1.1 Notice Inviting Tender

(National Competitive Bidding through e-Tendering mode only) RFP No. RO/UK/TIMS/2023/01 Dated 11.03.2024

Ministry of Road Transport and Highways (Hereinafter referred to as "Authority" or "MoRTH") intends to engage the System Integrator for Design, Supply, Installation, Testing, Commissioning, Configuration, System Integration, Operations and Maintenance of Traffic Incident Management System (TIMS) for Chardham Mahamarg.

The project shall be a complete TIMS solution with provision of skilled resources at all locations for operations. The period of engagement shall be for 3 phases subject to the terms of this RFP as mentioned under Section 4.

The prospective bidders are hereby invited to submit their bids comprising Technical and Financial Bids through e-tendering mode on the E-Tendering portal (https://eprocure.gov.in/eprocure/app) by the bid due date. Bid shall be valid for 120 days w.e.f. bid due date. The bids should be submitted online only on e-tender portal of MoRTH and in the prescribed formats. No change in the formats and / or other mode of bid submission is permissible.

1.2 Schedule of Important Events / Activities

Sl. No.	Event(s)	Date (Unless otherwise notified separately)
1.	Issue of Bid Document	11/03/2024
2.	Last date for Submission of Pre bid Queries	05/04/2024 at 11:00 AM
3.	Pre-bid Meeting	05/04/2024
4.	Deadline for online submission of bids (Bid due date)	15:00 Hrs on 25/04/2024
5.	Opening of Technical bids	15:00 Hrs on 26/04/2024
6.	Opening of Financial bids	To be intimated to shortlisted/ pre-qualified bidders separately

1.3 Other Important Information Related to Bid

<table>
<tr><th>Sl. No.</th><th>Item</th><th>Description</th></tr>
<tr><td>1.</td><td>RFP Document Fee in the form of DD favoring “Ministry of Road Transport and Highways” (Non-Refundable)</td><td>Cost of the Document in the form of a Non-refundable document fee of Rs. 5,000 (Rupees Five Thousand only) + 18% GST through online portal “BHARAT KOSH” Portal only in favour of Pay and Accounts Officer (NH), New Delhi. Details to be selected in Bharatkosh Portal for making payment are as under:
<table>
<tr><th>Sl No.</th><th>Description</th><th>Details to be selected in Bharatkosh Portal</th></tr>
<tr><td>1</td><td>Ministry</td><td>CE-RO MINISTRY OF ROAD TRANSPORT & HIGHWAYS</td></tr>
<tr><td>2</td><td>Purpose</td><td>Sale of Tender Documents</td></tr>
<tr><td>3</td><td>Pay & Account Office(PAO)</td><td>034415-PAO(NH), New Delhi</td></tr>
<tr><td>4</td><td>Drawing & Disbursing Office (DDO):</td><td>234444- ENGINEER LIASON OFFICER</td></tr>
</table></td></tr>
<tr><td>2.</td><td>Bid Validity Period</td><td>One hundred and twenty (120) days from the date of opening of bid</td></tr>
<tr><td>3.</td><td>Performance Security Deposit & Last date for furnishing Performance Security Deposit to “Ministry of Road Transport and Highway” (By successful Bidder)</td><td>3% of project cost to be furnished as per Section 10 “Performance Security”</td></tr>
<tr><td>4.</td><td>Performance Security Deposit validity period</td><td>Valid till 60 (Sixty) days beyond the contract / authorization period.</td></tr>
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- A Bidder is required to submit, along with its BID, a BID Security of Rs. 2,00,00,000/- (INR 2 Crores Only), refundable not later than 150 (One hundred & fifty) days from the BID Due Date, except in the case of the Selected Bidder whose BID Security shall be retained till it has provided a Performance Security as per the provisions of this RFP. BID Security shall be submitted in the form of Insurance Surety Bond, Account Payee Demand Draft, Banker’s Cheque or Electronic Bank Guarantee (e-Bank Guarantee) issued by nationalized bank, or a Scheduled Bank in India having a net worth of at least Rs. 1,000 crore. The Insurance Surety Bond shall be verified from the specific portal created for this purpose. The e - Bank Guarantee shall be transmitted through SFMS Gateway to MoRTH. Details of Designated bank Account are as under:

S.No.	Particulars	Details
1	Name of Beneficiary	PAO(NH),MoRTH
2	Name of Bank	Canara Bank
3	Account No.	90621150000040
4	IFSC Code	CNRB0003525

- Bid Security shall have a validity period of not less than 180 (one hundred eighty) days from the BID Due Date, inclusive of a claim period of 60 (sixty) days and may be extended as may be mutually agreed between the Authority and the Bidder from time to time.
- While submitting Bid Security and Performance Security via Account Payee demand draft or Banker’s cheque, it is to be ensured by the bidder that Account Payee demand draft or Banker’s cheque are

submitted physically latest within 5 working days of the Bid Due Date to the Office of CE-RO (Dehradun) MoRTH.

- The BID Security shall be forfeited and appropriated by the Authority as damages payable to the Authority for, inter-alia, time cost and effort of the Authority without prejudice to any other right or remedy that may be available to the Authority under the bidding documents and / or under the Agreement, or otherwise, under the following conditions:
    a. If a Bidder engages in a corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice; or
    b. If the Bid is withdrawn during the intervening period between the bid due date and the expiration of the Bid Validity; or
    c. If the bidder tries to influence the evaluation process; or
    d. If a Bidder having been notified as Successful Bidder by MoRTH with the issuance of Letter of Award (LOA) , if it fails within specified/extended time period by the authority: (i) to sign and return the duplicate copy of LOA (ii) to furnish the Performance Security, in accordance with the conditions of RFP; or (iii) refuses to sign the Contract within the stipulated time frame.
- No Bidder shall submit more than one Bid for the Project. A Bidder bidding individually or as a member of a JV/Consortium shall not be entitled to submit another Bid either individually or as a member of any JV/ Consortium, as the case may be. If any Bidder or member of a Consortium submits or participates in more than one Proposal, then all such Proposals with the Bidder's or Consortium member's participation shall be rejected, and the Bidder shall stand disqualified.

RFP for Selection of System Integrator for Implementing and Maintaining Traffic Incident Management System on the Chardham Mahamarg

March 2024

Table of Contents

1 Instruction to Bidders

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2 Introduction

2.1 Objective of this RFP

Ministry of Road Transport and Highways (MoRTH) intends to appoint a System Integrator (SI) by following competitive bidding process to design, develop, implement, operate and maintain a Traffic Incident Management System (TIMS) on the Chardham Mahamarg.

The objective of the system is to install a comprehensive system to detect and respond to any traffic incidents in a timely and effective manner. Said traffic incidents may include accidents, congestions, and roadblocks due to reasons including but not limited to natural disasters.

The TIMS shall consist of appropriate surveillance technology and integrated Command Centers setup to be maintained and operated by the SI.

The deployment of surveillance equipment, maintenance and operations of the deployed system at the designated Command Center as well as the various branch centers shall be implemented after Go Live date to the end of the contract period.

The TIMS system envisaged is to make use of intelligent transportation systems as an effective tool to enhance road / user / commuter safety via early detection of incidents and initiating emergency response including medical, traffic management, etc.

2.2 Scope of Work

1. The 'TIMS System Integrator' hereafter may be called as 'System Integrator' shall conduct the field survey, preparation of design drawings and supply of TIMS equipment and materials, spare parts, test equipment, tools and materials, factory inspection (inspection of equipment & materials upon delivery), training, transportation and site delivery, civil works on space provided for Command Center and integrations with existing Command Centers/Control Rooms, preparation of as-built drawings, testing and commissioning of equipment and overall Operations and Maintenance of the TIMS project.
2. The scope of the works under this document is deployment of TIMS (including operations & maintenance) for approximately six years across approx. 834 Km of highways (~660 kms under the Chardham Mahamarg Pariyojana, and ~170 kms of Uttarkashi-Ghansali-Tilwara route) in the state of Uttarakhand.
3. The implementation plan, in proposed chronological order, across highway stretches with approximate highway lengths is as follows:
    a. Phase 1 (142 Km) –
        i. NH 7 Rishikesh-Rudraprayag 142 Km

b. Phase 2 (258 Km) –
    i. NH 34 Rishikesh-Uttarkashi 120 Km
    ii. NH 7 Rudraprayag-Mana 138 km
c. Phase 3 (434 Km) –
    i. SH 15 Uttarkashi-Ghansali-Tilwara 171 Km
    ii. NH 107 Rudraprayag-Kedarnath 76 Km
    iii. NH 134 Dharasu-Yamunotri 76 Km
    iv. NH 34 Uttarkashi-Gangotri 111 Km

However, the above list is indicative and the plan for final highway stretches, and associated timelines will be decided and finalized in conjunction by the Operating Committee, TIMS PMU and the System Integrator and be approved by the Governance and Steering Committee.

MoRTH may at any time withdraw any works forming part of this Agreement. If MoRTH is unable to transfer any segment of the road stretch to the TIMS System Integrator, then that specific segment shall be excluded from the project scope. The exclusion will be in accordance with the ratio of cameras planned for that segment, based on the system design initially submitted to and approved by the TIMS Project Management Unit (PMU)/Operating Committee. The Contract Price shall be reduced by an amount equal to 90 (ninety) percent of the value of the Works withdrawn and the System Integrator shall not be entitled to any other compensation or Damages for the withdrawal of Works. Provided that if any Works are withdrawn after the commencement of such works, MoRTH shall pay to the System Integrator 110% (one hundred and ten percent) of the fair value of the work done, as assessed by the TIMS PMU and Operating Committee.

4. The TIMS System Integrator shall set up the Hub Command Center during Phase-1 at the Uttarakhand Transport Department Office, Kulhan, Sahastradhara Road, Dehradun (or alternate location finalized by the Governance and Steering Committee). The TIMS System Integrator shall also set up Other Command Centers in a phased manner at each of the following locations – Uttarkashi, Tehri Garhwal, Chamoli, Pauri Garhwal and Rudraprayag. The requisite space for setting up the Other Command Centers shall be provided to the System Integrator. The Hub and Other Command Centers shall include the following:
    a. Operation area
    b. Server area
    c. UPS area
    d. Data center area
    e. Project Manager area – *(Optional, shall be decided in conjunction with TIMS PMU/Operating Committee)*

The scope of any additional civil works, interior works, MEP works, for setting up the Command Centers, including all additional related electrical, lighting, electrical connection, DG set, power backup, HVAC works, access control, building CCTV, PTZ cameras outside building, firefighting system, alarm, fire extinguishers, raised floor, housekeeping, building cleaning, maintenance, recurring charges including electricity bills, telephone bills, DG fuel, servicing, security, etc. shall be undertaken by the System Integrator.

5. The TIMS System Integrator shall also create integrations with existing Command Centers and Control Rooms under different departments & entities, as follows –
    a. Video feed and console for incident alerts (linked to Command Center software) at 112 Control Rooms operated by Police
        i. Uttarkashi
        ii. Tehri Garhwal
        iii. Chamoli
        iv. Pauri Garhwal
        v. Rudraprayag
        vi. Any other control room setup by the Police
    b. Console for incident alerts and updates (linked to Command Center Software) for District Emergency Operations Centers (DEOC) operated by District Disaster Management Authority
        i. Uttarkashi
        ii. Tehri Garhwal
        iii. Chamoli
        iv. Pauri Garhwal
        v. Rudraprayag
        vi. Any other control room/ center setup by USDMA
    c. Console for incident alerts and updates (linked to Command Center Software/ dashboards)
        i. Uttarakhand Health Department Command Center
        ii. USDMA State Emergency Operations Center
        iii. Tourism Department Command Center
        iv. Any other Command Center/Control Room as decided upon by TIMS PMU and Operating Committee of Chardham Mahamarg TIMS
    d. Additional Software integrations (details to be finalized by TIMS PMU)
        i. 1033 Control Center

ii. Vahan Database

iii. Deleted

iv. Deleted

v. Early Warning Systems by USDMA

vi. Deleted

vii. Tourism Command Center

viii. Health Command Center

ix. Any additional software integrations as mutually agreed upon by the Operating Committee, TIMS PMU and the System Integrator

e. The System Integrator shall ensure that TIMS is designed to be modular, enabling it to integrate with any preventive systems such as landslide prevention systems that may be deployed on the Chardham Mahamarg in the state of Uttarakhand during the term of the System Integrator.

6. The TIMS System Integrator is also expected to take on works that may not be explicitly outlined in this document but are essential to meet the existing scope of work, service levels and outcomes mentioned in this RFP.

7. The TIMS System Integrator shall coordinate with TIMS PMU, Operating Committee and relevant departments of Uttarakhand State Government (viz. Disaster Management, Police, Transport, Health, Tourism, etc.) and/or their agencies to finalize the SOP for notification of any incidents, their key responsibilities and associated integrations/ interfacing with relevant systems/ offices of the Departments that are critical to ensure the efficient operations of the TIMS.

8. The requirements stated herein shall be construed as minimum requirement and meeting the respective requirements shall not relieve the TIMS System Integrator from the responsibility of supplying the TIMS that functions efficiently as a system and carry out its Operation & Maintenance for the stipulated period.

9. Deleted.

10. The TIMS System Integrator shall provide the entire system and facilities on a “single responsibility” basis such that the Contract Price covers all TIMS System Integrator’s obligations mentioned in or to be reasonably inferred from this document in respect of the design, manufacture, procurement, construction, installation, adjustment and testing of the Works and remedying any defect therein. This includes all requirements under the TIMS System Integrator’s responsibilities for testing and commissioning of the systems and facilities, and where required by this document, the acquisition of all permits, approvals and license,

etc.; the training services and such other items and services as may be specified in this document.

11. The TIMS solution deployed by the TIMS System Integrator shall fully comply with the Traffic Management Data Dictionary (TMDD) Standard v3.1 or latest for the Center-to-Center (C2C) Communications released by Institute of Transportation Engineers (ITE). The proposed TIMS solution shall also be fully compatible with similar standards / protocol released by Government of India / IRC / IEEE for integration and seamless transfer / exchange of data from Command Center to Control Center of different projects.
12. In order to ensure that the proposed TIMS delivers on the objectives, it is important that the TIMS System Integrator perform a detailed Concept of Operations including Standard Operating Procedure for day-to-day operations of the TIMS (and generate the relevant 'CONOPS' document with the involvement of all stakeholders with final approval to be provided by the Operating Committee) in line with established engineering practices (ref: Systems Engineering Guidebook for Intelligent Transportation systems published by the US Department of Transportation, Federal Highway Administration, Version 3.0). Once the system has been installed and commissioned it shall be operated as per the above evolved Concept of Operations in order to validate it for its ability to deliver with respect to its objectives.
13. The component systems comprising TIMS to be constructed under the Contract shall include but not be limited to the following component systems:
    a. Central Processing System (CPS)
    b. Traffic Monitor Camera System (TMCS)
    c. Accident and Incident Detection System (AID)
    d. Deleted
    e. Power and Other Cables, and Power conditioning equipment
    f. Digital Transmission System (DTS)
    g. Facility Monitoring System (FMS)
    h. Variable Message Sign (VMS)
    i. Emergency Call Boxes (ECB)
14. The System Integrator shall also implement an effective monitoring and management system for the system. It is proposed that a proven Enterprise Management System is proposed by the System Integrator for efficient management of the system, reporting, SLA monitoring and resolution of issues. Various key components of the EMS to be implemented as part of the engagement are –
    a. Network Management System - Solution should provide fault & performance management of the cameras, server-side infrastructure and should monitor IP/SNMP enabled devices

like Routers, Switches, etc. (i.e., all devices supplied as part of RFP scope). This system shall also help monitor key KPI metrics like availability, in order to measure SLAs. Following are key functionalities that are required to assist administrators to monitor network faults & performance degradations in order to reduce downtimes, increase availability and take proactive actions to remediate & restore network services.

i. The proposed solution must automatically discover manageable elements connected to the infrastructure and map the connectivity between them. Solution should provide centralized monitoring console displaying network topology map.

ii. Proposed solution should provide customizable reporting interface to create custom reports for collected data

iii. The system must use advanced root-cause analysis techniques and policy-based condition correlation technology (at network level) for comprehensive analysis of infrastructure faults.

iv. The system should be able to clearly identify configuration changes and administrators should receive an alert in such cases.

v. The solution should support multicast protocols too, if the overall project solution offered includes multicast.

b. Server Monitoring System –

i. The proposed tool should integrate with Network Management System and support operating system monitoring for various platforms supplied as part of this Project.

ii. The proposed tool must provide information about availability and performance for target server nodes.

iii. The proposed tool should be able to monitor various operating system parameters such as processors, memory, files, processes, file systems, etc. where applicable.

iv. If the offered server/computing solution includes virtualisation, then the server performance monitoring solution must include virtualisation monitoring capabilities.

c. Helpdesk System

i. Helpdesk system should provide incident management, problem management templates along with helpdesk SLA system for tracking SLA's pertaining to incident resolution time for priority / non-priority incidents.

ii. System should also automatically create tickets based on alarm type

iii. The proposed helpdesk solution must provide flexibility of logging, viewing, updating and closing incident via web interface for issues related to the project

iv. IT Asset database should be built and managed by the bidder, in order to carry out the scope of work items.

The solution should provide a unified web-based console which allows role-based access to the users.

15. The System Integrator shall provide necessary support to the State Government/ relevant departments in their activities (incl. integrated/ otherwise app development). To this effect, the SI shall:
    a. Cooperate in the building of a unified platform architecture to ease integrations with health and other state departments
    b. Share discrete data points/logs real-time with the state departments whenever required
    c. Share relevant data (e.g., number plate identification, logs in real-time format, other relevant data, etc.) and cooperate in meeting any other requirements/integrations during the tenure of the contract
16. The System Integrator shall implement all phases of the project as finalized by the TIMS PMU. At the completion of installation of each phase and one quarter of Operation & Maintenance, the performance of the System Integrator shall be evaluated on the basis of timely completion of work, deliverables and adherence to defined Service Level Requirements. The TIMS PMU and Operating Committee shall determine satisfactory performance of the System Integrator along the defined parameters. In case of unsatisfactory performance during any period of time, MoRTH/Governance and Steering Committee retain the authority to replace the existing System Integrator.

2.3 Standards

1. All equipment's of the SI (included by the SI in the proposal), supplies shall be new and subject to the Factory Acceptance Test (FAT) to the satisfaction of the TIMS PMU. Unless other standards are specifically required to be complied with herein or in the Contract, all materials and components used under the Contract and all design calculations and tests shall be performed in accordance with Indian standards.
2. In the absence of such standards in India, relevant clauses of international standards including but not limited to International Electro technical Commission (IEC), Institute of Electrical and Electronic Engineers (IEEE), International Organization for Standardization (ISO), International Telecommunication Union Telecommunication Standardization Sector (ITU-T) shall be applied.
3. In the absence of such standards in India and the international standards mentioned above, industry standards generally accepted and approved in one of the major industrialized countries such as Great Britain, Japan, U.S.A, and Germany shall be applicable.

4. Whenever in this Document reference is made to the Japanese Industrial Standards (JIS), British Standards (BS), American Association of State Highway Transportation Officials (AASHTO) standards, American Society for Testing and Materials (ASTM) standards, and American National Standards Institute (ANSI) standards, and the like, it shall be understood that equivalent internationally acknowledged standards will be accepted.
5. If SI offers materials, equipment, design calculations or tests which conform to the standards other than those specified standards, full details of the differences between the proposed standard and the specified standards shall be submitted when required by the TIMS PMU.
6. Wherever Indian Technical specifications and Quality Certificates exists, the same shall be acceptable and the SI shall not be required to submit the foreign Quality Certifications and Accreditations. The SI/OEM shall only be required to submit the technical comparison between Indian Quality Certifications and the equivalent Foreign Quality Certification mentioned in this document, if any.

Digital Transmission Standards

The following standards or de-facto standards shall apply to the digital transmission system:

No.	Item	Standards
1.	BER/CER/DER	ISO/IEC 8825-1:1995 Information technology - ASN.1 encoding rule - Part 2: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)
2.	Ethernet	8802-3:1995(ISO/IEC) [ANSI/IEEE Std 802.3, 1995 Edition] Information technology -- Telecommunications and information exchange between systems -- Local and metropolitan area networks -- Specific requirement -- Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications. 8802-3:1996(ISO/IEC) [ANSI/IEEE Std 802.3, 1996 Edition] Information technology -- Telecommunications and information exchange between system -- Local and Metropolitan area networks -- Specific requirement -- Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications. EIA/TIA568B (AT and T-258A) Commercial Building Telecommunications Wiring Standard, 1991

No.	Item	Standards
3.	Fast Ethernet	IEEE 802.3u-1995 IEEE Standards for Local and metropolitan area networks: Supplement to Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications: Media access control (MAC) Parameters, Physical Layer, Medium Attachment Units, and Repeater for 100Mb/s Operation, Type 100BaseT (Clauses 21-30) (ANSI) EIA/TIA568B (AT and T-258A) Commercial Building Telecommunications Wiring Standard, 1991
4.	FDDI	ANSI X3.166-1989 (R1995) Fibre Distributed Data Interface (FDDI) Physical Layer Medium Dependent (PMD) ANSI X3.148-1988 (R1994) Information Systems - Fibre Distributed Data Interface (FDDI) - Token Ring Physical Layer Protocol (PHY) ANSI X3.139-1987 (R1997) Information Systems - Fibre Distributed Data Interface (FDDI) - Token Ring Media Access Control (MAC) ISO/IEC 9314-3:1990 Information Processing systems - Fibre distributed Data Interface (FDDI) - Part 3: Physical Layer Medium Department (PMD) ISO 9314-2:1989 Information processing systems - Fibre Distributed Data Interface (FDDI) - Part 2: Token Ring Media Access Control (MAC) ISO 9314-1:1989 Information processing systems - Fibre Distributed Data Interface (FDDI) - Part 1: Token Ring Physical Layer Protocol (PHY)
5.	FTP	RFC 959 File Transfer Protocol, J. Postel, J.K. Reynolds, Oct-01-1985
6.	Giga Ethernet	IEEE 802.3ab: Physical coding sublayer (PCS), physical medium attachment (PMA) sublayer and baseband medium, type 1000BASE-T IEEE 802.3z: Media Access Control(MAC) Parameters, Physical Layer, Repeater and Management Parameters for 1000 Mb/s Operation
7.	G.703a	TTC JT-G703-a Leased Line Secondary Rate User-Network Interface Layer1
8.	HTTP	RFC 1945 Hypertext Transfer Protocol -- HTTP/1.0. R. Fielding, H. Frystyk, T. Berners-Lee, May 1996 RFC 2068 Hypertext Transfer Protocol -- HTTP/1.1. R. Fielding, J. Gettys, J. Mogul, H. Frystyk, T. Berners-Lee, January 1997 (Status: PROPOSED

No.	Item	Standards
		STANDARD) RFC 2616 Hypertext Transfer Protocol /1.1 June 1999 RFC 2617 HTTP Authentication: Basic and Digest Access Authentication, June 1999
9.	H.261	ITU-T Recommendation H.261 (1993), Video codec for audio-visual services at p x 64kbit/s
10.	IP	RFC 791 Internet Protocol. J. Postel. Sep-01-1981
11.	I.430	TTC JT-I430 ISDN Basic User-Network Interface Layer1
12.	I.431	TTC JT-I431-a ISDN Primary-Rate User-Network Interface Layer1
13.	MPEG 2	ISO/IEC 13818-1:1996 Information technology - Generic coding of moving pictures and associated audio information: Systems ISO/IEC 13818-2:1996 Information technology - Generic coding of moving pictures and associated audio information: Video ISO/IEC 13818-3:1998 Information technology - Generic coding of moving pictures and associated audio information - Part 3: Audio ITU-T Recommendation H.222.0(07/95) - Information technology - Generic of moving pictures and associated audio information: Systems ITU-T Recommendation H.262(07/95) - Information technology - Generic of moving pictures and associated audio information: Video
14.	MPEG 4	ISO/IEC 14496-1:2010 Information technology – Coding of audio-visual objects – Part 1: Systems ISO/IEC 14496-2:2004 Information technology – Coding of audio-visual objects – Part 2: Visual IEC 14496-3:2009 Information technology – Coding of audio-visual objects – Part 3: Audio
15.	PER	ISO/IEC 8825-2:1996 Information technology - ASN.1 encoding rule - Part 2: Specification of Packed Encoding Rules (PER)
16.	PPP	RFC 1661 The Point-to-Point Protocol (PPP), W. Simpson, July 1994

No.	Item	Standards
17.	SNMP	RFC 1157 Simple Network Management Protocol (SNMP), J.D. Case, M. Fedor, M.L. Schoffstall, C. Davin, May-01-1990
18.	TCP	RFC 793 Transmission Control Protocol. J. Postel. Sep-01-1981
19.	TFTP	RFC 1350 The TFTP Protocol (Revision 2), K. Sollins, July 1992
20.	UDP	RFC 768 User Datagram Protocol. J. Postel. Aug-28-1980
21.	V.24/V.28	ITU-T Recommendation V.24(10/96) - List of definitions for interchange circuits between data terminal equipment (DTE) and data circuit - terminating equipment (DCE) ITU-T Recommendation V.28(03/93) - Electrical characteristics for unbalanced double - current interchange circuits
22.	X.21	ITU-T Recommendation X.21(09/92) - Interface between Data Terminal Equipment Data Circuit - terminating Equipment for synchronous operation on public data network

3 Bid Evaluation Methodology

3.1 Overall Methodology

Bidder submissions will be evaluated based on Quality and Cost-Based Selection (QCBS). All bidders must meet the requirements specified in the 'Eligibility Criteria'.

The Bidder scoring the highest in the combined score (based on Technical and Financial bids) shall be selected as the System Integrator. The Bidder with the second highest score shall be kept in reserve and may be invited to match the Bid submitted by the highest Bidder, in case the highest-scoring Bidder withdraws or is not selected for any reason. If the second highest scoring Bidder does not match the Bid of the highest-scoring Bidder, the Authority may, in its discretion, invite fresh bids.

The Successful Bidder shall be intimated by MoRTH through Letter of Award (LoA). Upon issue of LoA, the Successful Bidder shall be required to furnish Letter of Acceptance and Performance Security and other guarantees as prescribed in the RFP document. MoRTH shall have the right to get the bank guarantees verified from the respective issuing bank. Upon receipt of verification, the successful bidder shall be invited to sign the contract with MoRTH.

MoRTH reserves the right to reject any bid which is non-responsive and no request for alteration, modification, substitution, or withdrawal shall be entertained by MoRTH in respect of such bids.

3.2 Bid Opening

- Step 1: The Bidder's relevant submissions will be checked to establish qualification against the "Eligibility" criteria defined herein (Section 3.5)
- Step 2: Those Bidders who qualify in the Eligibility criteria, will have their Technical Proposal opened for "Technical Evaluation". If a bidder fails to comply with any requirements in the Eligibility criteria, it will lead to the rejection of the bid.
- Step 3: Those Bidders who qualify in the Eligibility criteria, will have their Financial Proposal opened for "Financial Evaluation".
- Step 4: The bidder submissions will be evaluated based on Quality and Cost-Based Selection (QCBS) where Technical and Financial will be given a weightage of 70 and 30 percent respectively.

3.3 Bid Evaluation Committee

The Bid Evaluation Committee shall oversee the bid evaluation process and submit its recommendation to MoRTH whose decision shall be final.

3.4 Bid composition

1. PART 1 – Eligibility Proposal
    a. Eligibility Proposal comprising various prescribed formats need to be submitted by the Bidders.
2. PART 2 - Technical Proposal
    a. Technical Bid comprising various formats which will be prescribed need to be submitted by the Bidders.
    b. The Bidder shall describe the proposed works in sufficient detail in his Technical Proposal to enable the Bid Evaluation Committee to evaluate the technical adequacy of the proposed system.
    c. The Bidder shall propose and describe in detail in his Technical Proposal the approach, methodology, technology, and procedure of the detailed design of the Traffic Incident Management System (TIMS) and associated works.
3. PART 3 – Financial Proposal
    a. The bidder shall submit the financial proposal with the total bid amount across capital expenditure and O&M stages (including operating costs to be accounted for equipment & manpower from the date of planned go-live for each phase till the end of the contract period).
    b. The proposal should include all the charges payable in full compliance to the Scope of Work and other terms specified in the RFP document. No additional payments whatsoever are envisaged.
    c. The proposal should include all statutory taxes/ levies / surcharge on tax etc. but exclude GST (as applicable on services).
    d. Under this stage, the financial proposal of such firms as selected above shall be opened and evaluated (Refer Format F-1: Format for Financial Bid Submission).
4. PART 4 – Evaluation
    a. The weightage of Technical and Financial score shall be 70% & 30% respectively. The final selection of the firm shall be based on the highest combined score of Technical and Financial Proposal.
    b. The lowest evaluated Financial Proposal (Fm) is given the maximum financial score (Sf) of 100. The formula for determining the financial scores (Sf) of all other Proposals is calculated as following: Sf = 100 x Fm/ F, in which “Sf” is the financial score, “Fm” is the lowest price, and “F” the price `of the proposal under consideration.
    c. The weights given to the Technical (T) and Financial (P) Proposals are: T = 70%, P = 30%

d. Proposals are ranked according to their combined technical (St) and financial (Sf) scores using the weights (T = the weight given to the Technical Proposal; P = the weight given to the Financial Proposal; T + P = 1) as following: S = St x T% + Sf x P%.

3.5 Eligibility Criteria

S. No.	Criteria	Document proof
1.	The Bidder/Lead Bidder of JV/ Consortium shall be a registered company in India and should be in the field of System Integration / Information Technology / Electronics/ Communication Technology for at least 5 years (prior to the date of bid submission).	• Copy of certificate of Incorporation, MOA & AOA for Companies and form T-2 Brief information about the Bidder(s) • Power of Attorney to the Authorized Signatory (as per the format provided in Form T-3)
2.	**Joint venture**: A Joint Venture (JV)/ Consortium is permissible subject to fulfilling the following conditions: **i.** maximum number of members in the JV or Consortium shall be two; **ii.** the parties in a JV or Consortium shall be jointly and severally liable; iii. members of the JV/ Consortium shall nominate one member as the lead bidder (the "Lead Bidder"), who shall have at least 51% (fifty one percent) stake in the JV/ Consortium. The nomination(s) shall be supported by a Power of Attorney (as per the format provided in Form T-4) iv. the Lead Bidder, shall be the technology/ solution provider firm/ system integrator company amongst the parties in JV/ Consortium and shall	• In case of consortium, MoU signed by both the parties • Joint Bidding Agreement signed by both the parties • Power of Attorney to the Lead Bidder (as per the format provided in Form T-4)

S. No.	Criteria	Document proof
	fulfill eligibility condition of minimum 5 years of experience; v. the Bid should include a brief description of the roles and responsibilities of individual members, particularly with reference to financial, technical and O&M obligations. vi. an individual Bidder cannot at the same time be member of a JV/ Consortium replying to the RFP. Further, a member of a particular JV/ Consortium cannot be member of any other JV/ Consortium replying to the RFP. **vii.** members of the JV/ Consortium shall enter into a binding Joint Bidding Agreement for the purpose of submitting a Bid. viii. the technical and financial eligibility/ experience of any partner of JV or Consortium shall be considered only if the partner is proposed to have at least twenty-six percent (26%) stakes in the JV/ Consortium.	
3.	The Bidder must have an average annual Turnover (TO) from Systems Integration /IT/ItES/ICT Services in last 3 financial years (FY 2020-21, 2021-22 and 2022-23) not less than INR 40 Cr. In case of a JV/ Consortium, the weighted combined Turnover of each partner of JV or Consortium shall be considered in proportion to their stakes in the JV/ Consortium in order to meet the minimum aggregate requirements of	• Turnover Certificate from statutory auditor clearly specifying the Average Annual Turnover of the Bidder for the specified years (as per the format provided in Form T-6)

S. No.	Criteria	Document proof
	those members, who have at least 26% (twenty six per cent) stake in the JV/ Consortium	
4.	The Bidder must have a net worth not less than INR 10 Cr in the financial year (FY 2022-23) immediately preceding the Bid due date For the purpose of this RFP, net worth shall mean the aggregate value of the paid-up share capital and all reserves created out of the profits and securities premium account, after deducting the aggregate value of the accumulated losses, deferred expenditure and miscellaneous expenditure not written off, as per the audited balance sheet, but does not include reserves created out of revaluation of assets, write back of depreciation and amalgamation. In case of a JV/ Consortium, the weighted combined net worth of each partner of the JV or Consortium shall be considered in proportion to their stakes in the JV/ Consortium in order to meet the minimum aggregate requirements of those members, who have at least 26% (twenty-six per cent) stake in the JV/ Consortium. Provided that each member of the Consortium shall have a positive Net Worth in the financial year (FY 2022-23) immediately preceding the Bid due date.	• Net Worth Certificate from statutory auditor clearly specifying the Net Worth of the Bidder for the specified year (as per the format provided in Form T-6)
5.	The Bidder/ Lead Bidder of JV/ Consortium should have experience of implementation and maintenance of at least 1 ‘Similar Project’ In case of a JV/ Consortium, the requirement for 1 'Similar Project' can be fulfilled by any one or all JV/Consortium members combined who have at least 26% (twenty-six per cent)	• Copy of Work Order & Work Completion certificate of the project from respective client clearly stating the scope, current status (percentage completion), System Stability Status and the contact details of the authority. Project cost should be

S. No.	Criteria	Document proof
	stake in the JV/ Consortium.	mentioned clearly. • The format for exhibiting past experience should be used as prescribed in the Annexure of the RFP (as per the format provided in Form T-5)
6.	As on last date of submission of the proposal, the Bidder/all members of JV/ Consortium shall have not been blacklisted by Central/State Government/PSU entity in India or similar agencies globally for unsatisfactory past performance, corrupt, fraudulent or any other unethical business practices.	• Self-declaration to this effect shall be submitted as part of the Bid by the Bidder/ All members of the JV/ Consortium (as per the format provided in Form T-1).
7.	A Bidder determined non-performing or having been terminated any project during last five years by Ministry of Road Transport & Highways, Government of India or its executing agencies like NHAI, NHIDCL etc. or any other Ministry / PSU / State / Central Government or its Department/ Enforcement agencies/ Autonomous Body etc. will not be eligible to participate in this RFP.	• Self-declaration to this effect shall be submitted as part of the Bid (as per the format provided in Form T-1).
8.	Lead Bidder should be CMMI Level 3, ISO 9001	• Bidder to enclose copy of proof
9.	List of Proposed sub-contractors (if applicable)	• List of proposed subcontractors (if applicable) as per format provided in T-12 • Undertaking from sub-contractor as per format provided in T-13

Special Instructions for OEMS/ Bidders		
1.	Bidder / OEMs of equipment, Hardware and Software (proposed to be supplied for this tender) to ensure that OEMs must be genuine and as per definition below: 1. OEM should have designed the offered product and hold the IPR of technology being deployed for the offered model(s) as per the DOT Notification dated 29 August 2018 and as per notifications below: a. Department of Industrial Policy & Promotion (DIPP) Order No. P-45021/2/2017-B.E.-II dated 15.06.2017 b. Department of Industrial Policy & Promotion (DIPP) Order No. P-45021/2/2017-PP (BE-II) dated 28.05.2018 Additionally, OEMs must comply with DPIIT Order no. P-45021/2/2017-PP (BE-II) dated 16.09.2020. 2. Further, OEMs of equipment, Hardware, Software and Firmware (proposed to be supplied for this tender) own the Intellectual Property Rights of Hardware and "Source Code" of Firmware & Software (including Cameras/NVR), and that they are actual manufacturers, and are not getting any 3rd party manufacturing done e.g., branding & reselling in India through importing/ trading from a country that shares a Land Border with India. 3. OEMs to submit an affidavit that they own the source code of the Software and Firmware being supplied for all the relevant equipment being supplied against this tender and does not reside in any Country that shared a Land Border with India. 4. OEMs are not suspended by ONVIF even though the products of the OEMs may still appear on the ONVIF website. 5. Equipment, like Cameras etc., shall not be installed with standards like - GB28181, GB/T28181-2011, GB/T 28181-2011, GBT 28181-2011, GBT28181-2011, GB/T28181-2016, etc., protocols/standards and there	• Bidder to submit as per format given in Annexure Form T-9

	shall be no option in the camera web page/settings to activate or deactivate such protocols/standards any of their version(s) or any such protocol which allow certain organizations to bypass all security parameters and look into the devices directly. 6. The offered cameras should not support or have H.265+, H.265++ or H.265X compression (Compression from any country sharing land border with India). The bid will be immediately rejected. 7. Deleted. 8. The OEM of CCTV cameras/NVR selected, should have the MAC addresses (of all makes and models of IP CCTV quoted for this tender) registered in the name of the OEM. The MAC address should not be in the name of any 3rd party.	
2.	Bidders while selecting OEMs of equipment, Hardware and Software (proposed to be supplied for this tender) to ensure that OEMs Must NOT be Blacklisted/Delisted/Debarred with any Government Entity in India or any other Country.	• Submit as per format given in Annexure Form T-10
3.	Deleted	• Deleted
4.	Information on Sensitive Technology PPP-MII Order (Public Procurement No. 4) issued vide F.7/10/2021-PPD dated 23.02.2023 1. Any bidder from a country which shares a land border with India will be eligible to bid in any procurement whether of goods, services (including consultancy services and non-consultancy services) or works (including turnkey projects) only if the bidder is registered with the Registration Committee constituted by DPIIT (under Order Public Procurement No.1). Further, any bidder (including bidder from India) having specified Transfer of Technology (ToT) arrangement with an entity from a country which	• Submit as per format given in Annexure Form T-14

shares a land border with India, shall also require to be registered with the Registration Committee constituted by DPIIT (under Order Public Procurement No.1).

2. "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.

