantity of water to achieve adequate compaction.
ii. It is essential to have compaction not less than 90%, when the excavation is carried out along and across the road shoulders and foot paths.
iii. A hump of 15cm shall be maintained over the trench to compensate the settlement of backfilled soil below the ground level.
iv. Housekeeping after removing all the debris should be complete.

r. **Restoration**

The restoration / Re-instatement (RI) shall be done as per equivalent or better than As-Is condition before the works.

i. If the trench comes under Asphalt, then 30 cm soil from the trench should have to be removed and compacted.10cm has to be backfilled by 40mm aggregate as first layer and compacted, 10cm has to be backfilled by 20mm aggregate Tar as second layer and compacted, 10cm seal coat as final layer and compacted.
ii. If it is in concrete portion, then 15cm soil should be removed and compacted, pour concrete of M20 grade or better with the proper mix of 1:2:4.
iii. If it is in Tiles, then 15cm soil should be removed and compacted, the tiles should be laid (of similar tiles and specify) by using the cement mortar in the ratio of 1:2.

### 3.1.5. Construction of Traffic Islands

The erection of pole / cantilever may be done on the footpath, median, existing traffic island etc. However, construction of Traffic Island wherever required, shall be done by local authorities, i.e. either corporation, or PWD etc. Need for such traffic island or any dedicated structure shall be minimum. MSI shall ensure use of all the existing structures as much as possible. However, the MSI shall be required to submit Junction plan submitted by the MSI, and duly agreed by BTD. Erection of Poles, cantilever and gantry (including its foundation work), cabling for network and electric, junction box etc. and its RI etc. shall be in the scope of MSI at no additional cost to BTD. Any change required in existing island structure, shall also be suggested by MSI, which may or may not be accepted by BTD as per its discretion. MSI shall ensure the implementation is as per RFP requirements.

### 3.1.6. Signboards

- MSI shall be required to place various signboards for proper guidance of the citizens such as “You are under CCTV Surveillance”, “Don’t overspeed”, “Accident Spot Ahead” etc.
- Such sign boards shall be mounted at all locations on the poles, especially near the Blackspot locations and other hotspot locations.
- The size, design, colour etc. shall be finalized in consultation with the BTD as per requirements under Rule 167A and relevant IRC guidelines.

### 3.1.7. Damage of infrastructure

*(Read with Clause 10 under Administrative Aspects”)*
During implementation period or during O&M period, in case any edge device is damaged by a vehicular accident (or due to any other reason outside the control of MSI) and needs repair, then the MSI will need to repair / have the new pole within 15 days of the incident. Damages are to be borne by MSIs in such cases through proper insurance.

### 3.1.8. Completion of Civil Works

The MSI shall ensure not more than 10 locations are picked up for civil work at a time. The existing civil works shall be completed before moving on to the next set of locations. The detailed planned regarding the same shall be mutually finalised. However, BTD shall not allow digging of multiple locations and non-completion of works for more than 15 days per location. On Completion of the Works, the MSI shall clear away and remove from the Project Sites all equipment’s, surplus materials, rubbish and temporary works of every kind and leave the whole of the Project Sites and the Works clean and in a workmanship condition, tidy and in an aesthetically pleasing appearance to the satisfaction of BTD. The above shall be done as soon as work at any particular site is completed. However, the MSI shall be responsible to remove the debris, construction material etc. as soon as possible from the site, as per directions of the BTD. The MSI shall, unless otherwise instructed in writing by BTD, remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of

temporary works, stockpiles of excess or waste materials and other vestiges of construction prior to the issue of the Completion Certificate.

### 3.2. FAT and Procurement and Installation of Hardware

The MSI shall be required to procure and install all the required and necessary IT infrastructure including CCTV cameras, sensors, ITMS LPUs, Variable Messaging Sign, workstations, servers, storage units and any other equipment along with its accessories for recording and monitoring, storage, retrieval and analysis of video feeds & other inputs and provide requisite systems to monitor and enforce the traffic violations and incidents in the state through the TMC and Viewing Centers. All the cabling, accessories, installation, and commissioning of the hardware at all the sites as per requirement of the project shall be sole responsibility of the MSI. The supply / delivery of Hardware, its safety, security, logistics, warehousing etc. shall be sole responsibility of the MSI.

**The MSI shall be responsible for the various activities including but not limited to:**

a. Factory Acceptance Test (FAT) of all major and relevant products as per directions of BTD.
b. Procure all the required hardware including field components, TMC etc.
c. Provide product test certificate of all the supplied products along with batch ID.
d. Provide all the equipment, tool, machinery, vehicles, logistics, manpower, warehousing facility etc. required for supply, installation and commissioning of the systems.
e. MSI shall also provide necessary vehicle, preferably hydraulic boom for the purpose of inspection.
f. Ensure appropriate casing / housing is provided to protect VMS, camera PA systems, and other sensors from the on-field challenges including extreme weather conditions and manual physical damage and vehicle accidents.
g. Ensure project objectives are met while positioning the cameras, creating the required field of view, finalizing the height at which any sensor is installed etc.
h. Carry out proper adjustments to have best possible image, view and sensor readings.
i. MSI shall undertake due diligence for selection and placement of cameras and sensors to ensure optimized coverage of the strategic field of view accuracy of information captured.
j. Prepare and submit a delivery report for all sites including details of components supplied. The delivery report may be validated by the BTD authorized person at each site. All the solution / hardware procured, delivered and installed at the respective site shall be of exactly same make and model and as per specifications (as per format defined in Annexure Set II – Annexure 7) as proposed and submitted by the bidder during the technical evaluation (or later as change) and as accepted by the BTD.
k. Connecting to the network, making final connections to the junction box and necessary equipment with proper connectivity of the on-field components with the control room components and other components to ensure smooth monitoring of the feeds.
l. All hardware procured for this project shall be as per the latest industry standards and brand new with warranty, comprehensive BTD, replacement, and software assurance and end of life only after end of project period.
m. Manufacturing month of offered component should not be greater than 12 Month at the time of signing of contract.
n. MSI shall place orders on various OEMs or OEM Authorized Vendor directly and not through any sub-contractor / partner. All licenses should be in the name of the BTD.
o. OEM shall provide installation support and certification for pilot installation for few installations of the products for mandatory ones as defined in Annexure Set II- Format 6.
p. The MSI shall be responsible for any copyright infringement. BTD bears no responsibility towards the same or towards any consequence resulting from non-conformance or non-compliance thereof.
q. MSI shall be fully responsible for maintaining these assets as per the Warranty and BTD Clauses and shall be fully accountable for the same for entire project period.

r. MSI shall cover all components with IRDA approved Insurance Company for entire duration of MSI contract period as detailed in the RFP (Read with Clause 10 under "Administrative Aspects")
s. All the hardware and network components shall have adequate spare during entire project duration to maintain the SLA.
t. All hardware devices shall be compatible with all weather conditions of the state.
u. All filed components shall be coupled with suitable lighting arrester.

### 3.3. Procurement and Installation of Software

The MSI shall be required to procure and install all the required and necessary software applications for recording and monitoring, video analytics, storage & retrieval of video feeds, and provide requisite systems to monitor Traffic situation, enforce the traffic violations in the state. All ancillary software and security applications necessary shall be sole responsibility of the MSI.

a. MSI shall procure and install all the required software application with necessary number of licenses as applicable on the hosting infrastructure, as well all any the required software at client machine level (such as in the workstation).
b. All such applications shall be integrated with each other as per requirement as applicable for smooth exchange of data and information between various systems.
c. MSI shall ensure the system is well integrated with all the 3rd party applications including integration with NIC's eChallan and Vahan. MSI shall also make available SDKs, APIs, other tools for collaboration with 3rd party apps.
d. MSI shall be required to ensure all the components are up and running and video feeds, analytics, data from other sensors etc. are received in the desired format and are processed as per requirements.
e. MSI shall ensure all the required functionalities as mentioned in the RFP and agreed upon during the Implementation and Operations Plan stage are working as expected.
f. MSI shall be responsible for development, testing and commissioning of all the applications including security applications.
g. MSI shall create role based login of all the system users including MSI staff, BTD staff, Traffic Police Staff or any other stakeholder as directed by BTD.

### 3.4. Procurement and Installation of Network and Power

a. MSI shall be responsible for procurement and installation of network and power cables, wiring, switches, routers, terminals, and all other equipment, components etc. as required and as defined in the RFP to connect all the systems under the project to the network.
b. The MSI shall plan the procurement and installation as per availability of the existing network and power connections to the point of interest under ITMS project.
c. MSI shall ensure to get sufficient power supply for all the field components and other device in the ITMS system, install the DG set as well as UPS for the entire project as per defined requirements. MSI shall also be responsible for earthing requirement of the project.
d. MSI shall ensure the network and power are working as per the requirements to ensure smooth running of the ITMS system.

### 3.5. Integration and agreement for Co-use

This clause to be read along with Clause 2 under "Scope of Work"

**MSI shall be responsible for following:**

a. **Violation Detection System:** BTD may direct MSI to integrate all the existing VDS under existing projects. The existing VDS shall push the suspected violation details to the ITMS system along with photo evidence, metadata and link to access indexed / bookmarked video on system of existing project.
b. **Poles:** Some of the poles may be co-used under ITMS project as per survey report by the MSI. The dismantling of existing poles, and erection at required location including any excavation along with all cabling and mounting of any existing assets along with new assets including any mounting accessories shall be in the scope of MSI.
c. **Network:** MSI shall use existing setup of ISP / TSP in compliance with RFP requirements. MSI may also propose to use any already created Network Backbone at any locations. Final decision shall be of the BTD and shall be binding. All the connections to existing network (if applicable), last mile cabling, ducting, trenching, connections to ITMS Junction box and edge device shall be done by MSI. Network for DC to DR replication along with its one-time setup and recurring costs shall be responsibility of MSI.
d. **Electricity Connection cost along** with the cabling, ducting, trenching, sub-meter, last mile connectivity, connection to ITMS junction box, edge devices and other associated Items shall be responsibility of MSI.
e. **Variable Message Sign:** The MSI shall integrate the software of existing VMS with the larger ITMS system to relay the messages on new and existing VMS together. The detail of existing VMS will be shared with MSI at later date.
f. **City Operations Center / Traffic Management Center:** Read Clause 8 under "Scope of Work"

The MSI shall ensure that any existing system in the state is not disturbed. Eg. Operational cameras of existing projects, their field of view, network etc. shall not be disturbed. MSI shall read this clause along with Clause 2 under "Scope of Work" as well as relevant clauses of each section. The MSI may conduct a site survey before bidding to understand the as-is situation and the expectations, efforts for co-use and integration. No extra cost shall be admissible at later date. The locations for which co-used is proposed may vary as per condition. The procurement of any new system will be as directed by BTD from time to time, as per rates quoted by the MSI and duly approved by BTD.

## 4. Testing and UAT

MSI shall demonstrate the following mentioned acceptance criteria prior to acceptance of the proposed solution as well as during project operations phase. The Acceptance criteria parameters may get revised and finalized with mutual agreement, however, the decision of BTD would be final and binding in this regard.

a. MSI shall log and track the testing results, upload & maintain the test cases and log and track issues / bugs identified through required tools.
b. MSI to prepare test plan and test cases and may be required to share the test cases and results with BTD as per BTD requirements.
c. Should be performed through manual as well as automated methods. MSI needs to provide the details of the testing strategy and approach including details of intended tools/environment to be used by MSI for testing in its technical proposal.
d. Automation testing tools to be provided by MSI. BTD doesn't intend to own these tools.
e. Testing and UAT to be carried out in the exact same environment / architecture that would be set up for production.
f. It should be noted that MSI has to arrange all the necessary equipment / tools / other resources / manpower / power etc., which are required for carrying out such testing of the ITMS. Cost of such shall be borne by the MSI itself.

g. BTD if required, could involve third party auditors (TPA) to monitor/validate various testing parameters. Cost for such audits to be paid by BTD. However, the cost of any rectification of noncompliance shall be borne by the MSI.

h. **The following kind of testing is envisaged for the project:**
   - **Automated Testing**: Tests conducted with the use of software tools which complete a series of pre-defined, automated tests.
   - **Manual Testing**: Tests conducted through manual steps and scripts (human intervention).
   - **Functional Testing**: To validate operational functional and features specifications.
   - **Compatibility Testing**: To validate compatibility with other existing systems.
   - **Integration Testing**: To test individual components to determine whether they function as a unit (i.e. share data). MSI shall liaison with the existing service providers for finalising test cases and assist in conducting joint UAT.
   - **Performance Testing**: Performance testing is a non-functional software technique that determines how the stability, speed, scalability, and responsiveness of an application holds up under a given workload.
   - **Load Test**: Load testing shall be performed to determine a system's behaviour under both normal and anticipated peak load conditions. It helps to identify the maximum operating capacity of an application as well as any bottlenecks and determine which element is causing degradation.
   - **Stress Test**: Stress testing (sometimes called torture testing) shall be performed as deliberately intense or thorough testing to determine the stability of a given system, critical infrastructure or entity. It shall involve testing beyond normal operational capacity, to a breaking point and results shall be observed.
     MSI shall validate compliance with performance requirements and specifications.
   - **Regression Testing:** Retest a particular system after changes have been made to verify that problems have been solved, and to ensure that there are no new problems.
   - **Conformance Testing**: Validate whether a particular system conforms to documented requirements and specifications.
   - **Workflow Testing**: Validate deliverables functionality and viability using actual end-user workflows (real-world procedures and circumstances) as a basis for testing.
   - **Ad-Hoc Testing**: Validate deliverables functionality and viability using random, unscripted testing by end-users (i.e. to try to uncover the unexpected).
   - **User acceptance testing:** MSI shall prepare test cases for User Acceptance Testing (UAT) in consultation with BTD. MSI shall facilitate the team from BTD to conduct this test after successful completion of performance testing. MSI will close all observations, bugs, etc. identified during the UAT. This process of UAT will continue in an iterative manner till zero defects are shown by the MSI for the test cases developed. The MSI also needs to ensure that errors / defects detected in previous round of tests do not get repeated in successive tests.
   - **Calibration Testing:** All the systems under the project which needs calibration, such as Radar shall be calibrated and tested as per prevailing guidelines.

i. The MSI will submit a testing report along with test cases, tests results, etc. at the end of each testing exercise. The MSI should get a sign-off on the UAT report from BTD. However, MSI shall be required to make any and all the necessary changes in the system as per requirement of BTD from time to time throughout the contract period.

j. The MSI shall work in a manner to satisfy all the testing requirements and adhere to the testing strategy outlined. The MSI shall perform the testing of the solution based on the approved test plan, document the results and shall fix the bugs found during the testing. It is the responsibility of MSI to ensure that the end-solution delivered by the MSI meets all the requirements specified in the RFP. The MSI shall take remedial action based on

outcome of the tests at no cost to the BTD. Changes in the system as an outcome of UAT shall not be considered as Change Request.

k. The MSI shall arrange for environments and tools for testing and for training as envisaged. Post Go-Live; the production environment should not be used for testing and training purpose. Detailed process in this regard including security requirement should be provided by the MSI in its technical proposal. The process will be finalized with the MSI.
l. If required, BTD may appoint any TPA directly at its cost. MSI needs to prepare and provide all requisite information/documents/support to third party auditor. The cost of rectification of non-compliances shall be borne by the MSI.

## 5. IT Security Audit

a. The Security Audit of all the systems under the ITMS Project is mandatory before commencement / Go-Live.
b. The MSI shall be responsible to perform comprehensive Application Security, IT Infrastructure Audit and Vulnerability Audit including review of Security Controls for the complete ITMS Project from a Cert-In empanelled agency.
c. CERT (https://www.cert-in.org.in/) have empanelled a number of security audit agencies to conduct the security audit of applications. The MSI shall coordinate with such agencies (excluding itself if applicable) and provide full access to the system for testing.
d. If there is any major change / addition in the Application's functionality anytime during the contract period (including the O&M period), then MSI will have to obtain the Certification for the changes / additions. BTD's decision shall be final and binding in this regard.
e. **The Audit shall be done in following Phases**
    - **Implementation Phase: Prior to partial Go-live Commissioning of the ITMS Project**
    - **O & M Phase: At End of every O and M Year (10 years Post Commissioning)**

    i.e. minimum of 1 (during commencement - for each phase) + 10 (end of each O&M year) = minimum 11 security audits.
f. All the expenses towards security audit to be incurred by the MSI.
g. Any changes recommended by the Auditor (or as directed by BTD) shall be sole responsibility of the MSI at no extra cost to BTD. The MSI has to submit a report within an agreed upon stipulated time, about the changes done as per requirement of the Auditor.
h. Upon successful completion of the Audit, MSI is required to share the Audit Completion Certificate with adequate validity along with copies of all communication, written or otherwise, issues list, bug report, etc. and corrective / compliance measures taken by MSI taken thereof on the Audit observations.
i. BTD reserves right to get the audit done by any other third-party agency as it deems fit. MSI shall provide all the necessary access to the auditor as directed by the BTD.

## 6. Training and Capacity Building

a. MSI shall conduct a proper Training Needs Analysis of all the concerned staff and draw up a systematic training plan in line with the overall project plan.
b. MSI shall provide training to officials of BTD, other stakeholders and users before UAT and Go-Live of the ITMS Project for the operation and maintenance of all the equipment and ancillary components.
c. Training shall be designed to familiarize the MSI's own Operations & Maintenance personnel and BTD's representatives with the design, installation, operation and maintenance of the equipment, TMC etc.
d. To provide training to officers and staff of the BTD, Traffic Police and any other stakeholder from time to time, for effective usage of the system and various applications.

e. The training shall also cover functionality, theory of operation, calibration, testing, performance and operating parameters.
f. Training should also cover do's & don'ts for the usage of the system.
g. Training shall be role based. Details for the same shall be shared with MSI at later date.
h. A single organized training shall be conducted by MSI at a location decided by BTD.
i. The MSI shall ensure all of its resources are adequately trained and equipped to operate and maintain the ITMS Project. Any resource replaced, must also be trained by the MSI.
j. Deployed resources will also be responsible to ensure smooth functioning of the entire project. MSI shall ensure that the deployed resources are trained to operate systems under this ITMS project, by the OEM / Application developers or its authorized representative for troubleshooting.
k. MSI shall prepare necessary documentation and aids required for successful trainings. For all these training programs the MSI has to provide necessary course material and reference manuals (user / maintenance / administration).
l. The MSI shall also conduct training for BTD and its designated officers after installation and commissioning has been completed. The detailed scope of the training program would be decided by BTD at later date. All the training material will be provided by the MSI. The training shall cover both IT and Non-IT components involved in the project. However, the training should include:
    - Guidelines and other backend processes
    - Basic functionalities of Application
    - Overview of all IT and Non – IT components installed for the ITMS project
    - Process to review, extract the traffic data and violation data.
    - Do's & Don'ts for the usage
    - Practical training on the system including for operations of ITMS.
    - SLA Monitoring
    - Basic troubleshooting activities in case of problems.
m. The training materials shall be provided in English by the MSI.
n. One copy on digital format and three copies in hard prints are to be provided, including all manuals, data sheets, technical sheets, technical manuals, maintenance and repair manuals, spare part manuals etc. to the BTD in English language.
o. Training room shall be provided by BTD. Any food, beverages etc. during the training will be taken care by BTD.
p. Trainings shall be provided to any new officials as and when required by the BTD.
q. MSI shall be responsible for Refresher Trainings at least once every year as per requirement of BTD and Traffic Police.
r. The MSI shall ensure complete knowledge transfer of operations, repair and maintenance to the BTD and to any other party that may be appointed by the corporation from time to time and at the completion of the project. A system hand-over, explaining the configuration of the storage & Backup Infrastructure as documented in the relevant Build Specification, to the appropriate staff before project completion.
s. MSI shall submit completion report to BTD on completion of training as per schedule.

## 7. Documentation

Documentation should follow the ITIL/ISO 2000 (Information Technology Infrastructure Library/ITSM) standards. This documentation should be submitted as the project undergoes various stages of implementation. Indicative list of documents includes:

a. **Project Commencement**: Project Plan with micro level activities, milestones & deadlines.
b. **Delivery of Material**: Original Manuals and Datasheets from OEMs.
c. **Training:** Training Material will be provided which will include the presentations used for trainings and also the required relevant documents for the topics being covered.

d. **Process documentation:** MSI shall be responsible for preparing process documentation related to the operation and maintenance of each and every component of the ITMS Project. The prepared process document shall be formally signed off by BTD before completion of final acceptance test. MSI shall document all the installation and commissioning procedures and provide to the BTD within one week of the commissioning.
e. MSI shall submit a complete set of project drawings including cabling system layout (as installed), cable routing, network backbone route etc. Layout shall detail locations of all components and indicate all wiring pathways. Manuals for configuring of various component shall be provided by MSI.
f. Prepare revised traffic signal control plans, alternate signal control plans, KPIs for performance monitoring of transport network etc.

## 8. Final Acceptance Test and Commencement of Operations

a. Final Acceptance Test Certificate (FAT) shall be issued by the BTD to the MSI.
b. **Prerequisite for Carrying out FAT activity**
   - Detailed test plan shall be defined by the MSI in consultation with BTD.
   - All documentation related to ITMS along with all relevant acceptance test document (including IT Components, Non-IT Components etc.) should be completed & submitted before the final acceptance test to BTD.
   - MSI shall submit report of components, furniture etc. installed at each site location in the format as specified by BTD. Indicative format is mentioned below:

| Sr. | Junction Name | Item Name | Item Description | Item ID | MAC IDs (if applicable) | Total Qty required as per RFP | Total qty supplied | OEM / Make | Model | Delivery date | Installation and Commissioning date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| . | | | | | | | | | | | |

   - All perpetual licenses shall be fully paid up, in the name of BTD and shall be confirmed from respective applications along with submission of paper license on OEM Letterhead by the MSI.
   - Training requirements should be completed before the final acceptance test of the respective module/s.
   - Successful hosting and testing of all the applications.
   - The MSI shall submit the details of both IT & Non-IT equipment / software manuals / brochures / Data Sheets / CD / DVD / media for all the ITMS supplied components.
   - All user logins are created and given to the respective users.
   - The SLA monitoring tool, and all other applications are integrated, deployed commissioned, and access is provided to the BTD officials.

c. **The FAT shall include the following**
   - Site preparation, supply and installation of the required components (hardware, software, network etc.) at ITMS center are completed as per the requirement.
   - MSI shall be required to demonstrate all the features / functionalities as per RFP.
   - MSI shall conduct all the necessary testing, any required modifications as a result of testing, and Security Audit Testing is completed.
   - All required activities as defined in the RFP and SRS document including all changes agreed by BTD and delivered by the MSI and accepted by BTD.
   - All the required integration with existing system, components, hardware, software etc. is completed successfully and accepted by BTD.

- OEM has provided installation support and certification for pilot installation for mandatory products as defined in Annexure Set II- Format 6.
- Commissioning of all hardware, network, non-IT components etc. as per the design and that all the detailed procedures of operating them have been carried out by the MSI in the presence of BTD officials.
- Configured, calibrated all the components and systems of the ITMS and VDS system, and entire ITMS system.
- All required documentation as defined in this document including all changes agreed by BTD and delivered by the MSI and accepted by BTD.
- All required training as defined in this document including all changes agreed by BTD and delivered by the MSI and accepted by BTD.
- All identified shortcomings / defects in the systems have been addressed to BTD complete satisfaction.
- Deployment of all manpower as per requirements mentioned in the RFP.
- MSI shall be required to provide any and all additional services and products not identified and accounted within the bid as may be necessary to correct all problems which are preventing the Final Acceptance, at no extra cost to BTD.
- **All O&M report template, including SLA monitoring methodology and format.**

d. On successful completion of the above defined activities and all other required activities as defined in the RFP document, to the satisfaction of the BTD, BTD shall issue Final Acceptance Testing Completion Certificate for the respective phase, as defined in the RFP.
e. BTD (or any third party hired by the BTD) reserves right to visit and inspect the ITMS project sites before the commencement of the project and anytime during the entire project without any prior intimation to the MSI.
f. The quality and standard of ITMS equipment, Hardware and Software infrastructure, Non-IT infrastructure shall remain constant during the entire contract period and shall also be checked periodically. In case of any deviation to the expected and directed scope found, the MSI shall be liable for penalties as defined in Annexure Set IV – Annexure 3 including termination of contract and forfeiture of PBG.

## 9. Operations

The MSI has to adhere to the operating policies and procedures, as directed by Government of Bihar (GoB) and BTD, for managing and operating the ITMS Project. This includes (but not limited to) activities related to manpower, vendor management, security, services, repair and maintenance and other primary functions, training programs to staff, deliverables, administrative policies and procedures etc. for entire ITMS project.

a. The MSI shall be responsible for assisting BTD officials and Traffic Police at Traffic Management Center and Viewing Centres on continuous basis for various operations on the ITMS systems such as defining parameters for Traffic violations detection on dynamic basis, defining SOPs for violation and incident, set messages for the VMS, validating suspected violations for first level, manually detecting violations, manually identify vehicle and recognize registration plates in case of ANPR fails, extracting reports for the authorities etc. and other use case as defined in the RFP document.
b. **MSI shall be responsible for the following activities:**
    i. Deploy required resources for appropriate up-keeping, maintenance, and operation of all networks, hardware, and software components, and ensure smooth functioning of the ITMS System during the entire O and M period.
    ii. MSI shall deploy manpower for the entire operations period for various functions as defined in the RFP including the operators at TMC, repair and maintenance staff

at various locations, other manpower for day-to-day activities, including managerial and technical staff.

iii. Monitor and manage utilities like network, electricity etc.
iv. Liaison with existing service providers of the co-used assets for smooth operations and SLA management.
v. Ensure regular payment dues to Cloud, Network, SMS Service provider etc. as applicable.
vi. Re-fuel the DG set and keep it ready for use all time.
vii. Provide product upgrades, virus definition updates, OS updates and other updates of any COTS applications, whenever they are available. Any downtime caused due to upgrading of patches shall be to the account of the MSI and it shall not be considered as 'Planned Service Down-Time'.
viii. Keep a watch on the health of the system to ensure minimum downtime of each of the components and system as whole.
ix. Maintain the database, server, cloud storage and perform regular backup as per stipulated policies and test them on regular basis.
x. Maintain a log of the performance monitoring of hosting infrastructure including but not limited to monitoring CPU, disk space, memory and I/O utilization, etc.
xi. Identification, diagnosis and resolution of problem areas pertaining to the Hosting Infrastructure, application and maintenance of assured SLA levels.
xii. Security and safety arrangements for safe custody of the backup data shall also be the responsibility of MSI and Maintain system audit logs.
xiii. Recording of any system failure and report the same to concerned person for immediate action so as to ensure smooth operations as per defined SLAs.

c. MSI shall be responsible to report any issues, bugs, threats, attacks, loopholes, system failures, warnings etc. to the concerned person and coordinate for necessary action.
d. MSI shall also be responsible for regular monitoring of entire system, all equipment, proactively perform warranty checks, and generate SLA reports from SLA monitoring tool.
e. MSI shall manage and coordinate with 3rd party vendors for any requirements, integration, technical issues etc.; escalate to BTD in case of any problems in such management.
f. MSI shall ensure that safety and security of all users of the premises is maintained at all times related to the MSI's scope of work.

**10. Maintenance Services**

MSI shall be responsible to deploy required resources for appropriate up-keeping, maintenance, and operation of entire ITMS Project and ensure smooth functioning of the ITMS System during the entire O and M period.

**MSI shall perform minimum following activities with regards to the Maintenance:**

**a. Civil, Electrical and Network**

- Undertaking routine maintenance including prompt repairs of poles, cantilevers, gantries, road signs, Road marking, furniture and fixtures etc. at least once in every six months, or as directed by BTD from time to time. The marking shall meet minimum specifications as per Annexure Set II – Annexure 7.
- **MSI shall be required to take up operation and maintenance of all the existing poles along with new poles under the ITMS project scope.**
- Undertaking routine maintenance including prompt repairs / replacement of all electrical works / services and electronic equipment.

- Cleaning of all lamp heads, retrofits, warning blinkers and other aspects - remove dust and mud from lamps of the junction using blower, water etc., once in every six months.
- Painting of signal poles including lamp heads and plinth with synthetic enamel galof approved colour once in every one year;
- Replacement of cables if they are damaged / non-working.
- Digging, re-erection, reinstatement of all the foundation, island, pole, cantilever, ducts, manholes, etc.
- Periodic updates & upgrades of all equipment, cabling and connectivity provided at all locations.
- Setting up / building / renovating the necessary physical infrastructure including provisioning for network, power, rack, etc. at all the locations.

**b. IT – Hardware and spare parts**

- Provide comprehensive onsite warranty for all hardware items and all peripherals.
- Undertaking routine maintenance including prompt repairs / replacement of all software, hardware and networking works etc.
- Provide comprehensive Repair and Maintenance for all CCTV cameras, Variable Messaging Sign, workstations, servers, network components, various other active and passive components supplied for the project. This involves comprehensive maintenance of all components including configuration of components, repair, replacement of parts, providing spare parts etc.
- MSI shall provide replacement of any component if not repairable, in order to keep the system up and running at all times to maintain the defined SLA standards and storing the minimum number of spare components as required as directed by BTD from time to time. MSI shall have to stock and provide adequate onsite and offsite spare parts and spare component to ensure that uptime as per SLA is met.
- Whenever a component has to be replaced because of technical, functional, manufacturing or any other problem, it shall be replaced with a component of same make and configuration. If it's not available, the replacement shall conform to open standards and shall be of a higher configuration as directed and approved by BTD.
- Calibration of devices as required on regular basis.

**c. IT – Software and upgrades**

- Manage the usernames, roles and passwords of all the relevant subsystems, including, but not limited to servers, applications, devices, etc.
- Implementation and maintenance of standard operating procedures for maintenance of the infrastructure based on the pre-defined I.T. policies, mutually defined in consultation with BTD.
- All patches and updates to any software and hardware devices shall be provided by the MSI without any additional costs during the period of the contract.
- Manage of necessary upgrade or patch upgrade within 15 days of availability from the respective OEM with minimal downtime. The MSI shall inform the BTD about the same before update.
- Conduct penetration testing and vulnerability assessment at least on yearly basis.
- Rectification of system software problems due to crashing or malfunctioning of the OS, database or user interface within the time limits to meet the SLAs.

**d. IT – Security**

- Update for virus definitions, program updates, patches, fixes etc. (automatic periodically and in push-updates in case of outbreaks) without bringing server off-line, remotely over internet.
- Ensure security policies is maintained and updates to the same are made regularly.

- Protect all the IT assets to prevent any known & unknown attacks by maintaining an updated knowledge base of all the published security vulnerabilities and virus threats.
- Define process to tune, update, and monitor IDS information.
- Ensure patches for identified vulnerabilities are patched/blocked immediately.
- Respond to all security incidents and coordinate with respective OEM/service provider in case of a new threat is observed to ensure that patch is made available.
- Ensure OS security through appropriate configuration and patch updates.
- Updates shall be capable of being rolled back, if required.

e. MSI may cover all components and hardware under comprehensive maintenance contract with respective OEM, however entire responsibility of same shall be of MSI. The BTD reserves right to seek details about the service level agreement signed with the respective OEMs by the MSI.

**f. MSI shall ensure all the required calibrations to the system are done as per schedule. Any default of the MSI in the calibration shall attract penalty as defined in the SLA.**

g. BTD reserves the right to ask for replacement of any hardware, software and network components etc. anytime during the contract period, if it is not from a reputed brand and does not conform to all the requirements specified in the RFP document.

h. BTD also reserves right to ask for replacement of any manpower deployed on the Project.

i. MSI shall ensure all the components and entire system is insured as per the value defined to ensure any unforeseen events such as vandalism, theft, fire and lightening etc. are covered for the entire duration of the contract against. Safety and security of all the hardware, equipment, manpower etc. deployed by MSI as part of the project shall be sole responsibility of the MSI. MSI shall hold BTD indemnified from any claims arising for the same.

j. MSI shall ensure that the instruction manuals, technical manuals and user manuals supplied by OEMs are referred, referenced, always reviewed & maintained up-to-date.

k. The MSI shall provide Remote Support / Off-Site support wherever possible. MSI shall also depute adequate manpower as full time dedicated onsite Repair and Maintenance team.

l. MSI shall ensure that the Repair and Maintenance team has the relevant skillsets.

m. MSI shall keep necessary tools, equipment etc. required for carrying out repair and maintenance services.

n. MSI shall maintain records of all maintenance of the system, operational downtime of the one or more systems etc. and shall maintain a logbook on-site, as well as reports in the system that may be inspected by the BTD at any time.

o. MSI shall plan for the Changes by drawing up a task list, decide on responsibilities, coordinate with all the affected parties, establish and maintain communication between parties to identify and mitigate risks, manage the schedule for minimum impact on day to day operations, execute the change, plan for rollback in case of failure and maintain version control, ensure and manage the post Maintenance Process tests and documentation.

p. MSI shall plan system maintenance in accordance with pre-defined and approved schedule and make any changes and / or updates to the production environment only after written approvals by BTD. For any Maintenance Process, MSI must prepare detailed documentation including proposed changes, impact to the system in terms of outcomes/additional features added to the system etc.

q. The cost for repair, replacement and maintenance shall be borne by the MSI.

r. All planned, or emergency Maintenance Process shall be approved from BTD.

**Maintenance is of two types, namely;**

**Preventive Maintenance Services**

a. Shall be carried out at least once every 90 days (or any other period as may be directed by BTD from time to time) in addition to the normal maintenance for entire ITMS system.

b. Check for any loose contacts in the cables & connections, concealed and piped cabling

c. Calibrate the CCTV camera and other components of the all the systems under ITMS on regular basis.
d. Extract the log reports, study, draw logical conclusions, do fixes and submit the final report.
e. Conduct activities such as inspection, testing, satisfactory execution, diagnostics and necessary repairing of the equipment, including hardware, software existing devices etc.
f. Cleaning / removal of dust and dirt from the interior and exterior of the equipment, aspects, cameras lens, Workstation, sensors if any used, etc.
g. A 10 days prior intimation to the BTD shall be given before all preventive maintenance.

**Corrective Maintenance Services**

a. Troubleshooting of hardware problem of all supplied equipment and rectification of the same within the time of issue logged as per timelines of the SLA.
b. Troubleshooting of OS, database and all application and patch updating.
c. Documentation of problems, isolation, cause and rectification procedures for building knowledge base for the known problems.
d. Component that is reported to be down on a given date should be either fully repaired or replaced by temporary substitute (of equivalent configuration) within the time frame indicated in the Service Level Agreement (SLA). In case the MSI fails to meet the above standards of maintenance, there will be a penalty as specified in the SLA.
e. Any cost towards repair and replacement of any equipment or work under this project shall be sole responsibility of the MSI.
f. Any component that is reported to be faulty / non-functional on a given date should be either fully repaired or replaced by temporary substitute (of equivalent configuration) within the time frame agreed upon in the Service Level Agreement (SLA).

**Monitoring and Management Services:**

MSI shall be responsible for Monitoring, Administration and Management of the entire ITMS infrastructure, including the hosting infrastructure. The entire stack of monitoring and management services shall include but is not limited to the following:

a. Network Monitoring Services and Security Administration Services
b. Server and VM Monitoring, Administration, Configuration & Management Services
c. Database Administration & Management Services, Management of changes to database schema, disk space, storage, user roles.
d. Storage Administration & Management Services and Backup & Restore Services.
e. Management of users, processes, resource contention, preventive maintenance.
f. Management of updates & patches to ensure that the system is properly updated.

**Prevention of damage to ITMS assets or co-used Assets under the project:**

The MSI shall understand that the selected areas of the state are under constant development. There are development works on-going across involving widening of roads, construction of bridges etc. For any such up-coming projects anytime during the Implementation and O&M period, MSI shall bring any potential damage to the assets (ITMS or co-used assets) to the notice of BTD. Both BTD and MSI shall explore best possible endeavours to ensure no or minimum damage by appropriate planning and actions (at least 2 weeks prior to commencement of such development works), such as relocation of assets, dismantling the assets for specific agreed period, and its re-installation etc. Any cost towards dismantling, and warehousing / logistics of assets to BTD specified space shall be in the scope of MSI. BTD may pay the MSI for re-installation of the assets proportionately as per quoted rates. BTD may also consider DSR charges for the same. Both BTD and MSI shall enter into a negotiation and finalise the plan on case to case basis in a good faith. MSI shall ensure to bring to the notice of the BTD about any such requirement. Failure of MSI to bring to the notice and any subsequent damage shall be sole responsibility of the MSI.

**Urgent Repairs**

If, by reason of any accident or failure or an emergency or other event occurring to, in or in connection with the Project or any part thereof during the period of the Contract, any repair shall, in the opinion of BTD, be urgently necessary and the MSI is unable or unwilling or not available at once to do such repair, BTD may by its own or other workmen do such repair as BTD may consider necessary. If the repair so done by BTD is work which, in the opinion of the BTD, the MSI was liable to do at its own expense under the Contract, all costs and charges properly incurred by BTD in so doing shall within 14 days from the date of receipt of the claim be paid by the MSI to BTD or their authorized representative or may without prejudice to any other method of recovery, be deducted by BTD from any monies due or which may become due to the MSI or may be recovered as a debt.

## 11. Regular Reporting to BTD

In addition to the MIS and Reports which shall be extracted from the system itself, MSI shall submit quarterly project report to BTD including (not limited to following):

a. Attendance Report of deployed manpower, along with compliance to labour law and other requirement.
b. Clearance report of all the utility charges including network, power etc.
c. Tax clearance certificate for all applicable taxes
d. Traffic Reports as finalised by BTD
e. Violation detected, missed, false alarm, penalty collection, incident detected, and other SLA parameters.
f. Incidents report, and Action Taken Report.
g. Reports from various sensors
h. Repair and maintenance activities, count of spare kept.
i. Uptime of the system, network, Hosting Infrastructure etc.
j. Network reports, damage reports and preventive and corrective action taken report
k. Hardware damage reports and preventive and corrective action taken report
l. Audit report for Network, Server and Application (frequency as applicable)
m. Challenges and Risk and their mitigation.
n. Any other report demanded by BTD from time to time.

# Administrative Aspects

## 1.1. Roles and Responsibilities of Stakeholders of the project

The roles of the stakeholders shall change over a period of time as the project will evolve from design to implementation to the operations phase. With this background, stakeholders' responsibilities, illustrative organizational structure for the design & implementation phase, operational phase is given below.

The MSI shall identify resources who will be available on-site at TMC and one at project level who shall act as Single Point of Contact (SPOC) for BTD for all the issues, incidents and service requests with regards to ITMS Project.

Below mentioned Table 1 summarizes the roles and responsibilities of stakeholders involved in the project.

| Stakeholder | Role |
|---|---|
| **BTD** | • Oversee and review overall ITMS Project Activities<br>• Strategic and Policy level decision taking, Tactical decisions taking<br>• High level guidance, management and decision making<br>• Interface with external, public, enforcement and other strategic bodies<br>• Handle dispute resolution, governance and risk related issues of the project.<br>• Setting up Project Monitoring Unit (PMU)**:** A PMU will be formed by the BTD which shall be responsible for keeping track of the progress during the implementation phase and O&M phase of the project. Such PMU may comprise of officials from BTD, Traffic Police, PWD, and other authorities, experts, consultants or advisors etc.<br>• Appointing nodal person to address issues raised by the MSI during the project execution.<br>• To provide necessary permissions and approvals for installation of equipment, electricity, network etc. and other scope under the project.<br>• To provide electricity connection (excluding last mile connectivity) and recurring charges as defined in the RFP<br>• To permission for laying of network and electricity cables for the project at all the ITMS project point of interest (including that for last mile connectivity).<br>• To provide approval to junction drawing, approval to the estimation wherever required as per junction plan submitted by MSI and duly approved by BTD.<br>• To provide access to existing assets for co-use, and coordinate with different stakeholders for the same.<br>• To finalise co-used count and new component count as per status of the components and project requirements.<br>• To review and monitor civil works at field and TMC and DC (if any), etc.<br>• Reviewing and approving all the deliverables of the MSI including SRS document, Project Plan Document etc.<br>• Coordinating with Existing Project owners for providing necessary permissions to MSI for hosting and necessary permission for onboarding Cloud Service Provider and other services related to Hosting Infrastructure. |

| Stakeholder | Role |
|---|---|
| | • Providing necessary permissions for obtaining electricity connection for all equipment of the ITMS system including at TMC and DC (as required).<br>• Coordination with NIC for integration (like sharing APIs)<br>• Providing necessary permissions and support for integration with other 3rd party applications such as SMS gateways, email etc.<br>• Providing necessary knowledge and guidance about the Act, Rule, Laws, SOPs and other domain knowledge necessary for the project.<br>• Coordination with Metrology department, Pollution Control Board etc.<br>• Finalising all the format required as input and output from the system with MSI.<br>• Reviewing and approving all the formats, MIS, reports etc. from time to time.<br>• Permission and necessary directions for training BTD staff.<br>• Testing, quality check, recommendations, monitoring the progress, development, UAT, finalising aesthetics of the ITMS system and issuing Final Acceptance Letter.<br>• Carrying out periodic quality checks of the system, the output of sensors, quality of video feeds etc.<br>• Continuous Monitoring of the project, services, applications, hardware, security, deployed manpower, Service Levels and other benchmarks etc.<br>• Risk monitoring and management (time-cost overruns, project issue redressal and resolution, scope changes, contract deviations etc.)<br>• Monitor, review and approve overall timelines, SLAs and calculation of penalties, Liquidated Damages accordingly.<br>• Supporting for coordination with 3rd party institution.<br>• Issuing permissions, certificates, acceptance letters, approvals, serving notices, conducting surprise audits etc.<br>• Reviewing and approving the payments to the MSI as per SLAs and timely payment to MSI.<br>• To create internal capacity for execution of the project after takeover from the MSI or hire a new service provider to takeover.<br>• The challan approval SOP pertaining to challan review, including defined roles and responsibilities, objective grounds for rejection, maximum approval timelines, procedures for handling rejected/disputed challans, and the monthly reconciliation process, shall be shared after the issuance of the LOI.<br>• Providing the necessary space for TMC, Viewing centres and DC (free of cost and rent free)<br>• Providing access to operational CCC with entire facility in working condition, video wall etc. as agreed and defined in RFP. |
| **BTD / Traffic Police** | • Finalization of Locations of Violation Detection systems, VMS, PA systems etc. and other components and systems.<br>• Traffic Violation management authority to review and approve the violations<br>• Analyse traffic data for taking necessary decisions for efficient traffic management in consultation with BTD.<br>• Penalising and Challaning Authority.<br>• Reviewing and approving (or not approving) challans |

| Stakeholder | Role |
|---|---|
| | • Deploying manpower at TMC to review and approve challans, and supervise TMC operator and Viewing Centres for day to day operations.<br>• Penalty collection, court cases and other processes related to approved challan.<br>• Defining rules and SOP for the violation detection and defining the parameters for considering the violation<br>• Defining Standard Operating Procedures (SOPs) for Traffic management, signal management etc.<br>• Coordination with NIC for integration (like sharing APIs)<br>• Providing necessary knowledge and guidance about the Act, Rule, Laws, SOPs and other domain knowledge necessary for the project.<br>• Permission and necessary directions for training Traffic Police staff.<br>• Manning the TMC and Viewing Centres as per project requirements. |
| **City corporation** | • Providing all the necessary and relevant details of existing components / equipment, network and other assets decided to be co-used.<br>• Integration support for co-using field components, software application for VMS, violation detection systems, TMC, DC etc.<br>• Providing comments while selection of the locations for erection of pole, cantilever and gantries.<br>• Providing necessary approvals for RoW and certifying the RI. |
| **National Informatics Center (NIC)** | • Developing and Maintaining body for applications like eChallan, Vahan and Sarathi.<br>MSI shall be required to coordinate with NIC for integration with the eChallan and other system. |
| **Project Management Consultants** | • Project conceptualization<br>• Responsible for Project Management activities of ITMS Project<br>• Support MSI during Implementation and SRS phase on behalf of the BTD.<br>• Vendor evaluation and tracking of vendor performance<br>• Monitoring Project Implementation as per contract terms<br>• SLA Monitoring and related activities |
| **MSI** | • Responsible for overall Project Implementation, operations, maintenance, deployment of manpower and reporting to BTD as per scope defined in the RFP. |

**Note:** Based on the above, typical responsibility matrix will need to be finalized by BTD depending upon the functions from time to time. All the decisions, approvals, and status updates related to this project shall be routed through BTD's key designated officials only. BTD's decision shall be final and binding on the MSI.

## 2. Technology Refresh

During the entire project period, the MSI shall be required to mandatorily replace any project components as required for the project to maintain the defined SLA at no extra cost to the BTD. At the start of 06th , 07th and 08th year post successful Full Project Go-Live a joint survey with the MSI and BTD teams including any appointed Project Management Consultant (PMC) teams will be carried out.

The survey shall help to prepare a list of components for which the available technology in the market has been upgraded significantly and in the opinion of the BTD basis the joint survey, the upgraded technology will add value to the project. The cost of the mandatory upgraded component/s shall be part of Technology refresh cost and shall be consider by the bidder during the commercial bid.

For all other components, MSI shall ensure all the components meet required uptime and accuracy and MSI shall replace components from time to time as required to maintain the SLAs at no extra cost to BTD. For avoidance of doubt, repair / replacement to run the project throughout the project tenure shall be sole responsibility of the MSI without any extra cost to the BTD.

The mandatory IT infrastructure shall be refreshed through phased replacement as follows:

- Year 6: Replacement of minimum 30% of the total IT infrastructure under each Category as defined below
- Year 7: Replacement of an additional minimum 30% of the total IT infrastructure under each Category as defined below; and
- Year 8: Replacement of the remaining ~ 40% of the total IT infrastructure under under each Category as defined below.

For the purpose of Technology Refresh, the applicable IT Infrastructure shall comprise of the items listed in the Priced BOQ (Format 3 of Annexure Set III) under the following serial numbers:

Sr. Nos. 1 to 7, 24, 25, 26, 36, 37, 50, 52, 53, 54, 57 to 78 (excluding Sr. No. 69, i.e., DG Set), 86, 87 and 97, categorized as defined in the Priced BOQ.

Bidders shall include all associated mandatory Technology Refresh costs for the above replacements in their commercial bids against the respective years indicated.

## 3. Project Timelines and Project Deliverables

The tentative list of main deliverables that are expected during the implementation of the proposed system from the MSI at various stages of the project are given in this section along with the proposed timelines. The list shall be finalized at the time of approval of Project Plan submitted by the MSI and can be updated as per requirements of BTD from time to time.

| Phase | Responsibility / Deliverables | Maximum Timeline | Total Project Time | Payment Phases |
|---|---|---|---|---|
| **Project Inception Stage** | | | | |
| **Signing of Contract** | • Contract Agreement/s **OR** date of Letter of Acceptance of LOI MSI and<br>• Kick-off meeting | **$T_0$ = 0 month** | **0 month** | |
| **Project Inception** | • Field Survey + Requirements Gathering<br>• Discussion with Stakeholders to finalize requirement and SOPs.<br>• Preparation and submission of Inception Report, Project Plan Document / Project Implementation and Operation Plan Document along with Junction Geometry, structural components drawings and reports<br>• Network Architecture<br>• Insurance as per Clause 10 below.<br>• Deployment of required teams and Project Manager<br>• Factory Acceptance Testing (FAT) and initial purchase orders to OEM for major components like CCTV, Pole, Gantry, Switches, LPUs, Servers, Storage etc.<br>• Application of RoW permissions by MSI to BTD and other stakeholders<br>• Application for use of TMC premises, viewing centers premises, access to existing assets to an extent of ITMS project, electrical junction box, network connectors. | **$T_0$ + 2 month** | **2 month** | |
| **Approval** | | **$T_1 = T_0 + 3$ months** | **3 months** | |

| Phase | Responsibility / Deliverables | | Maximum Timeline | Total Project Time | Payment Phases |
|---|---|---|---|---|---|
| | • Letter of Approval for submitted Inception Report, Project Plan Document, Implementation Plan, Survey report etc. from BTD – or Part thereof. | | | | |
| **Project Implementation Stage** | | | | | |
| **Supply of Field Components** | • FAT of the components before Supply.<br>• Supply of field components at MSI warehouse (location disclosed to BTD) followed by inspection and acceptance by BTD.<br>• Triplicate Delivery Challan (along with original) clearly mentioning the project name, delivery date, country of origin, MSI name, OEM name, model, serial number etc. should contain the serial number of the equipment being supplied.<br><br>(Priority of junctions / locations as decided by BTD) | | **$T_1$ + 6 months** | **9 months** | |
| **Implementation of Field Components** | • Site Preparation (including Civil Work, cabling for last mile electricity, network etc.)<br><br>• Installation, configuration, integration, testing and commissioning of I.T. and Non I.T. field components, etc.<br><br>*As per Partial Go-Live conditions mentioned in the RFP* | All other field components including RLVD, SVDS, ANPR, VMS, PA systems along with pole, cantilever, electricity, network, junction box etc. | **$T_1$ + 10 months** | **13 months** | 50% of agreed Capital support<br><br>BTD may make payment in maximum 4 phases as per the below percentage progress achieved :<br>• 10% of agreed capital support on successful implementation of 25% of field component |

| Phase | Responsibility / Deliverables | | Maximum Timeline | Total Project Time | Payment Phases |
|---|---|---|---|---|---|
| | | | | | • 10% of agreed capital support on successful implementation of 50% of field component<br>• 10% of agreed capital support on successful implementation of 75% of field component<br>• 20% of agreed capital support on successful implementation of 100% of field component |
| **Implementation of Software Applications** | • Delivery (Perpetual License and Source Code as applicable), Development, installation.<br>• Configuration, user creation, integration, testing and commissioning of all software applications etc. | | **$T_1$ + 10 months** | **13 months** | |
| **Integration with existing assets** | • Integration with e Challan, Vahan etc., and with existing systems / components, CCC Video Wall etc. | | | | |
| **Traffic Management Center Setup** | • Delivery and installation of any new hardware, networking components, power backup etc. at TMC.<br>• Integration with all required third party application.<br>• Setting up of On-Premise Data Center and Cloud DR | | | | |
| **Configuration & Commissioning** | • Creation of users as per requirement | | | | |

| Phase | Responsibility / Deliverables | Maximum Timeline | Total Project Time | Payment Phases |
|---|---|---|---|---|
| | • Configuration of all the systems, signal phase timing etc. | | | |
| **Testing Report** | **Test Report**<br>• Change Request & Compliance Report, if any | **$T_1$ + 11 months** | **14 months** | |
| **Security Audit** | • Submission of the Report of Security Audit including VAPT by CERT-In emplaned auditing agency. | | | |
| **Partial Go-Live** | • **Go-live of Min. 200 no. of location (in all respect i.e. UAT, system integration etc.)**<br>*For all the components, services, violations for which the MSI proposes partial Go-Live should have UAT by BTD, Traffic Police and other relevant officials, System Integration, Security Audit and other mandatory activities completed, for other components, the same shall be completed as per envisaged timelines. | **$T_2 = T_1 + 12$ months** | **15 months** | 10% of agreed Capital support |
| **Documentation** | • Technical Manuals<br>(Operational Procedures, Hardware, Network manuals etc.) | **$T_2 = T_1 + 12$ months** | **15 months** | 25% of agreed Capital Support |
| **User Customization and UAT (Remaining 300 location)** | • Site Preparation (including Civil Work, cabling for last mile electricity, network etc.)<br>• Installation, configuration, integration, testing and commissioning of I.T. and Non I.T. field components, etc<br>• UAT Test Cases and other details to be provided by SI.<br>• Getting the system ready for UAT including integration and connections to the existing assets. | **T2 + 3 months** | **18 months** | |
| | • UAT by BTD, Traffic Police and other relevant officials, PMU and other stakeholders including on-field UAT and UAT certificate from the BTD. ***Full Go-live*** | **T2 + 4 months** | **19 months** | |
| **Training and Capacity Building** | • Training by MSI to BTD and all other stakeholders<br>• Creation of login credentials, assigning roles, configuration.<br>• Training by MSI to its resources<br>• Learning Materials (User Manual, Administrator Manual, SOP etc.) | **$T_2$ + 4 month** | **19 months** | |

| Phase | Responsibility / Deliverables | Maximum Timeline | Total Project Time | Payment Phases |
|---|---|---|---|---|
| | • Training Completion Report by MSI | | | |
| **Deployment of Resources** | • Deployment of MSI resources.<br>• Submission of O&M manpower CVs, contact details, escalation matrix etc. | **$T_2$ + 4 month** | **19 months** | |
| **Stabilization Period** | • Report on all the issues, Bugs, etc. Changes committed in the System due to issues or functional changes requirements etc. | **$T_2$ + 5 month** | **20 months** | 5% of agreed Capital Support |
| **Final Acceptance by BTD** | Final acceptance of the project implementation on successful completion of all the proposed activities. | **NA** | **20 months** | |
| **Commissioning** | **Commencement of Operations** | **$T_3 = T_2 + 5$ month (start of 21st month)** | | |
| **Operations and Maintenance Stage – 10 Years / (120 months)** | | | | |
| **Ongoing Status Reports** | Project Risks and Mitigation | Monthly | | Monthly payment of O&M quoted and accepted subject to SLAs + 5% of agreed Capital Support in each quarter in the first year (Total 20%) |
| | Report on Manpower Deployed including attendance and leave report along with compliance to labor law and other requirements | | | |
| | Standard MIS reports as required by BTD such as Traffic density mapping, total violations detected, corridor wise, violation wise etc. | | | |
| | Quality, Maintenance and change Metrics<br>Issue Log and Resolutions and Corrective actions | | | |
| | Clearance report of all the utility charges including SMS, network, power (as applicable) etc. | | | |
| | SLA Metrics, Utilization Report – from NMS, EMS and SLA monitoring tool | | | |
| | Other issues and outstanding problems; proposed actions to be taken<br>Repair and maintenance activities | | | |
| | Tax clearance certificate for all applicable taxes | | | |
| | Report of all violations detected, violations pushed by MSI, challans approved | | | |

**Note:** MSI should complete all the activities within the defined timelines as indicated above. The timeline will be reviewed regularly during implementation phase and may be extended incase BTD feels that extension in a particular Milestone is imperative, for the reason beyond the control of the MSI. In all such cases BTD's decision shall be final and binding. The MSI will be eligible for the payment based on the completion of activities and approval of the relevant deliverables.

## 4. Partial Go-Live

- BTD reserves the right to declare the project partial Go-Live in **maximum 2 phases** (i.e. one Partial Go-Live and one entire Project Go-Live).
- **Partial Go-Live shall have following activities successfully completed, including but not limited to:**
    - TMC Setup and respective Viewing Center Setup including all the required software, hardware etc.
    - Field work completion including supply, installation, testing, commissioning, re-instatement etc.
    - Security Audit
    - Calibration and 167A certification of each system and components under partial Go-Live.
    - Integration with NIC's eChallan and other applications as per project requirement.

  BTD's decision shall be final and binding.
- The MSI shall be required to conduct Security Audit more than once before Project Go-Live at its own cost in case of any changes in the application during the implementation phase.
- Basis the project completion status and project implementation priority of the BTD, BTD and Technical Committee appointed by the BTD, as its discretion may take an appropriate decision to declare the project Go-Live in phases, as per the physical progress of the project and priority of the BTD. This shall not be less than 200 locations and satisfying above mentioned conditions.
- The above clause does not relieve the MSI to execute the project as per defined timelines and SLAs requirements.
- **Post partial Go-live, the payment to the bidder will be given on the basis of calculation sheet mentioned under Annexure-8**

## 5. Suspension of Work

The MSI shall, on receipt of the order in writing from BTD (whose decision shall be final and binding on the MSI), suspend the progress of the works or any part thereof for such time and in such manner as the BTD may consider necessary so as not to cause any damage or injury to the work already done or endanger the safety thereof the following reasons:

- On account of any default on the part of the MSI or;
- For improper execution of the works or part thereof for reasons other than the default of the MSI; or
- For safety of the works or part thereof.

The MSI shall, during such suspension, properly protect and secure the works to the extent necessary and carry out the instructions given in the behalf by the BTD. The BTD may give time extension for the completion of the work once the suspension is lifted, for a period as it deems fit. BTD shall not pay any additional payment / compensation during such suspension period or any payment with respect to such suspension.

## 6. Payment

1. The MSI shall be paid as per **fixed "Per Challan Rate**", on per challan basis as per terms defined in Clause 13.6.3 under Instructions to Bidders.
2. The payment to the MSI shall be effective Go-Live / Partial Go-Live date and shall be on monthly basis *after a "Waiting Period" of **2** months post issuance of challan to the citizen,*

*i.e. the payment of challan issued to the citizen between 01 Jan to 31 Jan shall be paid in the monthly invoice cycle post 01 June of the same year*. MSI shall be required to submit the invoice on monthly basis for all the eligible challans along with other set of documents to process payments.

3. For clarity of doubt, any challans issued by the system during the Implementation Phase, **till the BTD approved Partial Go-live**, shall not be accounted and BTD shall not pay any sums towards the same during the said period.
4. BTD reserves right to involve third party auditors for audit, technical examination and evaluation of works completed against the invoice raised. Cost of such third party auditor shall be borne by BTD.
5. Payment of the undisputed amount shall be released against the due amount, after deduction of applicable penalties as per SLA parameters.
6. No interest shall be paid by BTD to MSI on any pending payment, whatsoever. However, BTD shall make its best effort to release payment against the undisputed monthly invoice submitted by the MSI within forty-five (45) days from the date of invoice submission, subject to the availability of budget / funds.
7. **With-holding and lien in respect of sums due from / to MSI:** During the audit and technical examination for the final bills of MSI, if it is found that the MSI is overpaid/underpaid for any work done, the same shall be adjusted during the clearance of subsequent Bill. MSI shall also be liable to refund BTD the amount over-paid and BTD shall liable to pay the amount under paid to the MSI for the work done, without any interest.
8. The MSI shall be solely responsible to make any payments to its sub- contractors.
9. No mobilization advance shall be payable to the MSI.
10. All the deduction will be calculated based on the SLA and will be deducted from the invoice amount and the remaining amount will be paid to the MSI.
11. All penalty that is collected from the violators shall be collected by the BTD and / or Traffic Police Officials. MSI shall have no role to play except for technical solutioning and support.
12. BTD does not guarantee on the minimum number of violations and / or minimum number of challans approved and / or amount of revenue earnings to the MSI.
13. Based on findings of the site survey activity done by the MSI as part of Clause 1 under "Project Activities", the MSI may propose a change in the number of sites or individual units to be deployed in each phase as well as overall scope and a consequent change in phasing. BTD also retains the right to suo-moto change the number of sites or individual units to be deployed for each scope item. The final decision on change in phasing shall be at the discretion of BTD, and binding on the MSI. The payment in such cases shall be proportionately adjusted in the IRR calculations as per **Annexure Set IV – Annexure 8.**

The BTD shall have the right to deduct the calculated liquidated damages, penalties as per SLA from the payments due to the MSI. Apart from penalties and Liquidated damages, the BTD has the right to deduct any other amount deemed fit from payment to the MSI.

## 7. Change Request Management

**Following shall NOT be considered as Change Request:**

- The cost pertaining to new hardware or hardware to be upgraded to meet SLA requirements over and above minimum specifications specified in the RFP shall be borne by MSI at no additional cost to BTD anytime during the contract period, and the same shall not be consider under change management.
- Any additional integration efforts, over and above what is defined in the RFP with any existing or new systems implemented under the project shall be at no additional cost to the BTD. Such integration efforts shall be including but not limited to API creation, changes to existing flow as per requirement, extra licenses for software, additional number of users and hits, additional data storage and processing etc.

- Any additional components required during the implementation phase and / or during O&M phase which is not explicitly defined but is required to provide the complete solution as envisaged in the RFP shall be sole responsibility of the MSI, and the same shall not be considered under the Change Request.
- Any change requests raised during UAT, Stabilization period and within the three months from date of Go-Live / Partial Go-Live, shall be delivered by the MSI without any additional cost to the project.

BTD may at any time, give written order to the MSI to scale up one or more junction or location or stretch of road with new and / or additional systems as per requirement of BTD. MSI shall ensure accommodation of additional requirements of the BTD, if any, which is specifically required, but not falling within the general scope of this document. This will also include any proposed co-used systems which may not be available for co-use during the implementation phase. MSI may also propose additional locations / junctions based on the field survey conducted or anytime during the project period.

- In such case, the MSI shall add / upgrade / replace the current infrastructure in order to meet the new requirements. **The cost for any new additional components / service in such case shall be adjusted in the IRR calculations as per Annexure Set IV – Annexure 8.** However, the MSI shall note that no additional cost towards implementation or charges for security audit etc. will be considered for adjustments or paid to the MSI. BTD will only adjust **one-time cost** of any additional component or service as per the rate defined in the BoQ submitted by the MSI (Successful Bidder) while bidding for the project and duly accepted by the BTD. **The Commercial Bid quoted by the bidder and duly accepted by BTD, shall be deemed to be valid for entire contract / extended contract period.** In case any component not part of the BoQ and required for the project as part of new requirement meeting the other terms of this clause, **Bihar Government** DSR Rate effective at the time shall be taken as a base, under which BTD reserves right to negotiate with the MSI. In either case, BTD shall not consider any additional charges for installation, commissioning, testing etc. for adjustments in the IRR calculations for any such new component/s, however, it would still be responsibility of the MSI. However, for both cases, **BTD shall adjusted for Operations and Maintenance of such component on pro-rata basis.** The new component / solution shall be part of SLA calculation as well under the relevant category.
- MSI shall provide necessary manpower for managing the Change Requests.

**The change order/management procedure will follow the following steps:**

Any change request proposed by the MSI shall be considered by BTD only when the efforts involved are greater than 0.5% and less than 25% of the **quoted and Accepted CAPEX value**.

Efforts lesser than the above shall not be considered under change request management and the MSI shall be required to do the required changes at no extra cost to the BTD. Total change request cost shall not exceed the above limits in the entire duration of the contract. If the efforts are greater than the above defined limits, BTD reserves the right to either approve the request or go to market for price discovery and award, as it deems fit.

**Following steps for Change Management Shall be followed:**

- **Identification and documentation of the requirement for the change:** The information related to the initiator, initiation date, priority of the change will be documented by BTD.
- **Analysis and evaluation of the Change Request:** The impact of the change in terms of the estimated effort, changed schedule, cost based on the financial Bid and the items impacted will be analysed and documented by the MSI.

- **Approval or Disapproval of the change request:** BTD shall approve or disapprove the change requested after discussion with MSI on the impact.
- **Implementation of the change:** The change will be implemented in accordance to the agreed cost, effort, and schedule.
- **Verification of the change:** The change will be verified by BTD on the implementation of the change request.

MSI shall ensure all the necessary configuration, calibration, testing, UAT, Audits, certification and all other applicable stages as defined in the RFP are completed with no extra cost to BTD.

Within maximum of 7 working days of the receipt of such written order, MSI shall communicate in writing to the BTD the changes, if any, which may be caused to the delivery schedule, costs, technology, etc. and the parties shall mutually agree on the same before giving effect to such changes, if the changes requested are outside the scope of MSI agreed to herein.

All changes which may have likely financial implications in terms of the overall cost / time of the project shall be undertaken by the MSI only after securing the express consent of BTD. In the event the consent of BTD is not received within a period of 3 month from the date of communication of MSI, then the change will NOT be carried out and same shall be communicated to BTD. The impact of the change in terms of the cost and schedule will be re-estimated and such approval on the new cost and schedule will be taken, if the change is approved after the 3 months.

If any of such change causes an increase or decrease in cost of or the time required for MSI's performance of any provisions under the resultant Agreement**, equitable adjustments shall be made in the Agreement Price and IRR calculations**, as well as on Delivery Schedule, and the resultant Agreement shall accordingly be amended. Any claims by MSI for adjustment under this must be asserted within 1 month from the date of MSI receiving the BTD change order.

Any changes in the scope of work shall be finalized with the BTD's approval. The MSI shall detail out and discuss specific changes in the scope of work with the BTD before incorporating them in the plan of action. Any deviations from the scope of work shall be highlighted at the earliest.

## 8. Successful Completion of the Project

The MSI shall be responsible to submit Exit Management Plan as per timelines defined in the RFP, with the details as defined in the RFP. The Exit Management Plan will be reviewed by BTD. Any suggestions and directions of BTD shall be adhered to.

**At the successful completion of the project, following activities including but not limited to below points shall be in force:**

1. MSI shall peacefully vacate all the premises of BTD and all the components of ITMS system as it is, leave all the hardware, furniture and any other equipment setup, all the software applications, data, network arrangements etc. deployed as a part of the Project by the MSI on as-is where-is basis.
2. All the software licenses shall be perpetual. MSI shall coordinate between BTD and respective OEMs and other service providers and sub-contractors for executing new contracts, if BTD wishes to.
3. All the utility charges like Internet, power etc., or any other recurring charges such as hosting infrastructure, SMS etc. if responsibility of the MSI, must be cleared by the MSI and lines be transferred to the name of BTD (if not in the name of BTD already).

4. Transfer all hardware, software license, after clearing all liens and liabilities on any financial institute, if any. All documents regarding the discharge of such lien and liabilities shall be furnished to the BTD.
5. MSI shall ensure, all the login, access to any system of the project to any of the MSI's personnel shall be revoked, and logical access to the database, applications or any other system has been revoked.
6. Any on-going auditing, maintenance activities etc. shall be planned in such a way to ensure all such activities are completed on or before last day of the contract, and the system is up and running as per business usual.
7. MSI shall train BTD or its nominated agencies for running the entire operations including repair, maintenance etc.
8. All the payment due till midnight of the last day of the Project (or extended project period) to the MSI shall be paid as per terms and conditions of the RFP, subject to SLA.

**MSI shall follow Exit Management Plan submitted by MSI and duly approved by BTD.**

## 9. Term of Contract Post Contract Period

1. Post the term defined above, BTD reserves the right to extend the contract to the existing MSI based on mutual agreement between BTD and MSI by a further period of maximum 2 years, maximum one year at a time. The MSI may submit a proposal for Operation and Maintenance of the ITMS system expressing its interest in continuing the Contract for a further period as agreed. BTD may consider this proposal after satisfying itself about the technological and commercial soundness of the proposal. Based on the satisfaction of BTD, it may enter into negotiations with the MSI for extension of Contract. Upon successful conclusion of negotiations, the MSI shall upgrade the systems / technology, as required and as mutually agreed during the negotiation between BTD and MSI and operate the same for a further period as agreed between the MSI and BTD.
2. Extension term shall have substantially same terms and conditions.
3. BTD may invite proposal from the MSI to continue its services. Such proposal shall not exceed 10% of the annual payment being paid to the MSI as per original contract. The MSI shall submit fresh Performance Security of for the new period and execute agreements as directed by BTD.
4. Such extension shall be completed three (3) months prior to expiry of the agreement date.