3. "Bidder (or entity) from a country which shares a land border with India" for the purpose of this Order means:

    a. An entity incorporated, established or registered in such a country; or

    b. A subsidiary of an entity incorporated, established or registered in such a country; or

    c. An entity substantially controlled through entities incorporated, established or registered in such a country; or

    d. An entity whose beneficial owner is situated in such a country; or

    e. An Indian (or other) agent of such an entity; or

    f. A natural person who is a citizen of such a country; or

    g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above

4. The beneficial owner for the purpose of 3 above will be as under:

a. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.

Explanation-

i. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent. of shares or capital or profits of the company;

ii. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements;

b. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;

c. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals;

d. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;

	e. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership. 5. An Agent is a person employed to do any act for another, or to represent another in dealings with third person. 6. The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Registration Committee constituted by DPIIT (under Order Public Procurement No.1). 7. The registration shall be valid at the time of submission of bid and at the time of acceptance of bid. 8. If the bidder was validly registered at the time of acceptance/ placement of order, registration shall not be a relevant consideration during contract execution	
5	1. The provisions of the revised "Public Procurement (Preference to Make in India), Order 2017", dated 16.09.2020 (and subsequent amendments, if any, till opening of the tender) by Department of Industrial Policy and Promotion, Government of India shall apply to this tender to the extent feasible. The criteria for Capability (verifiable evidence that they have manufacturing capability to manufacture the specified quantity and supply the same with in stipulated time period), Equipment and Manufacturing facilities as well as net worth under the financial standing eligibility criteria shall be applicable to local suppliers also.	• Self-Certification by the OEM

	2. Bidders seeking Purchase preference for this tender shall submit the documents/ declarations etc. as per latest DIPP guidelines and the applicable/associated latest letters if any till date of opening of the bid. 3. As per clause no. 3 (b) of the PPP-MII Order dated 16.09.2020, only bidders offering minimum 20% of local content of supply portion of their offered bid (Class-I Local suppliers/bidders - minimum 50% LC and Class-II Local Suppliers/bidders- minimum 20% LC as per PPP-MII Order) are eligible to participate in this tender. Bid of bidders offering less than 20% local content of supply portion of their offered bid will be SUMMARILY REJECTED. 4. As per DPIIT's OM dated 4th March 2021, services such as transportation, insurance, installation, commissioning, training and after sales service support like AMC/CMC etc. can't be claimed as local value addition. 5. The necessary documentation for items being declared to be Local shall be as per the stipulated guidelines as laid down in above mentioned policy letters and to be signed by the Bidder's Statutory Auditor/Cost Auditor	
6	All bidders to submit the MTBF report for all type of cameras for minimum 1,00,000 Hrs @ 40 Degrees, Celsius for VSS as per Telcordia Issue 3, Quality factor method Level-I Case 3 with following minimum details: 1. Calculation Background 2. Lifespan Prediction 3. Board MTBF calculation Results 4. Unit and Set Level MTBF Calculation Results 5. Unit and Set Level B10 MTBF Calculation Results	• OEM shall submit complete and detailed test reports issued from Govt. / NABL Accredited Test Labs/Internationally Accredited Test Labs such as UL/TUV

	6. Defection Prediction using MTBF Mean Time Between Failure (MTBF) should be calculated at 40°C for each type of camera should not be less than 1,00,000 hours	
7	Integrity pact should be submitted by the Bidder/Lead Bidder of JV/Consortium (on a separate plain paper) with the Bid duly signed by authorized signatory of the Bidder	• Submit as per format given in Annexure Form T-15

Note:

1. Definition of 'Similar Project':

   Establishment of state-of-the-art Incident Detection System / TIMS with at least 1 Traffic Management Centre/ Integrated Command and Control Centre with 24x7 CCTV based Surveillance involving at least 100+ Cameras that have been satisfactorily completed within last five years as a prime System Integrator (single entity of JV member) under PSUs / Central Government or its Department/ State Government/ Enforcement agencies/ Autonomous Body etc. and at least 2 of the following Key activities have been deployed on the project:

   a. Traffic Monitoring Camera/Radar System
   b. CCTV Surveillance system with motion detection
   c. Video based Incident / Violation Detection System
   d. Vehicle speed Detection System (VSDS)
   e. Control and command Room

2. Deleted.
3. The tender is governed by Government of India (GOI) Rules and Regulations like General Financial Rules (GFR), DPIIT Policies etc. Bidders to ensure all GOI guidelines are followed. Bidders while selecting OEMs of equipments, Hardware and Software (proposed to be supplied for this tender) are to ascertain the documents submitted by OEMs carefully as they shall be held accountable for submitting any False Claims/Representations made by ANY OEMs of equipment, Hardware and Software (proposed to be supplied for this tender) as per GOI guidelines. Bidders to read the entire GFR of GOI carefully, especially compliance to Rule 144 (with latest addition of point (xi)), Rule 151 and Rule 175 must be complied to.
4. Deleted.
5. The Authority prefers that the Bidder quote only one make and model for each component in the Technical Bid.

6. All communication between devices should be done on TLS/SSL
7. To ensure security of VSS (Camera & Software) from vulnerabilities & breaches and discourage false undertaking from OEMs, security auditing and testing of equipment including source code of camera and software shall be carried out from STQC (Ministry of Electronics & Information Technology) or any other Agency from the list of CERT-In empanelled Information Security Auditing Organization. In order to ensure security of network and other IT equipment of VSS system, before bulk supply and installation, purchaser should ensure that security auditing and testing at the time of POC (Proof of Concept) as well as at the time of completion of project are conducted or as specified by the purchaser. In case any security breach is found in the system at any stage including at POC level, immediate strict penal action is to be initiated by the purchaser.
    a. All Cameras should be minimum OWASP L2 Appendix "C" Compliant before supply of equipment
    b. All software's should be OWASP Top 10 Compliant before supply of equipment
    c. Deleted

3.6 Technical Criteria

#	Performance Area	Max. Points	Scoring Criteria
A.	**Experience & Size**	**45 points**	
1	Years of experience in System Integration/ Information Technology / Electronics / Communication Technology (prior to the date of bid submission).	20 points	10 points for 5 years 2 additional point for every additional year of experience above 5 years up to a max. of 20 points
2	No. of 'Similar Projects' implemented in Information Technology / Electronics / Communication Technology (prior to the date of bid submission) for the Bidder / The Lead Bidder (in case of JV/consortium)	25 points	10 points for 1 project +2.5 additional points for every additional project implemented above 1 project up to a max. of 25 points
B.	**Command Center and Analytics Experience**	**25 points**	

#	Performance Area	Max. Points	Scoring Criteria
1	Integrated Command and Control Center with Surveillance Camera Integrations with min. 100+ cameras each	25 points	10 points for 1 project +2.5 additional points for every additional project above 1 project subject to a max. of 25 points
C.	**Procurement and Standards**	**10 points**	
1	Manufacturing of equipment proposed for TIMS (as per DPIIT Order no. P-45021/2/2017-PP (BE-II) dated 16.09.2020 (revised "Public Procurement (Preference to Make in India) Order 2017")	4 points	4 points for Class-I Local supplier 2 points for Class-II Local supplier 0 points for Non-Local Supplier
2	CMMI Standards Level	3 points	3 points for CMMI Level 5 2 points for CMMI Level 4 1 point for CMMI Level 3 0 points for lower than CMMI Level 3
3	OWASP "Appendix C" compliant Cameras (Internet of Things)	3 points	3 points for OWASP Level 3 2 points for OWASP Level 2 0 points for compliance below Level 2
D.	**Key Personnel Profile**	**10 points**	
1	Evaluation for Project Lead who will look after implementation of the scope for the System Integrator • Experience in similar capacity / broad sector – 50% • Experience in relevant to TOR / Project – 50% *(Submission as per format given in Annexure Form T-16)*	10 points	1. Experience in sector (Max. 5 points) • 5 points for 10 years+ • 4 points for 5 years+ • 3 point for 3 years+ 2. Experience in the implementation of TIMS/ Integrated Command and Control Centre in smart city/safe city/city surveillance projects

#	Performance Area	Max. Points	Scoring Criteria
			(Max. 5 points) • 2 points for 2 projects • 1 additional point for every additional project for a maximum of 5 points
E.	**Presentation / Technical Demo**	**10 points**	
1	Technical Presentation and/or Demo for Proof of Concept *(In addition to submission as per format given in Annexure Form T-7)*	10 points	Based on technical presentation

Note:

1. Definition of 'Similar Projects':

Establishment of state-of-the-art Incident Detection System / TIMS with at least 1 Traffic Management Centre/ Integrated Command and Control Centre with 24x7 CCTV based Surveillance involving at least 100+ Cameras that have been satisfactorily completed within last five years as a prime System Integrator (single entity of JV member) under PSUs / Central Government or its Department/ State Government/ Enforcement agencies/ Autonomous Body etc. and at least 2 of the following Key activities have been deployed on the project

   a. Traffic Monitoring Camera/Radar System
   b. CCTV Surveillance system with motion detection
   c. Video based Incident / Violation Detection System
   d. Vehicle Speed Detection System (VSDS)
   e. Control and command Room

2. Bidder should submit relevant details of each project in the prescribed format in the annexure and should enclose Go-live / acceptance / completion Certificate issued by the customer and Work Order / Purchase order / Copy of contract / Letter of Award highlighting detailed scope of project implemented.
3. Any change / termination for the Project Lead for the System Integrator shall be with due approval and discussion with the Governance committee. In such a case where a change

occurs, profiles of the Project Lead will be evaluated basis the technical specification criteria scope of this RFP and appointed after due approval from MoRTH.

4. For documents to be submitted as proof for technical criteria scoring in Section 3.6, the bidder should refer to documents proof listed in Section 3.5 for eligibility criteria and other relevant sections of the RFP.
5. The technical and financial eligibility/ experience of any partner of JV or Consortium shall be considered only if the partner is proposed to have at least twenty-six percent (26%) stakes in the JV/ Consortium.
6. The minimum technical score to qualify for evaluation of financial proposal is 75% marks out of a total of 100 marks.

4 Project Deliverables

4.1 Project Timelines

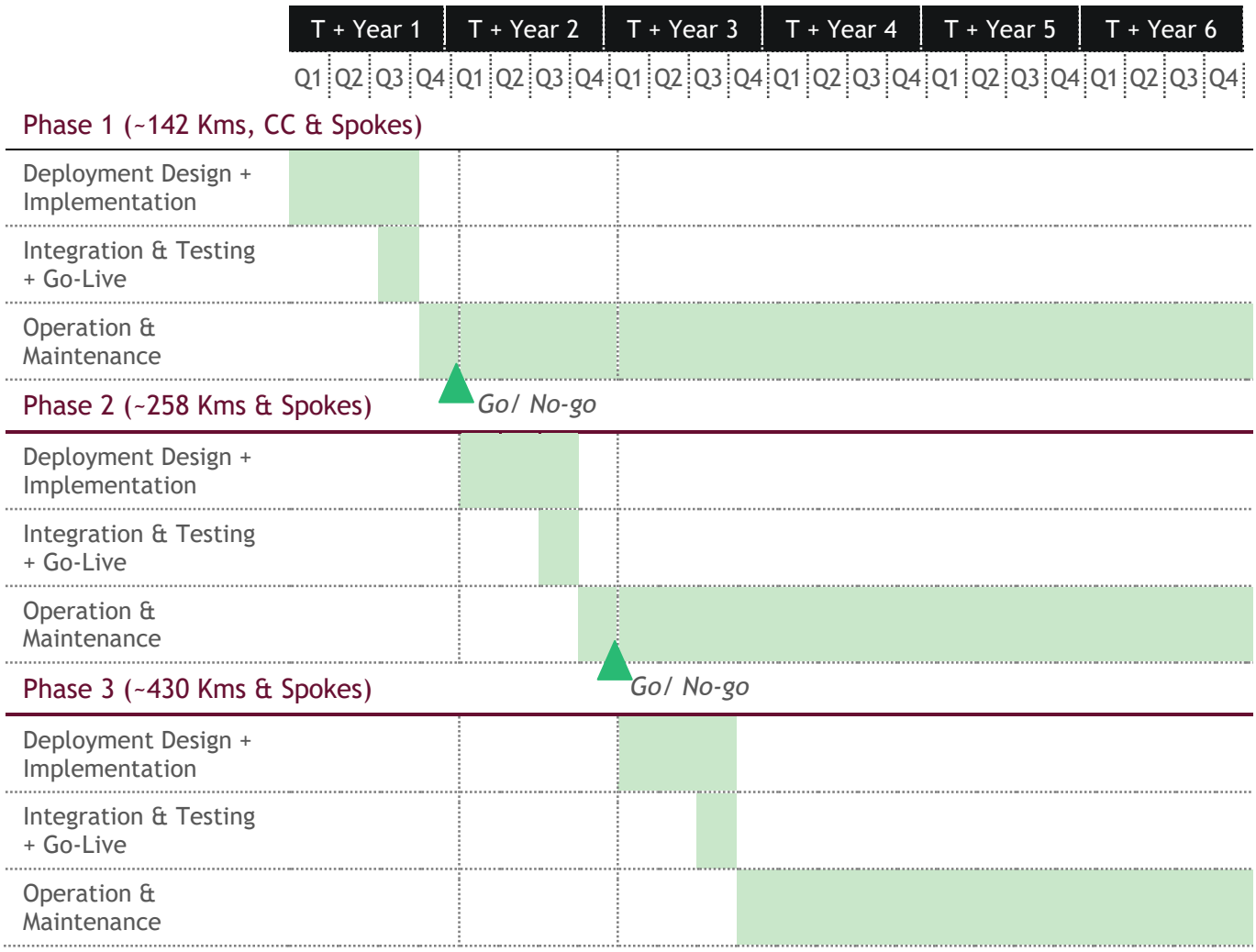
The timeline for phase-wise implementation with end dates for each milestone is as follows (T = selection of System Integrator) –

- Phase 1 –
  - Capex: Deployment Design + Implementation: T + 9 months
  - Integration & Testing + Go-Live: T + 9 months
  - Operation & Maintenance: Till T + 72 months

  Decision for go-ahead for Phase-2 to be taken at T + 12 months
- Phase 2 –
  - Capex: Deployment Design + Implementation: T + 21 months
  - Integration & Testing + Go-Live: T + 21 months
  - Operation & Maintenance: Till T + 72 months

  Decision for go-ahead for Phase-3 to be taken at T + 24 months
- Phase 3 –
  - Capex: Deployment Design + Implementation: T + 33 months
  - Integration & Testing + Go-Live: T + 33 months
  - Operation & Maintenance: Till T + 72 months

The final timelines for implementation, the share of phase-wise works and the go-ahead for Phase 2 and Phase 3 shall be approved by the Governance and Steering Committee.

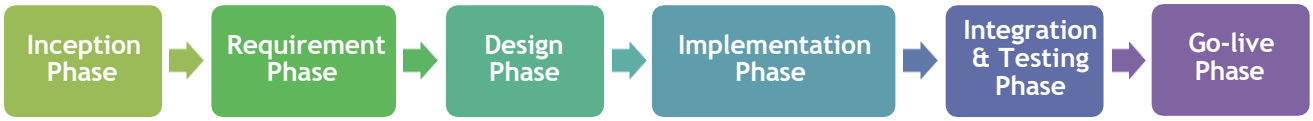


Note:

- Deployment design phase consists of inception, requirement, and design phase as detailed in Section 4.2
- Implementation phase involves hardware and software deployments for TIMS
- Integration & Testing phase involves integrating with existing and future proposed ICT
- Go-Live phase consists of go-live of the entire system phase along with the detailed reports
- Operation & Maintenance phase consists of operating and maintaining all components of the TIMS system

4.2 Project Implementation Phase and Key Deliverables

Complete Traffic Incident Management system shall be implemented in following phases and SI must follow following implementation cycle.



4.2.1 Inception Phase

Once contract is awarded to SI and agreement signed, SI shall mobilize the team proposed for the project and will ensure that project inception report is prepared comprising the following.

- Project Concept and Understanding
- Detailed Project Plan
- Approach & Methodology adopted for implementation of the project substantiating the approach mentioned in technical proposal
- Define project governance plan
- Resource planning and availability of resources during the project implementation period as well as during O&M phase onsite and offshore.
- Highlight the milestone and associated risks
- Measure project deadlines and performance objective
- Prepare project status reporting template in consultation with MORTH and frequency of report sharing including Milestones as per RFP/agreement, milestone achieved, plan for next reporting cycle, dependencies if any, issues/concerns etc.

4.2.2 Requirement Phase

SI will perform the detailed assessment of the business requirements and IT Solution requirements as mentioned in this RFP. Based on the understanding and its own individual assessment, SI shall develop & finalize the Functional/System Requirement Specifications (FRS/SRS) in consultation with MoRTH and its representatives.

SI shall perform at-least minimum activities as mentioned below during requirement phase:

- SI shall conduct a As-Is study of the existing infrastructure to establish the key performance indicators (KPI) of the TIMS project. The KPIs of the study shall be included in the FRS report

- Prior to starting the site clearance, SI shall carry out survey of field locations as determined by MoRTH
- SI shall directly interact with electricity boards for provision of mains power supply at all desired locations for field solution. MoRTH shall facilitate the same.

4.2.3 Design Phase

SI shall design & build the solution as per the indicative locations identified and mentioned in RFP. The SI shall review and verify these on-ground during the Deployment Design phases and align final locations with TIMS PMU. The solution proposed by SI should comply with the design considerations mentioned in the RFP. The SI should ensure that the Command Centers have the capability to scale up with additional implementations of TMCS, AIDS and the other systems mentioned in the detailed Functional Requirement and Indicative Technical Specifications section. Further, the software/dashboard deployed at the Command Centers should be integrated with the relevant existing (and upcoming) dashboards and data sources with the Uttarakhand Government including disaster monitoring by Uttarakhand State Disaster Management Authority, flood monitoring by Central Water Commission, weather monitoring by Indian Meteorological Department, earthquake and landslide monitoring etc. SI shall submit all layout and designs document to TIMS PMU and Operating Committee before start of any work at TIMS. The same shall be approved by the TIMS PMU and Operating Committee. The TIMS PMU shall also approve the camera locations proposed by the System Integrator and the quality of video feed before deployment of the system.

4.2.4 Implementation Phase

SI shall carefully consider the scope of work and provide a solution that best meets the project's requirements. Considering the scope set in this RFP, SI shall carefully consider the solutions it proposes and explicitly mention the same in the technical proposal. The implementation of the application software and hardware will follow the procedure mentioned below:

- SI shall be responsible for supplying the application and license of related software products and installing them to meet the project requirement
- SI shall have provision for procurement of licenses in a staggered manner as per the actual requirement of the project
- SI shall perform periodic audits to measure license compliance against the number of valid End User software licenses consistent with the terms and conditions of license agreements, volume purchase agreements, and other mutually agreed upon licensed software terms and conditions. SI shall report any exceptions to license terms and conditions at the right time to MoRTH. However, the responsibility of license compliance solely lies with SI. Any financial penalty imposed on MoRTH during the contract period due to license noncompliance shall be borne by SI

- SI shall also supply any other tools & accessories required to make the integrated solution complete as per requirements. These shall include but not be limited to:
    - Software & Licenses
    - Supply tools, accessories, documentation and provide a list of the same. Tools and accessories shall be part of the solution
    - System Documentation: System Documentation both in hard copy and soft copy to be supplied along with licenses. Documentation to be maintained, updated and submitted to MoRTH regularly. The documentation shall include but not limited to following.
        - Functional Requirement Specification (FRS)
        - High level design of whole system
        - Low Level design for whole system/Module design level
        - System Requirements Specifications (SRS)
        - Any other explanatory notes about system
        - Traceability matrix
        - Technical and product related manuals
        - Installation guides
        - User manuals
        - System administrator manuals
        - Toolkit guides and troubleshooting guides
        - Other documents as prescribed by MoRTH
        - Quality assurance procedures
        - Change management histories
        - Version control data
        - SOPs, procedures, policies, processes, etc. developed for MoRTH
        - SI shall maintain and handover document related to software programs as well as programs.
            - Any customized code developed for TIMS
            - Maintain Version control
            - Will maintain all version of releases and shall submit release note
            - Detailed Test methodology document
            - Module level testing

- Overall System Testing
- Acceptance test cases
- Must have explanatory notes linked with each software for detailed understanding

4.2.5 Integration & Testing Phase

The Hub and Other Command Centers must be integrated with all existing ICT systems or software applications implemented, and also be modular to be able to integrate with any proposed ICT systems/ software applications that may be proposed during the term of the SI. Requisite support for all integrations with other systems shall be extended by the State Government and MoRTH to the selected SI. SI shall provide the testing strategy, including traceability matrix, test cases and shall conduct the testing of various components of the software developed/ customized and the solution as a whole. The testing should be comprehensive and should be done at each stage of implementation and integration.

4.2.6 Go-live Phase

SI shall prepare and agree with MoRTH, the detailed plan for Go-Live (in-line with MoRTH implementation plan as mentioned in RFP).

- SI shall define the criteria for Go-Live of Command Center and its components in consultation and agreement with MoRTH through the TIMS PMU and the Operating Committee
- SI shall submit signed-off UAT report (issue closure report) ensuring all issues raised during UAT are being resolved prior to Go-Live
- SI shall ensure that Go-Live criteria for TIMS and other application/component as mentioned in User acceptance testing of Project is met and SI needs to take approval from MoRTH on the same through the TIMS PMU and the Operating Committee
- Go-live of the TIMS and its components shall be done as per the finalized and agreed Go-Live plan

4.2.7 Operation & Maintenance Phase

SI will operate and maintain all the components of the TIMS System through to the end of the contract period. During O&M phase, SI shall ensure that service levels are monitored on continuous basis; service levels are met and are reported to MoRTH. After Go-Live, if any system/sub-system/appliance that is deployed during the O&M phase must be added in the System only after proper induction procedures are followed including hardening and security testing.

Every process and procedure implemented in this project must be reviewed and updated by SI at least on annual basis from the Go-Live Date. All the manpower engaged for O&M support of the

project should be citizens of India. SI will ensure that, in any circumstances, no data of TIMS System be ported outside the geographical limits of the country.

5 Governance Structure

MoRTH shall appoint a Project Management Unit (PMU) with a dedicated Project Manager to oversee the design, implementation and operation of the project. Further, a Governance and Steering Committee will be formed with the key senior level stakeholders in the Incident Response System in Uttarakhand and an Operating Committee will be formed for the day-to-day management of the TIMS. The members of the two committees will be as follows –

- Governance & Steering Committee
  - MoRTH Secretary – Chair
  - Uttarakhand Chief Secretary - Co-Chair
  - MoRTH DG (RD) & SS / ADG
  - Secretaries of Uttarakhand State Depts – Transport, PWD, Traffic Police, USDMA, Health, Tourism
  - MoRTH – JS (Highways) – Convenor
  - ADG/ CE, BRO
  - MoRTH – CE (Project Zone)
  - MoRTH – TIMS Project Manager (PM)
  - Any other experts/ dept./ entity as specified by MoRTH for inclusion
- Operating Committee
  - CE (Project Zone) – Chair
  - CE (NH), Uttarakhand State PWD
  - CE, BRO (in respective jurisdiction)
  - Nominees of Secy (level of AS/JS/ED/MD) of Uttarakhand State Depts – Transport, Traffic Police, USDMA, Health, Tourism
  - MoRTH – TIMS Project Manager (PM) – Convenor
  - Any other experts/ dept./ entity as specified by MoRTH

The responsibilities of the Project Manager along with the Project Management Unit (PMU) will include -

- **Project Manager** - Oversee entire project and finalize the details of the project with the System Integrator, including but not limited to:
  - Finalizing the design and plan for the TIMS
  - Finalizing the details of the integration required with other Command Centers/Control

Rooms

- Overseeing the day-to-day functioning of the TIMS, and reporting to Governance & Steering Committee

- Project Manager & System Integrator shall coordinate for the following:
  - Alignment on scope and timelines
  - Monthly Progress Reports
  - Approval on adherence to Service Level Requirements
  - Additional requirements during project duration

The System Integrator shall provide the documents and status update to the PMU at all times for the smooth operation of the project as well as for any requirement raised by the Governance committee.

6 Service Level Agreements and Penalties

Service Level Agreement (SLA) shall become part of Agreement between MoRTH and the Successful Bidder. SLA defines the terms of the Successful Bidder's responsibility in ensuring the timely delivery of the deliverables and the correctness of the same based on the agreed Performance Indicators as detailed in this section. The Successful Bidder has to comply with Service Levels requirements to ensure adherence to Project timelines, quality and availability of services.

The Successful Bidder (refer as System Integrator, SI) must supply software/automated tools to monitor all the SLAs mentioned below.

Note: SLAs and Penalties shall not be applicable on the System Integrator for the affected portion and for the affected duration of the project in the following cases:

1. There is a Force Majeure event, as defined in Clause 11.14, affecting the SLAs which is beyond the control of the System Integrator.
2. The non-compliance to the SLAs has been due to other unforeseen events, i.e., theft, vandalism, damage due to accident/mishap, network issues attributable to the ISP (to be determined through investigation by the TIMS PMU and/or Operating Committee) and power shutdown beyond 24 hours. Theft cases and deliberate damage to field devices will be decided on a case-to-case basis by the TIMS PMU and/or Operating Committee.

The SLAs shall not be applicable on the System Integrator for a duration mutually decided upon by the System Integrator, TIMS PMU, and the Operating Committee.

The purpose of this Service Level Agreement (hereinafter referred to as SLA) is to clearly define the levels of service which shall be provided by the System Integrator to MoRTH for the duration of this Agreement.

6.1 Definitions

For the purposes of this service level agreement, the definitions and terms are specified in the contract along with the following terms shall have the meanings set forth below

1. "Uptime" shall mean the time period for the specified services / components with the specified technical service standards are available to the user department. Uptime, in percentage, of any component (Non IT & IT) can be calculated as:

   Uptime = {1- [(Downtime) / (Total Time – Maintenance Time)]} * 100
2. "Downtime" shall mean the time period for which the specified services / components with specified technical and service standards are not available to the user department and excludes downtime owing to Force Majeure & Reasons beyond control of SI.

3. “Instance” refers to any event / abnormalities in the functioning of the Services specified as part of the Scope of Work of the Systems Integrator that may lead to disruption in normal operations of the TIMS System.
4. “Incident” refers to any untoward event on the stretches in the Scope of Work of the System Integrator, including but not limited to accidents (with or without involvement of vehicles e.g., vehicle run-off road, vehicle collision, vehicle flipped, hit by another vehicle, animal hit, vehicle collision with median or shoulder fencing or MBCB or crash barrier, etc.), run-off-road collision, roadblocks, traffic violations such as over-speeding, wrong direction driving, wrong lane driving, dangerous driving (e.g., in a zig-zag manner), natural disasters along the stretches (e.g., landslides), etc.
5. “Resolution Time” shall mean the time taken (after the instance has been reported at the helpdesk), in resolving (diagnosing, troubleshooting and fixing) or escalating (to the second level or to respective vendors, getting the confirmatory details about the same from the vendor and conveying the same to the end user), the services related troubles during the first level escalation.

6.2 Payment calculation based on SLA

The SLA metrics provided specifies performance parameters as baseline performance, lower performance and breach. All SLA calculations will be done on quarterly basis. The SLA also specifies the liquidated damages for lower performance and breach conditions.

Payment to the SI is linked to the compliance with the SLA metrics. The matrix specifies three levels of performance, namely,

1. The SI will get 100% of the Contracted value due for the period (as per the ‘Payment Schedule’ section of the Terms of Reference) if all the baseline performance metrics are complied with and the cumulative credit points are 100
2. The SI will get lesser payment in case of lower performance. (For e.g. if SLA point score is 80 then the SI will get 20% less on the quarterly payment – The formula calculating the deductions is “(100 – SLA Point Score)%”)
3. In case the score falls below 50 for two consecutive quarters, the Authority can invoke the termination clause.
4. If the performance of the Agency in respect of any parameter falls below the prescribed termination trigger (in terms of performance metric for a specified time period), the concerned authority will have the right to invoke the termination clause.

The quarterly payment shall be made after deducting for lower performance as mentioned above. The aforementioned 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 SI and audited by the TIMS PMU and Operating Committee for accuracy and reliability.

MoRTH shall also have the right to conduct, either itself or through any other agency as it may deem fit, an audit / revision of the SLA parameters. The SLAs defined, shall be reviewed by MoRTH on an annual basis and any revision to SLAs shall be after consultation with the SI, TIMS PMU and experts nominated by the Authority.

6.3 SLAs during CAPEX cycle

The pre-implementation SLA will be applicable for each CAPEX cycle (per phase). Timely delivery of deliverables would comprise entire bill of material and the application systems, and as per successful testing of the same.

Service Level Requirement	All the deliverables defined in the contract have to be submitted On-time as per the timelines defined in the 'Timelines' section of the Terms of Reference with no delay.
Measurement of Service Level Parameter	To be measured in Number of weeks of delay from the timelines mentioned in the section "Timelines"
Penalty for non-achievement of SLA Requirement	Any delay in the delivery of the project deliverables (solely attributable to vendor) would attract the following damages – • liquidated damage per week of 0.25% of the CAPEX estimate of contract value of that phase for first 4 weeks and • liquidated damage per week of 0.3% of the CAPEX estimate of contract value of that phase per week for every subsequent week If delay is during Phase-1: Liquidated damages incurred shall be calculated as: • 10% x Contract Value X 0.25% for the first 4 weeks. • 10% X Contract Value X 0.3% for every subsequent week. If delay is during Phase-2: Liquidated damages incurred shall be calculated as: • 17.5% X Contract Value X 0.25% for the first 4 weeks. • 17.5% X Contract Value X 0.3% for every subsequent week. If delay is during Phase-3: Liquidated damages incurred shall be calculated as • 22.5% X Contract Value X 0.25% for the first 4 weeks.

- 22.5% X Contract Value X 0.3% for every subsequent week.

If the liquidated damages during any phase reach 7% of the CAPEX estimate of the contract value of that phase, Authority may invoke the termination clause.

6.4 SLAs during O&M Period

	#	Performance Area	Scoring	Termination Trigger	Measurement Mechanism
A	**System Uptimes**				
A.1	**Camera Systems**				
	1	**Uptime of Traffic Monitoring Camera System**	5 Points for >=98% 2.5 Points for >=95% to <98% 0 Points for <95%	<95% for any two months in a 12-month period	Enterprise Management System with real-time access provided to TIMS Project Management Unit (PMU)/any other specified authority
	2	**Uptime of ANPR Cameras**	5 Points for >=98% 2.5 Points for >=95% to <98% 0 Points for <95%	<95% for any two months in a 12-month period	Enterprise Management System with real-time access provided to TIMS Project Management Unit (PMU)/any other specified authority
	3	**Uptime of Accident and Incident Detection Cameras**	5 Points for >=98% 2.5 Points for >=95% to <98% 0 Points for <95%	<95% for any two months in a 12-month period	Enterprise Management System with real-time access provided to TIMS Project Management Unit (PMU)/any other specified authority
A.2	**Command Center Software & Equipment**				
	1	**Overall application availability at Command Centers**	5 Points for >=99% 2.5 Points for >=95% to <99% 0 Points for <95%	<95% for any two months in a 12-month period	Enterprise Management System with real-time access provided to TIMS Project Management Unit (PMU)/any other specified authority

#	Performance Area	Scoring	Termination Trigger	Measurement Mechanism
2	**Overall application availability at all 'Spoke' locations**	5 Points for >=99% 2.5 Points for >=95% to <99% 0 Points for <95%	<95% for any two months in a 12-month period	Enterprise Management System with real-time access provided to TIMS Project Management Unit (PMU)/any other specified authority
3	**Videowall System** at Command Centers and Spoke Locations	5 Points for >=99% 2.5 Points for >=95% to <99% 0 Points for <95%	<95% for any two months in a 12-month period	Enterprise Management System with real-time access provided to TIMS Project Management Unit (PMU)/any other specified authority
4	**Monitoring workstations** at Command Centers and Spoke Locations	5 Points for >=99% 2.5 Points for >=95% to <99% 0 Points for <95%	<95% for any two months in a 12-month period	Enterprise Management System with real-time access provided to TIMS Project Management Unit (PMU)/any other specified authority
A.3 Server and Storage system Uptime				
1	**Server Uptime**	5 Points for >=99% 2.5 Points for >=95% to <99% 0 Points for <95%	<95% for any two months in a 12-month period	Enterprise Management System with real-time access provided to TIMS Project Management Unit (PMU)/any other specified authority
2	**Storage System Uptime**	5 Points for >=99% 2.5 Points for >=95% to <99% 0 Points for <95%	<95% for any two months in a 12-month period	Enterprise Management System with real-time access provided to TIMS Project Management Unit (PMU)/any other specified authority
B Incident Response & Management				
1	**Detection of all traffic accidents** on the routes under camera surveillance (automatic)	10 points if 0 missed incidents 5 points if 1-3 missed incidents 0 points if more than 3 missed incidents	More than 5 missed incidents in a 6-month period	Time of incident as logged by the Command Center software to be checked against time taken to generate alert and/or time taken for alert call to be completed

#	Performance Area	Scoring	Termination Trigger	Measurement Mechanism
2	**Detection of traffic accidents** on the routes under camera surveillance received through other reporting channels (manual information)	10 points for 0 missed incidents 5 points if 1 missed incident 0 points if more than 1 missed incidents	More than 2 missed incidents in a 6-month period	Manual detection of incident on the stretch which is not logged by the Command Center software automatically
3	**Informing ambulance control center** the need for an ambulance, through dashboard alert/ manual call (requirement to be finalized by SI)	5 points for alert within 1 minute 2.5 points for alert within 1-3 minutes 0 points for alert within >3 minutes	>5 minutes for 100% of valid instances for two months in a 6-month period	Time of incident as logged by the Command Center software to be checked against time taken to generate alert and/or time taken for alert call to be completed
4	Informing **112 Police Control Room** through dashboard alert/manual call (requirement to be assessed by SI)	5 points for alert within 1 minute 2.5 points for alert within 1-3 minutes 0 points for alert within >3 minutes	>5 minutes for 100% of valid instances for two months in a 6-month period	Time of incident as logged by the Command Center software to be checked against time taken to generate alert and/or time taken for alert call to be completed
5	Informing **nearest Route Patrol Vehicle** through dashboard alert/manual call (requirement to be assessed by SI)	5 points for alert within 1 minute 2.5 points for alert within 1-3 minutes 0 points for alert within >3 minutes	>5 minutes for 100% of valid instances for two months in a 6-month period	Time of incident as logged by the Command Center software to be checked against time taken to generate alert and/or time taken for alert call to be completed
6	Provide video **evidence and incident report t**o relevant agencies with Incident location, date and time of detection of incident, visual image within specified time limit of incident detection by AIDS, TMCS, ANPR and any other camera connected with TIMS	5 points for alert within 1 minute 2.5 points for alert within 1-3 minutes 0 points for alert within >3 minutes	>5 minutes for 100% of valid instances for two months in a 6-month period	Time of incident as logged by the Command Center software to be checked against time taken to generate incident report. TIMS Project Management Unit (PMU) to complete randomized checks on completeness and accuracy of incident reports. Video log of incident to be maintained for 6-month period or until legal proceedings are complete.

#	Performance Area	Scoring	Termination Trigger	Measurement Mechanism
7	**Provide evidence of overspeeding and other traffic violations** including – location, date and time stamp of overspeed detection	5 points for alert within 1 minute 2.5 points for alert within 1-3 minutes 0 points for alert within >3 minutes	>5 minutes for 100% of valid instances for two months in a 6-month period	Time of incident as logged by the Command Center software to be checked against time taken to generate incident report. TIMS Project Management Unit (PMU) to complete randomized checks on completeness and accuracy of incident reports. Video log of overspeeding vehicles to be maintained for 6-month period or until processing of challan.
8	**Quality of Incident video feed** (Bad feeds due to Video Jitter, dim, blurred, unfocused, obstructed, non-aligned feeds)	10 Points for >=98% Good quality video feed 5 Points for >=95% to <98% Good quality video feed 0 Points for <95% Good quality video feed	<95% for any two months in a 12-month period	TIMS Project Management Unit (PMU) to conduct randomized checks on quality of video feed. Video log of bad feeds to be maintained for a 6-month period.
	For B3-B8, in case of zero incidents in the evaluation period, the full quota of marks shall be allocated for respective SLAs			

6.5 Mechanism for measuring SLAs

The SI shall develop suitable mechanisms for measuring defined SLAs and create formats for weekly and monthly reporting on system performance which has to be aligned with and approved by the Operating Committee and TIMS PMU.

All hardware and software components shall be linked to an Enterprise Management System which shall provide real-time updates on the connectivity and functionality of all connected devices with components including Network Monitoring System, Server Monitoring System, Helpdesk System and any other system as deemed suitable for reporting on SLAs by the SI. The dashboard for the Enterprise Management System along with the audit and system logs should be accessible to the Operating Committee and TIMS PMU 24x7 to enable randomized checks.

Monthly reports on adherence to SLAs shall be submitted to the Operating Committee on the second working day of the subsequent month. Thereafter, the Operating Committee and TIMS PMU shall validate the adherence to SLAs by the eighth working day of the month and initiate payment as calculated based on the scoring system at the end of each quarter.

If a defect is detected within the system while measuring SLAs, the cause of such defect shall be ascertained and informed by the System Integrator to the TIMS PMU and Operating Committee. Such defects may be cured as per the timelines defined in section 6.6.

The SLAs during the implementation period have been defined on the following categories –

1. Hardware and software uptimes/availability – to be measured by Enterprise Management System and its components. The uptimes shall be averaged out for the quarter. Randomized checks to be facilitated through 24x7 remote access to EMS for TIMS PMU and any other specified authority.
   a. Camera systems
   b. Command Center software and equipment
   c. Server and storage systems
2. Incident Response & Management – alerts to be raised under these SLAs can be in the form of dashboard software updates and/or calls to respective control rooms/on-ground units as necessary. The concerned control room/on-ground unit should be informed of a major vehicle accident/natural disaster through at least one medium (e.g., software alert, call, SMS) in order to meet the SLA within the stipulated time limit. Any deviations to the time limit shall be checked against timestamp of incident video recording and software log (in case of dashboard pop-up), call and SMS logs as required.

6.6 Delays in remedying the system

In case of general non-performance, failure by the System Integrator to have remedied all reported system defects within the cure period of 7 days shall result in the application of the penalties for delays.

- The penalty will be applied at 0.5% of the O&M estimate of the contract value (for that phase) for every 3 calendar days of delay in system commissioning or delay in completion of any of the milestones, up to a maximum of 10% of the O&M estimate of the contract value (for that phase).
- Once the liquidated damages reach the maximum limit, MoRTH may consider terminating the contract and forfeiting the performance security deposit. MoRTH also reserves the right to debar the System Integrator from further participation in MoRTH's subsequent tenders due to its nonperformance for a period it decides.
- Upon termination of the Agreement due to service defaults, MoRTH may allocate the site to any other System Integrator within the 60-day timeframe following the issuance of a termination notice at its sole discretion as per clause 11.10.

In case of delays attributable to a Force Majeure event upon such request from the System Integrator or recommendation from the Operating Committee and TIMS PMU, MoRTH (or its

representatives) may, in its sole discretion, consider a suitable extension of time (EOT) without imposing any liquidated damages upon the System Integrator.

- The System Integrator shall submit such a request at least 10 days before the completion schedule/timeline/ milestone. In case of a delay in submitting a request for EOT, the penalty will be applied at 0.5 % of the contract value of that phase per week of delay in submitting the request for EOT.
- Any corrective maintenance and replacement of equipment attributable to a Force Majeure event which entails additional capital expenditure shall be mutually decided based on, schedule of payment, and timelines for such works. SI shall be paid for replacing the damaged equipment on the affected stretch, post adjusting any insurance proceeds received by the SI, and the payment shall be estimated basis based on equipment deployed on such affected stretch as per design document/layout submitted to MoRTH.
- Once the extension of time expires and if the SI fails to remedy defects, MoRTH may consider termination of the contract as per clause 11.10 and forfeiture of the performance security deposit. MoRTH also reserves the right to debar the System Integrator from further participation in MoRTH's subsequent tenders due to its nonperformance for a period decided by it.

In case of delays attributable to other unforeseen events i.e., theft, vandalism, damage due to accident/mishap, network issues attributable to the ISP (to be determined through investigation by the TIMS PMU and/or Operating Committee) and power shutdown beyond 24 hours, and upon such request from the System Integrator or recommendation from the Operating Committee and TIMS PMU, MoRTH (or its representatives) may, in its sole discretion, consider a suitable extension of time (EOT) without imposing any liquidated damages upon the System Integrator.

- The System Integrator shall submit such a request at least 10 days before the completion schedule / timeline/ milestone. In case of a delay in the submission of a request for EOT, the penalty will be applied at 0.5 % of the contract value of that phase, per week of delay in submission of request for EOT.
- Any corrective maintenance and replacement of equipment attributable to an unforeseen event which entails additional capital expenditure shall be mutually decided based on scope, schedule of payment, and timelines for such works. SI shall be paid for replacing the damaged equipment on the affected stretch after adjusting any insurance proceeds received by the SI, and the payment shall be estimated based on the equipment deployed on such affected stretch as per the design document/layout submitted to MoRTH.
- Once the extension of time expires and if the SI fails to remedy defects, MoRTH may consider termination of the contract as per clause 11.10 and forfeiture of the performance security deposit. MoRTH also reserves the right to debar the System Integrator from further

participation in MoRTH's subsequent tenders due to its nonperformance for a period decided by it.

6.7 Non-compliance to Safety Standards at Site

Failure by the System Integrator's personnel in maintaining the safety standards at the site at any time shall attract penalty on every instance noticed by the MoRTH (or its representatives).

- Staff working without safety gears – penalty of INR 10,000 per instance. In case of repeated instance by the same staff member of the System Integrator, the penalty shall be doubled per instance. The System Integrator shall have to replace the repeated offenders / sub-System Integrator (safety lapses more than 3 times) with immediate effect.
- Improper safety measures at site / safety hazard to the commuters due to poor workmanship, etc., / System Integrator's vehicle wrongly parked at site / System Integrator's vehicle moving in wrong direction / working during low visibility hours or at night time without proper safety measures warning signages and lighting/ improper traffic diversion / non-standard warning signages etc. / unauthorized lane closure / traffic rule violation – minimum penalty of INR 1,00,000 per instance shall be imposed on recommendation of the MoRTH (or its representatives). In case of repeated instance, the penalty shall be doubled per instance. The System Integrator shall have to replace the repeated offenders / sub-System Integrator (safety lapses more than 2 times) with immediate effect. MoRTH or its representatives shall reserve the right to take legal action against the errant staff / sub-System Integrator of the System Integrator, as such safety lapses may lead to major safety concern / hazard for the road users as well as the workers.

6.8 Penalty for Delay in Staff Mobilization

Delay in submission of detailed written statements and/or mobilization of aforesaid Key Personnel shall attract penalty @ INR 10,000/- (Rupees Ten Thousand) per day per Key Personnel. In case the delay is more than 3 weeks, MoRTH reserves the right to invoke the Bid Securing Declaration and PBG towards the aforesaid penalty and may proceed with the revocation of LOA or termination of the project, as the case may be.

6.9 Other Penalties

The Service Provider would be penalized for non-compliance of scope for Operations as well as Maintenance of the Project. Any penalty levied by MoRTH or MoRTH's representative shall be applicable and deducted from the monthly payable amount. The Service Provider should enable and facilitate continuous measurement of all-round performance of the VIDS System and not just event-based performance. The penalties are detailed here under:

3. For non-availability of video recording of any accident/ incident/ violation/ vehicle / vehicle identification etc., the penalty shall be imposed as follows:

S.No.	Penalty per instance	Non-reporting of any accident/ incident/ violation/

	(in INR) per location	vehicle etc. in a month (in numbers)
1.	1,00,000	First 5 instances
2.	2,00,000	6 to 10 instances
3.	3,00,000	11 to 15 instances
4.	5,00,000	16 to 20 instances

Further, MoRTH may consider termination of TIMS Contract and forfeiture of performance bank guarantee, in case of any non-availability of video feed of 21 or more events during any month.

7 Functional Requirement and Indicative Technical Specification

7.1 Central Processing System

7.1.1 General

- The TIMS for the Project is composed of many components systems. These systems are expected to perform their functions to achieve overall objective for the efficient, safe and smooth traffic on the Highway.
- The TIMS System Integrator shall provide and construct a central server system that manages various systems comprising the Highway traffic surveillance and controls system in an efficient manner, provides user-friendly human machine interface for the operator and records all events and incidents related to the Highway.
- System shall be expandable to account for increase in field installed devices. Minimum 25% spare capacity (rounded off to the nearest higher whole number) should already be part of the quoted system.
- All the supplied equipment shall operate on 230 V, 50 Hz single -phase power supply. Power for all the equipment will be conditioned using on-line UPS with minimum 4 hours or more back up. If any equipment operates on any voltage other than the supply voltage and supply frequency, necessary conversion/correction device for supply shall be supplied along with the equipment.
- All the control equipment e.g., file servers, database servers, Central Video Recorder, SAN/NAS/Raid backup device, decoders, networking equipment etc. shall be provided in standard Racks.
- System shall have WAN connectivity for remote monitoring.
- Online backup should be maintained to protect against storage failure.
- TIMS System Integrator shall provide all technical details regarding data formats, communication protocols, packet formats, etc. to enable TIMS PMU and MoRTH to formulate national standards on successful implementation of the highway stretch.
- All the modules supplied (CCTV, Speed display, Roadside Communication etc.) shall deliver data and reports that are safety-centric (fatal collisions in a given stretch, violation of regulation etc.), enforcement-centric (number of tickets issued, comparison of violations on monthly basis etc.) as well as equipment-centric (failed packets, number of repairs carried out on field devices, down time on account of major faults etc.)
- The system shall provide detailed reports related to the System Operations (including the actions of various stakeholders during Incident Management) and Maintenance. The format

for the same shall be finalized by the System Integrator in consultation with TIMS PMU. Maintenance reports, at the minimum, shall include the current operational status of each equipment, actual events of Down-times of each equipment, actual events of Mean time to Repair of each equipment and actual events of Meantime between failure of each equipment and the preventive & repair maintenance log.

- The system shall also provide a method to log and report road highway incidents. Data used for logging and reporting shall be 'picked-up' automatically from the road-side and other sensors to the maximum extent possible.
- Further the system shall provide a facility of generating user-formatted reports that can, for example, bring together the occurrence of highway incidents, values of various sensors and the operational status of various equipment on a common timeline / scale.

7.1.2 Main Function

- The central server system shall constantly monitor the operation of component systems and their subsystems. It shall be possible through the supervisory server to define/ modify the system configuration and add/remove any device connected to one of the component systems. It shall also be possible to change any system parameters defined and stored in the database.
- Provision shall be made with preventive measures against inadequate change to the system parameters. Access to the system configuration function must be restricted to the authorized personnel and error check function shall be incorporated as much as possible. The configuration and parameters of the system shall be backed up to allow recovery.
- Seamless data exchange (including incident/event management/ monitoring, video streaming of all cameras, access to reporting modules, facility management system, NMS etc.) between Hub Command Center at Uttarakhand Transport Office, Dehradun, Other Command Centers and spoke locations.

7.1.3 Equipment Location

- The TIMS System Integrator shall design the layout of the Operations Area and Server Area in the Hub Command Center as well as the Other Command Centers. The Operations Area is where Graphic Display, TMCS monitor display, and console will be placed, and the operation of the Project will be monitored. The Server Area will be where the server, network equipment and other devices will be installed.
- The layout shall be designed taking into consideration the function of the server and workstations to be placed in the room, the role of the staff and operators stationed in the room, position of Graphic Display and TMCS monitor screen, cable routes, viewing by visitors and other factors to establish a functional Operations Area and Server Area. The layout shall be approved by the TIMS PMU.

7.1.4 System Functions

7.1.4.1 Event input and management

The central processing unit must have at least the following system and functions:

7.1.4.1.1 Basic concept of event management

Considering further information reuse for the Traffic Management and Traffic Information Provisioning, the system shall provide function to allow input and register the traffic data/events with location information in the specified management unit and also taking the actual O&M into account. The system shall cover all items which should be managed as traffic events.

7.1.4.1.2 Event generation

1. Judgment of traffic situation
    a. Automatic event generation
        i. Using the traffic data measured by appropriate field systems like ANPR data in real time, and live video data from AID and ANPR, the system shall be able to detect traffic jam situation automatically by using a user specified velocity parameter.
        e.g., Judged as traffic jam in case of traffic velocity less than 20km/h
        ii. Using the live video data monitored by AID in real time, the system shall be able to detect an abnormal situation (e.g., vehicle accident, run-off-road collision) automatically.
        iii. Using the live video data from AID, TMCS, and ANPR data analysis, the system shall be able to detect the traffic violations (e.g., Over speeding, wrong direction driving, wrong lane driving – bus/truck driving in car lane or vehicle continuously driving in overtaking lane/truck lane, zig zag driving and dangerous driving) automatically.
        iv. Using the live video data from AID, TMCS, and ANPR data analysis, the system shall be able to detect the Faulty/ non-standard number plate of the vehicles through suitable means in line with proposed system design.
        v. Using the live video data from AID, TMCS, and ANPR data analysis, the system shall be able to detect the faulty taillight (when the rear of the vehicle is within the viewing zone of the camera) and head light of the vehicles through suitable means in line with proposed system design.
        vi. Automatic validation request generation and E-Challan generation for above violations post validation by the operator.

2. Manual event registration

After confirming events by the following method, the operator shall be able to register events manually.

i. Incident reported by Highway emergency call (e.g., 1033)

ii. Incident reported by Patrol vehicle

iii. Incident found in camera for TMCS, AID, ANPR, etc.

iv. Incident reported by other sources, etc.

3. Priority management of event (Seriousness and Distance)

Based on the pre-defined seriousness of events and the distance between event location, the system shall have function to prioritize information to be provided automatically.

4. Association (connection) function

The system shall have function to associate the traffic situation and the causal traffic event automatically. e.g., “Traffic Jam” caused by “Vehicle Accident”

a. Complementing of missing data

The system shall provide a function to the operator who is monitoring the camera feed in the Command Centers for manual complementing/ correction of the missing incident data. Any manual change shall be communicated to the TIMS PMU within 48 hours for its approval.

5. Tuning of setting

For the above-mentioned event generation, threshold parameter shall be adjustable (i.e., can be tuned) for the daily operation e.g., Threshold velocity for traffic jam detection (20km/h-30km/h), Information delivery distance for non-serious event (within 5km-within 10km)

Note: For any / all of the above related to Event generation the TIMS System Integrator may utilise relevant Artificial Intelligence and / or Machine Learning algorithms built into the TIMS system. The TIMS System Integrator shall indicate these features in the Technical Proposal.

7.1.4.1.3 Event management method

1. Event entry and release

The system shall have the function to associate the location (Up/Down lane), the event type, and the event detection time with TMCS camera which detect event. And it also shall provide event management method to register and release traffic events.

e.g., Register and Release events by pull down operation, specifying the type of event and the number of cameras which detected the event.

2. Supporting function

In general, the events (e.g., vehicle incident) are supposed to be released by the operator manually. But to prevent neglecting release of events, the system shall provide notification function to ask confirmation of operator for events which keeps on going after specified time period.

e.g., Alarm is raised for the event which keeps ongoing more than 30 min

7.1.4.1.4 Relationship with Other agency

Deleted.

7.1.4.1.5 Call recording

Deleted.

7.1.4.2 Internet Server and Project website

1. A website of Highway traffic-information will be set up and the TIMS System Integrator shall design the website layout and prepare the contents.
2. The site shall present the Highway graphically and the existing events such as congestion, maintenance work, lane closure and others that affect normal operation. They shall be indicated on the map by icons and colour. The map shall be updated, when there is any change in the event status without delay.
3. The highway map shall show also camera-icon at the installation points of TMCS camera. If a camera-icon is clicked, the site shall be designed to display in another window, live video taken by the selected camera with clicking. Resolution and frame rate of live video shall be variable to reduce the bandwidth required to access the site.
4. The Website shall be hosted on the NIC only and the link of this website shall be provided on the MoRTH website with access limited to identified senior officials within MoRTH, as communicated by the TIMS PMU / Operating Committee. The TIMS System Integrator shall be responsible for coordinating with the concerned agencies and the cost of hosting and development charges shall be in the scope of the TIMS System Integrator.
5. At least following information (Road and Traffic condition) shall be provided via Internet:
    a. GIS Map
    b. Live Video from TMCS camera
    c. Traffic Condition like congestion
    d. Traffic Event using Image Icon (Type and Location)
    e. Traffic Violation details with an option to search by vehicle number
    f. Traffic guidance in the form of alternate routes

7.1.4.3 Information Exchange with Other agencies

Traffic information must be created including road traffic condition of other agencies. For that purpose, TIMS System Integrator must introduce dedicated device to make information exchange with other organizations. Moreover, the system must include conversion/integration functions of data formats in order to recognize exchanged data as of continuous roads for the integrated traffic information provision.

7.1.5 Software

7.1.5.1 General

1. The TIMS software integrates the field equipment like CCTV cameras, AID with the Integrated Traffic Management (ITM) console to ensure the availability of an effective system for Traffic monitoring & incident / accident management. In addition, it shall also have the capability to integrate and exchange data (using standard protocols) with multiple IoT (Internet of Things) devices that have been temporarily / permanently located on the project highway for Traffic study / Traffic management / Road safety purposes.
2. The TIMS software shall be based on modern architecture and shall optimally execute on the ITM workstation and the TIMS server to ensure that
    a. The system response time should be instantaneous to support effective Traffic Management (i.e., Traffic monitoring and incident / accident management) actions on the ITM workstation.
    b. No information (data, video stream & audio stream) from any source is lost. Further all such information is made available on the Integrated Traffic Terminal, with no delay, precisely at the time they are required.
    c. Effective integration with the CCTV system, AID system, and other relevant TIMS equipment is carried out in a seamless manner with no disruption of / disturbance to the Traffic management function (i.e., Traffic monitoring and incident / accident management). For such integration, standard interfaces (e.g., NTCIP) shall be used wherever available.
    d. All information (Data, video and audio streams) collected from various sources shall be archived in the TIMS server for quick retrieval by authorized personnel. However, the performance of the TIMS software in terms of response times shall not be affected during such a retrieval process.
3. The TIMS System Integrator shall provide a set of software to operate on the servers, workstations, terminal equipment, and other components and devices to be provided under the Contract. The software shall function as a system to provide end results required in the Contract.
4. The software will be either the software that the TIMS System Integrator has, modification of the existing software, or the new software to be developed for the Project. The copyright of

the software specifically developed for the project shall remain with the TIMS System Integrator.

5. The set of the software to be provided shall consist of those provided by third party and those specifically developed for the project. All third-party software shall be legally licensed and there shall be no restriction on the use in the Traffic Incident Management System. They shall be registered under the name of MoRTH and any supports and services provided by the software developer including update and revision shall be available to the MoRTH.
6. The software to be specifically developed for the Project shall be fully tested and shall be free from bugs.
7. The programming of the applications shall be arranged in such a way that maximum flexibility is afforded by the design to allow the MoRTH to implement modifications or additional equipment which may become available or desirable during the working life of the system. Such future modifications or changes shall not be the part of the current scope of the contract and shall be estimated and paid time to time by the MoRTH if required but comprehensive documentation of the software and any customized code developed for TIMS shall be provided under the Contract to allow such changes to be implemented by the MoRTH without recourse to the TIMS System Integrator.
8. The MoRTH may wish to implement additional software packages to run concurrently with the software provided under the Contract. These packages may include but will not be limited to the following:
    a. Programs allowing the Command Center system to operate with other systems such as Toll Management System / Electronic Toll Collection/ ANPR cum FASTag System interfaced to the data network and involving bidirectional transfer of files.
    b. Analytical and statistical program to process the data collected by the system.
    c. Software that offers new service to the road users through Internet.
9. The TIMS System Integrator shall propose in the Technical Proposal the feasibility and ease with which such applications might be implemented using the Traffic Incident Management System proposed by them and shall advise the spare memory capacity and processing power which could be available, but not necessarily provided, within the proposed computer to allow such applications to be implemented.
10. The video steam captured and displayed at any location under this project shall be authenticated through Digital Watermark containing MoRTH logo with date and time stamping. The purpose of Digital Watermark is to ensure following:
    a. Copyright protection
    b. Source tracking
    c. Broadcast monitoring

d. Video authentication

7.1.5.2 Third Party Software

1. The third-party Commercial-off-the-shelf software to be provided shall include but not be limited to the following:
    a. Server operating system
    b. Storage device operating system
    c. Client operating system
    d. Database management software
    e. Video Management and Analytics Software
    f. Firewall and antivirus program
    g. Network Management System
    h. GIS enterprise edition platform
    i. Facility Management System
    j. Network Video Management Software
    k. Microsoft office Pro 2021 or latest license for all workstations
2. All third-party programs to be provided shall be widely used and suitable for the application of Traffic Incident Management System in terms of functions, capacity, speed, and interface with other software, maintenance and user friendliness.
3. If the third-party software is provided in CD or DVD, the original CD or DVD shall be submitted as part of documentation. The requirement is not applicable to the software preinstalled in the server or workstation.

7.1.5.3 Traffic Incident Management System Software

1. The TIMS System Integrator shall develop new software or modify the existing software to provide the Traffic Incident Management System functions specified herein.
2. The software to be provided as Traffic Incident Management System software shall include but not be limited to the following:
    a. Core Advance Command Center software
    b. Utility software
    c. Maintenance activity tracking and logging software
    d. Integration with Enterprise web enabled GIS and Image Processing module
    e. Integration with other third-party COTS modules

3. The actual configuration of software modules may not be limited to as listed above.
4. All software shall be of modular construction and the interaction between the modules shall be kept minimum. They shall be designed to operate continuously, and no periodical maintenance of the software shall be required.
5. All the display on the display monitor and printed report shall be in English.
6. The utility software shall include but not be limited to the system backup and restoration, database backup and restoration, and access control and operation log functions. Usage of the server and workstations shall be controlled by log in/out procedure and different levels of access control shall be provided to restrict the use of certain software by unauthorized persons. All operations shall be recorded as log together with staff identification number.
7. The software that interacts with the system operator shall be provided with fault tolerant functions and access control functions. They shall be designed in such a way that any operation error shall not cause damage to the system, loss of data or system shut down.
8. All software shall be tested under the different conditions and cases including incorrect operation by the system operator and erroneous data to verify the sturdiness of the software. The software testing shall also include appropriate load and stress testing.
9. The TIMS software shall be a modular system comprising of the following modules:
    a. Data acquisition module for acquiring data, video streams and audio streams from field equipment
    b. Highway Traffic Monitoring module
    c. Incident / Accident Management Module
    d. Integrated audio communication module
    e. Report generation module
    f. System Administration module
    g. Communication module for authorized access by external systems (e.g., Uttarakhand Transport Department, spoke locations, and central hub integrations.)
    h. Automatic Traffic Counter and Classifier (ATCC) Module shall be provided for collection of traffic data
    i. Travel Time Measurement System (TTMS) module shall be provided for estimation and calculation of traffic data

Data Acquisition module

1. The Data Acquisition enables the acquiring of data from the various field equipment in the form of data strings, video streams and audio streams. Examples include

a. Data strings from AID System

b. Video Streams from TMCS Camera, AID Camera

2. Deleted.

3. The module allows the user to configure the acquisition conditions as follows:

   a. At regular intervals of time with the interval being user

   b. On the occurrence of Traffic related events in the field (e.g., data from the VID system, instances of calls from Emergency helpline number and 1033)

   c. On demand (e.g., Video stream from a Camera)

   d. On the occurrence of system related events like equipment failure and restoration, user login / logout

4. The above information thus acquired shall be stored in the TIMS server using high performance FOSS database, as also prescribed by relevant guidelines of the Government of India.

Highway Traffic Management module

1. This module shall support effective Traffic monitoring on the highway including the display of the road on the Large display and Integrated Traffic Management (ITM) workstation, in the form of animated screens including Graphic User interfaces specified under Clause 816.1 to 816.17 of Specifications for Road and Bridge Works of MoRTH and including locations of all TIMS field devices on a GIS map with the ability to display alongside the current information (e.g. CCTV video Images, etc.) relevant for each field device, either permanently or on selecting the device with a mouse. The details of the project-specific composition of the GUI will be finalized during the project execution phase between the TIMS System Integrator and TIMS PMU in consultant with Operating Committee.

2. The module shall display the events acquired by the system (Traffic related, and system related) on a window at the bottom of the ITM / Graphic display, with the window size in terms of the number of events displayed being user configurable.

   Further the system shall provide a feature for the user to acknowledge such events and subsequently shall display the same.

3. In addition to the above, the module shall also display the related event (where relevant e.g., an AID event) on the GIS map using suitable animated icons. The animation shall suitably change when the event has been acknowledged and when the condition causing the event has disappeared.

Incident / Accident Management module

This module shall support Incident / Accident Management by

1. Allowing the Traffic Management console operator to locate and mark (with a mouse) an accident / incident on the GIS map of the highway and initiate the Incident management actions.
2. Displaying a contextual on-line checklist for the operator to follow in sequence. Further the clicking on each item of the checklist shall automatically activate the related TIMS equipment to aid in the management viz.,
    a. Seamless audio connection for the Traffic Management console operator, via the integrated audio communication unit, irrespective of the communication media (Mobile radio, Mobile phone/ landline), to the ambulance, Trauma Care Centres, Patrol & other O&M vehicles
    b. Automatic Pan, Tilt and Zoom of the nearby camera to view the accident
    c. Bringing on the message edit screen to create and dispatch messages to relevant stakeholders via appropriate media.

    The checklist itself shall be derived from the relevant Traffic Management and rescue procedures captured either in the Operation (O&M) manual of the highway or based on world-class practices relevant for the highway.
3. Logging the timestamp of the operator, who is operating each element of the checklist to aid in 'post-mortem' analysis of the operator's performance towards establishing his /her efficiency and further training needs.
4. Automatically performing pre-defined actions related to each of the above elements (e.g. Identification of the accident spot on the road, further shall control the nearby cameras to 'look' in the direction of the accident spot)
5. Aiding on-line tracking (via GPS) of the various O&M vehicles like the Ambulance, Tow-vehicle and the Patrol vehicle supported with dynamic display of information like shortest route, travel time to the accident spot, Trauma Care Centre etc.
6. Providing a user-programmable facility, as an aid, for the automatic generation of messages depending on incidents based on e.g., information measured by the cameras and sensors installed on the highway. This module shall alert the operator on generating the message which shall then be deployed on the operator's approval.

Integrated audio communication module

This module shall interface with and control the integrated audio communication unit to aid the operator seamlessly, communicate with various stakeholders via a host of communication media like telephone landlines, mobile telephony, mobile wireless etc.

The Integrated Audio communication unit enables the Traffic Manager / operator to communicate with all stakeholders in a seamless manner irrespective of the medium of communications. Using a

hardware like a digital telephone exchange that supports software control, this unit allows the Traffic manager wearing a headset with a microphone (or a handset) to seamlessly communicate with the stakeholders in traffic operations using various audio communication media like Mobile wireless radios, Mobile (GSM) telephones, and Telephone landlines. The communication is initiated on selection of a context sensitive checklist element or by selection of suitable icons on the ITM workstation screen during the Traffic monitoring or accident / incident management. This unit shall support communication between the Traffic manager and a single stake holder or a group of stakeholders. As a back-up option this unit shall also enable such communication via physical pushbuttons located on the unit.

Report generation module

1. This module shall generate periodic as well as on-demand statistical reports using data received from Automatic Traffic counter cum Classifier and Met sensors for traffic planning and management, accurate forecasting. There shall also be a provision to generate reports to aid planning and strategizing enforcement.
2. The module shall provide a range of reports on demand including those
    a. related to the acquired data,
    b. Messages edited and sent,
    c. Equipment availability,
    d. System related events including those related to
        i. System malfunction and restoration
        ii. User login – logout
        iii. AID events detected
3. The module shall further provide detailed performance reports on all aspects ranging from detection of incidents, through the field Operations team (Patrol vehicles, Break-down cranes and Ambulances) actions, Traffic Management Console operator and other TIMS Command Center operator actions.
4. Detailed formats of each report shall be provided by the TIMS PMU during Detail Design Phase.

System Administration module

This module shall essentially enable the definition and maintenance of user accounts.

Communication module

This module will manage authorized access to the TIMS system by

1. Authorized MoRTH personnel / representatives / TIMS PMU
2. Other authorized MoRTH systems like the Regional office Control Centre
3. Any other system authorized by MoRTH

Based on requests from the above entities the communication module shall provide the following information to the requesting entity:

1. Video Streams (Live and Archived)
2. Audio streams (Live and Archived)
3. Data strings and Data elements (Live and Archived)

The standard data exchange protocols for the above will be shared by TIMS PMU with the successful TIMS System Integrator.

Enterprise web enabled GIS and Image Processing module shall be deployed at the Command Center that shall form the part of the Dashboard and shall have following functionalities:

1. Map analysis of TIMS planning and operations.
2. Asset Management of TIMS like TMCS, AID, Route Patrol, Maintenance, Recovery vehicle location, and Route to reach the incident spot.
3. Demarking area of highway which is more susceptible to potential hinderances on highway like by cattle, wildlife, prohibited vehicle entry from etc. from nearby inhabitancies.
4. GIS enabled planning of diversions for safety of vehicle movement on maintenance area, installation area, and work in progress. This feature shall be made available by the TIMS System Integrator to MoRTH and Project manager before the start of the installation of roadside equipment at the site, for planning of the diversion and monitoring of the work in progress.
5. The Software should have capability of visualising GIS layers, attribute integration and analysis of layers.
6. The software should support GPS data for showing emergency and maintenance vehicle on Map. Geofencing of the GPS devices installed as part of the ADAS and the GPS devices already installed on the project vehicles shall be done and the dashboard shall generate alarms on the vehicle exiting / leaving the authorized routes / areas.
7. The web module should have out of box standard GIS functions like: Pan, Zoom, Identify, Measurement (Line, Area), Search, query, etc.
8. Software should have facility of advanced rule base labelling for dynamic placement of labels as per the extent, defined position and priority of layers by defining the different classes and should have the option to set the scale labels at specified scale.

9. The software should be Commercial-off-the-shelf based and Open Geospatial Consortium certified.
10. The software should have image filtering, vegetation indices calculation, linear algebraic combination, band Math, change detection, image extraction, mosaicking, image visualization, filtering, georeferencing, atmospheric correction, transformation tools, change management, feature extraction, classification etc.
11. The software should support all type of Standard GIS Data format, Imagery formats, and RDBMS.
12. GIS Tools functionalities such as Data creation, Import/Export tools, Transformation Techniques, Theme management, Geometric correction.
13. The software should have feature to identify and query/question various spatial Data.
14. The software should have Map composer, report module and Map print layout functionality.

Automatic Traffic Counter and Classifier (ATCC) Module

The ATCC module shall be provided in the TIMS Software for automatic traffic counting and classification of vehicle class, based on the data collected through ANPR cameras.

The system shall identify and record all types of vehicles on the highway for effective monitoring and data collection at TIMS Command Center. Besides, the system shall be capable of classifying any other vehicle category as per user needs. Vehicle classification should be user selectable based on length of vehicle and / or detuning of the loop inductivity. The software module shall be robust and be capable of operating with minimum maintenance. Software and manuals to analyse the data from output of vehicle counts, classifications speeds and headways shall be provided. Capability of graphic/tabular presentation of analysed data shall also be offered.

System Accuracy Requirements

Parameter	Accuracy Required	Conditions
Average Speed	90 percent	There are at least 25 vehicles in the group, individual vehicle speeds are between 10 kmph and 195 kmph and the vehicles conform to normal highway driving behavior.
Average Headway	90 percent	There are at least 25 vehicles in the group, individual vehicle speeds are between 10 kmph and 195 kmph, individual vehicle headways are between 1 and 10 seconds and the vehicles conform to normal highway driving behavior.

Parameter	Accuracy Required	Conditions
Flows	95 percent	There are at least 100 vehicles of each category in group and vehicles conform to normal highway driving behavior.
Vehicle classification	95 percent	Out of a group of 100 vehicles, conforming to normal highway driving behavior, at least 95 shall be accurately classified as per the classification scheme as per MoRTH guidelines.
Occupancy	90 percent	There are at least 25 vehicles in the group, individual vehicle speeds are between 10 kmph and 195 kmph, individual vehicle headway are between 1 and 10 seconds and the vehicles conform to normal highway driving behavior.

The ATCC module shall be able to cross-verify the vehicle class, fetched by the AIDS system-integrated with the Vahan Database. In case of any discrepancy, such transactions shall be audited by the operator using the ANPR & ATCC camera image / video available in the ATCC central system.

The data shall be segregated and provided in the report format on the bases of Sectionwise, direction-wise, class-wise, etc. as approved by the TIMS PMU.

Travel Time Measurement System (TTMS) module

Travel Time Measurement System (TTMS) module shall be provided for measuring required travelling time between major section of the project. The ANPR cameras shall be installed at AIDS locations on the entire stretch. TTMS shall use these ANPR data to detect the current vehicle location. Using this location data, TTMS module shall calculate the actual travelling time per section for each vehicle and derive the average travelling time by the statistics process.

The ANPR cameras will capture the image of each vehicle crossing the AIDS location and shall extract the vehicle number. The image and vehicle number shall be stamped with time and location for the purpose of section speed calculation of each vehicle. The same data shall be used for travel time estimation.

TTMS module shall calculate the actual travel time and velocity (speed) of each vehicle between every checkpoint (AIDS location). Speed data from all vehicles shall be processed statistically by TTMS module to calculate the average travel time between two consecutive check points (AIDS location), to calculate the average speed and average travel time for each section and the entire

project stretch in both the directions. Route Travel Time Estimation Models in IRC:SP:110-2017 shall be referred for estimation of travel time.

No additional hardware or field equipment shall be installed on the Project for TTMS functionalities.

7.1.5.4 Integration with Vahan Database, NPCI FASTag Mapper, Police Control Rooms, Dial 112, Smart City ITIMS

The TIMS System Integrator shall develop the TIMS Software in a manner that it is capable of being integrated with Vahan Database and NPCI FASTag Mapper, in the future. This integration shall enable fetching the Vehicle owner details of errant commuters detected by the TIMS System (ANPR, AID, TMCS, etc.) or reported by the route patrolling team, with evidence under violation of any traffic and safety rule / law on the project stretch.

7.1.5.5 Outline of Command Center Software

The TIMS System Integrator shall describe in his Technical Proposal, application software to be provided to the servers and workstation in the Command Center required hereunder.

1. Graphical presentation of module and components comprising application of servers and workstation.
2. Data processing flow in the form of class diagram, use case diagram, sequence diagram, or data flow diagram
3. GIS and Image Processing module
4. Scale or size of the module and components, and programming language used
5. Extent of the development required for the Project.

7.1.5.6 Interface with Mobile Phone Apps

Rajmarg Yatra App for Road Users

The TIMS system shall seamlessly interface with NHAI's Rajmarg Yatra through standardized API interfaces or through modules on Rajmarg prepared for TIMS. The integration should be regarding the following but not limited to:

a. Getting live information from incidents reported by highway users on the particular stretch. The TIMS system should be able to generate an incident event in a similar fashion and alert the Command Center about the location of incidents as reported by the User through the Rajmarg App. The API shall share the location, photo, incident type, etc. The nearest TMCS camera should be identified automatically based on the incident location for the Command Center to confirm the incident and notify emergency responders for necessary support.

b. TIMS should be able to send information regarding traffic, congestion, maintenance work, identified incidents, accidents, and manual messages to Rajmarg Yatra users through either API or through a module prepared for TIMS System Integrator on the Rajmarg web portal. These messages will be geo-tagged and broadcasted by Rajmarg to users in the vicinity of the incidents. For events like construction etc., the TIMS software shall also inform Rajmarg when the event has closed.

7.1.6 Advance Driver Advisory System (ADAS)

Deleted.

7.1.7 Incident Monitoring System (IMS)

Incident Monitoring System (IMS) shall be deployed at each spoke location (as applicable) of the project.

The IMS shall include following components:

1. Workstation (1 nos. at each location),
2. UPS as per site requirement,
3. Networking devices, switches,
4. Connectivity with Command Center & Command Center of other project/packages,
5. CCTV camera,
6. DG of suitable ratting as per site requirement,
7. MPLS etc.

The TIMS System Integrator shall establish seamless connectivity between IMS and Command Center of other packages / adjacent projects such that the officials are able to monitor the Command Center and TIMS system in whole. The IMS shall be customized as per the requirement raised by the Operating Committee/ TIMS PMU from time to time.

The IMS shall provide function to monitor any camera of the stretch. It shall provide access to the reporting modules, NMS, FMS, SLA monitoring and GIS.

The standard / default screen of the IMS display shall be the live view of the Command Center (option to select / toggle automatically) Graphic display screen content being displayed at the Command Center and shall be configurable without any requirement of support from TIMS System Integrator.

The incident / event pop-up and alerts shall be configurable as per the requirement. IMS system shall be manned by the TIMS System Integrator's operator during the O&M period as per the working hours of the spoke locations.

7.1.8 Video Analytics and Management System (VAMS)

1. The Video Analytics and Management System (VAMS) software shall be provided to view live and recorded video from all the cameras connected to local and wide area network.
2. The VAMS software shall have a client/server-based architecture that can be configured as a standalone VAMS system with the client software running on the server hardware and/or the client server running on any network-connected TCP/IP workstation. It shall support all major operating systems (windows, Linux). It shall support web client interface and shall operate without requirement of installation of any software.
3. The VAMS shall have a single page that displays the status of all servers and cameras currently connected. This page shall display any alarms, events, MAC addresses, camera configuration, format and frame rate from each individual camera.
4. The VAMS system shall have the ability to record an audit trail of when users login, which further shows what changes they have made, what video they have viewed and what they have exported.
5. The VAMS shall allow for the configuration of what drives to use for recording video. Those drives may be local drives, direct attached storage drives or iSCSI drives.
6. The VAMS software shall have an open architecture supporting IP cameras and encoders from multiple manufacturers providing high-resolution megapixel features.
7. Multiple control room consoles/workstations shall be able to simultaneously view live video and audio and/or recorded video and audio from the storage/video server. All storage / video servers shall also be able to simultaneously provide live and/or recorded video to one or more consoles. Its operator shall be able to push the video to another operator console seamlessly.
8. The VAMS software shall be able to send a predefined email based on an event trigger. The VAMS software shall also support SSL and TLS connections for transmissions of the mail.
9. The VAMS shall be capable of multi streaming on all connected workstations/ consoles in the entire network of the project stretch as well as minimum 20 remote users simultaneously. The remote users shall have full functionalities as are available for the Command Center operators.
10. It shall be possible to configure multiple monitors on one workstation / console i.e. multiple VAMS application simultaneously on one workstation.
11. Recording of all video transmitted to the VAMS shall be continuous, uninterrupted and unattended.
12. Deleted.

13. System Integrator may use VAMS or a combination of software for Suspect Tracking features to configure camera links between cameras, to follow a suspect between different camera scenes.
14. Inactivity timeout feature shall be provided to save the bandwidth
15. Archive bookmarks feature shall be available to specifically archive bookmarked video and create a second copy of important video.
16. VAMS shall automatically generate alarm / alert in case of any video loss or failure and shall have failover/redundancy feature without any manual intervention.
17. The VAMS software shall be used to connect different types of events, such as input triggers, to a desired action such as recording video or triggering an alarm. The VAMS software shall recognize the following event types: video motion, video loss, input trigger, health monitoring, IP camera connection, software trigger and analytics, camera preview style, hovering, server disconnect, archive alarm - failure on archiving target, such as bad mount point. The VAMS shall provide the search and display analytic meta data when searching analytic event linkages etc.