## 10. Change of Applicable Law

1. **Applicable Law**: Laws and any other instruments / subordinate legislation having the force of law having been published in India. For the avoidance of doubt, Applicable Law shall include any applicable statute, ordinance, decree, regulation, or by-law or any rule, circular, directive or any licenses, consent, permit, authorization, concession or other approval issued by any authority which has appropriate jurisdiction.
2. **Change of Law**: Any change in the Applicable Law; or any applicable judgment of a relevant court of law which changes the interpretation of the Applicable Law and is a binding precedent which directly and adversely affects the MSI performance / obligations under the Contract in a material way, coming into effect after the date of signing of resultant Contract entered by the MSI or after the bid submission date.
3. **Effect of Change of Law during tendering process**: The provisions of this RFP are governed by applicable laws, sub-ordinate legislation, statute, rules, or regulations prevalent at the time of floating of this tender. In the event of any change in such applicable laws, sub-ordinate legislation, statute, rules, or regulations which necessitate modification in any of the provisions of this RFP, the BTD reserves right and discretion to modify the provisions or terminate the tendering process altogether, without any obligations whatsoever.

4. **Effect of Change of Law during contract period:** In event of any change in applicable law, laws, sub-ordinate legislation, statute, rules, or regulations leading to change in requirements, processes w.r.t to the scope of this RFP, necessitating either change in terms and conditions, payment terms, and scope of work or termination of the contract, the BTD may do so by giving one month notice to the MSI from the date of such change of applicable laws, sub-ordinate legislation, statutes, rules, or regulations coming in to effect. Any change required in the scope of MSI due to change of law shall be binding on the MSI.
5. Any change request which may be raised due to this shall be in accordance with the Clause 7 under "Administrative Aspects". The Change request shall be considered as per upper and lower limits defined in the said clause.

## 11. Insurance

1. Utmost care must be taken while implementing the system at any point to make sure that no damage occurs to the any asset of the BTD and other project stakeholders.
2. **Any damage to ITMS project Assets and any other assets of BTD or any other authorities taken over by the MSI under the project during the Implementation Stage and / or Operations and Maintenance Phase shall be complete liability of the MSI. Such damages can be because of natural wear and tear, road accidents, natural calamity or any other kind of unintentional damage (excluding theft). Such damages claimed by the BTD and MSI is liable to pay for such damages and / or do good for the same.**
3. MSI shall have insurance with IRDA approved Insurance Company, valid for entire project period (date of Signing of Agreement till Contract end date) so as to protect itself and BTD from any damages described above in point 2 of this clause. MSI shall be required to submit the Insurance as per timelines mentioned in Clause 3 under "Administrative Aspects"
4. The MSI shall be required to procure and maintain valid and enforceable insurance coverage for the entire Agreement Period, at its sole cost and expense, upto such maximum sums as may be required under and in accordance with applicable laws **(not less than total quoted and duly agreed CapEx value)** and such insurance as may be considered necessary in accordance with Good Industry Practice, including 3rd party insurance, as approved by BTD. Sufficient Insurance coverage shall be responsibility of MSI, and any insufficiency shall be dealt by MSI only.
5. In case any damage which are not covered under Insurance for any reasonable justifiable reasons, not violating any of the terms and conditions of this RFP, and for the reasons not attributable to MSI, and for the reasons attributable to Government authorities, BTD may decide to pay for the damages as per rates discovered in the tender or the DSR rates. However, in case, assets under such damage is within the scope of the ITMS project, the repair execution shall be sole responsibility of the MSI, unless directed otherwise by BTD.
6. The following types of insurance from an insurance company acceptable to BTD (or meeting alternative insurance specifications as BTD may from time to time reasonably require):
    i) Public liability insurance for an insured amount equivalent to the value of resultant contract per occurrence and not less than the total contract value in aggregate;
    ii) Either professional indemnity or errors and omissions insurance for an insured amount equivalent to the value of resultant contract per occurrence and not less than the total contract value in aggregate;
    iii) Product liability for an insured amount equivalent to the value of resultant contract per occurrence and not less than the total contract value in aggregate;

    **Damage can be including but not limited to the following, for ITMS assets or other co-used assets:**

    - Natural Wear and Tear
    - Natural Calamity

- Road Accident

Damage will explicitly exclude any damage due to –construction / development work across the city. The cost for which shall be borne by BTD, subject to failing to conditions mentioned under clause 11 under "Project Activities"

iv) Commercial General Liability (CGL) Insurance covering the Agency as a named insured in the amount equivalent to the total value of the contract in aggregate and per occurrence, and naming BTD, its officers, agents and employees also as additional insured thereunder, and endorsed to cover liabilities for financial loss resulting or arising from acts, errors, or omissions in connection with the services provided under the resultant contract.

v) Employer's liability and Worker's Compensation insurance in respect of the Personnel of the MSI as well as with respect to such personnel, health, life, accident, travel or other insurance as may be deemed appropriate by the relevant laws in effect or BTD;

vi) Any other insurance as required by law and directed by BTD from time to time.

7. All insurance as listed above shall be primarily with respect to MSI's activities and BTD's insurance policies shall be non-contributing. Such policies shall contain a provision waiving the insurer's right of subrogation against BTD.
8. MSI shall furnish BTD with certificates of insurance which evidence the minimum levels of insurance set forth above. BTD shall be notified in writing at least thirty (30) days prior to cancellation of or any change in the policy.
9. All such insurance shall meet the applicable laws of India. MSI shall at all times comply with the terms of such insurance policies and all requirements of the insurer under any such insurance policies. The limits of coverage under each insurance policy maintained by the MSI shall not be interpreted as limiting or expanding the MSI's liability and obligations under the resultant contract.
10. Within 30 days of the execution of the resultant contract, MSI must, on request by the BTD, provide current relevant confirmation of insurance documentation from its insurance brokers certifying that it has insurance as required by this Clause.
11. MSI shall replace any coverage prior to the date of expiry/cancellation. MSI must notify the BTD immediately of any material adverse change in insurance coverage, including, but not limited to, changes in limits, coverage, or status of the policy with a 30 days prior written notice.
12. BTD may terminate the resultant contract upon the failure of MSI, or notification of such failure, to maintain the required insurance coverage. Inadequate insurance coverage for any reason shall not relieve MSI of its obligations under the resultant contract.
13. Within 15 (fifteen) days of obtaining any insurance cover, the MSI shall furnish to the BTD, notarized true copies of the certificate(s) of insurance, copies of insurance policies and premium payment receipts in respect of such insurance, providing current relevant confirmation of insurance documentation from its insurance brokers certifying that it has insurance as required as per the RFP and the Agreement conditions.
14. No such insurance shall be cancelled, modified, or allowed to expire or lapse until the expiration of at least 30 (thirty) days after notice of such proposed cancellation, modification or nonrenewal has been delivered by the MSI to the BTD.

The MSI shall be liable for, and shall indemnify, defend and hold the BTD, its officers, agents, and employees harmless from, any and all claims or damages to persons, data, or property by any reason.

**12. Service Level Agreement**

1. This RFP document, Master Service Agreement, NDA, Tripartite Agreements and any other resultant contract agreements resulting out of this RFP, shall be governed by Service Level Agreement (hereinafter referred to as SLA).
2. The purpose of SLA is to clearly define the performance levels for the MSI for the duration of the project, and ensure the responsibility is clearly defined in case of co-used assets. The MSI must comply with Service Levels requirements to ensure adherence to project timelines, quality and availability of services, throughout the period of the contract i.e. during implementation stage and Operations and Maintenance stage.
3. Each of the service parameters has an associate level of performance, expected to be met by the MSI. There is also an associated penalty mentioned for not meeting the performance level.
4. Detailed Service Level Parameters and required performance level are as **Annexure Set IV – Annexure 3** of this Document.
5. The MSI shall develop, supply appropriate software / automated tools including the SLA Management System to monitor the performance indicators and all the SLAs Parameters as per requirements of the RFP document.
6. Auditing agency shall verify the accuracy and completeness of the information captured by the SLA monitoring system implemented by the MSI and shall certify the same.
7. The application deployed for the project, based on SLAs, shall be configured by the MSI to calculate the applicable penalties and payment due after deducting the penalties.
8. Power to impose penalties shall be at sole discretion of BTD and bounding on the MSI.
9. Service levels shall include but not limited to:
    - Uptime of entire system
    - Uptime of individual components
    - Time taken for bug fixing / repair / replacement after call logged
10. Service levels shall be defined along with the penalty based on the business loss due to not meeting the service level and considering the cost of operations. Service levels shall also include breach levels beyond which the agreement is liable for termination.

## 13. Sub-Contracting

1. The MSI shall not sub-contract / sub- lease any part of the scope of the project to any external service provider, without prior written approval of BTD, MSI may be allowed to subcontract following works to India Registered Firm:
    a. Civil Work
    b. Electrical work
    c. ISP Internet
    d. Cloud / Hosting
    e. Facility Management
    f. Manpower (except for Project Director, Project Manager, Lead TMC Operator)
2. BTD may approve, at its own discretion, sub-contracting of any scope or services. BTD's decision shall be final and binding on the MSI.
3. In case BTD approves subcontracting, the MSI is encouraged to include Medium and Small and Medium Enterprises (MSMEs) in the delivery of the project by Subcontracting or Outsourcing part of the scope as per RFP Terms and Conditions. The MSME partner shall be registered under the Micro Small Medium Enterprise Act, 2006 or later.
4. The MSI shall submit all the details of sub-contractors (shall be in India only) to BTD as a part of **Project Plan Document** and specify the activities that the MSI's plans to sub-contract. BTD shall review the same and any suggestions by BTD shall be agreed upon.
5. Anytime during the process of award, Implementation Stage or Operations and Maintenance stage, if there is a change in sub-contractors or the activities being sub-contracted, MSI shall obtain prior permission form BTD. BTD shall review the activities listed for sub-contracting and any suggestions by the BTD shall be agreed upon and binding

on the MSI. For any deviation from suggestions made by BTD on Sub-Contracting, BTD reserves the right to initiate action as it deems fit at any stage.

6. **However, the entire responsibility of the project delivery, operations, maintenance etc., payment to sub-contractor shall be of the MSI. MSI shall be sole responsible agency for any non-compliance anytime during the contract period.**
7. MSI shall ensure to maintain the smooth operations of the project and maintain the SLA requirements.

# Annexure Set I – Envelope A

## 1. Format 1: Bid Submission Covering Letter

<< To be printed on Bidder (Lead Bidder in case of consortium) Company's Letter Head and Signed by Authorised Signatory>>

Date:

To,
State Transport Commissioner,
2nd Floor, Visvesvaraya Bhawan,
J L N Marg Patna - 800001
Tel: 0612-2547448
Email ID: stcbihar@bihar.gov.in

Dear Sir,

**Subject: Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis - Bid Submission Covering Letter**

**Ref: RFP No.: _____ Dated _____**

We, the undersigned bidders, having read and examined in detail all the bidding documents for Tender "Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis", do hereby propose to provide our services as specified in the RFP.

1. We have examined and have no reservations to the Bidding Documents, including Corrigendum / Addenda issued in accordance with Instruction to Bidders.
2. We confirm that we have made all the necessary inquires and assessment and have conducted investigations and analysis to check the accuracy, reliability and completeness of the information in this RFP Document, and wherever necessary, we have obtained independent advice from appropriate sources with regards to the project and the BTD' requirements and have not solely rely on the information contained in this RFP.
3. We attach hereto our responses to the requirements and technical and commercial proposals as required by the RFP, and we meet the eligibility requirements as per Instructions to Bidders. We confirm that the information contained in these responses or any part thereof, including the exhibits, and other documents and instruments delivered or to be delivered to BTD are true, accurate, verifiable and complete. This response includes all information necessary to ensure that the statements therein do not in whole or in part mislead the BTD in its shortlisting process.

4. We fully understand and agree to comply that on verification, if any of the information provided here is found to be misleading the selection process, we are liable to be disqualified from the selection process or termination of the contract during the project, if selected to do so. We also understand, this may lead to forfeiture of the EMD / Performance Security as applicable, at any stage and further actions as per Procurement Act and Rules and other applicable laws.
5. We agree for unconditional acceptance of all the terms and conditions set out in the RFP document and also agree to abide by this tender response being valid for a period of 180 days from the date fixed for commercial bid opening. We hereby declare that in case the contract is awarded to us, we shall submit the Performance Security in the form prescribed the RFP.
6. We offer to supply in conformity with the Bidding Documents and in accordance with the Project Timelines specified in the RFP for the scope in the RFP.
7. We agree that you are not bound to accept any tender response you may receive. We also agree that you reserve the right in absolute sense to reject all or any of the products / services specified in the tender response.
8. If our bid is accepted, we commit to obtain a performance security in accordance with the Bidding Documents.
9. We hereby certify that we have fulfilled our obligations to pay all such taxes as payable to the Central Government and State Government or any local authority.
10. We hereby authorize BTD to seek references from our Bankers, Financial Institutes, Firms, Corporations or persons in regard to pertinent information deems necessary and required by the Procuring Entity.
11. We are not participating as a bidder or Consortium member, in more than one bid in this bidding process.
12. We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in any activities which is in contravention of the Code of Integrity or engage in any type of fraud and corruption and we will strictly observe the laws against fraud and corruption in force within the country.
13. We understand that this bid, together with your written acceptance thereof included in your Letter of Intent (LOI), shall constitute a binding contract between us, until a formal contract is prepared and signed.
14. We understand that you are not bound to accept to accept the lowest bid or any other bid that you may receive.
15. It is hereby confirmed that I/We are entitled to act on behalf of our company / corporation / firm / organization and empowered to sign this document as well as such other documents, which may be required in this connection.

Dated this _____ Day of _____ 20--

Thanking you,
Yours faithfully

(Signature of the Authorized signatory of the Bidder)
(In the capacity of)

(Name)

Duly authorized to sign the Tender Response for and on behalf of:

(Name and Address of Company) Seal/Stamp of bidder

| | |
|---|---|
| Witness Signature: | Witness Signature: |
| Witness Name: | Witness Name: |
| Witness Address: | Witness Address: |

(along with Power of Attorney)

## 2. Format 2: Bidder Information Format

<< To be printed on Bidder (all members, in case of consortium) Company's Letter Head and Signed by Authorised Signatory>>

**TO WHOMSOEVER IT MAY CONCERN**
**Bidder Information Format**

Please find below the details of Bidder for participating **"Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis"**

| Particulars | Details |
|---|---|
| **Name of the Organization** | |
| **Type of Organization (Pvt. Ltd/ Public Ltd / LLP)** | |
| **Address of Registered Office in India (or in Bihar)** | |
| **Company Registration Details** | |
| **Date of Registration** | |
| **Details of**<br><br>**CMMI level 3 or above**<br>**ISO 9001:2015 or above**<br>**ISO 20000:2018 or above**<br>**ISO 27001:2018 or above**<br><br>*(as applicable)* | |
| **PAN / Equivalent** | |
| **TIN / Equivalent** | |
| **GST** | |
| **Number of years of Operation in India** (including name change / impact of mergers or acquisitions) | |
| **Number of Employees in India (**as on date of submission of bid):<br>• **ITMS and / or enforcement system and / or Electronic Enforcement of Road safety and / or IT and / or ITeS and / or ICT**<br>(required as per Qualification Parameters defined in the RFP) | |
| **Authorized Signatory Name** | |
| **Authorized Signatory Designation** | |
| **Authorized Signatory Contact Details** | |

Thanking you,
Yours faithfully

(Signature of the Authorized signatory of the Bidder)
Name:
Designation:
Seal:
Date:
Place:
Business Address:

## 3. Format for Power of Attorney

### Format 3A: Format for Power of Attorney to appoint and authorized Attorney

(To be submitted on a Stamp Paper of Rs. **1000**/-)

**Power of Attorney**

Know all men by these presents, we _____ _____ (name and address of the registered office) do hereby constitute, appoint and authorize Mr. / Ms. _____(name and residential address) who is presently employed with us and holding the position of _____ as our attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to our bid for the Project envisaging "**Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis**", (the "Project") including signing and submission of all documents and providing information / responses to Bihar Transport Department, (BTD) representing us in all matters before BTD, and generally dealing with BTD in all matters in connection with our bid for the said Project.

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

For _____

(Signature) (Name, Title and Address)

Accepted

(Signature)

(Name, Title and Address of the Attorney)

**Note:**

- The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required the same should be under common seal affixed in accordance with the required procedure.
- In case the Application is signed by a Partner / authorised Director of the Applicant, a certified copy of the appropriate resolution / document conveying such authority may be enclosed in lieu of the Power of Attorney.

(To be submitted on a Stamp Paper of Rs. **1000**/-)

**Power of Attorney**

Whereas the Bihar Transport Department, Patna (BTD) has invited applications from eligible bidders for "**Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis**", (the "Project")

Whereas, _____ and _____ (collectively the "Consortium") being Members of the Consortium are interested in bidding for the Project in accordance with the terms and conditions of the Request for Proposal (RFP) and other connected documents in respect of the Project,

AND

Whereas, it is necessary for the Members of the Consortium to designate one of them as the Lead Member with all necessary power and authority to do for and on behalf of the Consortium, all acts, deeds and things as may be necessary in connection with the Consortium's bid for the Project and its execution.

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS

We, M/s. _____ having our registered office at _____,

And M/s._____ having our registered office at _____,
(Hereinafter collectively referred to as the "Principals") do hereby irrevocably designate, nominate, constitute, appoint and authorize M/s. _____ having its registered office at _____ _____,

being one of the Members of the Consortium, as the **Lead Bidder** and true and lawful attorney of the Consortium (hereinafter referred to as the "Attorney").

We hereby irrevocably authorize the Attorney (with power to sub-delegate) to conduct all business for and on behalf of the Consortium and any one of us during the bidding process and, in the event the Consortium is awarded the contract, during the execution of the Project and in this regard, to do on our behalf and on behalf of the Consortium, all or any of such acts, deeds or things as are necessary or required or incidental to the pre-qualification of the Consortium and submission of its bid for the Project, including but not limited to signing and submission of all applications, bids and other documents and writings, participate in bidders and other conferences, respond to queries, submit information / documents, sign and execute contracts and undertakings consequent to acceptance of the bid of the Consortium and generally to represent the Consortium in all its dealings with the BTD, and / or any other Government Agency or any person, in all matters in connection with or relating to or arising out of the Consortium's bid for the Project and / or upon award thereof till the Master Service Agreement is entered into with the BTD.

AND

hereby agree to ratify and confirm and do hereby ratify and confirm all acts, deeds and things done or caused to be done by our said Attorney pursuant to and in exercise of the powers conferred by this Power of Attorney and that all acts, deeds and things done by our said Attorney in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us / Consortium.

IN WITNESS WHEREOF WE THE PRINCIPALS ABOVE NAMED HAVE EXECUTED

THIS POWER OF ATTORNEY ON THIS _____ DAY OF _____, 20_____.

For _____
(Signature)
Name & Title _____

For _____
(Signature)
Name & Title _____

Witnesses:
1.
2.

_____
(Executants)
(To be executed by all the Members of the Consortium)

**Notes:**

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

Also, wherever required, the Bidder should submit for verification the extract of the charter documents and documents such as a board or shareholders' resolution/ power of attorney in favour of the person executing this Power of Attorney for the delegation of power hereunder on behalf of the Bidder.

## 4. Format 4: Format for Financials and Technical qualification criteria

### 4.1. Format for Financials from Statutory Auditors of the bidder

<On a letter head of Statutory Auditors of the b**idder (all members, in case of consortium)**>

This is to certify that <Bidder name> having its registered office at _____ have turnover and Net worth required as per **clause 13.3** under "Instructions to Bidders" of Tender Number _____ dated _____, as under:

| **Financial Year** | **Total Turnover**<br><br>**from IT / ITeS / ICT / ITMS business**<br><br>**(or overall for one consortium member, as applicable)** | **Net Worth**<br><br>**As defined in Companies Act 1956 / 2013 as amended from time to time** |
|---|---|---|
| | **Rupees in Crore** | |
| **2022-23 (Audited)**<br>**As on 31st March 2023** | | **NA** |
| **2023-24 (Audited)**<br>**As on 31st March 2024** | | **NA** |
| **2024-25 (Audited)**<br>**As on 31st March 2025** | | **As on 31st March 2025** |
| **2025-26 (Audited)**<br>**As on 31st March 2026** | | **As on 31st March 2026** |

Supporting Document Reference for the above is as follows: _____<Page number, file name>_____

I understand, the term of "IT/ITeS/ICT/ITMS" refers to the definition as defined in Clause 13.1 under "Instructions to Bidders" of the Part 1A of the RFP number_____dt. ____.

**Authorized Signatory:**
**Name:**
**Designation:**
**Membership Number:**
**Place:**
**Date:**
**Stamp:**

### 4.2. Format for Technical Qualification Criteria

(To be executed on **Letter Head of the Bidder (All members (as applicable) in case of Consortium)**)

M/s_____ (name and registered office address of Bidder) acting through _____ (name and address of the authorized representative of the Bidder), do hereby solemnly affirm and undertake as under;

That the below table represents the list of projects matching the definition as per clause 13.1 for "**Similar Projects**"

| # | **Project Name / Client Name** | **Name of authorized person from Client** | **Email ID and Contact Number of Authorized persons** | **Project Start Date (Operations start date)** | **Project End Date** | **Total Project value of the "Similar Project"** | **Type and number of locations of Violation Detection Systems implemented** (as applicable) | **Number of locations of Electronic Enforcement of Road safety implemented** (as applicable) |
|---|---|---|---|---|---|---|---|---|
| Eg. | ABC ITMS Project | Mr. Abc Xyz | abc@xyz.com 022 XXXXX +91 XXXXX | 15th Jan 2016 | On – going 14th Jan 2025 | INR 120 Crore | RLVD - 23 SVDD - 12 No Helmet - 23 | 40 junctions 3 arms – 10 4 arm – 25 5 arms - 3 6 arms - 2 |
| 1 | | | | | | | | |
| 2 | | | | | | | | |

Supporting Document Reference for the above is as follows: _____< Page number from - to, file name >_____

I / We declare that all the above information is correct and best of my / our knowledge. I / We understand that the BTD may cross verify any and all information provided above and any false representation, or false information provided may be liable for action as deem fit to the BTD under relevant act / rules, or as per RFP Terms and Conditions, including but not limited to disqualification of Bid / withdrawal of LoI and forfeiture of EMD or Termination of contract and Performance Security forfeited, whichever is applicable.

SEAL, SIGNATURE & STAMP OF BIDDER / AUTHORISED SIGNATORY
Dated / Place:

### 4.3. Format for OEM Technical Qualification Criteria

(To be executed on **letter head of OEM / OEM Authorized Vendor**)

M/s_____ (name and registered office address of OEM / OEM Authorized Vendor) supplying to _____ (name and address of the authorized representative of the Bidder / Lead Bidder of Consortium), do hereby solemnly affirm and undertake as under;

| # | **Supplied System** (as per **clause 13 under Instructions to Bidders)** | **Project Name / (ultimate) Client Name and SI name** | **Name of authorized person from Client (ultimate client)** | **Email ID and Contact Number of Authorized person** | **Number of junctions / systems, meeting the criteria** | **Project Start Date** | **Project End Date** |
|---|---|---|---|---|---|---|---|
| **Eg**. | Speed Violation Detection System | ABC Department M/s ABC Ltd. | Mr. Abc Xyz | abc@xyz.com 022 XXXXXXXX +91 XXXXXXXXXX | 34 | 15th Jan 2016 | On – going 14th Jan 2024 |
| 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |

Supporting Document Reference for the above is as follows :_____< Page number from - to, file name >_____

I / We declare that all the above information is correct and best of my / our knowledge. I / We understand that the BTD may cross verify any and all information provided above and any false representation, or false information provided may be liable for action as deem fit to the BTD under relevant act / rules, and as per RFP terms and conditions, including but not limited to disqualification of Bid / withdrawal of LoI and forfeiture of EMD or Termination of contract and PBG forfeited of the Bidder, whichever is applicable.

SEAL, SIGNATURE & STAMP OF BIDDER / AUTHORISED SIGNATORY

Dated:

Place:

## 5. Format 5: Undertaking – Non-Blacklisting

<< To be printed on Bidder (all members in case of consortium)'s Letter Head and certain defined OEM's letter head and Signed by Authorized Signatory>>

Date:

To,
State Transport Commissioner,
2nd Floor, Visvesvaraya Bhawan,
J L N Marg Patna – 800001
Tel: 0612-2547448
Email ID: stcbihar@bihar.gov.in

**Sub: Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement of Road Safety at identified high-risk and risk-density corridors and critical junctions for Bihar State on PPP basis– Non-Blacklisting Undertaking.**

**Ref: RFP No.: _____ Dated _____**

Dear Sir / Madam,

We, the undersigned, hereby declare that:

1. We are not convicted for any of the following offenses under the Prevention of Corruption Act, 1988; Or
2. We have not been convicted under any Indian Penal Code or any law in force, for creating public injury or loss of life to person or property or risk to public health as a part of execution of public procurement contract;
3. We have not been blacklisted / banned / debarred by any Government (State / Central / UT) or its Department, Central or State Public Sector Unit, Defence, Govt. Boards, Urban Local Bodies in India or under a declaration of ineligibility / banned or convicted of economic offence for any reason in India in last 3 (three) years from the last date of submission of bid.
4. We have not violated the code of integrity in last 3 years;
5. Our Security Deposit or EMD or Performance Security deposit or any other deposit was not withheld (fully or partly) by the BTD during any procurement process or contract execution undertaken by BTD in last 3 years;
6. We have not withdrawn our bids post submission of the same. (maximum incidents are limited to 3)
7. If Owner / Partner / Director / Trustee of the organization is Owner / Partner / Director / Trustee of any other organization
8. We hereby declare that Our Owner / Partner / Director / Trustee are not Owner / Partner / Director / Trustee of any other organization which is presently blacklisted / Banned / Suspended by the Government / Semi-Government / PSUs, and any other organization as applicable.
9. We accept that in case of any irregularity, lapses, non-compliances, BTD decision shall be final and binding on us.

Sincerely,
Seal and Signature of the Authorized signatory of the Bidder)
Name and Designation:
Date and Place:

## 6. Format 6: Undertaking of "No Conflict of interest"

<< To be printed on Bidder (All members in case of consortium) Company's Letter Head and Signed by Authorized Signatory>>

Tender No. Date:

To,
State Transport Commissioner,
2nd Floor, Visvesvaraya Bhawan,
J L N Marg Patna - 800001
Tel: 0612-2547448
Email ID: stcbihar@bihar.gov.in

**Subject: Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis – Non-Conflict of Interest Undertaking.**

**Ref: RFP No.: _____ Dated _____**

We do hereby confirm that we, our consortium partners, OEMs, ISPs, sub-contractors are not involved in any actual or perceived conflict of interest situation with one or more parties in this bidding process, including but not limited to:

1. receive or have received any direct or indirect subsidy from any of them; or
2. have common controlling shareholders; or have the same legal representative for purposes of this Bid; or have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on Bid of another Bidder, or influence the decisions of BTD regarding this bidding process; or
3. Bidder participates in more than one bid in this bidding process. Participation in more than one Bid shall result in the disqualification of all Bids in which the bidder is involved. However, this does not limit the inclusion of the same product (commercially available hardware, software or network product manufactured or produced by the firm), as well as purely incidental services such as installation, configuration, routine training and ongoing maintenance / support, in more than one bid; or
4. Bidder participated as a consultant in the preparation of the design or technical specifications of the goods and services that are the subject of the bid. Bidder gets associated as Consultant / Advisor / Third party independent evaluating agency with any of the agencies taking part in the bid process; or
5. Have an existing contract with the BTD
6. Have a clear and certain possibility that the services executed / delivered by the bidder as part of the scope of work would lead to outcomes wherein the bidder can have vested business interests / benefits
7. Have a position in a business or personal interest that could improperly influence the judgment in the exercise of bidder's duties.
8. Is not privy to information from the BTD which is not available to other bidders.
9. Has not recently worked for the BTD overseeing the project in a role which is even perceived as "influential role" for drafting of SOW and evaluation criterion
10. Have an ownership interest or a continuing business interest or an on-going relationship with an existing Consultant working with the BTD and interacting with the same officials of the BTD.

We also confirm to disclose to the BTD in writing, all actual and potential conflicts of interest that exist, arise or may arise in due course of performing the Services as soon as it becomes aware of such a conflict.

Sincerely,

(Signature of the Authorized signatory of the Bidder)
Name:
Designation:
Seal:
Date:
Place:
Business Address:

## 7. Format 7: Declaration from the HR head of the Bidder for Experienced Manpower

<< To be printed on Bidder (all members in case of consortium) Company's Letter Head and Signed by Authorized Signatory>>

Date:

To,
State Transport Commissioner,
2nd Floor, Visvesvaraya Bhawan,
J L N Marg Patna - 800001
Tel: 0612-2547448
Email ID: stcbihar@bihar.gov.in

**Subject Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis s– Experienced Manpower Declaration.**

**Ref: RFP No.: _____ Dated _____**

We confirm that our Company <Name of Bidder / consortium member> as on date of submission of the proposal Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Intelligent Traffic Management Systems (ITMS) for Road Safety and Operate & Maintain for a period of 10 years for Bihar State, has following number of professionals on our payroll in India meeting the criteria requested in the RFP, as on date of submission of bid.

| Sr. | Type of professional | Number of professionals |
|---|---|---|
| 1 | ITMS and / or enforcement system and / or Electronic Enforcement of Road safety and / or IT and / or ITeS and / or ICT | |

We also understand that BTD reserves right to ask for EPF payment receipts of all declared employees.

Sincerely,

(Signature of the Authorized signatory of the Bidder)
Name:
Designation:
Seal:
Date:
Place:
Business Address:

## 8. Format 8: Self Declaration

(To be submitted on a Stamp Paper of Rs. **1000**/- by Bidder (all Members in case of Consortium))

M/s_____ (name and registered office address of the company) acting through _____ (name and address of the authorized representative of the Bidder), do hereby solemnly affirm and undertake as under;

**Ref: RFP No.: _____ Dated _____**

1. That I / we have read through the entire Tender document number _____, regarding _____<Name of the Tender>_____, and agree that we have read each and every page and clause mentioned in the said tender document including all the parts of RFP, any corrigendum, pre-bid responses, amendments etc.
2. That the infrastructure required and necessary for carrying out the work as prescribed under the scope of the RFP document shall be made operational within the period stipulated in the RFP document.
3. That I / We shall appoint the requisite manpower with necessary qualifications and experience as stipulated in the RFP.
4. That I, shall implement the project myself and shall not franchise / sublet / subcontract it, if awarded to me, without prior written consent of the BTD.
5. That I / We shall comply with, and always observe, the terms and conditions of the RFP document and with the direction and orders issued by the BTD from time to time.
6. That I / We hereby certify that the proposal submitted by us is non-conditional and is without any deviation from the RFP requirements.
7. That all the statements, submissions made by me / us and the documents submitted by me / us are genuine to the best of my / our knowledge and that the same reflects the facts as on the date.
8. That I / We shall ensure that the key staff deployed (as identified by BTD at the start of project execution) for the Project shall formally sign the Non-disclosure Agreement in the format specified by BTD and further shall comply with all the requirements of Information Technology Act 2000 (ITA-2000) of Government of India, IT (Amendment) Act 2008 and any such amendments and requirements from time to time.
9. We have read and understood the General Financial Rules (GFRs), 2017 (including Global Tender Enquiry Amendment Rule 161(IV) dated 15 May 2020 and Amendment Rule 144 (xi) dated 23rd July 2020), all as amended from time to time, and we agree that we comply to the same as on date of this letter. We also agree, that we will bring to the notice of the BTD as applicable from time to time in case of change of any status with respect to this.
10. I / We shall ensure that all the software, application licenses provided and deployed by us for the project shall be as described in the RFP document.

I / We understand that failure to do so may result in forfeiture of EMD and / or withdrawal of LOI.

SEAL, SIGNATURE & STAMP OF BIDDER (All Members in case of Consortium) / AUTHORISED SIGNATORY

Date:
Place:

## 9. Format 9: Format for Anti-Collusion Certificate

(To be submitted on the Letter Head of the Bidder (Lead Bidder in case of consortium), duly signed by the Authorized Signatory)

Anti-Collusion Certificate

**Ref: RFP No.: _____ Dated _____**

We hereby certify and confirm that in the preparation and submission of this Proposal for RFP "**Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis**", we have not acted in concert or in collusion with any other Bidder or other person/s and also not done any act, deed or thing which is or could be regarded as anti-competitive.

We further confirm that we have not offered nor will offer any illegal gratification in cash or kind to any person or agency in connection with the instant Proposal.

Dated this _____ Day of _____, 202___

Name of the Bidder _____

Signature of the Authorized Person _____

Name of the Authorized Person _____

## 10. Format 10: Earnest Money Deposit as Bank Guarantee

**Tender. No. :**
**Date :**
**Bank Guarantee No. :**

To,
State Transport Commissioner,
2nd Floor, Visvesvaraya Bhawan,
J L N Marg Patna - 800001
Tel: 0612-2547448
Email ID: stcbihar@bihar.gov.in

For bidding for the tender bearing number _____ dated _____ for the project "**Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis**" (hereinafter referred as 'RFP') for, _____ a company registered under Indian Companies Act, 1956 / 2013 OR LLP firm under LLP provisions 2008 (hereinafter called the "Bidder" (Lead Bidder in case of Consortium)), we at the request of the Bidder, certify that, we, _____ Bank having one of the branches at _____(hereinafter called the "Bank") are holding in trust in favour of **Bihar Transport Department** (hereinafter referred as **'BTD'**), the amount of Rs. _____ (write the sum here in words) to indemnify and keep indemnified the BTD against any loss or damage that may be caused to or suffered by the BTD by reason of any breach by the Bidder of any of the terms and conditions of the RFP and the bidding process as described in the RFP.

We agree that the decision of BTD, whether any breach of any of the terms and conditions of the RFP and/or in the performance thereof has been committed by the Bidder and the amount of loss or damage that has been caused or suffered by BTD shall be final and binding on us and the amount of the said loss or damage shall be paid by us forthwith on demand and without demur to BTD.

We _____ Bank, further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for satisfactory performance and fulfilment in all respects of the RFP and bidding process by the Bidder i.e. till _____(write a date which is at least **180 days** from the Last date (deadline) for uploading of bids on the e-Tendering website in response to RFP notice- hereinafter called the **said date**) and that if any claim accrues or arises against us _____ Bank, by virtue of this guarantee before the said date, the same shall be enforceable against us _____ Bank, notwithstanding the fact that the notice of any such claim is given to us _____ Bank, by BTD before the **said date**.

Payment under this letter of guarantee shall be made promptly, within two week of our receipt of notice to that effect from BTD.

It is fully understood that this guarantee is effective from the last date (deadline) for uploading of bids in response to RFP notice and that we _____ Bank, undertake not to revoke this guarantee during its currency without the consent in writing of BTD.

We undertake to pay to BTD any money so demanded notwithstanding any dispute or disputes raised by the Bidder in any suit or proceeding pending before any court or Tribunal relating

thereto our liability under this present guarantee being absolute and unequivocal without any demur, reservation, recourse, contest or protest and without any reference to the Bidder or any other person.

The payment so made by us under this guarantee shall be a valid discharge of our liability for payment there under.

We _____ Bank, further agree that BTD shall have the fullest liberty, without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said RFP or to extend time of performance by the Bidder from time to time or to postpone for any time or from time to time any of the powers exercisable by BTD against the said Bidder and to forebear or enforce any of the terms and conditions relating to the said RFP and we, _____ Bank, shall not be released from liability of BTD under this guarantee by reason of any such variation or extension being granted to the said Bidder or for any forbearance by BTD to the said Bidder or for any forbearance and or omission on the part of BTD or any other matter or thing whatsoever, which under the law relating to sureties, would, but for this provision have the effect of so releasing us from our liability under this guarantee.

This guarantee will not be discharged due to the change in the constitution of the Bank or the Bidder or any absorption, merger or amalgamation of the Bank or the Bidder with any other person.

Our liability under this Bank Guarantee shall not exceed and is restricted to Rs. _____ (Rupees _____ only).

The Bank declares that it has power to issue this Guarantee and discharge the obligations contemplated herein, the undersigned is duly authorized and has full power to execute this Guarantee for and on behalf of the Bank.

---

Signature of Authorized Signatory (with official seal)
Date :
Place :
Name :
Designation :
Address :
Telephone & Fax :
E-mail address :

_____ _____
Signature of Witness 1 Signature of Witness 2
Name: _____ Name: _____

(Bank's common seal)

**Bank details of BTD:**

a) **Name of Beneficiary:** Bihar Road Safety Fund
b) **Bank Name:** State Bank of India
c) **Branch Name:** Bailey Road, Patna
d) **Branch Address:** Visveswaraya Bhawan (6379), Patna
e) **Account Number:** 36614020208
f) **IFSC Code:** SBIN0006379

## 11. Draft Joint Bidding Agreement

[To be stamped / franked for Rs. **1000** non-judicial]

### JOINT BIDDING UNDERTAKING

This Joint Bidding Undertaking is entered into on this the _____ day of _____ 202__, ("**Undertaking**")

### AMONGST

1. _____ Limited, a company incorporated under the Companies Act, 1956 / 2013 or Limited Liability Partnership firm under LLP Act 2008, and having its registered office / office at _____ hereinafter referred to as the "**First Part**" which expression shall, unless repugnant to the context include its successors and permitted assigns);

   [Note: Party selected by Bidding Consortium as Lead Bidder should be party of the 'First Part'.]

AND

2. _____ Limited, a company incorporated under the Companies Act, 1956 / 2013 or Limited Liability Partnership firm under LLP Act 2008, and having its registered office / office at _____ hereinafter referred to as the "**Second Part"** which expression shall, unless repugnant to the context include its successors and permitted assigns);

The above-mentioned parties of the FIRST, and SECOND PARTS are collectively referred to as the "**Parties**" and each is individually referred to as a "**Party**".

**Note**: All members of the Bidding Consortium are required to execute the Joint Bidding Undertaking.

**IN FAVOR OF:**

The **Bihar Transport Department** and having its principal offices at_____, (hereinafter referred to as the "Authority" which expression shall, unless repugnant to the context include the successors and assigns).

**WHEREAS**

A. The Authority has invited Bids from the Bidders by its Request for Proposal No. _____ dated _____ (the "RFP") for selection of a Master System Integrator (MSI) for the Project on terms specified in the RFP (the "Proposals").
B. The Parties are interested in jointly bidding for the Project in accordance with the terms and conditions of the RFP, as members of a Consortium.
C. It is a condition to participation in the RFP that all members of the Consortium furnish a Joint Bidding Undertaking to the Authority as below.

**Now therefore, the Parties hereby agree with and undertake to, the Authority as follows:**

## 1. Definitions and Interpretations

In this Undertaking, the capitalized terms shall, unless the context otherwise requires, have the meanings ascribed to them in the RFP Document.

## 2. Consortium

2.1. The Parties do hereby irrevocably constitute a Consortium in accordance with the terms of the RFP for the purposes of jointly participating in the RFP process.

2.2. The Parties hereby undertake to participate in the bidding process only through this Consortium comprising of the Parties (the "Bidding Consortium") and each Party agrees and undertakes that it shall not, whether directly or indirectly (including through one or more of its Affiliates), participate as, or otherwise be interested in the Bid of, any other Bidder, whether as a member of another Consortium, or a partner, director, shareholder of another Bidder or member of another Consortium or otherwise, except otherwise provided in the RFP explicitly.

"**Affiliate**" means, with respect to any person, any other person that directly or indirectly, controls, is controlled by, or is under common control with, the first mentioned person, where
"**control**" means the ability to control the management and policies of a person, whether directly or indirectly, through the ownership of voting securities or the power to appoint a majority of the members of the board of directors or equivalent governing body of such person, or through contract or otherwise. The term Affiliate includes without limitation subsidiary companies, holding companies, and subsidiaries of the holding companies, of a person.

The roles and responsibilities of each consortium member along with reference to **financial, technical and O&M obligations** is mentioned as below:

| Sr. No. | Name of Party | Roles and Responsibility |
|---|---|---|
| 1. | | Lead Bidder : |
| 2. | | Consortium Member 1 : |
| 3. | | Consortium Member 2 : |

We hereby agree and undertake to obey the roles and responsibilities mentioned above in all respect throughout the contractual period.

## 3. Role of the Parties

3.1. The Parties hereby undertake and agree that _____ [insert name of party], Party of the First Part shall be the Lead Entity of the Bidding Consortium and the Parties represent and warrant that the Party specified as the Lead Entity of the Bidding Consortium in the preceding sentence has the power of attorney from all other Parties for conducting all business for and on behalf of the Bidding Consortium during the bidding process and for the entire duration of the contract.

3.2. The Parties undertake that there shall be no change in composition of the Bidder during the entire contract period without written consent of BTD, in accordance with **Clause 13.2** under "Instructions to Bidders" of the RFP.

**4. Representation of the Parties**

**Each Party represents and warrants as of the date of this undertaking that:**

4.1. Such party is duly organized, validly existing and in good standing under the laws of its incorporation and has all requisite power and authority to enter into this Undertaking;

4.2. The execution, delivery and performance by such Party of this Undertaking has been authorized by all necessary and appropriate corporate or governmental action and a copy of the extract of the charter documents and board resolution / power of attorney in favour of the person executing this Undertaking for the delegation of power and authority to execute this Undertaking on behalf of the Parties is **annexed** to this Undertaking, and shall not, to the best of its knowledge:

i. require any consent or approval not already obtained;
ii. violate any Applicable Law presently in effect and having applicability to it;
iii. violate the memorandum and articles of association, by-laws or other applicable organizational documents thereof;
iv. violate any clearance, permit, concession, grant, license or other governmental authorization, approval, judgment, order or decree or any mortgage agreement, indenture or any other instrument to which such Party is a party or by which such Party or any of its properties or assets are bound or that is otherwise applicable to such Party; or
v. create or impose any liens, mortgages, pledges, claims, security interests, charges or Encumbrances or obligations to create a lien, charge, pledge, security interest, encumbrances or mortgage in or on the property of such Party, except for encumbrances that would not, individually or in the aggregate, have a material adverse effect on the financial condition or prospects or business of such Party so as to prevent such Party from fulfilling its obligations under this Undertaking;

4.3. this Undertaking is the legal and binding obligation of such Party, enforceable in accordance with its terms against it; and

4.4. there is no litigation pending or, to the best of such Party's knowledge, threatened to which it or any of its Affiliates is a party that presently affects or which would have a material adverse effect on the financial condition or prospects or business of such Party in the fulfilment of its obligations under this Undertaking.

**5. Termination**

This Undertaking shall be effective from the date hereof and shall, (i) in case the Bidding Consortium is declared the Successful Bidder, continue in full force and effect from the date hereof until the end of the Contract Period (ii) in case the Bidding Consortium is not declared the Successful Bidder, continue in full force and effect from the date hereof until the date of return of the Earnest Money Deposit by the BTD to the Bidder.

**6. Joint and Several Liabilities**

6.1. The Parties hereby undertake that they shall be jointly and severally responsible and liable for compliance with the terms and conditions of the RFP and the representations, warranties, covenants, undertakings and obligations of the Bidding Consortium or any of its members, pursuant to the RFP, including without limitation the Bidding Consortium's Proposal and this Undertaking.

6.2. Without prejudice to the generality of the foregoing, the Bidding Consortium agrees to the forfeiture of the EMD / PBG under the circumstances set forth in the RFP which shall include without limitation any breach of any term by any Party to this Undertaking.

6.3. The Parties hereby undertake that in the event the Bidding Consortium is the Successful Bidder, they shall be jointly and severally liable for ensuring the due and timely performance and compliance by the Bidder of the terms and conditions of the Contract Agreement including without limitation in respect of its representations, warranties, covenants, undertakings and obligations hereunder.

6.4. The Parties hereby undertake that they shall be jointly and severally liable for ensuring that all the conditions set out in the RFP document is complied with, including number of proposals, management restrictions etc., failing which they will be liable for penalty as per SLAs defined in the RFP or withdrawal of LOI and forfeiting of EMD or termination of contract and forfeiting PBG as applicable.

**7. Miscellaneous**

7.1. This Undertaking shall be governed by laws of India. Courts situated at Patna / Patna High Court shall have exclusive jurisdiction in respect of this Undertaking.

7.2. The Parties acknowledge and accept that this Undertaking shall not be amended by the Parties without the prior written consent of the BTD.

IN WITNESS WHEREOF THE PARTIES ABOVE NAMED HAVE EXECUTED AND DELIVERED THIS UNDERTAKING IN FAVOR OF THE BTD AS OF THE DATE FIRST ABOVE WRITTEN.

| | |
|---|---|
| For and on behalf of<br>Party of the FIRST PART by:<br>Signature, Name, Designation and Address | for and on behalf of<br>Party of the SECOND PART by:<br>Signature, Name, Designation and Address |

In the presence of:
1.
2.

[**Note:** The mode of the execution of the Joint Bidding Undertaking should be in accordance with the procedure, if any, laid down by the Applicable Law and the charter documents of the executants(s) and when it is so required, the same should be under common seal affixed in accordance with the required procedure.]

**<Attach applicable Annexures to the Jt. Bidding Agreement including Power of Attorney>**

# Annexure Set II – Envelope A

## 1. Format 1: Technical Proposal Covering Letter

<< To be printed on Bidder (Lead Bidder in case of consortium) Company's Letter Head and Signed by Authorised Signatory>>

Date:

To,
State Transport Commissioner,
2nd Floor, Visvesvaraya Bhawan,
J L N Marg Patna - 800001
Tel: 0612-2547448
Email ID: stcbihar@bihar.gov.in

Dear Sir,

**Subject: Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis– Technical Proposal Covering Letter**

**Ref: RFP No.: _____ Dated _____**

Having examined the RFP, the receipt of which is hereby duly acknowledged, we, the undersigned, offer to provide the professional services as required and outlined in the RFP for the aforementioned Project.

1. We attach hereto our response Technical Proposal as required by the RFP.
2. We have examined and have no reservations to the Bidding Documents, including Addenda/Corrigenda issued in accordance with Instructions to Bidders;
3. We meet the eligibility requirements as per Instructions to Bidders
4. We are not participating, as a Bidder, in more than one Bid in this Bidding process in accordance with Instruction to Bidders
5. We offer to supply in conformity with the RFP and in accordance with the Delivery Timelines, Terms of the RFP and SLAs specified in the RFP all the services as per RFP defined requirements.
6. We confirm that the information contained in this response or any part thereof, including its exhibits, and other documents and instruments delivered or to be delivered to BTD is true, accurate, verifiable and complete. This Proposal includes all information necessary to ensure that the statements therein do not in whole or in part mislead BTD in its evaluation and selection process.
7. We give you the undertaking that information being submitted as our Bid is correct and true, and that any false information shall lead to disqualification at any stage and further actions as BTD deems fit.
8. We hereby authorize the BTD to seek references from our Bankers, Financial Institutions, Firms, Corporations or persons in regard to pertinent information deemed necessary and required by the BTD, anytime during the bid evaluation and contract period.
9. We fully understand and agree to comply that on verification, if any of the information provided here is found to be misleading the evaluation and selection process, we are

liable to be disqualified from the selection process or be terminated during the Contract, if selected to sign and execute the Contract.

10. We (the Bidder including all members of Consortium) hereby certify that we have no conflicts of interest.
11. We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in any activities which is in contravention of the Code of Integrity or engage in any type of fraud and corruption and we will strictly observe the laws against fraud and corruption in force within the country.
12. We agree for unconditional acceptance of all the terms and conditions set out in the RFP document but for the suggestions provided by us along with our Proposal and also agree to abide by this Bid for a period of 180 days from the date of opening of Commercial Bids by BTD.
13. We hereby certify that we have fulfilled our obligations to pay all such taxes as payable to the Central Government or the State Government or any local authority.
14. We hereby declare that in case the Contract is awarded to us, we shall submit the Performance Security the format prescribed in the RFP within the specified time as per the RFP Terms.
15. We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed;
16. We agree that you are not bound to accept any Bid you may receive. We also agree that you reserve the right in absolute sense to reject all or any of the products/ services specified in the Bid. We understand that you are not bound to accept the lowest evaluated Bid or any other Bid that you may receive.
17. We accept the provisions in the Contract in regard to amicable as per procedure defined under Clause 22, Governing and Dispute Resolution, under Part II of the RFP.
18. It is hereby confirmed that I/We are entitled to act on behalf of our company/ corporation/ firm/ organization and empowered to sign this document as well as such other documents, which shall be required in this connection.

Technical Proposal, as per format provided in the RFP, is enclosed.

Dated this _____ Day of _____ 20--

Thanking you,
Yours faithfully

(Signature of the Authorized signatory of the Bidder)
(In the capacity of)

(Name)

Duly authorized to sign the Tender Response for and on behalf of:

(Name and Address of Company) Seal/Stamp of bidder

## 2. Format 2: Un-priced Bill of Material

<< To be printed on the Bidder (Lead Bidder in case of Consortium)'s Letter Head and shall be signed by Authorized Signatory>>

**TO WHOMSOEVER IT MAY CONCERN**
**Un-priced Bill of Material**

**Subject: Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement of Road Safety at identified high-risk and risk-density corridors and critical junctions for Bihar State on PPP basis– Un-priced Bill of Material**

**Ref: RFP No.: _____ Dated _____**

Please find attached detailed Un-priced Bill of Material for the project.

| Sr. | Item | Unit of Measurement | Quantity | Make | Model, Version Details (if applicable) | Manufacturer Authorization Form Submitted (Yes / No) | Compliance Submitted (Yes / No) |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| **Additional line items over the above BoQ, if any, to deliver the entire scope as per RFP** | | | | | | | |
| **Sr.** | **Item** | **Unit of Measurement** | **Quantity** | **Make** | **Model, Version Details** (if applicable) | **Manufacturer Authorization Form Submitted (Yes / No)** | **Remarks (Reason for additional line item)** |
| | | | | | | | |

**Note**: For detailed reasoning for additional line item, Bidder may attach additional sheets and give reference in the above table.
"We confirm that there is no Alternate Proposal for any line items / same components, we understand and accept the clause."

The bidder shall mention only one quantity and Unit of Measurement (UOM) for each line item and quote each line item / same component from single OEM as part of this un-priced bill of material. Any bids, which propose multiple options in terms of quantity, UOM and OEM/ Type for each line item / same component shall be summarily rejected. For example, in case of VMS, the bidder submitting two options of VMS with different options for quantity, UOM and OEM/ Type shall be summarily rejected."

Thanking you,
Yours faithfully

(Signature of the Authorized signatory of the Bidder)
Name and Designation:
Seal:
Date:
Place / Business Address:

## 3. Format 3: Profile of Proposed Project Team

<< To be printed on Bidder (Lead Bidder in case of consortium) Company's Letter Head and Signed by Authorized Signatory>>

Date:

To,
State Transport Commissioner,
2nd Floor, Visvesvaraya Bhawan,
J L N Marg Patna - 800001
Tel: 0612-2547448
Email ID: stcbihar@bihar.gov.in

**Subject: Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis- Team Deployment Undertaking**

**Ref: RFP No.: _____ Dated _____**

Dear Sir,

We, having read and examined in detail all the bidding documents for **Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis** do hereby propose to provide our services as specified in the RFP.

In order to submit the bids and execute the project, it is understood that we are required to give details of the team being deployed as part of this initiative. Accordingly, we are providing the details of the team, and also the CVs, as per the format prescribed in the RFP are attached.

**In this regard, we understand and comply with the following:**

i) Officials belong to our company
ii) We are solely responsible for the supervision and control of the personnel deployed in the Project and for payment of such personnel's compensation, including salary, withholding of income taxes and social security taxes, worker's compensation, employee and disability benefits and the like and shall be responsible for all obligations of an employer subject to Applicable Law and Terms and Conditions of the RFP.

The same team shall be deployed, in the event of signing of the contract, and the members of the team shall not be replaced, without prior approval of BTD.

Please find below, details of Project Team proposed to be deployed for executing of this project.

**List of Key Personnel (as per RFP Clause 2 under "Project Activities"**

| Sr. | Name of Key Personnel | Area of Expertise | Position/Task assigned for this job | Qualification | Years of Experience | Certification | Relevance | Compliance Check (Yes / No) |
|---|---|---|---|---|---|---|---|---|
| 1. | | | Project Manager | | | | | |
| 2. | | | Other manpower as defined | | | | | |

**Compliance to Manpower Qualifications (as per RFP Clause 2 under "Project Activities"**

| Sr. No. | Manpower Designation | Minimum Qualifications | Compliance Check (Yes/no) |
|---|---|---|---|
| **1.** | Project Manager | | |
| | | | |
| | | | |

NOTE:
1 Names of only the Key Personnel shall be mentioned in the table above. If more than one Key Personnel is provided for a particular role, all the names shall be mentioned in separate rows.
2 One Key Personnel can be assigned more than one role.
3 The compliance to manpower qualifications of Key Personnel shall be mentioned as per formats below.

**Curriculum Vitae (CV) of Key Personnel (of minimum 5 resources as per requirement defined in Clause 13.3 under "Instruction to Bidders")**

| | | |
|---|---|---|
| **1.** | **Proposed Position** | |
| **2.** | Name of Staff | |
| **3.** | Current Job Title/ Designation | |
| **4.** | Date of Birth | |
| **5.** | Nationality | |
| **6.** | Education | **Sr.** / **Degree Obtained** / **University/ Institute** / **Dates** |
| **7.** | Trainings and Certifications | |
| **8.** | Employment Record | |
| **9.** | Number of years with the Bidder (Any One Member, in case of Consortium) | |
| **10.** | Membership of Professional Associations | |
| **11.** | Other Training | |
| **12.** | Countries of Work Experience | |

| | | |
|---|---|---|
| **13.** | Languages | Sr. \| Language \| Read \| Write \| Speak<br>\| \| \| \| \| \|<br>\| \| \| \| \| \| |
| **14.** | Detailed Tasks Assigned (for ITMS project) | |

**15. Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned**

| | |
|---|---|
| **Name of the Assignment/Job or project** | |
| **Year** | |
| **Location** | |
| **Employer** | |
| **Main Project Features** | |
| **Position Held** | |
| **Activities Performed** | |

***Bidder must insert additional tables as per requirement**

**Certification:**
**I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience. I understand that any wilful miss-statement described herein shall lead to my disqualification or dismissal, if engaged.**
**Date:**
**Place:**

NOTE: For Key Personnel, it is mandatory to provide name of proposed resource along with details desired as per format given above. **CV for every resource is to be submitted in this format only.**

**Escalation Chart for the entire Project Duration**

{Bidder to insert Escalation Chart here}

Thanking you,

(Signature, Name and Designation of the Authorized signatory of the Bidder)
Name:
Designation:
Seal:
Date:
Place:
Business Address:

## 4. Format4: Details of Solution Partners

<< To be printed on Bidder (Lead Bidder in case of Consortium) Company's Letter Head and Signed by Authorized Signatory>>

Date:

To,
State Transport Commissioner,
2nd Floor, Visvesvaraya Bhawan,
J L N Marg Patna - 800001
Tel: 0612-2547448
Email ID: stcbihar@bihar.gov.in

**Subject: Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis - Details of Solutions Partners**

**Ref: RFP No.: _____ Dated _____**

Dear Sir,
Please find below the list of all the Key Solution Partners of <<<Bidder Name>>> for the project "Design, Supply, Implement, Integrate and Commission Electronic Enforcement of Road Safety at identified high-risk and risk-density corridors and critical junctions for Bihar State"

| Sr. No. | Name of Solution Partner | List of Services and Solutions by each partner |
|---|---|---|
| **1.** | <<Bidder>> | 1.<br>2. |
| **2.** | Consortium Member | 1.<br>2. |
| **OEMs** | | |
| **1.** | | 1.<br>2. |
| **2.** | | 1. |
| **Sub-Contractors** (subject to clause 13 under "Administrative Aspects") | | |
| **1.** | | 1.<br>2. |
| **2.** | | 1. |

Thanking you,

Signature: << Authorized Signatory>>
Name:
Designation:
Seal:
Date:
Place:
Business Address:

## 5. Format 5: Undertaking - Technical Support Arrangement with OEM

<< To be printed on Bidder (Lead Bidder in case of Consortium) Company's Letter Head, signed by Authorized Signatory>>

Date:

To,
State Transport Commissioner,
2nd Floor, Visvesvaraya Bhawan,
J L N Marg Patna - 800001
Tel: 0612-2547448
Email ID: stcbihar@bihar.gov.in

**Subject: Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis- Technical Support Arrangement with OEM**

**Ref: RFP No.: _____ Dated _____**

Dear Sir,

We, the undersigned, having read and examined the requirements of the project, have licensed all our products / COTS that shall complement the solution in the best possible way and that all the requirements shall be fulfilled either by the products / COTS or through customizations.

**We have/shall enter(ed) into requisite arrangements with the OEMs for the following:**

- **Professional Services and Technical Support:** We confirm that we have chosen the products from OEMs who have professional support services in India (or through their authorized channel partners) as per requirements of the RFP. These professionals shall be made available physically as and when required for supporting all technical aspects of project implementation, solution maintenance and support during entire period of Project including extended period if any as stated in RFP.
- **Vetting of solution**: We confirm that OEM's support shall be taken for vetting of the technical solution as proposed and implemented.

It is hereby confirmed that I/We are entitled to act on behalf of our company and empowered to sign this document as well as such other documents, which shall be required in this connection.

**Summary of Arrangement with OEMs for implementation and operations support**

| Sr. | OEM Name and Registered Office | Product | Arrangement for Technical Support |
|---|---|---|---|
| | | | |
| | | | |

(Signature of the Authorized signatory of the Bidder)
Name and Designation:
Seal:
Date:
Place:
Business Address:

## 6. Format 6: Manufacturer Authorization Form (MAF) from OEM

<< To be printed on OEM's Letter Head and Signed by Authorized Signatory>>
<for all the products for which MAF is mandated in the below table>

Date:

To,
State Transport Commissioner,
2nd Floor, Visvesvaraya Bhawan,
J L N Marg Patna - 800001
Tel: 0612-2547448
Email ID: stcbihar@bihar.gov.in

Dear Sir,

**Subject: Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis- Manufacturer Authorization Form (MAF) from OEM**

**Ref: RFP No.: _____ Dated _____**

We, who are established and reputed developers / producers of _____ having development facilities at (*address of factory / facility)* do hereby authorize M/s _____ *(Name and address of Bidder)* to submit a Bid, and sign the contract with you against the above Bid Invitation.

| Sr. | Name of OEM / Solution Partner | Name of Software / Hardware / other components | Name of Make (OEM) | Model | Version | Planned End of Sale | Planned End of Support and spare parts availability | Remark |
|---|---|---|---|---|---|---|---|---|
| 1. | | | | | | | | |
| 2. | | | | | | | | |
| 3. | | | | | | | | |

- We hereby agree to the following with regards to the Solution, Products and services offered by us through the above firm against this Bid Invitation.
    - We extend full on-site guarantee and warranty
    - OEM Warranty for the offered product(s), is for **minimum Six Years** from the date of this letter.
    - We have read and understood the said RFP and the functional and technical requirements and the offered product(s), as mentioned above, is complying with the respective requirements.
    - Confirm that the offered product(s) is not likely to be declared as
        - End-of-sale will not be within next 24 months from the date of this letter
        - End-of-Support within next six years from the date of this letter
    - Confirm that the support including spares, patches, upgrades for the quoted products shall be available for the period of the Project.
    - We will provide all the necessary and latest security and version updates as applicable
    - We will provide any or all of the materials, notifications, and information

- Such Products as BTD may opt to purchase from OEM, provided, that this option shall not relieve OEM of any warranty obligations under the Contract; and
- in the event of termination of production of such Products:
- advance notification to BTD of the pending termination, in sufficient time to permit BTD to procure needed requirements; and
- Following such termination, furnishing at no cost to BTD, the operations manuals, standards and specifications of the Products, if requested.

- We duly authorize the bidder <Bidder name> to act on our behalf in fulfilling all installations, Technical support and maintenance obligations required by the contract.
- We have read and understood the General Financial Rules (GFRs), 2017 (including Global Tender Enquiry Amendment Rule 161(IV) dated 15 May 2020 and Amendment Rule 144 (xi) dated 23rd July 2020), all as amended from time to time, and we agree that we comply to the same as on date of this letter. We also agree, that we will bring to the notice of the Bidder and / or BTD as applicable from time to time in case of change of any status with respect to this.

We also confirm that we have an existing registered service / support centre in India at _____

OR

We also conform we shall establish registered service / support centre in India within 30 days of award of contract to the Bidder __<Name of the Lead Bidder>__.

Yours faithfully,
For and on behalf of M/s _____ (Name of the manufacturer / OEM)

Signature :
Name :
Designation :
Address :
Date :

Company Seal

Thanking you,

(Signature, Name and Designation of the Authorized signatory of the Bidder)

**List of Products for which MAF shall be mandatorily submitted:**

| Sr. | Product | MAF mandatory | OEM installation support compatibility and Pilot certification mandatory – for each unique product (Yes / No) |
|---|---|---|---|
| 1. | Local Processing Unit | **Yes** | **No** |
| 2. | Speed Radar | **Yes** | **Yes** |
| 3. | **All type of Camera** (including ANPR Camera, Evidence Camera, PTZ etc.) | **Yes** | **Yes** |
| 4. | Variable Messaging Signages | **Yes** | **Yes** |
| 5. | PA System | **Yes** | **Yes** |
| 6. | Pole, Cantilever Pole, Gantry, LED Pole | **Yes** | **Yes** |
| 7. | All UPS (field, TMC etc.) | **Yes** | **No** |
| 8. | Workstations | **Yes** | **No** |
| 9. | Servers (DC) | **Yes** | **Yes** |
| 10. | Storage (DC) | **Yes** | **Yes** |
| 11. | SLB and WAF (DC) | **Yes** | **Yes** |
| 12. | All network switches (DC, TMC, Field) | **Yes** | **Yes** |
| 13. | Rack and PDU (DC) | **Yes** | **No** |
| 14. | KVM Switch (DC) | **Yes** | **No** |
| 15. | ICCC application (along with all integrations) (for TMC) | **Yes** | **Yes** |
| 16. | GIS (if separate) | **Yes** | **Yes** |
| 17. | ITMS application | **Yes** | **Yes** |
| 18. | Video Analytics (VAS) | **Yes** | **Yes** |
| 19. | Video Management System (ViMS) | **Yes** | **Yes** |
| 20. | Enterprise Management System | **Yes** | **Yes** |
| 21. | Cloud Service Provider (DR) | **Yes** | **No** |
| 22. | Application Availability, Security and Performance (DR) | **Yes** | **No** |

Any other product / component for which MAF may be mandated by BTD during Technical Bid Evaluation shall be provided by Bidders.

Factory Acceptance Test (FAT) of all products listed above from Sr. 1 to Sr. 13 is mandatory. FAT of other products as per directions of BTD shall be provided for.

## 7. Format 7: Detailed Technical Specifications and Compliance Matrix

<< To be printed on Bidder (Lead Bidder in case of Consortium) Company's Letter Head and Signed by Authorized Signatory>>

**TO WHOMSOEVER IT MAY CONCERN**

**Technical Specification Compliance Matrix**

**Subject:** Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis– Technical Specifications and Compliance Matrix.

**Ref: RFP No.: _____ Dated:_____**

Please find below, duly filled Technical Compliance Matrix. We understand, the following are the minimum technical specifications, and the make and model proposed for the project shall ensure to meet all the requirements and the quality as described in the RFP, and that in case of higher specification required to fulfil the project requirements, shall be done by us at no extra cost. **We have also submitted datasheet and other Product Documentation for each and every product.**

All these components are with OEM Warranty / support from MSI for limited period. We agree that we will replace products with same or better make and model as per directions of BTD, if so required, anytime during the project period, to maintain the SLA requirements..

**If there is any deviation to the Minimum specifications, we have highlighted the same with appropriate remarks (in a separate remarks column) for consideration of the BTD. We understand BTD may or may not agree to the deviation, and we agree to provide other product as per directions of BTD to meet or exceed the minimum specifications.**

**We understand and agree that all the civil components including island, pole, cantilever, gantry, signage boards etc. so installed under the project, shall have the design and installation approved by the Structural Engineer appointed by BTD, and we agree to make necessary payment to such structural engineer as per directions of BTD.**

In case of any product is required to be replaced, we agree to replace it with the higher technical specifications, preferably of the same make. In case the make requires to be changed, the same shall be done only after reasonable justifications and undertaking as per directions of BTD. In such case, MSI shall ensure the technical qualification of the new proposed OEM and proposed components of the new OEM, matches or exceeds the required technical specifications.