7.1.9 Emergency Telephone console

Deleted.

7.1.10 Hardware for Central Processing System

The Central Processing System shall comprise of following components:

1. Central Processing Servers in hot standby configuration (Primary + Secondary)
2. Central Video Recorders
3. Backup Video Recording (Only Incidents) Server
4. Internet and SMS Server
5. Operations Laser Printer (Colour)
6. Operations Laser Printer (Black)
7. Operator Consoles each with 4 nos. 21” monitors
8. Deleted.
9. Graphic Display with Graphics Display management software and Controller
10. Firewall, IDS, IPS and other network security components
11. Core Switch
12. Routers

13. Network Equipment – Layer 3 Switch, Layer 2 Switch etc.

14. Network Management System (NMS)

7.1.10.1 Command Center Central Processing Servers

The Command Center application server system shall consist of two servers with cluster configuration, one primary server and one stand-by server. Each of the two servers in the cluster shall meet or exceed the minimum requirements stated hereunder.

The Command Center server and workstation computer hardware shall be standard models manufactured by organizations of international repute. Custom built or non-standard equipment will not be acceptable. All the servers and computing shall be BIS/ UL/ CE/FCC certified. Wherever Indian Technical specifications and Quality Certificates exists, the same shall be acceptable and the TIMS System Integrator shall not be required to submit the foreign Quality Certifications and Accreditations. The TIMS System Integrator shall only be required to submit the technical comparison between Indian Quality certifications and the equivalent Foreign Quality Certification mentioned in the DOCUMENT, if any.

Full maintenance support services and ready availability of consumables, spare parts or replacement units shall also be assured from a third party, based in India, who is not connected with the TIMS System Integrator and his agent.

The specifications in this section are provided as reference. The servers to be provided by the TIMS System Integrator shall materially comply with these specifications and shall be subject to the approval by the TIMS PMU.

1. Each server shall have a minimum of two numbers of latest generation Intel/AMD 16-Core processor 2.8 Ghz CPU of 19.25 MB Cache, 105W.
2. The server shall have 256 GB RAM memory using 32GB Module scalable to at least up to 1.5TB, using DDR4 2666MHz DIMM (RDIMM) memory modules.
3. Deleted.
4. Server shall have 4* 1.6 TB SSD/HDD bays with each SSD having minimum endurance of 3 DPWD
5. Deleted.
6. One optical drive DVD-RW shall be provided in each server.
7. Server should have RAID controller with 4GB battery backed write cache (onboard or in a PCI Express slot).
8. Server should support 1Gb 4-port network adaptor supporting advanced features.
9. The power supply shall be Redundant 800W Platinum hot plug and redundant hot-plug system fans. The display controller should support VGA.

10. The server should be provided along with the out-of-band remote management and maintenance capability. Remote management should be possible by using API and Web based GUI.
11. The server should support all industry leading OS / Hypervisor like Windows, Linux, VMware, KVM etc.

7.1.10.2 Central Video Recorder (CVR)

The Central Video Recorders shall be provided at the nearest Command Center for recording the live video feed from all the cameras (TMCS, AID, ANPR) and for incident video recording at the Hub Command Center. The VAMS (Video Analytics and Management System) software shall be installed on the CVR. The inbuilt storage prescribed for CVR is estimated for minimum 180 days @ minimum 25 FPS, 2 MP for incident video recording, and minimum 45 days @ minimum 25 FPS, 2 MP for live video feed recording at requisite load and buffer. The TIMS System Integrator shall propose the storage capacity of CVR as per its own calculation and proposed solution to provide incident video recording of all the cameras for minimum of 180 days and live video feed recording for 45 days, keeping requisite buffer. The specified storage here is the minimum requirement to be provided by the TIMS System Integrator.

1. Each server shall have a minimum one latest generation Intel Xeon 4-Core processor 3.5 Ghz CPU of 8 MB Cache, 256 SSD in RAID 1 for operating system and video management software. Each server shall support at least 128 channels at full HD along with 2-way audio feature Audio ports should be inbuilt from the factory in the recording server without using third party external connector. The Central Video Recorder works on Windows, Linux platform and client application should work on MAC, Windows, Linux from workstation.
2. The server shall have 32 GB RAM memory DDR3 memory.
3. The Server shall have SSD/HDD bays such that minimum useable internal storage space is available as per the System Integrator’s calculation and proposed solution to provide incident recording of all the cameras for a minimum of 180 days and live video feed recording for a minimum of 45 days, keeping the requisite buffer. Recording server supports RAID 6 configuration.
4. One optical drive DVD-RW shall be provided in each server.
5. Central Video Recorder should support 2 x 10 Gbps SPF+, 1 x 2.5 Gbps, 1 x 1 Gbps network adaptor supporting advanced features with bandwidth management
6. The power supply and fan shall be Redundant
7. Deleted.
8. The server shall support minimum 1200 Mbps bandwidth for read and write the video recording and shall support 8 input and 4 output alarm and One RS485 Port this should be inbuilt from the factory in the recording server without using third party external connector

9. The server shall support minimum Operating Temperature - 4.5° - 35°C
10. Regulatory: BIS/UL/CE/FCC. Wherever Indian Technical specifications and Quality Certificates exists, the same shall be acceptable and the TIMS System Integrator shall not be required to submit the foreign Quality Certifications and Accreditations. The TIMS System Integrator shall only be required to submit the technical comparison between Indian Quality certifications and the equivalent Foreign Quality Certification mentioned in the Document, if any.

Note: Total number of servers required at each location / Sub-system shall be as per the solution design of the TIMS System Integrator.

All the Servers shall come with 5 years OEM Warranty with 24X7 support and Next Business Day (NBD) resolution.

7.1.10.3 Graphic Display for Command Center

1. The TIMS System Integrator shall provide Graphic Display cubes with DLP based technology with Laser light source or Active LED based display of 0.9 mm or less pixel pitch. Graphic Display shall show large-scale presentation of central server monitor screen and live video streaming from the all the cameras (TMCS, AID, ANPR), TIMS Dashboard and GIS Map.
2. It shall be able to show multiple screens at a time and the number of screens on the display shall be flexible.
3. It should have a life of at least 7 years in 24x7 operations.
4. The Graphic Display shall be made up of several units. It should have automatic and continuous color calibration and uniform brightness amongst all cubes. Each cube should be able to take full HD signal. The Laser DLP based graphic display shall be provided in 6x3 matrix of 70" cube or bigger, suitable to display minimum 40 cameras along with GIS Map and TIMS dashboard in full high definition. The size of the Active LED based display shall be calculated such that it achieves the size equalvalent to laser DLP display of 70" cube in 6x3 configuration, such that at least 40 nos. TMCS cameras can be viewed in full high definition at same time along with GIS Map and TIMS dashboard.
5. The brightness of the cube shall be 400 nits and should be adjustable for lower or even higher brightness requirements with brightness uniformity of more than 95%. The dynamic contract ratio shall be 1000000:1 or more.
6. The ingress design of the projection unit shall conform to IEC-60529 standard.
7. The depth of the cube/ Videowall for Laser DLP / active LED shall be as per OEM and shall be minimum possible to avoid wastage of space in the Command Center. The control room layout shall be considered accordingly, such that minimum viewing distance is achieved..
8. Graphic Display Controller and management software shall be from the same OEM. The number of output shall be capable to drive number of cubes to achieve the resolution.

9. The Operator shall be able to see multiple source in one window and shall be able to specify time interval and sequence. The software shall provide the option to split the entire display in multiple sections and layouts. The operator shall be able to define multiple layouts that can be launched based on time schedule or sequence as defined by the operator or control room Manager. The layouts shall be finalised in consultation with the TIMS PMU and Operating Committee.
10. The software shall have self-health diagnostics function and shall raise alert or popup in case of any error is diagnosed in the graphic display. The operator shall notify the maintenance engineer regarding such alerts through FMS.
11. At least following information (Road and Traffic condition) shall be provided on Graphic Display:
    a. GIS Map of the Stretch with each lane
    b. TMCS Camera live video streaming
    c. AID live video streaming and Incident Pop-ups
    d. ANPR and speed radar live data
    e. Traffic Condition
    f. Traffic count and classification
    g. Travel time
    h. Traffic Event using Image Icon (Type and Location)
    i. Emergency call (1033) status
    j. Status of each equipment plotted on the GIS Map
    k. NMS
    l. Deleted
    m. Deleted
    n. FMS

Note: For the ergonomic design of the Command Center, ISO 11064 shall be followed.

* if provided as part of the project scope under TIMS

7.1.10.4 Network Equipment

7.1.10.4.1 General

1. The TIMS System Integrator shall coordinate with the existing telecom providers in Uttarakhand to purchase OFC bandwidth required to connect each peripheral to the Command Center systems. The TIMS System Integrator shall supply and install all equipment, cables,

connectors, terminals and other miscellaneous materials necessary to establish a working local area network connecting these systems with the nearest installed OFC.

2. The network between the Command Center and sub-systems shall either use the optical fibre cable network or high-end Wireless Access Points along the stretch and a data communication network shall be established using layer 3 switch to be supplied by the TIMS System Integrator. The TIMS System Integrator shall supply and install the network equipment suitable for interfacing the layer 2 switch to the layer 3 switch. The network devices and equipment shall be IPv6 ready, compliance and procurement shall be as per DOT, DPIIT, and Govt. of India latest guidelines, as applicable during the supply of the system.
3. The type and the number of the network equipment proposed by the TIMS System Integrator shall be shared as part of the network design and architecture (detailed in Form T-7).

7.1.10.4.2 Network design

1. The TIMS System Integrator shall undertake the detailed design of the digital transmission system. The design work shall include but not be limited to transmission protocol, network and transmission equipment, type and size of cable, cable splicing, conduit and cable installation work, manhole, hand-hole and pull box at bridge and earth sections.
2. Digital transmission system shall adopt IP. Suitable media and transmission protocol at Layers 1 and 2 shall be decided, type of digital station equipment shall be selected. In developing the design, various factors such as amount and type of data, transmission distance, quality of service (QoS), reliability, latency, and changeover time to backup route shall be considered. Type of optical fibre cable shall also be considered in the design. Packet based transmission system will be preferred than circuit-based transmission system such as Gigabit Ethernet. All devices and network equipment, switches etch shall be IPv6 ready and compliant as per DOT, DPIIT, and Govt. of India latest guidelines, as applicable during the supply of the system.
3. Loop topology based on resilient packet ring (RPR) shall be adopted for local line transmission system for redundant operation. A cut in the communication at a point in the loop shall not affect the normal operation of the communication system.
4. Physically separate optical fiber cables shall be used for a ring topology and for back up route in the future trunk line transmission system. Compressed image data and data from other devices must be separately allocated to the optical fiber core.
5. Layer **2** switch will be used at each node to connect local network or device to the local line network. Layer 2 switch will also be used to connect devices to the local network. The switches used at the field nodes shall only be of industrial grade for operations under extreme weather and outdoor conditions.
6. In addition to the equipment listed above, the system requires fibre distribution frame and main distribution frame for cable termination, surge arrester or similar surge protection

device to protect the equipment from the lightening, and accessories necessary for cable installation. The TIMS System Integrator shall supply and install these devices and accessories.

7.1.10.4.3 Reliability

Digital transmission system shall have high reliability to ensure continuous operation of the system. Bit error rate for the end to end data communication must be 1×10^{-6} or better.

7.1.10.4.4 Capacity and Quality of service

1. The digital transmission shall have a sufficient capacity in terms of speed and bandwidth to meet the demands to be decided based on the estimated amount of data including digitized voice data at each facility such as Command Center, and service area. Video signal from the TMCS camera shall be transmitted in H.264/H.265 format and the digital transmission system shall provide sufficient capacity for it. The TIMS System Integrator shall estimate the type, amount and location of data transmission need and design the system, equipment and cables that satisfy the demand.
2. Quality of service (QoS) capability shall be provided to the digital transmission system to ensure smooth and uninterrupted delivery of data for voice and video image transmission required for TMCS camera system.

7.1.10.4.5 System supervision

The digital transmission system shall be equipped with a supervisory function which continuously monitors the system operation and issues an alarm in case malfunction is found. The supervisory shall have the following functions:

1. Management of occurrence and recovery of malfunction
2. Registration and modification of system configuration
3. Registration and modification of network configuration
4. Testing of equipment and circuit
5. Logging of equipment operation and cable performance
6. Changeover between primary and backup routes

7.1.11 Closed Circuit Television (CCTV) and Access Control System (ACS) for Command Center Building and Security

7.1.11.1 General

1. This part of the DOCUMENT covers the equipment and services to be supplied under this Contract for CCTV equipment and Access Control System (ACS) to be installed at the Command Centre. The CCTV and ACS equipment shall be categorized as two types, CCTV and ACS for Building and CCTV for Security.

2. All the cameras shall be IP-based and shall be connected to the Video server. The cameras shall support ONVIF profile S & G, & SDK to be provided and shall be BIS certified. The VAMS installed on video server shall provide the facility to control the cameras at the Supervision workstation in the Control room Buildings. The incident video recording of each camera shall be stored at the Video server/storage for a period of minimum 180 days and live video feed for 45 days at 2MP (1920×1080), and 25 FPS.
3. All Cameras shall have inbuilt IR illuminator for night vision functionality. External IR illuminator shall be acceptable for box type cameras, however inbuilt IR shall be preferred for these types of cameras also.
4. The Video Server of each location shall be interfaced to Command Center system and MoRTH to be able to watch and control the cameras for the PTZ activities from the Command Center control room, and On-line access facility. The priority shall be given to the local control room staff.
5. The functionality of the CCTV cameras provided by the TIMS System Integrator shall be described as follows:
    a. Building Surveillance CCTV cameras – These cameras installed on a sufficient height mast shall be intended for general surveillance of the building area and field activity outside the building and walkways. These cameras shall also be linked for remote monitoring. As both the traffic control room staff and sub-control room staff can control the pan, tilt and zoom function, the priority shall be given to the local control room staff.
    b. Building Security CCTV cameras – These cameras shall be intended for monitoring of security areas such as the building compound, general parking area, Control Room, supervisor room, building lobby, walkway, server room, UPS room, and emergency vehicle parking area.
    c. These cameras shall have voice recording and Class 10 SD memory card of minimum 256GB for local storage of videos and voice recordings.
    d. These cameras shall be of two types
        i. Motorised Bullet/ Box colour cameras. 2.8 – 13.5 mm, motorized varifocal zoom lens, auto focus
        ii. Motorised Dome colour cameras 2.8 – 13.5 mm, motorized varifocal zoom lens, auto focus
    e. The box cameras installed outdoor shall be installed in the weatherproof enclosure.
    f. Shall be OWASP L2 Compliant before supply of equipment
6. These cameras shall have AI based Intelligent video analytics capability for Video Motion Detection, Active tampering Alarm, object Detection, Intrusion, Loitering, Line Crossing, Face Detection and Meta Data generation for easy search

7. The design of the CCTV system shall consider the following: -
    a. Provide effective supervision and control
    b. Easy to use
    c. Self-contained system
    d. Increase span of management
    e. Reduce unnecessary travel
    f. View / evaluate situations quickly
    g. Motion detection
    h. Savings on time and manpower
    i. Easy access to video information and quick playback
    j. Minimize the use of security guards
    k. Eliminate unnecessary responses to false alarms
    l. Provision for future scalability
8. The camera and VAMS shall be capable of triggering alarms in case of Video motion detection, manual trigger, digital input, periodical trigger, system boot, recording notification, camera tampering detection and audio detection. The triggering alerts can be controlled by the control room operator.
9. The system should support intelligent video motion detection to track objects, learn the scene and adapt to a changing outdoor environment. Environmental changes such as rain, hail, wind, swaying trees and gradual light changes should have minimum effect on the settings.
10. The control software should provide for alarms and alarm log. Alarm settings need to be individually configurable for each alarm and each camera prerecord duration. The duration shall be selectable from a list of values ranging between 2 seconds or less to 5 minutes or more. There shall be provision to achieve, print and display the log using device filter, device group filter and/or a time window.
11. The administrator should be able to create, add, edit & delete users. He should be able to administer access rights to system resources and functionality as well as access permissions to a list of cameras, a user can view and control.
12. The system shall provide User activity log (audit trail) with user id, time stamp, health monitoring, etc.
13. TIMS Command Center will have workstations along with controllers for Camera operation.

14. The Workstation Frontend Software should also be working on a browser-based system and mobile application for remote users to allow any authorized user to display the video of any desired camera on the monitor with full PTZ and associated controls.

7.1.11.2 CCTV Specifications

7.1.11.2.1 Dome Camera

1. A surveillance camera of 5MP at 25 FPS shall be provided. The IP camera shall be POE powered dome type with in build IR of 30 meters with illumination at 0.1 lux for colour image and black& white at 0 lux with IR. The lens shall be of 2.8-12 mm motorised varifocal with true WDR, 3D DNR, BLC, AGC and Quad streaming (i. live viewing, ii. Analytics, & iii. Recording iv. Mobile). The Camera shall have inbuild SD card slot and shall be provided with at least 256GB class 10 SD card. The shutter speed of the camera shall be 1/30 second to 1/10000 seconds for capturing the motion detection even during low light condition and provide proper image. The housing shall be IP 67 rated with IK10 protection against vandalism. The camera shall support one alarm I/O port and audio I/O.
2. These Cameras shall have AI based intelligent video analytics capability for Video Motion Detection, Active Tampering Alarm, Object Detection, Intrusion, Loitering, etc. (Object Sub-Classes: Person Clothing Colour, Vehicle Colour, Object Classes: Person, Bicycle & Vehicle)
3. Whenever any event is triggered, the camera shall record the event on SD card.
4. Should be OWASP L2 Compliant before supply of equipment

7.1.11.2.2 Bullet Camera

1. A surveillance camera of 5MP at 25 FPS shall be provided. The IP camera shall be POE powered bullet type with inbuild IR of 40 meters with illumination at 0.15 lux for colour image and black & white at 0 lux with IR. The lens shall be of 2.8-13.5 mm motorised varifocal with true WDR, 3D DNR, BLC, AGC and quad streaming (i. live viewing, ii. analytics, & iii. Recording iv. Mobile). The Camera shall have inbuild SD card slot and shall be provided with at least 256 GB class 10 SD card. The shutter speed of the camera shall be 1/30 second to 1/10000 seconds for capturing the motion detection even during low light condition and provide proper image. The housing shall be IP 67 rated with IK10 protection against vandalism. The camera shall support one alarm I/O port and audio I/O.
2. These Cameras shall have AI based intelligent video analytics capability for Video Motion Detection, Active Tampering Alarm, Object Detection, Intrusion, Loitering, etc. (Object Sub-Classes: Person Clothing Colour, Vehicle Colour, Object Classes: Person, Bicycle & Vehicle)
3. Whenever any event is triggered, the camera shall record the event on SD card.
4. Should be OWASP L2 Compliant before supply of equipment

7.1.11.3 Access Control System

1. Door / premises entry Access control system shall be provided in each Command Center building and rooms including server room, UPS room, generator room, etc.
2. The system shall provide an integral software tool designed to reduce or eliminate tailgating.
3. Restricting or denying access to a card holder shall happen automatically if they have entered a zone without a valid card transaction.
4. The access control system should be modular in nature, with the below mentioned modules-
    a. Card Management and enrolment module
    b. Alarm Management Module
    c. Rolling Transaction Display Module
    d. Web Dash Board
    e. Zone Management and Broadcast
    f. Time & Attendance Module
    g. Visitor Management System Module
    h. Reporting module
5. The dashboard shall display data in multiple formats such as bar, line, and pie charts, and tabular formats and shall provide following information:
    a. Card Swipes & Zones Swipes
    b. Cards Parked
    c. Zone Occupancy & Muster zone swipes
    d. Type of Cards Issued and their status
    e. Licensing
    f. Diagnostics
    g. Users logged on
    h. Invalid Swipe Analysis
    i. Average Alarm Acknowledgement/Cancel Locked Out Accounts
    j. Top current alarms
    k. System and capacity & software licensing information
    l. Alarm acknowledgment analysis
    m. Locked out workstation user accounts
    n. Users currently logged on

o. System Time and Date

p. Last backup status and Backup history report

6. Reporting Module shall provide the following information:
   a. Access Level changes
   b. Alarm Reports
   c. Transaction Reports
   d. First & Last transaction report
   e. Device Reports
   f. Device Access Report
   g. Device configuration reports
   h. Personnel Reports
   i. Card parking Reports
   j. Absentee Report
7. The ACS shall have following features:
   a. Record cardholder personal and access information.
   b. Control card verification (i.e., the recording of cards on the system).
   c. Control data flow to the Ethernet Reader Controllers - card and configuration information.
   d. Provide automatic updates of Ethernet Reader Controllers and field device changes, so that the system is continually updated.
   e. Pass alarm and status information in real-time to client PC workstation computers being used for system monitoring.
   f. Pass alarms to an integrated Short Message Service (SMS) for a text messaging service to user defined recipients.
   g. Issue broadcast messages to the Ethernet Reader Controllers.
8. The ACS shall be integrated with following sub-systems of the building
   a. Video Analytics and Management System (VAMS)
   b. Fire Systems (FS)
   c. Intrusion Detection Systems (IDS)
   d. Perimeter Intrusion Detection Systems (PIDS)
   e. Generic Lift or Elevator interface

f. Building Management Systems (BMS)

g. Time and Attendance (T&A) Module

h. Visitor Management System

9. The ACS system shall be BIS, CE certified and designed for UL294, with IP 20 rating. The readers shall be RS485 OSDP compliant, communicate through encrypted OSDP RS485 Wiegand, and encrypted host communications with TLS and AES encryption.
10. The single door and true four door ACS shall have touch screen terminals for easy access with 12 keys (10 numeric keys, 2 context sensitive function keys), capacitive, light touch and 10/100 Mbps ethernet port.
11. The system shall have sufficient offline data storage capacity of minimum 50,000 cardholders transactions and 10,000 offline events (transactions and alarms).
12. Shall have inbuilt battery and charging system. It shall automatically switch over on detection of power supply.
13. The system shall have tamper detection capabilities and shall raise alarm that shall be configurable as per site requirement.

7.1.12 Variable Message Sign

1. There shall be a Control System with Variable Message Sign Control Software to manage all the VMS Boards within the installation.
2. The software should be capable of managing at least the number VMS's designed for the package. It should support VMS boards of varying sizes.
3. The software shall operate on open architecture and integrate/ co-exist with other subsystem software that are installed to manage CCTV, AIDS, Speed Display, and Roadside Communication, apart from the Traffic Management module (where applicable), etc.
4. The software shall store the configuration (VMS ID, its actual location, brightness levels, horizontal pixel size, number of lines supported, Regional Language supported etc.) of each VMS that it controls. There shall be options to generate reports of stored device configuration.
5. The VMS boards associated with AIDS should be integrated with the AIDS such that incidents identified by AIDS that need to be warned to incoming traffic are automatically relayed without any manual intervention.
6. The system should support adaptive display brightness to adjust readability to the changing outdoor environment.
7. The control software should support some form of CRC1 on display data and command center packets for device error reporting.

8. The administrator should be able to create, add, edit & delete users. He should be able to administer access rights to system resources and functionality as well as access permissions to a list of VMS a user can control.
9. The administrator should be able to place users in a hierarchy. The higher priority user should inherit the rights of a lower priority user automatically when he is taking overriding control of VMSs, which are already being controlled by a lower priority user. There should be minimum 3 hierarchical levels of security for providing user level log in.
10. The system shall provide User activity log (audit trail) with user id, time stamp, and action performed, etc.
11. TIMS Command Center will have a workstation for VMS operation. Facility for controlling all the VMSs at various other locations, as required, shall be provided.
12. The VMS to be controlled shall be accessed from TIMS Command Center through workstations with the help of VMS Control Workstation Frontend Software. Further the above software shall also accept messages for display from the Traffic Management console programmed on GUI interfaces provided by this software.
13. As the VMSs can be configured to display messages in a chosen regional language, the software should be able to control VMS configured for any regional language.
14. The user shall have the facility to request control of any VMS outside his rights for a reservation period. Control of VMS is released after the reservation period (Request enhanced control rights for a short duration).
15. TIMS Command Center may have one or more Operators simultaneously controlling the installed VMSs.
16. As stated earlier, all data and command packets shall have a suitable CRC attached to them. All packets sent would be acknowledged by a response packet from the respective display with its own CRC.
17. The response packets from VMSs shall include status (command executed or not) as well as error codes to indicate the nature of error.
18. The system should support multicast (broadcast to a predefined group of displays) and broadcast. Multicast or broadcast packets shall have no response packets from VMSs.
19. A single message may be shown as a static sign or a group of messages may be shown in a round robin fashion till a new set of messages are not relayed to a particular VMS.
20. The time duration for which a message is displayed while in round robin mode will be programmable from 1 second to 255 seconds.
21. VMS and the associated software shall support the following text animations:
    a. Scroll right to left

b. Flashing (For example, this would be to attract attention to speed limits)
c. Typing
d. Curtain top to bottom
e. Curtain bottom to top
f. Replace left to right
g. Replace right to left
h. Text without any effect (for example, this would be default for most text)

22. The use of text effects shall be strictly a policy of MoRTH road safety experts dictated by the situation and hence, should not be a fixed global parameter. It shall be dynamically assignable and remain valid for a text string for the current instance alone.
23. It shall be possible to send ten strings in round-robin mode.
24. The Database Server shall keep track of all configurations, error data, configuration events, usage events and error events.

7.1.13 Emergency Call Box

1. There shall be a Control System with Control Software to receive all Emergency Communication from the 24 X 7 National Highways helpline and the Emergency Call Box (shortcode '1033').
2. The software shall operate on open architecture and integrate/ co-exist with other subsystem software that is installed to manage CCTV, VMS, and Speed Display, apart from the Traffic Management module (where applicable), etc.
3. The software shall store the configuration Emergency Call Box ID, Location on the highway stretch, etc.) of each Emergency Call Box it controls. There shall be options to generate reports of stored device configuration.
4. Calls from ECBs shall be directed to the closest Police Control Rooms or National Highways Helpline Central Control Room, or any other Control Room prescribed by the State Authorities, who shall then coordinate the response and inform the appropriate State Department including the state disaster management authority.
5. The Police Control Rooms/National Highways Helpline Central Control Room/Any other Control Room prescribed by the State Authorities shall have the facility to call back any Emergency Call Box.
6. The system shall provide an activity log (audit trail) with user id, time stamp, action performed, etc.

7. The Command Center shall perform a communication health check (link quality check) on all the connected field communication devices and report errors if any on the administrator console.
8. It shall be possible to archive old call logs on CD, DVD, Blu-ray recorders, or RAID backup devices. Log of any such activity should be maintained by the system for audit purposes.
9. The Database Server shall keep track of all configurations, error data, configuration events, usage events, and error events.

7.2 Traffic Monitoring Camera System (TMCS)

7.2.1 General

The TIMS System Integrator shall implement the Traffic Monitor Camera System (TMCS) that meets the requirements stated herein for the surveillance of the traffic and vehicles, and automatic incident identification on the project. The system and its component devices shall be of rugged nature for outdoor industrial use and capable of 24x7 operations in all weather conditions applicable to the project.

7.2.2 Key Functions

The Traffic Monitoring Camera System shall be deployed for monitoring the project corridor, junctions and interchanges. The cameras with Pan/Tilt/ Zoom (PTZ) facility shall provide a 360-degree field-of-view to enable the operational objective of full coverage of the highway, at-grade roads, junctions, service road, entry/exit ramps and related spaces within the corridor/ ROW.

Operationally, the main function of the camera is to provide surveillance of the transportation system and, enhance situational awareness and enable operations staff to perform a number of valuable monitoring, detection, identification, verification functions.

Under normal conditions of the Project, the TMCS cameras shall be set at home position and shall periodically move to other pre-set positions to enable automatic incident detection and identification.

All TMCS cameras shall be used to conduct automatic detection of key events which are central to incident response and road safety including but not limited to Accidents (collisions, crashed vehicles, smoke etc.), Parked/ Stationary Vehicles etc. The system shall conduct the analytics on all PTZ pre-sets, across the entire Project Stretch and shall be designed to detect any incident within 60 seconds.

7.2.3 System Configuration

The system shall consist of the cameras at the site, and control equipment and VAMS at the Command Centre. The digital transmission system shall transmit video signals from the TMCS camera to the Command Center in real-time.

7.2.3.1 Camera

The camera shall be for industrial use, capable of continuous operation under harsh environments on the highway. The camera shall be IP based at least 2 MP colour type with 1/2” image sensor (CMOS) or better. It shall have a frame rate of up to 30 frames per second in all compression mode and shall have 4 simultaneous streams and live view for more than 5 users.

7.2.3.1.1 Lens

Motorized zoom lens with more than 36x Optical zoom and having optical defog (Optional) auto focus covering suitable range of focal length shall be provided and mounted on the camera. The lens size shall be approx. 4.6mm to 216 mm +/- 10% suitable to achieve the required optical zoom. The lens size may vary by ±5% as per the OEM design but shall be able to meet the minimum functional requirements and PoC parameters.

7.2.3.1.2 Night vision capability

Cameras shall have an inbuilt IR illuminator of 100 meters for night vision functionality. External IR illuminators shall not be acceptable for PTZ cameras; Inbuilt IR shall be preferred. The minimum illumination shall be 0.1 lux for colour and 0 lux for black and white image (IR On) with automatic gain control on in auto/ manual mode. The camera shall be capable of recording black and white video even in 0 lux with IR up to a distance of 100 meters.

7.2.3.1.3 Camera Housing

The camera shall be housed in a suitable housing to protect them from solar radiation, UV, dust, and rain. An inbuilt wiper may be provided with the housing to permit cleaning of the camera gimble during a rainstorm/ dust etc., or a Turret shape with water-resisting coating, The field of view of the camera shall not be obstructed by the housing nor by the wiper which shall automatically park out of view. Picture quality or optical performance shall not be degraded by the housing. The Housing shall have an IP 66 or higher rating for Weather-proof, an IK10 or higher rating of equivalent Indian standard for Vandal-proof. The housing shall have an inbuilt heater and blower function.

7.2.3.1.4 Pan-tilt Head

Camera housing shall be mounted on a motorized pan-tilt head. The angles of the head and rotating and tilting speed shall be as follows:

Rotating angle: 360 degrees endless with pre-set pan and tilt speed of minimum 200^{o} per second faster.

7.2.3.1.5 Camera Control

1. The following control functions shall be provided to the system to cover a wider area and longer distance:
    a. Pan (right-left)
    b. Tilt (up-down)
    c. Zoom (wide–telescope)
    d. Focus (near-far)
    e. Wiper (on-off) *(optional)*

2. The TMCS Camera shall support H.264, H.265 video compression and shall support the latest ONVIF S & G protocol & SDK. The camera shall have auto motion detection and shall be capable of auto tracking the moving object, wrong direction detection, stationary object detection, face detection, 250 plus pre-set, patrolling mode, audio I/O ports, alarm I/O, multiple privacy masking features
3. The TMCS Cameras shall support edge-based video analytics motion detection, occlusion detection, line crossing, region entrance/exiting, intrusion and tampering.
4. The Camera shall have applicable BIS Certification.
5. Should be OWASP L2 Compliant before supplying equipment.

7.2.3.1.6 Image Enhancement Capability

The Camera shall have Image Enhancement features including electronic image stabilization, hue light compensation, backlight compensation, and three-dimensional digital noise reduction features, Wide Dynamic Range (WDR) 120 dB, optical defog etc.

7.2.3.2 Motion Detection surveillance camera, hooter alarm with beacon, and all-in-one solar streetlight

Deleted.

7.2.3.3 Power supply system

1. A solar power supply system consisting of a solar panel, a controller, a UPS and a battery bank shall be provided at each TMCS camera location that operates on solar power. Solar power equipment, except solar panels, shall be accommodated in the same cabinet as the TMCS camera controller or in a separate cabinet. The solar panel shall have sufficient size to generate the power required. The TIMS System Integrator shall provide support for the solar panel and connection between the panel and the controller, which shall not be exposed. A mechanism shall be provided to adjust the angle of the solar panel to the solar panel support and prevent pilferage. System Integrator is given the flexibility to install the solar panel at an appropriate height, provided that they ensure the safe operation of TIMS and successfully achieve the specified service levels and outcomes outlined in the RFP.
2. The battery shall be custom-built so that it cannot be used for any other application/purpose. It shall be designed such that the terminals/cells get damaged upon unauthorized removal of the battery from the enclosure/cabinet to prevent pilferage.
3. The battery shall provide power for the Camera for at least 24 hours even if solar power cannot be generated due to the weather condition. The TIMS System Integrator shall present the calculation of power consumption and capacity of the solar power supply system to be used for the TMCS system. The TIMS System Integrator shall also consider the power

requirement of network devices, wireless access points, PoE switch, SPD etc., during the calculation.

4. Proper earthing shall be provided at each equipment location.

7.2.3.4 Quality

1. TMCS camera system shall be designed to operate 24 hours a day and 7 days a week without shutdown. Thus, high reliability and availability shall be achieved.
2. Mean Time Between Failure (MTBF) calculated at 40°C should not be less than 1,00,000 hours for which OEM shall submit complete and detailed test reports issued from Govt. / Test Labs. / NABL Accredited Test Labs/ Internationally Accredited Test Labs such as UL/TUV
3. Availability of the system and each camera shall be 99% or better.

7.2.4 Equipment Location

1. TMCS camera shall be installed in the median or shoulder (as per the availability of space and OFC cable and chamber location) such that the monitoring of the entire route is ensured and there is no blind spot / black spot at nighttime between 2 TMCS locations. The number of cameras should be sufficient to monitor the key location, accident-prone areas, junctions, major median openings, major structures, urban areas, major villages junctions etc., through the entire journey of every vehicle on the road.
2. The TIMS System Integrator shall propose the actual locations to satisfy the above requirement. The exact location will be determined based on the alignment, geometry, and viewing area (based on site visit) and shall be approved by the Operating Committee and TIMS PMU.

7.2.5 Installation

TMCS camera shall be mounted on a pole installed in the median or shoulder beside the Highway at an appropriate height. The Pole shall be rigid enough so as to not vibrate under strong wind and passage of heavy vehicles. Optical fibre cable and power cable shall be extended from the nearest hand-hole at the shoulder where branch connection of cable is possible. The TMCS camera shall be connected to the nearest Wireless Access-point through the repeater/access point/transceiver appropriately.

7.2.6 Acceptance test

1. Camera, camera housing, pan-tilt head, TMCS camera station, Solar power system, and TMCS camera system central equipment shall be subjected to all stages of Acceptance tests, i.e., Factory Acceptance Test, during installation work and upon completion. Depending on the test

item, three types of tests, i.e., function, performance test and general test, shall be conducted.

2. Details of the test item, test procedure, and criteria to judge test results shall be proposed by the TIMS System Integrator subject to the approval of the TIMS PMU and Operating Committee.
3. In principle, the function and performance requirements stated above shall be tested.

7.3 Accident and Incident Detection (AID) System

7.3.1 General

Accident and Incident Detection (AID) System will be installed at the accident-prone and other essential areas identified by the enforcement agency and other vulnerable locations to detect incidents as well as both spot and stretch over-speeding and enable penalties for speeding vehicles.

7.3.2 Key Functions

7.3.2.1 Monitoring function

1. The road and traffic condition video and images taken by AID cameras on the project shall be transmitted as video signals to the Command Centre through the communication network. The TIMS Software shall be capable of selecting video signals from any AID camera to be displayed on the monitor and graphics display.
2. Sequential display function shall be provided to the TIMS Software. The sequential display function shall allow the video image from the multiple cameras to be sequentially displayed at a pre-set interval. It shall be possible to select the cameras for sequential display and to set the display time of the image from each camera.
3. The AID console and graphics display shall have multiple screen capability and shall display either one image or four images at a time. The image on the Graphics Display shall be controlled by the TIMS Software.
4. Deleted.
5. AID System shall also consist of ANPR Camera, Radar etc. solution for vehicle speed detection, vehicle identification, and enforcement of over-speeding vehicles, and speed display on VASD in real time. Solution provider may employ visual speed detection (entry/exit frames) using cameras or through other sensors (radar etc.) – choosing whichever is able to meet functional requirements the most economically.
6. The ANPR should work fully automatically day and night and capture court evidence images. ANPR Camera should also identify vehicle class, reverse vehicle movement detection, and wrong lane driving (on the bases of the vehicle classification, e.g., Bus/truck driving in the car/overtaking lane, vehicle continuously driving in overtaking lane, etc. The system shall be capable of capturing all type and classes of vehicles, including but not limited to 2-wheelers, three wheelers, tractor, over-sized, non-standard vehicles, etc.
7. Vehicle Actuated Speed Display (VASD) shall be installed at each location to cover all the lanes per direction. The purpose of the VASD is to display the speed of the vehicle to the driver and alert about his/her speed and prevent him/her from over speeding, hence shall act as speed calming device.

8. TIMS System Integrator may be required to integrate with AFS (ANPR cum FASTag System) for exchange of ANPR data, as per the requirement raised by MORTH / Operating Committee/ TIMS PMU in the future.

7.3.2.2 Incident detection

1. The AID system shall have an incident detection function and automatically detect incidents occurred within its viewing area when the camera is set at home position.
2. "Incident" refers to any untoward event on the stretches in the Scope of Work of the System Integrator, including but not limited to accidents with or without involvement of vehicles (vehicle run-off road, vehicle collision, vehicle flipped, hit by another vehicle, animal hit, vehicle collision with median / shoulder fencing / MBCB / crash barrier), run-off-road collision, roadblocks, traffic violations such as over-speeding, wrong direction driving, wrong lane driving, dangerous driving (e.g., in a zig-zag manner), natural disasters along the stretches (e.g., landslides), etc.
3. If an incident is detected, TIMS Software shall generate an alarm and incident image shall be automatically displayed on the AID operator console monitor display and Graphics Display. The GIS Map shall show the location of the incident with a red dot and a popup of the video.
4. Deleted

7.3.2.3 Image recording and retrieval

All images of AID cameras shall be automatically recorded in the CVR at the Command Center with camera ID and time stamp. The frame rate of the video signal can be configured to one frame to 60 frames per second to optimize the storage capacity as per the site requirements. Images shall be stored for minimum 180 days.

7.3.2.4 Diagnosis

1. The AID system shall have a diagnosis function.
2. The TIMS Software shall check the connection with the AID camera and the status of AID camera by sending the diagnosis signal every minute. If an AID camera fault signal is received or there is no response from the AID camera, the TIMS Software shall issue an alarm on the Graphics display and operator console.
3. The fault shall also be recorded in the log.

7.3.3 System Configuration

1. The AID system shall consist of the following components:
    a. AID system cameras
    b. Deleted.

c. LPU at the roadside

d. Cabinet

e. Solar and UPS/PCU

f. Network equipment

g. ANPR Camera

h. Vehicle Actuated Speed Display with Speed Radar

i. Civil Works and Gantry Structure, etc.

2. No periodical manual adjustment shall be required in cameras and Local Processing Units (LPU).
3. The AID application shall be provided to the Command Centre for receiving pre-processed data from AID LPU on the Project. The data collection interval shall not be more than 60 seconds.

7.3.3.1 AID Camera

1. The IP camera shall be POE/POE+ powered Box type with Housing with inbuilt IR of 30 meters.
2. The Camera shall have inbuild SD card slot and shall be provided with at least 256 GB class 10 SD card.
3. The shutter speed of the camera shall be 1/30 second to 1/10000 seconds for capturing the motion detection even during low light condition and provide proper image.
4. The face detection/object detection function shall be activated as soon as the motion detection is triggered.
5. The camera shall support motion detection, alarm/audio detection, tampering and trip zone.
6. Whenever any event is triggered, the camera shall record the event on SD card also.
7. The camera shall accompany infrared illuminators or thermal sensors to ensure incidents (debris, fog, accidents, pedestrian, animal crossing etc.) are automatically detected in night conditions also in the range of upto 100m.

7.3.3.1.1 Lens

2 MP Full HD motorized varifocal lens with minimum 6-50 mm motorized AI\uto IRIS, Varifocal Lens function having optical defog (Optional) feature and Motorized / AI VF Varifocal and Focus, P-Iris / auto-Iris, auto focus covering suitable range of focal length shall be provided and mounted on the camera. The range of the camera shall be minimum 60 meters. The resolution shall be full HD at 30 FPS.

7.3.3.1.2 Night vision capability

Cameras shall have inbuilt IR illuminator of 60 meters for night vision functionality. External IR illuminator shall be acceptable in case of box cameras, however inbuilt IR shall be preferred. The minimum illumination shall be of 0.1 lux for colour image with automatic gain control on in auto/ manual mode. The camera shall be capable of recording black and white video even in 0 lux with IR up to a distance of 60 meters.

7.3.3.1.3 Camera Housing

The camera shall be housed in a suitable housing to protect them from solar radiation, UV, dust and rain. The field of view of the camera shall not be obstructed by the housing. Picture quality or optical performance shall not be degraded by the housing. The Housing shall have IP-66 or higher rating for Weather-proof, and rating IK10 or higher rating for Vandal-proof

7.3.3.1.4 Image enhancement capability

The camera shall have hue light compensation, backlight compensation, and three-dimensional digital noise reduction features. The camera shall support a true wide dynamic range of a minimum of 120 dB.

7.3.3.2 Motion Detection surveillance camera, hooter alarm with beacon, and all-in-one solar streetlight

Deleted.

7.3.3.3 Power Supply System

1. A solar power supply system consisting of a solar panel, a controller, a UPS and battery bank shall be provided at each location that operates on solar power. Solar power equipment except solar panel shall be accommodated in the same stainless-steel cabinet as controller or in a separate stainless-steel cabinet. The solar panel shall have sufficient size to generate the power required. The TIMS System Integrator shall provide the support for solar panel and connection between the panel and the controller, which shall not be exposed. A mechanism shall be provided to adjust the angle of solar panel to the solar panel support and prevent pilferage. System Integrator is given the flexibility to install the solar panel at an appropriate height, provided that they ensure the safe operation of TIMS and successfully achieve the specified service levels and outcomes outlined in the RFP.
2. The battery shall provide power for Camera for at least 24 hours even if solar power cannot be generated due to the weather condition. The TIMS System Integrator shall present the calculation of power consumption and capacity of solar power supply system to be used for the system. The TIMS System Integrator shall also consider the power requirement of network devices, wireless access points, PoE switch, SPD etc. during the calculation.
3. Proper earthing shall be provided at each equipment location.

4. Power consumption of all types of AID shall be 100VA or less regardless of the type of power supply.

7.3.3.4 AID LPU and Cabinet

1. LPU (Local Processing Unit) shall be a fan-less industrial grade rugged compact CPU housed in a cabinet together with power supply and network equipment.
2. The cabinet shall be electrically and mechanically isolated and shall have a degree of protection of IP 55 or higher specified in IEC 60529. If necessary, the cabinet may be provided with a ventilation fan for controlling internal temperature, but the protection code requirements shall be met.
3. A right-hinged door shall be provided on the front to realize easy maintenance work.
4. The turning direction of the handle shall be counterclockwise.
5. The power supply unit shall be provided with a circuit breaker.
6. The anti-lightning and surge protection complying with the IEC 61643-1 shall be provided.
7. The cabinet shall be finished with the anticorrosive treatment.
8. The TIMS System Integrator shall state the details of the anticorrosive treatment and painting.
9. The Cabinet shall have door open alert feature and alarm to be sounded locally as well as the Command Center.
10. The Cabinet shall have suitably built with appropriate locking arrangements to protection from theft, vandalism etc.
11. The cabinet shall be of suitable size to accommodate the equipment to be housed in the cabinet and shall be designed to meet the environmental conditions at the site and cooling, heating, ventilation requirement for the equipment, etc.

7.3.3.5 Local warning flashing lights and Alarm

1. The local AID controller shall be enabled to provide appropriate local warnings (in the interest of road safety) to vehicles on the main carriageway on detection of incidents like reverse traffic (along with warning to the Command Center).
2. Pole mounted flashing lights of minimum 300mm diameter with at least 96 hours solar power backup with a visibility of at least 500m shall be used for local warning.
3. There shall be at least five such warning lights each mounted typically at a distance of 100 meters and 200 meters before the incidence monitoring point when seen from the direction of travel. The above distances shall be suitably optimized during detailed engineering. Two warning lights shall be installed in the median and three on the shoulder side.

4. The lights shall be powered by a local solar PV-based power supply with inbuilt Li-ion battery and shall be interconnected with the incident detection system either by cable or by wireless (GSM based).
5. During periods of poor visibility, as detected by the AID or Command Center operator, the lights shall go into a flashing mode until visibility improves to a level for adequate incident detection. The Command Center operator shall have the option to turn on/off the lights remotely.
6. The above lights shall stop flashing either in the event of the disappearance of the detected incident(s) or on the occurrence of a reset from the Command Center operator.
7. In case of failure of the AID LPU, the above lights shall, by default, switch to the flashing mode.

7.3.3.6 Solar powered Amber Flasher Light

Deleted.

7.3.3.7 Public Announcement System

Deleted.

7.3.3.7.1 Power Amplifier for Public Address (PA) System.

Deleted.

7.3.3.7.2 PA IP Speakers with brackets.

Deleted.

7.3.3.7.3 Desktop goose neck type paging microphone:

Deleted.

7.3.3.8 Quality

1. The system shall operate on a 24x7 basis. The AID shall be capable of taking clear images of road and traffic conditions under any brightness conditions during the daytime and night-time.
2. Mean Time Between Failure (MTBF) calculated at 40°C should not be less than 1,00,000 hours for which OEM shall submit complete and detailed test reports issued from Govt. / Test Labs. / NABL Accredited Test Lab/ Internationally accredited test labs such as UL/TUV.
3. It shall be the responsibility of the TIMS System Integrator to furnish and install all necessary hardware, software, and database, integrate all system components and deliver a complete operational VID.

7.3.3.9 ANPR Camera

1. The ANPR Camera should be installed on site along with the AID Camera. The System Integrator may employ visual speed detection (entry/exit frames) using ANPR cameras or through other sensors (radar etc.) – choosing whichever is able to meet functional requirements the most economically.
2. Success rate of number plate recognition, reading and associating with transaction shall not be less than 90% during night-time at a speed of 180 kmph for standard number plates. The vehicle image capturing, and processing zone shall be within 40 meters for higher accuracy.
3. The night vision should not affect the accuracy.
4. The camera shall capture the image of each over speeding vehicle for spot speeding with speed data and each vehicle for section speeding and send to the control room. In case the ANPR/OCR is unable to read/recognize the number plate, the system shall create an incident and send an alert to the operator. The operator shall be able to zoom the vehicle image to read the registration number plate and manually enter the vehicle number in the system for further processing. The TIMS System Integrator shall be responsible to propose the system capable of processing all over speeding vehicles, irrespective of the accuracy, read rate of the ANPR.
5. The images of each ANPR camera shall be stored for a period of 180 days in H.264/ H.265/ JPEG format. The cost of storage shall be borne by the System Integrator. The number of images per violation shall be proposed by the TIMS System Integrator such that the same can be produced to the enforcement agency as and when required as an evidence of speed violation. It shall be solely the responsibility of the TIMS System Integrator to produce the evidence and provide required support to the Authority and enforcement agency for justifying the speed violation.
6. The system should be verified on 6-month basis and the certified test report shall be submitted to the Operating Committee and TIMS PMU.
7. The software shall correctly link the image captured by the ANPR camera with radar speed data.
8. The commissioning certificate shall only be issued after authentication of the test reports and calibration certificates. Radar speed should be verified by a calibrated Laser gun, – as per MVD rule;167a requirements.
9. The cameras shall be POE / 12VDC powered box type with external IR of illuminator to cover the field of view of the ANPR camera.
10. The Camera shall have inbuilt SD card slot and shall be provided with at least 256 GB class 10 SD card / suitable storage at site.
11. The shutter speed of the camera shall be 1/30 second to 1/10000 seconds for capturing the motion detection even during low light condition and provide proper image.

7.3.3.9.1 Lens

Suitable day & night corrected lens should be provided each camera to provide required resolution at day & night conditions External IR illuminator are always recommended. The minimum illumination shall be of 0.15 lux for colour image with automatic gain control on in auto/ manual mode. The camera shall be capable of recording black and white video even in 0 lux with IR up to a distance of required by the ANPR cameras.

Camera should have required dynamic range to capture retro & non retro number plates and also vehicle image with high quality, seatbelt identification also should be possible at night in most situations.

7.3.3.9.2 Night vision capability

Cameras shall have inbuilt IR illuminator of 60 meters for night vision functionality. External IR illuminator shall be acceptable in case of box cameras, however inbuilt IR shall be preferred. The minimum illumination shall be of 0.1 lux for colour image with automatic gain control on in auto/ manual mode. The camera shall be capable of recording black and white video even in 0 lux with IR up to a distance of 60 meters

7.3.3.9.3 Camera Housing

The camera shall be housed in a suitable housing to protect them from solar radiation, UV, dust and rain. The field of view of the camera shall not be obstructed by the housing. Picture quality or optical performance shall not be degraded by the housing. The Housing shall have IP-66/IP-68 rating for Weather-proof with better dust & dirt protection, The housing shall have built-in heater and blower.

7.3.3.10 Vehicle Actuated Speed Display (VASD)

7.3.3.10.1 Function

The speed display shall display the speed of the vehicle in real-time and provide textual or graphical warning to the vehicles exceeding the pre-set speed limit. The speed shall be displayed in green colour if the speed is within the permissible limit for the vehicle class, orange colour if the speed is matching the speed limit, and red if the vehicle is over-speeding. The display shall blink continuously if the speed of vehicle is more than 120% of the permissible speed limit, along with the message “Over-Speed – Slow down” in the first row of the display. One speed display shall be installed for each lane on both the sides of the road.

Time shall be displayed at the top section of the display in HH:MM:SS (24 hour) format at all the times, even if no speed is being displayed on the VASD. The font size shall be suitable and visible from 100 meters distance. The time on all the displays shall be synced with the central server.

7.3.3.10.2 Specifications

1. The system shall perform during day and night as well as in adverse weather conditions.

2. It shall have built in diagnostic functions to quickly assess the validity of speed calibration.
3. It shall adjust display intensity automatically to suit the ambient light conditions.
4. It shall be modular in construction for ease of maintenance.
5. It shall display numeric speed data as well as graphical (standard IRC road warning sign) (preferably) / textual warning.
6. Measurement:
   a) Speed range: 0.5 km/h to 200 km/h
   b) Minimum Monitored section length: 100m
7. It shall have the facility to log vehicle speed of over- speeding vehicles and transfer them to the TIMS Command Center.
8. The speed display shall be formed using individual modules.
9. Speed display must be constructed using corrosion resistant panel with LED pixels in row: column matrix.
10. The Display shall show the speed in green colour if the speed is within 80% of the limit for the vehicle class, orange if the speed in exceeding 80% of the speed limit and red (blinking) if speed of the vehicle exceeds the speed limit for the vehicle class.
11. Scanning/Multiplexing ratio shall be 1/8 or better.
12. The LED Cluster shall consist of individual LED`s rated for out-door use.
13. The board size shall be minimum 750 mm (W) x 750 mm (H) ±5%
14. The LED configuration shall be 3 in 1 SMD and the pixel pitch shall be 6mm outdoor or better. Lower pixel pitch shall be considered better. The pixel density shall be more than 2500 pixels per square meters.
15. The LED board shall have the capacity to display any content, graphics, videos, symbols, text in full matrix, with multiple font size and character height, and multiple languages.
16. Shall support an industry standard communication interface such as TCP/IP on copper, Wi-Fi, and/or fibre optic to help setting the pre-set speed and retrieve log data.
17. Shall maintain time stamped record (speed and vehicle image) of each case of over speeding in a log file that can be retrieved over the connected network or using a locally connected laptop.
18. It shall optionally be possible to configure the display to send real time violation event record (speed, and time stamp) over the connected network while recording the same
19. It shall be possible to control the brightness of displays automatically using built-in light sensors.

20. All PCBs shall be of FR4 material, 1.6mm thick and LED matrix PCB shall be 2.4mm thick. PCBs shall be of quality suitable for use in the environmental conditions as specified.
21. The equipment shall allow local diagnostics via laptop connected to its communication port.
22. Display size shall be suitable to display both the speed of the vehicle and warning message simultaneously in two rows.
23. Brightness intensity shall be 7500 cd per sq.m. with option to adjust the brightness manually as well as auto brightness adjustment feature.
24. Fault diagnostics shall be provided to include the following as a minimum:
    a) Radar Failure
    b) LED Failure
25. The radar Sensor must have high accuracy and detection range. The operational range should be 90 meters.
26. The Sensor shall be Capable for the tracking up to 32 vehicles simultaneously.
27. The accuracy of speed detection shall be more than 98% at a speed range of 0.5 to 200 km/hr.
28. The radar shall be calibrated and tested by the third-party for speed detection. The commissioning certificate shall only be issued after authentication of the test reports and calibration certificates.

7.3.4 Equipment Location

ANPR, AIDS, Radar and VASD shall be installed at suitable locations as identified during the survey by the TIMS System Integrator and approved by the TIMS PMU and Operating Committee. The Cameras shall be installed in the section where the over speeding chances as well as chances of incidents occurring are higher (blackspots, potential accident spot locations, clovers, interchanges, busy junctions etc).

7.3.5 Installation

AID camera station (local control electronics) shall be installed in AID cabinet on the gantry.

To the extent feasible, all equipment (including VASD, Radar, ANPR camera, AID Camera) shall be installed on the same gantry.

7.3.6 Acceptance Test

Acceptance test shall be conducted for AID system at the factory (before Site Acceptance test), during installation work and upon completion depending on the test item. Test will be classified into two types, functional and performance test, in addition, trial operation shall be conducted after the Acceptance test.

Details of the test item, test procedure, and criteria to judge test results shall be proposed by the TIMS System Integrator subject to the approval of the TIMS PMU and Operating Committee.

7.4 Vehicle Speed Detection System (VSDS)

Deleted.

7.4.1 General

Deleted.

7.4.2 Key Functions

Deleted.

7.4.3 System Configuration

Deleted.

7.4.3.1 Roadside Equipment

Deleted.

7.4.3.2 Command Center Equipment

Deleted.

7.4.3.3 Camera

Deleted.

7.4.3.3.1 Lens

Deleted.

7.4.3.3.2 Night vision capability

Deleted.

7.4.3.3.3 Camera Housing

Deleted.

7.4.3.4 ATCC Camera Specifications

Deleted.

7.4.3.5 VSDS LPU and Cabinet

Deleted.

7.4.3.6 Vehicle Actuated Speed Display (VASD)

7.4.3.6.1 Function

Deleted.

7.4.3.6.2 Specifications

Deleted.

7.4.3.7 4D Radar System

Deleted.

7.4.3.8 Motion Detection surveillance camera, hooter alarm with beacon, and all-in-one solar streetlight

Deleted.

7.4.3.9 Power supply system

Deleted.

7.4.3.10 Quality

Deleted.

7.4.4 Equipment Location

Deleted.

7.4.5 Installation

Deleted.

7.4.6 Acceptance test

Deleted.

7.5 Design Principles of TMCS, AID, and Other Foundations

7.5.1 System Integrator's Detailed Survey and Design

Before commencing the actual work, System Integrator shall carry out the field detailed survey/design of the facilities. The detailed drawings including the calculation data based on the survey/design shall be prepared and shall be submitted to Operating Committee and TIMS PMU for approval.

7.5.2 Construction of Foundation

7.5.2.1 TMCS, AID, and other Foundations

System Integrator shall comply with the following specifications for preparing and mixing concrete.

All foundations shall be constructed with a ready-mixed or site-mixed, M20 Grade Or if made manually then the concrete when made with a normal Portland Cement, shall attain a minimum compressive strength of 2,500N/cm2 (250kg/cm2) in 28 days (cylinder type) , or when made with a high rapid strength Portland Cement, it shall acquire the same strength in 7 days (Test to be performed on cylindrical type concrete specimen of size 150mm x 300mm).

The slump range for the concrete used in the construction of foundation shall be between 8 and 15cm.

MoRTH may order three (3) test pieces (cylinder type) from any batch of the concrete to be taken and properly marked for the laboratory test as required.

The concrete shall be slowly poured around the moulds or forms, up to adequate level evenly and tamped into all parts of the moulds or forms, by using a vibrator until a densely solid mass without cavities is obtained.

The concrete, once mixed, shall be used within 60 minutes. After one hour, any remaining concrete shall be removed and shall not be used.

Cement mortar shall consist of one (1) measure of Portland Cement and two (2) measures of sand.

The concrete shall be covered with saturated sackcloth or similar materials and shall be sprinkled with water to keep sufficient moisture, adequate times a day for 7 days.

7.5.2.2 Excavation for Foundation

1. The System Integrator shall take all countermeasures necessary for safety of the public and for protecting and preserving any and all temporary or permanent utilities.
2. System Integrator shall obtain all permissions, right-of-way and/or permits necessary for the execution. The permissions shall include property owners' approvals for necessary work on their properties.

3. System Integrator shall be directly responsible for all damages to existing utilities and shall restore these services immediately at his own expense.

7.5.2.3 Backfilling

1. Backfilling shall commence after notifying TIMS PMU.
2. Upon completion of the backfilling, all remaining soil shall be removed and the road surface, pavement and the area concerned shall be immediately cleaned.
3. Before backfilling, all foreign objects shall be removed from the excavation.

7.5.3 Material for Foundation

7.5.3.1 Cement

1. All cement used in underground construction shall be Portland Cement and in accordance with BS 12 or equivalent.
2. The cement shall be stockpiled in such a manner as to afford easy access for inspection. Cement shall be kept dry at all times prior to use in order to prevent deterioration. Open air storage of cement shall not be permitted.
3. Deteriorated cement, such as cement containing lumps that are too difficult to powder by hand, shall not be used.

7.5.3.2 Water

1. All water used for mixing and curing of concrete shall be supplied by the waterworks.
2. Water from other sources may be used only if authorized by MoRTH after tests have shown the quality to be better than that supplied by the waterworks.
3. Water from any source which has been contaminated with dirt, oil, salt or other foreign substances shall not be used.

7.5.3.3 Fine Aggregate

1. The fine aggregate for concrete shall consist of natural river sand or equivalent material.
2. The fine aggregate shall be uniformly graded and shall meet the grading requirements as follows:

Sieve Designation	Percentage by Weight Passing square mesh sieve
(10.0mm)	100
No.4 (5.0mm)	95 to 100

No.16 (1.2mm)	45 to 80
No.50 (0.3mm)	10 to 30
No.100 (0.15mm)	2 to 10

3. The fine aggregate shall be stored in such a manner as to prevent mixture with other aggregate prior to the use and also to prevent inclusion of foreign materials.

7.5.3.4 Coarse Aggregate

1. The coarse aggregate for concrete shall consist of crushed stones having hard, strong and durable pieces free from adherent coatings such as mud or other foreign materials. The coarse aggregate shall be graded between a maximum size of 25mm and a minimum size corresponding to No.4 sieve size. It must be free from dirt, floury stone dust, earth or any similar materials.
2. The coarse aggregate shall be stored in such a manner as to prevent mixture with other aggregate, prior to the use and also to prevent inclusion of foreign materials.

7.5.3.5 Reinforcing Bar

Reinforcing bars shall be deformed steel bars. The bars shall be free from dirt, oil, paint, grease, thick rust and other defects and shall confirm to the following requirements:

Item	Unit	Specific Value
Tensile Stress at Minimum	N/mm2	500 (49 kg/mm2)
Yield Point at Minimum	N/mm2	300 (30kg/mm2)
Elongation at Minimum	%	14
Design Stress	N/cm2	160(1,600kg/mm2)

7.6 Power and Other Cables, Power conditioning equipment

7.6.1 Power Cable

7.6.1.1 Type of Power Cable

The types of cables shall be as follows:

No.	Item	Specifications
1.	Outdoor Power Cable	Minimum 1.5 square mm - 22 square mm, 3 cores

7.6.1.2 Specification of Outdoor Power Cable

Outdoor power cable shall meet the following specifications:

1. Bright annealed, 99.97% electrolytic grade
2. Copper conductor (solid/stranded),
3. Voltage grade 1100 V,
4. Single or multi core cable,
5. Flame retardant low smoke (FRLS),
6. PVC / XLPE insulated,
7. With high oxygen and temperature index
8. Armored,
9. IS 8130, IS 5831, IS 3975, IS 1554 (Part I) / IS 7098 (Part I) or BS 6346/ IEC 60502

7.6.2 Power Conditioning Equipment System

7.6.2.1.1 General

1. This specification lays down the general, functional and technical requirements of the power conditioning equipment.
2. Power supply rated at 440V, 3 phases will be made available at the Essential Supply Board of the Command Center Building. This supply will be backed up by standby generators to be provided by others; should there be an absence of electrical power.
3. A power distribution board (PDB) shall be supplied and installed under this Contract. The TIMS System Integrator shall provide power distribution board at other locations where necessary, and the cost of such power distribution board shall be considered included in the Contract Price
4. The TIMS System Integrator shall supply and install UPS systems indicated below. All equipment except the equipment with solar power supply shall be provided power through this UPS to make sure that the power is continuously available to all equipment during the interruption of commercial power.

7.6.2.1.2 System Configuration

The UPS system shall consist of the following components:

1. UPS at Command Center, and all Road-side equipment
2. Power distribution board at the Command Center, and all Road-side equipment

7.6.3 Type of UPS

1. Rating of UPS Type for the Command Center shall be 10KVA, 15KVA or 20KVA.
2. The TIMS System Integrator shall make his own calculation of the rating based on the power requirement of the equipment he supplies and the sound engineering practice. The TIMS System Integrator shall submit the calculation and the rating to the TIMS PMU for his approval before the supply of the UPS.

7.6.3.1 Installation Location

1. All the UPS to be provided shall be online type UPS only with minimum 4-hour back-up for Command Center and 24 hours for roadside equipment. The minimum UPS rating for each system and subsystem shall be as shown in the table below:

No.	Position	For TIMS		Remarks
		UPS Rating (minimum)	Tentative Quantity*	
1	For Server Rack	10 KVA	2	1 at Command Center (4 hours backup each)
2	Command Center	20 KVA	2	In Hot Standby configuration (4 hours backup combined)
3	Road-Side Equipment	TIMS System Integrator to Propose	1 at each location	With solar panel TMCS: Minimum 24 hours backup AID: Min. 24 hours backup ANPR: Min. 24 hours backup

*Actual quantity of UPS as per the project / site requirement, to be finalised by the Operating Committee/ TIMS PMU.

2. The TIMS System Integrator shall be responsible to calculate the UPS rating required for each location in the configuration as mentioned in the table above, based on the load of the equipment being proposed.

7.6.4 Cabinet

7.6.4.1 Fabrication

Panel or distribution board shall be wall mounted. It shall be fabricated or readymade with 14/16SWG CRCA Sheet, compartmentalized, double door hinged type. Gasket shall be provided to prevent the ingress of dust and vermin confirming to degree of protection IP-54 (panel) and IP-43 (distribution board), IP-65 (outdoor) with suitable space & direction for cable entry. Distribution board shall be cleaned with 7 Tank process, powder coated with primer and epoxy paint as per IS 2174/1962 as amended.

7.6.4.2 Switchgears & Meters

All switchgears (MCCB / MCB / fuses/ measuring instruments / meters/ indicating lamps / relays / switches) rating, capacity, make, kA rating, dimension shall be as per the type of DB with quick make & break type operating mechanism suitable for rotary operation with suitable extended operating handles with capacity and position marking on door, flush mounted, with suitable spreaders / links for cable connection as per IS 1248, 2208, 4237, 8623, 10118 (Parts I to IV).

7.6.4.3 Wiring

All power wiring within panel and distribution board shall be with suitable size flexible copper wire of 1.1kV grade, C.T. & control wiring with 2.5 square mm and 1.5 square mm, respectively

with 1.1kV grade with proper lugging, ferruling, and connection with SS Nut - Bolt with adjustable and fixed washer.

7.6.4.4 Indication and Marking

All distribution board and panel shall have suitable main name plate, feeder name plate, danger board plate engraved or anodized aluminium type as per IS 2551. All panels and distribution boards shall have earthing node, point or strip similar to busbar as per IS 3043.

7.6.4.5 UPS Specification

The UPS system to be provided under the Contract shall comply with the specifications below.

Description	Specifications
Rated Power	10 KVA/20KVA
Technology	i. True online rack mountable IGBT based UPS with double conversion technology.
	ii. UPS should be capable of paralleling up to 2 units or better .
	iii. UPS should have IGBT based rectifier and inverter.
	iv. Advance battery management feature should be built in for prolonged battery life
	v. The UPS should be compatible for single phase input and single-phase output supply.
Input	i. Voltage range 110 -275 V, Load dependent ,1 Ph,380v AC3 Phase
	ii. 45-55Hz / 54-66Hz (extendable to 40~70HZ when load < 60%)
	iii. Power Factor 0.99 (With PF correction)
	iv. Capacity as per rating
Output	i. Voltage range 220 /230/240 VAC +/- 2%
	ii. Harmonic distortion <3% (Linear Load); <5%(Nonlinear load)
	iii. 45-55Hz / 54-66Hz (extendable to 40~70HZ when load < 60%)
	iv. Power Factor Unity
	v. CREST factor 3:1
Efficiency	@ 230V output with typical load (Line mode with battery full charged)
Battery	i. Type - Sealed lead , acid maintenance free (SMF)

Description	Specifications
	ii. Backup Time - 04 hours hours in parallel mode
	iii. Transfer Time – Zero
Display	Multi-language LCD + status LED
Interface slot	USB & Intelligent Slot (SNMP)
Protection Grade	IP 20
Auto shutdown Software	UPS should come with Auto shutdown and monitoring software in CD media
Credentials	i. Manufacturer should be ISO 9001: 2000 certified
	ii. Manufacturer should be ISO 14001 certified
	iii. UPS should meet ROHS standards
Warranty	UPS Should have 05 years Onsite warranty and Batteries should have at least 05 years Onsite warranty
Surge Regulations	IEC 61000-4-5 Level 4
Parallel Cable component	For running UPS in parallel
Rated Voltage	2KVA / 3KVA
Technology	True Online Double Conversion Microprocessor based 2 kVA/1.6 kW UPS as per Bureau of Indian Standards
	UPS should have IGBT based rectifier and inverter.
	Advance battery management feature should be built in for prolonged battery life.
	The UPS should be compatible for single phase input and single phase output supply.
Input	i. Voltage range 110 -300 V, Load dependent
	ii. UPS Input Frequency should be 50Hz with frequency window 40 Hz to 70 Hz.
	iii. Power Factor 0.99 (With P.F correction)
	iv. Capacity as per ratting
Output	i. Voltage range 220 /230/240 VAC +/- 2%

Description	Specifications
	ii. Harmonic distortion <3% (Linear Load), <5%(Nonlinear load)
	iii. UPS output frequency should be 50 Hz +/-1%
	iv. Power Factor 0.8
	v. CREST factor 3:1
Efficiency	UPS should provide online double conversion efficiency >90%, provide Economy mode efficiency >97.5% and provide Battery mode efficiency >86% and should be certified from Bureau of Indian standard lab
Battery	i. Type - Sealed lead acid maintenance free (SMF)
	ii. Backup Time- 04 hours in standalone mode & @ Full load
	iii. Transfer Time – Zero
	iv. Audible Noise - <51 db
Display	UPS LCD display should provide Input/output/Battery/Load details on single screen.
Interface slot	RS232 & Intelligent Slot (SNMP)
Output socket	UPS should have 3* IEC C13 Output Socket + 1 terminal block
Protection Grade	IP 20
Auto shutdown Software	UPS should come with Auto shutdown and monitoring software in CD media
PCB Coating	UPS should come with conformal coated boards for harsh environment
Surge Regulations	UPS should have inbuilt surge protection as per Criteria B, DM Level 3: 2KV, CM Level 4: 4KV Ref Std : IEC 61000-4-5:2014
Credentials	i. Manufacturer should be ISO 9001: 2000 certified
	ii. Manufacturer should be ISO 14001 certified
Warranty	UPS Should have 05 years Onsite warranty and inbuilt Batteries module /EBM should have at least 05 years Onsite warranty

7.6.5 Cable Installation Work

7.6.5.1 Cable Pulling

1. Sufficient care shall be taken, and measures shall be taken during the loading, transportation and unloading of cable drum so as to avoid shock and damage to the cable.
2. Appropriate surplus of cable shall be required at inside of handhole/ manhole.
3. Cable shall be connected only inside the handhole/ manhole.
4. Cable tag (plastic plate) describing the name of the cable (power cable or earthing cable) and the origin of cable (cable name, type of cable, interchange name & etc.) shall be attached to the cable.
5. During the installation of cable, the following constraints shall be observed:
    a. The maximum tension allowed.
    b. The minimum curvature radius allowed: When installing cable at the handhole/ manhole, curvature radius shall be more than 6 times of the diameter of the cable being laid at all times. After cable laying work, minimum radius of more than 20 time of the diameter shall be ensured.
    c. Extension speed of layin
    d. Towing cable shall be made smoothly without any excessive tension intermittently at the time of laying, and calibration of appropriate apparatus for setting up allowable tension shall be required.
    e. The extension of cable shall be carried out at a constant speed and it shall apply the suitable back tension for a drum to avoid hunching.
    f. Cable in the point in a handhole/ manhole shall have at least 3 m margin complied with curvature radius at every handhole/ manhole and the point of handhole/ manhole terminal equipment shall have the 3 m margin at both sides of branch.
6. Winding up of Insulating tape for the connecting point of electric wire shall be required.
7. Connection between electric wire and terminal equipment shall be connected using terminal lug or a screw.

7.6.6 Inspection and Acceptance test

Acceptance test specified shall be performed by the TIMS System Integrator under the supervision of TIMS PMU. Necessary equipment and materials for the site inspection and the Acceptance tests shall be provided by the TIMS System Integrator at his own expense. Written report including the test results shall be prepared by the TIMS System Integrator and verified by the TIMS PMU.

7.7 Digital Transmission System

7.7.1 Digital transmission system

The field / roadside equipment deployed under the scope of this Contract shall be connected with the central equipment at the Command Center and data and voice are exchanged between them. Digital transmission system is required to perform the service of data and voice communication. IP based digital transmission system over optical fibre cable shall be provided for this purpose. The network devices and equipment shall be IPv6 ready and compliant as per DOT, DPIIT, and Govt. of India latest guidelines, as applicable during the supply of the system.

The TIMS System Integrator shall rent optical fiber bandwidth from existing ISPs and design, supply, install and test any additional components required to build a fully functional digital transmission system that satisfies the needs of the component systems in terms of speed, bandwidth and reliability.

7.7.2 System configuration

Digital transmission system shall consist of local line transmission system and access line transmission system. The former connects between nodes established along the Highway and uses optical fibre cable while the latter connects roadside facility to the node using optical or metallic cable.

It is specifically noted that when the Highway is extended, trunk line transmission system will be introduced for long distance data transmission between the Command Center and the offices on the highway. Digital transmission equipment for trunk line transmission system will not be installed under this project. The local line transmission system to be provided shall be compatible with the standard digital transmission system commonly used in trunk line transmission. The optical fibre cable to be installed along the Project shall have minimum 48 cores to accommodate trunk line system.

All transmission cables shall be optical fibre cable having suitable number of cores.

7.7.3 System design

The TIMS System Integrator shall undertake the detailed design of the digital transmission system. The design work shall include but not be limited to transmission protocol, network and transmission equipment, type and size of cable, cable splicing, conduit and cable installation work, manhole, handhole and pull box at bridge and earth sections.

Digital transmission system shall adopt IP. Suitable media and transmission protocol at Layers 1 and 2 shall be decided and type of digital station equipment shall be selected. In developing the design, various factors such as amount and type of data, transmission distance, quality of service (QoS), reliability, latency, and changeover time to backup route shall be considered. Type of

optical fibre cable shall also be considered in the design. Packet based transmission system will be preferred than circuit-based transmission system such as Gigabit Ethernet.

Layer 3 switch will be used at each node to connect local network or device to the local line network. Layer 2 switch will also be used to connect devices to the local network.

In addition to the equipment listed above, the system requires fibre distribution frame and main distribution frame for cable termination, surge arrester or similar surge protection device to protect the equipment from the lightening, and accessories necessary for cable installation. The TIMS System Integrator shall supply and install these devices and accessories.

7.7.4 Reliability

Digital transmission system shall have high reliability to ensure continuous operation of the system. Bit error rate for the end-to-end data communication must be 1 x 10-6 or better.

7.7.5 Capacity and quality of service

The digital transmission shall have a sufficient capacity in terms of speed and bandwidth to meet the demands to be decided, based on the estimated amount of data including digitized voice data at each facility such as Command Centre, Toll Plazas, and service area/wayside amenities. Video signal from the TMCS camera shall be transmitted in H.264/H.265 format and the digital transmission system shall provide sufficient capacity for it. The TIMS System Integrator shall estimate the type, amount and location of data transmission need and design the system, equipment and cables that satisfy the demand.

Quality of service (QoS) capability shall be provided to the digital transmission system to ensure smooth and uninterrupted delivery of data for voice and video image transmission required for AID, ANPR and TMCS camera system.

7.7.6 System supervision

The digital transmission system shall be equipped with a supervisory function which continuously monitors the system operation and issues an alarm in case malfunction is found. The supervisory shall have the following functions:

- Management of occurrence and recovery of malfunction - Registration and modification of system configuration
- Registration and modification of network configuration
- Testing of equipment and circuit
- Logging of equipment operation and cable
- Changeover between primary and backup routes

7.7.7 Communication Cable

7.7.7.1 General

The type of cable for digital transmission system shall be as per the design and site requirement. The cable having suitable number of cores for optical cable and pairs for metallic cable shall be selected. Two types of cable, optical fibre cable and metallic cable shall be used for digital transmission system along the Highway. In addition, power cable of suitable size shall be installed to provide power to the roadside equipment, as applicable.

7.7.7.2 Specification

Optical fibre cable (OFC) to be installed along the Highway (main duct route) shall have a minimum of 24 cores. Branching of optical fibre cable shall be made in such a way that only the cores connected to the facility are taken into the facility and other cores will be bypassed. Splicing of optical fibre cable shall be made with the method that allows re-opening of splicing housing and change of connection. The connection of core shall be made with fusion splicing.

Other materials not specified in this Part shall be based on the TIMS System Integrator's own technical specifications, subject to the approval of TIMS PMU.

7.7.7.2.1 OFC Specification

The optical fibre cable to be supplied and installed under the TIMS System Integrator shall be single-mode fibre optic cable having characteristics meet ITU-T G.652B, or equivalent and specification as below.

No.	Item	Specifications	
1.	Cable type	OF-SM 24C OF-SM 8C	
2.	Number of cores	OF-SM 24C: OF-SM 8C:	24 cores 8 cores
3.	Mode	Single mode	
4.	Cladding diameter	125.0 µm ± 1.0	
5.	Coated fibre diameter	245 µm ±10	
6.	Core/cladding concentricity error	≤ 0.8µm	
7.	Coating/cladding concentricity error	≤ 12µm	
8.	Cladding non-circularity	≤ 1.0 %	
9.	Mode Field Diameter	9.3µm ± 0.5 at 1310nm	
10.	Attenuation (cable)	0.36dB/Km at 1310nm	

No.	Item	Specifications
		0.25dB/Km at 1550nm,

The size of CCP cable shall be 0.65 mm or larger. The number of pairs shall be decided taking the future demand after 10 year into consideration. Al least spare capacity of 100 % shall be reserved for future use. The minimum number of pairs shall be 50 pairs for the cable to be installed along the Highway and 10 pairs for the cable other than the above. In case of metallic cable, all pairs shall be connected to the MDF at each facility.