### 7.1. Civil / Non – IT Specification

i. **Road Marking** with Hot Applied Thermoplastic Compound with Reflectorizing Glass Beads on Bituminous Surface (Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorizing glass beads @ 250 gms. per sqm area, thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35. The finished surface to be level, uniform and free from streaks and holes.)

ii. **CCTV Signage**

| # | Parameter | Minimum Specifications | Compliance (Yes / No) |
|---|---|---|---|
| **1.** | Size | Board Width = 12" / 18" | |
| **2.** | Plate Material | Corrosion resistant Aluminum Alloy as per IRC 67:2001 (Code of Practice for Road signs) or latest specification | |
| **3.** | Plate Thickness | Minimum 1.5 mm | |
| **4.** | Retro-Reflective sheeting for sign-plate | Weather-resistant, having colour fastness | |
| **5.** | Other Specifications | As per IRC 67:2001 (Code of Practice for Road signs) | |
| **6.** | Mounting | Can be mounted on wall or pole *(Appropriate mounting brackets to be provided)* | |
| **7.** | Design | Yellow Rectangular or circular plate with message as directed by BTD<br>Eg. "You are under CCTV Surveillance" | |
| **8.** | Message Language | As per the requirement the message can be in English or Hindi | |

**iii. Pole**

| Sr. | Parameter | Minimum Specifications | Compliance (Yes / No) |
|---|---|---|---|
| | **Make** | | |
| | **Model** | | |
| **1.** | Pole Type & Pole Dimensions | Hot Dip Galvanized after Fabrication with Silver coating of 86-micron standard (IS 2713 (1980), IS :2629)<br>7-10 mtrs 2'/3' MS Poles with concrete foundation | |
| **2.** | Height | 7-10 mtrs (as per site requirement) | |
| **3.** | Pole Bottom OD | 150 - 180 mm | |
| **4.** | Pole Top OD | 60- 75 mm | |
| **5.** | Pole Thickness | 5 mm | |
| **6.** | Pole Shape | Round / Octagonal as per site requirement | |
| **7.** | Breakway Base Required | Yes | |
| **8.** | Pole Base Bolt Dimensions | 180 mm | |
| **9.** | Pole Base Depth | 1000 mm | |
| **10.** | Pole Number of Arms | 1 | |
| **11.** | Pole Wing Load in Wind velocity KMPH | Minimum 60 KMPH | |
| **12.** | Material | Rustproof Materials to be used for Harsh weather in outdoor use. | |
| **13.** | Provision of Electrical Ground | Yes | |

| Sr. | Parameter | Minimum Specifications | Compliance (Yes / No) |
|---|---|---|---|
| **14.** | Provision for Cable Routing | Yes | |
| **15.** | Mounting facilities | To mount Cameras. | |
| **16.** | Pole Pit | 600 X 900 X 1500 | |
| **17.** | Bottom Base Plate | Minimum base plate size: 30 x 30 x 1.5 cm | |
| **18.** | Base Foundation | Concrete base foundation to be used | |
| **19.** | Camera Stand | Required in accordance with the Pole specs and similar rustproof material | |
| **20.** | Junction Box | Each Pole will have junction box IP 55 rated, installed at 3-meter height. | |
| **21.** | Foundation | Ensure vibration free erection (basic aim is to ensure that video feed quality is not impacted due to winds in different climatic conditions). | |
| **22.** | Protection | Lightning arrestors with proper grounding. Protect pole from any vehicle hit. | |
| **23.** | Sign Board | A sign board describing words such as "This area under surveillance" and with serial number of the pole. | |
| **24.** | Certifications | BS EN ISO 1461/y IS: 875/1987 | |

**iv. Gantry**

| Sr. | Parameter | Minimum Specifications | Compliance (Yes / No) |
|---|---|---|---|
| | **Make** | | |
| | **Model** | | |
| **1** | Gantry Size | • MS Gantry with service path on the top of the gantry<br>• Supported at spans of 1500cm at side and central medians and using B Class MS pipes conforming to IS 1239 or equivalent and as per approved shop drawing furnished by the supplier.<br>• 6-10 Meters (or higher), as- per-requirements for different types of cameras & Site conditions - 250 NB vertical post<br>• Clear height of 6m from the bottom of the board to the ground level<br>• ~40 to 45 meter (as per variable length of the entire YCEW) long for full length 6 lanes and 20 to 22 meter for half-length 3 lanes as per requirements 250 NB horizontal beam pole<br>(to be checked by bidder during Survey) | |
| **2** | Gantry type | • Gantry Capacity: for erecting all sets of sensors, solar panels, VMS etc.<br>• Serviceable gangway capacity: Structurally safe to simultaneously accommodate a maximum of two crew personnel to traverse on the gantry top for installation / maintenance without affecting the ongoing traffic. | |

| Sr. | Parameter | Minimum Specifications | Compliance (Yes / No) |
|---|---|---|---|
| | | • Structural drawings submitted for approval shall be duly certified by a qualified and approved Registered Structural Engineer and shall conform to relevant BIS specifications / MoRTH specs.<br>• 150 x 150 x 6mm square hollow sections for making box type structure of circular shape overhead gantry structure with hot dip galvanizing along with suitable foundation bolt sets made up of high tensile sheet confirming to BSEN 100025 or equivalent suitable for mounting of DMS, other sensors etc. along with horizontal b<br>• x type truss structure.<br>• Galvanization thickness for the cantilever structure should be avg. 85 microns IS:2629; Fabrication in accordance with IS-2713 (1980)<br>• Painted/powder-coated to an appropriate minimum coating thickness. | |
| **3** | Mounting facilities | To mount ANPR, CCTV Camera, Sensors, Switch, Junction Box, VMS, solar panels etc. | |
| **4** | Pipes, Tubes | Suitably designed holes on the sides to allow for electrical cables to enter or exit the pole undamaged. All wiring must be hidden, through tubes/pipes. No wires shall be visible from outside. | |
| **5** | Foundation | • Casting of Civil Foundation with foundation bolts, to ensure vibration free erection (basic aim is to ensure that video feed quality is not impacted even in at full optical zoom due to winds in different climatic conditions).<br>• Expected foundation depth of min. 100cms. Deflection due to wind shall not exceed 0.1 degrees<br>• Bottom portion of gantry shall be treated for corrosion resistance in accordance to the installation site.<br>• Please refer to earthing standards mentioned in the RFP document. | |
| **6** | Protection | Lightning arrester shall be provided, to protect all field equipment mounted on pole. | |

**v. Junction Box**

| Sr. | Minimum Specifications | Compliance (Yes / No) |
|---|---|---|
| | **Make:** | |
| | **Model:** | |
| **1.** | • IP55 or better junction box<br>• Junction Box design should ensure to keep the temperature within suitable operating range for equipment's and should also avoid intentional water splash and dust intake and dust intake | |

| Sr. | Minimum Specifications | Compliance (Yes / No) |
|---|---|---|
| | • Minimum JB size 900 mm x 900 mm x 600 mm (Floor mounted) and 535 mm x 600 mm x 600mm (Pole Mounted) suitable for outdoor application, suitable for use in extreme weather conditions. Bidder may propose one or more JB to ensure all the components in the fields are accommodated as per the RFP terms. The bidder shall provision capacity at a minimum of 50% above the current requirements to ensure scalability and accommodate future growth.<br>• Material Thickness: Min 1.2 mm<br>• Pole mounted type having all mounting accessories with Compact LIU - 12 Core fully loaded with Splice box, Tray, Adaptor, Pigtail -6 Nos, Patch cord-3 Nos and Cable spool, Splicing, I/c termination etc. complete as required for connectivity to single mode fiber cable Surge protection device along with other necessary protection & isolation switchgears | |
| **2.** | The box shall have customized locking mechanism. | |
| **3.** | The box shall have wire management (including OFC, power, Ethernet Loop). | |
| **4.** | Box shall fit all the field equipment (Media Converter / Switch, Power Supply, LIU, PoE injector, Patch Panels etc.) with proper mounting arrangements. | |
| **5.** | The door shall be surface mounted with 130° opening. It shall have concealed removable hinges with captive pin. Hinges can be mounted to allow left- or right-hand opening. | |
| **6.** | Sealing shall be ensured by an injected one-piece polyurethane gasket or better. | |
| **7.** | Size, as per site requirement - shall accommodate all the equipment installed on the field for any location. | |
| **8.** | The junction box shall be of SS construction complete with SS mounting arrangements, accessories, bolts, nuts, washers, screws, etc. | |
| **9.** | JB shall have power isolation provisions using Double pole MCB for incomers & outgoings in addition to RCCB's. | |
| **10.** | JB shall have terminal blocks (WAGO) for power wiring & for connection of communication wires (part of OFC cable), properly segregated. | |
| **11.** | All individual components in the Junction Box shall be provided with clear & legible printed acrylic labels indicating the component type. | |
| **12.** | The junction box shall also have a drawing pocket complete with all as-built drawings for the relevant Junction Box. | |
| **13.** | All cable entries shall be through double compression SS cable glands (only from the bottom of Junction Box). | |
| **14.** | Unused cable entries shall be provided with SS plugs. | |
| **15.** | Canopy to completely cover the Junction Box from rainfall (in any direction). The Canopy shall have suitable coverage. | |

**vi. Cable Laying Requirements**

| # | Feature |
|---|---|
| **1** | 40M HDPE conduit for OFC cable: it should have Low Coefficient of Friction |

| | |
|---|---|
| | Temperature Resistance, Ultraviolet (UV) protection<br>Should meet all the requirements of TEC Specifications as well as IS 4984-1995<br>Permanently lubricated HDPE Telecom Ducts have special lubricated compound on Inner Side for Conveying Optical Fibre cables with extremely low friction |
| **2** | Cable to be laid inside HD pipe in Median, at a depth of 1.5- 2 feet below ground. For bridges / culverts, it should be wall clamped. |

### 7.2. Common Specifications for IT Field components

*(below specifications applicable for all IT field components (7.3) unless explicitly specified otherwise)*

| # | Parameter | Minimum Specifications | Compliance for all components (Yes / No) |
|---|---|---|---|
| **1.** | Operating & Storage Humidity | 95% or less (non-condensing) | |
| **2.** | Operating temperature | 10 Deg C to 60 Deg C | |
| **3.** | Power Supply | 24 VDC ± 20% / 220 to 240 VAC<br><br>Preferably powered through POE | |
| **4.** | Power Consumption | < 30 W per equipment<br><br>Power over Ethernet (POE) (802.3 af) wherever application | |
| **5.** | RoHS compliant certificate | RoHS compliant certificate with third party test report (for components with battery / power source) | |
| **6.** | Protection Level | Minimum IP65 or better | |
| **7.** | Protection | The field equipment should come with concealed cabling and connectors, with no exposed wiring or connector. | |
| **8.** | | The housing should be of composite or Stainless-Steel Material without heater/fan. | |
| **9.** | Security | All IT equipment on field should have Password protection, IP address Filtering | |
| **10.** | Communication Protocol | As per requirement<br>IPv4 / IPv6 / NTCIP /RJ-45 / RS232 / RS485 / Ethernet etc. | |
| **11.** | Body Colour | Traffic Aspects, Timer etc. – Light Grey / Black<br>Others: White / Light Grey / Black | |
| **12.** | Approvals / Certifications | EN / CE / UL / BIS / IRC | |

#### i. Bullet/Fixed Evidence Camera

| # | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| **1** | Camera Type | 4MP IR Bullet Camera | |
| **2** | Image Sensor | 1/2" CMOS or Better | |
| **3** | Lens | 12 ~ 45mm VF Lens or Better, P-Iris | |
| **4** | Total pixels | 2688 x 1520 | |

| # | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| **5** | Frames per second | Min 60 fps | |
| **6** | Wide Dynamic Range | 120 dB | |
| **7** | Illumination | Color: 0.04 lux<br>B/W: 0.01 lux<br>IR: 0.0 lux | |
| **8** | Image Stabilization | Electronic image stabilization (gyro based) | |
| **9** | Video Compression | H.265; H.264; M-JPEG | |
| **10** | Shutter Speed | AES, 1/25 to 1/15,000 | |
| **11** | Analytics | The solution should offer following triggers such as Object in Field, Line crossing, Enter /leave field, Loitering, follow route, Counting, Occupancy, Similarity search, Object stopping or starting to move, wrong way detection, Tracking Mode- Base Tracking 2D, Tamper Detection, Attribute based trigger on basis of Duration, Size, Direction, Color; Object classes like persons, Bikes, Cars & Trucks. Camera should be able to count number of people with minimum 60 people at a time in scene in both moving and static condition with more than 90%accuracy. It should not give false alarms caused by challenging environment such as rain, wind (moving trees), water reflection, hails shadows etc. Camera should also reliably classify person, vehicle in scene.<br><br>The system should be able to simultaneously trigger any 08 user defined rules from above list on each camera. If Edge based analytics are not available in camera, then the same to be given in server-based analytics. POC is mandatory to demonstrate above features. | |
| **12** | Memory card slot | Micro SD/SDHC/SDXC card support min 1.5 TB or more (Single Slot) | |
| **13** | Field of view | Field of View tele (H x V) 9° x 5°<br>Field of View wide (H x V) 42° x 24° | |
| **14** | IR Range | Min 120 Mtrs IR or Higher | |
| **15** | Digital Noise reduction | iDNR | |
| **16** | Alarm Inputs & Outputs | 1 I/P & 1 O/P | |
| **17** | Audio IN/OUT | Yes | |
| **18** | ONVIF Confirmation | ONVIF profile S, G, M & T | |
| **19** | Environment / Impact rating | IP66 / IP67, NEMA 4X and IK10 | |
| **20** | Material | Aluminium Housing | |
| **21** | Defog | Yes | |

| # | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| **22** | Data security | TPM Module RSA 4096-bit, X.509, AES 256, TLS 1.3 Encryption, XTS-AES, SHA-1, SHA-256, signed firmware, secure Boot | |
| **23** | Power | POE and 12V/24V power supply | |
| **24** | Operating Temperature | -50 ºC to +50 ºC<br>10% to 90% relative humidity (non condensing) | |
| **25** | Certification | CE, UL, FCC, BIS, STQC (BIS-ER), NDAA & TAA | |
| **26** | MTBF | >320000 hours | |
| **27** | Warranty | 5-year OEM warranty | |

### ii. ANPR Box Camera

| # | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| **1** | Camera Type | 4MP IR Bullet Camera | |
| **2** | Image Sensor | 1/2" CMOS or Better | |
| **3** | Lens | 12 ~ 45mm VF Lens or Better, P-Iris | |
| **4** | Total pixels | 2688 x 1520 | |
| **5** | Frames per second | Min 60 fps | |
| **6** | Wide Dynamic Range | 120 dB | |
| **7** | Illumination | Color: 0.04 lux<br>B/W: 0.01 lux<br>IR: 0.0 lux | |
| **8** | Image Stabilization | Electronic image stabilization (gyro based) | |
| **9** | Video Compression | H.265; H.264; M-JPEG | |
| **10** | Shutter Speed | AES, 1/25 to 1/15,000 | |
| **11** | Analytics | The solution should offer following triggers such as Object in Field, Line crossing, Enter /leave field, Loitering, follow route, Counting, Occupancy, Similarity search, Object stopping or starting to move, wrong way detection, Tracking Mode- Base Tracking 2D, Tamper Detection, Attribute based trigger on basis of Duration, Size, Direction, Color; Object classes like persons, Bikes, Cars & Trucks. Camera should be able to count number of people with minimum 60 people at a time in scene in both moving and static condition with more than 90%accuracy. It should not give false alarms caused by challenging environment such as rain, wind (moving trees), water reflection, hails | |

| # | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| | | shadows etc. Camera should also reliably classify person, vehicle in scene. ANPR detection feature enabled by loading the respective license of the same camera OEM at the edge.<br><br>The system should be able to simultaneously trigger any 08 user defined rules from above list on each camera. If Edge based analytics are not available in camera, then the same to be given in server-based analytics. POC is mandatory to demonstrate above features. | |
| **12** | ANPR Feature | LPR System shall detect and read license plates on moving vehicles. The license plate information shall be transmitted in real time. | |
| | | The system shall perform OCR (optical character recognition) of the license plate characters (English alphanumeric characters in standard fonts) | |
| | | The LPR software shall run on camera edge to avoid any time lag and performance due to network disconnection, bandwidth constraints, etc. | |
| | | Investigation for a specific car (based on the license plates number) using text search feature | |
| | | The system should provide advanced and smart searching facility of License Plates from the database. There should be an option of searching number plates almost matching with the specific number entered (up to 1-and 2-character distance). | |
| | | The system shall have options to search historical records for post event analysis with license plate and date time combinations | |
| **13** | Memory card slot | Micro SD/SDHC/SDXC card support min 1.5 TB or more (Single Slot) | |
| **14** | Field of view | Field of View tele (H x V) 9° x 5°<br>Field of View wide (H x V) 42° x 24° | |
| **15** | IR Range | Min 120 Mtrs IR or Higher | |
| **16** | Digital Noise reduction | iDNR | |
| **17** | Alarm Inputs & Outputs | 1 I/P & 1 O/P | |
| **18** | Audio IN/OUT | Yes | |
| **19** | ONVIF Confirmation | ONVIF profile S, G, M & T | |
| **20** | Environment / Impact rating | IP66 / IP67, NEMA 4X and IK10 | |
| **21** | Material | Aluminium Housing | |
| **22** | Defog | Yes | |

| # | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| **23** | Data security | TPM Module RSA 4096-bit, X.509, AES 256, TLS 1.3 Encryption, XTS-AES, SHA-1, SHA-256, signed firmware, secure Boot | |
| **24** | Power | POE and 12V/24V power supply | |
| **25** | Operating Temperature | -50 ºC to +50 ºC<br>10% to 90% relative humidity (non-condensing) | |
| **26** | Certification | CE, UL, FCC, BIS, STQC (BIS-ER), NDAA & TAA | |
| **27** | MTBF | >320000 hours | |
| **28** | Warranty | 5-year OEM warranty | |

**iii. Pan, Tilt and Zoom cameras (PTZ) for Surveillance**

| # | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| **1** | Camera Type | 4MP IR PTZ Camera | |
| **2** | Image Sensor | 1/2" CMOS sensor | |
| **3** | Optical Zoom | 30x Optical,<br>6~8mm to 180~240 mm | |
| **4** | Digital Zoom | 16x | |
| **5** | Total pixels | 2688 x 1520 | |
| **6** | Stabilization | Electronic image stabilization | |
| **7** | Frames per second | Min 60 fps | |
| **8** | Wide Dynamic Range | 120 dB | |
| **9** | Illumination | Color: 0.1 lux<br>B/W: 0.01 lux<br>with IR: 0.0 lux or better | |
| **10** | Video Compression | H.265, H.264, M-JPEG | |
| **11** | Shutter Speed | Automatic Electronic Shutter (AES);<br>1/15,000 max; 1/1.875s min | |
| **12** | Analytics | The solution should offer following triggers such as Rule based alarms and tracking, Line crossing, Enter /leave field, Follow route, Loitering, Idle / removed object, People counting, Occupancy, Crowd detection, Condition change, Duration, Size, Aspect ratio v/h, Speed, Direction, Color, Similarity search, Object classes (Persons, Bikes, Cars, Trucks), Audio, Motion & Tamper detection, Camera should be able to count number of objects with minimum 60 objects at a time in scene in both moving and static condition with more than 90%accuracy. It should not give false alarms caused by challenging environment such as rain, wind (moving trees), water reflection, shadows etc, 3D Auto & Map based Calibration, Geo-location-based Object tracking. | |

| # | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| | | The Camera should be able to simultaneously trigger any 08 user defined rules from above list on all the cameras. If Edge based analytics are not available in camera, then the same to be given in server-based analytics. POC is mandatory to demonstrate above features. | |
| **13** | Memory card slot | Micro SD/SDHC/SDXC card support min 1.5 TB or more (Single Slot) | |
| **14** | Field of view | 58.5° to 2.1° | |
| **15** | No of Preset | 256 preset | |
| **16** | Tour | min 02 Guard tours | |
| **17** | PAN Range | 360° continuous | |
| **18** | Tilt Range | -90° to 5° (Auto-flip 180°) | |
| **19** | PAN Speed | 240°/s | |
| **20** | Tilt Speed | 100°/s | |
| **21** | IR Range | Min 300Mtrs or Higher (Integrated) + White Light LEDs | |
| **22** | Digital Noise reduction | Yes | |
| **23** | Alarm Inputs & Outputs | 1 I/P & 1 O/P | |
| **24** | Audio IN/OUT | 1 line IN & 1 line OUT | |
| **25** | ONVIF Confirmation | ONVIF profile S, G, M and T | |
| **26** | Environment / Impact rating | IP66 | |
| **27** | Material | Aluminium | |
| **28** | Defog | Yes | |
| **29** | Data security | TPM Module, RSA 4096 bit, AES /CBC 256-bit, X.509, AES/CBC 256, MD5, SHA-1 / 256 Checksum, TLS 1.2, TLS 1.3, XTS-AES, EAL6+ & FIPS140-3 level3 (Secure Element 3.0), Encryption, signed firmware, secure Boot | |
| **30** | Power | 24 VAC and POE+ | |
| **31** | Operating Temperature | -50 °C to +50 °C<br>10% - 90% non-condensing | |
| **32** | Wiper Facility | Yes (Integrated) | |
| **33** | Certification | CE, FCC, UL, BIS, STQC (BIS- ER) | |
| **34** | MTBF | >90,000 hours | |
| **35** | Warranty | 5-year OEM warranty | |

**iv. On-Prem AI Appliance**

| # | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| **1** | Compute | CPU / Processor - 32 cores or equivalent | |
| **2** | | CPU Frequency - 2 GHz or higher | |

| # | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| **3** | | Memory - 768 GB | |
| **4** | Storage | Total Storage - 15 TB | |
| **5** | | Storage Class - Enterprise SSD | |
| **6** | | Storage Redundancy - Software Defined Storage, Hot Spare & Checkpointing | |
| **8** | Network | Primary Network - 2 × 10 GbE | |
| **9** | | Management Network - 1 × 1 GbE | |
| **10** | GPU / AI | GPU Memory – 192 GB | |
| **11** | | GPU Performance / AIOPS - 8000 | |
| **12** | Power | Power Supply / Redundancy - Dual Redundant | |
| **13** | Virtualization Software | • Server shall be pre-installed with Host Operating System, required hardware drivers, hypervisor, virtualization software, AI/ML Tools, LLM as a Service, GPU as a Service, Data Ops, Mlops services and a centralized web based management console.<br>• The solution should be bundled with Virutliazation software license, k8 software license, AI/ML Tools, DataOps, MLOps licenses for the duration of the contract<br>• The vendor shall provide security patches, version upgrades, defect fixes for all the software components in the solution at no additional cost during the 3 years contract period. The vendor shall enable the patches/updates to work in an air-gapped environment<br>• The proposed solution shall support virtualization for compute, storage, and networking workloads.<br>• The Virtualization platform shall support creation and management of virtual machines and containerized workloads, there should not be any license limits on the number of virtual machines or containers provisioned on the hardware<br>• The solution shall include centralized infrastructure monitoring and management software.<br>• The management platform shall provide dashboard-based monitoring for CPU, GPU, memory, storage, thermal, and power metrics.<br>• The solution shall support role-based access control (RBAC) for administration and operations.<br>• The platform shall support remote lifecycle management including firmware and driver updates.<br>• The virtualization platform should support all common Linux and windows flavours of guest operating systems as virtual machines | |

| # | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| **14** | AI Stack | • The solution shall include pre-installed AI/ML software frameworks compatible with GPU acceleration.<br>• The solution shall support multi-GPU inference workloads.<br>• The platform shall support model serving for LLM and generative AI workloads.<br>• The solution shall support quantized inference including INT8 and INT4 precision modes.<br>• The solution shall support LoRA and/or QLoRA based fine-tuning workflows.<br>• The solution shall support Retrieval Augmented Generation (RAG) based architectures.<br>• The solution shall support concurrent multi-user AI inference workloads. | |
| **15** | GPU Infrastructure | • The server shall support enterprise-grade GPU accelerators optimized for AI/ML workloads<br>• The system shall support centralized GPU utilization and health monitoring. | |
| **16** | Security & Compliance | • The solution shall support deployment in air-gapped environments.<br>• The solution shall not require mandatory external cloud connectivity for operation.<br>• The platform shall support audit logging and event monitoring.<br>• The solution shall support secure authentication mechanisms including MFA/2FA.<br>• All data processing shall remain within the on-premises deployment environment. | |
| **17** | Monitoring & Operations | • The solution shall include centralized monitoring for hardware and software components.<br>• The solution should include monitoring of CPU, Memory, Network, Storage, GPU, CPU/GPU Temperature<br>• The monitoring platform shall provide alerting for hardware failures, thermal events, and resource thresholds (CPU, Memory, Storage, temperature)<br>• The solution shall support historical performance analytics and reporting.<br>• The solution shall support remote management and diagnostics.<br>• The solution should support automated patch management of OS, all other installed software tools and applications. | |
| **18** | Energy Management | • It should have an integrated Energy management and Monitoring Solution, enabling the solution to be deployed in existing data centre racks without any specialized cooling technologies. | |

**v. IR Illuminator**

| # | Parameters | Minimum Specifications | Compliance (Yes / No) |
|---|---|---|---|
| | **Make** | | |
| | **Model** | | |
| **1.** | Type | High efficiency ultimate SMD LED technology (Covert IR Wavelengths: 850 nm or 940 nm) | |
| **2.** | Distance | Upto 95-100 m | |
| **3.** | Construction | Rugged Weatherproof, IP 65 or better | |
| **4.** | Power | Input Power 230 VAC/POE+ | |
| **5.** | Other feature | Automatic On/Off facility<br>Beam pattern : sufficiently wider to Area of Interest. | |
| **6.** | White LED flash of low intensity to influence the driver behaviour | | |
| **7.** | Certification | CE & FCC and UL/BIS | |

As per design requirement to ensure night vision for all the Camera systems, ANPR system etc. MSI shall provide IR at one or more location with better specifications as per field requirement as directed by BTD from time to time, at no extra cost to BTD.

### vi. Radar for Speed Detection

| # | Parameters | Minimum Specifications | Compliance (Yes / No) |
|---|---|---|---|
| | **Make** | | |
| | **Model** | | |
| **1.** | Speed | Up to 150 KPMH | |
| **2.** | Enclosure IP protection | NEMA 4X /IP 66 | |
| **3.** | Distance | Minimum up to 150 mtrs. | |
| **4.** | Frequency | **Frequency**: 24 to 24.25 GHz / 76 to 81 GHz within permissible band by Government of India. | |
| **5.** | Beam Width | 35° × 16° or better /suitable to cover Area of Interest | |
| **6.** | Trigger Consistency | ≤+1m or better | |
| **7.** | Trigger Mode | Approaching, leaving, bidirectional | |
| **8.** | Capture Rate | ≥ 95% or better | |
| **9.** | Capture Distance | 18 to 28 m (adjustable) or better | |
| **10.** | Lane coverage | Multi-lane (3 lanes or better) | |

### vii. Speed Display

| # | Parameter | Minimum Specifications | Compliance (Yes / No) |
|---|---|---|---|
| | **Make** | | |
| | **Model** | | |
| **1.** | Sign size | 1000mm X 1000mm | |
| **2.** | Matrix Pixel Pitch | 25mm | |
| **3.** | Brightness | > 8000 CD/m2 | |
| **4.** | Dual colour | Red (violation) and Green / Amber (within limit) | |
| **5.** | Viewing angle | >30 degrees | |

### viii. Outdoor 2 / 6 kVA Field UPS

| # | Parameter | Minimum Specification | Compliance (Yes/No) |
|---|---|---|---|
| | **Make** | | |
| | **Model** | | |
| **1** | Capacity | 2.0 kVA 2 Hour Backup<br>(UPS Capacity to be finalized as per MSI solution Design. Minimum Specification is provided). | |
| **2** | Input Voltage | 160-280 VAC 50Hz ±3% | |
| | Input Power Factor at Full Load | >0.90 | |
| **3** | Output | AVR output Voltage AC mode- 230V AC ±9% 50Hz ±3% | |
| | | UPS Output Voltage in Battery mode- 230V AC ±10% 50Hz ±3%. | |
| **4** | Output Wave Form | Pure Sine wave | |
| **5** | UPS shutdown | UPS should shutdown with an alarm and indication on following conditions: | |
| | | 1) Output over voltage | |
| | | 2) Output under voltage | |
| | | 3) Battery low | |
| | | 4) Inverter overload | |
| | | 5) Over temperature | |
| | | 6) Output short | |
| **6** | Battery Backup | 2 Hour Backup | |
| **7** | Battery | Solid State - LiPo / LFP Batteries / Equivalent | 、 |
| **8** | Indicators & | Indicators for AC Mains, Load on Battery, Fault, Load Level, Battery Low Warning, Inverter On, UPS on Bypass, Overload, etc. | |
| | Metering | Metering for Input Voltage, Output Voltage and frequency, battery voltage, output current etc. | |
| **9** | Audio Alarm | Battery low, Mains Failure, Over temperature, Inverter overload, Fault etc. | |
| **10** | Management Protocol | SNMP Support through TCP/IP & SNMP card to be provided | |
| **11** | Certifications | UPS should be ROHS & CE complied | |

**ix. Local Processing Unit**

| # | Parameter | Minimum Specifications or better | Compliance (Yes/No) |
|---|---|---|---|
| 1. | | • On-site outstation processing unit, industrial grade unit<br>• Should be scalable and latest Gen CPU, RAM, SSD and OS to be offered. SATA or any other HDD not acceptable. | |

| # | Parameter | Minimum Specifications or better | Compliance (Yes/No) |
|---|---|---|---|
| 2. | Data Storage on site | • System be equipped with appropriate storage capacity for minimum number of 7 days with 24X7 recording, @ 2 MP Resolution with 25 FPS (minimum)with overwriting capability, as defined in the RFP.<br>• The images should be stored in tamper proof format only.<br>• It should be noted that at any point of time the local storage at the base station should have the data of previous days irrespective of availability of network connectivity. | |
| 3. | Network | Wired & GSM based wireless technology with 4G / 5G capability. | |
| 4. | Minimum 2(two) USB Port to support the latest external mass storage devices and Ethernet (10/100) Port for network connectivity. However, all logs of data transfer through the ports shall be maintained by the system. | | |
| 5. | Advanced Encryption Standard (AES) shall be followed for data encryption on site and TMC, and its access should be protected by a password. | | |

**x. 5G**

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| **1** | | Gateway should be ruggedized industrial grade with minimum IP40 or above certification. | |
| **2** | | Gateway should support QUAD core 600MHz CPU, DRAM of 4GB & usable Flash Memory of 4GB | |
| **3** | | Gateway should support multiple mounting options like Panel and din rail | |
| **4** | | Gateway shall support integrated 4G LTE Advanced (LTE-A Pro) wireless WAN connectivity from day one with Dual Nano-SIM support for carrier redundancy and automatic failover. The gateway shall support a migration path to future 5G connectivity through modular/pluggable cellular interfaces. All necessary LTE antennas, GNSS antennas, RF cables and accessories shall be supplied. The gateway shall support dedicated Gigabit Ethernet WAN connectivity and Gigabit Ethernet interfaces for flexible WAN deployment. | |
| **5** | | Gateway shall provide 4 × 10/100/1000BASE-T Gigabit Ethernet LAN ports and 1 × 10/100/1000BASE-T Gigabit Ethernet WAN port. The gateway shall support 1 × Industrial | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| | | Serial Interface (RS-232/RS-485 configurable) for industrial device connectivity. | |
| **6** | | Gateway shall provide RJ45 Console Port, USB Console Port (Micro USB/USB-C as applicable) and USB Type-A Host Port for local management, software upgrades and storage. | |
| **7** | | Gateway shall support 24–48 VDC industrial power input and shall be supplied with a suitable AC-to-DC power adapter. The router shall support industrial power redundancy and operate reliably in harsh industrial environments. | |
| **8** | | Gateway should provides an open, extensible environment for hosting OS and applications at the network edge. | |
| **9** | | Gateway should have an option of having industrial-grade field-replaceable 100-GB storage in future | |
| **10** | | The gateway should come with built-in software and provide highly secure routing, data, voice, wireless and industrial communications for mission-critical applications. The platform shall support integrated security, and options for application hosting, SD-WAN and edge computing capabilities. | |
| **11** | | The gateway shall support Hardware Root of Trust (Trust Anchor Module), Secure Boot, Secure Image Verification, Secure Software Upgrade, Secure Unique Device Identity (SUDI) and digitally signed software images to ensure the integrity of the complete software stack from boot loader to operating system. | |
| **12** | | The gateway shall support integrated security services including IPSec VPN, FlexVPN, DMVPN, GETVPN and SSL VPN for secure remote access. It shall support AES-128/192/256 encryption, SHA-256/384/512 authentication, PKI certificates, NAT Traversal (NAT-T), IPSec over IPv4 and IPv6, and support a minimum of 20 IPSec VPN tunnels. The gateway shall include a Zone-Based Policy Firewall, VRF-aware Stateful Inspection Firewall, advanced application inspection, Access Control Lists (ACLs), Dynamic and Static NAT/PAT, and security policy enforcement. | |
| **13** | | Gateway should have the capability to classify traffic per application level and be able to | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| | | monitor application response in terms of jitter, loss, and latency and apply service control policies and QOS to prioritize critical applications. Should support Queuing (LLQ, WFQ, CBWFQ) , Shaping (CBTS) and Poicing features (CBTP) | |
| **14** | | The gateway shall support IPv4 and IPv6 Dual Stack, IPv6 DNS, IPv6 DHCP Server/Relay/Client, Static Routing, OSPFv2, OSPFv3, EIGRP, BGP, RIP, VRF Lite, GRE, IP SLA, Policy-Based Routing (PBR), Multicast Routing (PIM-SM/IGMPv3), and advanced routing services. | |
| **15** | | The gateway should support remote LTE firmware and configuration upgrade/updates. | |
| **16** | | The gateway shall support High Availability protocols including HSRP and VRRP, IP SLA Tracking, WAN failover, LTE failover and automatic recovery. The gateway shall support Dual Nano SIM with automatic cellular failover for resilient WAN connectivity. | |
| **17** | | Supports SD-WAN ready to effectively manage hundreds of disparate locations, lowering TCO and operating at scale in the future as needed. | |
| **18** | | Gateway should support SNMP V1, V2, V3 so that it can automatically be discovered, monitored, managed to a granular level to have config push, config backup, image backup, auto provisioning of devices, auto reboot functionality, inventory management can be done using a Network Management Tool. | |
| **19** | | Gateway should support IPv4, IPv6 protocols from day one without adding any additional cost. | |
| **20** | | Additional external antenna must be provisioned from day one along with the Gateway so that signal strength can be improved. All necessary accessories like antenna, cable etc must be provided along with the router | |
| **21** | | The gateway shall operate reliably in harsh industrial environments with an operating temperature range of –40°C to +70°C, suitable for deployment inside sealed industrial cabinets. | |
| **22** | | The Gateway should have optional standalone GPS which should help to map the coordinates on the NMS | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| 23 | | Gateway should support both In-band and out-of-band management using Telnet and SNMP, including MIB II and other extensions | |
| 24 | | Gateway should support Industry-standard 4G LTE diagnostics and monitoring tools | |
| 25 | | Gateway should be Common Criteria Certified and comply to standards UL 60950-1, IEC/EN 62368-1, UL 62368-1 and other applicable industrial safety standards. | |
| 26 | | Gateway should comply to EMC standards EN/IEC61000-4-2, 3, 4, 5, 6, 8, 9, 11 | |

**xi. SDWAN Firewall**

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| 1 | Interface and Connectivity Requirement | 8x 1/10/25 Gigabit Ethernet ports Day 1 | |
| 2 | | Future Expandable with Network modules upto 24 x 10G/8 x 25G/8 x 40G Interfaces | |
| 3 | Hardware Architecture | The appliance based security platform should provide Next-Gen Firewall functionality like IPS, Application Control, URL filtering and Anti-malware functionality in a single appliance from day one. | |
| 4 | | The appliance hardware should be a multicore CPU architecture and should not be proprietary ASIC based in nature & should be open architecture based on multi-core cpu's to protect & scale against dynamic latest security threats. The appliance hardware should have a hardened operating system from the OEM and should support minimum of 256GB of RAM to make sure all the security capabilities are provided without degradation form day one | |
| 5 | | Proposed firewall should not consume more than 1RU of rack space to make sure sustainability goals of the organization. | |
| 6 | | The firewall should have integrated redundant hot swappable fan tray and dual redundant power supply to remove any single point of failure in the solution | |
| 7 | Performance & Scalability | The NGFW throughput of the firewall should be a minimum 80 Gbps with application identification and | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| | | firewalling enabled with real world/enterprise/ production traffic. The IPS throughput should be minimum 70 Gbps | |
| **8** | | The firewall should provide minimum 45 Gbps of IPSEC VPN throughput | |
| **9** | | NGFW Firewall should support at least 80M Layer 7/app-id Concurrent sessions | |
| **10** | | NGFW Firewall should support at least 1.5M new connections per second L3/L4 or Layer 7/app-id connections per second. | |
| **11** | | High Availability Configurations shall support Active/ Passive | |
| **12** | Next Gen Firewall Features | Firewall should support creating security policies with source/destination zones, network subents/ranges, geolocation objects, ports/protocols, applications, user/group attributes, URL/URL categories and action on traffic . The actions on the traffic should be to allow, alert, block, block and continue , reset. The firewall should provide time based polices with options for reccurrecing schedule or one time schedule. | |
| **13** | | The firewall should supports NAT's like source NAT , destination NAT , U-Turn NAT. Firewall should support Nat66, Nat 64 & Nat46 functionality. | |
| **14** | | Solution should provides capabilities like dynamic real-time metrics based , policy-based, application path selection across multiple WAN connections and supports service chaining for additional services such as WAN optimization and firewalls. | |
| **15** | | The solution should provide the following routing capabilities: OSPF, BGP, RIP, Multicast, Static, Route Tracking(SLA) PBR, ISIS, BFD, ECMP, VRF, Application based Routing | |
| **16** | | The IPS engine shall detect and block entire classes of web-application exploits (SQL injection, cross-site scripting, command injection) using an on-box machine learning model that | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| | | requires no signature update or cloud lookup to cover a previously unseen exploit variant, and this capability must be natively integrated into the core IPS engine (not a bolt-on sensor) | |
| **17** | | Should support capability to integrate with other security solutions to receive contextual information like security group tags/names. | |
| **18** | | Should support more than 5000+ (excluding custom application signatures) distinct application signature as application detection mechanism to optimize security effectiveness and should be able to create 40 or more application categories for operational efficiency | |
| **19** | | Should support more than 25,000 (excluding custom signatures) IPS signatures or more. Solution should be able to passively detect endpoints and infrastructure for threat correlation and Indicators of Compromise (IoC) intelligence. The signatures should also have categorization based on MITRE TTP's. | |
| **20** | | The firewall solution should have capabilities like Application Aware Routing, Health Monitoring, DIA, Dual ISP, Data interface Management for simplified branch capabilities | |
| **21** | | The detection engine must incorporate multiple approaches for detecting threats, including at a minimum exploit-based signatures, vulnerability-based rules, protocol anomaly detection, and behavioural anomaly detection techniques. | |
| **22** | URL Filtering Features | Should must support URL threat intelligence feeds to protect against threats | |
| **23** | | Should support Reputation- and category-based URL filtering offering comprehensive alerting and control over suspect web traffic and enforces policies on more than 250 million of URLs in more than 75+ categories. | |
| **24** | Anti-APT / Malware Features | Should support the capability of providing network-based detection of malware by checking the disposition of | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| | | unknown files using SHA-256 file-hash or signature as they transit the network and capability to do dynamic analysis. | |
| **25** | | Solution shall have capability to analyze and block TCP/UDP protocol to identify attacks and malware communications. At minimum, the following protocols are supported for real-time inspection, blocking and control of download files: HTTP, SMTP, POP3, IMAP, NetBIOS-SSN and FTP | |
| **26** | | Proposed solution shall have required subscription like Threat Intelligence for proper functioning | |
| **27** | VPN | The solution should support IPSec and SSL VPN | |
| **28** | | The Solution shall provide a secure Remote Access VPN capability for users connecting from trusted and untrusted networks, using industry-standard SSL/TLS and/or IPsec protocols. | |

### xii. Variable Messaging System (VMS)

**Variable Messaging System: Technical Specification**

| Sr. | Parameter | Minimum Specification | Compliance (Yes/ No) |
|---|---|---|---|
| | **Make** | | |
| | **Model** | | |
| **1.** | LED Type | The LED type used in VMS shall be SMT (Surface Mounted Technology) | |
| **2.** | Pixel Pitch | 10mm (P10) or better. | |
| **3.** | Pixel Configuration | 1R/1G/1B | |
| **4.** | Board size | Type 1: 3.8 mtr length x 1.8 mtr height Customized (5-10% tolerance) | |
| **5.** | Brightness and Legibility | The displayed image shall not appear to flicker to the normal human eye. Auto dimming feature to adjusts to ambient light level. | |
| **6.** | Pixel Density | Minimum 10,000 pixels per sqm or higher | |
| **7.** | Environmental grade | UV Resistant | |
| **8.** | Colour type | True Colour | |
| **9.** | Brightness | 6500-7500 cd/m² | |

| Sr. | Parameter | Minimum Specification | Compliance (Yes/ No) |
|---|---|---|---|
| | | (Ensure excellent Images) | |
| **10.** | Brightness Adjustment | Manual and Automatic as per ambient environment | |
| **11.** | Display Language | To support both pictograms and bilingual (English and Hindi - Devanagari) text | |
| **12.** | Max. Power Consumption | 600 w/sq m or better | |
| **13.** | Control Method | Synchronized with System | |
| **14.** | Frame Frequency | ≥60 Hz. | |
| **15.** | Number of Lines and Characters | The number of lines and characters can be customized as per the requirement (Min 3 Lines and 10 Characters) | |
| **16.** | Colour | ≥16 Million Colours | |
| **17.** | Flicker | Refresh Frequency should not be less 90 Hz. No visible flicker to naked eye. | |
| **18.** | Defect Ratio | ≤0.1% | |
| **19.** | Video Interface | Supports RJ45 and DVI or better | |
| **20.** | Communication | Wired through RJ45/Wireless through Dongle | |
| **21.** | Ingress Protection rating | IP 55- Cabinet. | |
| **22.** | Operating System | Windows 7 Embedded OS / equivalent | |
| **23.** | Operating System Videos & image format | At least should support MPEG-4, WMV, QuickTime, AVI (without sound)<br>JPEG, PNG, BMP, GIF, PDF etc. | |
| **24.** | Integration | Integration with the ICCC application | |
| **25.** | Viewing distance | Suitable for readability from 150 Mtrs. or more at the character size of 240mm, from moving vehicles. | |
| **26.** | Display capability | Fully programmable, full colour, full matrix, LED displays Alpha-numeric, Pictorials, Graphical and video | |
| **27.** | Certification | Display should have certifications for FCC, CE, RoHS. IP55 for whole cabinet as a regulatory compliance. BIS Certificate: As per Standard. | |
| **28.** | Beam Width | Viewing angle shall ensure message readability for citizens, motorists, pedestrians, etc. on the respective locations | |
| **29.** | Contrast Ratio | R3. 5000:1 or better | |
| **30.** | Message Creation | Through Central control room.<br>In the event of central server failure, each of the boards should be individually capable of continuous & uninterrupted display of real time traffic & other information as per last | |

| Sr. | Parameter | Minimum Specification | Compliance (Yes/ No) |
|---|---|---|---|
| | | configuration/ Programmed message - thereby ensuring continuous operation. | |
| **31.** | Message Validity | If there is no data connectivity due to network issues then the boards shall display the programmed content, thus ensuring uninterrupted performance | |
| **32.** | Storage Capacity | Should be capable to store at least 200 messages and symbols/pictograms to allow display to run in isolated mode on a predefined - structures / timings, in case of connectivity failure. | |
| **33.** | Battery | 230VAC+ 15%, 50Hz, Single Phase (automatically re-start in the event of an electricity supply failure) / at least 1 hours UPS backup. | |

### 7.3. Traffic Management Center

#### i. Video Wall

| Sr. | Parameter | Minimum Requirements | Compliance (Yes / No) |
|---|---|---|---|
| | **Make** | | |
| | **Model** | | |
| **1.** | Display Type | Bezel Free Active Led Display with COB Technology | |
| **2.** | Videowall Grid | The existing wall has dimensions of approx. 35 ft (W) × 14 ft (H). The proposed solution shall provide a seamless LED display covering the maximum possible area within the existing wall dimensions, as per the approved solution design. | |
| **3.** | Number of pixels | 1920×1080 (full HD) / 4 K or higher, 16:9 Widescreen | |
| **4.** | Contrast Ratio | 10000:1 or higher | |
| **5.** | Brightness | 700 nits or higher | |
| **6.** | Refresh Rate | 3840 - 7680 HZ | |
| **7.** | Bezel-to-Bezel Width | 0.44 or Bezel less | |
| **8.** | Viewing angle | 160 degree/ 160 degree (H/V) or better | |
| **9.** | Input Signal | RGB Digital, DVI-D or HDMI (Input interface shall be compatible with output interface of Video Switches.) | |
| **10.** | Control input | RS-232C(D-SUB9) or RJ-45(10/100BASE-T) | |

| Sr. | Parameter | Minimum Requirements | Compliance (Yes / No) |
|---|---|---|---|
| **11.** | Mount | Pedestal / Wall mounted videowall solution as per prevailing site condition and requirement | |
| **12.** | Control | On Screen Display (OSD) - IP/IR remote control | |
| **13.** | Operations | 24 x 7, Life of light source 100000 hrs in eco-mode. | |
| **14.** | Standards | BIS, IP 55, CE, FCC, ROHS | |
| **Controller** | | | |
| **1.** | Controller | Controller to control Video wall of 8x6 matrix panels (and further considering future scalability) as per requirement along with software | |
| **2.** | Processor | Latest Generation 64 bit Quad Core processor (3.4 Ghz) or better | |
| **3.** | Operating System | Pre-loaded 64-bit Operating System Windows / Linux / Equivalent, with recovery disc | |
| **4.** | RAM | 16 GB DDR3 ECC RAM | |
| **5.** | Hard disk | 2x500 GB 7200 RPM HHD (Configured in RAID 0) | |
| **6.** | Networking | Dual-port Gigabit Ethernet Controller 8with RJ-45 ports | |
| **7.** | RAID | RAID support 0 and 1 | |
| **8.** | Power Supply | (1+1) Redundant hot swappable | |
| **9.** | Accessories | 104 key Keyboard and Optical USB mouse | |
| **10.** | USB Ports | Minimum 4 USB Ports | |
| **11.** | Redundancy support | Power Supply, HDD, LAN port & Controller | |
| **12.** | Scalability | Display multiple source windows in any size, anywhere on the wall | |
| **13.** | Control functions | Brightness/Contrast/ Saturation/ Hue / Filtering/ Crop/ Rotate | |
| **14.** | Inputs | LAN input from CCTV LAN. Controller should be able to decode minimum 120 4MP H.265 IP streams @ 4Mbps bitrate from. The controller should also have at least 4 DVI/HDMI (4x4=16) inputs and scalable up-to 24 | |

| Sr. | Parameter | Minimum Requirements | Compliance (Yes / No) |
|---|---|---|---|
| | | DVI/HDMI for connecting workstations. | |
| **15.** | Output | To connect scalable up-to 48 ports<br>Displays through HDMI / DVI. | |
| **16.** | Cable & Connections | The Contractor should provide all the necessary cables and connectors, so as to connect Controller with Display units | |
| **17.** | Integration | Seamless integration among display unit, controller, wall management software to be ensured. Preferred to have same OEM. | |

**ii. Control Room Workstation**

| # | Parameter | Minimum Specifications | Compliance (Yes / No) |
|---|---|---|---|
| | Make | | |
| | Model | | |
| **1.** | Processor | Latest Gen Core i7 (8 cores or higher) | |
| **2.** | Chipset | Latest series 64bit Chipset | |
| **3.** | Motherboard | OEM Motherboard | |
| **4.** | RAM | Minimum 2x16 GB DDR4 / DDR5 ECC Memory @ 3200 Mhz. Slots should be free for future upgrade. | |
| **5.** | Graphics card | Must support smooth video & surveillance operations to 3 no. of 4K/UHD Monitor output. | |
| **6.** | Storage | 1 TB NVMe SSD<br>Optional: 2 TB HDD | |
| **7.** | Network interface | 10/100/1000 Mbps autosensing on board integrated RJ-45 Ethernet port. | |
| **8.** | Audio | Line/Mic IN, Line- out / Spr Out (3.5 mm) | |
| **9.** | Ports | Minimum 6 USB ports (out of that 2 in front) | |
| **10.** | Keyboard | 104 keys minimum OEM keyboard | |
| **11.** | Mouse | 2 button optical scroll mouse (USB) | |
| **12.** | Monitor | • Three Monitors of 24” or above (+_5%) TFT LED monitor,<br>• Minimum 1920 x1080 resolution, 5 ms or better response time<br>• Minimum input of 1x HDMI and 1x Display port (VGA)<br>• Energy Saving<br>• Allow tilt and swivel motion<br>• Black colour<br>• Monitor shall have high refresh rate to eliminate screen flicker causing eyestrain and headache | |

| # | Parameter | Minimum Specifications | Compliance (Yes / No) |
|---|---|---|---|
| | | • Monitor shall have adjustment controls (e.g. brightness/contrast) easily accessible, easy to locate and easy to use. | |
| **13.** | Operating System | 64-bit OS with recovery disc | |
| **14.** | Software | Microsoft Office Word, Excel and PPT, and any Leading End Point Protection software with license for 10 years pre-loaded. | |
| **15.** | Antivirus feature | Advanced antivirus, antispyware, desktop firewall, intrusion prevention (comprising of a single, deployable agent) which can be managed by a central server. (Support, updates, patches and errata for the entire contract / project period) | |
| **16.** | Power supply | SMPS; Minimum 400- watt Continuous Power Supply with Full ranging input and APFC. | |

**iii. Network Printer (Colour Laser)**

| # | Parameter | Minimum Specifications | Compliance (Yes / No) |
|---|---|---|---|
| | **Make** | | |
| | **Model** | | |
| **1** | Print Speed | **Black:** 16 ppm or above on A3, 24 ppm or above on A4<br>**Colour:** 8 ppm or above on A3, 12 ppm or above on A4 | |
| **2** | Resolution | 600 X 600 DPI | |
| **3** | Memory | 8 MB or more | |
| **4** | Paper Size | A3, A4, Legal, Letter, Executive, custom sizes | |
| **5** | Paper Capacity | 250 sheets or above on standard input tray, 100 Sheet or above on Output Tray | |
| **6** | Duty Cycle | 25,000 sheets or better per month | |
| | | | |
| **8** | Interface | Ethernet Interface | |

**iv. Online 50 kVA UPS for TMC and DC**

| # | Parameter | Minimum Specification | Compliance (Yes/ No) |
|---|---|---|---|
| | **Make** | | |
| | **Model** | | |
| **1** | Capacity (in kVA / kW) | 50 kVA/ 50 kW 3-Phase Input / 1 or 3-Phase Output. With 60 Min battery backup on full load.<br>(UPS Capacity to be finalized as per MSI solution Design. Minimum Specification is provided). | |
| **2** | Technology and Capability | a) True Online configuration with double conversion UPS | |
| | | b) DSP based technology with reduction in electronic components. | |

| # | Parameter | Minimum Specification | Compliance (Yes/ No) |
|---|---|---|---|
| | | c) Fully rated power (kVA=kW) for maximum power availability. | |
| | | f) UPS should be designed at Rated PF of 1 . | |
| | | g) Dual Input design. | |
| | | h) UPS should have IGBT topology for both PFC (power factor correction) and inverter. | |
| | | i) Capability of independent or common battery bank operation of the UPS system when operated in parallel system | |
| **3** | **Input** | | |
| **3.1** | Input facility - Phases / Wires | 3-Phase / 4-Wire & Gnd (3Phase & Neutral + Ground) | |
| **3.2** | Input Voltage Range | 380V, 400, 415V Range (Full Load) 320~475VAC | |
| **3.3** | Nominal Input Frequency | 50/60Hz (Auto Selectable) | |
| **3.4** | Input Frequency Range | 45-65Hz or better | |
| **3.5** | Input Power Factor | > 0.99 (Full Load) | |
| **3.6** | Current Harmonic Distortion (ITHD) | < 5% | |
| **4** | **Output** | | |
| **4.1** | Nominal Output voltage for 3ϕ | 380, 400, 415 Vac | |
| **4.2** | Output Voltage Regulation | ± 1 % | |
| **4.3** | Nominal Output Frequency | 50/60 Hz | |
| **4.4** | Output Frequency Regulation | ± 0.05Hz | |
| **4.5** | Output Wave Form | Pure sine wave | |
| **4.6** | Output Voltage Distortion (THDu) | < 3 % (linear load) | |
| **4.7** | Crest Factor | 03:01 | |
| **4.8** | Output Short circuit Protection | Electronic Protection | |
| **4.9** | Frequency Converter Mode | Available | |
| **5** | **Efficiency** | | |
| **5.1** | Overall Efficiency (AC to AC) - Online (Double Conversion) | Upto 95% | |
| **5.2** | Overall Efficiency (AC to AC) - ECO Mode (Bypass feeding the load under normal conditions) | Upto 99% | |

| # | Parameter | Minimum Specification | Compliance (Yes/ No) |
|---|---|---|---|
| **6** | Indications (LED) | For fault indications | |
| **7** | Audible Alarms | I/P Fuse Open, PFC soft start Fail, DC BUS over shutdown, DC BUS under shutdown, INV volt abnormal, Output overload shutdown, Charger fault, overheat shutdown etc. | |
| | | shutdown, Battery disconnected. | |
| **8** | **Battery Backup / Battery Bank & Charger** | | |
| **8.1** | Battery Bank Voltage | 480Vdc (default) | |
| **8.2** | Type | Solid State - LiPo /LFP Batteries/Equivalent | |
| **8.3** | Backup Required | 60 min on full load | |
| **8.6** | Nominal Capacity in Ah | 50-100Ah | |
| **8.8** | Safety Features in the Cabinet | MCCB to be present & should have inbuilt protection for Overcurrent, short circuit, | |
| | | Overvoltage, under-voltage & over temperature | |
| **8.9** | Communication Scheme with UPS | BMS Level/Dry contact integration & communication scheme | |
| **8.10** | Nominal Operating Temperature Batteries | +10 deg C to +50 deg C | |
| **8.11** | **Restart / Testing Capability** | | |
| **A** | Automatic Restart | UPS should start up automatically on mains | |
| | | resumption after battery low shutdown | |
| **B** | Battery Self-Test | Manual / Scheduled battery test to ensure healthiness of batteries. | |
| **8.12** | Physical | | |
| **8.13** | Operating Humidity | 0 to 95% RH (Non-condensing) | |
| **8.14** | Protection Class | IP – 20 | |
| **8.15** | Form Factor | Free Standing Floor Mounted UPS- Tower type | |
| **8.16** | Connections - Rectifier Input / Output / Bypass Input / Battery | Breakers for input, output, bypass & Maintenance bypass | |
| **9** | Interfaces | Monitors and controls the status of the UPS via a network system | |
| **10** | **Restart / Testing Capability** | | |
| **10.1** | Cold Start | UPS should start up | |
| | | On AC Supply (Mains) without DC Supply (Batteries) | |
| | | On DC Supply (Batteries) without AC Supply (Mains) | |
| **10.2** | Automatic Restart | UPS should start up automatically on mains resumption after battery low shutdown | |
| **10.3** | Self-Diagnosis | UPS should be capable to carry out self-test of Rectifier / Charger /Battery & Inverter module during start-up | |
| **11** | **Physical** | | |

| # | Parameter | Minimum Specification | Compliance (Yes/ No) |
|---|---|---|---|
| **11.2** | Operating Humidity | 5% ~ 95% (non-condensing) | |
| **12.** | **Certifications** | | |
| **12.1** | ROHS compliance | UPS should be ROHS & CE complied | |

v. **DG Set** (If required to maintain SLA over and above existing DG set at TMC / CoC)

| # | Parameter | Minimum Specifications | Compliance (Yes / No) |
|---|---|---|---|
| | **Make** | | |
| | **Model** | | |
| **1.** | General Specifications | • Auto Starting DG Set mounted on a common base frame with AVM (Anti-Vibration) pads, residential silencer with exhaust piping, complete conforming to ISO 8528 specifications and CPCB certified for emissions.<br>• KVA rating as per the requirement | |
| **2.** | Engine | Engine should support electric auto start, Radiator cooled / water cooled, multi cylinder, maximum 1500 rpm with electronic/manual governor and electrical starting arrangement complete with battery, 4 stroke multiple cylinders/single and diesel operated conforming to BS 5514/ ISO 3046/ IS 10002 | |
| **3.** | Fuel | High Speed Diesel (HSD) | |
| **4.** | Alternator | Self-exciting, self-regulating type alternator rated 0.8PF or better,<br>415 Volts, 3 Phase, 4 wires, 50 cycles/sec, 1500 RPM, conforming to IS 4722/ BS 5000, Windings of 100% Copper, class H insulation, Protection as per IP 23. | |
| **5.** | AMF (Auto Main Failure) Panel | AMF Panel fitted inside the enclosure, with the following meters/indicators:<br>• Incoming and outgoing voltage<br>• Current in all phases<br>• Frequency, KVA and power factor<br>• Time indication for hours/minutes of operation<br>• Fuel Level in fuel tank, low fuel indication<br>• Emergency Stop button<br>• Auto/Manual/Test selector switch<br>• MCCB/Circuit breaker for short-circuit and overload protection<br>• Control Fuses, Earth Terminal<br>• Any other switch, instrument, relay etc. essential for automatic functioning of DG set with AMF panel<br>• DG parameters (like battery voltage, fuel level, RPM, Total running time, etc) should be integrated with EMS / BMS system | |

| # | Parameter | Minimum Specifications | Compliance (Yes / No) |
|---|---|---|---|
| **6.** | Acoustic Enclosure | • DG set shall be provided with acoustic enclosure / canopy to reduce sound level and to house entire DG set (Engine & Alternator set) assembly outside (open-air).<br>• The enclosure must be weather resistant powder coated, with insulation designed to meet latest MOEF/CPCB norms for DG sets, capable to withstand the climate. The enclosure must have ventilation system, doors for easy access for maintenance, secure locking arrangement | |
| **7.** | Fuel Tank Capacity | It should be sufficient and suitable for containing fuel for 12 hours continuous operation, Complete with level indicator, fuel inlet and outlet, air vent, drain plug, inlet arrangement for direct filling and set of fuel hoses for inlet and return. | |
| **8.** | Output Frequency | 50 HZ | |
| **9.** | Tolerance | +/- 5% as defined in BSS-649-1958 | |
| **10.** | Indicators | Over /under speed/High water temperature/low lube oil etc. | |
| **11.** | Intake system | Naturally Aspirated | |
| **12.** | Number of phases | 3 phase | |
| **13.** | Frequency | 1500 RPM | |
| **14.** | Cooling | Liquid Cooled (EG 50:50) | |
| **15.** | Certifications | ISO 9001/9002, relevant BS and IS standard | |

### 7.4. Network (City wide network backbone)

#### i. Access Layer (Field) Switches / Outdoor Field Switch

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| **1** | Type | Industrial grade Din-rail Ethernet Switch | |
| **2** | Switching Capacity & Forwarding rate | 20Gbps & Forwarding rate of 14.4Mpps | |
| **3** | No. of Ports | Minimum 8 * 10/100/1000 Base Tx half/full duplex ports and Minimum 2 * 1000 Base Fx Single mode SFP ports | |
| **4** | PoE / POE+ | All 8 access ports shall deliver 30W Power with total 240W power budget. | |
| **5** | Protocols support | Switch should support STP, RSTP, SPAN, RSPAN, FSPAN, Modbus TCP/IP, IEEE 1588 PTP v2, | |
| **6** | Type of VLANs | IEEE 802.1Q Port based VLANs, Q-in-Q, Static routing & Inter-VLAN routing should be supported | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| **7** | Multicast traffic | Switch should support Multicast traffic through IGMPv1, v2, v3 snooping, & MLD Snooping. | |
| **8** | Quality of Service | 802.1p, priority queuing, Ingress policing, rate limit, egress queuing and shaping, auto QoS, Low latency queuing | |
| **9** | Security | DHCPv6 Guard, IP Source Guard, PACL, VACL, HTTPS, RADIUS, TACACS+, Secure Shell (SSH), DHCP Snooping, 802.1X, Client Information Signaling Protocol (CISP), Dynamic ARP Inspection (DAI), authentication, authorization, and accounting (AAA). | |
| **10** | Layer 2 IPv6 | IPv6 Destination Guard, IPv6 Neighbor Discovery Multicast Suppress, IPv6 Router Advertisement (RA) Guard, IPv6 Snooping, IPv6 Source/Prefix Guard, IPv6 Neighbor Discovery Duplicate Address Detection | |
| **11** | Management | WebUI, MIB, SNMP, syslog, DHCP server, NETCONF, RESTCONF, Express setup | |
| **12** | Power supply | Switch should support Dual DC Power input and suitable AC power supply to be provided to meet POE power budget | |
| **13** | Utility | Removable storage (SD Card or USB) for configuration backup | |
| **14** | Operating Temperature: | -40 to 60°C or better with Corrosion resistant IEC 60068-2-52 (salt fog) IEC 60068-2-60 (flowing mixed gas) | |
| **15** | Operating Humidity | 5% to 95% (non-condensing) | |
| **16** | Housing | IP30 protection | |
| **17** | MTBF | 5,00,000hrs or better | |
| **18** | Safety Certifications | UL/CSA 60950-1, CE Marking, RoHS compliant, Suitable for Hazardous Locations Class I, Div/Zone 2, NEMA TS-2. | |
| **19** | EMC Emissions compliance | CISPR 32, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-10, EN 61000-4-29, EN 61000-6-4 | |

### ii. Ethernet Surge Protector

| Sr. | Minimum Specification | Compliance (Yes/No) |
|---|---|---|
| | **Make** | |
| | **Model** | |
| 1 | Industrial Grade POE Surge Protector | |
| 2 | Should support 1 x 10/100/1000Base-T(x) RJ45 Port In-Line, 60W PoE Support. | |
| 3 | Should not require additional ground cables | |
| 4 | Should Support PoE Pass-Through up to 60W | |
| 5 | Transparent to all types of traffic and protocols including VLAN's, Jumbo Frames, Multicast etc. | |

| | | |
|---|---|---|
| 7 | To be used for each camera end and controller end connectivity | |

**iii. 12 Core Armoured OFC (if required as per site requirement)**

| Sr. | Parameters | Minimum Specification | Compliance (Yes/No) |
|---|---|---|---|
| | **Make** | | |
| | **Model** | | |
| 1 | Core | 12 Core Single mode (OS2), Stranded Loose tube, Gel-free, outdoor armoured, Fiber Optic Cable for backbone cabling in outdoor ducts or direct buried applications. | |
| 2 | Fiber size | 9/125/250 micron coated fibers. | |
| 3 | No. of Fibers | 12 | |
| 4 | No. of Tubes | 2 | |
| 5 | Construction Materials | a) Jacket Material: PE / MDPE outer sheath<br>b) Armor Type: ECCS tape min thickness 0.15mm<br>c) Number of fibers per tube: 6<br>d) Jacket Color: Black<br>e) Jacket UV Resistance: UV Stabilized<br>f) Water Swellable Tape: Yes | |
| 6 | Dimensions | a) Cable Diameter: 10.0 – 12.0 mm<br>b) Cable Weight: 100 - 160 kg/km ± 10% or more | |
| 7 | Environmental Space | Aerial, lashed or buried | |
| 8 | Optical Specifications | Attenuation, Maximum<br>a) 0.22 dB/km @ 1550 nm<br>b) 0.34 dB/km @ 1310 nm<br>c) 0.31 dB/Km @ 1385nm | |

**iv. Outdoor Fiber Distribution enclosure (field side / for outdoor junctions)**

| Sr. | Parameters | Minimum Specification | Compliance (Yes/No) |
|---|---|---|---|
| | **Make** | | |
| | **Model** | | |
| **1.** | **Type** | Outdoor Wall / pole mountable fiber splicing closure, suitable for distribution and drop fibers in FTTX networks.<br>Shall be supplied loaded with 6F / 12 LC SM adapters, pigtails and splice trays. | |
| **2.** | **Outdoor usability** | Anti UV and IP 55 rated | |

| | | | |
|---|---|---|---|
| **3.** | **Cable sealings** | All cable ports and door openings to be securely sealed using rubber seals. | |
| **4.** | **Mounting options** | Wall mount or pole mountable. Wall mounting kits to be included in supply. | |
| **5.** | **Cable entry ports** | Shall have multiple cable entry ports for cables ranging from 3mm – 13mm. | |
| **6.** | **Capacity** | Shall have splicing capacity of upto 12 fibers.<br>Storage space for 1.5m pass through cable.<br>Upto 12 standard LC adapters. | |
| **7.** | **Material** | ABS grade plastic. | |
| **8.** | **Door access** | Shall have front door with lock | |

**v. Outdoor Fiber Joint Closure**

| Sr. | Parameters | Minimum Specification | Compliance (Yes/No) |
|---|---|---|---|
| | **Make** | | |
| | **Model** | | |
| **1** | **Type** | Fiber Optic Joint closure shall be of single ended environmentally sealed enclosure for fiber management in the outside plant network | |
| **2** | **Size options** | Shall be available for 12 fiber / 24 fiber / 48 fiber splice options. | |
| **3** | **Sealings** | Base and dome to be sealed with a clamp and O-ring system.<br>The sealing agent must be of re-usable mechanical type.<br>Heat shrink type is not accepted. | |
| **4** | **Cable inlets** | Multiple cable inlet options from upto 4 round cable ports and atleast 1 oval port shall be provided | |
| **5** | **Splice trays** | Splice trays to be hinged for access to any splice without disturbing other trays | |
| **6** | **Cable Handling** | Closure shall be compatible with most common cable types: e.g. loose tube, central core, slotted core, ribbon fiber | |
| **7** | | Shall be capable of receiving cable OD of 15-19mm 2 nos and 9-12mm cables OD upto 4 nos. | |
| **9** | **Environment** | The closure shall be suitable for usage in aerial, pedestal and underground (up to 5 meters) environments.<br>Shall be IP 65 or better rated for outdoor usages. | |

**vi. UTP Field Termination Plug**

| Sr. | Parameters | Minimum Specification | Compliance (Yes/No) |
|---|---|---|---|
| **1** | Standardization | Compliant with Cat.6/Cat6A | |
| **2** | Cable shield | U/UTP | |
| **3** | Number of conductors | 8 | |
| **5** | Material | PC UL 94V-0/Copper alloy High-impact, flame retardant, thermoplastic | |
| **6** | Contact material | Metal | |

| Sr. | Parameters | Minimum Specification | Compliance (Yes/No) |
|---|---|---|---|
| 7 | Mating cycle | 750 cycle min | |
| | | The bidder shall provide outdoor-rated Cat6 U/UTP armoured cable. Required UTP patch cords/Fiber Patch cords shall be provided by the bidder. | |

**vii. HDPE Duct (50mm)**

| Sr. | Minimum Specification | Compliance (Yes/No) |
|---|---|---|
| | **Make** | |
| | **Model** | |
| 1. | Permanently lubricated HDPE telecom Ducts for use as underground optical fibre cable conduits conforming to TEC/GR/TX/CDS-008/03/MAR-11 issued by Telecom Engg. Centre, New Delhi. | |
| 2. | HDPE Pipe Silicon Coated 40 mm outer dia | |
| 3. | Permanent lubricated HDPE Pipe / Duct shall confirm to IS 7328 or to its equivalent. | |
| 4. | Impact strength No crack or split in compliance to IS 12235 | |
| 5. | Environmental Stress cracking resistance (ESCR) conforming to American Society for Testing & Materials (ASTM) D 1693 | |
| 6. | Environment Condition with ambient temperature : 0 deg C to +55 degree C | |
| 7. | **Appearance:** Smooth inside & outside surface, free of blisters, shrink, hole, flaking, scratches & roughness. Duct shall be smooth, clean and round. | |
| 8. | Lubricated layer: Must have inner lubricant layer clearly visible & white in colour, uniform in thickness. | |
| 9. | | |