7.7.8 Conduit and Cable Work

7.7.8.1 General

1. Conduit work includes underground conduit, conduit attached to bridge and culvert, handhole, manhole, cable rack and associated accessories necessary for cable installation.
2. The TIMS System Integrator shall undertake the detailed design of conduit and cable work including preparation of plain plan of conduit and cable route showing type and length of conduit, number of conduits, type and length of cable, and type of handhole, manhole. The detailed design shall be submitted to the TIMS PMU for approval.
3. For the section where electromagnetic induction or electrostatic induction caused by high power transmission line is expected, countermeasures such as use of steel conduit or used of aluminum sheath shall be taken.
4. Caution message shall be printed on all Cables and Conduits along with the project name and MoRTH name.
5. The OFC cable shall be of orange colour only.

7.7.8.2 Conduit Works

Scope of work shall cover the following.

- Installation of conduit (HDPE PLB duct Φ40mm x 1),
- Excavation and back filling,
- Construction of cable trench,
- Construction of manhole,
- Temporary reinstatement of road surface,
- Safety measures and warning signs during installation works,
- Power cable duct to be included (as required),
- Site clean-up and disposal of excess materials

- Compaction and backfill.

7.7.8.2.1 Installation of Cables

Scope of cable installation work shall cover the following.

- Installation of cable rack (vertical part of inside building) and ODF (Optical Distribution Frame).
- Laying of cable into HDPE pipe,
- Splicing of optical fibres and jointing of cables,
- Splicing of metallic cables and jointing of cables,
- Termination of optical fibre cable and metallic cable,
- Testing of optical fibre cable and metallic cable,
- Preparation of as-built documents,
- Site clean-up and disposal of excess materials,
- Safety precaution where necessary,
- Preparation of as-built documents,
- Acceptance test

7.7.8.3 Cable Works

Conduit works done under this Project shall have satisfied to conduit works acceptance tests before cable are pulling in, specially to cable test piece for conduit (ducts). Conduits shall be rodded by an acceptable method and cleaned before cables are pulled / blown in.

Duct assignment shall be always done carefully to avoid crossing of cables between the duct entrance and cable bearer, and blockage of future access to vacant duct. In general, placing shall start at the bottom row and handhole/ manhole wall side of the duct arrangement. Splicing shall be carried out as soon as possible after placing of the cables.

The extension of fibre optic cable shall be carried out at a constant speed and suitable back tension shall be applied to the drum to prevent hunching.

While under tension, a minimum bend radius of 20 times the outside cable diameter shall be maintained through the use of pulleys and sheaves where required. After pulling, no bend may have a radius, at rest, of less than 10 times the outside cable diameter.

At the splicing point, slack of minimum 3 meter shall be kept on each side of splicing kit. The slack shall be neatly arranged and the requirement for the minimum radius shall be met.

7.7.8.3.1 Type and Size of Conduit

Main materials to be supplied by the TIMS System Integrator for the implementation of the duct installation shall be in accordance with, or better in quality than, the specification stipulated hereinafter.

7.7.8.3.2 Application of Conduit

In general, HDPE (high density polyethylene) pipe having nominal inside diameter of 40mm shall be used.

7.7.8.3.3 Warning Tape and Caution Message on OFC Cable

“CAUTION: MORTH F.O CABLE BELLOW, GOVT. OF INDIA PROPERTY” caution marks in English and Hindi should be printed in every two meters of the yellow warning tape to be placed in the cable trench (100mm width and 0.15mm thickness). The caution message shall also be printed in the OFC cables, electrical cables, conduits, etc. The message shall be approved by the TIMS PMU before printing. The printing of name of the project, MoRTH, and caution message shall be done by the OEM during manufacturing of the cables and conduits.

7.7.8.3.4 Cable Tag

Cable tag (plastic plate) describing the name of the cable and the origin of cable (cable name, type of cable, interchange name & etc.) shall be attached to the cable

All other materials not specified in this Functional and Technical Specifications shall be in conformity with the TIMS System Integrator’s own technical specification, subject to the approval of the TIMS PMU.

7.7.8.3.5 Depth of Conduit

The covering depth from the top of HDPE pipes and GI pipes to the surface of ground shall be as follows:

Location	Depth
Side-shoulder	165cm
Carriageway	100cm or more
Highway road crossing, Main road crossing and Interchange area	120cm or more

However, in special case, the depth shall be determined in consultation with TIMS Engineer, as per the site conditions and soil type.

7.7.8.4 Installation and Construction

Conduit installation works shall be performed in accordance with the specification stipulated hereinafter.

Other installation and/or construction works, the detail of which is not specified in this section, shall be based on the industry standard specification and/or the TIMS System Integrator's own Technical Specifications, subject to the approval by TIMS PMU.

Operating Committee / TIMS PMU shall, at any time when deemed necessary during the construction period, carry out inspection and/or tests on the facility under construction and/or the portions of facilities completed by the TIMS System Integrator.

Upon completion of conduit section, loose materials such as concrete, mud, dirt, sand, etc. shall be cleaned out from new ducts before testing. 6.0 m cable test piece may be used for main duct sections (cable test piece diameter 35mm) with sharp curve under the condition of the prior approval of the TIMS PMU.

The TIMS System Integrator shall apply the Area Log Book in order to facilitate a full supervision on the construction work.

7.7.8.5 Handhole and Manhole

The internal sizes of the standard type of Handhole and Manhole shall be as follows:

Type	Number of Ducts	Length (m)	Width (m)	Depth (m)	Cable Bracket
Handhole					
HH-1	1-8	1.20	0.60	0.85	One side
Manhole MH-1	1-9	1.80	1.00	1.50	One side

Handhole and Manhole shall be equipped with covers, duct plug, ladders, steps, cable bearers, cable brackets, name plates and pulling irons according to detailed drawings.

7.7.8.6 Excavation for Handhole, Manhole and/or Conduit

All excavation shall be done in a thorough and workmanlike manner in accordance with the detailed drawings and the Specifications.

The TIMS System Integrator shall obtain all pertinent records from the Electric, Water Supply, and Sewage pipe and other organizations for underground utilities in order to proceed with his work and safeguard the other utilities.

During the execution of the work, if existing underground facilities are damaged, or any part thereof is disturbed, the TIMS System Integrator shall immediately notify of the facts to MoRTH and owner of the utility and shall be responsible for the rectification of the damaged utility at its own cost. The TIMS System Integrator shall indemnify the MoRTH and its representatives from any loss or damaged caused by the TIMS System Integrator during execution of the works. The TIMS System Integrator shall cart away all excavated materials except that to be used for backfilling.

7.7.9 Inspection and Acceptance test

Site inspection specified herein shall be performed throughout installations and constructions of the various type of conduit facilities.

Should any errors in construction, faulty materials or other evidence of unsatisfactory construction and installation are found in the course of test, the TIMS System Integrator shall immediately repair, replace and/or remedy such unsatisfactory items.

The TIMS System Integrator shall perform the conduit facility inspection by himself every time to see if the work meets the requirement before the Acceptance test.

Acceptance test specified shall be performed by the TIMS System Integrator under the supervision of the TIMS PMU. Necessary equipment and materials for the site inspection and the Acceptance tests shall be provided by the TIMS System Integrator at his own expense. Written report including the test results shall be prepared by the TIMS System Integrator and verified by the TIMS PMU. During interim inspection, at least the following test and inspection items shall be performed:

- Visual inspection of location, dimension, accessories and workmanship of handhole/manhole, Number and type of conduit, Cable test piece passage test, Check of new conduit, Backfilling and temporary reinstatement Acceptance test.

During Acceptance test, at least the following test and inspection item shall be performed. Acceptance test item for handhole, manhole, conduit and optical fibre cable on-site inspection are as follows:

No.	Item	Contents
1	Visual Check	Handhole, Manhole & Conduit Construction/Cable Installation Workmanship/ Installation Practice Compliance to Drawings
2	Optical Line Performance Test	Optical Fibre Attenuation Test (Transmission Loss Measurement by Laser Source & Power meter)/ OTDR (Optical Time Domain Reflectometer) Test (OTDR Measurement both direction and Splice Loss)
3	As-built Drawings	Verification

7.8 Facility Monitoring System

7.8.1 Function

Facility monitoring system shall be provided to monitor the operation of facilities on the Highway. The system shall monitor the operation of the following component systems:

1. Traffic Monitor Camera System (TMCS)
2. Accident and Incident Detection (AID) System (AID)
3. Automatic Traffic Counter and Classifier (ATCC) module
4. Travel Time Measurement System (TTMS) module
5. Deleted
6. Central processing System
7. Deleted
8. Deleted
9. Incident Monitoring System (IMS)
10. Digital Transmission System
11. Power supply system (at building and field)

The functions of facility monitoring system may not be integrated in a single system. They may be achieved by the operation monitoring function of the component systems. The role of the facility monitoring system is to consolidate the monitoring function undertaken by component system, present the system status in a concise manner to the operator and keep the record of system operation. In case any abnormality or malfunction is detected, the system shall issue an alarm together with the information regarding type and location of the trouble so that remedial action can be taken swiftly. The TIMS System Integrator shall design, procure, manufacture, install, test and commission the facility monitoring system that meets the concept and functions stated herein.

7.8.2 Operating Status

1. Items to be monitored and its content differ from one system to another system to be monitored. In general, the condition of the system and device such as ‘Normal’, ‘Error’ and ‘No Reply’ shall be classified in detail.
2. The system shall have a function to test itself without affecting normal operation of the system being monitored by the system.
3. Each error or malfunctioned status shall be assigned with severity level for each system. Depending on the severity level, different action shall be taken by the system. For minor

errors such as abnormal data from vehicle detector for one interval, error is recorded in the log and no alarm will be issued. For severe errors such as interruption of communication circuit, alarm signal shall be automatically displayed on the system supervisory server overwriting the display being shown.

7.8.3 Monitoring

The manner of monitoring shall differ depending on the system and device to be monitored. In general, normal operation shall be confirmed periodically by the monitoring system by sending inquiry command. The time interval of inquiry shall be adjustable for each component system and its devices. But alarm signal shall be issued immediately by the component system and their devices comprising it to minimize delay.

7.8.4 Recording and logging

The facility monitoring system shall keep record of its operation and status of the various systems and devices in a unified manner in the database. All incident and events shall be recorded. Data retrieval software shall be provided to retrieve and display the operating history of the specified systems and devices. The database thus stored will be used to calculate the reliability indicators of the system and device including MTBF (mean time between failures) and MTTR (mean time to repair). Availability calculation shall be reported in a quarter. The formula for calculation of availability is:

Availability={1-{[(A)/(B-C)] *100}}

Where,

A= Time for which system is down

B = Total Time

C= Scheduled downtime

7.8.5 Monitoring signal interface

1. The TIMS System Integrator shall provide necessary number of monitoring signal interface units to receive operating condition and alarm signal from the system or device to be monitored. The interface shall be provided with sufficient number of analog, digital and pulse interfaces. It shall be capable of receiving operating condition signals through interface and sending them to the Command Centre using FTP, SNMP or DATEX-ASN protocol.
2. The interface shall be provided with an optical hub or switcher and can be connected to optical fibre cable directly.
3. The interface shall be equipped with a clock and the clock shall be adjusted using network time protocol (NTP) or simple network time protocol (SNTP).

Some of the monitoring signal interface shall be installed outdoor. The device to be used outdoor shall be capable of withstanding the environmental conditions for outdoor equipment.

7.9 Data Center & Data Recovery

Data Centre Architecture including networking, computing, storage, management, and security is planned as described below:

1. In each Data Centre, there will be two Core Routers (to be provided by SI) interfacing towards the network thorough DWDM in physical layer.
2. The two Core routers will work as a Gateway Router from the network towards Datacenter.
3. There will be a Two-tier Architecture Core/Aggregation and Access Switching Layer.
4. This architecture accommodates a north-south traffic pattern where client data comes in from a WAN or the Internet to be processed by a server/workstation in the data center and is then pushed back out of the data center.

Data Centre Core and Aggregation layer—Provides the high-speed packet switching backplane for all flows going in and out of the data center. Provide important functions such as Layer 2 domain definitions, spanning tree processing, and default gateway redundancy. Server-to-server multi-tier traffic flows through the aggregation layer and can use services, such as firewall, to optimize and secure applications.

Data Centre Access layer—Where the servers/workstation physically attach to the network. The server/workstation components consist of 1RU rack servers/workstations, blade servers/workstations with integral switches, blade servers/workstations with pass-through cabling, clustered servers/workstation. The access layer network infrastructure consists fixed configuration 1 or 2RU stackable switches (Top of Rack/End of ROW). Switches provide both Layer 2 and Layer 3 topologies.

Resiliency is achieved by load balancing the network traffic between the tiers Security is achieved by placing firewalls between the tiers.

7.10 Variable Message Sign (VMS)

This specification lays down the general, functional, and technical requirements of the Variable Message Signs (VMS) to be used as a sub-system of TIMS implementation. VMS shall include Fixed (L & M Gantry) variable message signs .

7.10.1 Function

The VMS shall provide road users advance information on road conditions ahead and shall be controlled from the Command Centers. VMS system is one of the important and effective tools to manage traffic in response to road incidents, special events, and construction or maintenance activities on the road. When drivers are to be warned of an incident, advised to opt for an alternate route, guided to reach a specific location, or clear a lane as a response to an incident, the message posted should be appropriate and precise. The messages and the procedure for displaying them should be such that the information is grasped by a driver whose primary focus is driving his vehicle while ensuring his and his co-passengers safety. The main function of a fixed VMS is to display highway status and travel guidance information and warn vehicles of traffic congestion in the cities/villages immediately ahead.

7.10.2 Functional Requirements

1. A VMS message should be effective. To ensure effective messages, the message themselves:
    a. Shall fulfil a purpose
    b. Shall command a short-span but definite attention.
    c. Shall convey Information that is unambiguous and simple to comprehend.
    d. Shall aim to elicit a definite and desired response from the driver
    e. Shall be displayed early enough to provide adequate time to respond to the event.
2. The display procedure shall be such that:
    a. The message accuracy is authenticated.
    b. Relevance of the message is maintained by continually monitoring the incident and updating the display.
    c. Avoid stating the obvious.
    d. Credibility of the information is maintained and ensured.
3. Should have procedures to post alter, and delete messages interactively to ensure message relevance and credibility.
4. Should have an intuitive user interface for the operator to learn, operate and manage the system.

5. Should be modular in construction for ease of maintenance.
6. The VMS should have sufficient graphics capability to display multi-lingual messages (English, Hindi and the local language) and standard IRC road signs.
7. The modules shall be field replaceable.
8. Integration with adjacent AIDS for automated messages for select incident/accident types.

7.10.3 Technical Requirements

1. The display board shall be formed using individual modules.
2. Display panel must contain a corrosion resistant panel with LED pixels in row: column matrix (Full Matrix display).
3. Scanning/Multiplexing ratio shall be 1/8 or better.
4. The LED Cluster shall consist of individual LED rated for out-door use.
5. Failure of one Text row shall not affect the Other Rows. It shall also be possible to query the status of each row to determine its health and configuration status.
6. Shall use Unicode to display messages in English, Hindi and a selected local language.
7. Shall have built in test and monitoring facilities to ensure data integrity of the messages.
8. Shall adjust display intensity automatically based on ambient light conditions to ensure readability at all times.
9. The display background should be non-reflective and the display should be U.V. resistant. Shall support multiple industry standard communication interfaces, minimum being RS-422, TCP/IP on copper, Wi-Fi, and optionally fibre optic.
10. Shall support at least the NTCIP and any one of defined and documented communication protocol(s) such as NMCS2, MESSAGE CONTROL, TR2070D, Version 2 or other equivalent international protocol.
11. It shall be possible to control the brightness of displays automatically using built-in light sensors or remotely through the provided VMS control software.
12. All PCB`s shall be of FR4 material, 1.6mm thick or better and LED matrix PCB shall be 2.4mm thick. PCBs shall be of the quality suitable for use in environment conditions specified.
13. The controller shall allow local diagnostics via laptop connected to its communication port.
14. The equipment shall comply with the following specifications:
    a. Length (minimum) 2400+/- 100mm for L Type Fixed VMS
    b. Height (minimum) 1500+/-100mm for L Type Fixed VMS
    c. Length (minimum) 5000 +/-200 mm for M Type Full Fixed VMS

d. Height (minimum) 1800 +- 200 mm for M Type Full Fixed VMS

e. Depth (minimum) 200 mm (for all types)

15. Fault diagnostics shall be provided to include the following as a minimum:
    a. Power Failure at VMS
    b. Processor PCB Failure
    c. Display line Failure
    d. Incoming data reception/communication error detection.
    e. Temperature within the enclosure information.
16. The technical specifications of VMS shall be as per the provisions given in latest edition of IRC 67 and IRC SP 85
17. VMS shall be provided at all such locations, at a distance not more than 20 km from one another, as finalized by the System Integrator after approval from TIMS PMU and Operating Committee.

7.10.4 Environmental Specifications

The VMS shall meet the following climatic and environmental requirements:

1. Operating temperature: -20ºC to + 55ºC
2. Relative Humidity: Up to 95 % (non-condensing)

TEST and REFERENCE

1. Change of temp test IS 9000 Part XIV Sect. II
2. Dry heat test IEC-571; IS: 9000 Part-III Sect 3
3. Cold test IS 9000 Part II Sect. III
4. Damp heat test (Cyclic) IS9000 Part V Sect. 2 Variant 1
5. Damp heat test (Steady state storage) IS9000 Part IV
6. Salt mist test IS9000 Part XI Procedure 3
7. Dust test IS 9000 Part XII
8. Bump test IS 9000 Part VII, Sec. 2
9. Vibration test TEC (IPT 1001A revised)

7.10.5 Installation Requirements

1. Power shall be obtained from 230V 50 Hz mains / UPS/ Diesel Generator Set provided on site or from on-board lead-acid automobile batteries rated for a nominal voltage of 12V DC (for

mobile VMS). If powered from an UPS the source of charging shall be preferably a renewable energy source (e.g. Solar PV, wind etc.)

2. Fixed VMS shall be mounted on a sturdy and aesthetically pleasing gantry structure whereby the vertical clearance of at least 5.5m is available from the road.
3. Safety barriers shall be provided at gantry support column(s) for their protection and for safety of road users.
4. The structure on which the VMS is mounted shall be sturdy and capable of bearing wind loads up to 200 kmph.
5. The concrete pedestal for support column should be flushed with ground but in no case should protrude more than 1.5m.
6. Minimum distance of VMS on expressways should be 1.5 km prior to decision point and that for National Highways it should be 1 km. The signs should be visible from a distance of 250m.

7.10.6 Maintenance Requirements

1. The VMS and its sub-systems shall test/diagnose on a regular basis as well on request & log event of any problem for each individual equipment, Such problems shall be automatically flagged at the TIMS command center and also logged in the TIMS server .
2. The equipment supplied shall remain operable for at least the contract period from the date of commissioning.
3. The System Integrator shall undertake to support/maintain till the completion of the Contract period.

7.10.7 Operational Requirements

1. The software supplied and installed at the TIMS Command Center to operate the VMS shall be able to integrate with/Export data to and import data from the TIMS unified database located in TIMS Command Center.

7.11 Emergency Call Box (ECB)

This specification lays down the general, functional, and technical requirements of the Emergency Call Box to be used as a sub-system of TIMS implementation. The term “Emergency Call Box” or the term “Phone” covers the phone instrument, mounting hardware, pole, or any other mounting structure along with grouting, the charging stations, secondary power sources such as the batteries, and the solar modules in case the units are solar charged.

7.11.1 Function

Emergency Roadside telephones are to be used by road users to make emergency calls to the closest Police Control Room or National Highways helpline central control room, or any other control room prescribed by the state authorities to report incidents such as accidents and /or other emergencies on the highway requiring immediate help/intervention.

7.11.2 Functional Requirements

1. Suitable for working on a Fibre Optic / dedicated copper transmission/ wireless network as per requirement.
2. Built-in speaker and microphone for hands-free operation.
3. Clearly labelled and distinctly identifiable “activate” button to initiate communication.
4. Audio and visual indication of communication status such as call placed, call acknowledged, call in progress, or call on hold at the closest Police Control Room or National Highways helpline central control room, or any other control room prescribed by the state authorities.
5. Multiple numbers shall be programmed (at least three) into the device so that incidents of line busy are minimized.
6. The unit shall dial each number in sequence automatically till the line is connected or call is cancelled by the road user.
7. Shall provide a means to record the message in case all the lines are busy.
8. Provision to operate the phones in case of primary power failure. Battery backed power source shall be used and preferably, it shall be solar charged.
9. The ECB Phones shall operate in duplex mode.
10. The ECB Phones shall have the front facia suitable for rugged outdoor use.
11. The ECB phone shall be designed to provide the following operation related functions:
    a. The user will push the call button to initiate a call from the phone.
    b. The calling user shall hear a ringtone if the call is successfully initiated. Alternatively, if the line is busy, a busy tone accompanied by a voice message both in English, Hindi & Local

language shall sound. When the system is not functioning a suitable message shall sound along with a distinctive tone that is other than the ring tone or the busy tone.

c. The phone units shall have self –diagnostics to test themselves for correct operation. Any malfunction detected shall be reported to the control room system immediately along with the nature of the fault.

d. A scheduled test of all phone units shall be performed at regular intervals for correct operation of speaker and microphone.

12. The ECB system shall have automated start-up ability in the event of power outage and restoration.

13. All Alarms, results of self-diagnostics tests and data related to the ECB system shall be logged to a central database. Attempted damage as detected by the anti-tampering sensor shall be recorded separately for quick access.

7.11.3 Technical Requirements

1. Echo cancellation should be implemented in the phone.
2. The design should consist of a single PCB and minimal serviceable parts.
3. To prevent vandalism it is essential that the components and PCB shall not be usable as a regular phone even after modification.
4. The phones shall be remotely configurable using software at the command center.
5. The phones shall also be locally configurable using a laptop and provided software.
6. The phones shall remain operable up to a noise level of 95dB
7. If using cables, there should be at least 20% spare capacity to replace faulty pairs without laying additional cables.
8. Configuration, Diagnostics and other communications shall not interfere with the voice communications. These signals and their significant harmonics should be beyond the audible range.
9. Protection from ESD and lightning should meet or exceed class – D for data lines and class – B for power lines.
10. Remote fault diagnostics shall be provided to include the following minimum: a) Power Failure/low/high voltage at Phone site
    a. Voice data transmission/reception/communication failure detection.
    b. Correct operation of speaker and microphone.
    c. Crosstalk detection.

d. Storage battery condition information.

11. The ECB phone shall have a front panel locking arrangement which shall require a special tool / key to access the door.
12. In the event of any tampering (e.g. door open condition) the Emergency Roadside telephone shall generate an automatic electronic signal that can be detected and displayed (in the form of an audio-visual alarm) at the TIMS Command Center.

7.11.4 Environmental Specifications

1. The housing shall be fibre-reinforced plastic sporting a prominent colour that can be easily recognized by road users.
2. The housing shall meet or exceed IP65 standards of water ingress protection.
3. Operating Temperature -20^{0}C to + 55^{0}C
4. Relative Humidity: Up to 95 % (Non-Condensing)
5. The electronic subassemblies shall be certified to meet or exceed the following specifications:

SN TEST REFERENCE

1. Change of temp test IS 9000 Part XIV Sect. II
2. Dry heat test IEC-571; IS: 9000 Part-III Sect 3
3. Cold test IS 9000 Part II Sect. III
4. Damp heat test (Cyclic) IS9000 Part V Sect. 2 Variant 1
5. Damp heat test (Steady state storage) IS9000 Part IV
6. Salt mist test IS9000 Part XI procedure 3
7. Dust test IS 9000 Part XII
8. Bump test IS 9000 Part VII, Sec. 2
9. Vibration test TEC (IPT 1001A revised)

7.11.5 Testing

The equipment shall be tested for functional requirements as below:

1. Earth continuity
2. Insulation resistance
3. Call from phone to operator - Ringing tone
4. Check for the speech path

5. Check for hold tone
6. Check for busy message
7. Check for call back facility from operator station to phone
8. Check for phone test facility from operator station
9. Check for Programming of ECB address
10. Check for Tamper alarm

7.11.6 Installation Requirements

1. Potential zones of Telecommunication black spots shall be identified on the project highway for locating the Emergency Call Boxes.
2. On longer (> 2 km) stretches suffering from telecommunication blackspots and other locations as finalized by the System Integrator after approval from TIMS PMU and Operating Committee, ECBs shall be installed at intervals of 2 Km (+/- 100m) on both sides of the highway such that a distance of 1km (+/- 50m) is the maximum one has to travel to reach the nearest available ECB.
3. Power shall be obtained from Solar PV charged onboard batteries rated to operate the phone for a minimum of 3 days in the absence of adequate solar radiation.
4. Solar panels and chargers (if applicable and supplied) are to be installed in accordance with the site requirements.
5. The ECB phone shall mounted on a metal pole with a base that shall be grouted over a 1 m X 1 m X 0.3 m concrete platform provided with a handrail (with a suitable access opening) for protecting the user from vehicular collision. Further, the direction of the ECB phone shall be such that the user can have a clear view of the arriving traffic during access and use of the phone. Further, a minimum length of 10 meters of crash barrier shall be installed for protecting the ECB phone location from arriving traffic.
6. Illuminated guide signage shall be placed approximately 50 metres and 10 meters on either side of the phone.
7. Suitable mounting fixtures such as poles and other suitable/related equipment shall be supplied and installed by the System Integrator.

7.11.7 Maintenance Requirements

1. The equipment supplied shall remain operable for at least the contract period from the date of commissioning.
2. The System Integrator shall undertake to support/maintain the equipment till the completion of the Contract period.

7.11.8 Operational Requirements

The software supplied and installed at the TIMS Command Center to operate the facility shall be able to integrate with/Export data to and import data from the TIMS unified database located in TIMS Command Center.

8 Guidelines Regarding Compliance of Systems/Equipment

- The specifications mentioned for various IT/Non-IT components are indicative requirements. SI is required to undertake their own requirement analysis to meet the required scope of work and SLAs.
- In case of addition/update in number of licenses for the products, SI is required to meet the technical specifications contained in the RFP and any upward revisions and/or additions of licenses shall be governed by Section 11 “General Conditions of the Contract”.
- Exact locations and number of systems to be installed shall by determined by the TIMS System Integrator in conjunction with the TIMS PMU and the Operating Committee after deliberations with relevant State departments.
- Any manufacturer and product name mentioned in the Tender should not be treated as a recommendation of the manufacturer/product
- None of the IT/Non-IT equipment proposed by SI should be End of Life Product.
- It is essential that the technical proposal is accompanied by the OEM certificate in the format given in Form T-11, where-in the OEM will certify that product/solutions meets the technical & functional requirements mentioned in the RFP, the product is not end of life product & shall support for at least 6 years from the date of Bid Submission
- All IT Components should support IPv4 and IPv6
- Technical Bid should be accompanied by OEM‘s product brochure/datasheet. SI should provide complete make, model, part numbers and sub-part numbers for all equipment/software quoted, in the Technical Bid
- SI should ensure complete warranty and support for all equipment from OEMs. All the back-to-back service agreements should be submitted along with the Technical Bid
- All equipment, parts should be original and new
- The user interface of the system should be a user-friendly Graphical User Interface (GUI)
- Critical core components of the system should not have any requirements to have proprietary platforms and should conform to open standards
- All the Clients Machines/Servers shall support static assigned IP addresses or shall obtain IP addresses from a DNS/DHCP server
- Successful SI should also propose the specifications of any additional servers /other hardware, if required for the system
- Bidder must provide the architecture of the solution they are proposing

- The Servers provided should meet industry standard performance parameters (such as CPU utilization of 60 percent or less, disk utilization of 75 percent or less). In case any non-standard computing environment is proposed (such as cloud), detail clarification needs to be provided in form of supporting documents, to confirm (a) how the sizing has been arrived at and (b) how SLAs would be met
- SI is required to ensure that there is no choking point/bottleneck anywhere in the system (end-to-end) and enforce performance and adherence to SLAs. SLA reports must be submitted as specified in the Bid without fail
- All the hardware and software supplied should be from the reputed Original Equipment Manufacturers (OEMs). MoRTH reserves the right to ask replacement of any hardware/software if it is not from a reputed brand and conforms to all the requirements specified in the tender documents
- All proposed servers, active networking components, security equipment, storage systems and COTS Application should be from OEMs who are top supplier in the market
- Cameras, Network Video Recorder (NVR) and the Video Management/Video Analytics Software should be ONVIF Core Specification compliant (as mentioned in RFP) and provide support for ONVIF profiles such as Streaming, Storage, Recording, Playback, and Access Control
- All licenses should be in the name of the Ministry of Road Transport and Highways
- The components (including but not limited to CCTV Cameras, Video Management System Software, ANPR Cameras & Solution, RLVD Solution, Edge Level (Field) Switches, Data Centre Switches & Routers, Servers, Storage, Racks, Desktop PC and Workstations etc.) should have existing registered service/support centre or establish in India within 30 days of award of contract. The Bidder should submit an undertaking from the OEM to that effect. The OEM of active devices including Data centres, network to be quoted by the bidder should have local Technical Assistance Centre (TAC) support in India through a toll free number and should be able to log a call 24x7 via phone, email or website for technical assistance
- The camera footage/video of all incidents captured by the cameras (TMCS, AIDS and ANPR) shall be stored for 180 days in the Command Center backup server or at the National Data Center maintained by the National Informatics Centre. The cost of storage shall be borne by the System Integrator.
- All the servers and computing, Closed Circuit Television (CCTV) and Access Control System (ACS) for Command Center Building and Security and other camera systems shall be BIS/UL/CE/FCC certified. Wherever Indian Technical specifications and Quality Certificates exists, the same shall be acceptable and the Bidder shall not be required to submit the foreign Quality Certifications and Accreditations. The TIMS System Integrator shall only be

required to submit the technical comparison between Indian Quality certifications and the equivalent Foreign Quality Certification mentioned in the document, if any.

- Deleted.
- Deleted.
- All the OEMs should have authorized presence (for sale or service) in India either directly or through channel partner(s) as on the date of release of RFP.
- The OEM for all active components should give a declaration that products or technology quoted are neither end of- sale nor end-of-life as on the date of installation and commissioning and are not end-of-support till the successful completion of O&M period of the project.
- The bidder's proposed OEM should not have been blacklisted by any State / Central Government Department or Central /State PSUs as on bid submission date.
- The bidder shall, as part of the technical proposal, also submit details on:
    - Assessment of feasibility and ease with which applications such as electronic toll collection, analytical and statistical software, etc. can be integrated with the proposed Traffic Incident Management System along with details on the spare memory capacity and processing power which must be available within the proposed computer to allow applications to be implemented.
    - Incident detection mechanism of AID Cameras that the TIMS System Integrator proposes together with its limitation.
    - The types of error and malfunction of the AID System that can be diagnosed from the TIMS Software.
    - Layout plan of the Operation Room in the command center.
    - Application software to be provided to the servers and workstation in the Command Center.
    - The software quality assurance program that SI intends to adopt in developing the software for the project.
    - The third-party software that SI proposes along with justification.
    - Technical Specifications of main and other material for digital transmission systems.
    - UPS rating required for each location in the configuration, based on the load of the equipment being proposed.
- The bidder shall, along with the technical proposal, also submit:

- Test and calibration certificates for 4D Radar Systems for speed detection
- Test certificate that the ingress design of the projection unit for Graphic display in Command Center shall conform to IEC-60529 standard
- The original CD or DVD of any third-party software (The requirement is not applicable to the software preinstalled in the server or workstation)

9 Payment Terms

The payment will be disbursed on a pro-rata basis for each quarter with 50% of payment after implementation for each phase (i.e., on Go-live) and 50% of payment over the Operation & Maintenance period for that phase. Operation & Maintenance phase to run from go-live for each phase till the end of the 6-year contract period. The payment schedule shall be as follows –

1. Phase-1 (indicative value of 20% of the entire project value)
    a. Go-live phase – 50% of Phase 1 value
    b. Operation & Maintenance – 50% of Phase 1 value
2. Phase-2 (indicative value of 35% of the entire project value)
    c. Go-live phase – 50% of Phase 2 value
    d. Operation & Maintenance – 50% of Phase 2 value
3. Phase-3 (indicative value of 45% of the entire project value)
    e. Go-live Phase – 50% of Phase 3 value
    f. Operation & Maintenance – 50% of Phase 3 value

Contract value for O&M to be disbursed in quarterly installments over the O&M period. The final timelines for implementation and share of phase-wise works shall be aligned with the MoRTH appointed TIMS PMU, and the Operating Committee and be approved by the Governance and Steering Committee.

10 Performance Security

Upon issue of a Letter of Award (LoA) by MoRTH, the Successful Bidder shall be required to furnish an unconditional and irrevocable Performance Security in the form of Insurance Surety Bonds, Account Payee Demand Draft, fixed Deposit Receipt from a Commercial bank, Bank Guarantee (including e- Bank Guarantee) from a Commercial bank or online payment in an acceptable form safeguarding the Authority's interest in all respects within a period of 15 days. The performance security shall be for an amount of 3% of Total Bid Value quoted in the financial bid and should be in favour of "Ministry of Road Transport and Highways", New Delhi. The Performance Security shall be valid for period upto the contract and valid till 60 (Sixty) days beyond the contract / authorization period. In case the contract is extended, the System Integrator shall extend the validity of Performance Security appropriately such that it remains valid until one year beyond completion of the contract.

The PBG from following banks shall only be accepted:

1. State Bank of India or its subsidiaries.
2. Any Indian Nationalized Bank.
3. IDBI or ICICI Bank.
4. A Foreign Bank (issued by a branch outside India) with a counter guarantee from SBI or its subsidiaries or any Indian Nationalized Bank.
5. Any Scheduled Commercial Bank approved by RBI having a net worth of not less than 500 Crores as per the latest Annual Report of the Bank. In the case of a Foreign Bank (issued by the branch of India) the net worth in respect of the Indian operations shall only be taken into account.

The acceptance of the PBG shall also be subject to the following condition:

1. The capital adequacy of the Bank shall not be less than the norms prescribed by RBI.
2. The bank guarantee issued by a Cooperative Bank shall not be accepted.

11 General Conditions of Contract

11.1 General Guidelines

- It is presumed that the Bidder has carefully studied standard, specification of the individual items and all condition before estimated rates are quoted by them.
- Special provisions in the detailed specifications or wording of any item shall give precedence over the corresponding contract provisions, if any.
- If the Bidder has any doubts, whatsoever, as to the contents of the contract he is deemed to having good time i.e., before submitting his tender, get his doubts clarified. Once the tender is submitted by Bidder, the matter will be decided according to the tender evaluation specified in the RFP

11.2 Key performance Measurements

- Unless specified by the MoRTH to the contrary, the Bidder shall implement the infrastructure, perform the Services and carry out the Scope of Work in accordance with the terms of this Contract, Scope of Work and the Service Specifications as laid down under Service Level Agreement.
- If the Contract/Service Specification include more than one document, then unless the MoRTH specifies to the contrary, the later in time shall prevail over a document of earlier date to the extent of any inconsistency.

11.3 Commencement & Progress

The Bidder shall commence the performance of its obligations in a manner as specified in the Scope of Work.

- The Bidder shall proceed to carry out the activities / services with diligence and expedition in accordance with any stipulation as to the time, manner, mode, and method of execution contained in this Contract.
- The Bidder shall be responsible for and shall ensure that all activities/ services are performed in accordance with the Contract, Scope of Work and that the Bidder's Team complies with such specifications and all other standards, terms and other stipulations/conditions set out hereunder.
- The Bidder shall perform the activities / services and carry out its obligations under the Contract with due diligence, efficiency and economy, in accordance with generally accepted techniques and practices used in the industry and with professional engineering

and consulting standards recognized by international professional bodies and shall observe sound management, engineering and security practices. It shall employ appropriate advanced technology and engineering practices and safe and effective equipment, machinery, material and methods.

- The Bidder shall always act, in respect of any matter relating to this Contract, as faithful advisors to the MoRTH and shall, at all times, support and safeguard the MoRTH's legitimate interests in any dealings with Third parties.

11.4 Trademarks, Publicity

Neither Party may use the trademarks of the other Party without the prior written consent of the other Party. Neither Party shall publish nor did permitted to be publish either along with or in conjunction with any other person any press release, information, article, photograph, illustration or any other material of whatever kind relating to this Agreement, the SLA or the business of the Parties without prior reference to and approval in writing from the other Party.

11.5 Events of default by the bidder

The failure on the part of the Bidder to perform any of its obligations or comply with any of the terms of this Contract shall constitute an Event of Default on the part of the Bidder. The events of default as mentioned above may include inter-alia of the following:

- When the Bidder does not adhere to 'Go-Live' in the committed timeline for each of the phases, in spite of a written notice from MoRTH
- When there is a critical breach on the scope and even after 2 months of MoRTH providing a written notice to the Bidder, the critical breach has not been rectified
- The Bidder's Team has failed to demonstrate or sustain any representation or warranty made by it in this Contract, with respect to any of the terms of its Bid, the Tender and this Contract.
- There is a proceeding for bankruptcy, insolvency, winding up or there is an appointment of receiver, liquidator, assignee, or similar official against or in relation to the Bidder.
- The Bidder's team has failed to comply with or is in breach or contravention of any applicable laws.
- The Bidder's team are involved in fraud/willful misconduct.

11.6 Consequences of Default

Where an Event of Default subsists or remains uncured then MoRTH shall be entitled to:

- Impose any such obligations and conditions and issue any clarifications as may be necessary to inter alia ensure smooth continuation of project and the Services which the Bidder shall be obliged to comply with. The Bidder shall in addition take all available steps to minimize loss resulting from such event of default.
- Where there has been an occurrence of such defaults inter alia as stated above, the MoRTH shall issue a notice of default to the Bidder, setting out specific defaults / deviances / omissions / non-compliances / non-performances and providing a notice of Sixty (60) days to enable such defaulting party to remedy the default committed.

11.7 Data and Equipment Ownership

All the data created as the part of the project would be owned by MoRTH and Bidder. Successful Bidder shall take utmost care in maintaining security, confidentiality and backup of this data. The successful Bidder, however, has the right to use the data to fulfil its obligations under this contract and otherwise to improve operations, but cannot use it for other purposes.

Infrastructure deployed along with any other hardware equipment, customized software, firmware, and licenses deployed for the purpose of the scope of works of this RFP shall be passed on to MoRTH at the end of the contract, and the Authority shall continue to operate and maintain the system.

11.8 Extension of timelines

Without prejudice to any other provision of this Agreement for and in respect of extension of time, the System Integrator shall be entitled to extension of time in the Project Completion Schedule (the “Time Extension”) to the extent that completion of any Project Milestone is or will be delayed by any of the following, namely:

a) delay in providing the stretch by the Authority for installation of TIMS;

b) Change of Scope;

c) occurrence of a Force Majeure Event; and;

d) any delay, impediment or prevention caused by or attributable to the Authority, the Authority's personnel or the Authority's other contractors on the Site.

The System Integrator shall, no later than 15 (fifteen) business days from the occurrence of an event or circumstance specified above, inform the TIMS PMU by notice in writing, with a copy to the Authority, stating in reasonable detail with supporting particulars, the event or circumstances giving rise to the claim for Time Extension in accordance with the provisions of this Agreement. Provided that the period of 15 (fifteen) business days shall be calculated from the date on which the System Integrator became aware, or should have become aware, of the occurrence of such an

event or circumstance. Provided further that notwithstanding anything to the contrary contained in this Agreement, Time Extension shall be due and applicable only for the Works which are affected by the aforesaid events or circumstances and shall not in any manner affect the Project Completion Schedule for and in respect of the Works which are not affected hereunder.

On the failure of the System Integrator to issue to the TIMS PMU a notice within the time specified above, the System Integrator shall not be entitled to any Time Extension and shall forfeit its right for any such claims in future. For the avoidance of doubt, in the event of failure of the System Integrator to issue notice, the Authority shall be discharged from all liability in connection with the claim.

The TIMS PMU shall, examine the claim expeditiously within the time frame specified herein. In the event the TIMS PMU requires any clarifications to examine the claim, It shall seek the same within 15 (fifteen) days from the date of receiving the claim. The System Integrator shall, on receipt of the communication of the TIMS PMU requesting for clarification, furnish the same within 10 (ten) days thereof. The TIMS PMU shall, within a period of 30 (thirty) days from the date of receipt of such clarifications, forward in writing to the System Integrator its determination of Time Extension. Provided that when determining each extension of time under this Clause, the TIMS PMU shall review previous determinations and may increase, but shall not decrease, the total Time Extension.

If the event or circumstance giving rise to the notice has a continuing effect:

a) a fully detailed claim shall be considered as interim;

b) the System Integrator shall, no later than 10 (ten) days after the close of each month, send further interim claims specifying the accumulated delay, the extension of time claimed, and such further particulars as the TIMS PMU may reasonably require; and

c) the System Integrator shall send a final claim within 30 (thirty) days after the effect of the event or the circumstance ceases. Upon receipt of the claim hereunder, the TIMS PMU shall examine the same within a period of 30 (thirty) days of the receipt thereof

11.9 Extension of Contract

MoRTH, at sole discretion, may extend this contract for another two years beyond the current term, subject to satisfactory services and continued requirement of MoRTH. MoRTH reserves the right to extend this contract at commercial rates mutually agreed at the time of such extension.

11.10 Termination

If the Bidder fails to carry out any obligation under the Contract, Governance and Steering Committee/MoRTH may notify the bidder to rectify the failure and to remedy it within the timelines defined under Section 6 “Service Level Agreements and Penalties”.

Governance and Steering Committee/MoRTH is entitled to terminate the System Integrator at any time, a portion or part of the work thereof, with a written notice of termination. Such notice of termination shall be effective after a period of 60 days from the date of receipt of notice by the System Integrator. Bidder shall be terminated if:

- The Bidder fails to complete the entire work before the scheduled completion date or the extended date;
- The Bidder has insolvency, receivership, reorganization, bankruptcy, or proceedings of a similar nature brought against it and the proceedings are not dismissed or effectively stayed within 30 (thirty) days of such commencement;
- The Bidder does not maintain a valid instrument of Performance Security (and additional performance security, if any), as prescribed;
- Any of the default points covered under Section 6, "Service Level Agreements and Penalties" come into existence;
- Any of the RFP clauses are not implemented and in case of nonadherence of implementation within the timelines.

In case the project is terminated, the System Integrator is entitled to receive all outstanding payments according to the payment terms outlined in Section 9, subject to Service Level Agreements and Penalties stipulated in Section 6 of the RFP.

The terminated system integrator must forfeit any infrastructure deployed along with any other hardware equipment, customized software, firmware, and licenses deployed for the purpose of the scope of works of this RFP and transfer complete ownership to MoRTH immediately.

All Intellectual Property of the successful bidder existing before the date of signing of the agreement shall continue to vest with them.

The SI shall be responsible for continuing the maintenance as per the scope of the contract during the Termination period of 60 days as per the SLAs.

MoRTH is entitled to impose any such obligations and conditions and issue any clarifications as may be necessary to ensure an efficient transition and effective continuity of the services. System Integrator is obligated to comply with these requirements and undertake all measures to mitigate losses stemming from the termination. The System Integrator shall extend full cooperation and assistance to MoRTH and/or the subsequent vendor, as required, for the continued execution of contractual obligations.

Within the 60-day timeframe following the issuance of a termination notice, MoRTH may allocate the site to any other System Integrator at its sole discretion and forfeit the Performance Security Deposit of defaulting System Integrator.

If the Termination of the Project is at the discretion of MoRTH and due to any reasons not attributable to the System Integrator, then the System Integrator shall be entitled to get all payments due as per the Payment Terms of this RFP. In Addition, the SI shall be entitled to get compensated for the CapEX deployed. The value of the CapEX deployed will be assessed by TIMS PMU in line with estimates made by Operating Committee, and any additional amount shall be paid to the SI.

The System Integrator acknowledges that the said compensation shall be a reasonable estimation of loss suffered due to such termination. Pursuant to payment of such compensation, the System Integrator shall have no further claim against MoRTH w.r.t. this Contract Agreement.

Termination due to Force Majeure Event

- In case a Force Majeure event affecting any Party subsists for a continuous period of 180 (one hundred eighty) days, then either Party may issue a notice of termination to the other Party. Upon receipt of this notice, the Parties shall have a period of 15 (fifteen) Days to agree on the manner in which the Contract may be progressed upon cessation of the Force Majeure event and the variations, if any, required to the Contract to address the consequences of the Force Majeure event. If on the expiry of the 15(fifteen) Day period, the Parties fail to arrive at an agreement, either Party may immediately terminate this Contract by written notice to the other Party.
- Notwithstanding anything to the contrary in this Contract, in case of occurrence of a Force Majeure event which affects one or more parts of the project but not the entire Contract, the Contract may be partially terminated with respect to the affected parts by such Force Majeure event. Such partial termination shall not impact the validity of the Contract or the obligations of the System Integrator with regard to the parts that are not affected by the Force Majeure event.

11.11 Dispute Resolution

- Any dispute or difference whatsoever arising between the parties and of or relating to the construction, interpretation, application, meaning, scope, operation or effect of this Contract Agreement or the validity or the breach thereof, shall be referred to the Society for Affordable Resolution of Disputes (SAROD) and the award made in pursuance thereof shall be final and binding on the parties subject to Provisions of The Arbitration and Conciliation Act, 1996.
- This Contract Agreement shall be governed by, and construed in accordance with, the laws of India and courts at New Delhi / Nainital shall have exclusive jurisdiction over all disputes arising under, pursuant to and/or in connection with this Contract Agreement.

11.12 Change Management and Control

Change Orders / Alterations / Variations

- SI agrees that the requirements given in the Bidding Documents are minimum requirements and are only indicative. The vendor would need to etch out the details at the time of preparing the design document prior to actual implementation. It shall be the responsibility of SI to meet all the requirements of technical specifications contained in the RFP and any upward revisions and/or additions of quantities, specifications sizes given in the Bidding Documents required to be made during execution of the works, shall not constitute a change order and shall be carried out without a change order and shall be carried out without any time and cost effect to MoRTH.
- Further upward revisions and or additions required to make SI's selected equipment and installation procedures to meet Bidding Documents requirements expressed and to make entire facilities safe, operable and as per specified codes and standards shall not constitute a change order and shall be carried out without any time and cost effect to MoRTH.
- Any upward revision and/or additions consequent to errors, omissions, ambiguities, discrepancies in the Bidding Documents which SI had not brought out to the MoRTH's notice in his bid shall not constitute a change order and such upward revisions and/or addition shall be carried out by SI without any time and cost effect to MoRTH.

Change Order

- The Change Order will be initiated only in case (i) MoRTH / Governing Committee directs in writing SI to include any addition to the scope of work covered under this Contract or delete any part of the scope of the work under the Contract, (ii) SI requests to delete any part of the work which will not adversely affect the operational capabilities of the facilities and if the deletions proposed are agreed to by MoRTH and for which cost and time benefits shall be passed on to MoRTH, (iii) MoRTH directs in writing SI to incorporate changes or additions to the technical specifications already covered in the Contract.
- Any changes required by MoRTH over and above the minimum requirements given in the specifications and drawings etc. included in the Bidding Documents before giving its approval to detailed design or Engineering requirements for complying with technical specifications and changes required to ensure systems compatibility and reliability for safe operation (As per codes, standards and recommended practices referred in the Bidding Documents) and trouble free operation shall not be construed to be change in the Scope of work under the Contract.

- Any change order comprising an alteration which involves change in the cost of the works (which sort of alteration is hereinafter called a “Variation”) shall be mutually decided basis scope, cost, schedule of payment, and timelines to be carried out by the SI
- Any change order shall be duly approved by MoRTH in writing.
- Within ten (10) working days of receiving the comments from MoRTH or the drawings, specification, purchase requisitions and other documents submitted by SI for approval, SI shall respond in writing, which item(s) of the Comments is/are potential changes(s) and shall advise a date by which change order (if applicable) will be submitted to MoRTH.

11.13 Risk and Cost

In case the selected bidder fails to deliver the services of this RFP as stipulated in the delivery schedule, MoRTH reserves the right to terminate the contract along with forfeiture of the Performance Security Deposit.

11.14 Force Majeure

For the purpose of this RFP the expression “Force Majeure” or “Force Majeure Event” includes any act, event or circumstance, or combination of acts, events or circumstances, which may affect the affected Party's performance of its obligations pursuant to the terms of this Contract, but only if and to the extent that such acts, events or circumstances are not within the affected Party's reasonable control, were not reasonably foreseeable and could not have been prevented or overcome by the affected Party through the exercise of reason able skill or care.

Any act, event, circumstance or combination thereof meeting the description of Force Majeure that has the same effect upon the performance of the Bidder which directly, materially and adversely affects the performance by MoRTH or the Bidder of its obligations in whole or in part under this Contract shall constitute Force Majeure with respect to the MoRTH or the Bidder respectively.

The Force Majeure Event shall comprise the acts, events and circumstances, such as

- act of war, invasion, armed conflict or act of foreign enemy, blockade, embargo, revolution, riot insurrection, civil commotion, act of terrorism or sabotage, in each case occurring inside or directly involving India;
- strikes or lockouts occurring within India or at the Site as part of a nation-wide, industry, wide or state-wide strike or local strike, or lock out (excluding such events which are Site specific and attributable to the Bidder);
- radioactive contamination or ionizing radiation or chemical contamination specifically affecting the Facility or resulting from another Force Majeure Event;

- Flood, Landslides, Cyclone, Lightning, Earthquake, Drought, Storm, Pandemic, Epidemics, Lockdown/Shutdown Restrictions, Quarantine Restrictions;
- any action by competent governmental instrumentality having jurisdiction over the Project, MoRTH or the Bidder resulting in a loss of access to the Site;
- an act of God
- any other act or event or circumstance of an analogous nature.
- any state/national govt order interrupting day to day operations or any other extreme effect of the natural elements

11.15 Exceptions to Force Majeure

Notwithstanding the foregoing, Force Majeure shall not include:

- any delay, default or failure (direct or indirect) by the Bidder in any agreement entered by it; and
- any act, event, or occurrence resulting in financial hardship, including any delay or rejection of an insurance claim, shall not constitute a Force Majeure Event.

11.16 Excused Performance

If either Party is prevented from rendering performance of its obligations, whether wholly or partially under this Contract for reasons of a Force Majeure Event, then that Party will be excused from the performance so affected by the Force Majeure Event to the extent so affected provided that:

- The affected Party gives the other Party written notice of the occurrence of the Force Majeure Event as soon as practicable and in any event within 15 (fifteen) Days from the date of occurrence of the Force Majeure Event, giving full particulars of such occurrence, including an estimation of its expected duration, impact on the performance of such Party's obligations here under, and thereafter continues to furnish there to timely regular reports with respect to continuation of the Force Majeure Event and measures which the affected Party has taken or proposes to take to mitigate the impact of the Force Majeure Event and to resume performance of such of its obligations affected thereby and the Completion Date shall be suitably extended.
- The suspension of performance shall be of no greater scope and of no longer duration than is reasonably required by the Force Majeure Event.
- Upon the occurrence of any circumstances of Force Majeure Event, the Bidder shall use all reasonable endeavors to continue to perform its obligations under the Contract and to

minimize the adverse effects of such circumstances. The Bidder shall also use all reasonable means and best endeavors to ensure that the loss caused by the Force Majeure Event is minimized as far as possible.

- An event of Force Majeure does not relieve a Party from liability for an obligation which arose before the occurrence of that event.

11.17 Sub-contract

- The System Integrator, whether Joint Venture or sole, shall not sub-contract any Works in more than 49% of the Contract Price and shall carry out Works directly under its own supervision and through its own personnel and equipment in at least 51% of the Contract Price. Procurement of any equipment such as cameras and manpower deployed for the purpose of execution of the project shall not be in scope of sub-contracting. The Parties further agree that all obligations and liabilities under this Agreement for the entire project shall at all times remain with the System Integrator.
- In the event any sub-contract for Works, or the aggregate of such sub-contracts with any Sub-contractor, exceeds 5% (five percent) of the Contract Price, the System Integrator shall communicate the name and particulars, including the relevant experience of the Sub-contractor, to the Governance and Steering Committee prior to entering into any such sub-contract. The Committee shall examine the particulars of the Sub- contractor from the national security and public interest perspective and may require the System Integrator, no later than 15 (fifteen) business days from the date of receiving the communication from the System Integrator, not to proceed with the sub-contract, and the System Integrator shall comply therewith.
- In the event any sub-contract for works exceeds 5% and relates to a Sub- contractor who has, over the preceding 3 (three) years, not undertaken at least one work of a similar nature with a contract value exceeding 40% (forty per cent) of the value of the sub-contract to be awarded hereunder, and received payments in respect thereof for an amount equal to at least such 40% (forty per cent), the Committee may, no later than 15 (fifteen) business days from the date of receiving the communication from the System Integrator, require the System Integrator not to proceed with such sub-contract, and the System Integrator shall comply therewith without delay or demur.
- It is expressly agreed that the System Integrator shall, at all times, be responsible and liable for all its obligations under this Agreement notwithstanding anything contained in the agreements with its Sub-contractors or any other agreement that may be entered into by the System Integrator, and no default under any such agreement shall excuse the System Integrator from its obligations or liability under this Agreement. However, in case of non-compliance of the System Integrator towards his obligations for payments to the

approved Sub-contractor(s), which is likely to affect the progress of works, the authority reserves the right to intervene and direct the System Integrator to release such outstanding payments to approved Sub-contractor(s) out of the payments due for the completed Works in the interest of work.

11.18 Effect of Force Majeure Event

Neither MoRTH nor the Bidder shall be considered in default or in contractual breach to the extent that performance of obligations is prevented by a Force Majeure Event, which arises after the Effective Date. An extension of time to the Construction Date shall be agreed upon by the Parties, provided the Bidder proves to MoRTH that;

- The execution of Works is actually and necessarily delayed by an Force Majeure Event; and
- The effect of such Force Majeure Event could not have been prevented or avoided or removed despite exercise of reasonable due diligence whether before, after or during the Force Majeure Event
- Also, in the event of Force Majeure, Bidder agrees to MoRTH deferring the payments for the Force Majeure period provided MoRTH agrees to pay the deferred amount immediately after the Force Majeure period is over.

11.19 Change in Law

- If as a result of Change in Law, the Bidder suffers any additional costs in the execution of the Works or in relation to the performance of its other obligations under this Agreement, the Bidder shall, within 15 (fifteen) days from the date it becomes reasonably aware of such addition in cost, notify the Authority with a copy to the TIMS PMU and Operating Committee of such additional cost due to Change in Law.
- If as a result of Change in Law, the Bidder benefits from any reduction in costs for the execution of this Agreement or in accordance with the provisions of this Agreement, either Party shall, within 15 (fifteen) days from the date it becomes reasonably aware of such reduction in cost, notify the other Party with a copy to the TIMS PMU and Operating Committee of such reduction in cost due to Change in Law.
- The TIMS PMU and Operating Committee shall, within 15 (fifteen) days from the date of receipt of the notice from the Bidder or the Authority, determine any addition or reduction to the Contract Price, as the case may be, due to the Change in Law.

“Change in Law” means the occurrence of any of the following after the Bid Due Date:

- The enactment of any new Indian law;

- The repeal, modification or re-enactment of any existing Indian law;
- The commencement of any Indian law which has not come into effect until the Bid Due Date; or
- A change in the interpretation or application of any Indian law by a judgement of a court of record which has become final, conclusive and binding, as compared to such interpretation or application by a court of record prior to the Bid Due Date.

11.20 Limitation of Liability

- Neither Party shall be liable to the other Party for loss of use of any Works, loss of profit, loss of any contract or for any indirect or consequential loss or damage which may be suffered by the other Party in connection with this Agreement, save and except as provided under Clause 11.10.
- The total liability of one Party to the other Party under and in accordance with the provisions of this Agreement, save and except as provided in Clause 11.10, shall not exceed the Contract Price. For the avoidance of doubt, this Clause shall not limit the liability in any case of fraud, deliberate default or reckless misconduct by the defaulting Party.

12 Annexure - Format for bid submission

Form T-1: Technical Bid Covering Letter

(To be prepared on letterhead of the Bidder, scanned & uploaded on E-tender portal)

To,

The Chief Engineer-Regional Office, Dehradun

Ministry of Road Transport and Highways

1St Floor, Institution of Engineers India Building

Near ISBT, Saharanpur Road, Dehradun-248001, Uttarakhand

Sub.: RFP for Selection of System Integrator for Implementing and Maintaining Traffic Incident Management System on the Chardham Marg

Ref: RFP No.

Dear Sir,

1. I/We, the undersigned, have carefully examined the contents of the above referred RFP document including amendments/ addendums (if any) thereof and we undertake to fully comply and abide by the terms and conditions specified therein and hereby submit our Bid for the aforesaid service. Our bid for the subject RFP is unconditional and unqualified.
2. I/We offer to execute the work in accordance with the Scope of work and the Conditions of Contract of this RFP both explicit and implied.
3. I/We undertake that, in competing for (and, if the award is made to us), for executing the above contract, we will strictly observe the laws against fraud and corruption in force in India namely “Prevention of Corruption Act 1988”.
4. I/We understand that:
    a) This bid, if found incomplete in any respect and/ or if found with conditional compliance or not accompanied with the requisite Bid Securing Declaration, shall be summarily rejected.
    b) If at any time, any averments made or information furnished as part of this bid is found

incorrect, then the bid will be rejected and the contract if awarded on the basis of such information shall be cancelled.

c) Ministry of Road Transport & Highways is not bound to accept any/ all Bid(s) it will receive.

d) Until a contract is executed, this bid together with RFP Document as well as notification of Letter of Award issued by Ministry of Road Transport & Highways shall constitute a binding Contract between us.

5. I/We declare that:

a) I/We have not been blacklisted/ declared ineligible by Ministry of Road Transport & Highways, Government of India or any other agency. I/We also confirm that I/We have not been declared as non-performing or debarred by Ministry of Road Transport & Highways, Government of India.

b) I/We haven't been blacklisted by a Central/ State Government Institution/ Public Sector Undertaking/ Autonomous body and there has been no litigation with any Government Department/ PSU/ Autonomous body on account of similar services.

c) I/We have not directly or indirectly or through an agent engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice, as defined in the Contract Agreement, in respect of any tender or request for proposal issued by or any Contract entered into with Ministry of Road Transport & Highways or any other public sector enterprise or any government, Central or State; and I/We hereby certify that we have taken steps to ensure that in conformity with the provisions of the RFP document, no person acting for us or on our behalf has engaged or will engage in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice.

6. In the event of my / our bid being declared as successful bid, I/we agree to enter into a Contract Agreement in accordance with the format of the Contract Agreement. I/We agree not to seek any change in the aforesaid format of the Contract Agreement and agree to abide by the same.

7. I/We certify that:

a) I/We have not been convicted by a Court of Law or indicted or adverse orders passed by a regulatory authority which could cast a doubt on our ability to undertake the subject work or which relates to a grave offence that outrages the moral sense of the community.

b) Neither the bidder nor any of its Directors are the subject of criminal or civil proceedings

that could be expected to adversely affect its business or its ability to bid in the present tender.

c) No investigation by a regulatory authority is pending either against us or against our CEO or any of our directors/ managers/ employees.

d) I / We don't have any conflict of interest in terms of Clause 3.5 of eligibility criteria defined in this RFP document.

e) The information provided in this technical bid (including the attachments) as well as the financial bid is true, accurate and complete to the best of my knowledge and belief. Nothing has been omitted which renders such information misleading; and all documents accompanying my/our bid are true copies of their respective originals. I/We shall be liable for disqualification or termination of contract at any stage, if any information/ declaration is found to be incorrect or false. I/We will intimate MoRTH promptly in case of any change in the information submitted as part of this technical bid.

f) The documents in original accompanying the bid document have been submitted in a separate envelope as envisaged in the RFP document and marked appropriately.

g) I am the Director / Authorized Signatory of the aforesaid company / firm and I am authorized to sign this bid on behalf of the firm / company. I am submitting this bid after carefully reading all the terms and conditions contained in the RFP document and its addendum/ amendment, if any, and undertake to abide by the same. It is also certified that the bid is being submitted in the prescribed formats without any addition / deviation / alteration and our bid is unconditional.

We remain,

Yours sincerely,

Name …….

Designation/ Title of the Authorized Signatory……

Form T-2: Brief information about the Bidder(s)

(To be prepared on letterhead of the Bidder, scanned & uploaded on E-tender portal)

Sub.: RFP for Selection of System Integrator for Implementing and Maintaining Traffic Incident Management System on the Chardham Marg

Ref: RFP No.

a) Name of Bidder:
b) Year of establishment
c) Constitution of the bidder entity e.g. Government enterprise, private limited company, limited company, proprietorship / partnership firm etc.
d) In case of a Government enterprise, please indicate as to whether legally and financially autonomous and operate under commercial law. **Yes/ No/ Not applicable**
e) Name(s) of Directors/ Proprietors/ Partners

…….

…….

…….

2. Address for correspondence with Telephone/ Fax numbers/ e-mail address:

(a) Complete postal address:

(b) Fixed telephone number

(c) Mobile telephone number

(d) E-mail address

Form T-3: Power of Attorney

Know all men by these presents, we, ... (name of Company and address of the registered office) do hereby constitute, nominate, appoint and authorize Mr / Ms..... son/daughter/wife of…….. and presently residing at ....., who is presently employed with us and holding the position of ..... as our true and lawful attorney (hereinafter referred to as the "Authorized Signatory or Attorney") to do in our name and on our behalf, all such acts, deeds and things as are necessary or required in connection with or incidental to submission of our Bid for selection as the System Integrator for "Design, Supply, Installation, Testing, Commissioning, Configuration, System Integration, Operations and Maintenance of Traffic Incident Management System (TIMS) for Chardham Mahamarg" proposed by Ministry of Road Transport and Highways, including but not limited to signing and submission of all applications, bid(s) and other documents and writings, and providing information/ responses to MoRTH, representing us in all matters before MoRTH, signing and execution of all contracts and undertakings consequent to acceptance of our bid and generally dealing with MoRTH in all matters in connection with or relating to or arising out of our Bid for the said Tender and/or upon award thereof to us.

AND, we do hereby agree to ratify and confirm all acts, deeds and things lawfully done or caused to be done by our said Authorised Signatory or 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 Authorised Representative/ Attorney in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us.

IN WITNESS WHEREOF WE, ...THE ABOVE NAMED PRINCIPAL HAVE EXECUTED THIS POWER OF ATTORNEY ON THIS ..... DAY OF ....., 2023

For .....
(Signature, name, designation and address)

Witnesses:
1.
2.
Notarised

Accepted
.....
(Signature, name, designation and address of the Attorney)

Notes:

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 executants(s) and when it is so required the same should be under common seal affixed in accordance with the required procedure. The Power of Attorney should be executed on a nonjudicial stamp paper of appropriate denomination and should be duly notarised by a notary public.

Wherever required, the Bidder should submit for verification the extract of the charter documents and other documents such as a 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.

Form T-4: Power of Attorney for Lead Member of JV/ Consortium

Whereas the Ministry of Road Transport and Highways ("Authority") has invited bids from interested parties for the selection as the System Integrator for "Design, Supply, Installation, Testing, Commissioning, Configuration, System Integration, Operations and Maintenance of Traffic Incident Management System (TIMS) for Chardham Mahamarg" ("the Project").

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

Whereas, it is necessary for the Members of the JV/ Consortium to designate one of them as the Lead Member with all necessary power and authority to do for and on behalf of the JV/ Consortium, all acts, deeds and things as may be necessary in connection with the JV/ 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 ……., 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 authorise M/s……., having its registered office at ……, being one of the Members of the JV/ Consortium, as the Lead Member and true and lawful attorney of the JV/ Consortium (hereinafter referred to as the "Attorney") and hereby irrevocably authorise the Attorney (with power to sub-delegate) to conduct all business for and on behalf of the JV/ Consortium and any one of us during the bidding process and, in the event the JV/ 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 JV/Consortium, all or any of such acts, deeds or things as are necessary or required or incidental to the submission of its bid for the Project, including but not limited to signing and submission of all applications, bids and other documents and writings, accept the Letter of Award, 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 JV/Consortium and generally to represent the JV/Consortium in all its dealings with the Authority, and/ or any other Government Agency or any person, in all matters in connection with or relating to or arising out of the JV's/ Consortium's bid for the Project and/ or upon award thereof till the Contract is entered into with the Authority and Completed.

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/ JV/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)

For …….
(Signature, Name & Title)

Witnesses:
1.
2.

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

Notes:

- 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. The Power of Attorney should be executed on a non-judicial stamp paper of appropriate denomination and should be duly notarised by a notary public.
- Wherever required, the Bidder should submit for verification the extract of the charter documents and documents such as a 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.

Form T-5: Format of submission of Work Experience / Technical Strength of Bidder

Name of Work / Project:
Client Name:
Address, name of contact person, contact number and email id:
Location:
Start date:
Completion date:
Approximate Value of Work / Project (INR)
Present status (as per the Bidders mandate):
Application users:
Name of persons deployed:
Detailed features of Project Executed:

Name …….

Designation / Title of the Authorized Signatory…….

Dated: …./…./2023

Note:

Bidder should submit relevant details of each projects in this format and should enclose:

1. Go-live / acceptance / completion Certificate issued by the customer; and
4. *Work Order / Purchase order / Copy of contract / Letter of Award highlighting detailed scope of project implemented within the last five financial years prior to the Bid due date as proof for the same.*

Form T-6: Format of Certificate in respect of Bidder's Average Annual Turnover and Net Worth

CERTIFICATE (To be given by a Statutory Auditor)

Sub.: RFP for Selection of System Integrator for Implementing and Maintaining Traffic Incident Management System on the Chardham Mahamarg

Dated: ….. /…../2023

Certificate of Annual Turnover

It is certified that we have examined the audited books of accounts of M/s. _____ (name and address of the bidder) _____ and the details of the annual turnover during the last three financial years and net worth as on 31.03.2023 are as under:

a) Annual Turnover from Information Technology / Communication Technology / System Integration Business

Financial year	Amount in figures	Amount in words
FY 2020-21		
FY 2021-22		
FY 2022-23		
Average of 3 years		

b) Net worth_

Financial year	Amount in figures	Amount in words
FY 2022-23		

___

(Signature of Statutory Auditor)
Name:
Seal:
Place: ……

_____
For (Name of Accounting Firm)

_____

Name of Partner/Proprietor

_____

Membership Number
Rubber Stamp

Form T-7: Format of submission of Detailed methodology and technical work plan (Supported with broad system architecture and design)

Sub.: RFP for Selection of System Integrator for Implementing and Maintaining Traffic Incident Management System on the Chardham Mahamarg

We hereby submit the proposed detailed methodology and technical work plan.

We hereby declare we have reviewed the Functional Requirements and Indicative Technical Specifications outlined in Section 7 and the Guidelines in Section 8 of the RFP and affirm that our proposed solution and technical specifications takes the above into account to meet the scope of work and SLAs detailed in the RFP.

NOTE:

2. Submission under this item is subject to evaluation under technical bid. While giving information, the bidders are advised to strictly focus and address the topic/sub-topic as asked for in a structured manner. Any superfluous submission shall be at bidders' risk.
    a. Detailed methodology
    b. Technical work plan
    c. Broad system architecture and design proposed
    d. Equipment Delivery Schedule and Time schedule to complete the entire work under ToR, supported with Bar Chart
    e. Limitations on part of bidder to address requirements under ToR and SLA

Signature of Authorized Signatory (with official seal)

Date:

Name:

Designation:

Address:

Telephone & Fax (as applicable):

E-mail address:

Form T-8: Bank Guarantee for BID Security (B.G. No. Dated)

1. In consideration of you, ****, having its office at ****, (hereinafter referred to as the "Authority", which expression shall unless it be repugnant to the subject or context thereof include its, successors and assigns) having agreed to receive the BID of …… and having its registered office at …… (and acting on behalf of its JV) (hereinafter referred to as the "Bidder" which expression shall unless it be repugnant to the subject or context thereof include its/their executors, administrators, successors and assigns), for the*** ** Project (hereinafter referred to as "the Project") pursuant to the RFP Document dated …… issued in respect of the Project and other related documents including without limitation the draft contract Agreement (hereinafter collectively referred to as "Bidding Documents"), we (Name of the Bank) having our registered office at …… and one of its branches at …….. (hereinafter referred to as the "Bank"), at the request of the Bidder, do hereby, irrevocably, unconditionally and without reservation guarantee the due and faithful fulfilment and compliance of the terms and conditions of the Bidding Documents (including the RFP Document) by the said Bidder and unconditionally and irrevocably undertake to pay forthwith to the Authority an amount of Rs. *** ** (Rupees *** ** only) (hereinafter referred to as the "Guarantee") as our primary obligation without any demur, reservation, recourse, contest or protest and without reference to the Bidder if the Bidder shall fail to fulfil or comply with all or any of the terms and conditions contained in the said Bidding Documents.

2. Any such written demand made by the Authority stating that the Bidder is in default of the due and faithful fulfilment and compliance with the terms and conditions contained in the Bidding Documents shall be final, conclusive and binding on the Bank.

3. We, the Bank, do hereby unconditionally undertake to pay the amounts due and payable under this Guarantee without any demur, reservation, recourse, contest or protest and without any reference to the Bidder or any other person and irrespective of whether the claim of the Authority is disputed by the Bidder or not, merely on the first demand from the Authority stating that the amount claimed is due to the Authority by reason of failure of the Bidder to fulfil and comply with the terms and conditions contained in the Bidding Documents including failure of the said Bidder to keep its BID open during the BID validity period as set forth in the said Bidding Documents for any reason whatsoever. Any such demand made on the Bank shall

be conclusive as regards amount due and payable by the Bank under this Guarantee. However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs. *** **(Rupees *** ** only).

4. This Guarantee shall be irrevocable and remain in full force for a period of 180 (one hundred and eighty) days from the BID Due Date inclusive of a claim period of 60 (sixty) days or for such extended period as may be mutually agreed between the Authority and the Bidder, and agreed to by the Bank, and shall continue to be enforceable till all amounts under this Guarantee have been paid.

5. We, the Bank, further agree that the Authority shall be the sole judge to decide as to whether the Bidder is in default of due and faithful fulfilment and compliance with the terms and conditions contained in the Bidding Documents including, inter alia, the failure of the Bidder to keep its BID open during the BID validity period set forth in the said Bidding Documents, and the decision of the Authority that the Bidder is in default as aforesaid shall be final and binding on us, notwithstanding any differences between the Authority and the Bidder or any dispute pending before any Court, Tribunal, Arbitrator or any other Authority.

6. The Guarantee shall not be affected by any change in the constitution or winding up of the Bidder or the Bank or any absorption, merger or amalgamation of the Bidder or the Bank with any other person.

7. In order to give full effect to this Guarantee, the Authority shall be entitled to treat the Bank as the principal debtor. The Authority shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee from time to time to vary any of the terms and conditions contained in the said Bidding Documents or to extend time for submission of the BIDs or the BID validity period or the period for conveying acceptance of Letter of Award by the Bidder or the period for fulfilment and compliance with all or any of the terms and conditions contained in the said Bidding Documents by the said Bidder or to postpone for any time and from time to time any of the powers exercisable by it against the said Bidder and either to enforce or forbear from enforcing any of the terms and conditions contained in the said Bidding Documents or the securities available to the Authority, and the Bank shall not be released from its liability under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the said Bidder or any other forbearance, act or omission on the part of the Authority or any indulgence by the

Authority to the said Bidder or by any change in the constitution of the Authority or its absorption, merger or amalgamation with any other person or any other matter or thing whatsoever which under the law relating to sureties would but for this provision have the effect of releasing the Bank from its such liability.

8. Any notice by way of request, demand or otherwise hereunder shall be sufficiently given or made if addressed to the Bank and sent by courier or by registered mail to the Bank at the address set forth herein.

9. We undertake to make the payment on receipt of your notice of claim on us addressed to [name of Bank along with branch address] and delivered at our above branch which shall be deemed to have been duly authorised to receive the said notice of claim.

10. It shall not be necessary for the Authority to proceed against the said Bidder before proceeding against the Bank and the guarantee herein contained shall be enforceable against the Bank, notwithstanding any other security which the Authority may have obtained from the said Bidder or any other person and which shall, at the time when proceedings are taken against the Bank hereunder, be outstanding or unrealised.

11. We, the Bank, further undertake not to revoke this Guarantee during its currency except with the previous express consent of the Authority in writing.

12. The Bank declares that it has power to issue this Guarantee and discharge the obligations contemplated herein, the undersigned is duly authorised and has full power to execute this Guarantee for and on behalf of the Bank.

13. For the avoidance of doubt, the Bank's liability under this Guarantee shall be restricted to Rs. *** crore (Rupees *** ** crore only). The Bank shall be liable to pay the said amount or any part thereof only if the Authority serves a written claim on the Bank in accordance with paragraph 9 hereof, on or before [*** (indicate date falling 180 days after the BID Due Date)].

14. This guarantee shall also be operatable at our…….. Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

15. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of [Ministry], details of which is as under:

S.No.	Particulars	Details
1	Name of Beneficiary	PAO(NH),MoRTH
2	Name of Bank	Canara Bank
3	Account No.	90621150000040
4	IFSC Code	CNRB0003525

Signed and Delivered by ……. Bank

By the hand of Mr./Ms ……., its …….. and authorised official.

(Signature of the Authorised Signatory)

(Official-Seal)

Form T-9: Self Declaration Form for Bidder and / or OEM

(To be submitted on the Letterhead of the responding company)

Date: dd/mm/yyyy

To

The Chief Engineer-Regional Office, Dehradun

Ministry of Road Transport and Highways

1St Floor, Institution of Engineers India Building

Near ISBT, Saharanpur Road, Dehradun-248001, Uttarakhand

Subject: Self Declaration Form for Bidder and / or OEM

Ref: Tender Reference No:

Dear Sir,

I, authorized representative of, hereby solemnly confirm that:

1. We have an IPR of technology (for both Software and Hardware) being deployed in offered models or Design for each offered model registered in our company name as per DOT Notification dated 29-August-2018 & as per notifications below:
    a. Department of Industrial Policy & Promotion (DIPP) Order No. P-45021/2/2017-B.E.-II dated 15.06.2017
    b. Department of Industrial Policy & Promotion (DIPP) Order No. P-45021/2/2017-PP (BE-II) dated 28.05.2018
    c. Gazette No. 18-10/2017-IP dated 31st August 2021
2. We own the Intellectual Property Rights of Hardware and "Source Code" of Firmware & Software (including Cameras/NVR), and are actual manufacturers, and are not getting any 3rd party manufacturing done e.g., branding & reselling in India through importing/ trading from a Country that shares a Land Border with India.
3. We own the source code of the Software and Firmware being supplied for all the relevant equipment being supplied against this tender and the source code does not reside in any Country that shared a Land Border with India.
4. We are not suspended by ONVIF.
5. Our equipment, like cameras etc., shall not be installed with standards like - GB28181, GB/T28181-2011, GB/T 28181-2011, GBT 28181-2011, GBT28181-2011, GB/T28181-2016, etc.,

protocols/standards and there shall be no option in the camera web page/settings to activate or deactivate such protocols/standards any of their version(s) or any such protocol which allow certain organizations to bypass all security parameters and look into the devices directly.