**viii. Core Router (as required)**

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| **1** | | Router Should be 1 RU fixed configuration with redundant and modular fans and power supplies. | |
| **2** | | The Router Hardware should support at least 4.8 Tbps (Full Duplex) throughput or higher. | |
| **3** | | The router should support the following functionality from the day one:- | |
| **4** | | IPv4 FIB - 6M<br>IPv4 RIB - 20M | |
| **5** | | IPv6 FIB - 3M<br>IPv6 RIB - 10M | |
| **6** | | 200K MPLS Labels | |
| **7** | | 8 Label Stack | |
| **8** | | 8K L2VPN<br>2K L3VPN | |
| **9** | | 2 Bpps | |
| **10** | | 100K Multicast routes | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| 11 | | Router should be able to support 1G, 10g, 25G, 50G, 100G, 400G interfaces natively. | |
| 12 | | Router should have 36 x 1/10G/25G interfaces, 6 x 100G and 4 x 400G interfaces from day 1. | |
| 13 | | Router should be able to support color optics on all 100G and 400G ports. | |
| 14 | | Router shall have option of checking configuration before committing and option of rolling back to at least five configurations. | |
| 15 | | Router should have redundant AC/DC power supply. | |
| 16 | | Digital Optical Monitoring (DOM) should be supported, optics information retrievable including RX/TX-power, threshold-monitoring/alarming, inventory. | |
| 17 | | It shall support role based privileges for the system access and RADIUS/TACAS authentication for the System admin. | |
| 18 | | The router should have a Console or Out-of-band Management. | |
| 19 | | Alerts for environmental or other hardware based alarms should be visibly implemented on the chassis. | |
| 20 | | All interfaces shall support services like L2VPN, L3VPN and multicast VPN for both IPv4 and IPv6 | |
| 21 | | Security: | |
| 22 | | a) The router should have mechanism to protect itself from DDoS attack. | |
| 23 | | b) The router should have ability to support MACSEC on all ports | |
| 24 | | c) Router should have support for PQC. | |
| 25 | | The router should be IPv6 ready from day one. | |
| 26 | | The router should support filtering based on different parameters like: src ip, dst ip, src port, dst port, protocol etc | |
| 27 | | The router should support IPFIX, Netflow, Jflow or equivalent | |
| 28 | | The router should support IP SLA or RPM (or equivalent) for performance measurements, it should also support monitoring of IP SLA/RPM (or equivalent) probes using SNMP polling (OEM has to provide SNMP MIB information) or through syslog | |
| 29 | | Shall support QoS, option of traffic shaping per Interface based. | |
| 30 | | Support for LFA and Ti-LFA, SRv6, SR-MPLS | |
| 31 | | Shall support MPLS based VPN services | |
| 32 | | a) L3VPN | |
| 33 | | b) L2VPN (Kompella BGP/ Martini LDP) | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| 34 | | IGMP v2 and v3 as described in RFC 2236 and RFC 3376 with IGMP Routing Policies to filter IGMP requests. | |
| 35 | | Router shall support SNMP v2/v3 and NTP | |
| 36 | | Shall support BFD : single hop, multi-hop and micro BFD | |
| 37 | | Router to support GRE tunnels (RFC 2784) | |
| 38 | | The offered devices must support following functionalities to support 3rd party SDN (in future) | |
| 39 | | (a) The router should support RFC 6020, YANG - A Data Modeling Language for the Network Configuration | |
| 40 | | (b) Protocol (NETCONF) | |
| 41 | | (c) The solution should support the network configuration protocol (NETCONF) that provides mechanisms to install, manipulate, and delete the configuration of network devices, RFC 6241 | |
| 42 | | (d) The router should be able to act as Path computation client in the PCE architecture defined in RFC 4655. | |
| 43 | | (e) The router should support PCECP as defined in RFC5440. | |
| 44 | | (f) The router should support BGP link-state (BGP-LS), RFC 4655 | |
| 45 | | (g) The router should support SPRING | |
| 46 | | The offered devices must support API/NBIs for auto discovery of Services and Physical & Logical Topology | |
| 47 | | Router Should Support Dual Image/Partition with USB flash drive booting option for OS recovery | |
| 48 | | Router should support jumbo frame. | |
| 49 | | Router should comply to following Temperature performance parameters: | |
| 50 | | i. Operating Temperature: 0 to 45 degree C or better | |
| 51 | | ii. Storage Temperature: -40 to 70 degree C or better | |
| 52 | | The operating system of the Routers category/series/family should be MEF-9/14 or CE(Carrier Ethernet) or latest Certified/compliant if not then roadmap for the same shall be submitted at the time of bidding. | |
| 53 | | The Router shall be designed for continuous operations with dual fan system. | |
| 54 | | Routers should be rack mountable to fit into a standard 19-inch rack | |
| 55 | | The OEM shall ensure that the use of third party optics shall not be explicitly blocked on the | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| | | Router. Router must support all MSA complied optics available in market | |
| **56** | | Segment Routing | |
| **57** | | a) The router should support SR-MPLS data plane and protocols OSPF,IS- IS and BGP Segment routing extensions | |
| **58** | | b) Traffic Steering of SR policies with Autoroute Include and Segment Routing TI-LFA SRLG Protection | |
| **59** | | c) LSP ping, trace-route, Pseudo wire Ping over Segment Routing, trace route for binding-SID | |
| **60** | | d) MPLS-LDP interworking with SR-ISIS and SR-OSPF | |
| **61** | | e) Router should have capability to calculate Bandwidth based path using centralized controller. | |
| **62** | | f) Shall support SR and MPLS (LDP) Interworking Mapping Server | |
| **63** | | g) Label distribution protocol and segment routing should coexist and there should support option to prefer LDP over segment routing. | |

**ix. Access Router**

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| **1** | | Router Should be 1 RU fixed configuration with redundant and modular fans and power supplies. | |
| **2** | | The Router Hardware should support at least 250Mpps or performance. | |
| **3** | | The router should support the following functionality from the day one:- | |
| **4** | | IPv4 FIB - 512K | |
| **5** | | IPv6 FIB - 256K | |
| **6** | | 200K MAC Address | |
| **7** | | 30K Multicast routes | |
| **8** | | Router should have: -<br>4 ports 1G/10G/25G SFP28<br>12 ports 1G/10G SFP+<br>12 ports 1G SFP | |
| **9** | | Router shall have option of checking configuration before committing and option of rolling back to at least five configurations. | |
| **10** | | Router should have redundant AC/DC power supply. | |
| **11** | | Digital Optical Monitoring (DOM) should be supported, optics information retrievable including RX/TX-power, threshold- monitoring/alarming, inventory. | |
| **12** | | It shall support role based privileges for the system access and RADIUS/TACAS authentication for the System admin. | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| 13 | | The router should have a Console or Out-of-band Management. | |
| 14 | | Alerts for environmental or other hardware based alarms should be visibly implemented on the chassis. | |
| 15 | | All interfaces shall support services like L2VPN, L3VPN and multicast VPN for both IPv4 and IPv6 | |
| 16 | | Security: | |
| 17 | | a) The router should have mechanism to protect itself from DDoS attack. | |
| 18 | | b) The router should have ability to support MACSEC on all ports | |
| 19 | | The router should be IPv6 ready from day one. | |
| 20 | | The router should support filtering based on different parameters like: src ip, dst ip, src port, dst port, protocol etc | |
| 21 | | The router should support IPFIX, NetFlow, Jflow or equivalent | |
| 22 | | The router should support IP SLA or RPM (or equivalent) for performance measurements, it should also support monitoring of IP SLA/RPM (or equivalent) probes using SNMP polling (OEM has to provide SNMP MIB information) or through syslog | |
| 23 | | Shall support QoS, option of traffic shaping per Interface based. | |
| 24 | | Support for LFA and Ti-LFA, SRv6, SR-MPLS | |
| 25 | | Shall support MPLS based VPN services | |
| 26 | | a) L3VPN | |
| 27 | | b) L2VPN (Kompella BGP/ Martini LDP) | |
| 28 | | IGMP v2 and v3 as described in RFC 2236 and RFC 3376 with IGMP Routing Policies to filter IGMP requests. | |
| 29 | | Router shall support SNMP v2/v3 and NTP | |
| 30 | | Shall support BFD : single hop, multi-hop and micro BFD | |
| 31 | | Router to support GRE tunnels (RFC 2784) | |
| 32 | | The offered devices must support following functionalities to support 3rd party SDN (in future) | |
| 33 | | (a) The router should support RFC 6020, YANG - A Data Modeling Language for the Network Configuration | |
| 34 | | (b) Protocol (NETCONF) | |
| 35 | | (c) The solution should support the network configuration protocol (NETCONF) that provides mechanisms to install, manipulate, and delete the configuration of network devices, RFC 6241 | |
| 36 | | (d) The router should be able to act as Path computation client in the PCE architecture defined in RFC 4655. | |
| 37 | | (e) The router should support PCECP as defined in RFC5440. | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| 38 | | (f) The router should support BGP link-state (BGP-LS), RFC 4655 | |
| 39 | | (g) The router should support SPRING | |
| 40 | | The offered devices must support API/NBIs for auto discovery of Services and Physical & Logical Topology | |
| 41 | | Router Should Support Dual Image/Partition with USB flash drive booting option for OS recovery | |
| 42 | | Router should support jumbo frame. | |
| 43 | | Router should comply to following Temperature performance parameters: | |
| 44 | | i. Operating Temperature: 0 to 65 degree C or better | |
| 45 | | The operating system of the Routers category/series/family should be MEF-9/14 or CE(Carrier Ethernet) or latest Certified/compliant if not then roadmap for the same shall be submitted at the time of bidding. | |
| 46 | | The Router shall be designed for continuous operations with dual fan system. | |
| 47 | | Routers should be rack mountable to fit into a standard 19-inch rack | |
| 48 | | The OEM shall ensure that the use of third party optics shall not be explicitly blocked on the Router. Rrouter must support all MSA complied optics available in market | |
| 49 | | Segment Routing | |
| 50 | | a) The router should support SR-MPLS dataplane and protocols OSPF,IS- IS and BGP Segment routing extensions | |
| 51 | | b) Traffic Steering of SR policies with Autoroute Include and Segment Routing TI-LFA SRLG Protection | |
| 52 | | c) LSP ping, trace-route, Pseudo wire Ping over Segment Routing, trace route for binding-SID | |
| 53 | | d) MPLS-LDP interworking with SR-ISIS and SR-OSPF | |
| 54 | | e) Router should have capability to calculate Bandwidth based path using centralized controller. | |
| 55 | | f) Shall support SR and MPLS (LDP) Interworking Mapping Server | |
| 56 | | g) Label distribution protocol and segment routing should coexist and there should support option to prefer LDP over segment routing. | |

### x. Aggregation Router

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| 1 | | Router Should be 1 RU fixed configuration with redundant and modular fans and power supplies. | |
| 2 | | The Router Hardware should support at least 1.2 Tbps (Full Duplex) throughput or higher. | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| 3 | | The router should support the following functionality from the day one:- | |
| 4 | | IPv4 FIB - 512K<br>IPv4 RIB - 2M | |
| 5 | | IPv6 FIB - 256K<br>IPv6 RIB - 1M | |
| 6 | | 30K MPLS Labels | |
| 7 | | 8 Label Stack | |
| 8 | | 4K L2VPN<br>500 L3VPN | |
| 9 | | 400 Mpps | |
| 10 | | 20K Multicast routes | |
| 11 | | Router should be able to support 1G, 10g, 25G & 100G interfaces natively. | |
| 12 | | Router should have 24 x 1/10G/25G interfaces and 4 x 100G interfaces from day 1. | |
| 13 | | Router should be able to support color optics on all 100G interfaces. | |
| 14 | | Router shall have option of checking configuration before committing and option of rolling back to at least five configurations. | |
| 15 | | Router should have redundant AC/DC power supply. | |
| 16 | | Digital Optical Monitoring (DOM) should be supported, optics information retrievable including RX/TX-power, threshold- monitoring/alarming, inventory. | |
| 17 | | It shall support role based privileges for the system access and RADIUS/TACAS authentication for the System admin. | |
| 18 | | The router should have a Console or Out-of-band Management. | |
| 19 | | Alerts for environmental or other hardware based alarms should be visibly implemented on the chassis. | |
| 20 | | All interfaces shall support services like L2VPN, L3VPN and multicast VPN for both IPv4 and IPv6 | |
| 21 | | Security: | |
| 22 | | a) The router should have mechanism to protect itself from DDoS attack. | |
| 23 | | b) The router should have ability to support MACSEC on all ports | |
| 24 | | c) Router should have support for PQC. | |
| 25 | | The router should be IPv6 ready from day one. | |
| 26 | | The router should support filtering based on different parameters like: src ip, dst ip, src port, dst port, protocol etc | |
| 27 | | The router should support IPFIX, Netflow, Jflow or equivalent | |
| 28 | | The router should support IP SLA or RPM (or equivalent) for performance measurements, it should | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| | | also support monitoring of IP SLA/RPM (or equivalent) probes using SNMP polling (OEM has to provide SNMP MIB information) or through syslog | |
| **29** | | Shall support QoS, option of traffic shaping per Interface based. | |
| **30** | | Support for LFA and Ti-LFA, SRv6, SR-MPLS | |
| **31** | | Shall support MPLS based VPN services | |
| **32** | | a) L3VPN | |
| **33** | | b) L2VPN (Kompella BGP/ Martini LDP) | |
| **34** | | IGMP v2 and v3 as described in RFC 2236 and RFC 3376 with IGMP Routing Policies to filter IGMP requests. | |
| **35** | | Router shall support SNMP v2/v3 and NTP | |
| **36** | | Shall support BFD : single hop, multi-hop and micro BFD | |
| **37** | | Router to support GRE tunnels (RFC 2784) | |
| **38** | | The offered devices must support following functionalities to support 3rd party SDN (in future) | |
| **39** | | (a) The router should support RFC 6020, YANG - A Data Modeling Language for the Network Configuration | |
| **40** | | (b) Protocol (NETCONF) | |
| **41** | | (c) The solution should support the network configuration protocol (NETCONF) that provides mechanisms to install, manipulate, and delete the configuration of network devices, RFC 6241 | |
| **42** | | (d) The router should be able to act as Path computation client in the PCE architecture defined in RFC 4655. | |
| **43** | | (e) The router should support PCECP as defined in RFC5440. | |
| **44** | | (f) The router should support BGP link-state (BGP-LS), RFC 4655 | |
| **45** | | (g) The router should support SPRING | |
| **46** | | The offered devices must support API/NBIs for auto discovery of Services and Physical & Logical Topology | |
| **47** | | Router Should Support Dual Image/Partition with USB flash drive booting option for OS recovery | |
| **48** | | Router should support jumbo frame. | |
| **49** | | Router should comply to following Temperature performance parameters: | |
| **50** | | i. Operating Temperature: 0 to 65 degree C or better | |
| **51** | | ii. Storage Temperature : -40 to 70 degree C or better | |
| **52** | | The operating system of the Routers category/series/family should be MEF-9/14 or CE(Carrier Ethernet) or latest Certified/compliant if not then roadmap for the same shall be submitted at the time of bidding. | |
| **53** | | The Router shall be designed for continuous operations with dual fan system. | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| 54 | | Routers should be rack mountable to fit into a standard 19-inch rack | |
| 55 | | The OEM shall ensure that the use of third party optics shall not be explicitly blocked on the Router. Router must support all MSA complied optics available in market | |
| 56 | | Segment Routing | |
| 57 | | a) The router should support SR-MPLS data plane and protocols OSPF,IS- IS and BGP Segment routing extensions | |
| 58 | | b) Traffic Steering of SR policies with Autoroute Include and Segment Routing TI-LFA SRLG Protection | |
| 59 | | c) LSP ping, trace-route, Pseudo wire Ping over Segment Routing, trace route for binding-SID | |
| 60 | | d) MPLS-LDP interworking with SR-ISIS and SR-OSPF | |
| 61 | | e) Router should have capability to calculate Bandwidth based path using centralized controller. | |
| 62 | | f) Shall support SR and MPLS (LDP) Interworking Mapping Server | |
| 63 | | g) Label distribution protocol and segment routing should coexist and there should support option to prefer LDP over segment routing. | |

### 7.5. Hosting Infrastructure, Core Network and Security

#### i. Data Center Core Switch

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| 1 | | Switch should support the complete STACK of IP V4 and IP V6 services. | |
| 2 | | The proposed switches should be part of Gartner Leader Quadrant for DC Networking for last 2 years | |
| 3 | | Switch should have the following interfaces: - Min of 36 non-blocking interfaces populated with multimode 40/100G Transceivers. Switch should have 400G ports from day 1 for future use. | |
| 4 | | Switch should have console port for local management & management interface for Out of band management | |
| 5 | | Switch should have adequate power supplies for the complete system usage and providing N+1 power supply redundancy | |
| 6 | | Switch should support minimum 1000 VRF instances with route leaking functionality | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| 7 | | The switch should support minimum 260K IPv4 LPM routes | |
| 8 | | The switch proposed should have minimum 80 MB Packet Buffer | |
| 9 | | The switch should support 8k multicast routes | |
| 10 | | Switch should support a minimum of 12Tbps of switching capacity. | |
| 11 | | Switch should support Network Virtualization using Virtual Over Lay Network using VXLAN | |
| 12 | | Switch should support VXLAN and EVPN symmetric IRB for supporting Spine - Leaf architecture to optimize the east - west traffic flow inside the data center | |
| 13 | | Switch should support minimum 90K no. of MAC addresses | |
| 14 | | Switch should support VLAN tagging (IEEE 802.1q) | |
| 15 | | Switch should support IEEE Link Aggregation and Ethernet Bonding functionality (IEEE 802.3ad) to group multiple ports for redundancy | |
| 16 | | Switch should support layer 2 extension over VXLAN across all Data Center to enable VM mobility & availability | |
| 17 | | The switch should support BGP EVPN Route Type 2, Type 4 and Route Type 5 for the overlay control plane | |
| 18 | | Switch should provide multicast traffic reachable using:<br>a. PIM-SM<br>b. PIM-SSM<br>c. Support Multicast Source Discovery Protocol (MSDP) | |
| 19 | | Switch should support Multicast routing | |
| 20 | | Switch system should support 802.1P classification and marking of packet using:<br>a. CoS (Class of Service)<br>b. DSCP (Differentiated Services Code Point) | |
| 21 | | Switch should support for different type of QoS features for real time traffic differential treatment using:<br>a. Weighted Random Early Detection<br>b. Strict Priority Queuing | |
| 22 | | Switch should support to trust the QoS marking/priority settings of the end points as per the defined policy | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| 23 | | Switch should support control plane Protection from unnecessary or DoS traffic by control plane protection policy | |
| 24 | | Switch should support for external database for AAA using:<br>a. TACACS+<br>b. RADIUS | |
| 25 | | Switch should support to restrict end hosts in the network. Secures the access to an access or trunk port based on MAC address. It limits the number of learned MAC addresses to deny MAC address flooding | |
| 26 | | Switch should support for Role Based access control (RBAC) for restricting host level network access as per policy defined | |

**ii. Servers (As Building block, to establishing computing solution for sub-systems/solutions) - VMS Server**

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| 1 | Form Factor | Max. 2U Rack Mounted | |
| 2 | Configured CPU | Up to two Latest Intel® 6th Gen Xeon® Scalable processors, (To be populated with dual processor each having min 16 Cores 2.3 GHz clock speed, 60MB Cache) | |
| 3 | Memory slots | 32 DDR5 DIMM slots RDIMMS& LR DIMMS supporting speeds up to min 6400MT/s and scalable up to 8TB of Memory | |
| 4 | Memory configured | Server should be configured with 256GB min 6400 Mhz memory should be offered in each node. | |
| 5 | Capacity Drive | Up to 24 SFF SAS/SATA hard drives (HDDs) or SAS/SATA/NVMe solid state drives (SSDs).System should be configured with 3* 3.8 TB SSD Drive in RAID 5 | |
| 6 | Boot Optimised SSD's | Each Server should configured with 2x480GB latest hot plugable M.2 SSD Drives in RAID1. | |
| 7 | RAID/HBA Controller | 24Gbps Tri-mode RAID controller with 4GB Cache supporting RAID 0,1, 5, 6,10, 50, 60 supporting capacity drives configured in system. | |
| 8 | I/O slots | Upto 6 PCIE Gen5 and 2 Gen4 slots. | |
| 9 | FC HBA | Server should configured with 2x32G FC HBA port with SFP. | |
| 10 | Ethernet ports | Min 1*quad Port 10/25G Ethernet Ports. Populated with 4*10G SFP Apapter. | |
| 11 | Certification and Compliance | Microsoft Windows Server, Hyper-V, VMWare, Red Hat Enterprise Linux (RHEL), SUSE Linux Enterprise Server (SLES), Oracle | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| 12 | Power Supply | Platinum rated redundant Power Supply | |
| 13 | Management Integration | Support for integration with Microsoft System Center and PowerShell toolkit | |
| 14 | Power & temperature | Integrated diagnostics and Power monitoring and reporting, Dynamic Power capping. | |
| 15 | IPV 6 compliance | The Hardware should be IPV 6 Compliant ready | |

**iii. Servers (As Building block, to establishing computing solution for sub-systems/solutions) – Analytics Server**

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| 1 | Form Factor | Max. 2U Rack Mounted | |
| 2 | Configured CPU | Up to two Latest Intel® 6th Gen Xeon® Scalable processors, (To be populated with dual processor each having min 16 Cores 2.3 GHz clock speed, 60MB Cache) | |
| 3 | Memory slots | 32 DDR5 DIMM slots RDIMMS& LR DIMMS supporting speeds up to min 6400MT/s and scalable up to 8TB of Memory | |
| 4 | Memory configured | Server should be configured with 256GB min 6400 Mhz memory should be offered in each node. | |
| 5 | Capacity Drive | Up to 24 SFF SAS/SATA hard drives (HDDs) or SAS/SATA/NVMe solid state drives (SSDs). System should be configured with 3* 3.8 TB SSD Drive in RAID 5 | |
| 6 | Boot Optimized SSD's | Each Server should be configured with 2x480GB latest hot pluggable M.2 SSD Drives in RAID1. | |
| 7 | RAID/HBA Controller | 24Gbps Tri-mode RAID controller with 4GB Cache supporting RAID 0,1, 5, 6,10, 50, 60 supporting capacity drives configured in system. | |
| 8 | GPU | The Server must be configured with 2x NVIDIA L4 GPU (24GB) from day1. | |
| 9 | I/O slots | Upto 6 PCIE Gen5 and 2 Gen4 slots. | |
| 10 | FC HBA | Server should configured with 2x32G FC HBA port with SFP. | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| **11** | Ethernet ports | Min 1*quad Port 10/25G Ethernet Ports. Populated with 4*10G SFP Adapter. | |
| **12** | Certification and Compliance | Microsoft Windows Server, Hyper-V, VMWare, Red Hat Enterprise Linux (RHEL), SUSE Linux Enterprise Server (SLES), Oracle | |
| **13** | Power Supply | Platinum rated redundant Power Supply | |
| **14** | Management Integration | Support for integration with Microsoft System Center and PowerShell toolkit | |
| **15** | Power & temperature | Integrated diagnostics and Power monitoring and reporting, Dynamic Power capping. | |
| **16** | IPV 6 compliance | The Hardware should be IPV 6 Compliant ready | |

**iv. DC SAN Switch**

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| **1** | | The switch should have complete non-blocking architecture with 48 ports in a single domain concurrently active at 32 Gbps full duplex and with no oversubscription. | |
| **2** | | The switch should support auto-sensing 16 , 32 and 64 Gbps capabilities , All the 48 ports should be activated and populated with 32G SFP from day1. | |
| **3** | | The switch should be rack mountable in min 1 RU form factor | |
| **4** | | All 32 autosensing Fibre Channel ports should be capable of speeds of 16 ,32 Gbps and 64 Gbps with 32 Gbps of dedicated bandwidth for each port. | |
| **5** | | FC buffer credits available for data frames should be up to min.1000 per port and switch should support aggregate bandwitdh of 3Tbs end to end full duplex. | |
| **6** | | The switch should support non disruptive software upgrade and configuration file installation on newly deployed switches. Additionally, it provides intelligent diagnostics, protocol decoding, network analysis tools for added reliability, faster problem resolution, and reduced service costs. | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| **7** | | The switch should protect SAN and End devices from corrupted frames (inbuilt CRC and Slow Drain detection and Mitigation) | |
| **8** | | The switch must be equipped with congestion control mechanisms such that it is able to throttle back traffic away from a congested link. | |
| **9** | | The switch must be capable of creating multiple hardware-based isolated Virtual Fabric (ANSI T11) instances. Each Virtual Fabric instance within the switch should be capable of being zoned like a typical SAN and maintains its own fabric services, zoning database, Name Servers and FSPF processes etc. for added scalability and resilience | |
| **10** | | Switch management, the management software must support both Fabric wide and Device level management without the additional purchase of software. | |
| **11** | | The switch must be able to load balance traffic through an aggregated link with Source ID and Destination ID. The support for load balancing utilizing the Exchange ID must also be supported. | |
| **12** | | Offered SAN switch shall support services such as Quality of Service (QoS) to help optimize application performance in consolidated, virtual environments. It should be possible to define high, medium and low priority QOS zones to expedite high-priority traffic | |
| **13** | | The switch using FSPF protocol, the switch must be able to load balance up to 16 equal cost paths across the SAN network | |
| **14** | | Switch should provide comprehensive tool set for analyzing, troubleshooting, and debugging storage networks. Power-on self-test (POST) and online diagnostics to proactively monitor system health. Identify the exact path and timing of flows with capabilities such as Fibre Channel traceroute. Capture network traffic using Cisco Switched Port Analyzer (SPAN) and Remote SPAN (RSPAN) without any limitation. | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| 15 | | The switch should have USB port which should be able to provision the switch in addition to storing log files, firmware images and configuration | |
| 16 | | The switch should offer fabric wide, per-VSAN role-based authentication, authorization, and accounting (AAA) services using RADIUS, Lightweight Directory Access Protocol (LDAP), Microsoft Active Directory (AD), and TACACS+. | |
| 17 | | SAN Switch should provide end to end visibility of fibre channel SAN traffic. It should inspect I/O flow to bring out a unified view of the infrastructure irrespective of the architecture or OEM of storage arrays, servers or operating systems. | |
| 18 | | Switch should provide proactive and predictive troubleshooting and capable of generating automated alarms. Switch should monitor flows between the compute and storage layers, including the read and the write transactions between a host and the backend storage. | |

**v. DC Aggregation Switch**

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| 1 | | Switch should support the complete STACK of IPv4 and IPv6 services. | |
| 2 | | The proposed switches should be part of Gartner Leader Quadrant for DC Networking for last 2 years | |
| 3 | | Switch should have the following interfaces:- Minimum 48 ports support 1/10/25 Gbps SFP ports for host connectivity and 6*100G ports for Fabric/Spine connectivity. The proposed switch should support native 25G and should be populated with required optics as per solution requirement. | |
| 4 | | Switch should have console port for local management & management interface for Out of band management | |
| 5 | | Switch should be provided with power redundancy | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| 6 | | Modular OS with dedicated process for each routing protocol | |
| 7 | | Switch should support minimum 1000 VRF instances with route leaking functionality | |
| 8 | | The switch should support 400k IPv4 LPM routes | |
| 9 | | The Switch should support intelligent buffer management with a minimum buffer of 40MB. | |
| 10 | | The switch should have MAC Address table size of 90k | |
| 11 | | The switch should support 8K multicast routes | |
| 12 | | Switch should support 4000 VLANs | |
| 13 | | Switch should support 64 nos of ECMP paths | |
| 14 | | Switch should support minimum 3.6 Tbps of switching capacity. | |
| 15 | | Switch should support Network Virtualization using Virtual Over Lay Network using VXLAN | |
| 16 | | Switch should support VXLAN and EVPN symmetric IRB for supporting Spine - Leaf architecture to optimize the east - west traffic flow inside the data center | |
| 17 | | Switch should support minimum 90k of MAC addresses | |
| 18 | | Switch should support IEEE Link Aggregation and Ethernet Bonding functionality (IEEE 802.3ad) to group multiple ports for redundancy | |
| 19 | | Switch should support Link Layer Discovery Protocol as per IEEE 802.1AB for finding media level failures | |
| 20 | | Switch should support layer 2 extension over VXLAN across all DataCenter to enable VM mobility & availability | |
| 21 | | The Switch should support DC Briding i.e. IEEE 802.1Qbb Priority Flow Control (PFC), Data Center Bridging Exchange (DCBX), IEEE 802.1Qaz Enhanced Transmission Selection (ETS), Explicit Congestion Notification (ECN). | |
| 22 | | Maximum number of port channels should be 48 | |
| 23 | | Maximum no of ports in the port channel should be 32 | |

| Sr No | Description | Minimum Requirement | Compliance (Yes / No) |
|---|---|---|---|
| **24** | | The switch should support BGP EVPN Route Type 2, Type 4 and Route Type 5 for the overlay control plane | |
| **25** | | Switch should support segment routing and VRF route leaking functionality from day 1 | |
| **26** | | Switch should support Segment Routing and Layer3 VPN over Segment Routing | |
| **27** | | Switch should support multi instance routing using VRF/ VRF Edge/ Virtual Router routing and should support VRF Route leaking functionality | |
| **28** | | Switch should provide multicast traffic reachable using:<br>a. PIM-SM<br>b. PIM-SSM | |
| **29** | | Support Multicast Source Discovery Protocol (MSDP) | |
| **30** | | Quality of Service | |
| **31** | | Switch system should support 802.1P classification and marking of packet using:<br>a. CoS (Class of Service)<br>b. DSCP (Differentiated Services Code Point) | |
| **32** | | Switch should support for different type of QoS features for reaL time traffic differential treatment using:<br>a. Weighted Random Early Detection<br>b. Strict Priority Queuing | |
| **33** | | Switch should support Rate Limiting - Policing and/or Shaping | |
| **34** | | Switch should support to trust the QoS marking/priority settings of the end points as per the defined policy | |
| **35** | | Switch should support control plane Protection from unnecessary or DoS traffic by control plane protection policy | |
| **36** | | Switch should support for external database for AAA using:<br>a. TACACS+<br>b. RADIUS | |
| **37** | | VXLAN and other tunnel encapsulation/decapsulation should be performed in single pass in Hardware | |
| **38** | | Switch should support for Role Based access control (RBAC) for restricting host level network access as per policy defined | |

### vi. KVM Module

| Sr. | Item | Minimum Specifications | Compliance (Yes/No) |
|---|---|---|---|
| 1. | KVM Requirement | Keyboard, Video Display Unit and Mouse Unit (KVM) for the IT Infrastructure Management at Data Center | |
| 2. | Form Factor | 19" rack mountable should come with retractable Full HD Monitor, Keyboard and mouse pad | |
| 3. | Ports | minimum 8 ports | |
| 4. | Server Connections | USB or KVM over IP. | |
| 5. | Auto-Scan | It should be capable to auto scan servers | |
| 6. | Rack Access | It should support local user port for rack access | |
| 7. | SNMP | The KVM switch should be SNMP enabled. It should be operable from remote locations | |
| 8. | OS Support | It should support multiple operating system | |
| 9. | Power Supply | It should have dual power with failover and built-in surge protection | |
| 10. | Multi-User support | It should support multi-user access and collaboration | |

### vii. Storage Specifications

| Sr. | Parameter | Minimum Specification | Compliance (Yes/ No) |
|---|---|---|---|
| | **Make** | | |
| | **Model** | | |
| **1.** | Solution/Type | Bidder is expected to provide NAS / Scale-out NAS / SAN / Unified or equivalent storage solution meeting benchmark performance parameters specified in SLA Solution proposed should yield low cost per TB, while meeting the performance parameters.<br><br>Minimum Usable Storge: 3 PB (To be finalized by bidder as per their solution design.) | |
| **2.** | Storage | Disks should be preferably dual coated Disks should be preferably of 3 TB / 4 TB / higher capacity. Storage to have 100% capacity for all cameras of the project as per defined requirement (of the RFP). The storage design must be based on the expected data volume from the project, including the expansion requirement as per client requirement.(System capable of scaling vertically (Controller) & horizontally (disk capacity)) | |
| **3.** | Hardware Platform | Rack mounted form-factor Modular design to support controllers and disk drives expansion | |
| **4.** | Controllers | At least 2 numbers of Controllers in active/active mode. The controllers / Storage nodes should be upgradable seamlessly, without any disruptions / downtime to production workflow for performance, | |

| Sr. | Parameter | Minimum Specification | Compliance (Yes/ No) |
|---|---|---|---|
| | | capacity enhancement and software / firmware upgrades. | |
| **5.** | RAID support | Should support various RAID levels | |
| **6.** | Redundancy and High Availability | The Storage System should be able to protect the data against single point of failure with respect to hard disks, connectivity interfaces, fans, and power supplies | |
| **7.** | Management software | All the necessary software to configure and manage the storage space RAID configuration, logical drives allocation, snapshots etc.<br>Should also include storage performance monitoring and management software Should provide the functionality of proactive monitoring of Disk drive and Storage system for all possible disk failures Should be able to take "snapshots" of the stored data to another logical drive for backup purposes | |
| **8.** | Data Protection | The storage array must have complete cache protection mechanism either by de-staging data to disk or providing complete cache data protection with battery backup for up to 4 hours | |

**viii. Smart Server/Networking Rack specifications**

| Sr. | | Minimum Specification | Compliance (Yes/No) |
|---|---|---|---|
| **1** | General Requirements | Racks should be self-Contained. | |
| | | Proper Air circulation within Rack Cooling solution should be provided | |
| | | Rack should have 100% assured compatibility with all equipment's conforming to DIN 41494 (General Industrial Standard for equipment's) or Equivalent EIA /ISO / EN Standard | |
| | | The Racks should be not more than 42U in height with 800X1200 for Network/ Server application | |
| **2** | Physical Specifications | The Rack unit supported by Plinth should support a static load of at least 1,000 kg, total installed equipment weight. | |
| | | The rack should have Front Glass door and Back Metal door | |
| | | The Rack should have two side panels, top Cover, four vertical frame posts, | |
| **3** | Equipment Access & Installation | The Rack should have 31U usable Space | |
| | | The Rack should have 4No's adjustable verticals with punched square hole and Universal size alternating hole pattern offers greater mounting flexibility, with Numbered U positions | |
| | | Mounting hardware for equipment fixing included | |
| | | The front and rare doors should be easily detachable | |
| | | The front and rear doors should be openable to allow easy access | |
| | | Side panels should flush with the frame, so the overall width of the unit does not change with the side panels installed. | |

| Sr. | | Minimum Specification | Compliance (Yes/No) |
|---|---|---|---|
| **4** | Material Requirements | All weight bearing components should be made from steel | |
| | | All sheet metal parts should be Pre-Treated and powder coated. | |
| **5** | Grounding Requirements | All enclosure components i.e. frame and door should be bonded together and to rack ground point | |
| | | OEM to provide rack ground point, Provision to further ground to Telecom Ground bus bar System | |
| | | Grounding and bonding as per UL Standards | |
| | | Manufacture should provide Horizontal OR vertical Ground bus bar for equipment Grounding as per Customer / Tender Requirement | |
| | | The rack should comply minimum of IP 50 rating for protection against touch, ingress of foreign bodies and ingress of water. | |
| | | The enclosure should both protect the user from mechanical hazards and generally meet the requirements for a mechanical enclosure (stability, mechanical strength, aperture sizes, etc.) | |
| **7** | Intelligent Rack Power Distribution Units with Smart Rack Monitoring | iPDU should have UL based bus bar architecture for minimizing the down time | |
| | | iPDU should have field replaceable controller to avoid downtime in case of maintenance. | |
| | | Data provided by the PDUs should be of billing grade accuracy i.e. +/- 1% | |
| | | iPDU controller should have 2 nos x 1G network ports for network redundancy or to access from different networks, thereby differentiate external and internal networks | |
| | | iPDU should support USB or Ethernet Cascading up to 16 PDU | |
| | | iPDU should support Smart Rack management with multiple sensors like Temperature & Humidity, Water Leakage Detection, Proximity, Differential Air Pressure, Smoke detection, contact closure, Airflow, Web Camera and Asset Management System . | |
| | | iPDU should have Dual USB Ports, supporting auto mass & independent configuration, Wi-Fi, Webcam and cascading between PDUs | |
| | | Full colour chassis - PDU should be available in different coloured enclosures to choose from to ensure deployment classification | |
| | | iPDU should support sending / recording alerts to users via SNMP, SMTP, GSM SMS, etc. | |
| | | iPDU should support variety of access protocols including HTTP, HTTPS, NTP, SMTP, SSH. | |
| | | iPDU should support integration with LDAP/LDAPs and AD for secure authentication, support setting Password Policies and Strong encryption | |
| **8** | Cable Management | The manufacturer should supply 2 No Brushed cable management with detachable door for management of Horizontal Cables | |
| | | 2 No Loop type / Closed Type Cable Organizer for management of Horizontal and power cables | |
| | | 2 No 300mm Cable basket for management of Vertical Cable | |

| Sr. | | Minimum Specification | Compliance (Yes/No) |
|---|---|---|---|
| | | Electrical items such as Sockets, switches, fans etc. should have warranty for 5 years from date of installation. | |
| | | For malfunction of any units/item in the rack, the support should be provided within the next business day. | |

**ix. Server Load Balancer & Web Application Firewall At DC**

| Sr. | Minimum Specification | Compliance (Yes/No) |
|---|---|---|
| | **Make** | |
| | **Model** | |
| | **GENERAL** | |
| **1** | Proposed hardware platform should be of high performance, highly scalable, and purpose-built next Generation platform for application security with integrated functionalities of Application Load Balancer and Web Application Firewall (WAF) | |
| **2** | The appliance must support Programmability to support Automation, native integration and orchestration. | |
| | Support of JSON and Rest API for the automated-on boarding of layer2-3 objects such as routes, virtual servers, VLAN's, pools and layer7 configurations | |
| **3** | The solution should support template/script driven configurations to abstract the complexity and reduce the misconfigurations for the on boarding of applications | |
| | **HARDWARE** | |
| **5** | Virtualization feature that virtualizes the device resources – including CPU, memory, network, operating system and acceleration resources. Each virtual SLB instance contains a complete and separated environment of the following: | |
| | i. Resources | |
| | ii. Configurations | |
| | iii. Management | |
| | iv. Operating System | |
| **6** | | |
| **7** | The solution shall be provided in High Availability in Active-Active and Active-Passive Mode configuration, when deployed in dual mode and should have seamless takeover in-case if one device fails. It should also support in transparent failover between the devices, and support session mirroring, connection mirroring and heartbeat check and necessary logs to be generated for audit and compliance. | |
| **8** | The proposed solution must have the capability to provide SSL offloading using both RSA and ECC based keys | |
| **9** | The proposed appliance should provide multi-tenant design and should have below capabilities:<br>1) Application traffic isolation: Should be able to define separate address space, VLANs, Routing information and default gateways for each application<br>2) Administrative Partitions: Should ensure that specific users are granted access to only the partitions for which they are authorized | |

| Sr. | Minimum Specification | Compliance (Yes/No) |
|---|---|---|
| **10** | . The proposed solution should provide certificate-based authentication between IOT devices and Load Balancer | |
| **11** | The proposed solution must provide below application optimization features:<br>1) TCP Optimization: Should be able to modify TCP parameters like keep alive interval, maximum RTO, window size, Nagle Algorithm, delay window control, packet loss ignore rate, flow control, congestion control speed etc. on the fly to improve application performance<br>2) Hardware based Compression: Solution should be able to provide cost-effective offloading of traffic compression processing to improve page load times and reduce band<br>idth utilization.<br>3) Caching: Solution should be able to do caching to reduce network traffic and increase application performance | |
| **12** | The proposed solution must offer out of band programming for control plane along with data plane scripting for functions like content inspection and traffic management | |
| **13** | Server Load Balancer should support SQL-based querying for the following databases for health checks: • Oracle • MSSQL • MySQL • PostgreSQL | |
| **14** | Should have administration partitioning and segmentation with different routing separation, whereby the physical device can span across multiple network segments without any inter device routing. The solution should support segmentation to use of the same IP address across the multiple network segments. | |
| **15** | The Proposed solution should have application delivery features such as Layer-7 load balancing, Layer-7 content switching, caching & compression. | |
| **16** | The Proposed solution should be able to monitor the applications using intelligent application monitors which can be either using system defined executable scripts. It should also provide mechanism to bind multiple health checks, support for application specific VIP health check and next gateway health checks | |
| **17** | The system must support proxy SSL function that allows inspection of SSL encrypted traffic while clients are directly authenticated by the backend servers. | |
| **18** | It should have the ability to granularly define the key exchange algorithm, ciphers and signing algorithm for the SSL & TLS connection as per the application need. | |
| **19** | The solution should provide OWASP Compliance Dashboard which provides holistic and interactive interface that clearly measures app's compliancy against the OWASP Application Security Top 10 and also provide suggestions/shortcuts to address the compliances and configure policies for it. | |
| **20** | The WAF solution must support Security Policy to be applied per application, rather than one single policy for an entire system. | |
| **21** | The Solution must protect the Application against credential theft from man-in-the-middle (MITM) and MITM browser attacks by encrypting and obfuscating the form parameters. The Solution must be flexible | |

| Sr. | Minimum Specification | Compliance (Yes/No) |
|---|---|---|
| | enough to configure the data encryption level, URL list, parameters, etc., to be protected against such attacks. | |
| **22** | WAF correlation should identify complex attack chains, and not just aggregate events based on attacks or sources along with advanced BOT detection mechanism based on smart combination of signature-based and heuristic analysis. | |
| **23** | WAF should support source based brute force and distributed brute force protection with source IP based and URL based rate limiting. | |
| **24** | Solution should provide automatic and manual updates to the signature database to ensure complete protection against the latest web application threats. New signatures should be in detection mode for some days and can be enforced in blocking mode based on our requirement. | |
| **25** | The Solution must protect against HTTP, HTTPS and Application layer DOS and DDOS attacks including stress-based DOS and Heavy URL attacks. The solution must support all the common web application vulnerability assessment tools (Web application scanners) . | |
| **26** | The Solution must detect and mitigate L7 DDoS attacks originating from a bot-net using application based behavioural analysis that learns application level parameters like HTTP request methods, reply types, average object size and more. | |
| **27** | The solution should be able to "clock" error responses to hide sensitive server related information in the response body and response headers. It should also facilitate hiding/masking sensitive parameters in logs policy wise. Device should support File Upload Violation & scanning for malicious content in Uploads through ICAP integration. | |
| **28** | System should support inbuilt ability or integration with any 3rd party solution to encrypt the user credentials in real time at the browser level (data at rest) before the traffic hits the network so as to protect the credentials especially password, Aadhar number or any other sensitive parameter to protect from cyber actors, key loggers and credential stealing malware residing in the end user's browsers. Necessary logs to be generated for audit and compliance. | |
| **29** | The solution must distinguish between browsers and bots which are able to execute Java script by using advanced techniques such as browser capability challenge and CAPTCHA challenge to do device fingerprinting. Should provide PCIDSS compliance requirements for web application servers. Necessary logs to be generated for audit and compliance. | |
| **30** | **Solution should support the following Security Protections:** | |
| | ZERO DAY ATTACK PROTECTION should be provided by behaviour-based protection with automatic signature creation against unknown, zero-day DDoS attacks. | |
| **31** | Should be able to uniquely detect and block if required the end user on the basis of internal IP address, Plug-ins Installed in the browser, OS, system files etc. instead of going with traditional IP based blocking only. | |
| **32** | Proposed solution should be capable of identifying the Client IP address through Geo-location IP database and provide controls to | |

| Sr. | Minimum Specification | Compliance (Yes/No) |
|---|---|---|
| | prevent identity theft, financial fraud and espionage activities. WAF should allow IP addresses or IP range for bypassing applied security policy for particular application, but should not bypass for others | |
| | Proposed solution should be capable of detecting unusual or unexpected patterns in the web traffic and rate limit based on specific URI. | |
| | Ability to enforce a given user to follow a sequences of pages while accessing | |
| **33** | The solution must be able to block transactions with content matching known attack signatures while allowing everything else. The solution should also have an option to put a signature in staging mode. Meaning that the system applies the attack signatures to the web application traffic, but does not apply the blocking policy action to requests that trigger those attack signatures. | |
| **34** | Must support multiple HTTP versions such as HTTP/1.0, HTTP1.1 & HTTP 2.0. Should validate header length, content length, Body length, Parameter length, body line length etc. | |
| | WAF solution should have GraphQL content profile and policy template and attack signatures on GraphQL traffic | |
| **35** | Solution should support the performing of comprehensive countermeasure to protect against zero-day attack, Challenge – Response Mechanism like Java script challenge, which should be able to detect and protect attacks in real time through inbuilt Captcha Mechanism. Necessary logs to be generated for audit and compliance | |
| **36** | Proposed Solution should have capability to automatically fetch signatures for relevant software, server technology. These signatures need to get updated on regular interval basis as and when released by OEM. | |
| **37** | WAF should support normalization methods such as URL decoding NULL byte string, termination, converting backslash to forward slash etc. | |
| | Solution must provide the following Features and Protections against various attacks:<br>1) Open Web Application Security Project (OWASP) Top 10 attacks<br>2) OWASP Top 10 API security<br>3) Parameters Tampering<br>4) Cookie Poisoning<br>5) SQL Injection<br>6) Session Hijacking<br>7) Heavy URL protection<br>8) Web Page Parameter Security<br>9) forceful Browsing<br>10) L7 DDOS attacks<br>11) Debug Options<br>12) Backdoor<br>13) Buffer Overflow Attacks<br>14) Data Encoding<br>15) Cross-Site Scripting (XSS)<br>16) Brute Force Attacks<br>17) OS Command Injection | |

| Sr. | Minimum Specification | Compliance (Yes/No) |
|---|---|---|
| | 18) Cross Site Request Forgery (CSRF)<br>19) Information Leakage<br>20) Path (directory) Traversal<br>21) Predefined resource location<br>22) Behavioral based detection and protection<br>23) Web application layer customized protection<br>24) White listing based protection<br>25) API (Application Programming Interfaces) protection<br>26) Support for JASON and XML format in API security.<br>27) Dynamic Bot protection and mitigation using script or challenge-response mechanism<br>28) Sensitive data exposure protection for example, passwords, credit card etc.<br>29) Unauthorized navigation<br>30) Anti-site scraping<br>31) HTTP/OCSP protocol validation<br>32) Cookie signing validation | |
| **38** | The proposed WAF appliance should provide real time and historical traffic logs with option to filter with multiple parameters i.e. source IP, destination IP, Port, signature, profile, custom words, etc. | |
| **39** | The WAF should support specific profiling like parameter length, meta characters etc. to configure granular controls for specific deployed web application. | |
| **40** | The solution must **have in-built function Vulnerability scanner and / or** support integration with third party DAST tool to perform virtual patching for its protected web applications. The solution must support all the common web application vulnerability assessment tolls (Web application scanners) to virtually patch web application vulnerabilities | |
| **41** | Solution must have anti-bot protection, Brute force protection with session tracking, Data Guard protection for Information leakage protection and advanced detection methods like- TPS (Transection per Second) and JavaScript, CAPTCHA Challenge and device fingerprinting. | |
| **40** | The solution must protect against FTP, SMTP, HTTP, HTTPS and Application layer Dos and DDOS attacks including stress based DOS and Heavy URL attacks. | |
| **42** | The solution should be able to perform profiling of JSON with dedicated JSON parser to inspect all JSON messages and apply security policies to embedded object pairs and binary payloads. Solution should enforce JSON security policy parameters, such as restricting URL wildcards and parameters, malformed data, and JSON payloads, methods and objects. | |
| **43** | The solution should be able to protect web applications that include Web services (XML) content like:<br>• Full Schema/WSDL validation<br>• Backend application parser protection against XML DOS<br>• XML Encryption and XML Signatures<br>• Granular WSDL methods selection | |

| Sr. | Minimum Specification | Compliance (Yes/No) |
|---|---|---|
| 44 | The proposed solution must support SSL VPN and Single Sign On functionality on same hardware solution running on same OS version from same OEM in future. | |
| | **MANAGEMENT** | |
| 45 | Proposed WAF Solution should be managed from dedicated Central Management solution i.e. Administration /Management /Logging /Reporting, etc. | |
| 46 | The proposed WAF and Management solution should be capable for backup and restoration of configuration, traffic logs, system logs, etc. | |
| 47 | Proposed WAF Solution and Management solution should be accessible through GUI (including TLS 1.0, TLS 1.1, TLS 1.2 or TLS 1.3) & SSH (including V3) | |
| 48 | If Central management solution is not available at DC then the WAF appliance should have capability to be managed locally or through secondary management at DR and vice-versa. | |
| 49 | Should have diagnostics capability support (e.g. logs, core dumps, Syslogs, configurations etc.) which can be used to share with Technical support team in case of any malfunctioning by the devices. Should have online vulnerability and configuration diagnosing tool. | |

### 7.6. Technical Specification of IP Phone with Headset

| Sr. | Parameter | Minimum requirement | Compliance (Yes / No) |
|---|---|---|---|
| 1 | Display | Two line or more, monochrome display or colour display for viewing features like messages, directory etc | |
| 2 | Integral Switch | 10/100 mbps for a direct connection to a 10/100 BASE- T Ethernet network through an RJ-45 interface | |
| 3 | Speaker Phone | Yes | |
| 4 | Headset | Wired, Noise Cancelling headset with mouthpiece microphone, port compatibility with IP Phone. | |
| 5 | VoIP Protocol | SIP V2 | |
| 6 | POE | IEEE 802.3af or better and AC Power Adapter (Option) | |
| 7 | Supported Protocols | SNMP, DHCP, DNS | |
| 8 | Codecs | G.711, G.726, G.729 including headset and speaker phone | |
| 9 | Speaker Phone | Full duplex speaker phone with echo cancelation speaker on/off button, microphone mute. | |
| 10 | Volume Control | Easy decibel level adjustment for the speaker phone, headset and ringer | |
| 11 | Phonebook/ Address Book | Minimum 100 contacts | |

| Sr. | Parameter | Minimum requirement | Compliance (Yes / No) |
|---|---|---|---|
| 12 | Call Logs | Access to missed, received and placed calls. (Minimum 20 overall) | |
| 13 | Clock | Time and Date on Display | |
| 14 | Ringer | Selectable Ringer tone | |
| 15 | Directory Access | LDAP standard directory | |
| 16 | QoS | QoS mechanism through 802.1 p/q | |
| 17 | Main telephony features - | Hold, transfer, forward (unconditional/no-answer/busy), 3-way conferencing, call park/pickup, call waiting and call history. Network interface- Ethernet ports, LCD Display, RJ9 headset jack. Headset compatible to telephones and IP phones(RJ9 interface) | |

### 7.7. Technical Specifications for IP-PBX and Voice Gateway

| Sr. | Minimum requirement | Compliance (Yes/ No) |
|---|---|---|
| 1 | Should have universal slots in cabinet/chassis. | |
| 2 | System shall have power supply redundancy | |
| 3 | Environmental Conditions: a. Operational temperature: 0 to 40 Degree C. b. Storage -20-degree C to +65-degree C. Humidity 10% to 90% without condensation | |
| 4 | The exchange cabinet should field replaceable RAM, flash, DSPs, PSUs, fan tray, and main board module for enhanced reliability | |
| 5 | Number of SIP Extensions should support 16 ch. | |
| 6 | SIP Extensions should Expandable upto 64 ch. | |
| 8 | It should be equipped with 2 PRI | |
| 9 | The voice/media Gateway may be a dedicated standalone voice / media gateway. | |
| 10 | Shall have at least 2 x 10/100/1000Base T ports. | |
| 11 | It should support variety of Voice interfaces like FXO, FXS, Channelized PRI (E1), etc. | |
| 12 | It shall have embedded voice / video capable digital signal processor (DSP) or equivalent. | |
| 13 | The voice gateway should have minimum 160 channel DSP resource scalable to 500 channels. | |
| 14 | It should be capable of Survivable Call Control functionality so as to provide fall back call control service to locally connected IP and Analog phones, in case the remote site loses all connectivity to both the primary & secondary Call Control Servers. The survivability call control system has to provide all telephony features to the end users that are available from the main call control system. | |

| Sr. | Minimum requirement | Compliance (Yes/ No) |
|---|---|---|
| 15 | It shall support QoS including classification, marking and prioritization. | |
| 16 | Shall have support for management using CLI, Web UI (HTTP/HTTPS), Telnet, SSH and SNMPv3 as well as out of band management through console. | |
| 17 | The entire solution (IP PBX, its hardware, IP Phones, Voice gateway, recording server, headsets etc.) should be from same or different OEMs ensuring smooth integration. | |
| 18 | If Auto Attendant facility, Number of Auto Attendant Channels for concurrent calls | |

### 7.8. Technical Specifications for IP Based PA System

| Sr. | Minimum requirement | Compliance |
|---|---|---|
| 1 | IP amplifier with minimum 250 Watts, Class D. | |
| 2 | Native IP connectivity, no convertors to be used | |
| 4 | Automatic Volume Control | |
| 5 | Frequency Response: 50Hz to 15000 Hz for Amplifier | |
| 6 | 2 Inputs and 1 Output relay contacts in Amplifier | |
| 7 | Speaker: Minimum 2 to 4 speakers 25 W capacity | |
| 8 | Frequency Response of Speaker 350 -10,000Hz | |
| 9 | Line Monitoring Facility for speakers | |
| 10 | IP55 for amplifier and IP65 for speaker or better | |
| 11 | Central Software based server application capable of working on virtual environment/cloud with 100% redundancy | |
| 12 | PA Master Controller to have facility for multiple mic inputs, direct dialing buttons, Colour LCD screen | |
| 15 | Software Client for making Calls to PA | |
| 17 | Transmission bandwidth 16000 KHz | |
| 18 | Should have the capability to control individual PAS i.e. to make an announcement at select location (1:1) or multiple locations (1: many). The PAS should also support both, Live and Recorded inputs | |

**Note:** Bidder / OEM may propose any equivalent or better specification than RFP as per project requirements at no extra cost to BTD.

We agree and understand that the BTD reserves right to ask bidder to show any or all the compliances in the product data sheet or any other document from the OEM. The bid may be rejected and EMD may be forfeited and / or contract may be terminated, and Performance Security may be forfeited as applicable, at sole discretion of BTD in case of any inconsistency found / observed anytime during the tendering process of contract period.

Thanking you,

Yours faithfully
(Signature of the Authorized signatory of the Bidder)

Name and Designation:
Seal:
Date and Place:
Business Address:

## 8. Format 8: Functional Requirements Deviation Matrix

<< To be printed on Bidder /Lead Bidder Company's Letter Head and Signed by Authorized Signatory>>

**TO WHOMSOEVER IT MAY CONCERN**

**Functional Requirements Compliance Matrix**

**Subject: Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis– Functional Requirements Deviation Matrix.**

Please find below, duly filled Functional Requirements Deviation Matrix.

| Sl. No | RFP Clause No. | RFP Page Number | RFP Clause (Entire Clause with all non-deviation points) | Compliance (No) | Details of Alternative Proposed |
|---|---|---|---|---|---|
| Eg. | | | | No | |
| Eg. | | | | No | |
| 1 | | | | | |
| 2 | | | | | |

**We agree and understand that the BTD may or may not consider the deviation and alternative proposed at its sole discretion, and it shall be final and binding on the MSI.**

BTD reserves right to ask bidder to show any or all the compliances in the product data sheet or any other document from the OEM. The bid may be rejected and EMD may be forfeited and / or contract may be terminated and PBG may be forfeited as applicable, at sole discretion of BTD in case any inconsistency found / observed anytime during the tendering process of contract period.

**We assure that all the points not covered above in the deviation are all complied with, and we will be able to deliver to the RPF requirements if selected as Successful Bidder.**

Thanking you,

Yours faithfully

(Signature of the Authorized signatory of the Bidder)
Name:
Designation:
Seal:
Date:
Place:
Business Address:

# Annexure Set III – Envelope B

## 1. Format 1: Commercial Bid Covering Letter

<< To be printed on the Bidder's (Lead Bidder in case of Consortium) Letter Head and shall be signed by Authorized Signatory>>

Tender No.: Date:

To,
State Transport Commissioner,
2nd Floor, Visvesvaraya Bhawan,
J L N Marg Patna - 800001
Tel: 0612-2547448
Email ID: stcbihar@bihar.gov.in

Dear Sir,

**Subject: Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis- Commercial Bid Covering Letter**

1) I, the undersigned Bidder, having read and examined in detail all the bidding documents in respect to "Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Intelligent Traffic Management Systems (ITMS) for Road Safety and Operate & Maintain for a period of 10 years for Bihar State", do hereby propose to provide our services as specified in the RFP.
2) **Price and Validity:**
   2A. All the prices mentioned in our bid are in accordance with the terms as specified in the bidding documents. All the prices and other terms and conditions of this bid are valid for a period of 180 days from the date of opening of the Commercial Bid.
   2B. On completion of the validity period, unless the Bidder withdraws its bid in writing, bid validity shall be deemed to be extended until such time that the contract is awarded to Successful Bidder or bidder formally (in writing) withdraws its bid. BTD reserves the right to direct the bidder to extend the validity of Bid for consideration for further evaluation post bid validity period, and keep the EMD in its possession during such period.
3) **Taxes:** We have studied the clause relating to Indian Income Tax and hereby declare that if any applicable direct or indirect taxes (Foreign, Central or State or Local), rates, duties, charges and levies (Foreign, Central or State or Local), is altered under the law, we shall pay the same. If applicable, all taxes, duties, levies and charges which are to be paid for the delivery of services have been paid by the Bidders in their respective countries.
4) **Deviations:** I hereby declare that all terms and conditions mentioned in RFP (all volumes, Annexures and Corrigendum) are acceptable to us without any deviation and all the services shall be performed strictly in accordance with the bid documents.
5) **Unit Rates:** I have provided in the relevant schedules enclosed, the unit rates for the purpose of price adjustment in case of any increase to / decrease from the scope of work under the contract. We shall abide by the rates provided by us for all the line items for

the entire duration of Contract period for any increase / decrease in scope of work as approved by BTD.

6) **Qualifying Data:** I confirm having submitted the information as required by you under Instruction to Bidders. In case you require any other further information / documentary proof in this regard before evaluation of our Tender, we agree to furnish the same in time to your satisfaction.
7) **Performance Security:** I hereby declare that in case the contract is awarded to us, we shall submit the Performance Security in the form prescribed in the RFP.
8) **Bid Prices:** I hereby declare that our Bid Price of Amount as mentioned in the Commercial Bid is all inclusive covering all the expenditure for the entire project period is for the entire scope of the work as specified in the RFP documents and shall not vary throughout the entire contract period unless specifically agreed by BTD in writing, and that Commercial Bid is exclusive of GST.
9) I hereby declare that our bid is made in good faith, without collusion or fraud and the information contained in the bid is true and correct to the best of our knowledge and belief.
10) I understand that our bid is binding on us and that you are not bound to accept a Bid you receive. I confirm that I am severally responsible for this commercial offer.

Thanking you,
Yours faithfully

(Signature of the authorized representative of the Bidder)

Name:
Designation:
Seal:
Date:
Place:
Business Address:

## 2. Format 2: Commercial Bid Format

<< To be given in Excel Format on Tendering portal>>

**Commercial Bid**

To,
State Transport Commissioner,
2nd Floor, Visvesvaraya Bhawan,
J L N Marg Patna - 800001
Tel: 0612-2547448
Email ID: stcbihar@bihar.gov.in

**Subject: Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis– Commercial Bid Format**

Please find below detailed Commercial Bid for the subject project. This bid is exhaustive and includes all the required components and services to be consumed during the execution of this project. The rates quoted are all inclusive, i.e. inclusive of all taxes, levies, other expenses:

| Sr. | Item | Description | in INR | |
|---|---|---|---|---|
| | | | (Up to two decimals only) (all inclusive, excluding GST) | In words |
| 1 | **Part A - Implementation Charges** | **"One Time Capex" as per the BoQ** | E.g. XX. XX | |
| 2 | **Part B - Operations and Maintenance Charges** | **"OpEx for 10 years" as per the BoQ** | E.g. XX. XX | |
| | **Commercial Bid Total (in INR) (all inclusive, excluding GST)** | | | |

**Note:**

- All the prices are to be entered in Indian Rupees ONLY
- The commercial bid evaluation will be all inclusive, excluding GST. GST will be paid as per actual rates prevailing at the time of payment.
- Prices indicated in the schedules shall be inclusive of all taxes, Levies, duties and other charges and BTD shall not pay any sum over and above the quoted rates in case of Successful Bidder.
- We agree, anytime during the project period, BTD reserves the right to ask the Bidder to submit proof of payment against any of the taxes, duties, levies indicated.

Further, we are aware that project duration is for 140 months i.e. 20 months of Implementation Stage and ten (10) years post Go-Live as defined in the RFP. The above rates shall hold good for the entire contract period, we shall be paid as per above quoted rates as agreed by BTD as per payment terms defined in the said RFP.

Thanking you,
Yours faithfully
(Signature of the authorized representative of the Bidder)
(Name, Designation, Seal, Date, Place, Business Address)

## 3. Format 3: Priced Bill of Quantity

<< To be printed on the Bidder's (Lead Bidder in case of Consortium) Letter Head and shall be signed by Authorized Signatory and to uploaded on E tender portal>>

**Commercial Bid**

To,
State Transport Commissioner,
2nd Floor, Visvesvaraya Bhawan,
J L N Marg Patna - 800001
Tel: 0612-2547448
Email ID: stcbihar@bihar.gov.in

**Subject:** Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis – Commercial Bid.

Please find detailed Bill of Quantity for each line item and entire project. We have also added additional line item separately with all the necessary justification and details (if any). All the rates are all inclusive, i.e. inclusive of all taxes(Excluding GST), levies, other expenses and charges.

| Sr | Category | SITCS of components including Warranty of 10 years | Unit of Measurement | Proposed Qty (Indicative) | All inclusive, Excluding GST (in INR) (as per Specifications attached and to fulfil all requirements of the RFP) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Unit Rate for SITC for each item | Total Capex Cost | O&M Y1 | O&M Y2 | O&M Y3 | …… | O&M Y10 | Cumulative O&M Cost for 10 Years |
| 1. | **Field Components**<br><br>**Violation Detection Systems**<br><br>**SVDS at mid-block / corridors** | **Spot Speed Detection System**<br><br>Radar + lane wise speed display Camera: Evidence Camera + ANPR + IR - as single unit or multiple - as per bidder solution.<br><br>This should also work for non-standard number plate detection ANPR can be one or more for all lanes to be covered. | 1 Lane (with Radar) | 20 | | | | | | | | |
| 2. | | | 2 Lanes (With Radar) | 200 | | | | | | | | |
| 3. | | | 3 Lanes (With Radar) | 130 | | | | | | | | |
| 4. | **Field Components**<br><br>**Violation Detection Systems**<br><br>**RLVD at junctions** | **2 Analytics**<br>Red Light Violation Stop Line Violation Detection System<br><br>Camera: Evidence Camera + ANPR + IR - as single unit or multiple - as per bidder solution.<br><br>ANPR can be one or more for all lanes to be covered | Arm Nos.<br><br>1 Lanes per Arm | 20 | | | | | | | | |
| 5. | | | Arm Nos.<br><br>2 lanes per Arm | 30 | | | | | | | | |
| 6. | | | Arm Nos.<br><br>3 lanes per Arm | 15 | | | | | | | | |
| 7. | **Field Components**<br><br>**Violation Detection Systems**<br><br>**Additional locations** | Additional ANPR Camera for various VDS Analytics (Multilane ANPR, or multiple ANPR Camera per location) | No. of Location | 600 | | | | | | | | |
| 8. | **Video Analytics / ITMS application** | **Seat Belt Violations** at SVDS location + Additional ANPR + Toll Plazas (if any) | Number of License per ANPR Camera | 1410 | | | | | | | | |

| Sr | Category | SITCS of components including Warranty of 10 years | Unit of Measurement | Proposed Qty (Indicative) | All inclusive, Excluding GST (in INR) (as per Specifications attached and to fulfil all requirements of the RFP) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Unit Rate for SITC for each item | Total Capex Cost | O&M Y1 | O&M Y2 | O&M Y3 | ..... | O&M Y10 | Cumulative O&M Cost for 10 Years |
| 9. | **licenses per ANPR Camera** | **Mobile Phone Violation** at SVDS location + Additional ANPR + Toll Plazas (if any) | Single Lane / Multi-Lane as per bidder solution | 1410 | | | | | | | | |
| 10. | | **Unauthorized Parking** (left most lane of Junctions and SVDS + Certain Additional ANPR locations) | | 715 | | | | | | | | |
| 11. | | **Two-Wheeler Violation** (No- Helmet (for front and pillion rider) AND Triple Riding) at Junctions + Certain additional ANPR locations + SVDS locations) | | 1535 | | | | | | | | |
| 12. | | **Fancy / Non- HSRP Number plate** (Junctions + Additional ANPR locations + Toll Plaza + SVDS locations | | 1535 | | | | | | | | |
| 13. | | **Wrong Way Driving / Wrong Side Driving / Reverse Driving Violation Detection System** (Left most lane of junctions + Additional ANPR locations + left most lane of SVDS locations) | | 715 | | | | | | | | |
| 14. | | **Driving in Wrong Lane Overtaking from left** All SVDS locations - with 3 lanes | | 390 | | | | | | | | |
| 15. | | **Passenger vehicle carrying more than defined capacity** (at Junctions + Certain additional ANPR locations + SVDS locations) | | 1535 | | | | | | | | |
| 16. | | **Carrying passengers in goods vehicle** (at Junctions + Certain additional ANPR locations + SVDS locations) | | 0 | | | | | | | | |
| 17. | | **Without Taillight Without Reflector** At all Toll Gates | | 200 | | | | | | | | |
| 18. | | **Fake / Forge Number Plate Detection** (at Junctions + Certain additional ANPR locations + SVDS locations) | | 1535 | | | | | | | | |
| 19. | | **Analytics for other violations using ANPR Camera** Projection of load **At Toll Gates** | | 200 | | | | | | | | |
| 20. | **Document related** | **Vehicle Document Related Violation** Expired Fitness Expired Insurance Expired PUC | As per BTD Requirement | | | | | | | | | |

| Sr | Category | SITCS of components including Warranty of 10 years | Unit of Measurement | Proposed Qty (Indicative) | All inclusive, Excluding GST (in INR) (as per Specifications attached and to fulfil all requirements of the RFP) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Unit Rate for SITC for each item | Total Capex Cost | O&M Y1 | O&M Y2 | O&M Y3 | ..... | O&M Y10 | Cumulative O&M Cost for 10 Years |
| | | Non-Use<br>Without Valid Permit<br>Without Valid ODC Permission<br>Time Restriction<br>Wanted Vehicle Detection | | | | | | | | | | |
| 21. | | **Invalid eWay Bill** | | | | | | | | | | |
| 22. | **Video Analytics licenses per Evidence Camera** | Accident Detection & Unusual Traffic at SVDS+ RLVD location + Additional ANPR (if any) | Number of License per Evidence Camera | 1535 | | | | | | | | |
| 23. | | Debris and object detection on road at SVDS+ RLVD location | | 935 | | | | | | | | |
| 24. | **Field Components**<br><br>**Other Components** | **Variable Message Signboards (3.8 mtr length x 1.8 mtr height)** VMS board + Controller + Hardware and Accessories + Mounting + UPS + VMS Software | Nos. | 38 | | | | | | | | |
| 25. | | **Public Address System** IP based PA with 2 to 4 speakers, Controller, Hardware and Accessories, UPS, Mounting Structure, and PA Software | Nos | 17 | | | | | | | | |
| 26. | | **PTZ for Incident Management and General Surveillance All other systems will also do General Surveillance** | Nos. | 219 | | | | | | | | |
| 27. | | **Signboards (1 ft. x 1.5 ft.) and mounting accessories including Galvanized Poles etc. as per IRC Guidelines**<br><br>"You are under CCTV Surveillance", <Speed Limits>, Junction name + all arms name etc.) | Per junction / location | 1070 | | | | | | | | |
| 28. | | Road Marking at RLVD junctions and SVDS locations | Per Arms lumpsum | 415 | | | | | | | | |
| 29. | **Mounting** | **Serviceable Gantry (3 lanes)** | Nos. | 230 | | | | | | | | |
| 30. | | **Gantry (3 lanes)** | Nos. | 15 | | | | | | | | |
| 31. | | **Galvanized Poles** (7 mtr to 9 mtr as per site requirement) | Nos. | 205 | | | | | | | | |
| 32. | | **Galvanized Serviceable Poles for Variable Messaging Sign Board (VMS)** (6 mtr to 9 mtr as per site requirement) | Nos. | 38 | | | | | | | | |
| 33. | | **Galvanized Poles for PTZ** (6 mtr as per site requirement) | Nos. | 87 | | | | | | | | |
| 34. | | **Galvanized Cantilever T Pole (for covering 1 / 2 /3 Lanes)** (to withstand the load and the windspeed as per local condition) | Nos. | 105 | | | | | | | | |

| Sr | Category | SITCS of components including Warranty of 10 years | Unit of Measurement | Proposed Qty (Indicative) | All inclusive, Excluding GST (in INR) (as per Specifications attached and to fulfil all requirements of the RFP) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Unit Rate for SITC for each item | Total Capex Cost | O&M Y1 | O&M Y2 | O&M Y3 | ..... | O&M Y10 | Cumulative O&M Cost for 10 Years |
| 35. | | **Galvanized Cantilever Pole (for covering 1 / 2 lanes)** (to withstand the load and the windspeed as per local condition) | Nos. | 245 | | | | | | | | |
| 36. | **Network and Power** | **Junction Box (IP 65 rated with RAIN Canopy, SS Glands 6 no., Lock, DIN Rail, Pole / Ground mounting kit) and Field Network Switch**<br><br>(including installation and all connections, Power DB, Sub Meter connectivity, Cables, Industrial Grade DIN Rail Mount POE Switch with 16 Ports with Industrial Grade SFP Modules, Industrial Grade DIN Rail PSU for switch, Terminal Block, Connectors, 12 Port Outdoor LIU, SM LC-LC Patch Cord 1 M, Power Line Surge Protector, POE Ethernet Surge Protector, MCB, RCCB, Power Strip 4X6AMP, 3 Core 2.5 Sq mm Armoured Power Cable, Armoured CAT6 Cable, Field Termination Plug, CAT 6 RJ45 Jacks, Cable Route Marker, 50mm HDPE, Metal Conduit, Flexible conduit, Lightning Arrester, Power cabling, chemical earthing and grounding etc.) | Set Per location<br><br>(One or more as per bidder Solution) | 644 | | | | | | | | |
| 37. | | **Local Processing Unit (LPU) for one or more systems at a junction / location - including SD / MMC card for local storage**<br>More than one LPUs, if required, shall be considered by the bidder as per bidder solution. | Set Per location | 644 | | | | | | | | |
| 38. | | **Electrical Junction Box** (including ACDB, MCB power switches, cabling, colling fans, space for UPS and Batteries, earthing connection etc.) | Set Per location | 644 | | | | | | | | |
| 39. | | **Pole Mounted Junction Box** (including ACDB, MCB power switches, cabling, colling fans, space for UPS and Batteries, earthing connection etc.) | Set Per location | 161 | | | | | | | | |
| 40. | | **Installation of all Poles, Gantries, Cantilever poles, T poles etc. and other Civil work**<br><br>Foundation J Bolts 4 Pieces with Nuts, Foundation Plate, Cable Entry Plate, | Set Per location | 644 | | | | | | | | |

| Sr | Category | SITCS of components including Warranty of 10 years | Unit of Measurement | Proposed Qty (Indicative) | All inclusive, Excluding GST (in INR) (as per Specifications attached and to fulfil all requirements of the RFP) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Unit Rate for SITC for each item | Total Capex Cost | O&M Y1 | O&M Y2 | O&M Y3 | ..... | O&M Y10 | Cumulative O&M Cost for 10 Years |
| | | Concrete Foundation, Lightening Arrestor Rod and Cable etc. | | | | | | | | | | |
| 41. | | Armoured 3 core 2.5 sqmm power cable | Per location | 644 | | | | | | | | |
| 42. | | Armoured 2 core 4 sqmm power cable | Per location | 644 | | | | | | | | |
| 43. | | HDPE Pipe | Per location | 644 | | | | | | | | |
| 44. | | GI Pipe | Per location | 644 | | | | | | | | |
| 45. | | CAT6 cable / OFC as per requirement | Per location | 644 | | | | | | | | |
| 46. | | Network Cable laying cost (Trenching, Ducting, Slicing, Termination, Manhole, etc.) | Location | 644 | | | | | | | | |
| 47. | | **Primary Connectivity** Minimum 50 Mbps ILL/MPLS with static IP | Location | 193 | | | | | | | | |
| 48. | | **Primary Connectivity** Minimum 25 Mbps ILL/MPLS with static IP at all other locations | Location | 451 | | | | | | | | |
| 49. | | **Secondary Connectivity** Minimum 10 Mbps ILL/MPLS with static IP at all locations / Wireless 4G / 5G line as per availability and Bidder Solution. | Location | 451 | | | | | | | | |
| 50. | | Industrial Grade Dual SIM 5G Router (Wireless Switch) | Set | 193 | | | | | | | | |
| 51. | | Recurring SIM cost - LTE (Secondary for redundancy) 5G unlimited upload | Per location | 193 | | | | | | | | |
| 52. | | DIN Rail mount Online UPS 2 KVA with Battery Bank of minimum 2 hours | Per location | 580 | | | | | | | | |
| 53. | | **Solar Panels** to provide necessary power + Charger + Installation + Mounting Accessories (to be installed on pole of respective systems) | Set | 64 | | | | | | | | |
| 54. | | **Field Solar UPS with invertor + Batteries** Minimum 2KVA (48 hrs backup with Solar as Primary Power) Li-Ion/ Li-Po Battery with Air Cooled Junction Box for 48 hrs backup | | | | | | | | | | |
| 55. | | **Electricity Connection Cost** | Location | 580 | | | | | | | | |
| 56. | | Recurring Electricity Charges for Field Components and TMC | Location | 581 | | | | | | | | |
| 57. | **Command and Control Center** | **Video Wall of 8 x 6 cubes with cube size of 55" LED display** | Nos. | 1 | | | | | | | | |
| 58. | | Videowall Processor / Controller Unit for display wall with required software | Nos. | 1 | | | | | | | | |
| 59. | | Connector cables and peripherals for Video Wall & Brackets | Lot(as Required) | 1 | | | | | | | | |

| Sr | Category | SITCS of components including Warranty of 10 years | Unit of Measurement | Proposed Qty (Indicative) | All inclusive, Excluding GST (in INR) (as per Specifications attached and to fulfil all requirements of the RFP) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Unit Rate for SITC for each item | Total Capex Cost | O&M Y1 | O&M Y2 | O&M Y3 | ..... | O&M Y10 | Cumulative O&M Cost for 10 Years |
| 60. | | Monitoring Workstations (3 Monitors per workstation) | Pcs | 20 | | | | | | | | |
| 61. | | IP phone with headset | Pcs | 20 | | | | | | | | |
| 62. | | Network Color Multifunctional Device (Printer, Scanner, Copier) with required accessories (paper, ink, toner, printer head etc.) for 10 years | Pcs | 1 | | | | | | | | |
| 63. | | IP Dome Camera System | Set | 1 | | | | | | | | |
| 64. | | Access Control System (Biometric + Access Reader +Face Reader) for UPS room, TMC, Data Center etc. | Set | 1 | | | | | | | | |
| 65. | | VESDA, WLD, Rodent Repellant and Fire suppression system, Addressable Fire alarm system (Panel + Detectors + alarms etc.) for UPS room, TMC and Data Center (as applicable) | Set | 1 | | | | | | | | |
| 66. | | Switches and all other networking components | Lumpsum (as Required) | 1 | | | | | | | | |
| 67. | | Civil Work for Command Center (Including false ceiling, false flooring, partitioning, step seating arrangement, Operator Consol with ergonomic chair, Popup Box, AC, Power Backup, Passive Cabling, False Ceiling, cladding, Carpet, partitioning, furniture and other Items (IT-Non IT) for Meeting room (10 Seater) officer cabin, Pantry, Reception Area etc.) | Lumpsum (as Required) | 1 | | | | | | | | |
| 68. | | Desktops for MVIs for Challans | Nos. | 20 | | | | | | | | |
| 69. | | Silent DG Set (100 KVA) for CCC-with all components, setup, accessories, cables, storage etc. + Diesel (~50 Ltrs per day)-including fuel at CCC | Set | 1 | | | | | | | | |
| 70. | | Miscellaneous (RO Water cooler, Vaccum cleaner, Coffee Machine, Pantry With associated Item, Laser Projector, Distribution rack) | Set | 1 | | | | | | | | |
| 71. | | Laptop with latest Configuration and Windows 11 Pro min. 32 GB RAM, 512 GB SSD | Nos. | 3 | | | | | | | | |
| 72. | | Min 55” Smart LED TV for Meeting room, Reception area and officer cabin, etc. | Nos. | 5 | | | | | | | | |
| 73. | **Viewing Centers** | Desktop with Monitor - for Viewing Center | Set | 37 | | | | | | | | |
| 74. | | IP phone with headset | Set | 37 | | | | | | | | |
| 75. | | 55" LED Screen with all mounting and other accessories | Set | 37 | | | | | | | | |

| Sr | Category | SITCS of components including Warranty of 10 years | Unit of Measurement | Proposed Qty (Indicative) | All inclusive, Excluding GST (in INR) (as per Specifications attached and to fulfil all requirements of the RFP) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Unit Rate for SITC for each item | Total Capex Cost | O&M Y1 | O&M Y2 | O&M Y3 | ..... | O&M Y10 | Cumulative O&M Cost for 10 Years |
| 76. | | 6 KVA 3Ph in 1 Ph out UPS with Battery Bank for 60 min backup | Set | 37 | | | | | | | | |
| 77. | | 16 Port L2 POE Switch with 4 SFP+ Modules | Set | 37 | | | | | | | | |
| 78. | | IP Dome Camera with NVR (as per requirement to cover entire area) | Set | 37 | | | | | | | | |
| 79. | | Furniture (Operator Consol with Ergonomic Chair, accessories, power and network cabling, air conditioning etc.) | Lumpsum ( As Required) | 37 | | | | | | | | |
| 80. | | Manpower - for manning all viewing Center zone wise for initial one year maximum 20 leaves per year, or with replacement | Nos. | 9 | | | | | | | | |
| 81. | | Primary - 25 MPLS / ILL / Broadband | Lumpsum | 37 | | | | | | | | |
| 82. | | Primary - 200 MPLS ILL 1 DC + CCC | Lumpsum | 1 | | | | | | | | |
| 83. | | Redundant - 200 MPLS ILL 1 DC + CCC | Lumpsum | 1 | | | | | | | | |
| 84. | | PRI Line - Primary | Lumpsum | 1 | | | | | | | | |
| 85. | | PRI Line - Secondary | Lumpsum | 1 | | | | | | | | |
| 86. | **Hosting On-premise Data Center** | On-Premise Data Center:<br>• Server Load Balancer & Web Application Firewall, IPS - IDS and other security components as per RFP Specification<br>• Core Router with adequate SFP modules as per scope of work<br>• Smart Network Core Switch with adequate SFP modules as per scope of work<br>• Aggregation Switch, 24 Port<br>• POE Access Switch with adequate ports as per scope of work<br>• 42U Smart Rack with iPDU as per specification<br>• Server Blade Chassis with OS as per technical specification, suitable to meet the functional requirements, scope of work and SLAs as mentioned in the tender document<br>• SAN/NAS Storage RAID 5 / RAID 10 configured as per scope of work (3 PB usable)<br>• SAN Switch as per scope of work and bidder solution<br>• Workstation/s | Lumpsum | 1 | | | | | | | | |

| Sr | Category | SITCS of components including Warranty of 10 years | Unit of Measurement | Proposed Qty (Indicative) | All inclusive, Excluding GST (in INR) (as per Specifications attached and to fulfil all requirements of the RFP) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Unit Rate for SITC for each item | Total Capex Cost | O&M Y1 | O&M Y2 | O&M Y3 | ..... | O&M Y10 | Cumulative O&M Cost for 10 Years |
| | | • KVM Switch as per RFP Specification<br>• Dome Cameras<br>• Comfort AC for UPS room (24 Hr. operations) (if required)<br>• Electrical Cabling & conduting<br>• Passive Network Components Including Patch Panel, LIU, OFC,<br>• Cat6 Cable, Patch Cords, Pipes, Installation & Labor Charges etc. Required Civil work (false ceiling, false flooring, partitioning, Anti Static Mat, if required etc.<br><br>(Bidders to give detailed breakup of the proposed components) | | | | | | | | | | | |
| 87. | | 50 KVA modular UPS with Solid State - LiPo /LFP Batteries/Equivalent Batteries bank with 60 min backup - at existing UPS and battery room as per RFP Specification | Nos. | 2 | | | | | | | | |
| 88. | **Software** | **Command and Control Centre Application including incident management.**<br>Geo-Map module including Base Map preparation, data layers etc. | Lumpsum | 1 | | | | | | | | |
| 89. | | **Video Management System** (VMS Base license + Per Camera License + Client license) | Lumpsum | 1 | | | | | | | | |
| 90. | | ITMS Base License | Lumpsum | 1 | | | | | | | | |
| 91. | | Video Analytics including Incident Detection | Lumpsum | 1 | | | | | | | | |
| 92. | | Enterprise Management Software (EMS) (Asset Management System, Network Management, SLA Management System etc.) | Lumpsum | 1 | | | | | | | | |
| 93. | | Mobile App - for Responder | Lumpsum | 1 | | | | | | | | |
| 94. | | GIS software | Lumpsum | 1 | | | | | | | | |
| 95. | | Contact Center Software | Lumpsum | 1 | | | | | | | | |
| 96. | | Integrations APIs -Vahan, Saarthi, NIC E-Challan, Dial 112, Mining Department, GST State E-way Bill Portal, CCTNS, Smart City, NHAI Toll Plaza Weighbridge, Existing SMS gateway, Email Services etc. | Lumpsum | 1 | | | | | | | | |
| 97. | **Misc** | **Inspection Vehicle - EV Vehicle (2026 Make) – 6-7 Seater** | Lumpsum | 3 | | | | | | | | |

| Sr | Category | SITCS of components including Warranty of 10 years | Unit of Measurement | Proposed Qty (Indicative) | All inclusive, Excluding GST (in INR) (as per Specifications attached and to fulfil all requirements of the RFP) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Unit Rate for SITC for each item | Total Capex Cost | O&M Y1 | O&M Y2 | O&M Y3 | …… | O&M Y10 | Cumulative O&M Cost for 10 Years |
| | | including drivers, operation cost, maintenance, repairs, insurance, etc. 3 vehicle - for entire implementation and O&M period - Avg. 50 km per day run. | | | | | | | | | | |
| 98. | | **Insurance Cost** For Theft, Fire, Death, Third Party Damage etc. | LumpSum | 1 | | | | | | | | |
| 99. | | **RoW permission and Reinstatement Cost (to the as-is position)** post installation of pole, cantilever, gantry, network and power cables etc. | Per location | 644 | | | | | | | | |
| 100. | | Security Audit as per RFP | Lump Sum | 1 | | | | | | | | |
| 101. | | Field Survey and Field visits | Lump Sum | 1 | | | | | | | | |
| 102. | | Structural Safety Certificate | Lump Sum | 1 | | | | | | | | |
| 103. | | Cloud Hosting of all applications Application Availability, Security - and Performance in Cloud DR | Lumpsum | 1 | | | | | | | | |
| 104. | **Training** | Functional Training | At least once every year | 1 | | | | | | | | |
| 105. | | Additional Implementation Manpower (Considering all components cost are SITC Cost) | Lumpsum (As Required) | 1 | | | | | | | | |
| 106. | | Project Manager | Nos. | 1 | | | | | | | | |
| 107. | | L2 Network Engineer | Nos. | 1 | | | | | | | | |
| 108. | | VMS/ITMS Expert | Nos. | 1 | | | | | | | | |
| 109. | | System Admin / Server Admin | Nos. | 1 | | | | | | | | |
| 110. | | Database Expert | Nos. | 1 | | | | | | | | |
| 111. | **Manpower** | Field Lead Supervisor | Nos. | 2 | | | | | | | | |
| 112. | | Electrician for ICCC+DC | Nos. | 3 | | | | | | | | |
| 113. | | Lead Traffic Management Center Operator 1 x 3 shifts | Nos. | 3 | | | | | | | | |
| 114. | | Traffic Management Center Operators Minimum 9 from 7 am to 11 pm. Minimum 4 from 11 pm to 7 am | Nos. | 13 | | | | | | | | |
| 115. | | TMC Support Staff (helpdesk) + office boy | Nos. | 6 | | | | | | | | |
| | | | **TOTAL CAPEX** | **All Excluding GST** | | | | | | | | |
| | | | **TOTAL OPEX** | | | | | | | | | |
| | | | **TOTAL Project Value** | | - | | | | | | - | |

Bidder may insert additional line item here, if any with all the required details}
{Bidder may insert all the assumptions here}

We fully understand that we will be paid only according to the above commercial Bid and BTD shall pay nothing over and above the same and we declare that entire scope mentioned in the RFP document will be delivered within the quoted Commercial Bid. We also understand the quantity of the items are subjected to change (increase or decrease) as per site requirement, and the payment shall be made as per actual quantity deploy on the project as per commercial rates quoted by us in the above table and duly accepted by BTD.

Yours faithfully

Thanking you
(Signature of the authorized representative of the Bidder))
Name:
Designation:
Seal:
Date and Place:
Business Address:

# Annexure Set IV – Other Annexures

## 1. Annexure 1: Key Submission

| Sr. | Parameters | Requirement | Supporting Documents |
|---|---|---|---|
| 1. | **Bidder:**<br>**Legal Entity** | **The Bidder (All members in case of Consortium) should be:**<br>A company registered under the Indian Companies Act, 1956 / 2013 OR Limited Liability Partnership firm under LLP Act 2008, both as amended from time to time.<br><br>**Bidder (All members in case of Consortium)** should have been operating for the last **five years** in India (including name change / impact of mergers or acquisitions).<br><br>**Maximum three companies are allowed in a consortium** including the Lead Bidder, subject to compliance to the **clause 13.2** under "Instructions to Bidder". **The Lead bidder** shall be jointly and severally responsible for complete scope, whereas consortium partners shall be severally responsible only for its respective scope.<br><br>**Lead Bidder should the main Technical Member of the consortium to delivery the project.** | • Copy of Certificate of Incorporation Registration under-Companies Act 1956 / 2013 OR Registered Limited Liability Partnership deed as applicable.<br>• Copy of Certificates of incorporation, Articles of Association (AOA) and / or Memorandum of Association (MOA) clearly specifying legal entity & type of business undertaking mentioning the relevant scope.<br>• The last three financial years Income Tax returns along with the copy of PAN Number of the bidder.<br>• Copy of Registration Certificates with the GST Authorities<br>• Documentary proof such as purchase orders or certified true copy of balance sheet and PL statements for last 5 years for operation in India as on the date of publishing of RFP notice. |

| Sr. | Parameters | Requirement | Supporting Documents |
|---|---|---|---|
| 2. | **Bidder Financial:**<br><br>**Turnover** | **The Bidder (Lead Bidder, in case of Consortium)** should have average annual turnover from **IT / ITeS / ICT / ITMS business** in India in last three financial years:<br>Minimum **INR 200 Crore**<br><br>**AND**<br><br>**Other consortium members, in case of Consortium** should each have average annual turnover from **IT / ITeS / ICT / ITMS business/civil / infrastructure works relevant to ITMS (poles, gantries, foundations, trenching, cabling, control-room construction)** in India in last three financial years:<br><br>Minimum **INR 50 Crore** | • Certificate from the Statutory Auditor / Chartered Accountant with valid UDIN.<br>• Copy of Audited Financial Statements<br>(In case of latest Financial Year Audited statements are not available, bidders shall be required to submit unaudited statements, along with above mentioned certificate. In case the bidder is declared as Successful Bidder, the bidder shall submit the Audited statement before issuance of LOI by BTD. Bidder shall note, the LOI shall be subject to satisfactory submission of the required certificate. BTD's decision shall be final and binding.)<br>• Details mentioned in format as mentioned in **Annexure Set 1 - Format 4 (4.1).**<br>• In case Chartered Accountant certificate is submitted the said certificate also need to be counter signed by Company Secretary / authorized signatory of the bidder. The certificate must have UDIN issued by ICAI)<br>• Balance sheet and PL statements for last three financial year |
| 3. | **Bidder Financial:**<br><br>**Net Worth** | **Bidder (All members in case of consortium)** should have positive net worth as per the audited consolidated financial statements as on 31st March 2025. | • Certificate from the Statutory Auditor / CA with valid UDIN clearly specifying the net worth of the firm.<br>• Audited and Certified Balance Sheet and Profit/Loss Account as on 31st March 2025 should be enclosed.<br>(In case of latest Financial Year Audited statements are not available, bidders shall be required to submit unaudited statements, along with above mentioned certificate. In case the bidder is declared as Successful Bidder, the bidder shall submit the Audited statement before issuance of LOI by BTD. Bidder shall note, the LOI shall be subject to satisfactory submission of the required certificate. BTD's decision shall be final and binding.) |

<table>
<tr><th>Sr.</th><th>Parameters</th><th>Requirement</th><th>Supporting Documents</th></tr>
<tr><td></td><td></td><td></td><td>• Details mentioned in format as mentioned in Annexure Set 1 - Format 4 (4.1).<br>In case Chartered Accountant certificate is submitted the said certificate also need to be counter signed by Company Secretary / authorized signatory of the bidder.</td></tr>
<tr><td>4.</td><td>Bidder Technical:<br><br>Similar Project experience</td><td>The Bidder (All Members jointly, in case of consortium) should have experience of executing minimum number of “Similar Project” with a minimum project value as per below table, in India during last 7 years.<br><br>
<table>
<tr><th>Number of similar projects executed</th><th>Minimum Project Value per project, meeting the criteria (in INR)</th></tr>
<tr><td>One Similar Project</td><td>250 Crore</td></tr>
<tr><td colspan="2">OR</td></tr>
<tr><td>Two Similar Projects</td><td>156 Crore</td></tr>
<tr><td colspan="2">OR</td></tr>
<tr><td>Three Similar Projects</td><td>125 Crore</td></tr>
</table>
<br>At least one project meeting the criteria, should be executed by the Lead Bidder, in case of consortium.</td><td>• Bidders shall submit copy of work order along with the copy of the contract agreement mentioning the relevant Scope of Work.<br>• Completion Certificate from the client<br>OR<br>• In case of on-going project AND / OR for PPP (including BOOT, BOT etc.), a Go-Live Certificate along with partial completion certificate from the Competent Authority designated by the client mentioning the relevant Scope of Work, having completed at least one year of O&M and payment received.<br><br>Details mentioned in format as mentioned in Annexure Set 1 - Format 4 (4.2).</td></tr>
<tr><td>5.</td><td>Bidder Technical:<br><br>ITMS Experience</td><td>The Bidder All members jointly, in case of Consortium) should have experience implementing Minimum Traffic Enforcement Solution (Violation Detection Systems / ITMS) including the Video Analytics Software and ANPR Camera), in any one or more (Maximum 5) “Similar Projects” in India, during last 7 years including at least three of the below:<br><br>• Speed Violation Detection<br>• Red-Light Violation Detection</td><td>• Bidders shall submit copy of work order along with the copy of the contract agreement mentioning the relevant Scope of Work.<br>• Completion Certificate from the client<br>OR<br>• In case of on-going project, a Go-Live Certificate along with partial completion certificate from the Competent Authority designated by the client mentioning the relevant Scope of Work, having implemented Traffic Enforcement Solution</td></tr>
</table>

| Sr. | Parameters | Requirement | Supporting Documents |
|---|---|---|---|
| | | • **Stop Line Violation Detection at a junction**<br>• **Wrong Way Driving**<br>• **No Helmet for Driver / Pillion**<br>• **Triple Seat riding violation detection**<br>• **Seat-belt violation detection**<br>• **Mobile phone use violation detection**<br>• **Non HSRP / Non Standard Number plate**<br>• **Lane Violation**<br>• **Parking Violation Detection**<br><br>**Minimum Traffic Enforcement Solution (Violation Detection Systems / ITMS: 200** junctions / locations | **(Violation Detection Systems / ITMS on required number of locations.**<br><br>• Details mentioned in format as mentioned in **Annexure Set 1 - Format 4 (4.2).** |
| 6. | | **The Bidder (Any one member, in case of Consortium)** should have experience implementing **Traffic Enforcement Solution (Violation Detection Systems / ITMS) including the Video Analytics Software and ANPR Camera**), **in anyone "Similar Projects"** in India, during last 7 years including at least three of the below:<br><br>• Speed Violation at a location<br>• Red-Light and Stop Line Violation at a junction<br>• Wrong Way Driving at a location<br>• No Helmet and Triple Seat riding violation detection<br>• Seat-belt violation detection at a location<br>• Mobile phone use violation detection at a location<br><br>**Minimum project with Go-Live Status:** 1 Project | • Bidders shall submit copy of work order along with the copy of the contract agreement mentioning the **relevant Scope of Work.**<br>• Completion Certificate from the client<br>OR<br>• In case of on-going project, **a Go-Live Certificate** along with partial completion certificate from the Competent Authority designated by the client mentioning the **relevant Scope of Work, having implemented Traffic Enforcement Solution (Violation Detection Systems / ITMS on required number of locations.**<br><br>Details mentioned in format as mentioned in **Annexure Set 1 - Format 4 (4.2).** |

<table>
<tr><th>Sr.</th><th>Parameters</th><th>Requirement</th><th>Supporting Documents</th></tr>
<tr><td></td><td></td><td><table><tr><th>Total Project with Go-Live Status meeting the criteria</th><th>Marks</th></tr><tr><td>< 1</td><td>00 Marks</td></tr><tr><td>>= 1 and < 3</td><td>07 marks</td></tr><tr><td>>= 3 and < 5</td><td>08 marks</td></tr><tr><td>>= 5</td><td>10 marks</td></tr></table></td><td></td></tr>
<tr><td>7.</td><td>OEM Authorization</td><td>In case the Bidder (All members jointly, in case of consortium) is not the Solution Provider / OEM of any of the Commercial Off the Shelf (COTS) product, Manufacturer Authorization Form (MAF) from the OEM or Solution Provider shall be submitted including following points:<ul><li>End-of-Support for the proposed product should not be within next five (5) years, preferably ten (10) years, from the date of publishing the RFP and End of sales during the next 24 months from the date of publishing the RFP.</li><li>In case the End-of-Support for the proposed product is less than ten (10) years from the date of publishing the RFP, the bidder / MSI shall ensure necessary replacement of such products and units as required to maintain defined SLA throughout the project period, at no extra cost to BTD.</li><li>OEM should have presence in India and have existing registered service / support Centre or establish in India within 30 days of Signing of Contract with the MSI, preferably in Bihar.</li></ul>In case the bidder is the Solution Provider / OEM of the any of the COTS product – MAF and undertaking must be submitted on the letterhead as per the RFP specified format.</td><td><ul><li>MAF from the OEM / Solution Provider in the format as per Annexure Set II – Format 6.</li><li>OEM Incorporation certificate.</li></ul></td></tr>
</table>

| Sr. | Parameters | Requirement | Supporting Documents |
|---|---|---|---|
| 8. | **Experienced Manpower** | **The Bidder (All members jointly, in case of Consortium)** as on date of submission of bid should minimum number of professionals on its roles in India as below:<br>**ITMS and / or enforcement system and / or Electronic Enforcement and / or IT and / or ITeS and / or ICT**:<br>Minimum 50 | • Declaration from the HR head of the Bidder on company letter head as per **Annexure Set I - Format 7. (**BTD reserves right to ask for EPF payment receipts of all declared employees)<br>• Detailed CV of at least 5 employees, including Project Manager proposed to be deployed as per format in **Annexure Set I– Format 7**. |
| 9. | **Local Office in** Bihar. | **Bidder (Lead Bidder in case of consortium)** should have a local office in Bihar.<br>If Bidder doesn't have local office in Bihar, it should open a local office, preferably in Patna, within 30 days from date of Signing of the contract. | • Proof of the Local Office (Rental Agreement/Utility bill) in Bihar OR Undertaking from authorized signatory to open the local office in Bihar within 30 days from Date of Signing of contract. |
| 10. | **Certifications** | **The Bidder (all members jointly, in case of consortium)** should possess the following Certifications which are valid as on last date (deadline) of bid submission:<br>• ISO 9001:2015 or above<br>• ISO 20000:2018 or above<br>• ISO 27001:2018 or above<br>• CMMI level 3 or above | • Copy of valid certificates on the name of the Bidder.<br>• **The certifications shall need to be kept valid throughout the duration of the contract period.** |
| 11. | **Blacklisting** | **Bidder (all members in case of consortium)** and **OEMs of ITMS and Software, IP Camera, Video Management & Video wall** should not have been blacklisted by any Government (State / Central / UT) or its Department, Central or State Public Sector Unit / Defence / Govt. Boards / Urban Local Bodies in India since last 3 as on last date of submission of bid. | • Undertaking by authorized signatory of bidder (all members in case of consortium) as per format given in **Annexure Set I - Format 5.**<br>• Undertaking by authorized signatory of respective OEMs |
| 12. | **Payment** | • Scanned copy of EMD uploaded & original EMD to be submitted & Bid Submission Cover Letter-**Annexure Set I - Format 1** | |
| 13. | **Additional requirement** | • Board Resolution authorizing a person from Bidder or Power of Attorney to sign / execute the bid as a binding document and execute all relevant agreements forming part of bid.<br>• Power of Attorney to sign / execute the bid as Lead Bidder among consortium, and Joint Bidding Agreement.<br>• Self-Declaration as per **Annexure Set I - Format 8.** | |

| Sr. | Parameters | Requirement | Supporting Documents |
|---|---|---|---|
| 1. | **OEM Criteria:** ITMS | OEM supplying the **Minimum Traffic Enforcement Solution (Violation Detection Systems / ITMS)** to the Bidder should have supplied / operated the **Minimum Traffic Enforcement Solution (Violation Detection Systems / ITMS)** for similar solutions in **any one or more (Maximum 10) operational "Similar Project"** in India during last 7 years.<br><br>**Such systems shall at minimum include at least three out of below violations:**<br>**xxi. Speed Violation Detection**<br>**xxii. Red-Light Violation Detection**<br>**xxiii. Stop Line Violation Detection at a junction**<br>**xxiv. Wrong Way Driving**<br>**xxv. No Helmet for Driver / Pillion**<br>**iii. Triple Seat Riding**<br>**xxvi. Seat-belt violation detection**<br>**xxvii. Mobile phone use violation detection**<br>**xxviii. Non HSRP / Non Standard Number plate**<br>**xxix. Lane Violation**<br>**xxx. Parking Violation Detection**<br><br>**Minimum Traffic Enforcement Solution (Violation Detection Systems / ITMS:** 500 junctions / locations OR **Min. 5000 analytics license (applicable only to the violation mentioned above)** | • OEM shall submit Purchase Order and invoice/s raised to the System Integration along with necessary evidence (including Work Order and / or Agreement and / or any other authentic documentary evidence) that the purchase order is against the "Similar Project", executed by the System Integrator, meeting the criteria.<br>• OEM shall submit work completion certificate from end user or respective System Integrator regarding supply / usage of respective product.<br>• BTD reserves right to seek for more evidence as part of clarifications to substantiate the claims of the OEM for the respective criteria.<br><br>Details mentioned in format as mentioned in **Annexure Set 1 - Format 4 (4.3).** |
| 2. | **OEM Criteria:** IP Camera | OEM supplying the Cameras to the Bidder, for using video analytics based Electronic Enforcement and Violation Detection System should have supplied **at least 2500 IP** | |

| Sr. | Parameters | Requirement | Supporting Documents |
|---|---|---|---|
| | | **Cameras** for similar solutions in **one or more (maximum 5) operational "Similar Projects"** in India during last 7 years.<br>IP Cameras mean all ANPR, Overview / Evidence Camera – Fixed / Bullet, PTZ | |
| 3. | **OEM Criteria:**<br><br>Video Management System | OEM supplying the Video Management System to the Bidder should have supplied / operated the VMS for at least **1500 IP Cameras** for similar solutions **in one or more (maximum 5) operational "Similar Projects"** with varied model camera OEM in India during last 7 years. | |
| 4. | **OEM Criteria:**<br><br>Enterprise Management System | OEM supplying the EMS solution to the Bidder should have supplied / operated the EMS System for monitoring & managing at least **1500 end – nodes** (including IT assets – Camera, Switch, server, etc.; Non-IT Assets, JB, KVM etc.) for similar solutions **in one or more (maximum 5) operational "Similar Projects"** in India during last 7 years. | |
| 5. | **OEM Criteria:**<br><br>Networking Components | The OEM must have a functional R&D Center and TAC (Technical Assistance Center) in India, along with a dedicated toll-free support number.<br>The OEM must have had an established presence in India for at least 15 years.<br>The OEM must have successfully executed at least one large-scale surveillance project deployment in India, which min should include:<br>1) A minimum of 500 field switches, servers, and storage systems for at least 4,000 cameras.<br>2) Associated data center technologies to support the deployment.<br>Relevant completion certificates / documentary proof/ OEM Undertaking must be submitted along with the bid. | |

| Sr. | Parameters | Requirement | Supporting Documents |
|---|---|---|---|
| | | As AI is prevalent and a mandatory requirement for security in the network devices, so OEM's under consideration must be part of Project Glasswing.<br><br>The OEM of Routers must provide two large Service Provider deployment references for the same router series/model/operating system from two different service providers in India or abroad. | |
| 6. | Annexure Set I – Envelope A<br>• Format 1: Bid Submission Covering Letter<br>• Format 2: Bidder Information Format<br>• Format for Power of Attorney<br>• Format 4: Format for Financials and Technical qualification criteria<br>o Format for Financials from Statutory Auditors of the bidder<br>o Format for Technical Qualification Criteria<br>o Format for OEM Technical Qualification Criteria<br>• Format 5: Undertaking – Non-Blacklisting<br>• Format 6: Undertaking of "No Conflict of interest"<br>• Format 7: Declaration from the HR head of the Bidder for Experienced Manpower<br>• Format 8: Self Declaration<br>• Format 9: Format for Anti-Collusion Certificate<br>• Format 10: Earnest Money Deposit as Bank Guarantee<br>•<br>• Joint Bidding Agreement | | |
| 7. | Annexure Set II – Envelope A<br>• Format 1: Technical Proposal Covering Letter<br>• Format 2: Un-priced Bill of Material<br>• Format 3: Profile of Proposed Project Team | | |

| Sr. | Parameters | Requirement | Supporting Documents |
|---|---|---|---|
| | | • Format 4: Details of Solution Partners<br>• Format 5: Undertaking - Technical Support Arrangement with OEM<br>• Format 6: Manufacturer Authorization Form (MAF) from OEM<br>• Format 7: Detailed Technical Specifications and Compliance Matrix<br>• Civil / Non – IT Specification<br>• Common Specifications for IT Field components<br>• Traffic Management Center<br>• Network (City wide network backbone)<br>• Hosting Infrastructure, Core Network and Security<br>• Format 8: Functional Requirements Deviation Matrix | |
| 8. | Annexure Set III – Envelope B | • Format 1: Commercial Bid Covering Letter<br>• Format 2: Commercial Bid Format<br>• Format 3: Priced Bill of Quantity | |

## 2. Annexure 2: Format for Performance Security as Bank Guarantee

Ref. No. :
Date :
Bank Guarantee No. :

To,
State Transport Commissioner,
2nd Floor, Visvesvaraya Bhawan,
J L N Marg Patna - 800001
Tel: 0612-2547448
Email ID: stcbihar@bihar.gov.in

Against Letter of Intent / Work Order number _____ dated _____ relating to Tender No. << >> for the project "**Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement of Road Safety at identified high-risk and risk-density corridors and critical junctions for Bihar State on PPP basis**" (hereinafter referred as 'LoI' / 'Work Order') and the contract to be executed between the Bihar Transport Department, (hereinafter referred as "BTD") _____ (hereinafter called the "Successful Bidder" / "MSI"), this is to certify that at the request of the Successful Bidder we _____ Bank, and having one of the branches at _____ (hereinafter called the "Bank") are holding in trust in favour of BTD, the amount of Rs. _____ (write the sum here in words) to indemnify and keep indemnified the BTD against any loss or damage that may be caused to or suffered by the BTD by reason of any breach by the Successful Bidder of any of the terms and conditions of the contract that will be entered subsequently and / or in the performance thereof.

We agree that the decision of BTD, whether any breach of any of the terms and conditions of the contract and/or in the performance thereof has been committed by the Successful Bidder and the amount of loss or damage that has been caused or suffered by BTD shall be final and binding on us and the amount of the said loss or damage shall be paid by us forthwith on demand and without demur to BTD.

We _____ Bank, further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for satisfactory performance and fulfilment in all respects of the contract by the Successful Bidder i.e. till _____(write a date which is **140 months** from the date of signing of contract (20 months Implementation Phase, 120 Months of O&M Phase post Go-Live, and 6 months thereafter) - hereinafter called the "**said date"**) and that if any claim accrues or arises against us _____ Bank, by virtue of this guarantee before the said date, the same shall be enforceable against us _____ Bank, notwithstanding the fact that the notice of any such claim is given to us _____ Bank, by BTD either before the said date.

Payment under this letter of guarantee shall be made promptly, within one month of our receipt of notice to that effect from BTD.

It is fully understood that this guarantee is effective from the date of the said LoI / Work Order and that we _____ Bank, undertake not to revoke this guarantee during its currency without the consent in writing of BTD.

We undertake to pay to BTD any money so demanded notwithstanding any dispute or disputes raised by the Successful Bidder in any suit or proceeding pending before any court or Tribunal relating thereto our liability under this present guarantee being absolute and unequivocal without any demur, reservation, recourse, contest or protest and without any reference to the Successful Bidder or any other person.

The payment so made by us under this guarantee shall be a valid discharge of our liability for payment there under.

We _____ Bank, further agree that BTD shall have the fullest liberty, without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said contract or to extend time of performance by the Successful Bidder from time to time or to postpone for any time or from time to time any of the powers exercisable by BTD against the said Successful Bidder and to forebear or enforce any of the terms and conditions relating to the said contract and we, _____ Bank, shall not be released from liability of BTD under this guarantee by reason of any such variation or extension being granted to the said Successful Bidder or for any forbearance by BTD to the said Successful Bidder or for any forbearance and or omission on the part of BTD or any other matter or thing whatsoever, which under the law relating to sureties, would, but for this provision have the effect of so releasing us from our liability under this guarantee.

This guarantee will not be discharged due to the change in the constitution of the Bank or the Successful Bidder or any absorption, merger or amalgamation of the Bank or the Successful Bidder with any other person.

Our liability under this Bank Guarantee shall not exceed and is restricted to Rs. _____only.

The Bank declares that it has power to issue this Guarantee and discharge the obligations contemplated herein, the undersigned is duly authorized and has full power to execute this Guarantee for and on behalf of the Bank.

_____

Signature of Authorized Signatory (with official seal)

Date :
Place :
Name :
Designation :
Address :
Telephone & Fax :
E-mail address :

Signature of Witness 1 Signature of Witness 2

Name: _____ Name: _____

(Bank's common seal)

**Bank details of BTD is mentioned below can be used for Bank Guarantee:**

a) Name of Account Holder: _____
b) Bank Name: _____
c) Branch Name: _____
d) Account No.: _____
e) IFSC Code: _____

# 3. Annexure 3: Service Levels

## 1.1. Definitions

| Term | Meaning / Definition / Explanation |
|---|---|
| **SLA Period** | **SLA Period :**<br>**For Implementation Period :**<br>**SLA will be calculated as per project timelines mentioned under the Project implementation phase header under clause 1.3 SLA Parameter**<br><br>**For O&M Phase :**<br>**SLA will be calculated on monthly basis, starting from date of Partial Go-live, by the SLA management system.** |
| **Services** | Includes Hardware, applications, components, equipment, spare parts, manpower, network, electric, SMS services, including all the integrated systems and co-used components unless specifically mentioned otherwise. |
| **Total Time** | Day is considered as 24 hours<br>Week is considered as calendar week, i.e. 7 days<br>Months is considered as calendar month, i.e. 28/29/30/31 days as applicable.<br><br>It is the total number of hours available in the SLA Period (Eg. SLA Period is monthly) being considered for evaluation of SLA performance.<br><br>Total Time = No. of Days of that quarter X 24 Hrs<br>Eg: No. of days in Qtr 2 (Apr-Jun) = 91 days<br>Total Time = 91 X 24 = 2184 hrs |
| **Downtime** | It is the time period for which the specified services / components are **not available** for use at specified functional, technical and service standards. It is calculated for every SLA Period, which is being considered for evaluation of SLA performance. |
| **Uptime** | It is the time period for which the specified services / components are **available** for use, at specified functional, technical and service standards. It is calculated for every SLA period, which is being considered for evaluation of SLA performance. Uptime can be calculated for any component / service (Non -IT and IT) as follows;<br>$$\textbf{Uptime (\%)} = \left(1-\left(\frac{\textbf{Downtime}}{\textbf{Total Time – Scheduled Maintenance Time}}\right)\right) \times 100$$<br>For eg. In a quarter cycle, there are a total of 91 days x 24 hours = 2184 hours. The downtime clocked is 48 hours. Hence the calculation would be {1- [(48) / (2184 – 0)]} * 100 = 97.80% |
| **Rounding off** | All figures will be rounded off to nearest number with maximum 2 decimals |
| **Scheduled Maintenance Time** | It is the time period for which the specified services / components with specified technical and service standards are not available due to scheduled maintenance activity. Any planned application / server downtime shall not be included in the calculation of application / server availability. BTD has liberty to decide the duration of such outage, on case-to-case basis. Scheduled Maintenance Time is calculated separately for each SLA period cycle, which is being considered for evaluation of SLA performance. |

<table>
<tr><th>Term</th><th>Meaning / Definition / Explanation</th></tr>
<tr><td>Information Security Breach</td><td>Any data leakage, information sharing other than concerned stakeholders, reports sharing without the consent of BTD, any instance of hacking, information/data compromise etc.</td></tr>
<tr><td>Guidelines Breach</td><td>Non-compliance to guidelines shared by various government agencies such as complying with standards for website/mobile app development etc.</td></tr>
<tr><td>Resolution Time</td><td>It is the time elapsed from the moment incident is occurred / reported by any applicable mode of communication, to the time by which the incident is resolved completely.</td></tr>
<tr><td>Warranty Period</td><td>If any issues remain outstanding at the end of the contract period, the MSI shall be required to still provide warranty until BTD is satisfied with the resolution of the issues.</td></tr>
<tr><td>Severity Matrix</td><td>The resolution time shall vary based on the severity of the incident reported, which is categorized as below:<br>i. Critical: Incidents which, have severe impact on service delivery resulting in complete halt of one or more business operations. These incidents may include, but are not limited to unavailability of critical hardware, software and severe civil damage, virus attack etc.<br>ii. High: Incidents which have significant impact of one or more business functions. These incidents may include, but are not limited to unavailability of non-critical hardware, software module, major civil damage etc.<br>iii. Medium: Incidents which have considerable impact of one or more business functions. These incidents may include, failure of one or few information providing functions or failure in execution of one or few Use Cases assigned by BTD which are not affecting the other day to day operations.<br>iv. Low: Incidents which have an impact on business operations, that is acceptable temporarily, and need to be addressed within the time-frame defined in SLA.<br><br>Response time for incidents for above mentioned severity levels is as below:
<table>
<tr><th>Type of Incident</th><th>Response Time</th><th>Resolution Time</th></tr>
<tr><td>Critical</td><td><=30 minutes from the time incident is reported</td><td><=8 hours from the time incident is reported</td></tr>
<tr><td>High</td><td><=1 hour from the time incident is reported</td><td><=12 hours from the time incident is reported</td></tr>
<tr><td>Medium</td><td><=2 hour from the time incident is reported</td><td><=24 hours from the time incident is reported</td></tr>
<tr><td>Low</td><td><=4 hours from the time incident is reported</td><td><=48 hours from the time incident is reported</td></tr>
</table>
</td></tr>
</table>

**Note:**

- In case of dispute regarding severity, BTD's decision shall be final & binding on MSI.
- Incident logging shall not be limited to raising the incident ticket by the MSI / BTD staff, the time of occurrence shall be taken as the base time of incident logging and shall be used for calculations of SLAs.

## 1.2. Service Level Conditions

### 1. General Terms of Service Level Conditions

a. The MSI shall configure the SLA Monitoring Tool as per definitions and conditions mentioned under this section.
b. Payment to the MSI shall be impacted by the penalty levied for non-performance as per SLA requirements.
c. The MSI shall be imposed a penalty on the payment due to the MSI for, at end of each SLA Period Cycle for that respective SLA Period cycle, for every deviation of the desired levels / non-compliance as defined in the SLA parameter table.
d. The afore mentioned SLA parameters shall be measured as per the individual SLA parameter requirements and measurement methods, through appropriate SLA Measurement tools to be provided by the MSI. The MSI shall need to configure the SLA Measurement Tools such that all the parameters as defined under SLA matrix given below are captured and calculated.
e. Apart from SLA monitoring tool, Incident Management System and Issues raised by Traffic Police and BTD officials shall also be taken into account.
f. During O&M Stage SLAs, shall be measured and appropriate reports be generated for monitoring the compliance.
g. In case, the downtime of any service or application is not resolved at the end of any quarter, the downtime for the same needs to be highlighted and carried forward to the next quarter from the time of call logging.
h. The SLA on the MSI shall be applicable only if the downtime / issues are attributable to the MSI. In case of co-used assets and components, the SLA shall be governed by Tripartite SLA agreement to be signed between MSI, BTD and the owner of co-used asset.

### 2. Implementation Stage SLAs

a. **Parameters**: The SLA parameters for the Implementation Stage shall be directly related to the Project Deliverable and Timelines as mentioned in the **clause 2** under "Administrative Aspects".
b. **Period**: These SLAs shall be applicable until "Commencement of Operations" / "Go-Live".
c. **Penalty Value:** As defined in SLA Parameters table. Week / Month period shall be considered as whole week (7 days together) or whole month as per calendar dates including the holidays.

### 3. Operations and Maintenance Stage SLAs

a. **Parameters**: The SLA parameters for the post-implementation stage shall be related to the ongoing operations and management of the project. The SLA Parameters table specifies performance parameters as 'Required', 'Acceptable' and 'Breach Level'. The measurements of individual SLAs shall differ as mentioned in the table.
b. **Required** parameter has the value that is always desired by BTD.
c. **Period**: These SLAs shall be applicable for the entire contract period post "Commencement of Operations" / "Go-Live".
d. **Penalty Value**: As defined in SLA parameter table.
e. In the event of non-compliance to the above conditions, BTD reserves to terminate the contract as per provisions in the resultant MSA.

f. In case, the downtime of any service or application is not resolved at the end of any quarter, the downtime for the same needs to be highlighted and carried forward to the next quarter from the time of call logging.
g. In the event of a single event triggers multiple service level failure, only specific set of SLA shall be imposed. This SLA dependencies shall be considered as mutually agreed between MSI and BTD. E.g. If the there is a Electricity failure due to which few camera systems are down, then the SLAs will be applicable for the electric cabling part only and not for other related parameters.

BTD's decision in this regard shall be final and binding on the MSI.

## 1.3. SLA Parameters

**Clause 1.3 SLA Parameter :**

| Sr. | Service Parameter | Required Performance Level | Acceptable Performance Level | Penalty during Acceptable Performance Level | Breach Level (Beyond Performance Level) |
|---|---|---|---|---|---|
| | **PROJECT IMPLEMENTATION PHASE** | | | | |
| **1.** | • Project Inception | 2 month from date of Signing of Contract | 3 months | Rs. 25,000 Per day delay | > 3 months |
| | **$T_1$ = Date of Start of Installation and Commissioning Phase**<br>Post Approval for Project Plan Document and for allocation of space at TMC, access to existing assets. | | | | |
| **2.** | • FAT for all defined items | As per defined timelines | Maximum 1 month delay | Rs. 5,000 per component per day delay | > 1 month delay |
| **3.** | • Supply of all Field Components | | | Rs. 1,000 per unit per day delay | |
| **4.** | • Failed FAT of any product | 0 FAT failed.<br><br>All proposed products shall be exactly as per defined specification & requirements | NA | Immediate Replacement of product Make and / or Model with equivalent or better with written approval from BTD<br>Rs. 10,00,000 per type of product listed for which FAT has failed | |
| **5.** | • Installation, configuration, integration, testing and commissioning of Field components<br>• Traffic Management Center Setup | 18 months | 1 months | Rs. 1,000 per unit per day delay | > 19 months |
| **6.** | • Implementation of Software Applications | | | Rs. 10,000 per Application per day delay | |
| **7.** | • Testing Report<br>• Documentation<br>• User Customization and UAT | 19 months | 20 months | Rs. 10,000 per day delay for each case and each component / system | > 20 months |
| | **$T_2$ = UAT certificate from the BTD** | | | | |
| **8.** | • Security Audit | 14 months | 15 months | Rs. 10,000 per day delay for each case. | > 15 month |

<table>
<tr><th>Sr.</th><th>Service Parameter</th><th>Required Performance Level</th><th>Acceptable Performance Level</th><th>Penalty during Acceptable Performance Level</th><th>Breach Level (Beyond Performance Level)</th></tr>
<tr><td></td><td>• Training and Capacity Building<br>• Deployment of Resources</td><td></td><td></td><td></td><td></td></tr>
<tr><td>9.</td><td>• Go-Live</td><td>20 months</td><td>21 months</td><td>Rs. 50,000 per day delay</td><td>> 21 months from estimated Go-Live date</td></tr>
<tr><td>10.</td><td>• Partial Go-Live</td><td>14 Months</td><td>15 months</td><td>Rs. 50,000 Per day delay</td><td>> 15 months from estimated partial Go-live date</td></tr>
<tr><td></td><td colspan="5">PROJECT OPERATIONS AND MAINTENANCE PHASE – OpEx</td></tr>
<tr><td>11.</td><td colspan="5">Components / locations</td></tr>
<tr><td>A</td><td>Uptime of single location (junction or otherwise) individually including one or more Field Components including but not limited to<br>• Cameras of all types and ANPR Camera<br>• Violation Detection System<br>• Variable Message Signboards<br>• Public Announcement System<br>• Controller, Local Processing Unit<br>• IR<br>• UPS<br>• Switch and other network components<br>• Other fields components</td><td>Uptime per location of >=95%<br><br>Downtime of any one component per location will be considered as location downtime</td><td>Uptime per location of >=90% and <95%</td><td>Below penalty shall be applicable per location SLA Period Cycle:
<table>
<tr><th>Cumulative Uptime per location</th><th>Applicable Penalty per location (in INR)</th></tr>
<tr><td>>=90% and <95%</td><td>30,000</td></tr>
<tr><td>>=85% and <90%</td><td>60,000</td></tr>
<tr><td>>=80% and <85%</td><td>1,20,000</td></tr>
<tr><td><80%</td><td>100% of due payment to MSI for respective location</td></tr>
</table></td><td>Uptime < 80%</td></tr>
<tr><td>B</td><td>Uptime for individually each TMC Components including but not limited to:<br>• Workstation and accessories including keyboard, mouse etc.</td><td>Uptime of >=98%</td><td>Uptime >=95% and <98%</td><td colspan="2">Rs. 30,000 per SLA Period Cycle per TMC component</td><td>Uptime < 95%</td></tr>
</table>

| Sr. | Service Parameter | Required Performance Level | Acceptable Performance Level | Penalty during Acceptable Performance Level | Breach Level (Beyond Performance Level) |
|---|---|---|---|---|---|
| | • Other TMC components | | | | |
| C | **Uptime for individually each Viewing Center Components including but not limited to:**<br>• Workstation and accessories including keyboard, mouse etc.<br>• Other TMC components | Uptime of >=98% | Uptime >=95% and <98% | Rs. **3,000** per SLA Period Cycle per Viewing Center component | Uptime < 95% |
| **12.** | **Regularly scheduled civil works** | | | | |
| | **Road Markings, Pole painting and other regularly scheduled civil works.** | Completion at the scheduled date as agreed by BTD as part of Project Plan | Within 15 days from the last date of the scheduled completion | Rs. 1,000 per day delay per pole / cantilever / arm / per component event | > 15 days delay pe event |
| **13.** | **Network (last mile)** | | | | |
| **A** | **Uptime for network services including but not limited to:**<br>• Last Mile cabling and connections for all field components<br>• MPLS / ILL / 4G / 5G<br>• Routers and Switches<br>• DC and DR link<br>*Bidder shall note, wired / wireless network shall both be equally pertinent to maintain as per SLA.* | Uptime of network at individual component / group of components / partial of full network >=98% | Uptime >=95% and <98% | Rs. **30,000** per SLA Period Cycle for individual field component, CCC and Viewing Center connectivity downtime or individual group of connected components connectivity downtime | Uptime < 95% |
| **14.** | **DC – DR Services and related services** | | | | |
| A | Uptime for each component of the on-premise Data Center | Uptime of >=99% | Uptime >=95% and <99% | Rs. **3,50,000** per SLA Period Cycle for each component or group of components | Uptime < 95%<br>**OR**<br>Uptime < 97% for 3 consecutive SLA cycle |
| B | Availability of the services of DC (on-premise Data Center at CCC) | Availability >=99.5% | Availability >=97.5% and <99.5 | Rs. **3,50,000** per SLA Period Cycle for each component or group of components | Availability <97.5% |
| C | Availability of the services of Cloud DR (and DC if applicable) | Availability >=99.5% | Availability >=97.5% and <99.5 | Rs. **3,50,000** per SLA Period Cycle for each service or group of services | Availability < 97.5% |

| Sr. | Service Parameter | Required Performance Level | Acceptable Performance Level | Penalty during Acceptable Performance Level | Breach Level (Beyond Performance Level) |
|---|---|---|---|---|---|
| D | CPU and Disk Utilization – per event | <= 75% | Utilization > 75% | Appropriates scaling up of DC and / DR as per requirement by next SLA cycle in case of occurrence of more than 100 events per server / storage. | Non scaling of hosting infra as per requirement within maximum 1 SLA Cycle |
| **15.** | **Uptime for Software Applications – applicable for all software applications, Mobile App for Responders, security applications etc.** | | | | |
| A | Availability / Uptime of software and other applications/tools (per application) | Availability / Uptime of >=98% | Availability / Uptime of >=95% and <98% | **Rs. 30,000** per SLA Period cycle per application | Uptime < 95% |
| **16.** | **Accuracy and False Alarms** | | | | |
| A | Accuracy of Violation Detection System (all types)<br>• ANPR (*Violations detected by the ITMS and not pushed to NIC ITMS by MSI shall be considered as inaccurate.)* | ± 5% variation than the defined values for less than 10% of violations detected by the ITMS | > ±5% and <= ±10% variation for 10+% of violations detected by the ITMS | 5% of the payable amount per SLA cycle | > ±10% variation |
| B | **Wrong Challans**<br><br>*(Challan issued contrary to law, evidence, configured business rules, or Authority instructions, including mis-tagging, misclassification, or duplicate issuance, as per interpretation of officials of Enforcement Agency or validated in audit.)* | <2% of Total Challans Pushed to NIC ITMS Per Month | | Deduction in number of challans for which the MSI to be paid, equivalent to 110% of the total number of detected traffic violation challans pushed to NIC ITMS by the MSI's ITMS Systems which are found to be wrong violations by the officials of designated authorities or as per Audit. | NA |
| C | Delay in push in calendar days from the date of detection of traffic violation | Pushed ≤ 7 Calendar days | NA | MSI shall not be paid for the challans pushed to NIC system beyond 7 days<br><br>Additionally, Rs. 50 per valid Challan which was detected by the system but not pushed to the NIC ITMS system by the MSI beyond 7 days. | NA |
| **17.** | **Spare Parts** | | | | |

| Sr. | Service Parameter | Required Performance Level | Acceptable Performance Level | Penalty during Acceptable Performance Level | Breach Level (Beyond Performance Level) |
|---|---|---|---|---|---|
| A | Spare Parts of each component maintained as per requirement and as agreed by BTD. | All the time | Upto 15 days delay for each component | Rs. 5,000 per component per incident of non availability of spare component | > 15 Days |
| **18.** | **Calibration** | | | | |
| A | Regular Calibration of each component as per requirement as per Calibration schedule defined by MSI and agreed by BTD.<br><br>Including compliance to the Rule 167A | Calibration of component as per pre-defined & agreed schedule | Upto 7 days delay per component | Rs. 5,000 per component unit delayed for calibration<br>*Challans without valid calibration, compliance and certification are considered as invalid challans.* | > 7 days |
| B | Replacement of components with failed Calibration | Within 7 days of calibration failed | > 7 days to <=15 days | Rs. 5,000 per component unit per day delay for replacement | > 15 Days |
| **19.** | **Security** | | | | |
| A | Virus / Malware Attack / Hacking incident and its Resolution (Detection and Quarantine / Removal) | <=4 hrs | >4 hrs to <=8 hrs | Rs. 1,00,000 per such incident reported | >8 hrs |
| | **Annual Compliances**<br>• Security Audit Certificate for hosting infrastructure and network<br>• Calibration of systems<br>• Valid certificates of the installed components<br>• Renewal of 167A certification from the designated authority of the state. | All renewals to be in place before 30 days of the end of the project year from the data of Go-Live | Between last 30 days and last 7 days of the project year | Any due payment shall be withheld during the defined period and will be cleared only upon successful renewals of the certifications.<br><br>BTD reserves the right to issue final notices to the MSI for non compliance during the last 7 days of the project year. | Delay in getting any annual compliance beyond the end date of the project year |
| **20.** | **Resolution for all above components, software, hardware, network, DC-DR, Manpower etc. based on severity level of impact** | | | | |
| A | Critical | <=4 hours | >4 to <=8 | Rs. 1,00,000 per such resolution delay reported | >8 |
| B | High | <=8 hours | >8 to <=12 | | >12 |
| C | Medium | <=12 hours | >12 to <=24 | | >24 |
| D | Low | <=24 hours | >24 to <=36 | | >36 |
| **21.** | **Manpower Availability** | | | | |

| Sr. | Service Parameter | Required Performance Level | Acceptable Performance Level | Penalty during Acceptable Performance Level | Breach Level (Beyond Performance Level) |
|---|---|---|---|---|---|
| A | Applicable for all the manpower required as defined in the RFP<br><br>OR<br>Replacement provided | Availability >=99.5% | Availability<br><br>>=95% and <99.5 | Rs. 50,000 per SLA Period Cycle per manpower resources | Availability <95% |
| **22.** | **Liquidated Damages** (Severe issues may directly lead to termination. BTD's decision in this regards shall be final and binding on MSI) | | | | |
| A | • Information Security Breach, Data Leakages<br>• Guidelines and Requirements Breach<br>• Network and System Security Breach | Resolution time <=3 hour | >3 to <=6 | Rs. 10,00,000 per such breach reported | >6 hours |

**Calculation example for SLA 15 C:**

| Eg. | **Total valid Challans detected** (excluding violations rejected by MSI) | **Total pushed within 7 days** | **Maximum challans per day as per Cashflow** *(Y1 as example with cap as 3000 challans)* | **Pushed post 7 days** | **% delayed** | **Due with cap** |
|---|---|---|---|---|---|---|
| | **A** | **B** | **C** *(either maximum cap or actual, whichever is lower)* | **D = A - B** | **E = D/A%** | **F = C x (1-E)** |
| 1 | 10000 | 8000 | 3000 | 2000 | 20% | 2400 |
| 2 | 2500 | 1850 | 1850 | 650 | 26% | 1369 |

**Note:**

- MSI shall be responsible for maintaining the SLA for the entire period of contract without exception. MSI shall ensure that during the entire contract period all components and equipment is supported by OEM warranty support. Any components / equipment approaching end of life cycle as per its OEM's policy, should be replaced with new equipment, at no extra cost to BTD. Any technology upgrade, replacement of hardware, software etc. required for the same, shall be provided by MSI at no extra cost to BTD.
- The maximum penalty per SLA cycle for the MSI shall be limited to **5% of the total monthly billing** of the respective SLA cycle. Beyond such limit, BTD reserves right to consider as reached "Breach Level".
- The maximum penalty for entire project period shall be limited **to 2% of total quoted and agreed CapEx (during the implementation phase) or 5% of O&M payment from the date of Go-live till that quarter as applicable (during O&M phase), post which, BTD reserves** right to invoke Termination Clause.

### 1.4 Breach Level

In case of SLA reaching the breach level post "Commencement of Operations", either due to individual Service Parameter or due to exceeding maximum limit, BTD may give **'Grace Period'** to the MSI for immediate next SLA Period Cycle for improving its performance, at its own discretion.

- MSI shall make necessary corrections in the operations and maintenance of the ITMS system to ensure that during such Grace Period, the **monthly** SLA penalty liability for the MSI shall be less than 2% of the monthly payment.
- MSI shall ensure that the monthly SLA penalty liability for the MSI shall reduce even post such Grace Period.

Failing which, BTD may invoke the termination clause as per MSA. The Grace Period also shall be inclusive of the Total Contract Period.

## 4. Annexure 4: Pre-Bid Queries Format

| **Name of the Bidder / OEM:** | | | | | |
|---|---|---|---|---|---|
| **Contact Address of the Bidder / OEM:** | | | | | |
| **Name of Person(s) Representing the Bidder / OEM:** | | | | | |
| **RFP Ref No.:** | | | | | |
| **RFP Name:** | | | | | |
| **Sr.** | **RFP Page No.** | **RFP Clause No.** | **Clause / Clause Title** | **Queries / Clarification / Suggestion** | **Justification by Bidder / OEM or Remarks** |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Signature:
Name of the Authorized signatory:
Company seal:
Date and Stamped

**Note:** To be submitted in the specified format in excel only to email id as mentioned in **Clause 6** under "Instructions to Bidders"

## 5. Annexure 5: List of Junctions Locations (Indicative)

**Note:** State is constantly under development, and the number and / or location of one or more junction/s may change during the implementation phase, which shall be as per requirement of BTD and binding on the MSI. The quantity of the items is subjected to change (increase or decrease) as per site requirement, and the payment shall be made as per actual quantity deploy on the project as per commercial rates quoted by MSI and duly accepted by BTD.

| Sr. | District | Location | Latitude (Mandatory) | Longitude (Mandatory) | Type of Roads (SH/MDR/Others) |
|---|---|---|---|---|---|
| 1 | ARARIA | RANIGANJ–FORBESGANJ ROAD (FORBESGANJ) | 26.16588 | 87.2713 | SH 77 |
| 2 | ARARIA | KHARAIYA BASTI ROAD | 26.143048 | 87.461028 | SH |
| 3 | ARARIA | ARARIA RAILWAY STATION(RS) MORE | 26.128908 | 87.434229 | MDR |
| 4 | ARWAL | SH-69 (KURTHA SURA) | 25.110062 | 84.811868 | RCD |
| 5 | ARWAL | SH-68 (BELSKHARA) | 25.14018 | 84.638194 | RCD |
| 6 | AURANGABAD | RAMESH CHOWK | 24.752939 | 84.374099 | RCD |
| 7 | AURANGABAD | NAWADIH CHOWK | 24.749138 | 84.380001 | RCD |
| 8 | AURANGABAD | NEAR GATE SCHOOL | 24.756556 | 84.368634 | RCD |
| 9 | AURANGABAD | CIVIL COURT (NH-219) BHABUA | 25.04049 | 83.602022 | RCD |
| 10 | BANKA | GANDHI CHOWK | 24.885483 | 86.920731 | SH |
| 11 | BANKA | DM RESIDENCE | 24.888371 | 86.915509 | SH |
| 12 | BANKA | KATORIA CHOWK | 24.747363 | 86.71855 | SH |
| 13 | BANKA | DHAKA MOR CHOWK | 24.879118 | 87.005403 | SH |
| 14 | BANKA | BONSI CHOWK | 24.802390 | 87.02365 | SH |
| 15 | BANKA | PANJWARA CHOWK | 24.85588 | 87.091246 | SH |
| 16 | BANKA | BHERAMOR CHOWK | 24.879118 | 87.005403 | SH |
| 17 | BANKA | AMARPUR CHOWK | 25.038674 | 86.903138 | SH |
| 18 | BANKA | ENGLISH MOR | 24.995707 | 86.905968 | SH |
| 19 | BANKA | SUIYA BAZAR | 24.835984 | 86.658125 | SH |
| 20 | BANKA | CHANDNI CHOWK | 24.855835 | 87.091155 | SH |
| 21 | BANKA | SAHEBGANJ CHOWK | 24.915179 | 86.624416 | SH |
| 22 | BANKA | GANDHI CHOWK | 24.885306 | 86.923543 | SH |
| 23 | BEGUSARAI | VEER KUNWAR SINGH CHOWK | 25.433128 | 86.136462 | SH |
| 24 | BEGUSARAI | LOHIA NAGAR BRIDGE | 25.422352 | 86.143178 | SH |
| 25 | BEGUSARAI | SATTA CHOWK | 25.557084 | 86.12861 | SH |
| 26 | BEGUSARAI | NEAR BARONI RAILWAY GATE | 25.579896 | 86.091794 | MDR |
| 27 | BEGUSARAI | KALI STHAN CHOWK | 25.413714 | 86.13894 | MDR |
| 28 | BEGUSARAI | KACHAHRI CHOWK | 25.413714 | 86.13894 | MDR |
| 29 | BEGUSARAI | HAR-HAR MAHADEV CHOWK | 25.420108 | 86.118628 | MDR |
| 30 | BEGUSARAI | PANAGACHHI (MATIHANI) | 25.390478 | 86.148026 | MDR |
| 31 | BEGUSARAI | MASJID CHOWK (TEGHRA) | 25.4167 | 86.1305 | MDR |
| 32 | BEGUSARAI | ENNAGA CHOWK (TEGHRA) | 25.4944 | 85.9405 | MDR |
| 33 | BEGUSARAI | VATIKA CHOWK (BARONI) | 25.46446 | 85.98504 | MDR |
| 34 | BEGUSARAI | WARD CHOWK (BALIA) | 25.425271 | 86.309722 | MDR |
| 35 | BEGUSARAI | GANDHI CHOWK | 25.417 | 86.133 | MDR |
| 36 | BEGUSARAI | AMBEDKAR CHOWK (BAKRI) | 25.5956 | 86.2559 | MDR |
| 37 | BEGUSARAI | RAJAPARA CHOWK (BAKRI) | 25.6098 | 86.273 | MDR |
| 38 | BEGUSARAI | BARI DURGA STHAN | 25.5975 | 86.2592 | MDR |
| 39 | BEGUSARAI | KHAIRPUR CHOWK | 25.413185 | 86.161801 | MDR |
| 40 | BEGUSARAI | R.C.S COLLAGE MANJHAUL | 25.549017 | 86.129056 | RCD |

| Sr. | District | Location | Latitude (Mandatory) | Longitude (Mandatory) | Type of Roads (SH/MDR/Others) |
|---|---|---|---|---|---|
| 41 | BEGUSARAI | COAL BOARD ROAD (NEAR THAKURI CHAK CHOWK) | 25.453462 | 86.01012 | RCD |
| 42 | BEGUSARAI | GAUTAM DHAM (SH-55) | 25.485133 | 86.142682 | RCD |
| 43 | BEGUSARAI | BAGHI CHOWK (B.B.S ROAD K.M-2) | 25.43222 | 86.126329 | RCD |
| 44 | BHAGALPUR | ULTAPUL | 25.242461 | 86.975779 | SH/MDR |
| 45 | BHAGALPUR | JANIPUR CHOWK | 25.180792 | 86.832592 | SH-85 |
| 46 | BHAGALPUR | SHIVNANDPUR TO KAMRAI TAK | 25.2392736 | 86.7287239 | SH-22 |
| 47 | BHAGALPUR | TADAR | 25.18173 | 87.166956 | SH-84 |
| 48 | BHAGALPUR | BALUACHAK SE NAYACHAK, MAKHNA | 25.150184 | 86.979043 | SH-19 |
| 49 | BHAGALPUR | MAHESHRAM TRIMUHAN D.P.S SCHOOL | 25.280984 | 87.418511 | SH-23 |
| 50 | BHAGALPUR | WALI MOHAMMADPUR KAJRAILI | 25.167093 | 86.945281 | SH-25 |
| 51 | BHAGALPUR | PETROL PUMP KAJRAILI BAZAR | 25.14574 | 86.935889 | SH-25 |
| 52 | BHAGALPUR | ORIUP CHAUK VIKRAMSHILA STHAL ROAD | 25.314712 | 87.306268 | MDR |
| 53 | BHAGALPUR | ANTICHAK VIKRAMSHILA MARG KHUDAI ASTHAL | 25.327466 | 87.287378 | MDR |
| 54 | BHAGALPUR | MUSLIM HIGH SCHOOL KE PASS RAILWAY CROSSING | 25.239703 | 86.963505 | RCD |
| 55 | BHAGALPUR | TRAFFIC CHECK POST JAHNAVI CHOWK | 25.31093 | 87.027891 | SH 131B |
| 56 | BHAGALPUR | TETARI ROAD DURGA MANDIR NAUGACHHIA | 25.36632 | 87.069154 | MDR |
| 57 | BHAGALPUR | MADHEPURA ROAD NEAR RAJA FUEL CENTER | 25.408338 | 87.055819 | SH 131 |
| 58 | BHOJPUR | DHANAURA MITHA | 25.18082 | 84.44277 | SH |
| 59 | BHOJPUR | NEAR SAHAR–ARWAL BRIDGE | 25.25238 | 84.63041 | SH |
| 60 | BHOJPUR | NEAR SMALL BRIDGE PETROL PUMP ON BUXAR-ARA ROAD | 25.68546 | 84.7877 | SH |
| 61 | BHOJPUR | PAKRI MOD DHARHARA | 25.55842 | 84.65551 | RCD |
| 62 | BHOJPUR | MANBHAVAN CHOWK | 25.57804 | 84.78026 | RCD |
| 63 | BHOJPUR | SAKADI MORE | 25.58162 | 84.76016 | RCD |
| 64 | BHOJPUR | BAMPALI MOR | 25.56476 | 84.61148 | RCD |
| 65 | BHOJPUR | ZERO MILE | 25.53204 | 84.64498 | RCD |
| 66 | BUXAR | JYOTI CHOWK | 25.56774 | 83.97526 | MDR |
| 67 | BUXAR | SINDICATE MORE | 25.57614 | 83.98669 | MDR |
| 68 | BUXAR | AMBEDKAR CHOWK | 25.564954 | 83.977466 | MDR |
| 69 | BUXAR | MODEL THANA | 25.571891 | 83.971704 | MDR |
| 70 | BUXAR | MUNIM CHOWK | 25.578127 | 83.977878 | MDR |
| 71 | BUXAR | JAMUNA CHOWK | 25.576242 | 83.977946 | MDR |
| 72 | BUXAR | GOLAMBER BUXAR | 25.580125 | 83.99389 | MDR |
| 73 | BUXAR | VIR KUWA SINGH CHOWK (MODAL THANA, BUXAR) | 25.57201 | 83.97166 | RCD |
| 74 | DARBHANGA | ASMA PANCHAYAT BHAWAN TO ASMA BRIDGE | 25.820785 | 86.301449 | SH-56 |
| 75 | DARBHANGA | ASMA PUL, PARO CHOWK | 25.829618 | 86.286298 | SH-56 |
| 76 | DARBHANGA | BAGH MORE | 26.169306 | 85.897712 | SH |
| 77 | DARBHANGA | BAGRASL SE BAJRANG CHOWK | 25.928424 | 86.308768 | SH-17 |
| 78 | DARBHANGA | BAHERI BAZAR MAHAVIR MANDIR CHOWK | 25.943537 | 86.046879 | SH-88 |
| 79 | DARBHANGA | BHAGAT SINGH CHOWK (BIRAUL) | 25.942521 | 86.245334 | SH-56 |
| 80 | DARBHANGA | DARBHANGA TOWER | 26.15455 | 85.891923 | MDR |
| 81 | DARBHANGA | DEKULI CHATI MORE | 26.112521 | 86.036562 | SH |
| 82 | DARBHANGA | DHOI CHATTI CHOWK TO DHOIGHAT | 26.1172819 | 85.9663502 | SH-56 |
| 83 | DARBHANGA | DHOI CHOWK | 26.144363 | 85.957504 | SH |

| Sr. | District | Location | Latitude (Mandatory) | Longitude (Mandatory) | Type of Roads (SH/MDR/Others) |
|---|---|---|---|---|---|
| 84 | DARBHANGA | DILAHI CHOWK TO FRONT OF DILAHI PETROL PUMP | 26.08522 | 85.833378 | SH-50 |
| 85 | DARBHANGA | DMCH EMERGENCY WARD TO HOSPITAL | 26.132854 | 85.899372 | RCD |
| 86 | DARBHANGA | DONAR CHOWK | 26.144264 | 85.907906 | SH-56 |
| 87 | DARBHANGA | DUMRI, DUMRI MORE, SUSAUNI MORE | 25.947416 | 86.232836 | SH-56 |
| 88 | DARBHANGA | EKMI CHOWK | 26.117178 | 85.874058 | SH |
| 89 | DARBHANGA | IDEAL SCHOOL MILKI TOLA | 25.866102 | 85.940136 | SH-56 |
| 90 | DARBHANGA | JILA SCHOOL KE PAAS | 26.13082664 | 85.89625931 | SH-50 |
| 91 | DARBHANGA | KALYANA (KALNA) | 26.154369 | 85.9635 | SH-56 |
| 92 | DARBHANGA | KARPOORI CHOWK | 26.132996 | 85.906712 | SH-50 |
| 93 | DARBHANGA | KHARKA MORE (JALE) | 26.381164 | 85.72784 | SH |
| 94 | DARBHANGA | KOTHRAM NEAR TEMUA | 25.929919 | 86.319566 | SH-17 |
| 95 | DARBHANGA | LAHERIYASARAI TOWER CHOWK | 26.118337 | 85.900094 | MDR |
| 96 | DARBHANGA | MADHAVPATTI TO MADHAVPATTI PETROL PUMP | 26.236852 | 85.839002 | SH-75 |
| 97 | DARBHANGA | MUSEUM GUMTI | 26.151992 | 85.907858 | SH-50 |
| 98 | DARBHANGA | NAVTOL & NEAR NAVTOL CHOWK | 25.987656 | 86.214416 | SH-56 |
| 99 | DARBHANGA | NEAR PARO 63 KM DARBHANGA-KUSHESHWAR ASTHAN ROAD | 25.829556 | 86.285998 | SH-56 |
| 100 | DARBHANGA | NEAR PUNACH 11TH KM OF GANDAUL-BIRAUL ROAD | 25.91648242 | 86.34804608 | SH-56 |
| 101 | DARBHANGA | OJHAL, OJHALKADAM CHOWK, OJHALI POOL | 26.112881 | 85.868157 | SH-50 |
| 102 | DARBHANGA | PANISHALA CHOWK | 26.216827 | 85.734557 | SH-97 |
| 103 | DARBHANGA | PUL GHAT CHOWK (BIRAUL) | 25.945749 | 86.247005 | SH-56 |
| 104 | DARBHANGA | SHANKAR CHOWK (JALE) | 26.388523 | 85.728628 | SH |
| 105 | DARBHANGA | SHIVDHARA CHOWK | 26.176467 | 85.878573 | SH-50 |
| 106 | DARBHANGA | SONKI BAZAR TO SONKI CHOWK, PETROL PUMP | 26.129128 | 86.00364 | SH-56 |
| 107 | DARBHANGA | SUPAUL BAZAR TO SHIVSHAKTI PETROL PUMP | 25.935198 | 86.249897 | SH-56 |
| 108 | DARBHANGA | TIRHI BRIDGE (KOTHI POOL) KM NO-17 | 26.314886 | 85.948566 | SH-56/17 |
| 109 | DARBHANGA | NEAR PUNACH IN 11TH KM OF GANDAUL - BIROAUL ROAD | 25.92216949 | 86.3385685 | RCD |
| 110 | DARBHANGA | NEAR PARO IN 63TH KM OF DARBHANGA- KUSHESHWAR ASTHAN ROAD (SH-56) | 25.828041 | 86.87109 | RCD |
| 111 | EAST CHAMPARAN | KACHHARI CHOWK | 26.632569 | 84.902564 | SH |
| 112 | EAST CHAMPARAN | BESIDE MOUNT LITERA ZEE SCHOOL | 26.661645 | 84.99487 | SH-54 |
| 113 | EAST CHAMPARAN | CHIRAIYA | 26.685906 | 85.101468 | SH-54 |
| 114 | EAST CHAMPARAN | ROOPAHARA | 26.674142 | 85.144162 | SH-54 |
| 115 | EAST CHAMPARAN | LACHMIPUR | 26.626299 | 84.878298 | SH |
| 116 | EAST CHAMPARAN | KAVALPUR | 26.605709 | 84.838929 | SH |
| 117 | EAST CHAMPARAN | PARASRAMPUR | 26.604744 | 84.807975 | SH |
| 118 | EAST CHAMPARAN | BALHA GHOWK (BETIYA GOVINDGANJ ROAD) | 26.558837 | 84.610621 | SH |
| 119 | EAST CHAMPARAN | CHHAPWA-HARSIDDHI-SEVRAHA &MTG ROAD JUNCTION | 26.5759692 | 84.6744277 | SH |
| 120 | EAST CHAMPARAN | HARIWATIKA CHOWK (BETTIAH) ON NH-727 | 26.802806 | 84.527073 | RCD |
| 121 | EAST CHAMPARAN | LALA CHAPRA CHOWK (SH-74 JOGIRAHA TO PASUPATI) | 26.331637 | 84.85124 | RCD |
| 122 | EAST CHAMPARAN | PUSHUPATI NATH CHOWK (SH-74 JOGIRAHA TO PASUPATI) | 26.51129 | 84.648458 | RCD |
| 123 | GAYA | IN THE TOWSA-KHIJARSARAI ROAD NEAR VENA MORE | 24.998672 | 85.392600 | SH |
| 124 | GAYA | MIRJA GALIB | 24.791348 | 84.993136 | MDR |
| 125 | GAYA | BANA MORE | 24.960724 | 85.088439 | SH |

| Sr. | District | Location | Latitude (Mandatory) | Longitude (Mandatory) | Type of Roads (SH/MDR/Others) |
|---|---|---|---|---|---|
| 126 | GAYA | AIMA | 24.5519 | 85.35913324 | SH-49 |
| 127 | GAYA | VILLAGE BALTHARWA KE PASS | 24.514471 | 84.637684 | SH-69 |
| 128 | GAYA | VILLAGE VISHANPUR | 24.53463 | 84.698066 | SH-69 |
| 129 | GAYA | AHIYAPUR KE PASS | 24.877754 | 84.849763 | SH-69 |
| 130 | GAYA | TUTWARI BALTI FACTORY | 24.80597 | 85.014808 | MDR |
| 131 | GAYA | NEAR VILLAGE AIMA | 24.551927 | 85.35913324 | SH-04 |
| 132 | GAYA | IN THE SWARAJPURI ROAD | 24.7951963 | 85.0006212 | SH-04 |
| 133 | GAYA | NEAR JAIPRAKASH LAKE | 24.79212 | 85.00151 | MDR |
| 134 | GAYA | NEAR VILLAGE CHIRAULI | 24.950539 | 84.831749 | MDR |
| 135 | GAYA | RAMESHWAR GARDEN NEAR TEKARI ROAD | 24.899516 | 84.863709 | MDR |
| 136 | GAYA | CHERKI BAZAR | 24.6956 | 84.8857 | SH-69 |
| 137 | GAYA | YAMUNA NADI KE PASS | 24.84307 | 84.9394 | SH-69 |
| 138 | GAYA | NEAR CHHATKUWAN | 24.551927 | 85.301499 | MDR |
| 139 | GAYA | NEAR SAGAHI BAZAR | 24.635049 | 84.85033 | SH-69 |
| 140 | GAYA | NEAR VILLAGE DUMARI MORE | 24.635049 | 84.762397 | SH-70 |
| 141 | GAYA | NEAR VILLAGE KOCHI | 24.078001 | 84.981827 | SH-69 |
| 142 | GAYA | NEAR VILLAGE DIGHASEEN | 24.48975 | 84.630088 | SH-69 |
| 143 | GAYA | SH-04, NEAR BUNIYADGANJ THANA | 24.827835 | 85.029744 | SH-69 |
| 144 | GAYA | SIKARIYA MORE NH-83 LEFT MORE PORTION | 24.777252 | 84.975846 | SH-69 |
| 145 | GAYA | KASHINATH MORE NH-83 LEFT MORE PORTION | 24.792255 | 85.000496 | SH-04 |
| 146 | GOPALGANJ | THAWE TEMPLE TRAFFIC CIRCLE | 26.4292 | 84.3946 | SH |
| 147 | GOPALGANJ | THAWE DIET (TOWARDS THAWE RAILWAY STATION) | 26.434 | 84.399 | SH |
| 148 | JAMUI | BODHWAN TALAB | 24.9169 | 86.221 | SH |
| 149 | JAMUI | MANIYADDA | 24.956424 | 86.211333 | RCD |
| 150 | JAMUI | JANTA HIGH SCHOOL, SATAYAN | 25.019663 | 86.17254 | RCD |
| 151 | JEHANABAD | NEAR POLICE STATION, MAKHDUMPUR | 25.072745 | 84.972759 | MDR |
| 152 | JEHANABAD | MAKHDUMPUR | 25.061943 | 84.970783 | MDR |
| 153 | JEHANABAD | OKARI | 25.259648 | 85.143528 | MDR |
| 154 | JEHANABAD | JEHANABAD-GHOSI RD HATI | 25.184977 | 85.040965 | SH-71 |
| 155 | JEHANABAD | GHOSHI MORE, GHOSI SH-71 ROAD | 25.165398 | 85.097129 | RCD |
| 156 | JEHANABAD | KAJI SARAI MORE, SH-71 ROAD | 25.165297 | 85.070722 | RCD |
| 157 | JEHANABAD | GHOSHI MORE, JEHANABAD SH-71 ROAD | 25.205085 | 84.9955681 | RCD |
| 158 | KAIMUR | BHABUA-ADHAURA ROD (SIO) | 25.020161 | 83.601898 | RCD |
| 159 | KAIMUR | KUDRA-BHABUA ROAD (KUKRADH) | 25.037853 | 83.651275 | RCD |
| 160 | KATIHAR | PHULWARIA NH31 | 25.567389 | 87.397187 | RCD |
| 161 | KATIHAR | NARHAIYA (SH-77) | 25.516824 | 87.249161 | RCD |
| 162 | KHAGARIA | BACHHERA CHOWK PARBATTA-MAHESHKHUT ROAD | 25.383819 | 86.730404 | MDR |
| 163 | KHAGARIA | BAKRI BUS STAND | 25.505326 | 86.460043 | MDR |
| 164 | KHAGARIA | BELDAUR THANA CHOWK | 25.596416 | 86.78699 | MDR |
| 165 | KHAGARIA | BELDAUR TILATHI CHOWK | 25.601842 | 86.79218 | SH |
| 166 | KHAGARIA | BETWEEN PARBATTA BLOCK AND THANA | 25.316542 | 86.719006 | MDR |
| 167 | KHAGARIA | BYPASS CHOWK, NH ROAD | 25.504755 | 86.481547 | MDR |

| Sr. | District | Location | Latitude (Mandatory) | Longitude (Mandatory) | Type of Roads (SH/MDR/Others) |
|---|---|---|---|---|---|
| 168 | KHAGARIA | GANDHI CHOWK, ALOULI | 25.508157 | 86.459158 | MDR |
| 169 | KHAGARIA | IN FRONT OF KATYAYANI TEMPLE, NH-95 | 25.583713 | 86.597443 | SH-95 |
| 170 | KHAGARIA | KOSHI COLLEGE CHOWK | 25.507398 | 86.484508 | MDR |
| 171 | KHAGARIA | MANSI BAZAAR SIVAN CHOWK | 25.511843 | 86.552824 | SH-95 |
| 172 | KHAGARIA | NEAR ALOULI HARIPUR ROAD | 25.653622 | 86.328802 | MDR |
| 173 | KHAGARIA | NEAR ALOULI THANA / BLOCK OFFICE | 25.640415 | 86.398717 | MDR |
| 174 | KHAGARIA | NEAR BELDA PATH, MANSI | 25.553801 | 86.580255 | SH-95 |
| 175 | KHAGARIA | NEAR CHAUTHAM KURMOD MORE | 25.531768 | 86.658036 | SH |
| 176 | KHAGARIA | NEAR GOGRI BLOCK REGISTRY MOD | 25.4154 | 86.644889 | MDR |
| 177 | KHAGARIA | NEAR GOGRI ROAD KOSI KOL | 25.448874 | 86.632247 | MDR |
| 178 | KHAGARIA | NEAR KHAGARIA-ALOULI PATH BRIDGE | 25.584448 | 86.427075 | MDR |
| 179 | KHAGARIA | NEAR PIPRALSI MORE CHAURAHA | 25.360161 | 86.71503 | MDR |
| 180 | KHAGARIA | PARBATTA MAHESHKHUT MOD TIRAAHA | 25.339095 | 86.745327 | MDR |
| 181 | KHAGARIA | RAJENDRA CHOWK | 25.5056 | 86.46999 | MDR |
| 182 | KHAGARIA | SURYA MANDIR CHOWK, AWAS BOARD | 25.513541 | 86.472912 | MDR |
| 183 | KHAGARIA | KHAGARIA-MUNGER GHAT LINK ROAD 2ND KM (BALUAHI) | 25.504732 | 86.481763 | RCD |
| 184 | KHAGARIA | KHAGARIA-SONMANKHI GHAT LINK ROAD 1ST KM (NEAR ROB EAST SIDE) | 25.507365 | 86.477267 | RCD |
| 185 | KISHANGANJ | BLOCK CHOWK, KISHANGANJ | 26.105465 | 87.942076 | RCD |
| 186 | KISHANGANJ | MASTAN CHOWK, KISHANGANJ | 26.1454 | 87.903 | RCD |
| 187 | KISHANGANJ | MGM MEDICAL COLLEGE, KISHANGANJ | 26.1021 | 87.969434 | RCD |
| 188 | LAKHISARAI | UNDER KIUL BRIDGE, NEAR LAKHISARAI RAILWAY STATION | 25.171466 | 86.09576 | SH-08 |
| 189 | LAKHISARAI | JAMUI MOD | 25.147329 | 86.092432 | SH-08 |
| 190 | LAKHISARAI | VIDYAPITH CHOWK | 25.189823 | 86.10698 | SH-08 |
| 191 | LAKHISARAI | B.ED COLLEGE MOD | 25.168901 | 86.092987 | MDR |
| 192 | MADHEPURA | COLLEGE MORE MADHEPURA | 25.929073 | 86.795322 | RCD |
| 193 | MADHEPURA | CHAUSA CHOWK, UDAKISHUNGANJ | 25.677791 | 86.947993 | RCD |
| 194 | MADHEPURA | UDAKISHUNGANJ, PHULAUT CHOWK | 25.674926 | 86.943184 | RCD |
| 195 | MADHEPURA | BP MANDAL CHOWK (NH-106) | 25.921963 | 86.798786 | RCD |
| 196 | MADHUBANI | RAM PATTI, BIHAR 84GP+3GV, NH527A | 26.337617 | 86.136863 | SH |
| 197 | MADHUBANI | NIDHI CHOWK, BHAUWARA | 26.322937 | 86.066313 | MDR |
| 198 | MADHUBANI | COURT CHOWK, JHANJHARPUR (IN BINDESHWAR ASTHAN-JHANJHARPUR- RAM CHOWK- MOHAN ROAD) | 26.266717 | 86.283283 | RCD |
| 199 | MADHUBANI | MURLI CHOWK, PUUPARAS (IN PHULPARAS-KHUTAUNA-LOKAHA ROAD SH-51) | 26.391723 | 86.501204 | RCD |
| 200 | MADHUBANI | THANA CHOWK, MADHUBANI | 26.205031 | 86.041712 | SH |
| 201 | MADHUBANI | RAMPATTI | 26.337988 | 86.135293 | RCD |
| 202 | MADHUBANI | JAGATPUR | 26.37428 | 86.053568 | RCD |
| 203 | MUNGER | KAURA MAIDAN CHOWK | 25.369422 | 86.474831 | RCD |
| 204 | MUNGER | SAFIYABAD CHOWK | 25.341632 | 86.489347 | RCD |
| 205 | MUNGER | 1 NO TRAFFIC CHOWK | 25.378577 | 86.471052 | RCD |
| 206 | MUNGER | BOCHAHI | 25.337131 | 86.549467 | RCD |
| 207 | MUNGER | KALYANPUR BAZAR | 25.254668 | 86.610716 | RCD |
| 208 | MUNGER | SRI RAM PETOLIYAM TO DOULATPUR KABRISTAN & SAFIYASRA CHOCK | 25.331743 | 86.490821 | MDR |
| 209 | MUNGER | NAWGAON | 24.992275 | 86.617897 | SH-22 |
| 210 | MUNGER | NEAR URDU CHOWK | 25.097876 | 86.666527 | SH-22 |
| 211 | MUNGER | MASUM GANJ POKHAR | 25.179991 | 86.706509 | SH-22 |

| Sr. | District | Location | Latitude (Mandatory) | Longitude (Mandatory) | Type of Roads (SH/MDR/Others) |
|---|---|---|---|---|---|
| 212 | MUZAFFARPUR | SIKANDARPUR ROAD, TOWER CHOWK | 26.128003 | 85.386647 | MDR |
| 213 | MUZAFFARPUR | RANI SANI MANDIR CHOWK | 26.131789 | 85.383386 | MDR |
| 214 | MUZAFFARPUR | POWER HOUSE CHOWK, MARIPUR | 26.12221 | 85.364782 | MDR |
| 215 | NALANDA | KASHINATH MORE NH-83 LEFT MORE PORTION | 25.302433 | 85.662084 | RCD |
| 216 | NALANDA | N.H. 333A- TOTHIA PAHAR \|JUNCTION, SHEIKHPURA | 25.151184 | 85.8173519 | RCD |
| 217 | NALANDA | N.H. 333A- TIN MUHANI, SHEIKHPURA | 25.1464397 | 85.8316936 | RCD |
| 218 | NALANDA | N.H. 333A- COLLAGE MORE, SHEIKHPURA | 25.1367619 | 85.7812415 | RCD |
| 219 | NALANDA | N.H. 33- EKANGARSARAI MORE, NALANDA | 25.22487 | 85.222046 | RCD |
| 220 | NALANDA | N.H. 333A- KHARGOUR MORE, JAMUI | 24.925499 | 86.191202 | RCD |
| 221 | NALANDA | DHARAMPUR GAON KE PASS ON NH 30A | 25.357612 | 85.381351 | RCD |
| 222 | NALANDA | PORARI GAON KE PASS ON NH 30A | 25.365479 | 85.516505 | RCD |
| 223 | NAWADA | VISHWA SHANTI CHOWK, HISUA | 24.837922 | 85.415565 | SH-08 |
| 224 | NAWADA | SHAHEED CHANDAN SINGH CHOWK, WARISALIGANJ | 25.00755 | 85.63375 | SH-82 |
| 225 | NAWADA | PAKRIBARAWAN WARISALIGANJ MORE | 24.953796 | 85.736832 | SH-8 |
| 226 | NAWADA | SIUR MORE ROH | 24.886943 | 85.673039 | SH-83 |
| 227 | NAWADA | KHANPUR HISUA ROAD | 24.853625 | 85.478046 | SH-08 |
| 228 | NAWADA | KADIRGANJ THANA MORE | 24.917204 | 85.600015 | SH-83 |
| 229 | NAWADA | DHARMASHEELA DEVI HOSPITAL MORE | 24.914753 | 85.537967 | MDR |
| 230 | NAWADA | PRAJATANTRA CHOWK | 24.88669 | 85.54348 | MDR |
| 231 | NAWADA | RAILWAY GUMTI | 24.888821 | 85.549652 | MDR |
| 232 | NAWADA | KENDUA ( MDR NAWADA BAZAR PORTION ROAD) | 24.9195202 | 85.537239 | RCD |
| 233 | NAWADA | BHAGAT SINGH CHOWK ( MDR NAWADA BAZAR PORTION ROAD) | 24.9893696 | 85.541351 | RCD |
| 234 | NAWADA | MASTANGNAJ ( MDR NAWADA BAZAR PORTION ROAD) | 24.868484 | 85.54675 | RCD |
| 235 | PATNA | BRIDGE (UP STREEM LANE) P 46 | 25.608658 | 85.201286 | RCD |
| 236 | PATNA | BRIDGE (UP STREEM LANE) P 23 | 25.614184 | 85.180062 | RCD |
| 237 | PATNA | BRIDGE (DOWN STREEM LANE) P 1 | 25.663852 | 85.23099 | RCD |
| 238 | PATNA | BRIDGE (DOWN STREEM LANE) P 23 | 25.606742 | 85.207193 | RCD |
| 239 | PATNA | NEAR RAMDEO ITI, RAHIMAPUR, VAISHALI | 25.683902 | 85.273736 | RCD |
| 240 | PATNA | NEAR SARAIRANJAN, SAMASTIPUR | 25.775971 | 85.719218 | RCD |
| 241 | PATNA | CURIS HOSPITAL, DANAPUR KHAGAUL ROAD | 25.61635 | 85.041851 | RCD |
| 242 | PATNA | CHHITNAWA VILAGE, 2ND KM OF USARI-CHHITNAWA-BYPASS | 25.637187 | 84.993115 | RCD |
| 243 | PATNA | SHERSHAH LINK ROAD (INFRONT OF NMCH) | 25.6043176 | 85.1991651 | RCD |
| 244 | PATNA | AGAMKUAN ROB GOLAMBAR | 25.5981621 | 85.1974254 | RCD |
| 245 | PURNEA | MIRGANJ | 25.7441139 | 87.2788024 | RCD |
| 246 | PURNEA | DIG CHOWK | 25.786935 | 87.477338 | RCD |
| 247 | PURNEA | BHOOTNATH MANDIR | 25.785842 | 87.484227 | RCD |
| 248 | PURNEA | BAGMAIRA | 25.814 | 87.48 | MDR |
| 249 | PURNEA | LOHIYA CHOWK | 25.7410451 | 87.212162 | SH65 |
| 250 | PURNEA | GERUA CHOWK | 25.62603 | 87.14018 | SH99 |
| 251 | PURNEA | BISHANPUR | 26.069246 | 87.739643 | SH65 |
| 252 | PURNEA | TIKAPURI TIRMUHANI | 25.772134 | 87.478956 | SH65 |
| 253 | PURNEA | MIRGANJ | 25.7441139 | 87.278802 | SH65 |

| Sr. | District | Location | Latitude (Mandatory) | Longitude (Mandatory) | Type of Roads (SH/MDR/Others) |
|---|---|---|---|---|---|
| 254 | PURNEA | DIG CHOWK | 25.786935 | 87.477338 | MDR |
| 255 | PURNEA | BHOOTNATH MANDIR | 25.785842 | 87.484227 | MDR |
| 256 | PURNEA | BELOURI CHOWK | 25.76742 | 87.51546 | MDR |
| 257 | PURNEA | KALI BARI MOR | 25.785295 | 87.514747 | MDR |
| 258 | PURNEA | GIRJA CHOWK | 25.77979 | 87.475212 | MDR |
| 259 | PURNEA | BANBHAG CHOWK | 25.794978 | 87.42825 | SH65 |
| 260 | PURNEA | R.N SAH CHOWK | 25.771306 | 87.471836 | MDR |
| 261 | ROHTAS | DHARMSALA CHOWK | 24.954969 | 84.019004 | SH |
| 262 | ROHTAS | KARGAHAR MORE | 24.933534 | 84.011534 | SH |
| 263 | ROHTAS | POST OFFICE CHOWK | 24.953973 | 84.014606 | SH |
| 264 | ROHTAS | PRABHAKAR MORE | 24.953224 | 84.006416 | SH |
| 265 | ROHTAS | RAMA RANI CHOWK DEHRI | 24.906278 | 84.174702 | SH |
| 266 | ROHTAS | TENDUNI CHOWK BIKA | 25.222943 | 84.265378 | SH |
| 267 | ROHTAS | THANA CHOWK DEHRI | 24.900252 | 84.183146 | RCD |
| 268 | SAHARSA | MANAURI CHOCK | 25.073632 | 86.703636 | SH |
| 269 | SAHARSA | NEAR SADAR HOSPITAL & RCD OFFICE | 25.887769 | 86.586289 | PWD |
| 270 | SAHARSA | NEAR SOUR BAZAR | 25.839006 | 86.682545 | SH |
| 271 | SAHARSA | PARSHURAM CHOWK | 25.880111 | 86.521695 | SH |
| 272 | SAHARSA | DAK BANGLA CHOWK | 25.723583 | 86.582323 | SH |
| 273 | SAMASTIPUR | PATEL CHOWK, SAMASTIPUR | 25.857991 | 85.779451 | RCD |
| 274 | SAMASTIPUR | KALYANPUR, SAMASTIPUR | 25.9565595 | 85.779097 | RCD |
| 275 | SAMASTIPUR | EKMI CHOWK, SAMASTIPUR | 26.11719 | 85.87386 | RCD |
| 276 | SAMASTIPUR | MOKSH DHAM, KALI MANDIR | 25.859639 | 85.801089 | RCD |
| 277 | SAMASTIPUR | AADHARPUR | 25.8596055 | 85.701926 | RCD |
| 278 | SARAN | BRHAMPUR CHOWK | 25.789264 | 84.702047 | RCD |
| 279 | SARAN | METAWALIA CHOWK | 25.807708 | 84.749503 | RCD |
| 280 | SARAN | KOTEA JALALPUR AT NH-101 (NEW NH-331) | 25.88028 | 84.705958 | RCD |
| 281 | SARAN | SISAI NEAR BASANTPUR AT NH-227A | 26.185428 | 84.562436 | RCD |
| 282 | SARAN | GAJGRAH CHOWK, BARBATTA, SONEPUR | 25.691969 | 85.187089 | RCD |
| 283 | SARAN | KUSHWAHA CHOWK BAKARPOR, BAIJALPUR | 25.7169 | 85.139762 | RCD |
| 284 | SARAN | BAJRANG CHOWK | 25.690892 | 85.12443 | MDR |
| 285 | SARAN | ACHITPUR | 26.042343 | 84.79763 | SH-90 |
| 286 | SARAN | CHANCHOURA | 25.816504 | 84.7495443 | SH-90 |
| 287 | SARAN | PARSA BAZAR | 25.892343 | 85.025167 | SH-73 |
| 288 | SARAN | MANCHITWA | 25.85157 | 85.033906 | MDR |
| 289 | SARAN | NEWARI | 26.038275 | 84.880714 | SH-73 |
| 290 | SHEIKHPURA | DALLU CHOWCK | 25.131176 | 85.842028 | MDR (RCD) |
| 291 | SHEIKHPURA | VIP MORE AND NH-333A | 25.146467 | 85.836991 | RCD |
| 292 | SHEOHAR | SHEOHAR-MINAPUR (MDR) ZERO MILE AT CH. 0.00 | 26.514263 | 85.18962 | RCD |
| 293 | SHEOHAR | SHEOHAR-BELWAGHAT (SH-54) AT CH. 0.00 | 26.514045 | 85.295904 | RCD |
| 294 | SHEOHAR | TIRIYANI CHOWK | 26.390305 | 85.312205 | MDR |
| 295 | SHEOHAR | PIPRAHI CHOWK | 26.565222 | 85.310645 | SH-54 |

| Sr. | District | Location | Latitude (Mandatory) | Longitude (Mandatory) | Type of Roads (SH/MDR/Others) |
|---|---|---|---|---|---|
| 296 | SHEOHAR | LACHKA BRIDGE (SHEOHAR–PIPRAHI ROAD) | 26.522705 | 85.298438 | SH-54 |
| 297 | SHEOHAR | KUSHAHAR CHOWK (SHEOHAR–MUZAFFARPUR ROAD) | 26.477439 | 85.331142 | MDR |
| 298 | SITAMARHI | NH- 77 DUMRA | 26.6141 | 85.4568 | RCD |
| 299 | SITAMARHI | GAUSHATA CHOWK | 26.583749 | 85.480638 | RCD |
| 300 | SITAMARHI | RIGA | 26.635459 | 85.423716 | RCD |
| 301 | SITAMARHI | PUPRI | 26.471719 | 85.704279 | RCD |
| 302 | SITAMARHI | JANKI MANDIR | 26.593 | 85.4834 | RCD |
| 303 | SITAMARHI | BAJPATTI | 26.552339 | 85.624332 | RCD |
| 304 | SITAMARHI | AJAD CHOWK | 26.5925 | 85.510605 | RCD |
| 305 | SUPAUL | BIRPUR | 26.502323 | 87.010221 | RCD |
| 306 | SUPAUL | BHIMPUR | 26.333965 | 87.043833 | RCD |
| 307 | SUPAUL | FULKAHA | 26.080783 | 86.998699 | RCD |
| 308 | SUPAUL | DAKAHI GHAT | 28.11857 | 86.62763 | RCD |
| 309 | SUPAUL | BANGAMA SOUTH (BHUTHA CHOWK) | 26.33856 | 86.56805 | RCD |
| 310 | SUPAUL | MALHANI | 26.075728 | 86.568203 | MDR |
| 311 | SUPAUL | SUPAUL | 26.1257375 | 86.6127758 | SH |
| 312 | SUPAUL | SORHI MALIKAN | 26.122465 | 86.60194 | MDR |
| 313 | SUPAUL | GAURAV GARH | 26.125845 | 86.612572 | SH |
| 314 | SUPAUL | PATEL CHOWK | 26.115095 | 86.602185 | SH |
| 315 | SUPAUL | CHAUGHARA CHOWK | 26.073528 | 86.695508 | SH |
| 316 | SUPAUL | HARDI | 26.089989 | 86.68369 | SH |
| 317 | SUPAUL | BHAWANIPUR CHOWK, BIRPUR | 26.468361 | 86.99968 | SH |
| 318 | SUPAUL | VERMA SELL, BIRPUR | 26.508178 | 87.007535 | SH |
| 319 | SUPAUL | DEGREE COLLEGE CHOWK | 26.128383 | 86.609196 | SH |
| 320 | SUPAUL | LOHIYA CHOWK | 26.12241 | 86.602219 | SH |
| 321 | SUPAUL | KISHANPUR GOL CHOWK | 26.2133178 | 86.682192 | SH |
| 322 | SUPAUL | HAZARI H.S, GAURAV GARH | 26.126018 | 86.163127 | VILLAGE ROAD |
| 323 | SUPAUL | CHILAUNI PUL, TRIVENIGANJ | 26.12759 | 86.89293 | SH |
| 324 | SUPAUL | KORIYAPATTI EAST, JADIA P.S | 26.095976 | 86.989075 | SH |
| 325 | SUPAUL | BHIMPUR DHALA CHOWK | 26.353771 | 87.04388 | VILLAGE ROAD |
| 326 | SUPAUL | JIWACHHPUR, BHIMPUR P.S | 26.318165 | 87.041237 | SH |
| 327 | SUPAUL | RAMJANKI CHOWK, BHIMPUR P.S | 26.362156 | 87.04013 | VILLAGE ROAD |
| 328 | SUPAUL | BELA TILA CHOWK, NIRMALI P.S | 26.349585 | 86.660253 | VILLAGE ROAD |
| 329 | SUPAUL | BELA HANUMAN MANDIR, NIRMALI P.S | 26.331594 | 86.6415 | VILLAGE ROAD |
| 330 | SUPAUL | DIGHIYA, NIRMALI | 26.35542 | 86.880633 | VILLAGE ROAD |
| 331 | SUPAUL | MARAUNA CHOWK | 26.171806 | 86.430686 | VILLAGE ROAD |
| 332 | SUPAUL | P.H.C MARAUNA | 26.171874 | 86.429391 | VILLAGE ROAD |
| 333 | SUPAUL | KHAGARPURA HANUMAN MANDIR | 26.170524 | 86.422395 | VILLAGE ROAD |
| 334 | SUPAUL | BALUAHI BAZAR, MARAUNA | 26.171373 | 86.41668 | VILLAGE ROAD |
| 335 | SUPAUL | MEHTA CHOWK, KAMALPUR | 26.428879 | 86.787081 | VILLAGE ROAD |
| 336 | SUPAUL | HARIPUR CHOWK, KUNAULI | 26.428453 | 86.778243 | MDR |
| 337 | VAISHALI | BELKUNDA BAZAR (SH-49) | 25.754789 | 85.301676 | RCD |
| 338 | VAISHALI | REPURA CHOWK (SH-74) | 25.849371 | 85.178667 | RCD |

| Sr. | District | Location | Latitude (Mandatory) | Longitude (Mandatory) | Type of Roads (SH/MDR/Others) |
|---|---|---|---|---|---|
| 339 | WEST CHAMPARAN | NEAR STATION GOLAMBER BETTIAH, AT NH-727 | 26.80434117 | 84.52055818 | RCD |
| 340 | WEST CHAMPARAN | NEAR HARIVATIKA CHOWK AT NH-727 | 26.80251192 | 84.52845768 | RCD |
| 341 | WEST CHAMPARAN | FATEHPUR CHOWK, YOGAPATTI POLICE STATION | 26.8888438 | 84.371742 | SH |
| 342 | WEST CHAMPARAN | KATHPHILIA CHOWK, CHANPATIA POLICE STATION | 26.921909 | 84.532615 | SH |
| 343 | WEST CHAMPARAN | MAJHAULIA BAZAR, MAJHAULIA POLICE STATION | 26.798109 | 84.622205 | DISTRICT ROAD |
| 344 | WEST CHAMPARAN | SHIVRAJ CHOWK, SHIKARPUR POLICE STATION | 27.103809 | 84.461203 | SH |
| 345 | WEST CHAMPARAN | NAGENDRA TIWARI CHOWK, SHIKARPUR POLICE STATION | 27.113099 | 84.468969 | PWD |
| 346 | WEST CHAMPARAN | HOSPITAL CHOWK, SHIKARPUR POLICE STATION | 27.114812 | 84.466805 | SH |
| 347 | WEST CHAMPARAN | HARDIYA CHOWK, SHIKARPUR POLICE STATION | 27.103619 | 84.463182 | RWD |
| 348 | WEST CHAMPARAN | SUGAR MILL CHOWK, SHIKARPUR POLICE STATION | 27.113816 | 84.465796 | SH |
| 349 | WEST CHAMPARAN | TIKULIYA CHOWK, CHANPATIA POLICE STATION | 26.943179 | 84.538019 | SH |
| 350 | WEST CHAMPARAN | RAMNAGAR BHAGAT SINGH CHOWK | 27.164407 | 84.328883 | MDR |
| 351 | WEST CHAMPARAN | RAMNAGAR AMBEDKAR CHOWK | 27.161289 | 84.328377 | MDR |
| 352 | SAMASTIPUR | PATEL GLOMBAR | 25.862 | 85.7797 | SH |
| 353 | SAMASTIPUR | BHOLA TAKIES | 25.863 | 58.781 | SH |
| 354 | SAMASTIPUR | SARAIRANJAN VARUNA PUL KE PASS | 25.862 | 85.781 | SH |
| 355 | BHAGALPUR | ULTAPUL | 25.242461 | 86.975779 | SH/MDR |
| 356 | BHAGALPUR | JANIPUR CHOCK | 25.180792 | 86.832596 | SH-85 |
| 357 | BHAGALPUR | SHIVNANDPUR TO KAMRAI TAK | 25.2392736 | 86.7287239 | SH-22 |
| 358 | BHAGALPUR | TADAR | 25.18173 | 87.166956 | SH-84 |
| 359 | BHAGALPUR | BALUACHAK SE NAYACHAK,MAKHNA | 25.150184 | 86.979043 | SH-19 |
| 360 | DARBHANGA | OJHAL, OJAHL KADAM CHAWK, OJHAOL POOL | 26.112274 | 85.868283 | SH 50 |
| 361 | DARBHANGA | DILADHI | 26.121915 | 85.769705 | SH-50 |
| 362 | DARBHANGA | ASMA PANCHAYAT BHAWAN TO ASMA BRIDGE | 25.822214 | 86.297811 | SH-56 |
| 363 | DARBHANGA | ASMA PUL, PARO CHAWK | 25.822214 | 86.297811 | SH 56 |
| 364 | DARBHANGA | DEKULI CHATI MORE | 26.094742 | 86.074463 | SH-56 |
| 365 | DARBHANGA | DHOI CHOWK | 26.146756 | 85.95488 | SH-56 |
| 366 | DARBHANGA | DHOI CHATTI CHAUK TO DHOIGHAT | 26.1172819 | 85.9663502 | SH-56 |
| 367 | DARBHANGA | DEKULI CHATI MORE | 26.104742 | 86.050638 | SH-56 |
| 368 | DARBHANGA | SONKI BAZAR TO SONKI CHAUK, PETROL PUMP | 26.129128 | 86.00364 | SH-56 |
| 369 | DARBHANGA | DUMRI, DUMRI MORE, SUSAUNI MORE | 25.947416 | 86.232836 | SH 56 |
| 370 | DARBHANGA | NOVTOL & NEAR NAVTOL, NAVTOL CHAWK | 25.987656 | 86.214416 | SH 56 |
| 371 | DARBHANGA | DILAHI, DILAHI CHAWK, NEAR DILAHI PETROL PUMP | 26.094561 | 86.838345 | SH 50 |
| 372 | DARBHANGA | DILAHI, DILAHI CHAUK TO IN FRONT OF DILAHI PETROL PUMP | 26.094561 | 86.838345 | SH-50 |

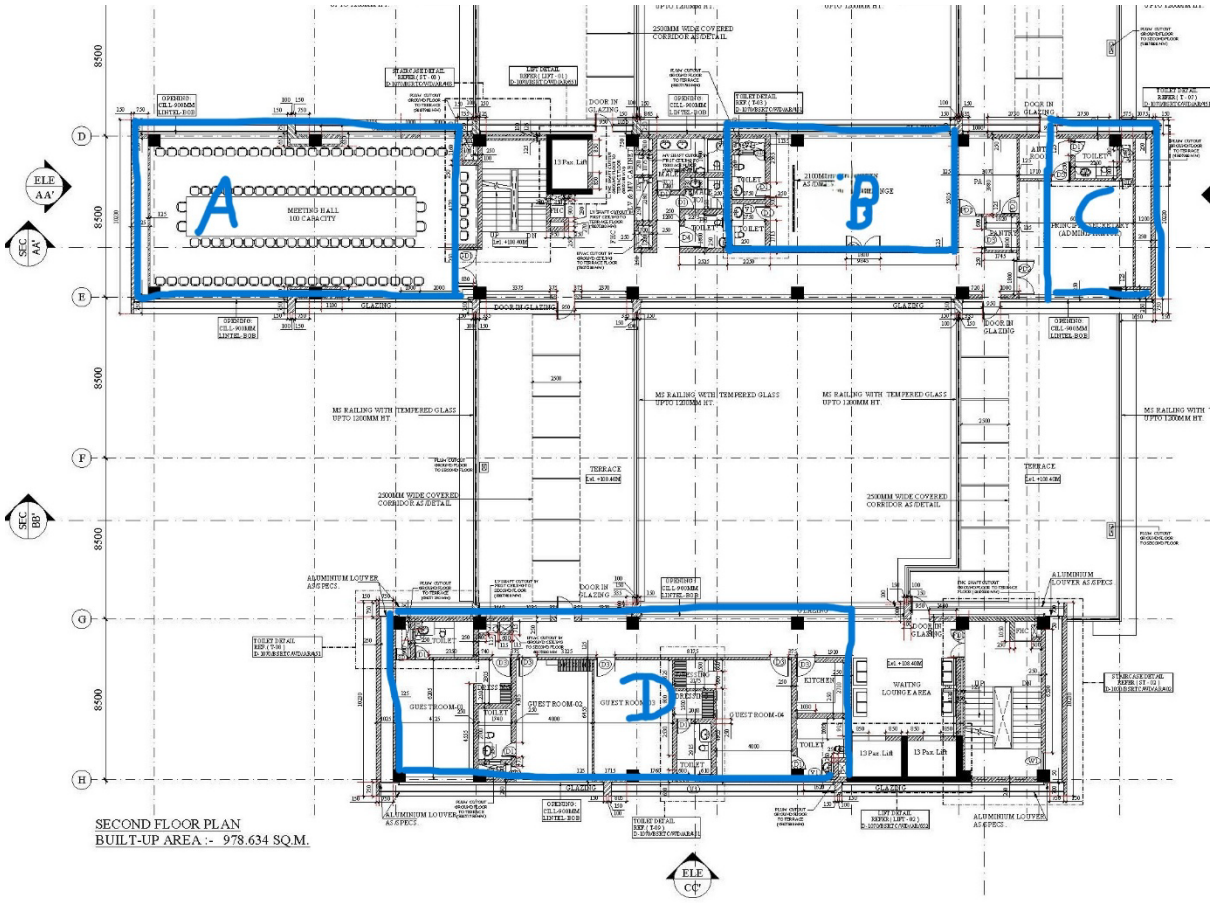
| Sr. | District | Location | Latitude (Mandatory) | Longitude (Mandatory) | Type of Roads (SH/MDR/Others) |
|---|---|---|---|---|---|
| 373 | DARBHANGA | LAHERIYA SARAI TOWER CHOWK | 26.11796 | 85.900683 | MDR |
| 374 | DARBHANGA | LAHERIASARAI TOWER CHAUK TO LAHERIASARAI BUS STAND | 26.117678 | 85.8974 | MDR |
| 375 | DARBHANGA | OJHAUL SE OJHAUL PUL | 26.11219 | 85.870728 | SH-50 |
| 376 | DARBHANGA | BAHERI BAZAR MAHAVIR MANDIR CHOWK | 25.943699 | 86.047035 | MDR |
| 377 | DARBHANGA | BAGRASI SE BAJRANG CHOWK BAGRASI | 25.942011 | 86.31311 | SH-17 |
| 378 | DARBHANGA | KOTHRAM EVM TENUA KE BITCH | 25.926475 | 86.326108 | SH-17 |
| 379 | DARBHANGA | MADHAVPATTI SE MADHAVPATTI PETROL PUMP | 26.240417 | 85.84014 | SH 75 |
| 380 | DARBHANGA | PANISHALA CHOWK | 26.21819 | 85.735094 | SH 97 |
| 381 | DARBHANGA | SUPAUL BAZAR SE SHIVSHAKTI PETROL PUMP | 25.935198 | 86.249897 | SH 56 |
| 382 | DARBHANGA | TINHI BRIDGE | 26.314886 | 85.948566 | SH 56 |
| 383 | DARBHANGA | KALYANA | 26.154369 | 85.9635 | SH 56 |
| 384 | DARBHANGA | IDEAL SCHOOL SE MILKI TOLA | 26.070526 | 86.246173 | SH-88 |
| 385 | DARBHANGA | JILA SCHOOL KE PASS | 26.131701 | 85.896617 | SH 50 |
| 386 | GAYA | VILLAGE BALTHARWA KE PASS | 24.514471 | 84.637684 | SH-69 |
| 387 | GAYA | VILLAGE VISHANPUR | 24.53463 | 84.698066 | SH-69 |
| 388 | GAYA | AHIYAPUR KE PASS | 24.877754 | 84.849763 | SH-69 |
| 389 | GAYA | TUTWARI BALTI FACTORY | 24.80597 | 85.014808T | MDR |
| 390 | GAYA | NEAR VILLAGE AIMA | 24.551927 | 85.359133 | SH-04 |
| 391 | GAYA | IN THE TOWSA-KHIJARSARAI ROAD NEAR VENA MORE | 24.998671 | 85.3926 | SH-04 |
| 392 | GAYA | MIRJA GALIB | 24.791348 | 84.993136 | MDR |
| 393 | GAYA | IN THE SWARAJPURI ROAD | 24.795196 | 85.000621 | MDR |
| 394 | GAYA | NEAR JAIPRAKASH LAKE | 24.79212 | 85.00151 | MDR |
| 395 | GAYA | NEAR VILLAGE CHIRAULI | 24.950539 | 84.831749 | SH-69 |
| 396 | GAYA | RAMESHWAR GARDEN NEAR TEKARI ROAD | 24.899516 | 84.863709 | SH-69 |
| 397 | GAYA | CHERKI BAZAR | 24.6956 | 84.8857 | MDR |
| 398 | GAYA | YAMUNA NADI KE PASS | 24.84307 | 84.9394 | SH-69 |
| 399 | GAYA | NEAR CHHATHKUWAN | 24.551927 | 85.301499 | SH-70 |
| 400 | GAYA | NEAR SAGAHI BAZAR | 24.635049 | 84.85033 | SH-69 |
| 401 | GAYA | NEAR VILLAGE DUMARI MORE | 24.635049 | 84.762397 | SH-69 |
| 402 | GAYA | NEAR VILLAGE KOCHI | 24.078001 | 84.981827 | SH-69 |
| 403 | GAYA | NEAR VILLAGE DIGHASEEN | 24.48975 | 84.630088 | SH-69 |
| 404 | MUNGER | SHRI RAM PATROL PUMP TO DAULATPUR KABRISTAN | 25.331743 | 86.490821 | MDR |
| 405 | MUNGER | NAWGAON | 24.992275 | 86.617897 | SH-22 |
| 406 | MUNGER | NEAR URDU CHOWK | 25.097876 | 86.666527 | SH-22 |
| 407 | MUNGER | MASUM GANJ POKHAR | 25.179991 | 86.706509 | SH-22 |
| 408 | MUZAFFARPUR | NARAULI | 26.077223 | 85.485808 | MDR |
| 409 | MUZAFFARPUR | BIG DAUD | 26.1374 | 85.0461 | SH-86 |
| 410 | MUZAFFARPUR | GARIBA CHOWK | 26.2071 | 84.5159 | SH-74 |
| 411 | NALANDA | CHANDRAKURA PETROL PUMP SE DIYAWA | 25.367125 | 85.283399 | SH-04 |

| Sr. | District | Location | Latitude (Mandatory) | Longitude (Mandatory) | Type of Roads (SH/MDR/Others) |
|---|---|---|---|---|---|
| 412 | NALANDA | CHANDRAKURA PETROL PUMP SE DIYAWA | 25.368991 | 85.249239 | SH-04 |
| 413 | NALANDA | CHAUKI DUMRI | 25.39209 | 85.28116 | SH-04 |
| 414 | NALANDA | KATHRAHI MORE KE PASS | 25.302592 | 85.661949 | MDR |
| 415 | NALANDA | MANDILPUR TO BHENDA MORE | 25.139746 | 85.604453 | SH-78 |
| 416 | NALANDA | MANDILPUR TO BHENDA MORE | 25.319746 | 85.601745 | SH-78 |
| 417 | NALANDA | SARMERA SE BUS STAND | 25.295012 | 85.752436 | SH-78 |
| 418 | NALANDA | GOPALBAD TO MEER NAGAR | 25.22888 | 85.720666 | SH-78 |
| 419 | NALANDA | MAHADEV BIGHA | 25.152726 | 85.260208 | SH-04 |
| 420 | NALANDA | FOUR LANE CROSSING | 25.1881 | 85.3786 | SH-78 |
| 421 | NALANDA | KATHRAHI MORE KE PASS | 25.302229 | 85.663495 | SH-78 |
| 422 | NALANDA | CHICKSORA MORE | 25.321685 | 85.278808 | SH-04 |
| 423 | NALANDA | ADAMPUR | 25.038286 | 85.53844 | SH-78 |
| 424 | NALANDA | VEERKUWAR SINGH CHOWK | 25.376402 | 85.841472 | MDR |
| 425 | NALANDA | KALYAN BIGHA MORE | 25.377596 | 85.536732 | MDR |
| 426 | NALANDA | PRINCE HOTEL | 25.275093 | 85.569318 | SH-78 |
| 427 | NALANDA | GOPALBAD TO MEER NAGAR | 25.22888 | 85.757612 | SH-78 |
| 428 | NALANDA | MIRNAGAR | 25.258798 | 85.796153 | SH-78 |
| 429 | NALANDA | DHARAMPUR | 25.212122 | 85.5626452 | SH-78 |
| 430 | NALANDA | GIDHAPAR | 25.18111 | 85.2612.993 | SH-78 |
| 431 | PATNA | RUPASPUR ROB TO PILLAR NO-242 | 25.60896 | 85.06003 | MDR |
| 432 | PATNA | SAGUNAMORE TO IPS MORE DANAPUR | 25.61662 | 85.04965 | MDR |
| 433 | PATNA | FATUHAN CROSS ROAD | 25.49076 | 85.3027 | SH-04 |
| 434 | PATNA | FATUHAN JUNCTION | 25.50536 | 85.30334 | SH-04 |
| 435 | PATNA | BAIRIYA ELAHIBAG | 25.56403 | 85.18572 | SH-01 |
| 436 | PATNA | SAGUNA MORE | 25.622912 | 85.041903 | MDR |
| 437 | PATNA | B.S COLLEGE DANAPUR | 25.643907 | 85.063128 | MDR |
| 438 | PATNA | ON RUPASPUR ROB | 25.579379 | 85.05408 | MDR |
| 439 | PURNEA | BAGHMARA | 25.814 | 87.48 | SH |
| 440 | PURNEA | LOHIYA CHOWK | 25.741045 | 87.212162 | SH-65 |
| 441 | PURNEA | GERUA CHOCK | 25.62203 | 87.14018 | SH-99 |
| 442 | PURNEA | VISHANPUR | 26.069246 | 87.739643 | SH 65 |
| 443 | PURNEA | LIBRAPUL TINMUHANI | 25.772134 | 87.478956 | SH-65 |
| 444 | SAHARSA | ZERO MILE | 25.838951 | 86.682678 | SH-17 |
| 445 | SAHARSA | MANAURI CHOWK | 25.713893 | 86.701547 | MDR |
| 446 | SAHARSA | GANDOL CHOWK(REAR & FRONT) | 25.5425 | 86.22858 | SH-17 |
| 447 | SARAN | BAJRANG CHOWK | 25.690892 | 85.12443 | MDR |
| 448 | SARAN | ACHITPUR | 26.042343 | 84.79763 | SH 90 |
| 449 | SARAN | CHANCHAURA | 25.816504 | 84.7495443 | SH 90 |
| 450 | SARAN | PARSA BAZAR | 25.892343 | 85.025167 | SH 73 |
| 451 | SARAN | MANCHITWA | 25.85157 | 85.033906 | MDR |
| 452 | SARAN | NEWARI | 26.038275 | 84.880714 | SH 73 |

## 6. Annexure 6: List of locations for the Spot Speed Violations Detection System will be provided at the time of the survey

**Note:** State is constantly under development, and the number and / or location of one or more junction/s may change during the implementation phase, which shall be as per requirement of BTD and binding on the MSI. The quantity of the items is subjected to change (increase or decrease) as per site requirement, and the payment shall be made as per actual quantity deploy on the project as per commercial rates quoted by MSI and duly accepted by BTD.

## 7. Annexure 7: Details of available infra at existing CCC




*Existing layout of the Proposed ICCC Building*

| Sr. | Particular area of Interest (as per above Image) | Approximate Area (Sq. Ft.) |
|---|---|---|
| 1 | **Area - A:** Indicative Traffic Management Center (TMC) Room | 1550 |
| 2 | **Area - B:** Indicative Data Center and UPS room | 500 |
| 3 | **Area - C:** Indicative Help Desk Room | 380 |
| 4 | **Area - D:** Others (Pantry, Meeting room, officer cabin, Reception etc.) | 2600 |

The MSI shall be responsible for providing comprehensive pantry management and housekeeping/cleaning services for the TMC premises, as detailed below.

- **Pantry Services**

The MSI shall ensure the provision and management of pantry services, including but not limited to:

- Supply and preparation of tea, coffee, and other standard refreshments (for staff and visitors only).
- Provision of light snacks such as sandwiches and other ready to eat items (for senior officials only).
- Maintenance of adequate stock levels of all pantry consumables at all times.
- Ensuring hygiene, cleanliness, and proper storage of food and beverages in compliance with applicable health and safety standards.
- Deployment of trained pantry staff for timely preparation and service.

- **Cleaning and Housekeeping Services**

The MSI shall be responsible for cleaning and upkeep of all designated areas within the TMC facility, including but not limited to:

- Daily cleaning of floors, offices, work areas, meeting rooms, washrooms, and common areas.
- Periodic deep cleaning, including dusting, mopping, vacuuming, and surface sanitization.
- Cleaning and maintenance of fixtures, furniture, doors, windows, and other fittings.
- Waste collection, segregation, and disposal in accordance with applicable environmental guidelines.
- Ensuring availability and replenishment of cleaning materials and consumables.
- Deployment of trained housekeeping personnel to maintain hygiene and cleanliness standards at all times.

## 8. Annexure 8: Calculation for Payment Upper Cap using IRR

The MSI shall be paid as per Payment Terms defined in the Clause 6 under Administrative Aspects for the payments eligible as defined in Clause 13.6.3. Payment Eligibility.
The upper cap for the payment due to the MSI shall be calculated as per formula as set in this Annexure.
Keeping in view the on-ground situation and in order to effectively manage the overall implementation of the project, the SoP for issuance of challans, process to be followed, exemptions, variations etc. shall be defined by the BTD in consultation with other stakeholders. The MSI shall support BTD in various endeavors to maximize the recovery of the challans issued.

**The below IRR calculations shall be followed for the project, and all the parameters, considerations and assumptions are as detailed below:**

| ***All Values in Rs. Crores Excluding GST*** | |
|---|---|
| **A.** Total Project Cost | **B + C**<br>**(Total of CapEx and OpEx for 10 years)** |
| **B.** Total Capex | As quoted by Bidder (MSI) and duly agreed by the BTD, subject to any variation in the quantity explicitly approved by the BTD from time to time. |
| **C.** Total OpEx for 10 yrs | As quoted by Bidder (MSI) and duly agreed by the BTD, subject to any variation in the quantity explicitly approved by the BTD from time to time, calculated on pro-rata basis. |
| **D.** Total OpEx / year | Annual OpEx calculated as **10 equal parts** of Quoted (by Bidder (MSI)) and duly agreed by the BTD. |
| **F.** Total IT Capex | Will be assumed at **55 % of total CapEx** |
| **G.** Total Non-IT Capex | Will be assumed at 25% of total CapEx |
| **H.** Capital Support (as per RFP) | 30% of CAPEX (i.e. quoted and accepted by BTD) or Rs. 60 Crore, whichever is lesser |
| **I CAPEX -Capital Support (amount considered as financed)** | |
| **J.** Assumed Debt taken by the MSI from financial institutes<br>(Amount Considered Financed) | 70% of (CapEx – Capital Support) quoted by Bidder (MSI) and duly agreed by the BTD, subject to any variation in the quantity explicitly approved by the BTD from time to time.<br>Debt Repayment for each year shall be calculated considering fixed EMI as per period and rate as mentioned below, minus the Finance Cost (Interest). |

| *All Values in Rs. Crores Excluding GST* | |
|---|---|
| | **Period and Rate:** Interest as per amortization schedule for period of 10 years at 12% interest on amount considered as Financed. |
| **K.** Assumed Equity invested by the MSI **( (I) – Total Debt (H)** | 30% of (CapEx – Capital Support) quoted by Bidder (MSI) and duly agreed by the BTD, subject to any variation in the quantity explicitly approved by the BTD from time to time. |

| | |
|---|---|
| **J.** "Per Challan Rate" excluding GST, as fixed by the BTD | **Rs. 350 (excluding GST)** |
| Corporate Tax *(as per prevailing rates)* | 25.17%<br>(will be adjusted as per prevailing rates) |

| **Income Statement** | **Before: Partial Go-Live)** | **From Partial Go-Live to Full Go-Live** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **Yr. 0a** | **Yr. 0b** | **Yr. 1** | **Yr. 2** | **Yr. 3** | **Yr. 4** | **Yr. 5** | **Yr. 6** | **Yr. 7** | **Yr. 8** | **Yr. 9** | **Yr. 10** |
| **Revenue** | | | | | | | | | | | | |
| Revenue from challan (w/o GST) in INR Cr. | | | | | | | | | | | | |
| Total no. of junctions | | | | | | | | | | | | |
| ***K.*** Max. no. of challan per day for which MSI may be paid as per RFP terms | | | | | | | | | | | | |
| **L. Total Revenue** | | | | | | | | | | | | |
| **M.** OPEX per Year | | | | | | | | | | | | |
| **N.** EBIDTA **(L-M)** | | | | | | | | | | | | |
| **O.** Depreciation | | | | | | | | | | | | |
| **P. PBIT (Profit Before Interest and Tax) (N-O)** | | | | | | | | | | | | |
| **Q.** Finance Cost (Interest) | | | | | | | | | | | | |
| **R. PBT (Q-R)** | | | | | | | | | | | | |
| **S.** Corporate Tax | | | | | | | | | | | | |
| **T. Net Profit (R-S)** | | | | | | | | | | | | |
| **T1.** (+ add) Depreciation | | | | | | | | | | | | |
| **T2.** (+ add) Debt inflow for Y0 | | | | | | | | | | | | |
| **T3** (+ add) Capital Support | | | | | | | | | | | | |
| **U. Cash Inflow (T+T1+T2)** | | | | | | | | | | | | |
| **U1.** (- less) CapEx (balance CapEX less Capital Support) | | | | | | | | | | | | |
| **U2.** (- less) Debt Repayment | | | | | | | | | | | | |

| Income Statement | Before: Partial Go-Live) | From Partial Go-Live to Full Go-Live | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V. Cash Outflow (U1+U2) | | | | | | | | | | | | |
| W. Net Cashflows (U-V) | | | | | | | | | | | | |
| X. IRR | | | | | | | | | | | | |

| Sr. | Item | Definition |
|---|---|---|
| 1. | **Year 0 (Yr.0a)** | Implementation Period as defined in the RFP, prior **to Partial Go-live** |
| 2. | **Year 0 (Yr.0b)** | **Implementation Period from the date of Partial Go-Live till the Full Project Go-Live** |
| 3. | Year 1 (Y1) to Year 10 (Y10) | Operations and Maintenance phase beginning from the date of Project Go-Live. |
| 4. | CapEx | Capital expenditure for the project for the entire scope as defined in the RFP.<br><br>As quoted by Bidder (MSI) and duly agreed by the BTD, subject to any variation in the quantity explicitly approved by the BTD from time to time. |
| 5. | Capital Support | 30% of CAPEX (i.e. quoted and accepted by BTD) or Rs. 60 Crore, all inclusive, including GST whichever is lesser,<br>**Interest-free Capital Support** shall be adjusted against the overall CAPEX, resulting in a profit **capped at 20% IRR annually** |
| 6. | OpEx | O&M expenditure which MSI will incur post project Go-Live *(or Partial Go-Live) as applicable)* for the entire scope as defined in the RFP.<br><br>As quoted by Bidder (MSI) and duly agreed by the BTD, subject to any variation in the quantity explicitly approved by the BTD from time to time, calculated on pro-rata basis |
| 7. | Maximum Challans per day | As per eligibility defined in the **RFP Clause 13.6 under "Instructions to Bidders"** (to arrive at profit capped at 20% IRR annually)<br>Subject to other terms of the RFP.<br>Calculated on annual scale for each project O&M year. |
| 8. | Per Challan Rate | As fixed by the BTD at **Rs. 350 + GST**<br><br>*(Per Challan Rate, excluding GST shall be considered for the calculations.)* |
| 9. | Revenue | During Partial Go-live, upper cap is defined as (5000 challan per day for 200 no. of junctions), till the period of Full Go-Live. **For the period from Y1 to Y10, the profit is capped at 20% IRR annually**, calculate as per formula defined in Annexure Set VI – Annexure 8, calculated as per MSI quoted (and duly agreed by BTD) project cost (or as duly updated by BTD). |
| 10. | EBITDA | Calculated as Revenue less OpEx |

| Sr. | Item | Definition |
|---|---|---|
| 11. | Finance Cost (Interest) | Interest as per amortization schedule for period of 10 years at 12% interest on amount considered as Financed. |
| 12. | Depreciation | Calculated as per depreciation rates as defined in the RFP for IT and Non IT assets as per values defined below:<br>**IT Assets : 16.67% per year**<br>**Non IT Assets : 6.67 % per year** |
| 13. | EBIT (Earning Before Income Tax) | Calculated as EBITDA less Finance Cost less Depreciation |
| 14. | Corporate Tax | As per prevailing and applicable rates subject to change by Income Tax Department. |
| 15. | Net Profit | Calculated as EBIT less Corporate Tax |
| 16. | Free Cash Flow | Calculated as Net Profit plus Depreciation plus Debt inflow less Capex less debt repayment, as per Formula defined in the RFP |
| 17. | IRR | Calculated for respective project O&M year as per Formula defined in the RFP |

BTD gives no commitment on number of challans generated and approved. The same shall be purely as per discretion of BTD and ground situation.

The calculations may be revisited in case of any adjustments required in lieu of changes in either of the following cases:

a. Corporate Tax rates change
b. Change in CapEx and OpEx due to any approved Change Request Management.

BTD's decision shall be final and binding.

## 9. Annexure 9: Proposed Traffic Management Center and Viewing Center under the Bihar State ITMS Project:

| SR. | SELECT DISTRICT | OFFICE ADDRESS | PINCODE | LATITUDE | LONGITUDE | CATEGORY |
|---|---|---|---|---|---|---|
| 1. | PATNA | DTO OFFICE PARIVAHAN PARISHAR, FULWARISHARIF, PATNA | 801505 | 25.592758 | 85.077499 | TMC & DC |
| 2. | ARARIA | KHARIA BASTI, NEAR CIRCUT HOUSE ,ARARIA | 854311 | 26.148783 | 87.457269 | VIEWING CENTER |
| 3. | ARWAL | COLLECTORATE ARWAL | 804401 | 25.231733 | 84.674736 | VIEWING CENTER |
| 4. | AURANGABAD | DTO OFFICE AURANGABAD BESIDE DM OFFICE | 824101 | 24.75479 | 84.371875 | VIEWING CENTER |
| 5. | BANKA | OLD OFFICER RESIDENCE NEAR JAIL GATE BANKA | 813102 | 24.885004 | 86.922471 | VIEWING CENTER |
| 6. | BEGUSARAI | KACHAHARI ROAD BEGUSARAI | 851101 | 25.416954 | 86.137135 | VIEWING CENTER |
| 7. | BHAGALPUR | ADAMPUR, NEAR COLLECTORATE, BHAGALPUR | 812001 | 25.251578 | 86.988247 | VIEWING CENTER |
| 8. | BHOJPUR | SANKAT MOCHAN NAGAR NEW POLICE LINE | 802313 | 25.564943 | 84.611511 | VIEWING CENTER |
| 9. | BUXAR | BUDHANPURWA, NEAR LAW COLLEGE, BUXAR | 802101 | 25.581569 | 83.986458 | VIEWING CENTER |
| 10. | DARBHANGA | CHITRAGUPTA NAGAR OPPOSITE KALI MANDIR | 846001 | 26.118714 | 85.894089 | VIEWING |

| SR. | SELECT DISTRICT | OFFICE ADDRESS | PINCODE | LATITUDE | LONGITUDE | CATEGORY |
|---|---|---|---|---|---|---|
| | | LAHERIASARAI ,DARBHANGA | | | | CENTER |
| **11.** | EAST CHAMPARAN | COLLECTORATE CAMPUS MOTIHARI | 845401 | 26.631878 | 84.897756 | VIEWING CENTER |
| **12.** | GAYA | DTO OFFICE KEWALI GAYA | 823002 | 24.830877 | 84.951932 | VIEWING CENTER |
| **13.** | GOPALGANJ | NEAR MINZ STADIUM, GOPALGANJ | 841428 | 26.467483 | 84.44192 | VIEWING CENTER |
| **14.** | JAMUI | DTO OFFICE JAMUI, NEAR COLLECTORATE OFFICE | 811307 | 24.928849 | 86.227716 | VIEWING CENTER |
| **15.** | JEHANABAD | NEAR GANDHI MAIDAN, JEHANABAD COURT, JEHANABAD | 804408 | 25.197943 | 84.985484 | VIEWING CENTER |
| **16.** | KAIMUR | DISTRICT TRANSPORT OFFICE, CIRCUIT HOUSE ROAD, PO-BHABUA, PS-BHABUA, DIST - KAIMUR, 821101 | 821101 | 25.049397 | 83.613396 | VIEWING CENTER |
| **17.** | KATIHAR | DRDA CAMPUS, MIRCHAIBARI | 854105 | 25.55969 | 87.55416 | VIEWING CENTER |
| **18.** | KHAGARIA | BEHIND SDO CAMPUS KHAGARIA | 851204 | 25.508368 | 86.479907 | VIEWING CENTER |
| **19.** | KISHANGANJ | DTO OFFICE, NEAR BUS STAND KISHANGANJ | 855107 | 26.094463 | 87.944869 | VIEWING CENTER |
| **20.** | LAKHISARAI | DISTRICT TRANSPORT OFFICE | 811311 | 25.147073 | 86.091463 | VIEWING |

| SR. | SELECT DISTRICT | OFFICE ADDRESS | PINCODE | LATITUDE | LONGITUDE | CATEGORY |
|---|---|---|---|---|---|---|
| | | LAKHISARAI NEAR COLLECTORATE | | | | CENTER |
| **21.** | MADHEPURA | DTO OFFICE MADHEPURA , NEAR COLLECTORATE CAMPUS MADHEPURA | 852113 | 25.922585 | 86.796883 | VIEWING CENTER |
| **22.** | MADHUBANI | DISTRICT TRANSPORT OFFICE MADHUBANI, NEAR THANA MORE, COURT ROAD MADHUBANI | 847211 | 26.346414 | 86.070225 | VIEWING CENTER |
| **23.** | MUNGER | DTO OFFICE, MUNGER | 811201 | 25.377478 | 86.463909 | VIEWING CENTER |
| **24.** | MUZAFFARPUR | COLLECTORATE COMPOUND, NEAR REGISTRY OFFICE, SUTAPATTI, POKHRAIRA, MUZAFFARPUR | 842001 | 26.12266 | 85.380785 | VIEWING CENTER |
| **25.** | NALANDA | CHAK RASALPUR, PS- DEEPNAGAR, PO- RAMCHANDRAPUR, NALANDA | 803216 | 25.187382 | 85.507422 | VIEWING CENTER |
| **26.** | NAWADA | DISTRICT TRANSPORT OFFICE BEHIND BUDHAUL BUS STAND NAWADA 805112 | 805112 | 24.891798 | 85.522183 | VIEWING CENTER |
| **27.** | PURNIA | DTO OFFICE, NEAR THE COLLECTORATE CAMPUS, PURNIA | 854301 | 25.770779 | 87.46847 | VIEWING CENTER |
| **28.** | ROHTAS | COLLECTORATE BUILDING POST OFFICE CHOUK SASARAM | 821115 | 24.955351 | 84.013447 | VIEWING CENTER |
| **29.** | SAHARSA | COLLECTRATE CAMPUS, SAHARSA | 852201 | 25.893516 | 86.593547 | VIEWING |

| S R. | SELECT DISTRICT | OFFICE ADDRESS | PINC ODE | LATIT UDE | LONGIT UDE | CATEG ORY |
|---|---|---|---|---|---|---|
| | | | | | | CENTE R |
| **30.** | SAMASTIPU R | COLLECTORATE CAMPUS SAMASTIPUR | 848101 | 25.8600 82 | 85.77819 9 | VIEWIN G CENTE R |
| **31.** | SARAN | DISTRICT TRANSPORT OFFICE SARAN, NEAR TRAFFIC OFFICE, CHPRA SARAN | 841301 | 25.7801 134 | 84.74143 91 | VIEWIN G CENTE R |
| **32.** | SHEIKHPUR A | DISTRICT TRANSPORT OFFICE SHEIKHPURA.COLL ECTORATE CAMPUS SHEIKHPURA | 811105 | 25.1436 87 | 85.83574 2 | VIEWIN G CENTE R |
| **33.** | SHEOHAR | DTO SHEOHAR ANUMANDAL FRONT OF SHIV MANDIR | 843329 | 26.3052 | 85.1739 | VIEWIN G CENTE R |
| **34.** | SITAMARHI | DUMRA SITAMARHI | 843301 | 26.5636 32 | 85.52116 6 | VIEWIN G CENTE R |
| **35.** | SIWAN | AT- MAHADEVA ROAD, SIWAN | 841226 | 26.2287 55 | 84.35798 4 | VIEWIN G CENTE R |
| **36.** | SUPAUL | COLLECTRATE CAMPUS SUPAUL | 852131 | 26.1275 77 | 86.60637 2 | VIEWIN G CENTE R |
| **37.** | VAISHALI | PHED COLONY, HAJIPUR NEAR CIRCUIT HOUSE, VAISHALI. | 844101 | 25.6962 77 | 85.22275 8 | VIEWIN G CENTE R |
| **38.** | WEST CHAMPARA N | KAMAL NATH NAGAR,COLLECTR ATE CAMPUS ,BETTIAH | 845438 | 26.8039 38 | 84.51934 9 | VIEWIN G CENTE R |

**-----xx-------xx-------END OF PART IA AND PART IB OF THE RFP-------xx------xx-----**




**Tender Name:**

# Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis

# Part II

**Tender Notification No**: 05-269/2025-777
**Date:** 04-11-2026

**Issued By**

Transport Department, Government of Bihar
(Vishweshwaraiya Bhawan, Bailey Road, Patna, Bihar, 800015)
Tel No: - (0612)-2546449
Fax No: - (0612)-2546212
Web Site: - https://state.bihar.gov.in/transport

## Confidentiality

This document has been designed for limited circulation only, amongst the interested parties (Bidders) who have requested for RFP for "Request for Proposal for Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis". Information shared with Bidders through this document, and any subsequent written document or verbally in this regard is confidential in nature. Any further circulation of this information without prior permission of BTD is prohibited and shall attract punishment / penalties.

## Disclaimer

Bihar Transport Department (hereinafter referred to as "BTD") has issued this Request for Proposal (hereinafter referred to as "RFP") for "Selection of Master System Integrator (MSI) to Design, Supply, Implement, Integrate and Commission Electronic Enforcement Systems at identified high-risk and risk-density corridors and critical locations for Bihar State and operate & maintain the systems for a period of 10 years on PPP basis" on such terms and conditions as set out in this RFP document, including but not limited to the Functional and Technical Specifications and requirements set out in different parts of this RFP document.

This RFP has been prepared with an intention to invite prospective Bidders and to assist them in making their decision of whether or not to submit a proposal.

It is hereby clarified that this RFP is not an agreement, and the purpose of this RFP is to provide the bidder(s) with information to assist them in the formulation of their proposals. This RFP document does not purport to contain all the information bidders may require. This RFP document may not be appropriate for all persons, and it is not possible for BTD to consider the investment objectives, financial situation and particular needs of each bidder. BTD has taken due care in preparation of information contained herein. However, this information is not intended to be exhaustive. Interested parties are required to make their own inquiries and respondents shall be required to confirm in writing that they have done so, and they do not solely rely on the information contained in this RFP in submitting their proposal. This RFP includes statements, which reflect various assumptions and assessments arrived at by BTD in relation to the project. Such assumptions, assessments and statements do not purport to contain all the information that each Bidder may require.

This RFP is not an agreement by and between BTD and the prospective bidders or any other person. The information contained in this RFP is provided on the basis that it is non–binding on BTD, any of its authorities or agencies, or any of their respective officers, employees, agents, or advisors. BTD makes no representation or warranty and shall incur no liability under any law as to the accuracy, reliability or completeness of the information contained in the RFP document. Each Bidder should conduct its own investigations and analysis to check the accuracy, reliability and completeness of the information in this RFP Document, and where necessary, obtain independent advice from appropriate sources. Each Bidder is advised to consider the RFP document as per his understanding and capacity. The bidders are also advised to do appropriate examination, enquiry and scrutiny of all aspects mentioned in the RFP document before bidding. Bidders are encouraged to take professional help of experts on financial, legal, technical, taxation, and any other matters / sectors appearing in the document or specified work.

Bidders are also requested to go through the RFP document in detail and bring to notice of BTD any kind of error, misprint, inaccuracies, or omission in the document. BTD reserves the right not to proceed with the project, to alter the timetable reflected in this document, or to change the process or procedure to be applied. BTD also reserves the right to decline to discuss the Project further with any party submitting a proposal.

No reimbursement of cost of any type shall be paid to persons, entities submitting a Proposal. The Bidder shall bear all costs arising from, associated with or relating to the preparation and submission of its Bid including but not limited to preparation, copying, expenses associated with any demonstrations or presentations which may be required by BTD, or any other costs incurred in connection with or relating to its Bid.

Issue of this RFP does not imply that BTD is bound to select and pre-qualify Bids for Bid Stage or to appoint the Agency for the project and BTD reserves the right to reject all or any of the Bids without assigning any reasons whatsoever. BTD may, in its absolute discretion but without being under any obligation to do so, update, amend or supplement the information, assessment or assumptions contained in this RFP.

The information contained in this Request for Proposal ("RFP") Document or subsequently provided to Bidder, whether verbally or in documentary form by or on behalf of the BTD or any of their employees is provided to the Bidder on the terms and conditions set out in this RFP Document and any other terms and conditions subject to which such information is provided.

The BTD, their employees and advisors make no representation or warranty and shall incur no liability under any law, statute, rules, or regulations as to the accuracy, reliability or completeness of the RFP Document. The Government Representatives may in their absolute discretion, but without being under any obligation to do so, update, amend or supplement the information in this RFP Document.

**Structure of the RFP**

This RFP is meant to invite proposals from interested bidders capable of delivering the services described herein. This Request for Proposal document consists of following parts viz:

**Part I:**

**Part IA: Instruction to Bidders**
Part IA of this RFP details out clear instructions to the bidders for the bidding process requirements in addition to selection process and criteria for selection of MSI

**Part IB: Scope of Work**
This part gives detail requirements of the project including the scope, project activities and timelines, technical requirements, integration requirements, and specifications with respect to the project.

This part also describes various phases of the project and roles and responsibilities of the Agency during the entire project duration including the implementation stage under Part A Work Order and the Operations and Maintenance stage under Part B Work Order.

Various administrative aspects including timelines are also described in this part.

**Part II: Draft Agreements**

This part of the RFP provides various Terms and conditions of the contract, Draft Agreements format such as Draft Non-Disclosure Agreement, Draft Master Service Agreement etc. which would be entered into between the BTD and the Successful Bidder (MSI) at the start of the project.

This is the **Part II** of the RFP document.

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# Draft Master Service Agreement

**THIS MASTER SERVICE AGREEMENT ("MSA")** is made on the _____ day of _____ 20__ at <PATNA>, India.

**BETWEEN**

The **Governor of the state of Bihar** exercising executive powers of the **Government of Bihar** through the State Transport Commissioner having its office at 2nd Floor, Visveswaraya Bhawan, J L N Marg Patna – 800001, India hereinafter referred to as **'BTD',** which expression shall, unless the context otherwise requires, include its successors and assigns);

**AND**

_____<Name of Bidder / Lead Bidder>_____**,** (a Company registered and incorporated in India under the Companies Act, 1956/2013 OR Limited Liability Partnership firm under LLP Act 2008, (as amended from time to time) through having its registered office at _____ (hereinafter referred to as **'MSI / Successful Bidder'** which expression shall, unless the context otherwise requires, include its permitted successors and assigns).

Each of the parties mentioned above are collectively referred to as the '**Parties**' and individually as a '**Party**'.

**WHEREAS**

a) Bihar Transport Department (BTD) is desirous to implement the project _____ _____, hereafter referred to **"Project"** for a period of 140 months (20 months of Implementation Phase till Go-Live and 10 years post Go-Live – "Contract Period")
b) In furtherance of the same, BTD undertook the selection of a suitable MSI through a competitive bidding process for implementing the Project and in this behalf issued Request for Proposal (RFP) number _____ dated _____.
c) The Successful Bidder has been selected as the MSI on the basis of a transparent bidding process and the bid response set out in the RFP, and as set out as Annexure of MSA, to undertake the _____ Project.
d) This agreement (**the "Master Service Agreement" / "MSA" / "Contract Agreement"**) shall be executed with the Bidder (Lead Bidder in case of Consortium), hereafter called as **'MSI'**, on mutually agreed terms and conditions. The MSI shall be responsible entirely for the complete implementation, operations and maintenance of the Project.
e) The MSI was issued Letter of Intent with number _____ dated _____ to carry out _____, Part A of the Scope.
f) The MSI has submitted Performance Bank Guarantee number _____dt. ___, of amount _____, valid throughout the contract period till date _____<Performance Security expiry date>_____ and agrees to extend the same to meet the SLAs and other requirements for the "Project" as per terms and conditions of the RFP.

**NOW THEREFORE**, in consideration of the mutual covenants, promises, assurances, representations and provisions set forth herein, the Parties hereto agree as follows:

# 1. DEFINITIONS AND INTERPRETATION

## 1.1. Definitions

Terms and expressions used in MSA (including the Introduction) shall have the meanings as under

| Terms | Definition |
|---|---|
| Adverse Effect / Material Adverse Effect | Means material adverse effect on<br>(a) the ability of the MSI to exercise any of its rights or perform / discharge any of its duties / obligations under and in accordance with the provisions of MSA and/or<br>(b) the legal validity, binding nature or enforceability of MSA; |
| Affiliate | "Affiliate" means, with respect to any Party, any other entity that, directly or indirectly: (a) Controls such Party; (b) is Controlled by such Party; (c) is Controlled by the same person who, directly or indirectly, Controls such Party; and "Control" with respect to any person, shall mean: (a) the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of such person whether through the ownership of voting share capital, by agreement or otherwise or the power to elect more than one-half of the directors, partners or other individuals exercising similar authority with respect to such person; (b) the possession, directly or indirectly, of a voting interest of more than 50%; and the terms "Controlling" and "Controlled by" shall be construed accordingly; |
| Agreement | Means this Master Services Agreement, Non-Disclosure Agreement etc. together with all Articles, Annexures, Schedules and the contents and specifications of the RFP; |
| Applicable Law(s) | Means any statute, law, ordinance, notification, rule, regulation, judgment, order, decree, bye-law, approval, directive, guideline, policy, requirement or other governmental restriction or any similar form of decision of, or determination by, or any interpretation or administration of the BTD as may be in effect on the date of the execution of the MSA and during the subsistence thereof, applicable to the Project; |
| Confidential Information | Means all information including BTD Data (whether in written, electronic or other format) which relates to the technical, financial and business affairs, dealers, suppliers, products, developments, operations, processes, data, trade secrets, design rights, know-how, plans, budgets and personnel of each Party and its affiliates, AND THE CITIZENS AND COMMUTERS which is disclosed to or otherwise learned by the other Party in the course of or in connection with the MSA (including without limitation such information received during negotiations, location visits and meetings in connection with the MSA and Project) |
| Control | Means, in relation to any business entity, the power of a person to secure<br>(i) by means of the holding of shares or the possession of voting power in or in relation to that or any other business entity, or<br>(ii) by virtue of any powers conferred by the articles of association or other document regulating that or any other business entity,<br>that the affairs of the first mentioned business entity are conducted in accordance with that person's wishes and in relation to a partnership, means the right to a share of more than one half of the assets, or of more than one half of the income, of the partnership; |

| Terms | Definition |
|---|---|
| Data | "Data" here refers to information gathered through the ITMS system or any other existing system of the BTD / Smart City or any other authority, or obtained from any BTD officials, written or verbal or in any other form. |
| Deliverables | As per defined Scope of Work in the RFP. |
| Effective Date | "Effective Date" means the date on which the Contract is signed and executed by the Successful Bidder – "Contract commencement date". |
| Go-live / Commencement of Operations | "Go-live" as defined in the Part I of the RFP document. |
| Intellectual Property Rights | Means all rights in written designs and copyrights, moral rights, rights in databases and Bespoke Software / Pre-existing work including its up-gradation systems and compilation rights (whether or not any of these are registered and including application for registration); |
| Agency / MSI | Refers to the Successful Bidder / Master System Integrator, the entity selected to execute the project and responsible for handling the overall implementation and operations of the _____ Project, in accordance with the terms of this RFP. |
| Material Breach | Means a breach by either Party (BTD or MSI) of any of its obligations under the MSA which has or is likely to have an Adverse Effect on the Project which such Party shall have failed to cure; |
| MSA / Contract / Agreement | Means the Agreement entered into between the BTD and the MSI as recorded in the Contract form signed including all attachments and Appendix / Annexes thereto, the Tender and all Annexures thereto and the agreed terms as set out in the proposal, all documents incorporated by reference therein and amendments and modifications to the above from time to time; |
| BTD Data | Means all proprietary data of the BTD, and any other authorities generated out of operations and transactions and related information including but not restricted to user data which the MSI obtains, possesses or processes in the context of providing the Services to the users pursuant to the MSA; |
| Personnel | Means persons hired by the MSI or by any Sub-Consultant as employees and assigned to the performance of the Services or any part thereof; |
| Project | Design, Supply, Implement, Integrate and Commission Electronic Enforcement of Road Safety at identified high-risk and risk-density corridors and critical junctions for Bihar State<br><br>**In 2 parts:**<br>Part A: Project Implementation<br>Part B: Project Operations and Maintenance (if Part B Work Order issued by BTD) |
| Project Implementation | Means Project Implementation as per the functional and technical requirements, SLAs, testing standards and acceptance criteria prescribed by BTD; |
| Project Implementation Committee | Shall be constituted by BTD to monitor the activities, deliverables and progress of the Project. PIC shall comprise of the staff members of the BTD, other officials from concerned department and external experts (as defined in the RFP); |
| Replacement MSI | Means any third party that BTD appoint to replace MSI upon expiry of the Term or termination of MSA to undertake the Services or part thereof; |

| Terms | Definition |
|---|---|
| Required Consents | Means the consents, waivers, clearances and licenses to use BTD 's Intellectual Property Rights, rights and other authorizations as may be required to be obtained for the software and other items that BTD or Smart City or any other authorities or service providers of BTD are required to make available to MSI pursuant to MSA; |
| RFP | The Tender Document (Part I and II) referred above along with all the Addendum / Corrigendum to the Request for Proposal (if any). |
| Role | Role based security model refers to a model of system security wherein only authorized users have access to the system. |
| Schedule | Schedule / Annexure / Appendix to this MSA unless explicitly specified otherwise. |
| Service Level | Means the level of service and other performance criteria which shall apply to the MSI for services as set out in the SLA parameters in the RFP document effective during the Term of MSA; |
| Services | Means the services delivered to the Citizens, Stakeholders of BTD, employees of BTD, other concerned stakeholders, and to professionals, using the tangible and intangible assets created, procured, installed, managed and operated by the MSI including the tools of information and communications technology and includes but is not limited to the list of services specified in relevant sections in the RFP. |
| SLA | Means the Performance and Maintenance Service Level Agreement agreed between the MSI and the BTD, and part of it with any other authority and its vendor whose assets are being co-used under the project as part of MSA executed for the Project as per SLA parameters defined in the RFP document. |
| Software | Means the software designed, developed / customized, tested and deployed by the MSI for the purposes of the Project and includes the source code (in case of Bespoke development) along with associated documentation, which is the work product of the development efforts involved in the Project and the improvements and enhancements effected during the term of the Project, including the third party software products (including the COTS products with **perpetual license** to use for the project), proprietary software components and tools deployed by the MSI, unless otherwise specified explicitly; |
| Stakeholders | Means the Citizens, BTD, Traffic Police, Corporation, state PWD, Smart City, vendors, consultants etc. and other Departments of State Government / Local Govt. / Central Govt.; |
| System | System refers to the hardware and software components used in the Project or the hardware and software components required for successful implementation, operations and execution of the Project. |
| Warranty / BTD Period | Shall be comprehensive onsite warranty for all civil, software, hardware modules and network components / equipment for the entire duration of the project. |

### 1.2. Interpretation

In MSA, unless otherwise specified:

a. References to Clauses, Sub-Clauses, Paragraphs, Schedules and Annexures are to clauses, sub-clauses, paragraphs, schedules and annexures to the MSA unless explicitly specified;
b. Use of any gender includes the other genders;
c. References to a ‘company’ shall be construed so as to include any allowed company, corporation or other body corporate, wherever and however incorporated or established

unless specifically restricted;

d. References to a 'person' shall be construed so as to include any individual, firm, company, government, state or MSI of a state, local or municipal authority or government body or any joint venture, association or partnership (whether or not having separate legal personality);
e. A reference to any statute or statutory provision shall be construed as a reference to the same as it may have been, or may from time to time be, amended, modified or re-enacted;
f. Any reference to a 'day' (including within the phrase 'business day') shall mean a period of 24 hours running from midnight to midnight;
g. References to a 'business day' shall be construed as a reference to a day (other than a Sunday) on which Government of Bihar is generally open for business;
h. References to times are to Indian Standard Time;
i. A reference to any other document referred to in the MSA is a reference to that other document as amended, varied, innovated or supplemented at any time; and
j. All headings and titles are inserted for convenience only. They are to be ignored in the interpretation of the MSA.
k. Successful Bidder or MSI has been used for the same entity i.e. bidder selected for the project.

### 1.3. Measurements and Arithmetic Conventions

All measurements and calculations shall be in the metric system and calculations done to 2 (two) decimal places, with the third digit of 5 (five) or above being rounded up and below 5 (five) being rounded down except in money calculations where such amounts shall be rounded off to the nearest INR (upper).

### 1.4. Ambiguities within Agreement

In case of ambiguities or discrepancies within the MSA, the following principles shall apply:

1. As between two Clauses of the MSA, the provisions of a specific Clause relevant to the issue under consideration shall prevail over those in a general Clause;
2. As between the provisions of the MSA and the Schedules/Annexures (including the Part I of the RFP document), the Agreement shall prevail, save and except as expressly provided otherwise in the Agreement or the Schedules/Annexures; and
3. As between any value written in numerals and that in words, the value in words shall prevail.

### 1.5. Priority of documents

The MSA, including its Schedules and Annexures, represents the entire agreement between the Parties as noted in this Clause. If in the event of a dispute as to the interpretation or meaning of the MSA it shall be necessary for the Parties to refer to documents forming part of the bidding process leading to the MSA, then such documents shall be relied upon and interpreted in the following descending order of priority:

1. The MSA, NDA agreement, Schedules and Annexures;
2. Request for Proposal (Part I of the RFP) and Addendum / Corrigendum to the Request for Proposal (if any).
3. For the avoidance of doubt, it is expressly clarified that in the event of a conflict between the MSA, Annexures / Schedules or the contents of the RFP, the terms of the MSA shall prevail over the Annexures / Schedules, contents specifications of the RFP.
4. For the avoidance of doubt, it is expressly clarified that in the event of a conflict between this Master Service Agreement and Non-Disclosure Agreement, MSA shall prevail over NDA.

## 2. SCOPE OF THE PROJECT

**The MSI shall be required to:**

1. Design, Supply, Implement, Integrate and Commission Electronic Enforcement of Road Safety at identified high-risk and risk-density corridors and critical junctions for Bihar State as per requirements specified in the RFP and Addendum / Corrigendum to the Request for Proposal (if any).
2. Operate, manage, maintain and provide technical support to the ITMS System for the period of for a period of 10 years **(120 months)** from the date of Commencement of Project.

The roles and responsibilities of the Parties under this Agreement have been set out in detail in the **Part I** of the RFP document.

For the avoidance of doubt, it is expressly clarified that the MSA shall govern the provision of the contracted professional services under the SLA to the BTD and other authorities. The Parties shall each ensure that the range of the Services defined in the RFP document and under the SLA shall not be varied, reduced or increased during the contract period unless explicitly agreed by both the parties in the writing and as addendum to this MSA.

## 3. TERM AND DURATION OF THE AGREEMENT

This Agreement (the "Master Service Agreement" / the "MSA" / "Contract Agreement") shall come into effect on _____, 2026 (hereinafter the '**Effective Date**') and shall continue till operation and maintenance completion date which shall be the date of the completion of the operation and maintenance of the Project. In the event that implementation period gets extended beyond 20 months, BTD reserves the right to extend the term of the Agreement by corresponding period to allow validity of contract for 120 months from the date of Date of Go – Live / Commencement of Operations. In the event of such an extension, BTD shall not reimburse the bidder for any expenses incurred.

# 4. CONDITIONS PRECEDENT and EFFECTIVE DATE

## 4.1. Provisions to take effect upon fulfilment of Conditions Precedent

Subject to express terms to the contrary, the rights and obligations under the MSA shall take effect only upon fulfilment of all the Conditions Precedent set out below. However, BTD may at any time at its sole discretion waive fully or partially any of the Conditions Precedent for the MSI.

## 4.2. Conditions Precedent of the MSI

**The MSI shall be required to fulfil the Conditions Precedent as follows:**

1. To provide the BTD, as and when required, certified true copies of its constitutional documents, Financial Documents, experience documents, tax cleared certificates, board resolutions authorizing the execution, delivery and performance of the MSA by the MSI and any other documental evidence BTD may ask from MSI from time to time.
2. No amount or any other charges whatsoever on any account shall be levied by the MSI on the BTD, Traffic Police, Corporation, Smart City, PWD and any other authorities, and any of its users or citizens for any services provided under the Project unless approved by the BTD.
3. MSI shall obtain all approvals and clearances required, with BTD's assistance, for Implementation of the Project including erection of Poles, Cantilevers, gantries, laying of electric and network cables etc.
4. Any other requirements as detailed in the RFP document.

## 4.3. Extension of time for fulfilment of Conditions Precedent

The parties shall, at BTD's discretion, extend the time for fulfilling the Conditions Precedent.

## 4.4. Non-fulfilment of the MSI's Conditions Precedent

1. In the event that any of the Conditions Precedent of the MSI have not been fulfilled within 15 days of signing of the MSA or time as specified in the RFP document or time as specified by BTD from time to time, and the same have not been waived fully or partially by BTD, the MSA shall cease to exist;
2. In the event that the Agreement fails to come into effect on account of non-fulfilment of the MSI's Conditions Precedent, the BTD shall not be liable in any manner whatsoever to the MSI and the BTD shall forthwith forfeit the Performance Security.
3. In the event that possession of any of the BTD facilities or facilities of any other authorities such as Smart City or Traffic Police, or their resources have been delivered to the MSI prior to the fulfilment of the Conditions Precedent, upon the termination of the MSA such possession shall immediately revert to original authority, free and clear from any encumbrances or claims as per direction from BTD.

# 5. REPRESENTATIONS AND WARRANTIES

## 5.1. Representations and warranties of the MSI

The MSI represents and warrants to the BTD that:

1. it is duly organized and validly existing under the laws of India, and has full power and authority to execute and perform its obligations under the MSA and other agreements as per scope of RFP and to carry out the transactions contemplated hereby;
2. it has the financial standing and capacity to perform its obligations under the Agreement as per scope defined in the RFP document and is a competent provider of a variety of information technology and business process management services as per requirements to meet the project objectives;
3. it has taken all necessary corporate and other actions under laws applicable to its business to authorize the execution and delivery of the MSA and to validly exercise its rights and perform its obligations under the MSA;
   i. from the Effective Date, it shall have the financial standing and capacity to undertake the Project in accordance with the terms of the MSA;
   ii. in providing the Services, it shall use reasonable endeavours not to cause any unnecessary disruption to BTD's normal business operations
4. the MSA has been duly executed by it and constitutes a legal, valid and binding obligation, enforceable against it in accordance with the terms hereof, and its obligations under the MSA shall be legally valid, binding and enforceable against it in accordance with the terms hereof;
5. the information furnished in the tender documents and as updated on or before the date of the MSA is to the best of its knowledge and belief true and accurate in all material respects as at the date of the MSA;
6. the execution, delivery and performance of the MSA shall not conflict with or result in the breach of or constitute a default by any of the terms of its Memorandum and Articles of Association or any Applicable Laws or any covenant, contract, agreement, arrangement, understanding, decree or order to which it is a party or by which it or any of its properties or assets is bound or affected;
7. there are no actions, suits, proceedings, or investigations pending or, to its knowledge, threatened against it at law or in equity before any court or before any other judicial, quasi-judicial or other authority, the outcome of which may result in the breach of the MSA or which individually or in the aggregate may result in any impairment of its ability to perform any of its obligations under the MSA;
8. it has no knowledge of any violation or default with respect to any order, writ, injunction or decree of any court or any legally binding order of any Government Instrumentality which may result in any Adverse Effect on its ability to perform its obligations under the MSA and no fact or circumstance exists which may give rise to such proceedings that shall adversely affect the performance of its obligations under the MSA;
9. it has complied with Applicable Laws in all material respects and has not been subjected to any fines, penalties, injunctive relief or any other civil or criminal liabilities which in the aggregate have or may have an Adverse Effect on its ability to perform its obligations under the MSA;
10. no representation or warranty by it contained herein or in any other document furnished by it to BTD in relation to the Required Consents contains or shall contain any untrue or misleading statement of material fact or omits or shall omit to state a material fact necessary to make such representation or warranty not misleading; and
11. no sums, in cash or kind, have been paid or shall be paid, by it or on its behalf, to any person by way of fees, commission or otherwise for entering into the MSA or for influencing or attempting to influence any officer or employee of BTD in connection therewith.
12. The MSI fully indemnifies the BTD, from any damages arising out of breach of the

aforesaid conditions.

### 5.2. Representations and warranties of the BTD

**BTD represent and warrant to the MSI that:**

1. it has full power and authority to execute, deliver and perform its obligations under the MSA and to carry out the transactions contemplated herein and that it has taken all actions necessary approvals to execute the MSA, exercise its rights and perform its obligations, under the MSA and carry out the transactions contemplated hereby;
2. it has taken all necessary actions under Applicable Laws to authorize the execution, delivery and performance of the MSA and to validly exercise its rights and perform its obligations under the MSA;
3. it has the financial standing and capacity to perform its obligations under the Agreement;
4. it is subject to the laws of India, and hereby expressly and irrevocably waives any immunity in any jurisdiction in respect of the MSA or matters arising thereunder including any obligation, liability or responsibility hereunder;
5. the MSA has been duly executed by it and constitutes a legal, valid and binding obligation enforceable against it in accordance with the terms hereof and its obligations under the MSA shall be legally valid, binding and enforceable against it in accordance with the terms thereof;
6. the execution, delivery and performance of the MSA shall not conflict with, result in the breach of, constitute a default under, or accelerate performance required by any of the Applicable Laws or any covenant, contract, agreement, arrangement, understanding, decree or order to which it is a party or by which it or any of its properties or assets is bound or affected;
7. There are no actions, suits or proceedings pending or, to its knowledge, threatened against it at law or in equity before any court or before any other judicial, quasi-judicial or other authority, the outcome of which may result in the default or breach of the MSA or which individually or in the aggregate may result in any material impairment of its ability to perform its material (including any payment) obligations under the MSA;
8. It has no knowledge of any violation or default with respect to any order, writ, injunction or any decree of any court or any legally binding order of any Government Instrumentality which may result in any Adverse Effect on the BTD's ability to perform its obligations under the MSA and no fact or circumstance exists which may give rise to such proceedings that would adversely affect the performance of its obligations under the MSA;
9. It has complied with Applicable Laws in all material respects;
10. All information provided by it in the RFP in connection with the Project is, to the best of its knowledge and belief, true and accurate in all material respects; and upon the MSI performing the covenants herein, it shall not at any time during the term hereof, interfere with peaceful exercise of the rights and discharge of the obligations by the MSI, in accordance with the MSA.

### 5.3. Obligations of the MSI

1. It shall provide to the BTD, Solutions, Systems, Deliverables etc. as set out in the RFP.
2. It shall perform the Services as set out in the RFP and in a good and workmanlike manner commensurate with industry and technical standards which are generally in effect for international projects and innovations pursuant thereon similar to those contemplated by the MSA, and so as to comply with the applicable Service Levels set out with the MSA.
3. It shall ensure that the Services will be provided as per the Project Timelines set out in the RFP. It shall keep accurate and systematic accounts and records in respect of the Services hereunder, in accordance with accepted accounting principles and in such form and detail as shall clearly identify all relevant changes in time and costs, and the bases thereof; and it shall agree that the BTD or its designated representative when applicable, and upto three (3) years from the expiration or termination of the MSA has the right, to inspect the same and make copies as well as to have them audited by auditors appointed by the BTD, if so required, as the case may be.
4. The MSI hereby acknowledges that the BTD has the discretion to conduct checks and audits depending on the situation of the case.
5. It shall comply with such reasonable instructions as may be notified by the BTD from time to time;
6. It shall deliver project monitoring, implementation, progress, compliance, utilization reports demonstrating performance of the Services in the prescribed formats and at the frequency, specified by the BTD.
7. It shall comply with all statutory and legal requirements of the Country, State and jurisdiction in which it operates and in which the Services are carried out as may arise from time to time whilst acting on the Instructions;
8. It shall seek the prior approval for any hardware or software proposed to be installed and also for the proposed manner of such installation and the BTD's decision in this regard shall be final and binding;
9. It shall provide alternate options not later than seven (7) days from the date on which the BTD rejects the said hardware / software or the proposed manner of installation.

## 6. APPROVALS AND REQUIRED CONSENTS

1. The MSI shall procure, maintain and observe all relevant and regulatory and governmental licenses, clearances and applicable approvals (hereinafter the "Required Consents") necessary for the MSI to erect the poles, cantilevers and gantries, cameras, and allied civil structure and provide the Services as per RFP document. All costs related to procuring such approvals shall be borne by the MSI.
2. The BTD shall use reasonable endeavours to support MSI to obtain the Required Consents. In the event that any Required Consent is not obtained, the MSI and the BTD shall co-operate with each other in achieving a reasonable alternative arrangement as soon as reasonably practicable for the BTD to continue to process its work with a minimal interruption to its business operations as is commercially reasonable until such Required Consent is obtained, provided that the MSI shall not be relieved of its obligations to provide the Services and to achieve the Service Levels until the Required Consents are obtained, if and to the extent that the MSI's obligations are not dependent upon such Required Consents. However, all costs related to procuring such approvals shall be borne by the MSI.

## 7. USE OF BTD, TRAFFIC POLICE, SMART CITY AND AUTHORITY'S ASSETS BY THE MSI

**During the Term the MSI shall:**

1. take all reasonable and proper care of the entire civil structure, hardware and software, network or any other information technology or non-IT infrastructure components used for the Project and other facilities leased / owned / operated by the MSI, exclusively in terms of ensuring their usability for the delivery of the Services as per the MSA (hereinafter the "Assets") in proportion to their use and control of such Assets;
2. keep all the tangible Assets in a good and serviceable condition (reasonable wear and tear) as at the date the MSI takes control of and/or first uses the Assets, during the entire Contract Period, and at the time of handover to the BTD at the end of the contract period / termination of the contract.
3. ensure that any instructions or manuals supplied by the manufacturer of the Assets for use of the Assets and which are provided to the MSI shall be followed by the MSI and any person who shall be responsible for use of the Assets;
4. take such steps as may be properly recommended by the manufacturer of the Assets and notified to the MSI or as may, in the reasonable opinion of the MSI, be necessary to use the Assets in a safe manner;
5. ensure that the Assets implemented for the project by the MSI, are kept suitably housed and in conformity with Applicable Law;
6. procure permission from the BTD and any person(s) duly authorized by them to enter any land or premises on which the Assets are, so as to inspect the same, subject to any reasonable third party requirements;
7. not, knowingly or negligently use or permit by use any of the Assets in contravention of any statutory provisions or regulation or in any way contrary to Applicable Law and for any other purpose not explicitly approved by BTD in writing.

## 8. USE OF BTD, TRAFFIC POLICE, SMART CITY AND AUTHORITY'S LOCATIONS

1. For so long as the MSI provides services to the project location, as the case may be, on a non-permanent basis and to the extent necessary, the BTD shall, subject to compliance by the MSI with any safety and security guidelines which may be provided by the BTD and notified to the MSI in writing, provide the MSI with:
   a. Reasonable access, in the same manner granted to the BTD employees, to the required location during working hours.
   b. Reasonable work space, access to office equipment and other related support services in such location and, as may be reasonably necessary for the MSI to perform its obligations hereunder and under the SLA.
2. Access to locations, office equipment and services shall be made available to the MSI on an "as is, where is" basis by the BTD.
3. The MSI agrees to ensure that its employees, agents and contractors shall not use the location, services and equipment referred to in RFP for the following purposes:
   a. For the transmission of any material which is defamatory, offensive or abusive or of an obscene or menacing character; or
   b. In a manner which constitutes a violation or infringement of the rights of any person, firm or company (including but not limited to copyright or right of confidentiality).
   c. Any other purpose not specifically forming the part of the Scope of the Project.
4. MSI shall not part with or create any Encumbrance on the whole or any part of the Site.
5. MSI agrees to promptly report in writing to the BTD, any act or omission or issues or conflicts which they are aware that could have an adverse effect on the project.
6. The MSI acknowledges and agrees that any information and data on climatic, hydrological, topographical and general conditions relating to the Project Sites made

available to it by BTD has been done so for the convenience of the MSI and that the MSI enters into the Contract based upon its own investigations and determinations.

7. MSI warrants that it has, to its complete satisfaction, examined and inspected the Project Sites and its surroundings and where applicable, any existing structures or works on, over and under the Project Sites and is familiar with and has satisfied itself with the Project Sites conditions including the climate, topography, access to and from Sites, safety, availability of labour, water and electricity. No claim by MSI regarding misunderstanding or misapprehension in respect of matters related to this Clause shall be maintainable.

## 9. OPERATION PHASE

1. **Governance:** The review and management process of MSA shall be carried out in accordance with the Governance Schedule set out in **Annexure III** of the MSA and shall cover all the management aspects of the Project.
2. **Use of Services:** The BTD shall undertake and use the Services in accordance with instructions or procedures communicated by the MSI and as per the SOP defined by BTD (or any other authority) and / or defined by the MSI and agreed by the BTD (or any other authority) which is part of the SLA or the MSA or RFP or any agreement that may be entered into between the Parties from time to time; The BTD shall use and operate the services and system implemented, managed and maintained by MSI.
3. **Security and Safety:** MSI shall comply with the technical requirements of the relevant security, safety and other requirements specified in the IT Act including the regulations issued by dept. of telecom (wherever applicable), guidelines and procedures of the relevant IRC codes, and other environmental guidelines and follow the industry standards related to safety and security (including those as stated in the RFP), in so far as it applies to the provision of the Services. Additionally, the following points shall be considered:
   a. Each Party to the MSA shall also comply with the Government of India, Government of Bihar and respective city and District regulatory authority's security standards and policies in force from time to time at each location of project.
   b. The Parties to the MSA shall use reasonable endeavours to report forthwith in writing to each other all identified attempts (whether successful or not) by unauthorized persons (including unauthorized persons who are employees of any Party) either to gain access to or interfere with the BTD as the case may be or any of their nominees data, facilities or Confidential Information.
   c. MSI shall upon reasonable request by the BTD, participate in regular meetings when safety and information technology security matters are reviewed. As per the provisions of the MSA, MSI shall promptly report in writing to the BTD, any act or omission which they are aware that could have an adverse effect on the proper conduct of safety and information technology security at the facilities of BTD.
4. **Cooperation:** Except as otherwise provided elsewhere in MSA, each Party ("Providing Party") to the MSA undertakes promptly to provide the other Party ("Receiving Party") with all such information and co-operation which the Receiving Party reasonably requests, provided that such information and co-operation:
   a. Does not require material expenditure by the Providing Party to provide the same;
   b. Is reasonably required by the Receiving Party in order for it to comply with its obligations under the MSA;
   c. cannot be construed to be Confidential Information; and
   d. Is capable of being provided by the Providing Party.
   e. Further, each Party agrees to co-operate with contractors and subcontractors of the other Party as reasonably requested in order to accomplish the purposes of the MSA.

## 10. NON-EXCLUSIVITY

The right of the MSI to perform executes and implements the Works or any part thereof pursuant to the Contract, is not exclusive and shall not prevent BTD from granting a similar right to other parties.

## 11. FINANCIAL MATTERS

### 11.1. Terms of Payment and Service Credits and Debits

1. In consideration of the Services and subject to the provisions of MSA, the BTD shall pay the MSI for the Services rendered in pursuance of MSA, in accordance with the Terms of Payment Schedule set out in the Part I of the RFP.
2. All payments are subject to the adherence to defined Service levels as may be provided for in the SLA. For the avoidance of doubt, it is expressly clarified that payment for the service provided shall be in accordance with the RFP. BTD may also calculate penalties and liquidated damages and raise a demand on the MSI for payment of the same. The MSI shall have to pay the penalty amount so raised within the time specified in the RFP document. In case of any dispute the same may be referred to the Transport Secretary / Transport Commissioner, Bihar, whose decision shall be final in this regard. In event of failure of MSI to pay the penalty amount, BTD shall have the discretion to recover the same from the payment due to the MSI and / or the PBG submitted. The MSI shall have to replenish the Performance Security amount so deducted by BTD within 15 days of such deduction.
3. Save and except as otherwise provided for herein or as agreed between the Parties in writing, the BTD shall not be required to make any payments in respect of the Services (or, without limitation to the foregoing, in respect of the MSI performance of any obligations under MSA) other than those covered in the RFP. For the avoidance of doubt, it is expressly clarified that the quoted rate in the Commercial Bid by the MSI shall be deemed to include all ancillary and incidental costs and charges arising in the course of delivery of the Services including consultancy charges, infrastructure costs, project costs, implementation and management charges and all other related costs including taxes.
4. Payments against Services rendered by the MSI shall be subject to fulfilment of the conditions of the RFP and MSA or any additional instructions by the BTD and subject to the MSI complying with provisions of MSA and Instructions, as stipulated by the BTD.
5. If the MSI fails, omits or neglects to observe or commits or allows to be committed a breach of any of the terms, conditions, provisions or stipulations of the RFP, MSA or in connection with any other instructions or in case of occurrence of any material breach, then the BTD shall be entitled to initiate appropriate legal proceedings, in addition to withholding / suspension of payment and / or recovering payments and / or termination along with damages, interests and expenses without prejudice to any other right or remedy which the BTD has under MSA or otherwise in law.
6. The BTD shall be entitled to delay or withhold part of the payment due to MSI which is under a dispute. The withheld amount shall be limited to that which is the disputed amount. The disputed amount shall be referred to the escalation procedure as set out in Dispute Management Clause under MSA. Any exercise by the BTD under this Clause shall not entitle the MSI to delay or withhold the Services. In case any payment is disputed by BTD, the same shall be notified to MSI. The MSI shall take suitable measures to rectify the errors, defects, mistakes, etc. in the services delivered and inform the BTD in writing. If the MSI does not act upon the errors, defects, mistakes etc. or fails / refuses to inform BTD to the satisfaction of BTD, the dispute may be referred in accordance with the Dispute Management Procedure defined in the MSA.

### 11.2. Payment and Settlement

Subject to the specific terms of the SLA, the MSI shall be paid in accordance with the Clause 5 under Administrative Aspects of the Part I of the RFP document.

### 11.3. Tax

Read Clause 17 under Instruction to Bidders, Part I of the RFP document.

## 12. TERMINATION

### 12.1. Breach

1. In the event the BTD has sufficient reasons to believe that the MSI is in Breach of its obligations under MSA and the SLA, the BTD may give one quarter's grace period for curing the Breach to MSI. In case the Breach continues, even after the notice period, the BTD, as the case may be, shall have the option to terminate the Agreement. Any notice served pursuant to this Clause shall give reasonable details of the Breach, which could include, but not limited to, the following events and the termination shall become effective if the MSI:
   a. is not able to deliver the services as per the SLAs defined in RFP.
   b. fails to deliver any or all goods / services within the period(s) specified in the RFP.
   c. fails to perform as per the performance standards as set out in the RFP.
   d. persistently neglects to carry out his obligations under the Contract and/or commits default in complying with any of the terms and conditions
   e. Fails to rectify, reconstruct or replace any defective work or that the work is being performed in an inefficient or otherwise improper or un-workman like manner
   f. without reasonable cause, suspended the progress of the work or has failed to proceed with the work with due diligence so that in the opinion of the BTD (which shall be final and binding) he will be unable to secure completion of the work by the date for completion and continues to do so
   g. Appoints a sub contractor without the prior approval of BTD, or terminates any of the Sub contractor; or
   h. having terminated any of the Subcontracts with the consent of BTD, appoints a replacement Sub-contractor without the prior approval of BTD.
   i. the MSI without the consent of BTD assigns or transfers all or any of its rights or obligations under the Contract;
   j. the MSI repudiates the Contract or otherwise evidences an intention not to be bound by the Contract; or
   k. the expropriation, confiscation, compulsory acquisition of the Project Facility;
   l. if the MSI or any of its servants or agents commit or suffer to be committed or omit or suffer to be omitted any act, deed, matter or thing which in the opinion of BTD whose decision (without an obligation to give reasons therefor) in this regard will be final, is prejudicial to the interests or reputation of BTD.
   m. the MSI offers, gives or promises any payment directly or indirectly to any government, political party, or official thereof, or any candidate for political office, or to BTD in order to influence any substantive decision of, or induce any party or person to use its influence to offset any substantive decision of any Relevant Authority or Statutory Authority or BTD in regard to any aspect of the Contract;
   n. MSI makes any warranty or representation in or in accordance with the Contract which was materially incorrect when made so as to materially affect BTD 's interests; or
   o. in the event that the MSI's liability for Liquidated Damages reaches the cap on such damages as set in the MSA and the Completion Certificate for the whole of the Works has not been issued; or
   p. fails to provide, maintain or renew and/or comply with its obligations in relation to the

Performance Security; or

q. the MSI has, without valid reason and BTD consent, failed to commence the Works promptly, or fails to progress the Works regularly and/or diligently or
r. the BTD has failed to adhere to the Technical Conditions of Contract and in the reasonable estimation of the BTD, such failure is likely to mean that Completion of the Works is likely to be delayed beyond the relevant Time for Completion; or
s. the MSI's personnel is/are incompetent, have acted in a manner prejudicial to BTD's best interest or have failed to comply with BTD health, safety, environment or other rules or regulations and procedures; or
t. the MSI has failed to achieve two Timelines Activities (as defined in Clause 3 under Administrative Aspects of Part I of the RFP), consecutively.
u. If the MSI, in the judgment of the BTD, has engaged in corrupt or fraudulent practices (as defined in the Part I of the RFP) in competing for or in executing the contract and / or during the project execution.
v. MSI fails to complete, test and commission the project works within the Time for Completion or commits any other violation/breach of the terms and conditions of the Contract which is not rectified within the grace period.

2. In the event, MSI (one or more members in case of consortium) undergoes one or more of the following:
   a. change of control **if materially and / or adversely affects to the MSI's.**
   b. passing of a resolution by the shareholders of the MSI for the winding up of the MSI;
   c. the appointment of a liquidator in a proceeding for the winding up of the MSI or the Bidder entering into a compromise with its creditors; or
   d. the making by the court of an order winding up the MSI,

   BTD may, as an alternative to termination, require a full Performance Guarantee for the obligations of MSI by a guarantor acceptable to BTD. If such a guarantee is not furnished within 30 days of BTD's demand, BTD may exercise its right to terminate the MSA in accordance with this Clause by giving 15 days further written notice to MSI.
3. BTD reserves the right to invoke the termination clause in case of breach of cap on penalties and liquidated damages by MSI as mentioned under the MSA and SLA Parameters defined in the RFP.

### 12.2. Effects of termination

1. In the event that BTD terminates MSA pursuant to failure on the part of the MSI to discharge any its obligations or in case of any loss to BTD or any other authorities due to MSI's negligence or failure of MSI to comply with the conditions in this MSA, SLA, NDA, RFP and its corrigenda, and instructions given by BTD to the MSI, and conditions as contained in this Clause, depending on the event of default, Performance Guarantee furnished by MSI may be forfeited wholly or partially, and any payment due to the MSI may be withheld for deduction of any applicable penalties and calculated liquidated damages to the BTD due to default on the part of the MSI and issue Show Cause Notice for Blacklisting such bidder for future works, as BTD deems fit.
2. **In the event that BTD terminates the MSA which is not due to default on the part of the** MSI**, the compensation shall be decided by BTD and mutually agreed as below:**
   - **If the contract is terminated at the Implementation Phase (on or before Phase I Go-Live / commissioning)**
     - MSI hall be asked to remove any temporary works and tools, remove all the equipment, material delivered and manpower deployed etc. and BTD shall not pay anything (or anything additional to what has been paid already / due to be paid for the completed works as per RFP payment terms), subject to adjustment of any liquidated damages, penalty charges as per SLA or charges for non-compliances or any kind of loss to BTD.
     - Any payment already made by the BTD, if any, for which the services /

products are not provided / delivered / returned, the sum shall be recovered from the Performance Bank Guarantee and / or BTD shall ask the bidder to refund any such payment promptly, no later than [21 (twenty-one)] days following the receipt of the notice from the BTD in this regard.

- **If the contract is terminated post Phase I Go-Live and within 3 months post Commissioning of the project / Phase I Go-Live** (effective after serving the notice period)**,**
    - **Hardware and consumables:**
        - BTD, at its discretion, may ask the MSI to **take all the hardware** and equipment, consumables etc. deployed as per terms defined of the MSA, OR
        - the BTD may ask the MSI to leave all the hardware and equipment, consumables etc. deployed as per terms defined of the MSA on as-is where-is basis in the premises of the BTD, and BTD may pay any applicable adjustment expenses to MSI incurs as a result of such termination (which MSI will take reasonable steps to mitigate.). The MSI shall be required to provide all the necessary documents, reasonable justification along with list of items for calculating applicable adjustment. The BTD's decision shall be final and binding. Such **adjustment shall be applicable only for those expenses for which original bill** of the respective hardware / equipment / consumable is produced, and only for the expense incurred by MSI and shall be paid at actuals, subject to adjustment of any liquidated damages, penalty charges as per SLA or charges for non-compliances or any kind of loss to BTD. BTD shall not pay any kind of interest. However, all other hardware shall be property of BTD. BTD's decision shall be final and binding.
    - **Software:**
        - All the perpetually licensed software, bespoke development, dashboard design and configuration, chatbot development, content created, and data generated as on date of Notice of Termination shall be property of BTD.
    - **Services and Manpower**
        - BTD shall ask the MSI to withdraw all the manpower
        - MSI shall transfer all the recurring services such as Network, Electricity, Cloud etc. to the BTD, and clear bills as on the effective contract end date.

3. **In the event that BTD terminates the MSA due to default on the part of the MSI, the below shall be applicable:**
    - The BTD shall ask the MSI to leave all the hardware, equipment and software applications, content, data etc. deployed / developed / installed as per terms defined of the MSA, as on date of such notice on as-is where-is basis, in the premises of the BTD. MSI shall be required to adhere to the same.
    - BTD shall ask the MSI to withdraw all the manpower
    - MSI shall transfer all the recurring services such as Network, Electricity, Cloud etc. to the BTD, and clear bills as on the effective contract end date.
4. The MSI shall paid as per **the fixed Challan Rate" mentioned in RFP and as per the profit capped at IRR defined in rfp /contract** , subject to adjustment of any liquidated damages, penalty charges as per SLA or charges for non-compliances or any kind of loss to BTD.the total payment to MSI shall be subject to maximum Profit capped at 20% IRR.
5. BTD, on receipt of a written application for reimbursement, on approval if deemed appropriate, agrees to pay MSI for:
    a. Charges for services MSI provides during Exit Management period as per quoted and duly accepted "Per Challan Rate" and

Reimbursable expenses MSI incurs, for activities over and above the defined Services in the opinion of BTD, during Exit Management will be paid at actuals.

6. **Upon Termination, the Parties shall comply with the following:**
   a. BTD may repatriate the MSI's and sub-contractor's personnel from any part of the Project Site and the Works;
   b. BTD may enter the Project Sites and the Works thereof and expel the MSI therefrom and BTD may complete the Works itself or by employing any third party;
   c. BTD may, to the exclusion of any right of the MSI over the same, take over and have free use, without payment to the MSI of any MSIs equipment and temporary works (which are not part of project deliverable) of which have been delivered to the Project Sites for such period as the BTD considers necessary for the Execution of the Works, without being responsible to the MSI for fair wear and tear thereof and to the exclusion of any right of the MSI over the same.
   d. BTD may at any time sell any of the said MSI's equipment, temporary works and any unused materials and apply the proceeds of sale in or towards for satisfaction of any sums due or which may become due to it from the MSI under the Contract; and
   e. BTD shall have the power and authority to prohibit the MSI and any person claiming through or under the MSI from entering the Project Sites.

   Depending on the event of default, Performance Guarantee furnished by MSI may be forfeited and any payment due to the bidder may be withheld for deduction of any applicable penalties and / or calculated liquidated damages to the BTD due to default on the part of the MSI.
7. Additionally, upon termination of MSA, the Parties shall comply with the Exit Management Schedule set out at **Annexure I** of the MSA.
8. BTD shall not be liable to pay any compensation in case of cancellation of Contract.
9. Upon the expiration or termination of the MSA for any reason, the provisions of the agreement clauses like CONFIDENTIALITY, PROPRIETARY RIGHTS, INDEMNIFICATION LIMITATION OF LIABILITY AND RISK ALLOCATION, and GOVERNING LAW AND DISPUTE RESOLUTION will survive indefinitely.

### 12.3. Termination of the MSA due to bankruptcy of MSI

In addition to all other rights or remedies provided for in MSA or by law, BTD may terminate the MSA in whole, but not in part, in the event that:

a. the other Party makes a composition with or assignment for the benefit of creditors;
b. the other Party becomes or is unable to pay debts as they fall due;
c. a trustee, liquidator, administrator or receiver (including an administrative receiver) or similar official is appointed with respect to the other Party or any substantial part of such Party's assets;
d. any action is taken by or against the other Party under any bankruptcy or insolvency laws or laws relating to the relief of debtors; or
e. the other Party is the subject of a winding-up petition which is not dismissed within five business days, or a resolution is passed for its winding-up.

The BTD may serve written notice on MSI at any time to terminate MSA by giving written notice of one month in any of the above event. In this event, termination will be without compensation to the MSI, provided that such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter to the BTD.

## 13. INDEMNIFICATION

### 13.1. Infringement Indemnity

a) MSI will indemnify, defend and hold harmless BTD, Traffic Police, PWD, Corporation and their respective Affiliates, employees, principals (partners,

shareholders or other holders of an ownership interest, as the case may be) and agents from and against any and all Losses to any third party from claims that any Work Product, Software or Hardware or infrastructure as applicable (or the access or other rights thereto) provided by MSI to BTD pursuant to MSA (i) infringes a patent incorporated in India or a copyright held by that third party or (ii) constitutes misappropriation or unlawful disclosure or use of that third-party's trade secrets; (iii) connection with any defect, damage during transportation, inadequacy or unsuitability of the design, manufacture, workmanship or materials or failure to meet in any or all respects the requirements of the Contract (iv) bodily injury, death or damage to tangible personal property arising in favour of any person, corporation or other entity (including the Indemnified Party) attributable to the Indemnifying Party's negligence or wilful default in performance or non- performance under MSA (collectively, "Infringement Claims")

**Patent Rights and Royalties**: Any Royalties and fees for patents covering equipment's, materials, articles, apparatus, devices or processes used in the Works for this project shall be deemed to have been included in the MSI Quoted Rates.

b) BTD will indemnify, defend and hold harmless MSI, any MSI Affiliates and their respective employees, principals (partners, shareholders or other holders of an ownership interest, as the case may be) and agents from and against any and all Losses arising from claims by third parties that any equipment, software (including BTD - Owned Software and other assets), information or other resources or items (or the access or other rights thereto) provided by BTD to MSI pursuant to MSA (i) infringes a patent incorporated in India or a copyright held by that third party or (ii) constitutes misappropriation or unlawful disclosure or use of a third party's trade secrets (collectively, "Infringement Claims").

c) Notwithstanding anything to the contrary herein, neither Party will have any liability or obligation to the other Party, such other Party's Affiliates or any other Person under (a) or (b) above to the extent that the Infringement Claim is based upon (i) modifications to any item made by or on behalf of the indemnitee in a manner that causes the infringement and the Indemnifier has warned about the same to the indemnitee in written; (ii) use of any item in combination with any hardware, software or other products or services in a manner that causes the infringement and where such combination was not within the reasonable contemplation of the Parties given the intended use of the item; (iii) the failure of a Party to use corrections or enhancements to such deliverables that are made available by the other Party; (iv) detailed, non-discretionary designs or specifications provided by the indemnitee that necessarily caused such Infringement Claim; or (v) the indemnitee's distribution, marketing or use for the benefit of third parties (other than to provide Services to the BTD hereunder) of the deliverable or item.

d) If any deliverable or item provided by a Party hereunder is, or in such Party's reasonable judgment is likely to become, the subject of an Infringement Claim, the providing Party, at its expense and in addition to defending the claim and paying amounts as required by (a) or (b) above, will use reasonable efforts to procure for the other Party the right to use and continue using such deliverable or replace it with a non-infringing equivalent or modify it to make its use hereunder non- infringing, provided that such replacement or modification does not result in a degradation of the performance or quality of the deliverable. If such option is not available on commercially reasonable terms in the providing Party's good faith judgment, the providing Party will so notify the other Party, whereupon (i) the other Party will cease use of such deliverable or Service and return it to the providing Party and (ii) the Parties will equitably adjust the Service Charges to reflect the added expenses or discontinuation of Services. In such event, the Parties will seek to establish mutually acceptable alternative arrangements and to make any appropriate adjustments to their respective obligations under MSA.

e) The foregoing provisions of this Clause 13.1 constitute the Parties' sole and exclusive remedies and each Party's entire liability with respect to infringement claims.

### 13.2. Indemnification Procedures

The following procedures will apply with respect to indemnification for third-party claims arising in connection with MSA:

a) Promptly after receipt by a Person entitled to indemnification hereunder (an "Indemnitee") of written notice of the assertion or the commencement of any claim, demand, action, cause of action or other proceeding by a third party, whether by legal process or otherwise (a "Claim"), with respect to any matter within the scope of above Clause the Indemnitee will give written notice thereof to the Party from whom indemnification is sought pursuant hereto (the "Indemnitor") and will thereafter keep the Indemnitor reasonably informed with respect thereto; provided, however, that the failure of the Indemnitee to give the Indemnitor such prompt written notice will not relieve the Indemnitor of its obligations hereunder except to the extent such failure results in prejudice to Indemnitor's defence of such Claim. Within 30 days following receipt of written notice from the Indemnitee relating to any claim, but no later than 15 days before the date on which any response to a complaint or summons is due, the Indemnitor will notify the Indemnitee in writing that the Indemnitor will assume control of the defence and settlement of such claim (the "Notice").

b) If the Indemnitor delivers the Notice relating to any claim within the required notice period, the Indemnitor will be entitled to have sole control over the defence and settlement of such claim; provided, however, that the Indemnitee will be entitled to participate in the defence of such claim and to employ legal advisers at its own expense to assist in the handling of such claim. After the Indemnitor has delivered a Notice relating to any claim in accordance with the preceding Clause (a) above, the Indemnitor will not be liable to the Indemnitee for any legal expenses subsequently incurred by such Indemnitee in connection with the defence of such claim.

c) If the Indemnitor fails to assume the defence of any such Claim within the prescribed period of time, then the Indemnitee may assume the defence of any such Claim at the cost and expense of the Indemnitor. The Indemnitor will not be responsible for any settlement or compromise made without its consent, unless the Indemnitee has tendered notice and the Indemnitor has then failed to assume and defend the claim and it is later determined that the Indemnitor was liable to assume and defend the claim. The Indemnitor will reimburse the Indemnitee for its costs and expenses incurred as a result of Indemnitor's failure to assume the defence of such Claim.

d) Indemnitee will provide reasonable assistance to the Indemnitor (at the Indemnitor's expense), including reasonable assistance from the Indemnitor's employees, agents, independent contractors and Affiliates, as applicable. Notwithstanding any provision of this Clause to the contrary, the Indemnitor will not consent to the entry of any judgment or enter into any settlement that provides for injunctive or other non-monetary relief affecting the Indemnitee without the prior written consent of the Indemnitee, which consent will not be unreasonably withheld or delayed.

## 14. LIMITATION OF LIABILITY AND RISK ALLOCATION

### 14.1. Limitation of Liability

a) Subject to Clause (b) below, the aggregate liability of **MSI** for any Losses, proceedings, actions and third party claims arising in connection with the MSA, whether based upon an action or claim in contract, tort (including negligence), misrepresentation, equity or otherwise (including any action or claim arising from the acts or omissions of the liable Party (or, as the case may be, its Affiliate)) shall not exceed in aggregate an amount

equal to the **50% of the total quoted and accepted CAPEX cost, as approved and agreed by BTD**.

b) Limitation described in Clause (a) above will not apply to (i) MSI's and BTD's obligations under Confidentiality or Infringement Indemnity or (ii) BTD's non-performance of its payment obligations for Services provided or for termination or related charges pursuant to MSA.
c) Each Party has a duty to mitigate the damages and any amounts payable under an indemnity that would otherwise be recoverable from the other Party pursuant to MSA by taking appropriate and commercially reasonable actions to reduce or limit the amount of such damages or amounts.
d) The provision of Service Level penalty will constitute BTD's key remedy for the corresponding Service Level Default.

### 14.2. Limitation on Category of Liability

a) [Subject to Clause (b) below] in no event will the measure of damages payable by either Party (or any of its Affiliates) include, nor will either Party (or any of its Affiliates) be liable for (i) any indirect or consequential loss or damage, or (ii) business interruption, loss of profits, loss of production, loss of savings, loss of competitive advantage or loss of goodwill (in each case, whether such loss or damage is direct or indirect), arising from or related to MSA, regardless of the type of claim, whether in contract, tort (including negligence), misrepresentation, strict liability or other legal or equitable theory, whether or not foreseeable, and regardless of cause of such damages even if Party has been advised of (or aware of) the possibility of such damages in advance.
b) The limitation set out in Clause (a) above will not apply to the liability of the applicable Party to the extent such liability results from (i) MSI's and BTD's breach of its obligations under confidentiality clause relating to Confidential Information or (ii) BTD's non-performance of its payment obligations for Services provided or for termination or related charges pursuant to the MSA.

### 14.3. Contractual Limitation of Action

Neither Party may assert against the other Party any claim through mediation, arbitration or litigation for breach or non-performance in connection with MSA unless the asserting Party has given the other Party written notice of the claim within three years after the asserting Party first knew or reasonably should have known of the underlying facts giving rise to such claim.

### 14.4. Recourse

Parties agree that they will look only to the corporate or firm assets of the other Party in connection with any liabilities hereunder and in no event will they have any claim against any shareholder, partner or holder of an ownership interest in other Party in connection with MSA.

### 14.5. Insurance

a) Utmost care must be taken while implementing the system at any point to make sure that no damage occurs to the any asset of the BTD.
b) Any damage shall be complete liability of the MSI. Such damages can be claimed by the BTD and MSI is liable to pay for such damages and / or do good for the same.
c) Any damage to the infrastructure which is part of the Project such as BTD or Smart City premises or Traffic Police Premises, hardware, software applications, any network hardware etc. shall also be sole responsibility of the MSI.
d) MSI shall have insurance with IRDA approved Insurance Company, valid for entire project period so as to protect itself and BTD from any damages as detailed in Clause 10 under Administrative Aspects of Part I of the RFP.

The MSI shall be liable for, and shall indemnify, defend and hold the BTD, Smart City, Traffic Police, PWD and other stakeholders its officers, agents, and employees harmless from, any and all claims or damages to persons, data, or property by any reason.

### 14.6. Allocation of Risks; Acknowledgements and Applicability of Limitations

Each Party acknowledges to the other that it understands the legal and economic ramifications of this Clause 14. Each Party acknowledges that (i) the Parties are sophisticated commercial enterprises with relatively equal bargaining power; (ii) the provisions of this Clause 14 constitute an essential element of MSA; (iii) such provisions, together with the indemnities, representations and warranties set out the bargained-for allocation of risk under MSA; (iv) such Party actively considered such provisions in determining the specific risks that it assumed in agreeing to its obligations under MSA and the price to be paid to MSI in consideration for its services under MSA; and (v) the Parties had meaningful choices with respect to such provisions, and such provisions are not unreasonably favourable to either Party. Each Party irrevocably accepts the limitations and exclusions contained in this Clause 14.

### 14.7. Particular Liabilities

MSI undertakes to indemnify BTD (the "Indemnified Party") from and against all Losses on account of bodily injury, death or damage to tangible personal property arising in favour of any person, corporation or other entity (including the Indemnified Party) attributable to the Indemnifying Party's negligence or wilful default in performance or non- performance under MSA.

# 15. FORCE MAJEURE

## 15.1. Definition of Force Majeure

The MSI or the BTD as the case may be, shall be entitled to suspend or excuse performance of its respective obligations under the MSA to the extent that such performance is impeded by an event of force majeure ('Force Majeure').

The MSI shall not be liable for forfeiture of its Performance Security, imposition of liquidated damages or termination for default, if and to the extent that it's delay in performance or other failure to perform its obligations under the MSA is the result of an event of Force Majeure. For purposes of this Clause, *"Force Majeure*" means an event beyond the "reasonable" control of the MSI, not involving the MSI's fault or negligence and not foreseeable. Such events may include Acts of God & acts of Government of India in their sovereign capacity.

## 15.2. Force Majeure events

A Force Majeure event means any event or circumstance, or a combination of events and circumstances referred to in this Clause, which:

1. is beyond the reasonable control of the affected Party;
2. such Party could not have prevented or reasonably overcome with the exercise of reasonable skill and care;
3. does not result from the negligence of such Party or the failure of such Party to perform its obligations under the MSA;
4. is of an incapacitating nature and prevents or causes a delay or impediment in performance; and
5. may be classified as all or any of the following events:

**Non-Political Events**

a. act of God, including earthquake, flood, inundation, landslide, pandemic, exceptionally adverse weather conditions, storm, tempest, hurricane, cyclone (except for normal monsoons), lightning, thunder, volcanic eruption, fire or other extreme atmospheric conditions;
b. radioactive contamination or ionizing radiation or biological contamination except as may be attributable to the MSI's use of radiation or radio- activity or biologically contaminating material;
c. a strike or strikes or other industrial action or blockade or embargo or any other form of civil disturbance (whether lawful or not), in each case affecting on a general basis the industry related to the affected Services and which is not attributable to any unreasonable action or inaction on the part of the MSI or any of its Subcontractors or suppliers and the settlement of which is beyond the reasonable control of all such persons.
d. general strikes, lockouts, boycotts, labour disruptions or any other industrial disturbances as the case may be not arising on account of the acts or omissions of the MSI and which affect the timely implementation and continued operation of the Project; or
e. any event or circumstances of a nature analogous to any of the foregoing.

**Political Events**

a. Change in Law, other than any Change for which relief is provided under the MSA;
b. expropriation or compulsory acquisition by BTD any material assets or rights of MSI;
c. unlawful or unauthorized revocation of, or refusal by BTD, GoI or any of its agencies to renew or grant any clearance or Required Consents required by the MSI to perform its obligations without valid cause, provided that such delay, modification, denial,

refusal or revocation did not result from the MSI's inability or failure to comply with any condition relating to grant, maintenance or renewal of such Required Consents applied on a non-discriminatory basis;

d. any judgment or order of any court of competent jurisdiction or statutory authority in India made against the MSI in any proceedings for reasons other than failure of the MSI to comply with Applicable Laws or Required Consents or on account of breach thereof, or of any contract, or enforcement of the MSA or exercise of any of its rights under the MSA;
e. expropriation or compulsory acquisition by the BTD of any material assets or rights of the MSI;
f. unlawful or unauthorized revocation of, or refusal by any authority other than the BTD to renew or grant any Required Consents required by the MSI to perform its obligations without valid cause, provided that such delay, modification, denial, refusal or revocation did not result from the MSI's inability or failure to comply with any condition relating to grant, maintenance or renewal of such Required Consents applied on a non-discriminatory basis;
    i. any requisition of the Project by any other authority; or
    ii. any requisition of the Project by the BTD;
g. For avoidance of doubt, suspension of the Project in accordance with the provisions of the MSA shall not be considered a requisition for the purposes of Force Majeure event.

**Other Events**

An act of war (whether declared or undeclared), hostilities, invasion, armed conflict or act of foreign enemy, blockade, embargo, prolonged riot, insurrection, terrorist or military action, civil commotion or politically motivated sabotage, for a continuous period exceeding seven (7) days.

6. For the avoidance of doubt, it is expressly clarified that the failure on the part of the MSI under the MSA to implement any disaster contingency planning and back-up and other data safeguards in accordance with the terms of the MSA against natural disaster, fire, sabotage or other similar occurrence shall not be deemed to be a Force Majeure event. For the avoidance of doubt, it is further clarified that any negligence in performance of Services which directly causes any breach of security like trespassing, theft, hacking aren't the forces of nature and hence wouldn't be qualified under the definition of "Force Majeure". In so far as applicable to the performance of Services, the MSI shall be solely responsible to complete the risk assessment and ensure implementation of adequate security hygiene, best practices, processes and technology to prevent any breach of security and any resulting liability therefrom (wherever applicable).

### 15.3. Notification procedure for Force Majeure

1. The affected Party shall notify the other Party of a Force Majeure event within Fifteen (15) days of occurrence of such event. If the other Party disputes the claim for relief under Force Majeure, it shall give the claiming Party written notice of such dispute within thirty (30) days of such notice. Such dispute shall be dealt with in accordance with the dispute resolution mechanism in accordance with **Clause 22 under MSA.**
2. Upon cessation of the situation which led the Party claiming Force Majeure, the claiming Party shall within Fifteen (15) days hereof notify the other Party in writing of the cessation and the Parties shall as soon as practicable thereafter continue performance of all obligations under the MSA.
3. BTD shall study the submission of the MSI and inform whether the situation can be qualified one of Force Majeure. Unless otherwise directed by the BTD in writing, the MSI shall continue to perform its obligations under the MSA as far as it is reasonably practical, and shall seek all reasonable alternative means for performance of services not prevented by the existence of a Force Majeure event.

### 15.3.1. Terms of Payment

**Upon the occurrence of any Force Majeure Event at any time after the Contract Signing Date, if any Force Majeure Event occurs:**

- **Before Go-Live**, the Implementation Period shall be extended by a period equal in length to the duration for which such Force Majeure Event subsists; OR
- **After Go-Live**, the MSI shall be entitled to compensation for the shortfall in revenue share, if the Force Majeure event continues for
    - More than 30 (Thirty) consecutive days impacting challan generation, or
    - More than 7 (Seven) consecutive days in case of complete cessation of challan generation.

Upon occurrence of a Force Majeure Event after the Effective Date, the costs incurred and attributable to such event and directly relating to the Project ('Force Majeure Costs') shall be allocated and paid as follows:

1. **Upon occurrence of a Force Majeure**, the Parties shall bear their respective 'Force Majeure Costs' and neither Party shall be required to pay to other Party any costs thereof. For the avoidance of doubt, 'Force Majeure Costs' may include interest payments on debt, operation and maintenance expenses, any increase in the cost of the Services on account of inflation and all other costs directly attributable to the Force Majeure Event, however **BTD** at its discretion may give leniency in consultation with the Government.
2. Save and except as expressly provided in this Clause, neither Party shall be liable in any manner whatsoever to the other Party in respect of any loss, damage, costs, expense, claims, demands and proceedings relating to or arising out of occurrence or existence of any Force Majeure Event or exercise of any right pursuant hereof.

### 15.4. Consultation and duty to mitigate

Except as otherwise provided in this Clause, the affected Party shall, at its own cost, take all steps reasonably required to remedy and mitigate the effects of the Force Majeure event and restore its ability to perform its obligations under the MSA as soon as reasonably practicable. The Parties shall consult with each other to determine the reasonable measures to be implemented to minimize the losses of each Party resulting from the Force Majeure event. The affected Party shall keep the other Parties informed of its efforts to remedy the effect of the Force Majeure event and shall make reasonable efforts to mitigate such event on a continuous basis and shall provide written notice of the resumption of performance hereunder. Nothing in this Clause will relieve MSI's obligations to provide Disaster Recovery Services for various infrastructure created for the project.

## 16. AUDIT, ACCESS AND REPORTING (Read with Clause 42.2 – Annexure II of MSA)

### 16.1. Operational Audits

MSI will provide to such auditors (including third-party auditors and BTD's internal audit staff) as BTD may designate in writing, access to any facility at which the Services are being performed, to appropriate MSI management personnel and material subcontractors, and to the data and records maintained by MSI with respect to the Services: (i) for the purpose of performing audits and inspections of BTD and its businesses; (ii) to verify the integrity of BTD Data; (iii) to examine the systems that process, store, support and transmit such BTD Data; and (iv) to confirm that the Services are being provided in accordance with the MSA, including the Service Levels. To the extent applicable to Services performed by BTD, the scope of such audits may include, without limitation, (a) MSI's practices and procedures; (b) adequacy of general controls (e.g., organisational controls, input / output controls, system modification controls,

processing controls, system design controls, and access controls) and security practices and procedures; and (c) the adequacy of disaster recovery and back-up procedures.

Any such audits will be conducted at BTD's expense. However, any recommendations / course corrections or any other incidental costs as a result of such audit shall be borne by respective party.

### 16.2. Financial Audits

In order to document the Services and the Charges paid or payable by BTD under MSA, MSI will retain its standard records and supporting documentation for at least [three] years post contract period.

### 16.3. Audit Conferences

a) Following any audit or examination, BTD will conduct (in the case of an internal audit), or request its external auditors or examiners to conduct, an exit conference with MSI to obtain factual concurrence with issues identified in review and provide MSI a report copy.
b) The Parties will meet to review each audit report promptly after the issuance thereof and mutually agree upon the appropriate manner, if any, in which to respond to the changes suggested by the audit report. MSI will respond promptly to audit reports in writing, but in no event more than 30 days from receipt of each report.

## 17. CONFIDENTIALITY; SAFEGUARDING OF DATA

### 17.1. Confidentiality

a) In connection with the MSA, each of the Parties has disclosed and may continue to disclose to the other Party information that relates to the disclosing Party's business operations, financial condition, traffic, citizens / applicants, products, services or technical knowledge. Except as otherwise specifically agreed in writing by the Parties, MSI and BTD each agree that (i) all information communicated to it by the other and identified as confidential, whether before or after the Signing of Contract; (ii) all information identified as confidential to which it has access in connection with the Services, whether before or after the Signing of Contract; (iii) all information communicated to it that reasonably should have been understood by the receiving Party, because of confidentiality or similar descriptions, the circumstances of disclosure or the nature of the information itself, to be confidential to the disclosing Party; and (iv) the terms and conditions of the MSA (collectively, the "Confidential Information"), will be deemed to have been received in confidence and will be used only for purposes of the Project. The Parties acknowledge that third-party software may be subject to additional confidentiality restrictions imposed by the applicable vendor's licence or other agreement.
b) Each Party's Confidential Information will remain the property of that Party except as otherwise expressly provided in the MSA. Each of the Parties will use at least the same degree of care to safeguard and to prevent disclosing to third parties the Confidential Information of the other as it employs to avoid unauthorised disclosure or publication of its own information (or information of its customers) of a similar nature, and in any event, no less than reasonable care. Each Party may disclose relevant aspects of the other Party's Confidential Information to its employees, Affiliates, subcontractors and agents to the extent such disclosure is reasonably necessary for the performance of its obligations, or the enforcement of its rights, under the MSA; provided, however, that such Party will use reasonable efforts to ensure that such employees, Affiliates, subcontractors or agents comply with these confidentiality provisions. Each Party will be responsible for any improper disclosure of Confidential Information by such Party's employees, Affiliates, subcontractors or agents. A Party may reuse for its own purposes with third parties the terms and conditions

of the MSA, provided that (i) such use in no way may be attributed to the other Party, the MSA or the relationship between MSI and BTD and (ii) such use is not used in negotiations with the other Party or any of the other Party's Affiliates for any other contractual arrangement.

c) Neither Party will (i) make any use or copies of the Confidential Information of the other except as contemplated by the MSA; (ii) acquire any right in or assert any lien against the Confidential Information of the other; or (iii) sell, assign, lease or otherwise commercially exploit the Confidential Information (or any derivative works thereof) of the other Party. Neither Party may withhold the Confidential Information of the other Party or refuse for any reason (including due to the other Party's actual or alleged breach of the MSA) to promptly return to the other Party its Confidential Information (including copies thereof) if requested to do so. Upon expiration or termination of the MSA and completion of a Party's obligations under the MSA, each Party will (except as otherwise provided in the MSA) return or destroy, as the other Party may direct, all documentation in any medium that contains or refers to the other Party's Confidential Information and retain no copies. Subject to the foregoing confidentiality obligations, either Party may retain copies of the Confidential Information of the other Party to the extent required for (i) in the case of MSI, compliance with applicable professional standards or quality assurance purposes and (ii) in the case of BTD, its continuing operations or internal business purposes.
d) This Clause will not apply to any particular information that either Party can demonstrate (i) at the time of disclosure to it, it was in the public domain; (ii) after disclosure to it, is published or otherwise becomes part of the public domain through no fault of the receiving Party; (iii) was in the possession of the receiving Party at the time of disclosure to it and was not the subject of a pre-existing confidentiality obligation; (iv) was received after disclosure to it from a third party who had a lawful right to disclose such information (without corresponding confidentiality obligations) to it; or (v) was independently developed by the receiving Party without use of the Confidential Information of the disclosing Party.
e) In addition, a Party will not be considered to have breached its obligations under this Clause for disclosing Confidential Information of the other Party to the extent required to provide information under Right to Information' 2005 or, satisfy any legal requirement of a competent governmental or regulatory authority.
f) Nothing contained in this Clause will be construed as obligating a Party to disclose its Confidential Information to the other Party, or as granting to or conferring on a Party, expressly or impliedly, any rights or licence to the Confidential Information of other Party.

### 17.2. Ownership of Data

a) As between the Parties, BTD will be the sole and exclusive owner of BTD Data.
b) MSI will utilise the BTD Data solely for purposes of the Project and will not sell, assign, lease or otherwise commercially exploit the BTD Data. BTD Data will be deemed BTD Confidential Information for purposes of above Clause of confidentiality. MSI is hereby authorised to have access to and to make use of the BTD Data during the Contract Term to the extent reasonably necessary or appropriate for the performance by MSI of its obligations hereunder.
c) MSI will observe BTD's pre-existing written procedures and safeguards against the destruction, loss or alteration of BTD Data in MSI's possession where they are provided to MSI in advance.
d) To the extent such procedures have not been established by BTD, MSI will maintain safeguards no less rigorous than those maintained by MSI for its own similar data. BTD will be responsible for the sufficiency of such policies and safeguards. With respect to the BTD Data in the possession of MSI, MSI will be responsible for compliance with such procedures and safeguards. BTD may establish backup security for the BTD Data and keep backup data and data files in its possession if it so chooses.
e) MSI may retain archival copies of BTD Data as reasonably necessary to verify MSI's compliance with the MSA. MSI will identify such data to BTD at the time such archival

copies are withheld.

f) Any document, other than the Contract and enumerated in the Contract shall remain the property of BTD and shall be returned (in all copies) to BTD on completion of the MSI's performance under the Contract, if so required by the BTD.

### 17.3. Unauthorized Acts

**Each Party will:**

a) notify the other Party promptly of any material unauthorised possession, use or knowledge, or attempt thereof, of the other Party's Confidential Information by any Person that may become known to such Party;

b) promptly furnish to the other Party details of the unauthorised possession, use or knowledge, or attempt thereof, and use reasonable efforts to assist the other Party in investigating or preventing the recurrence of any unauthorised possession, use or knowledge, or attempt thereof, of Confidential Information;

c) use reasonable efforts to cooperate with the other Party in any litigation and investigation against third parties deemed necessary by other Party, to protect its proprietary rights; and

d) Promptly use reasonable efforts to prevent a recurrence of any such unauthorised possession, use or knowledge of Confidential Information.

e) Party whose Confidential Information is the subject of such activity will reimburse any out-of-pocket expenses incurred by the other Party as a result of compliance with this Clause.

## 18. PROPRIETARY RIGHTS

1. As between the Parties, BTD will be the sole and exclusive owner of the Software owned by BTD as well as deployed by MSI as part of this project. Any derivative works, modifications, enhancements or improvements to the Software (or its related documentation) developed by MSI will be considered "Work Product".
2. BTD will have a perpetual, non-transferrable, non-exclusive paid-up right and licence to use the software deployed by the MSI as well as copy, modify and prepare derivative works of the "Work Product", subject to any restrictions of any third-party materials embodied in the Work Product and disclosed to BTD. BTD's rights in the Work Product will be for purposes of BTD's internal business only and, to the extent any Work Product contains MSI Confidential Information, will be subject to Clause related to confidentiality. All other rights (including all other intellectual property rights) in the Work Product will remain with or are hereby assigned to MSI.
3. Each Party agrees to execute any appropriate documents and take any other appropriate actions reasonably requested by the other Party to give effect to the provisions of this Clause.

### 18.1. Proprietary Items

In the course of performing its obligations under the MSA, MSI may use products, materials, tools and methodologies that are proprietary to MSI or to third parties (collectively, "Proprietary Items"). As between BTD and MSI, Proprietary Items will be deemed Confidential Information of MSI. BTD will neither have nor obtain any rights in such Proprietary Items (or in any modifications or enhancements thereto) other than (i) to use them as solely for purposes of performing its responsibilities under the MSA; (ii) pursuant to MSI's standard licence for such Proprietary Items or, in the case of Proprietary Items owned by third parties, pursuant to terms acceptable to the applicable third party. If Proprietary Items are made available to BTD under (i) above, they will be made available on an "as is" basis and, to the extent permitted by applicable law, without express or implied warranties of any kind. Proprietary Items made available under (ii) above will be subject to the terms of the applicable licence.

### 18.2. Knowledge Capital

Nothing in the MSA will preclude MSI from acquiring, marketing, developing, distributing, licensing or using for itself or others, services, products or technology that are the same as or similar to those provided to BTD by MSI pursuant to the MSA. Furthermore, MSI will continue

to be free to use the general knowledge, skills and experience and any ideas, concepts, know-how and techniques that are acquired or used in the course of providing the Services. This Clause will not diminish MSI's obligations regarding Confidential Information.

## 19. WARRANTY

1. The MSI warrants that the Project, including all the system(s) and other Services provided, shall be free from any defect or deficiency in the material, design, engineering, and performance / workmanship that prevent the Project and / or any of its system(s) from fulfilling the technical requirements or that limit in a material fashion the performance, reliability, or extensibility of the Project and / or any of its system(s) as per performance guarantee / warranty period which is entire contract period.
2. If during the contract period any defect or deficiency is found in the material, design and performance / workmanship of the Project and other Services provided by MSI, the MSI shall promptly, after approval from BTD, and at the MSI's sole cost repair, replace, or otherwise make good such default, defect or deficiency as well as any damage to Project caused by such default, defect or deficiency.
3. The BTD reserves the right to get the defect or deficiency corrected or replacement carried out, in case MSI refuses to do the same, at the sole cost of MSI.
4. If the Project or any of its System cannot be used by reason of such default, defect or deficiency and/or making good of such default, defect or deficiency, the contract period for the Project shall be extended by a period equal to the period during which the Project or any of its system could not be used by the BTD because of such defect and/or making good of such default, defect or deficiency and / or BTD reserves right to recover such cost as part of the SLA penalties, Liquidated Damages, from the payment due to the MSI or from the Performance Security etc. as it deems fit.

## 20. LIQUIDATED DAMAGES

1. In event of delay or any gross negligence, for causes attributable to the MSI, in meeting the deliverables or milestone, the BTD shall be entitled at its option to recover from the MSI as agreed, liquidated damages, a sum of 0.5% of the value of the deliverable or milestone which suffered delay or gross negligence for each completed week or part thereof subject to a limit of 10% of the value of delayed deliverables or milestone.
2. In the event of Liquidated Damages exceeding this cap, the BTD has a right to invoke "Termination Clause"
3. This right to claim any liquidated damages shall be without prejudice to other rights and remedies available to BTD under the contract and law.
4. BTD may claim liquidated damages in addition to the penalties as defined in the SLA under this project.
5. The activities pursuant to termination of the contract shall be in-line with **Annexure I** of the MSA.
6. The BTD reserves the right to recover the liquidated damages by adjusting the same from the payments due to MSI or by invoking the Performance Bank Guarantee which shall immediately be replenished to original amount within 15 days upon invocation.

## 21. CORRUPT OR FRAUDULENT PRACTICES and CONFLICT OF INTEREST

1. The terms and conditions of Clause 20 and 21 under "Instructions to Bidders" of the Part IA of the RFP document shall be applicable throughout the contract period.

# 22. GOVERNING LAW AND DISPUTE RESOLUTION

## 22.1. Informal Dispute Resolution

a) Prior to the initiation of formal dispute resolution procedures, the Parties will first attempt to resolve any dispute, controversy or claim arising under or in connection with the MSA (a "Dispute") informally, as follows:
   i) First, the BTD and the MSI will meet as often, for a duration and as promptly as the Parties deem necessary to discuss the Dispute and negotiate in good faith in an effort to resolve the Dispute.
   ii) If the BTD and MSI are unable to resolve the Dispute within 30 days after the referral of the Dispute to them, the Dispute will be referred to the Higher Management Committee. The Higher Management Committee may comprise of the Additional Chief Secretary / Principal Secretary, Transport Commissioner, along with a concerned Joint Secretary / Deputy Secretary and Deputy / Assistant Transport Commissioner as the member Secretary. The Higher Management Committee will use reasonable efforts to resolve such Dispute or, if appropriate, to negotiate a modification or amendment to the MSA. The Higher Management Committee will meet as often, for a duration and as promptly as the Parties reasonably deem necessary to discuss the Dispute and negotiate in good faith in an effort to resolve the Dispute.
   iii) If the Higher Management Committee is unable to resolve the Dispute within 30 days after such referral, then each of MSI and BTD will appoint one senior executive who is not involved on a day-to-day basis with the subject matter of the MSA. Such senior executives will meet as often, for a duration and as promptly as the Parties reasonably deem necessary to discuss the Dispute and negotiate in good faith in an effort to resolve the Dispute.
   iv) During the course of such discussions, all reasonable requests made by one Party to another for non-privileged information, reasonably related to the Dispute, will be honoured in order that each of the Parties may be fully apprised of the other's position. The specific format for such discussions will be left to the discretion of the Parties but may include the preparation of agreed-upon statements of fact or written statements of position.
b) Formal proceedings for resolution of Dispute may not be commenced until earlier of:
   i) the good faith determination by the appointed senior executives that amicable resolution through continued negotiation of the matter does not appear likely; or
   ii) 30 days following the date that the Dispute was first referred to the appointed senior executives.

## 22.2. Alternative Dispute Resolution

If a Dispute cannot be resolved as provided in above Clause, the Parties will cooperate in good faith to utilise mutually agreed upon alternative dispute resolution techniques prior to resorting to litigation.

a) The Adjudicator nominated to consider a dispute referred to him shall be selected on a strictly rotational basis from the relevant panel of experts appointed in accordance with the following:
   i) there shall be panels of experts in respect of Traffic enforcement systems, implementation and operational and maintenance matters (the "Panel"). All the experts on the panel shall be wholly independent of the MSI, the BTD, the relevant Sub-Contractor and any of the major competitors of the MSI or relevant Sub-Contractor;

ii) the Panel shall be comprised of 3 experts who shall be appointed jointly by the MSI and BTD.
iii) if any member of a panel resigns during the term of the Contract, a replacement expert shall be appointed by the MSI and the BTD as soon as practicable;
iv) if the BTD and the MSI are unable to agree on the identity of the experts to be appointed to the panel, both parties with mutual consent shall appoint such expert within 30 days of any application for such appointment by either party.

b) Within 7 days of appointment in relation to a particular dispute, the Adjudicator shall require the parties to submit in writing their respective arguments. The Adjudicator shall, in his absolute discretion, consider whether a hearing is necessary in order to resolve the dispute.
c) In any event, the Adjudicator shall provide to both parties his written decision on the dispute, within 30 days of appointment (or such other period as the parties may agree after the reference, or 45 days from the date of reference if the party which referred the dispute agrees). The Adjudicator shall give reasons for his decision. Unless and until revised, cancelled or varied by the Arbitrator, the Adjudicator's decision shall be binding on both parties who shall forthwith give effect to the decision.
d) The Adjudicator's costs of any reference shall be borne as the Adjudicator shall specify or, in default, equally by the parties. Each party shall bear its own costs arising out of the reference, including legal costs and the costs and expenses of any witnesses.
e) The Adjudicator shall be deemed not to be an arbitrator but shall render his decision as an expert and the provisions of the Indian Arbitration and Conciliation Act, 1996 and the law relating to arbitration shall not apply to the Adjudicator or his determination or the procedure by which he reached his determination.
f) The Adjudicator shall act impartially and may take the initiative in ascertaining the facts and the law. The Adjudicator shall have the power to open up, review and revise any opinion, certificate, instruction, determination or decision of whatever nature given or made under this Contract.
g) All information, data or documentation disclosed or delivered by a party to the Adjudicator in consequence of or in connection with his appointment as Adjudicator shall be treated as confidential. The Adjudicator shall not, save as permitted by Clause of Confidentiality (clause 17), disclose to any person or company any such information, data or documentation and all such information, data or documentation shall remain the property of the party disclosing or delivering the same and all copies shall be returned to such party on completion of the Adjudicator's work.
h) The Adjudicator is not liable for anything done or omitted in the discharge or purported discharge of his functions as Adjudicator unless the act or omission is in bad faith. Any employee or agent of the Adjudicator is similarly protected from liability.
i) Either party is dissatisfied with or otherwise wishes to challenge the Adjudicator's decision made in accordance, then either party may (within 30 days of receipt of the Adjudicator's decision, where appropriate), notify the other party of its intention to refer the dispute to arbitration. Such notification shall invite the other party to concur in the appointment of a sole arbitrator who shall be a solicitor, barrister or arbitrator recognised by the Indian Judiciary System / Government of not less than 10 years' standing. If the parties are unable within 14 days to agree the identity of the Arbitrator either party may request the Patna Bench of the Bihar High Court to make the appointment. The provisions of the Arbitration and Conciliation Act, 1996 shall be applicable and the award made there under shall be final and binding upon the parties hereto, subject to legal remedies available under the law. Such differences shall be deemed to be a submission to arbitration under the Indian Arbitration and Conciliation Act, 1996, or of any modifications, Rules or re-enactments thereof. The Arbitration proceedings shall be held at Patna Bihar State. Any legal dispute shall come under the sole jurisdiction of – Patna, Bihar State.

j) The Arbitrator shall have the power to open up, review and revise any opinion, certificate, instruction, determination or decision of whatever nature given or made under this Contract, to vary or cancel the decision of the Adjudicator and, where appropriate, to order financial compensation to be paid by one party to the other. The arbitration shall take place in Patna only.
k) Arbitrator shall in his absolute discretion, make such procedural directions such as ordering the parties to provide written submissions within such time period as he considers appropriate and/or to attend such hearings as he deems necessary.
l) The Arbitrator shall deliver his decision on any matter referred to him within 30 days of concluding any hearings which may have been held in connection with the matter and in any event within 3 months (or such other period as the parties may agree) of his appointment. The Arbitrator's decision shall be in writing and shall state his reasons for his decision. The decision of the Arbitrator shall be final and binding on both parties. The costs of the arbitration will be the discretion of the Arbitrator.
m) The parties shall continue to comply with, observe and perform all their obligations hereunder regardless of the nature of the dispute and notwithstanding the referral of the dispute for resolution under this Clause and shall give effect forthwith to every decision of the Adjudicator and the Arbitrator delivered under this Clause.

### 22.3. Exceptions to Dispute Resolution Procedure

The provisions of both Clauses above will not be construed to prevent a Party from:
a) seeking a temporary order or injunctive or other equitable relief with respect to a breach (or attempted breach) of the MSA by the other Party; or
b) instituting litigation or other formal proceedings to the extent necessary (i) to avoid the expiration of any applicable limitations period or (ii) to preserve a superior position with respect to other creditors (iii) to recover any undisputed charges owed to MSI when due under the MSA."

### 22.4. Jurisdiction.

Subject to Clauses above, the Patna Bench of Bihar High Court, India shall have exclusive jurisdiction to settle any Dispute, including a dispute regarding the existence, validity or termination of the MSA or the consequences of its nullity. The parties agree that the Patna Bench of Bihar High Court, India are the most appropriate and convenient courts to settle any Dispute and, accordingly, that they will not argue to the contrary.

## 23. PERSONNEL

1. The personnel assigned by MSI to perform the Services shall be employees of MSI or its subcontractor(s) as per requirements defined in the RFP document, and under no circumstances shall such personnel be considered employees of BTD or any other authorities. The MSI shall have the sole responsibility for the supervision and control of the personnel deployed in the Project and for payment of such personnel's compensation, including salary, deducting of income taxes and social security taxes, worker's compensation, employee and disability benefits and the like and shall be responsible for all obligations of an employer subject to Applicable Law as per requirements set out in the RFP and terms and conditions of the MSA.
2. The MSI shall ensure that sufficient MSI personnel are deployed to perform the Services and that such personnel have appropriate qualifications to perform the Services. BTD shall have the right to direct the removal or replacement of any MSI personnel performing work under the MSA based on bonafide reasons. MSI shall be bound to substitute of such personnel as per directions of BTD. MSI shall not remove such personnel from the Project without the prior written consent of BTD as per details in the RFP and terms and conditions

of the MSA.

3. Except as stated in this Clause, nothing in the MSA or the SLA shall limit the ability of MSI to freely assign or reassign its employees; provided that MSI shall be responsible, at its expense, for transferring all appropriate knowledge from personnel being replaced to their replacements. BTD shall have the right to review and approve MSI's plan for any such knowledge transfer. MSI shall maintain the same or higher standards for skills and professionalism among replacement personnel as in personnel being replaced.
4. Each Party shall be responsible for the performance of all its obligations under the MSA or the SLA as the case may be and shall be liable for the acts and omissions of its employees and agents in connection therewith.
5. All responsibilities towards personnel working on the project from the MSI, shall in no way be borne by BTD. This includes, but not limited to, compensation, medical reimbursement, any medical emergency, etc. However, in case of any exigencies, the BTD shall provide reasonable support, to the extent deemed appropriate by the BTD.
6. Neither Party shall solicit for employment or knowingly hire an employee of the other Party with whom such Party has contact pursuant to project engagements under the MSA. This restriction shall not apply to employees of either Party responding to advertisements in job fairs or news media circulated to the general public.
7. This clause shall be read with Clause 2 under "Project Activities" in the Part I of the RFP.

## 24. INDEPENDENT CONTRACTOR

Nothing in the MSA shall be construed as establishing or implying any partnership or joint venture between the Parties to the MSA and, except as expressly stated in the MSA, nothing in the MSA shall be deemed to constitute any Party as the agent of the other Party or authorizes either Party to:

a. incur any expenses on behalf of the other Party;
b. enter into any engagement or make any representation or warranty on behalf of the other Party;
c. pledge the credit of or otherwise bind or oblige the other Party; or
d. Commit the other Party in any way whatsoever without in each case obtaining the other Party's prior written consent.

## 25. SUB-CONTRACTORS

MSI shall not subcontract any work related to Project without prior written consent of BTD strictly as per terms and requirements set out on the RFP document. It is clarified that the MSI shall be the principal employer for all claims arising from the liabilities statutory or otherwise, concerning the sub-contractors. The MSI undertakes to indemnify the BTD from any claims on the grounds stated hereinabove.

## 26. ASSIGNMENT

1. All terms and provisions of the MSA shall be binding on the MSI and BTD and their respective successors and permitted assigns.
2. Subject to the provisions of the MSA, the MSI shall not be permitted to assign its rights and obligations under the MSA to any third party.
3. The BTD reserves the right to assign all or any part of the MSA and Annexures, and the MSI shall be a party to such assignment, to any third party contracted to provide services to BTD.

## 27. TRADEMARKS, PUBLICITY

1. Neither Party can use the trademarks/ Copyrights / Patents / any other intellectual property, of the other Party without the prior written consent of the other Party.

2. Except as required by law or the rules and regulations, MSI shall not publish or permit to be published either alone or in conjunction with any other person any press release, information, article, photograph, illustration or any other material of whatever kind relating to the MSA or the business of the Parties without prior reference to and approval in writing from the BTD.

## 28. SERVICE LEVEL AGREEMENT

1. Service Level Agreements shall govern the provision of the contracted professional services of the MSI to the BTD as per the performance criteria & expectations laid down in the RFP. SLA shall ensure establishment of the relevant performance measurement criteria & definition of the availability expectations;
2. The purpose of SLA is to clearly define the performance levels for the MSI for the duration of the MSA. The MSI has to comply with Service Level requirements to ensure adherence to project timelines, quality and availability of services, throughout the period of this contract i.e. during implementation phase and Operations and Maintenance Phase.
3. Each of the service parameters has an associate level of performance, expected to be met by the MSI. There is also an associated penalty mentioned for not meeting the performance level.
4. Detailed Service Level Parameters and required performance levels are as defined in the **Annexure Set IV – Annexure 3** of the Part I of RFP document.
5. The MSI shall develop / supply appropriate software / automated tools including the SLA Management System, Incident / Ticket Management system to monitor the performance indicators and all the SLAs Parameters as per requirements of the RFP document.
6. Power to impose penalties shall be at sole discretion of BTD and binding on the MSI.
7. Service levels are defined along with the penalty based on the business loss due to not meeting the service level and considering the cost of operations. Service levels shall also include breach levels beyond which the agreement is liable for termination.
8. The BTD anticipates that the SLA may need to be re-evaluated and modified to account for changes in work environment and technology from time to time. The BTD reserves the right to revise the terms of the SLA on an annual basis if it anticipates any revisions or modifications.

## 29. PRINCIPAL CONTACTS

1. The BTD and the MSI shall nominate a senior staff member to be the principal contact regarding operation of the MSA.
2. In the event that there is any change in the listed contacts, the same shall be communicated and updated prior to such change occurring.
3. The Single Point of Contact ("POC") for the MSI and BTD shall be as mentioned below and shall be available beyond working hours as per requirement / need of the project.

| Name | Title | Location | Telephone |
|---|---|---|---|
| **BTD** | **Authorized Representative, BTD** | <***> | <***> |
| **MSI** | <***> | <***> | <***> |

## 30. NOTICES

1. Any notice or other document which may be given by either Party under the MSA or under the SLA shall be given in writing, in person or by pre-paid recorded delivery post, email or by facsimile transmission.
2. In relation to a notice given under the MSA, any such notice or other document shall be

addressed to the other Party's principal or registered office address as set out below:

3. In relation to a notice given under the MSA, a Party shall specify the Parties' address for service of notices.

| | |
|---|---|
| Transport Department, Patna | MSI |
| <Insert Address> | <Insert Address> |
| Tel: | Tel: |
| Fax: | Fax: |
| Email: | Email: |
| Contact: | Contact: |
| With a copy to: | With a copy to: |

4. Any such notice or other document shall be deemed to have been given to the other Party (or, if relevant, its relevant associated company) when delivered (if delivered in person) if delivered between the hours of 9.00 am and 5.00 pm at the address of the other Party set forth above or if sent by fax, provided the copy fax is accompanied by a confirmation of transmission, or on the next working day thereafter if delivered outside such hours, and 7 days from the date of posting (if by letter).
5. Either Party to the MSA may change its address, telephone number, facsimile number and nominated contact for notification purposes by giving the other reasonable prior written notice of the new information and its effective date.

## 31. VARIATIONS AND FURTHER ASSURANCE

1. No amendment, variation or other change to the MSA shall be valid unless authorized mutually by both the parties.
2. Such amendment shall be made in writing and signed by the duly authorized representatives of the Parties to the MSA.
3. Each Party to the MSA agrees to enter into or execute, without limitation, whatever other agreement, document, consent and waiver and to do all other things which shall or may be reasonably required to complete and deliver the obligations set out in the MSA.

## 32. SEVERABILITY AND WAIVER

1. If any provision of the MSA, or any part thereof, shall be found by any court or administrative body of competent jurisdiction to be illegal, invalid or unenforceable the illegality, invalidity or unenforceability of such provision or part provision shall not affect the other provisions of the MSA or the remainder of the provisions in question which shall remain in full force and effect.
2. The relevant Parties shall negotiate in good faith in order to agree to substitute for any illegal, invalid or unenforceable provision a valid and enforceable provision which achieves to the greatest extent possible the economic, legal and commercial objectives of the illegal, invalid or unenforceable provision or part provision.
3. No failure to exercise or enforce and no delay in exercising or enforcing on the part of either Party to the MSA of any right, remedy or provision of the MSA shall operate as a waiver of such right, remedy or provision in any future application nor shall any single or partial exercise or enforcement of any right, remedy or provision preclude any other or further exercise or enforcement of such right, remedy or provision or the exercise or enforcement of any other right, remedy or provision.

## 33. COMPLIANCE WITH APPLICABLE LAW

Each Party to the MSA accepts that its individual conduct shall (to the extent applicable to its business like the MSI as a service provider) at all times comply with all laws, rules and regulations of government and other bodies prevailing in Bihar.

## 34. PROFESSIONAL FEES

All expenses incurred by or on behalf of each Party to the MSA, including all fees of agents, legal advisors, accountants and actuaries employed by either of the Parties in connection with the negotiation, preparation and execution of the MSA shall be borne solely by the Party which incurred them unless otherwise specified explicitly.

## 35. ETHICS

The MSI represents, warrants and covenants that it has given no commitments, payments, gifts, kickbacks, lavish or expensive entertainment, or other things of value to any employee or agent of BTD in connection with the MSA and acknowledges that the giving of any such payment, gifts, entertainment, or other things of value is strictly in violation of BTD standard policies (as detailed in the RFP under Corrupt and Fraudulent Practices) and may result in Termination of the MSA.

## 36. ENTIRE AGREEMENT

The MSA with all schedules and annexures appended thereto and the contents and specifications of the RFP constitute the entire agreement between the Parties with respect to their subject matter, and as to all other representations, understandings or agreements which are not fully expressed herein, provided that nothing in this Clause shall be interpreted so as to exclude any liability in respect of fraudulent misrepresentation.

The documents including but not limited to following shall be deemed to form and be read and construed as part of the MSA viz:

a. RFP (along with all Annexures) No: _____issued on _____
b. Corrigendum No _____ issued on _____
c. Clarifications to bidders' queries issued on _____
d. Technical Bid submitted by Successful Bidder on _____,and agreed by BTD.
e. Commercial Bid submitted by the Successful Bidder on _____, and agreed by BTD.
f. Non-Disclosure Agreement signed between BTD and MSI dated _____.
g. Tripartite agreements, if any, signed with, Smart City, CSP, ISP etc.

## 37. COOPERATION; CONSENTS

Each Party will cooperate with the other Party in good faith in the performance of its respective activities contemplated by MSA through, among other things, making available, as reasonably requested by the other Party, such management decisions, information, approvals and acceptances in order that the provision of the Services under MSA may be accomplished in a proper, timely and efficient manner. Where agreement, approval, acceptance or consent of either Party is required by any provision of MSA, such action will not be unreasonably withheld or delayed.

## 38. INCONSISTENCIES

To the extent that the provisions of the MSA and of any other Annexure hereto are in any respect inconsistent, the provisions of MSA will govern and control, provided that with respect to the description of the Services, the Annexure hereto will govern and control. In case of any dispute with this regards, BTD's decision shall be final and binding.

## 39. COUNTERPARTS

MSA may be executed in two counterparts, each of which will be deemed to be an original, but all of which together will constitute one agreement binding on the Parties, notwithstanding that both Parties are not signatories to the original or the same counterpart.

## 40. SURVIVAL

**Termination or expiration of the Term shall:**

a. not relieve the MSI or the BTD, as the case may be, of any obligations hereunder which expressly or by implication survive hereof; and
b. except as otherwise provided in any provision of MSA expressly limiting the liability of either Party, not relieve either Party of any obligations or liabilities for loss or damage to the other Party arising out of, or caused by, acts or omissions of such Party prior to the effectiveness of such termination or expiration or arising out of such termination or expiration.
c. All obligations surviving termination or expiration of the Term shall cease on termination or expiration of the Term, as the case may be.

## 41. DOCUMENT HISTORY

Any and all revisions made to the MSA shall be listed in chronological order as per the format set out below and a copy of the same shall be provided to the Parties:

| Version | Date | Description of changes | Reviewed/ Approved by |
|---|---|---|---|
| <***> | <***> | <***> | |

**IN WITNESS WHEREOF the Parties have by duly authorized** Representatives set their respective hands and seal on the date first above written

In the presence of:

WITNESSES:

Signed by:
(Name and designation)
For and on behalf of BTD
(FIRST PARTY)

Signed by:
(Name and designation)
For and on behalf of MSI
(SECOND PARTY)

# 42. ANNEXURE

## 42.1. Annexure I: Exit Management

### (1) PURPOSE

1. Provisions under this clause shall apply on expiry or termination of the MSA.
2. In the case of termination of the Project Implementation and/or Operation and Management, the Exit management shall be applicable.

### (2) TRANSFER OF ASSETS

1. BTD shall be entitled to serve notice in writing on the MSI at any time during the exit management period (minimum of 60 days) as detailed hereinabove requiring the MSI and/or its sub-contractors to provide the BTD with a complete and up to date list of the Assets (hard as well as soft assets) within 30 days of such notice.
2. BTD shall then be entitled to serve notice in writing on the MSI at any time prior to the date, that is 30 days prior to the end of the exit management period, requiring the MSI to transfer all the assets to BTD as per conditions defined in clause 12.2 of this MSA, which are not already in the name of BTD.
3. In case of contract being terminated by BTD, BTD reserves right to ask MSI to continue running project operations for a maximum period of 6 months from date of termination order. The payment of such period shall be made as per original payment terms and conditions defined in the MSA.
4. **Upon service of a notice the following provisions shall apply:**
    a. cease all further work as instructed by the BTD in the Termination Notice and the MSI shall carry out works for the sole purpose of securing, preserving and protecting that part of the Works already Executed and any work required to leave the Project Sites and the Works in a clean and safe condition as directed by BTD;
    b. repatriate the MSI 's and sub-bidder's personnel from any part of the Project Site and the Works;
    c. in the event, if the Assets to be transferred are mortgaged to any financial institutions by the MSI, the MSI shall ensure that all such liens and liabilities have been cleared beyond doubt, prior to such transfer.
    d. Transfer all Annual Maintenance Contract, Insurance, IP rights, hardware, software license and any other licenses after clearing all liens and liabilities on any financial institute, if any. All documents regarding the discharge of such lien and liabilities shall be furnished to the BTD.
    e. All risk and title to the Assets to be transferred / to be purchased by the BTD shall be transferred to BTD, as on the last day of the exit management period.
    f. BTD shall pay to the MSI on the last day of the exit management period the payment due to MSI as per quoted rates on pro rata basis considering SLA penalties and liquidated damages, if any.
    g. ensure that it and those it is contractually or otherwise responsible for, vacate the Project Site;
    h. promptly and in an orderly manner deliver to BTD all documents relating to the project which are for the time being under the control of the MSI;

5. Payment to the outgoing MSI shall be made to the tune of last set of completed services / deliverables, subject to SLA requirements.
6. The outgoing MSI shall pass on to BTD and / or to Replacement MSI, the subsisting rights in any leased assets / licensed products on terms not less favourable to BTD / Replacement MSI, than that enjoyed by the outgoing MSI, as directed by BTD.

### (3) COOPERATION AND PROVISION OF INFORMATION

**During the exit management period:**

1. The MSI shall allow BTD access to information reasonably required to define the then current mode of operation associated with the provision of the services to enable the BTD to assess the existing services being delivered;
2. promptly on reasonable request by the BTD, the MSI shall provide access to and copies of all information held or controlled by them which they have prepared or maintained in accordance with the MSA relating to any material aspect of the services (whether provided by the MSI or sub-contractors appointed by the MSI). The BTD shall be entitled to copy of all such information. Such information shall include details pertaining to the services rendered and other performance data. The MSI shall permit the BTD to have reasonable access to its employees and facilities as reasonably required by the BTD to understand the methods of delivery of the services employed by the MSI and to assist appropriate knowledge transfer.

## (4) CONFIDENTIAL INFORMATION, SECURITY AND DATA

The MSI shall promptly on the commencement of the exit management period, supply to the BTD or its nominated MSI the following:

1. information relating to the current services rendered and citizens, customers and performance data relating to the performance of sub-contractors in relation to the services;
2. documentation relating to OEMs, vendors, sub-contractors;
3. documentation relating to Project's Intellectual Property Rights;
4. documentation relating to the hardware, software, and other assets deployed along with all the maintenance, operations and calibration details;
5. all current and updated data as is reasonably required for purposes of BTD transitioning the services to its Replacement MSI in a readily available format as directed by BTD,
6. all other information (including but not limited to documents, records and agreements) relating to the services reasonably necessary to enable BTD, or Replacement MSI to carry out with due diligence in order to transition the provision of the Services to BTD or Replacement MSI (as the case may be)
7. all the data generated during the project

Before the expiry of the exit management period, the MSI shall deliver to the BTD all new or up-dated materials from the categories as detailed above and shall not retain any copies thereof, except that the MSI shall be permitted to retain one copy of such materials for archival purposes only. Before the expiry of the exit management period, unless otherwise provided under the MSA, the BTD shall deliver to the MSI all forms of MSI confidential information, which is in the possession or control of BTD (excluding the bid documents, contracts, letters, communication, deliverables by MSI, details about the project etc.) Decision of BTD in this regard will be final and binding.

## (5) GENERAL OBLIGATIONS OF THE MSI

The MSI shall provide all such information as may reasonably be necessary to effect seamless handover as practicable in the circumstances to the BTD or Replacement MSI and which the MSI has in its possession or control at any time during the exit management period. For the purposes of this Annexure, anything in the possession or control of any MSI, associated entity, or sub-contractor is deemed to be in the possession or control of the MSI. The MSI shall commit adequate resources to comply with its obligations under Exit Management Annexure.

## (6) EXIT MANAGEMENT PLAN

The MSI shall provide the BTD with a recommended exit management plan ("Exit Management Plan") which shall deal with at least the following aspects of exit management in relation to the MSA as a whole and in relation to the Project Implementation, and the Operation, Maintenance and SLA Management.

1. A detailed program of the transfer process that could be used in conjunction with a Replacement MSI including details of the means to be used to;
   a. ensure continuing provision of services throughout the transfer process or until the cessation of the services and of management structure to be used during the transfer;
   b. plans for the communication with such of the MSI's sub-contractors, staff, suppliers, vendors, OEMS and any related third party as are necessary to avoid any material detrimental impact on the BTD's operations as a result of undertaking the transfer;
   c. (if applicable) proposed arrangements for the segregation of the MSI's networks from the networks employed by BTD and identification of specific security tasks necessary at termination;
2. Plans for provision of contingent support to BTD, and Replacement MSI for a reasonable period after transfer.
3. In the event of termination or expiry of MSA, and Project Implementation, each Party shall comply with the Exit Management Plan. During the exit management period, the MSI shall use its best efforts to deliver the services.
4. This Exit Management plan shall be furnished in writing to the BTD within 60 days from the date of signing of the MSA, and yearly thereafter.

## 42.2. Annexure II: Audit, Access and Reporting

### (1) AUDIT NOTICE AND TIMING

As soon as reasonably practicable after the Effective Date, the Parties shall use their best endeavour to agree to a timetable for routine audits during the Project Implementation Phase and the Operation and Maintenance Phase. Such timetable during the Implementation Phase and thereafter during the operation Phase, the BTD or its nominated MSI shall conduct routine audits in accordance with such agreed timetable and shall not be required to give the MSI any further notice of carrying out such audits.

The BTD may conduct non-timetabled audits at its own discretion if it reasonably believes that such non-timetabled audits are necessary as a result of an act of fraud by the MSI, a security violation, or breach of confidentiality obligations by the MSI, provided that the requirement for such an audit is notified in writing to the MSI, a reasonable prior period to the audit (taking into account the circumstances giving rise to the reasonable belief) stating details of reasons in a reasonable level for the requirement and the alleged facts on which the requirement is based. If the MSI considers that the non-timetabled audit was not appropriate, the matter shall be referred to the escalation procedure as set out in the Governance Schedule.

The frequency of audits shall be a (maximum) half yearly, provided always that the BTD shall endeavour to conduct such audits with the lowest levels of inconvenience and disturbance practicable being caused to the MSI's operations of the project. Any such audit shall be conducted by adequate notice of 2 weeks to the MSI. BTD shall ensure that any 3rd party agencies (except CAG) appointed to conduct the audit shall not be the competitor of MSI and shall be bound by confidentiality.

### (2) ACCESS

The MSI shall provide to the BTD access to employees, subcontractors, suppliers, vendors, OEMs, agents and third party facilities as detailed in the RFP, documents, records and systems reasonably required for audit and shall provide all such persons with routine assistance in connection with the audits and inspections. BTD shall have the right to copy and retain copies of any relevant records. The MSI shall make every reasonable effort to co-operate with them.

### (3) AUDIT RIGHTS

The BTD shall have the right to audit and inspect suppliers, vendors, OEMs, agents and third party facilities (as detailed in the RFP), data centres applications, documents, records, procedures and systems relating to the provision of the services, but only to the extent that they relate to the provision of the services, as shall be reasonably necessary to verify:

1. The security, integrity and availability of all data processed, held or conveyed by the MSI on behalf of BTD and documentation related thereto;
2. That the actual level of performance of the services is the same as specified in the SLA;
3. That the MSI has complied with the relevant technical standards, and has adequate internal controls in place; and
4. Compliance of the MSI with any other obligation under the MSA and SLA and as per RFP.
5. Security audit of the system shall be done once every year, the cost of which shall be borne by the MSI.
6. Audit rights shall not include access to (i) the MSI's profit margins or overheads, or (ii) any confidential information relating to the MSI' employees, or (iii) minutes of its internal Board or Board committee meetings including internal audit, or (iv) such other information of commercial-in-confidence nature which are not relevant to the Services associated with any obligation under the MSA.

### (4) AUDIT RIGHTS OF SUB-CONTRACTORS, SUPPLIERS AND AGENTS

The MSI shall use reasonable endeavours to achieve audit and access provisions, with sub-contractors, suppliers and agents who supply labour, services, equipment or materials in respect of the services. The MSI shall inform the BTD prior to concluding any sub- contract or supply agreement due to failure to achieve the same rights of audit or access.

**REPORTING**: The MSI shall provide quarterly reports to BTD regarding any specific aspects of the Project and in context of the audit and access information as required by the BTD from time to time.

### (5) ACTION AND REVIEW

Any change or amendment to the systems and procedures of the MSI, or sub-contractors, where applicable, arising from the audit report shall be agreed within thirty (30) calendar days from the submission of the said report.

Any discrepancies identified by any audit, shall be immediately notified to the BTD and the MSI Project Manager, MSI Project Director and / or POC who shall determine what action shall be taken in respect of such discrepancies in accordance with the terms of the MSA.

### (6) TERMS OF PAYMENT

Apart from the required yearly system, security audits, for any other audits and inspections, the BTD shall bear the cost. The terms of payment are exclusive of any costs of the MSI and the sub-contractor, for all reasonable assistance and information provided under the MSA, the Project Implementation, Operation and Management, SLA, by the MSI pursuant to this Annexure. The cost towards the same shall be borne by the MSI.

### (7) RECORDS AND INFORMATION

For the purposes of audit in accordance with this Annexure, the MSI shall maintain true and accurate records in connection with the provision of the services and the MSI shall handover all the relevant records and documents upon the termination or expiry of the MSA.

## 42.3. Annexure III: Governance Schedule

### (1) PURPOSE

**The purpose of this Annexure is to:**

a. establish and maintain the formal and informal processes for managing the relationship between the BTD and the MSI;
b. define the principles that both Parties wish to follow to ensure delivery of the Services;
c. ensure the continued alignment of the interests of the Parties;
d. ensure that the relationship is maintained at the correct level within each Party;
e. create the flexibility to revise and maintain the relationship and the MSA during the Term;
f. set out the procedure for escalating disagreements; and
g. enable contract administration and performance management.

### (2) GOVERNANCE STRUCTURE:

1. **Project Managers**: The relationship under the MSA shall be managed by the Project Managers appointed by each Party, who shall provide the interface between the executive management of the respective Parties. Within 7 days following the Effective Date, BTD and the MSI shall each appoint a Project Manager. In the event that either Party wishes to substitute its Project Manager it shall do so in a manner in which the original appointment is made and notify the other Party of such substitution as soon as reasonably practicable but at the latest within 7 days of the substitution. The Project Managers shall have responsibility for maintaining the interface and communication between the Parties.
2. **Project Management Unit (PMU)**: A PMU shall be constituted under the supervision of PIC with Project Manager as its member secretary. PMU may comprise of appointed Assistant Commissioner, Deputy Commissioners, Executive Engineers, other concerned officials, BTD's consultants, if any from the BTD side, and at least Project Manager and Project Director from the MSI's side. Such unit shall meet at least on a fortnightly basis as required, at a time and location to be agreed between them. The PMU shall be responsible for monitoring the project implementation and operations, as well as address and resolve day to day issues arising during the execution.
3. **Project Management Team (PMT):** The BTD shall appoint a committee consisting of staff members of the BTD, other officials from concerned department and external experts / consultants. The PMT shall meet formally on a monthly / quarterly basis as required, at a time and location to be agreed between them. These meetings shall cover, at least the following agenda items: (i) consideration of Quarterly Performance Reports; (ii) issues escalated in accordance with the escalation procedure as set out in the Governance Schedule; (iii) matters to be brought before the PMT by the PMT in accordance with the MSA and the Annexures; (iv) any matter brought before the PIC by the MSI under this clause; and (v) any other issue which either Party wishes to add to the agenda.
4. In the event that there is any material factor which affects the delivery of the Services or the terms of payment, the Parties agree to discuss in the PMT any appropriate amendment to the MSA or Scope of Works including any variation to the terms of payment. In case of disagreement, the matter may be taken up by the PMT. Any variation so agreed shall be implemented by mutual consent of both parties. In case of dispute, BTD's decision shall be final and binding on both the parties.

## (3) GOVERNANCE PROCEDURES

1. The MSI shall document the agreed structures in a procedures manual.
2. The agenda for each meeting shall be set to reflect the discussion items referred to above and extraordinary items may be added either with the agreement of the Parties or at the request of either Party. Copies of the agenda for meetings, along with relevant pre-reading material, shall be distributed at least one week in advance of the relevant meeting.
3. All meetings and proceedings shall be documented such documents shall be distributed to the Parties and copies shall be kept as a record. All actions, responsibilities and accountabilities arising out of any meeting shall be tracked and managed.
4. The Parties shall ensure as far as reasonably practicable that the Governance Structure set forth herein shall resolve the issues and resolve the objectives placed before them and that members representing that Party are empowered to make relevant decisions or have easy access to empowered individuals for decisions to be made to achieve this.
5. In order to formally to submit a Disputed Matter to the aforesaid, one Party ("Claimant") shall give a written notice ("Dispute Notice") to the other Party. The Dispute Notice shall be accompanied by (a) a statement by the Claimant describing the Disputed Matter in reasonable detail and (b) documentation, if any, supporting the Claimant's position on the Disputed Matter.
6. The other Party ("Respondent") shall have the right to respond to the Dispute Notice within 7 days after receipt of the Dispute Notice. In the event that the parties are unable to resolve the Disputed Matter within a further period of 7 days, it shall refer the Disputed Matter to next level of the dispute resolution for action as per the procedure laid down in the Clause 22, Governing Law and Dispute Resolution.
7. All negotiations, statements and / or documentation pursuant to these Dispute and its notice shall be without prejudice and confidential (unless mutually agreed otherwise).
8. If the Disputed Matter is having a material effect on the operation of the Services (or any of them or part of them) the Parties shall use all their respective reasonable endeavours to reduce the elapsed time in reaching a resolution of the Disputed Matter.

----------x----------x----------x----------

# Draft Non-Disclosure Agreement

## NON-DISCLOSURE AGREEMENT

(To be signed on Rupees 100/- non-judicial Stamp Paper)

[This Non-Disclosure Agreement needs to be signed by authorized person/s of MSI to get access to all the confidential documents and records. All the personnel, employees, agents and contractors of the MSI shall sign an NDA with MSI which is to be annexed to this NDA]

**THIS NON-DISCLOSURE AGREEMENT ("NDA")** is executed on this the _____day of _____20___ at Patna, India.

**BETWEEN**

The **Governor of the state of Bihar** exercising executive powers of the **Government of Bihar** through the State Transport Commissioner having its office at 2nd Floor, Visveswaraya Bhawan, J L N Marg Patna – 800001,_India hereinafter referred to as **'BTD',** which expression shall, unless the context otherwise requires, include its successors and assigns);

**AND**

_____<Name of Bidder / Lead Bidder>_____**,** (a Company registered and incorporated in India under the Companies Act, 1956/2013 OR Limited Liability Partnership firm under LLP Act 2008, (as amended from time to time) through having its registered office at _____ (hereinafter referred to as **'MSI / Successful Bidder'** which expression shall, unless the context otherwise requires, include its permitted successors and assigns).

Each of the parties mentioned above are collectively referred to as the '**Parties**' and individually as a '**Party**'.

**WHEREAS:**

a) BTD is desirous to implement the project _____ _____, hereafter referred to **"Project"** for a period of 140 months (20 months of Implementation Phase till Go-Live and 10 years post Go-Live – "Contract Period"),
b) The BTD and MSI have entered into a Master Services Agreement dated _____ (the "MSA") in furtherance of the Project.
c) Whereas in pursuing the Project (the "Business Purpose"), a Party ("Disclosing Party") recognizes that they shall disclose certain Confidential Information (as defined hereinafter) to the other Party ("Receiving Party").
d) Whereas such Confidential Information (as defined hereinafter) belongs to Disclosing Party as the case may be and is being transferred to the Receiving Party to be used only for the Business Purpose and hence there is a need to protect such information from unauthorized use and disclosure.

**NOW THEREFORE**, in consideration of the mutual covenants, promises, assurances, representations and provisions set forth herein, the Parties hereto agree as follows:

## 1. DEFINITIONS and INTERPRETATION

Terms and expressions used in this Agreement (including the Introduction) shall have the same meanings set out in Clause 1 of Master Service Agreement (MSA).

## 2. AMBIGUITIES WITHIN AGREEMENT

In case of ambiguities or discrepancies within the NDA, the following principles shall apply:

1. as between two Clauses of the NDA, the provisions of a specific Clause relevant to the issue under consideration shall prevail over those in a general Clause.
2. as between the provisions of NDA and the Annexure, the NDA shall prevail, save and except as expressly provided otherwise in NDA or the Annexure; and
3. as between any value written in numerals and that in words, the value in words shall prevail.

## 3. PRIORITY OF AGREEMENTS

The Parties hereby expressly agree that for the purpose of giving full and proper effect to the NDA, the MSA and NDA shall be read together and construed harmoniously. In the event of any conflict between the MSA and the NDA, the provisions contained in the MSA shall prevail over NDA.

## 4. TERM

NDA shall remain in effect for five years from the date of the last disclosure of Confidential Information ("Term") or 10 years from the date of the Signing of Contract, whichever is later, at which time it shall terminate, unless extended by the disclosing party in writing.

## 5. SCOPE OF THE NDA

1. NDA shall apply to all confidential and proprietary information disclosed by Disclosing Party to the Receiving Party and other information which the disclosing party identifies in writing or otherwise as confidential before or within (30) thirty days after disclosure to the Receiving Party ("Confidential Information"). Such Confidential Information consists of certain specifications, documents, software, data including video, photos, prototypes and/or technical information, and all copies and derivatives containing such Information that may be disclosed to the Disclosing Party for and during the Business Purpose, which a party considers proprietary or confidential.
2. Such Confidential Information may be in any form or medium, tangible or intangible, and may be communicated/disclosed in writing, or through visual observation or by any other means to the Receiving Party.
3. NDA shall apply to all Information, documents, records and registers relating to the Project disclosed by the BTD, Bihar Transport Dept., Traffic Police or any other authorities or created or generated as the part and in course of the project, by the MSI.
4. Nothing contained in the NDA shall be construed as granting or conferring rights of license or otherwise, to the MSI, in any of the Information.
5. NDA shall benefit and be binding upon the BTD and MSI (and their subcontractors) and their employees, respective subsidiaries, affiliates, successors and assigns.
6. NDA shall be governed by and construed in accordance with the Indian laws having jurisdiction of Patna only.

## 6. OBLIGATIONS OF THE RECEIVING PARTY

**The Receiving Party shall:**

1. use the Confidential Information only for the Business Purpose and shall hold the Confidential Information in confidence using the same degree of care as it normally exercises to protect its own proprietary information, taking into account the nature of the Confidential Information, and
2. grant access to Confidential Information only to its employees, sub-contractors on a 'need to know basis' and restrict such access as and when not necessary to carry out the project.
3. cause its employees, partners, sub-contractors, and their employees to comply with the provisions of the NDA;
4. reproduce Confidential Information only to the extent essential for fulfilling the project;
5. prevent disclosure of Confidential Information to third parties;
6. disclose the Confidential Information to its consultants/contractors on a need to know basis; provided that by doing so, the Receiving Party agrees to bind such consultants/ contractors to terms at least as restrictive as those stated herein.
7. upon making a disclosure under this Clause shall advise the consultants/contractors of the confidentiality obligations imposed on them by this Clause.
8. upon the Disclosing Party's request, the Receiving Party shall either return to the disclosing party all Confidential Information or shall certify to the disclosing party that all media containing Confidential Information have been destroyed. Provided, however, that an archival copy of the Confidential Information may be retained in the files of the Receiving Party's counsel, solely for the purpose of proving the contents of the Confidential Information.
9. not remove any of the other Party's Confidential Information from the premises of the Disclosing Party without prior written approval.
10. exercise extreme care in protecting the confidentiality of any Confidential Information which is removed, only with the Disclosing Party's prior written approval, from the Disclosing Party's premises. Each Party agree to comply with any and all terms and conditions the disclosing party may impose upon any such approved removal, a condition such as that the removed Confidential Information and all copies must be returned by a certain date, and that no copies are to be made off of the premises.
11. Upon the Disclosing Party's request, shall promptly return to the Disclosing Party all tangible items containing or consisting of the disclosing party's Confidential Information all copies thereof
12. Not subcontract any work without prior written consent of BTD strictly as per terms and requirements set out on the RFP document. It is clarified that the MSI shall be the principal employer for all claims arising from the liabilities, statutory or otherwise, concerning the sub-contractors. The MSI undertakes to indemnify the BTD from any claims on the grounds stated hereinabove.
13. Hold such Information in confidence with the same degree of care with which the MSI protects its own confidential and proprietary information;
14. Restrict disclosure of the Information solely to its employees, agents and contractors with a need to know such Information and advice those persons of their obligations hereunder with respect to such Information;
15. Submit duly signed NDA with its said employees, agents and contractors;
16. Use the Information only as needed for the purpose of the Project;
17. Except for the said purpose of the Project, not copy or otherwise duplicate such Information or knowingly allow anyone else to copy or otherwise duplicate such information whether physical or digital under any circumstances; and
18. Not take out any information out of the BTD premises or BTD approved premises through any means or out from the Data Center, DR or any other storage site approved for the purpose of this project.

## 7. EXCEPTIONS TO CONFIDENTIAL INFORMATION

The foregoing restrictions on each party's use or disclosure of Confidential Information shall not apply to the Confidential Information that the Receiving Party can demonstrate that such Confidential Information:

1. was independently developed by or for the Receiving Party, without reference to the Information, or was received without restrictions; or
2. has become generally available to the public without breach of confidentiality obligations of the Receiving Party; or
3. was in the Receiving Party's possession without restriction or was known by the Receiving Party without restriction at the time of disclosure; or
4. is the subject of summons or other legal or administrative demand for disclosure; provided, however, that the Receiving Party has given the disclosing party prompt notice of such demand for disclosure and the Receiving Party reasonably cooperates with the disclosing party's efforts to secure an appropriate protective order; or
5. is disclosed with the prior consent of the disclosing party;
6. was in its possession or known to it by being in its use or being recorded in its files or computers or other recording media prior to receipt from the disclosing party and was not previously acquired by the Receiving Party from the disclosing party under an obligation of confidence; or
7. the Receiving Party obtains or has available from a source other than the disclosing party without breach by the Receiving Party or such source of any obligation of confidentiality or non-use towards the disclosing party.
8. Was previously known to the MSI free of any obligation to keep it confidential at the time of its disclosure as evidenced by the MSI's written records prepared prior to such disclosure; or
9. Is or becomes publicly known through no wrongful act of the MSI; or
10. Is independently developed by an employee, agent or contractor of the MSI not associated with the Project and who did not have any direct or indirect access to the Information.

Nothing contained herein shall be construed that any data that is generated by virtue of the Project shall be termed as "Confidential Information"

## 8. OWNERSHIP OF THE CONFIDENTIAL INFORMATION

1. Each Party recognizes and agrees that all the disclosing Party's Confidential Information is owned solely by the Disclosing Party (or its licensors) and that the unauthorized disclosure or use of such Confidential Information would cause irreparable harm and significant injury, the degree of which may be difficult to ascertain.
2. By disclosing the Confidential Information or executing the NDA, Disclosing Party does not grant any license, explicitly or implicitly, under any trademark, patent, copyright, mask work protection right, trade secret or any other intellectual property right. The Disclosing Party disclaims all warranties regarding the information, including all warranties with respect to infringement of intellectual property rights and all warranties as to the accuracy or utility of such information.
3. Access to Confidential Information hereunder shall not preclude an individual who has seen such Confidential Information for the purposes of the NDA from working on future projects for the Disclosing Party which relate to similar subject matters, provided that such individual does not make reference to the Confidential Information and does not copy the substance of the Confidential Information during the Term. Furthermore, nothing contained herein as imposing any restriction on the Receiving Party's disclosure or use of any general learning, skills or know-how developed by Receiving Party's personnel.
4. Execution of the NDA and disclosure of Confidential Information pursuant to the NDA do not constitute or imply any commitment, promise, or inducement by either party.

## 9. WAIVER

Waiver including partial or conditional waiver, by either Party of any default by the other Party in the observance and performance of any provision of or obligations under the NDA:-

1. shall be in writing
2. shall not operate or be construed as a waiver of any other or subsequent default hereof or of other provisions of or obligations under the NDA;
3. shall be executed by a duly authorized representative of the Party; and
4. shall not affect the validity or enforceability of the NDA in any manner.

## 10. EXCLUSION OF IMPLIED WARRANTIES

The NDA expressly excludes any warranty, condition or other undertaking implied at law or by custom or otherwise arising out of any other agreement or representation between the Parties not contained in a binding legal agreement executed by both Parties.

## 11. NOTICES

Any notice or other communication to be given by any Party to the other Party under or in connection with the matters contemplated by the NDA shall be in writing and shall be given by hand delivery, recognized courier, registered post, email or facsimile transmission and delivered or transmitted to the Parties at their respective addresses set forth in the Master Service Agreement.

## 12. LANGUAGE

All notices required to be given by one Party to the other Party and all other communications, documentation and proceedings which are in any way relevant to the NDA shall be in writing and in the English language only.

## 13. COUNTERPARTS

The NDA may be executed in counterparts, each of which, when executed and delivered, shall constitute an original of the NDA.

**IN WITNESS WHEREOF THE PARTIES HAVE EXECUTED AND DELIVERED THE NDA AS OF THE DATE FIRST ABOVE WRITTEN.**

| | |
|---|---|
| (Signature of the person/s working for and with the MSI)<br>Name:<br>Designation:<br>Date:<br>Place:<br>Seal: | For and on behalf of Bihar Transport Department, Patna<br>Name:<br>Designation:<br>Seal:<br>Date:<br>Place: |

---------- END OF THE PART II OF THE RFP----------

----------END OF THE RFP----------