6. Our offered cameras should not support or have H.265+, H.265++ or H.265X compression (Compression from any country sharing land border with India).
7. Our Camera OEM is a genuine manufacturer and is a MPEG LA licensor. We are paying a license fee for using the genuine HVEC compression legally. The same can be checked on following official website: https://www.mpegla.com/programs/hevc/licensees/
8. Our OEM of CCTV cameras/NVR selected, have a valid MAC address……. (of all makes and models of IP CCTV quoted for this tender) registered in the name of the OEM. Our MAC address is not in the name of any 3rd party.

In the event of any deviation from the factual information/ declaration, MoRTH reserves the right to reject the Bid or terminate the Contract without any compensation to the Company and forfeiture of Earnest Money Deposit and/or Security Deposit.

Thanking you,
Yours faithfully,

Signature of Authorized Signatory (with official seal)
Date:
Name:
Designation:
Address:
Telephone &Fax:
E-mail address:

Form T-10: Format for Declaration by the Bidder / all members of consortium for not being Blacklisted / Debarred

(To be submitted on the Letterhead of the responding company)

Date: dd/mm/yyyy

To

The Chief Engineer-Regional Office, Dehradun

Ministry of Road Transport and Highways

1St Floor, Institution of Engineers India Building

Near ISBT, Saharanpur Road, Dehradun-248001, Uttarakhand

Subject: Declaration for not being debarred / black-listed by Central / any Government or PSU in India as on the date of submission of the bid

Ref: Tender Reference No:

Dear Sir,

I, authorized representative of, hereby solemnly confirm that the Company is not debarred /blacklisted by any Government or PSU for any reason as on last date of submission of the Bid. In the event of any deviation from the factual information/ declaration, MoRTH reserves the right to reject the Bid or terminate the Contract without any compensation to the Company and forfeiture of Earnest Money Deposit and/or Security Deposit.

Thanking you,

Yours faithfully,

Signature of Authorized Signatory (with official seal)

Date:

Name:

Designation:

Address:

Telephone & Fax:

E-mail address:

Form T-11: Manufacturers'/Producers' Authorization Form

(This form has to be provided by the OEMs of the hardware and software solutions proposed. This letter should be on the letterhead of the manufacturer and should be signed by a person competent and having the power of attorney to bind the manufacturer.)

Date:

To,
The Chief Engineer-Regional Office, Dehradun
Ministry of Road Transport and Highways
1st Floor, Institution of Engineers India Building
Near ISBT, Saharanpur Road, Dehradun-248001, Uttarakhand

Subject: Manufacturer's Authorization Form

Ref: RFP No. <<…..>> dated << …..>>

Dear Sir,
We (Name of the OEM) who are established and reputable manufacturers of …… (List of Goods) having factories or product development centres at the locations …… or as per list attached, do hereby authorize … (Name and address of the Bidder) to bid, negotiate and conclude the contract with you against RFP No…….. Dated…… for the above goods manufactured or developed by us.

We have manufacturing CCTV equipment since ……

We hereby extend, our warranty for the hardware goods supplied by the bidder and or maintenance or support services for software products against this invitation for bid by … (Name of the Bidder) as per requirements and for the duration of contract as specified in this RFP.

We also confirm that our offered product will not be end of life for minimum of 6 years from the

date of bid submission and the support for such offered product/s will be available for minimum of 5 years from the date of award of contract

Thanking you,
Yours faithfully,
(Signature)

For and on behalf of:
(Name of the OEM)

Authorized Signatory Name:
Designation:
Place:
Date:

Form T-12: List of Proposed Sub-contractors (if applicable)

System/Sub-system/Item/Activity	Proposed Sub-contractor (Full Name & Address)

Form T-13: Undertaking from sub-contractor

(On the letterhead of the subcontractor firm)

Letter No. _____

Date: _/_/_

To:

The Chief Engineer-Regional Office, Dehradun

Ministry of Road Transport and Highways

1st Floor, Institution of Engineers India Building

Near ISBT, Saharanpur Road, Dehradun-248001, Uttarakhand

Ref: - Request For Proposal for Selection of System Integrator (SI) for implementation of Chardham Mahamarg TIMS project

Sub: - Consent of association with _____ as sub-contractor for the referred RFP

Dear Sir,

1. I, the undersigned, confirm my agreement to associate with M/s …… (hereinafter referred to as "lead bidder") as the "sub-contractor" to submit the proposal and work for the above-captioned project.
2. I authorize the lead bidder to include my company's experience and expertise in the above referenced Project Proposal and / or forward my profile to the Client for the proposal and represent me on all contractual aspects of this proposal.
3. I confirm my interest and availability to work on the projects awarded, should the lead bidder be successful in the RFP.
4. I confirm that to the best of my belief and knowledge, I have not been blacklisted by any government/ semi government body or donor agency.

Yours sincerely,

Authorised Signatory of the subcontractor

Form T-14: Certificate for Tenders for Works involving possibility of sub-contracting and in the cases of specified ToT

Date: _/_/_

To:

The Chief Engineer-Regional Office, Dehradun

Ministry of Road Transport and Highways

1st Floor, Institution of Engineers India Building

Near ISBT, Saharanpur Road, Dehradun-248001, Uttarakhand

Ref: - RFP for Selection of System Integrator for Implementing and Maintaining Traffic Incident Management System on the Chardham Mahamarg

Sub: -

Dear Sir,

1. I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries; I certify that this bidder is not from such a country or, if from such a country, has been registered with the Competent Authority and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority. I hereby certify that this bidder fulfills all requirements in this regard and is eligible to be considered. [Where applicable, evidence of valid registration by the Competent Authority shall be attached.]
2. I have read the clause regarding restrictions on procurement from a bidder having Transfer of Technology (ToT) arrangement. I certify that this bidder does not have any ToT arrangement requiring registration with the competent authority.

   OR

3. I have read the clause regarding restrictions on procurement from a bidder having Transfer of Technology (ToT) arrangement. I certify that this bidder has valid registration to participate in this procurement.

Thanking you,
Yours faithfully,

Signature of Authorized Signatory (with official seal)
Date:
Name:
Designation:
Address:
Telephone & Fax:
E-mail address:

Form T-15: Integrity Pact

(To be executed on the plain paper and submitted along with Technical Bid/ Tender documents for tenders having a value of Rs. 5 crore or more. To be signed by the bidder and same signatory competent/ authorized to sign the relevant contract on behalf of MoRTH)

(_____ Division)

Tender No ____

This integrity Pact is made at ____ on this ____ day of _____ 2023.

BETWEEN

The Ministry of Road Transport and Highways hereinafter referred to as "The Principal", which expression shall, unless repugnant to the meaning of contract thereof, include its successors and permitted assigns)

AND

…… hereinafter referred to as "The Bidder(s) " and which expression shall unless repugnant to be meaning or context thereof include its successors and permitted assigns.

PREAMBLE

Whereas, the Principal intends to award, under laid down organizational procedure, contract/s for ……. The Principal values full compliance with all relevant laws of the land, rules of land, regulations, economic* use of resources and of fairness/ transparency in its relations with its Bidder(s).

And whereas in order to achieve these goals, the Principal will appoint an Independent External Monitors (IEMs), who will monitor the tender process and the execution of the contract for

compliance with the Principles mentioned above.

And whereas to meet the purpose aforesaid, both the parties have agreed to enter into this Integrity Pact (hereafter referred to as "Integrity Pact") the terms and conditions of which shall also be read as integral part and parcel of the Tender documents and contract between the parties.

Now, therefore, in consideration of mutual covenants stipulated in this pact, the parties hereby agree as follows and this pact witnesses as under:

Article 1: Commitments of the Principal

1. The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-

    a. No employee of the Principal, personally or through family members, will in connection with the Tender for, or the execution of a Contract, demand, take a promise for or accept, for self, or third person, any material or immaterial benefit which the person is not legally entitled to.

    b. The Principal will, during the Tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the Tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

    c. The Principal will exclude all known prejudiced persons from the process.

2. If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the IPC/PC Act or any other Statutory Acts or if there be a substantive suspicion in this regard, the Principal will inform the Chief Vigilance Officer and in addition can initiate

disciplinary actions as per its internal laid down Rules/Regulations.

Article 2: Commitments of the Bidder(s)

The Bidder(s) commit themselves to take all measures necessary to prevent corruption. They commit themselves to observe the following principles during their participation in the tender process and during the contract execution.

a) The Bidder(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

b) The Bidder(s) will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contract, submission or non-submission or bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

c) The Bidder(s) will not commit any offence under the relevant IPC/PC Act and other Statutory Acts; further the Bidder(s) will not use improperly, for purposes of completion or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

d) The Bidder(s) of foreign origin shall disclose the name and address of the Agents/ Representatives in India, if any. Similarly, the Bidder(s) of Indian Nationality shall furnish the name and address of the foreign principals, if any. Further, details as mentioned in the 'Guidelines on Indian Agents of Foreign Suppliers' shall be disclosed by the Bidder(s). Further, all the payments made to the Indian Agent / Representative have to be Indian Rupees only.

e) The Bidder(s) will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection

with the award of the contract. He shall also disclose the details of services agreed upon for such payments.

f) The Bidder(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

g) The Bidder(s) will not bring any outside influence through any Govt. bodies/quarters directly or indirectly on the bidding process in furtherance of his bid.

h) The Bidder(s) who have signed a Integrity pact shall not approach the court while representing the matter to IEMs and shall wait for their decision in the matter.

Article 3: Disqualification from tender process and exclusion from future contracts.

1. If the Bidder(s), before award or during execution has committed a transgression through a violation of any provision of Article 2, above or in any other form such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s) from the tender process.

2. If the Bidder(s) has committed a transgression through a violation of Article-2 such as to put his reliability or credibility into question, the Principal shall be entitled to exclude including blacklist and put on holiday the Bidder(s) for any future tenders/ contract award process. The imposition and duration of the exclusion will be determined by the severity of the transgression. The severity will be determined by the Principal taking into consideration the full facts and circumstances of each case particularly taking into account the number of transgressions, the position of the transgressors within the company hierarchy of the Bidder(s) and the amount of the damage. The exclusion will be imposed for a minimum period of 6 months and maximum period of 2 years.

3. A transgression is considered to have occurred if the Principal after due consideration of the available evidence concludes that "On the basis of facts available there are no material doubts".

4. The Bidder(s) with its free consent and without any influence agrees and undertakes to

respect and uphold the Principal's absolute rights to resort to and impose such exclusion and further accepts and undertakes not to challenge or question such exclusion on any ground, including the lack of any hearing before the decision to resort to such exclusion is taken. This undertaking is given freely and after obtaining independent legal advice.

5. The decision of the Principal to the effect that a breach of the provisions of this Integrity Pact has been committed by the Bidder(s) shall be final and binding on the Bidder(s), however, the Bidder(s) can approach IEM(s) appointed for the purpose of this Pact.

6. On occurrence of any sanctions/ disqualification etc. arising out from violation of integrity pact, the Bidder(s) shall not be entitled for any compensation on this account.

7. Subject to full satisfaction of the Principal, the exclusion of the Bidder(s) could be revoked by the Principal if the Bidder(s) can prove that they have restored/ recouped the damage caused by them and have installed a suitable corruption prevention system in their organization.

Article 4: Compensation for Damages.

1. If the Principal has disqualified the Bidder(s) from the tender process prior to the award according to Article-3, the Principal shall be entitled to suspend the bidder for participation in the tendering process for the works of MoRTH/NHAI/NHIDCL and works under other Centrally Sponsored Schemes for a period of One Year from the bid due date of this work apart from any other legal right that may have accrued to the Principal.
2. In addition to 1 above, the Principal shall be entitled to take recourse to the relevant provisions of the contract related to Termination of Contract due to Selected Bidder(s)/ System Integrator’s Default. In such case, the Principal shall be entitled to forfeit the Performance Security Deposit of the Selected Bidder(s)/ System Integrator and/ or demand and recover liquidated and all damages as per the provisions of the contract agreement against Termination.

Article 5: Previous Transgressions

1. The Bidder(s) declare that no previous transgressions occurred in the last 3 years immediately before signing of this Integrity Pact with any other Company in any country conforming to the anti-Corruption/ Transparency International (TI) approach or with any other Public Sector

Enterprise/ Undertaking in India or any Government Department in India that could justify their exclusion from the tender process.

2. If the Bidder(s) makes incorrect statement on this subject, they can be disqualified from the tender process or action for their exclusion can be taken as mentioned under Article-3 above for transgressions of Article-2 and shall be liable for compensation for damages as per Article-4 above.

Article 6: Equal treatment of all Bidders/ Contractors/ Concessionaires/ Consultants/ Subcontractors.

1. The Bidder(s)/ Contractor(s)/ Concessionaire(s)/ Consultant(s) undertake(s) to demand from all sub-contractors a commitment in conformity with this Integrity Pact, and to submit it to the Principal before contract signing.
2. The Principal will enter into agreements with identical conditions as this one with all Bidders and subcontractors.
3. The Principal will disqualify from the tender process all Bidders who do not sign this Pact or violate its provisions.

Article 7: Criminal charges against violating Bidder(S)

If the Principal obtains knowledge of conduct of a Bidder or subcontractor, or of an employee or a representative or an associate of a Bidder/ Contractor/ Concessionaire/ Consultant or Subcontractor, which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the same to the Chief Vigilance Officer.

Article 8: Independent External Monitor (IEM)

1. The Principal has appointed _____, _____ and _____, as Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

2. The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the Secretary (RT&H).
3. The Bidder(s) accepts that the Monitor has the right to access without restriction to all project documentation of the Principal including that provided by the Bidder(s). The Bidder(s) will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors.
4. The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/Contractor(s)/Subcontractor(s) with confidentiality. The Monitor has also signed on 'Non-disclosure of Confidential Information' and of 'Absence of Conflict of Interest'. In case of any conflict of interest arising at a later date, the IEM shall inform Secretary (RT&H) and recuse himself/ herself from that case.
5. The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the Principal and the Bidder. The parties offer to the Monitor the option to participate in such meetings.
6. As soon as the Monitor notices, or believes, to notice any transgression as given in Article-2, he may request the Management of the Principal to take corrective action, ortotake relevant action. The monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.
7. The Monitor will submit a written report to the Secretary (RT&H) within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.
8. If the Monitor has reported to the Secretary (RT&H), a substantiated suspicion of an offence under relevant IPC/PC Act or any other Statutory Acts, and the Secretary (RT&H) has not, within the reasonable time taken visible action to proceed against such offence or reported it to the Chief Vigilance Officer, the Monitor may also transmit this information directly to the Central Vigilance Commissioner.
9. The word 'Monitor' would include both singular and plural.

Article 9: Pact Duration

This Pact begins when both parties have legally signed it (in case of EPC i.e. for projects funded by Principal and consultancy services). It expires for the Contractor/ Consultant 12 months after his Defect Liability Period is over or 12 months after his last payment under the contract whichever is later and for all other unsuccessful Bidders 6 months after this Contract has been awarded. (In case of BOT Projects) It expires for the concessionaire 24 months after his concession period is over and for all other unsuccessful Bidders 6 months after this Contract has been awarded. Any violation of the same would entail disqualification of the bidder and exclusion from future dealings.

If any claim is made/ lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/ determined by Chairman of NHA1.

Article 10: Other Provisions.

1. This pact is subject to Indian Law. Place of performance and jurisdiction is the Registered Office of the Principal, i.e., New Delhi.
2. Changes and supplements as well as termination notices need to be made in writing.
3. If the Bidder is in a partnership or a Joint Venture partner, this pact must be signed by all partners or members
4. Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
5. Issue like warranty / Guarantee etc. shall be outside the purview of IEMs.
6. In the event of any contradiction between the Integrity Pact and its Annexure, the clause in integrity pact shall prevail.
7. Any disputes/ differences arising between the parties with regard to term of this pact, any action taken by the Principal in accordance with this Pact or interpretation thereof shall not be subject to any Arbitration.

8. The actions stipulated in this Integrity Pact are without prejudice to any other legal action that may follow in accordance with the provision of the extent law in force relating to any civil or criminal proceedings.

In witness whereof the parties have signed and executed this Pact at the place and date first done mentioned in the presence of following witness

_____

_____

For & on behalf of the Principal

For & on behalf of Bidder/
Contractor/ Concessionaire/
Consulting

(Office seal)

Form T-16: Format for Resume of Project Lead

Position Title and No.	{e.g., Project Leader}
Name:	{Insert full name}
Date of Birth:	{day/month/year}
Country of Citizenship/ Residence	

Education: {List college/university or other specialized education, giving names of educational institutions, dates attended, degree(s)/diploma(s) obtained}

_____

_____

Employment record relevant to the assignment: {Starting with present position, list in reverse order. Please provide dates, name of employing organization, titles of positions held, types of activities performed and location of the assignment, and contact information of previous clients and employing organization(s) who can be contacted for references. Past employment that is not relevant to the assignment does not need to be included.}

Period	**Employing organization and your title/position**	**Country**	**Summary of activities performed relevant to the Assignment**
[e.g., May 2005-present]	[e.g., Ministry of ……, advisor to…		

Membership in Professional Associations and Publications:

_____

Language Skills (indicate only languages in which you can work): _____

_____

Adequacy for the Assignment:

Detailed Tasks Assigned:	**Prior Work/Assignments that Best Illustrates Experience in Sector and TIMS Implementation**

*Provide separate tables for each project

Contact information: (E-mail……., Phone……)

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and I am available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my disqualification or dismissal by the Client.

{day/month/year}

Name of Expert Signature Date

{day/month/year}

Name of Authorized Representative of the Bidder Signature Date

Format F-1: Format for Financial Bid Submission

(For sample only, actual Format to be downloaded from e-tender portal for online submission)

Sub.: RFP for Selection of System Integrator for Implementing and Maintaining Traffic Incident Management System on the Chardham Mahamarg

Dear Sir,

I/We, the undersigned having examined the above referred RFP including addendums thereof and, hereby offer to submit our bid to undertake the subject assignment with total bid value for the project.

Description	Amount (in Indian Rupees)	Amount (In words)
Total Bid Price		

Signature of Authorized Signatory (with official seal) Date:
Name:
Designation:
Address:
Telephone &Fax:
E-mail address:

13 Indicative Camera Locations

Indicative camera locations for TMCS and AIDS are provided below. The finalization of the exact locations and number of systems to be installed shall by determined by the TIMS PMU and the Operating Committee.

1. Accident-Prone Areas identified by Uttarakhand State Government along Chardham Routes for consideration of installation of the proposed Accident and Incident Detection System (*AID System shall also consist of ANPR Camera, Radar etc. solution for vehicle speed detection, vehicle identification, and enforcement of over-speeding vehicles, and speed display on VASD in real time*) under the TIMS program (only locations lying on above specified National Highways to be considered for system deployment). Locations to be finalized by System Integrator and TIMS PMU, and Operating committee.

S. No	District Name	Name of accident prone area other than marked black spot/Chainage	Latitude	Longitude
1	Tehri Garhwal	From Phakot Bazar towards Champa	-	-
2	Tehri Garhwal	Bemar Turn no. 2	30.24696331	78.35138020
3	Tehri Garhwal	Jajal Mirchwadi	-	-
4	Tehri Garhwal	Near Than village	29.93648192	78.47999603
5	Tehri Garhwal	Near Sabli	30.32109287	78.39753365
6	Tehri Garhwal	Below Sabli	30.32240797	78.39933073
7	Tehri Garhwal	4.5 Km	30.36356374	78.39519559
8	Tehri Garhwal	10-15 Km	30.40378180	78.39784859

S. No	District Name	Name of accident prone area other than marked black spot/Chainage	Latitude	Longitude
9	Tehri Garhwal	17.8 Km	30.41381480	78.42154977
10	Tehri Garhwal	23.50 Km	30.43329373	78.40613007
11	Tehri Garhwal	35.20 Km	30.46791239	78.38468166
12	Tehri Garhwal	44 Km	30.47136198	78.34962601
13	Tehri Garhwal	57.40 Km	30.51281206	78.36710867
14	Tehri Garhwal	61.30 Km and 63	30.53172297	78.34440168
15	Tehri Garhwal	67.20 Km	30.55712419	78.32998987
16	Tehri Garhwal	69.20 Km	30.55568112	78.32320291
17	Tehri Garhwal	Rishikesh to Chamba	-	-
18	Tehri Garhwal	Nainbagh bazar -Uttarkashi Route	-	-
19	Tehri Garhwal	Chainage 257.150(258 Km)	-	-
20	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
21	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
22	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
23	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
24	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
25	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
26	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
27	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
28	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
29	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
30	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-

S. No	District Name	Name of accident prone area other than marked black spot/Chainage	Latitude	Longitude
31	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
32	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
33	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
34	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
35	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
36	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
37	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
38	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
39	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
40	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
41	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
42	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
43	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
44	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
45	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
46	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
47	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
48	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
49	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
50	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
51	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
52	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
53	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
54	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
55	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
56	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
57	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
58	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-
59	Uttarkashi	Uttarkashi Ghansali Tilwara Motor Road	-	-

S. No	District Name	Name of accident prone area other than marked black spot/Chainage	Latitude	Longitude
60	Uttarkashi	R. M. No 94(134) Dharaso Band 0.2 to 0.7 Km	30.61409440	78.32117520
61	Uttarkashi	1.1 Km	30.80966828	78.21541348
62	Uttarkashi	7.7 Km	30.80782532	78.23266545
63	Uttarkashi	Brahakhal 15.1 Km	30.79293291	78.25498143
64	Uttarkashi	Dobata 55.7 Km	30.64162968	78.33156691
65	Uttarkashi	Chatanga 56.6 Km	30.62424645	78.32462870
66	Uttarkashi	Kharadi 66.20 Km	30.65070642	78.33286845
67	Uttarkashi	Barkot 109.95 Km	30.80082440	78.24985172
68	Uttarkashi	Naugaon 11.5 Km	30.80579802	78.22100180
69	Uttarkashi	34.00 Km	30.73241797	78.27592412
70	Uttarkashi	Damta Market 41.4 Km	30.52200550	78.03493167
71	Uttarkashi	One Barrier near Nagudh 2.6 Km	30.26764280	78.84324630
72	Uttarkashi	Pipal mandi, Chinyalisaur 3.4 Km	30.60153635	78.31706752
73	Uttarkashi	Badethi Dharasu 8.1 Km	30.65014821	78.33191772
74	Uttarkashi	Dharasu Band 9.6 Km	30.65959925	78.33672424
75	Uttarkashi	Nalupani near Dharasu turn 14.1 Km	30.74041636	78.35334154
76	Uttarkashi	About 1.4 km ahead of Nanu Pani 15.5 km	30.23976586	78.79930099

S. No	District Name	Name of accident prone area other than marked black spot/Chainage	Latitude	Longitude
77	Uttarkashi	Dunda Market 22.9 Km	30.70878318	78.35389711
78	Uttarkashi	Raturi Sera 28.00 Km	30.75112676	78.37402813
79	Uttarkashi	Bandarkot 29.1 Km	29.90755378	78.74905177
80	Uttarkashi	Uttarkashi Bus Stand 38.6 Km	30.87510033	78.66018546
81	Uttarkashi	Uzeli Kailash Ashram 39.6 Km	30.69820242	78.29775726
82	Uttarkashi	Gangori Bazar 42.4 Km	30.32233570	78.65476212
83	Uttarkashi	Netala 48.5 Km	30.34386280	78.64097067
84	Uttarkashi	About 500 meters ahead of Netala 49 kilometers	30.34665920	78.63496252
85	Uttarkashi	Maneri Dam 54 Km	30.36185664	78.61197017
86	Uttarkashi	Silkura turn to Bhatusaud 56 Km	30.36255942	78.59837054
87	Uttarkashi	Aungee 58.2 Km	30.36891467	78.58548113
88	Uttarkashi	Pilot Baba Ashram. 62 Km	30.10539151	78.57464219
89	Uttarkashi	Malla 66.00Km	30.08638546	78.58102666
90	Uttarkashi	Bhatwari Market 70.9 Km	30.39598032	78.50913475
91	Uttarkashi	50 metres ahead of Bhatwari Market 70.05 Km	30.39383334	78.51325462
92	Uttarkashi	Theerang 74 Km	30.09120160	78.53929205
93	Uttarkashi	Bhukki 77.7 Km	30.41422412	78.48185085
94	Uttarkashi	Helgugad 78.1 Km	30.41589064	78.48166891
95	Uttarkashi	200 meters ahead of Helgugad 78.3 Km	30.41796313	78.48304220

S. No	District Name	Name of accident prone area other than marked black spot/Chainage	Latitude	Longitude
96	Uttarkashi	100 meters east of Gangnani 81.1 kilometer	30.43221320	78.47652941
97	Uttarkashi	Gangnani 81.9 Km	30.43768947	78.47893267
98	Uttarkashi	82.3 kms about 500 meters ahead of Gangnani	30.44321007	78.47888600
99	Uttarkashi	About 2 kms ahead of Gangnani 83.8 kms	30.44227746	78.46313982
100	Uttarkashi	1 km ahead of Dabrani 93.5 km	29.93901749	78.69570247
101	Uttarkashi	95 km ahead of Songadh 500 meters	30.39858471	78.43532080
102	Uttarkashi	About 300 m east of Sukkhi 96.5 km	30.39871723	78.43530183
103	Uttarkashi	About 2 km ahead of Sukkhi Top 107.1 km	30.34934833	78.39455136
104	Uttarkashi	About 200 meters ahead of Kopang 130.2 Km	30.42993241	78.40474257
105	Uttarkashi	About 100 meters east of Bhairav Ghati, 133.7 km	30.43792059	78.39933814
106	Pauri	Amsod bend	-	-
107	Pauri	freighter	-	-
108	Pauri	Sirohbagad	-	-
109	Chamoli	mallyapod Km - 115.200	29.78844389	79.52256461
110	Chamoli	monachina km -131.700	29.59892480	79.30085958
111	Chamoli	condensed km - 97.050	29.76221316	79.24049257
112	Chamoli	Thala Band km - 120.350	29.63182259	79.29772117
113	Chamoli	Benaculi Band	-	-

S. No	District Name	Name of accident prone area other than marked black spot/Chainage	Latitude	Longitude
114	Chamoli	Air band	-	-
115	Chamoli	Near the lodge, 100 meters ahead of Hanumanchatti	30.08636590	78.26679346
116	Chamoli	second turn above hanuman chatti	-	-
117	Chamoli	Near Ghudsil Shiv Mandir	-	-
118	Chamoli	Near Radang Band Gadere	-	-
119	Chamoli	NHIDCAL N.H. - 07(Old N.H.S. - 58)	-	-
120	Chamoli	NHIDCAL N.H. - 07(Old N.H.S. - 58)	-	-
121	Chamoli	-	-	-
122	Chamoli	-	-	-
123	Chamoli	-	-	-
124	Chamoli	-	-	-
125	Chamoli	-	-	-
126	Chamoli	-	-	-
127	Rudraprayag	62KM.	30.39992803	78.71072212
128	Rudraprayag	68 KM	30.38452854	78.74848763
129	Rudraprayag	84KM.	30.39023742	78.83363167
130	Rudraprayag	94KM.	30.40760141	78.86553839
131	Rudraprayag	95KM	30.40694622	78.87009649
132	Rudraprayag	96 KM.	30.40989454	78.87807317
133	Rudraprayag	15.3Km to 15.5 Km	30.36063525	78.94931917
134	Rudraprayag	16.8Km to 16.9 Km	30.36004277	78.94107942
135	Rudraprayag	24.8 Km to25.6 Km	30.37189172	78.89541750
136	Rudraprayag	25.1 Km to 25.2Km	30.37396514	78.89267092
137	Rudraprayag	25.7 Km to 26.0 Km	30.37544612	78.88889437

S. No	District Name	Name of accident prone area other than marked black spot/Chainage	Latitude	Longitude
138	Rudraprayag	26.0 Km to 27.5 Km	30.37751946	78.89061098
139	Rudraprayag	27.7 Km to 28 Km	30.37100310	78.90400057
140	Rudraprayag	28 Km to 29.2 Km	30.37159551	78.90537386
141	Rudraprayag	29.3 Km to 29.8 Km	30.37722328	78.90022402
142	Rudraprayag	30.8 Km	30.38166602	78.89129763
143	Rudraprayag	30.8 Km to 31.9 Km	30.38373923	78.88649111
144	Rudraprayag	32.0 Km to 32.3 Km	30.38274807	78.88333491
145	Rudraprayag	32.7 Km	30.38807904	78.88127498
146	Rudraprayag	32.0 Km	30.38274807	78.88333491
147	Rudraprayag	33.1 Km	30.38979335	78.88324518
148	-	-	30.69400270	78.35241460
149	-	-	30.72664200	78.35807130
150	-	-	30.57938930	78.31895870
151	-	-	30.51835910	78.35958380
152	-	-	30.32158330	78.39403700
153	-	-	30.31180300	78.34678720
154	-	-	30.26613080	78.36828820
155	-	-	30.10949300	78.27972280
156	-	-	30.94514020	78.40865970
157	-	-	30.92182520	78.37971290
158	-	-	30.83807180	78.26308470
159	-	-	30.75412840	78.45392860
160	-	-	30.75132910	78.55572180
161	-	-	30.82675860	78.61863580
162	-	-	30.99968290	78.69732600
163	-	-	30.28796330	79.16000930
164	-	-	30.21841520	78.76734970
165	-	-	30.22641950	78.73039000

S. No	District Name	Name of accident prone area other than marked black spot/Chainage	Latitude	Longitude
166	-	-	30.13525270	78.41350650
167	-	-	30.43926750	79.07408690
168	-	-	30.41757750	79.06367350
169	-	-	30.36296640	78.97936440
170	-	-	30.28503950	79.14086640
171	-	-	30.56326910	79.57298150
172	-	-	30.55448960	79.57693580
173	-	-	30.40926490	79.37704630
174	-	-	30.29192220	79.28570320
175	-	-	30.27997210	79.24460990
176	-	-	30.34425400	79.31959210
177	-	-	30.39993940	79.32994810
178	-	-	31.00380740	78.89418270
179	-	-	31.00689000	78.88822640
180	-	-	31.01555510	78.87767820
181	-	-	31.04334390	78.80726100
182	-	-	31.03471040	78.74931450
183	-	-	30.96325650	78.69667740
184	-	-	30.92663530	78.68286720
185	-	-	30.75633480	78.57663390
186	-	-	30.75479510	78.56183880
187	-	-	30.73567260	78.51295000
188	-	-	30.74013720	78.45424210
189	-	-	30.73487540	78.40107070
190	-	-	30.73855390	78.39065570
191	-	-	30.67067730	78.34287620
192	-	-	30.81852400	78.22898020
193	-	-	30.92203670	78.38160360
194	-	-	30.41178820	79.39908560

S. No	District Name	Name of accident prone area other than marked black spot/Chainage	Latitude	Longitude
195	-	-	30.40731550	79.38389910
196	-	-	30.29838770	79.06578870
197	-	-	30.23719680	78.83361810
198	-	-	30.22004410	78.74017480
199	-	-	30.09005500	78.43480300
200	-	-	30.58315170	79.03762170
201	-	-	30.58549500	79.02424610
202	-	-	30.49745890	79.48471240
203	-	-	30.18946430	78.63623100
204	-	-	30.06829150	78.47752230
205	-	-	30.72331260	78.28372240

2. Indicative locations for Traffic Monitoring Camera Systems (TMCS)

S.No.	Route Name	Longitude	Latitude
1	Rudraprayag - Mana	79.49975000	30.76662000
2	Rudraprayag - Mana	79.49561000	30.73124000
3	Rudraprayag - Mana	79.49410000	30.73206000
4	Rudraprayag - Mana	79.49637000	30.73125000
5	Rudraprayag - Mana	79.50159000	30.71288000
6	Rudraprayag - Mana	79.49997000	30.71407000
7	Rudraprayag - Mana	79.50136000	30.71242000
8	Rudraprayag - Mana	79.49939000	30.71398000
9	Rudraprayag - Mana	79.50056000	30.71198000
10	Rudraprayag - Mana	79.49727000	30.71451000
11	Rudraprayag - Mana	79.49985000	30.71100000
12	Rudraprayag - Mana	79.49727000	30.71213000
13	Rudraprayag - Mana	79.51402000	30.69644000
14	Rudraprayag - Mana	79.51475000	30.69512000

S.No.	Route Name	Longitude	Latitude
15	Rudraprayag - Mana	79.51154000	30.67853000
16	Rudraprayag - Mana	79.50825000	30.68671000
17	Rudraprayag - Mana	79.52395000	30.64898000
18	Rudraprayag - Mana	79.55303000	30.56591000
19	Rudraprayag - Mana	79.55077000	30.56652000
20	Rudraprayag - Mana	79.55426000	30.56510000
21	Rudraprayag - Mana	79.55003000	30.56617000
22	Rudraprayag - Mana	79.54991000	30.56569000
23	Rudraprayag - Mana	79.55032000	30.56523000
24	Rudraprayag - Mana	79.55003000	30.56448000
25	Rudraprayag - Mana	79.54917000	30.56426000
26	Rudraprayag - Mana	79.55357000	30.56038000
27	Rudraprayag - Mana	79.55442000	30.55975000
28	Rudraprayag - Mana	79.55305000	30.55980000
29	Rudraprayag - Mana	79.55276000	30.55846000
30	Rudraprayag - Mana	79.51517000	30.52914000
31	Rudraprayag - Mana	79.52426000	30.53081000
32	Rudraprayag - Mana	79.51265000	30.52904000
33	Rudraprayag - Mana	79.52085000	30.53415000
34	Rudraprayag - Mana	79.50422000	30.52481000
35	Rudraprayag - Mana	79.48527000	30.48878000
36	Rudraprayag - Mana	79.48279000	30.48905000
37	Rudraprayag - Mana	79.44609000	30.46097000
38	Rudraprayag - Mana	79.44687000	30.46234000
39	Rudraprayag - Mana	79.44544000	30.46090000
40	Rudraprayag - Mana	79.44731000	30.46429000
41	Rudraprayag - Mana	79.42851000	30.42570000
42	Rudraprayag - Mana	79.42785000	30.41775000
43	Rudraprayag - Mana	79.41724000	30.41166000
44	Rudraprayag - Mana	79.39000000	30.40894000

S.No.	Route Name	Longitude	Latitude
45	Rudraprayag - Mana	79.38962000	30.41069000
46	Rudraprayag - Mana	79.33894000	30.40457000
47	Rudraprayag - Mana	79.32091000	30.34149000
48	Rudraprayag - Mana	79.32105000	30.33292000
49	Rudraprayag - Mana	79.30914000	30.32769000
50	Rudraprayag - Mana	79.30617000	30.32565000
51	Rudraprayag - Mana	79.30236000	30.30779000
52	Rudraprayag - Mana	79.30089000	30.30049000
53	Rudraprayag - Mana	79.29977000	30.29740000
54	Rudraprayag - Mana	79.30026000	30.29498000
55	Rudraprayag - Mana	79.27110000	30.28769000
56	Rudraprayag - Mana	79.25722000	30.28731000
57	Rudraprayag - Mana	79.23585000	30.27488000
58	Rudraprayag - Mana	79.22049000	30.25794000
59	Rudraprayag - Mana	79.15286000	30.28768000
60	Rudraprayag - Mana	79.11907000	30.28855000
61	Rudraprayag - Mana	79.09520000	30.29912000
62	Rudraprayag - Mana	79.09697000	30.29973000
63	Rudraprayag - Mana	79.09137000	30.29791000
64	Rudraprayag - Mana	79.03754000	30.30716000
65	Rudraprayag - Mana	78.98435000	30.28710000
66	Rudraprayag - Mana	78.98224225	30.28504515
67	Rudraprayag - Mana	78.98338000	30.28602000
68	Rudraprayag - Mana	78.98734000	30.29022000
69	Rudraprayag - Mana	78.99156000	30.29708000
70	Rudraprayag - Mana	78.99642000	30.30180000
71	Rudraprayag - Mana	79.00703000	30.29981000
72	Rudraprayag - Mana	79.00906000	30.30073000
73	Rudraprayag - Mana	79.01926000	30.29789000
74	Rudraprayag - Mana	79.02699000	30.30014000

S.No.	Route Name	Longitude	Latitude
75	Rudraprayag - Mana	79.02812000	30.30199000
76	Rudraprayag - Mana	79.03845000	30.30690000
77	Rudraprayag - Mana	79.04177000	30.30815000
78	Rudraprayag - Mana	79.04963000	30.30235000
79	Rudraprayag - Mana	79.05248000	30.29967000
80	Rudraprayag - Mana	79.06392000	30.29961000
81	Rudraprayag - Mana	79.06861000	30.29525000
82	Rudraprayag - Mana	79.07765000	30.29473000
83	Rudraprayag - Mana	79.10692000	30.29725000
84	Rudraprayag - Mana	79.11249000	30.29940000
85	Rudraprayag - Mana	79.12925000	30.28653000
86	Rudraprayag - Mana	79.13647000	30.28377000
87	Rudraprayag - Mana	79.14669000	30.28831000
88	Rudraprayag - Mana	79.14939000	30.28876000
89	Rudraprayag - Mana	79.15082879	30.28928628
90	Rudraprayag - Mana	79.16663000	30.28452000
91	Rudraprayag - Mana	79.16622000	30.27668000
92	Rudraprayag - Mana	79.16611000	30.27157000
93	Rudraprayag - Mana	79.16478000	30.27073000
94	Rudraprayag - Mana	79.16795000	30.27095000
95	Rudraprayag - Mana	79.17431000	30.26682000
96	Rudraprayag - Mana	79.18450000	30.26904000
97	Rudraprayag - Mana	79.18939000	30.26636000
98	Rudraprayag - Mana	79.19014000	30.26783000
99	Rudraprayag - Mana	79.19230000	30.26668000
100	Rudraprayag - Mana	79.20087000	30.26615000
101	Rudraprayag - Mana	79.20792000	30.26754000
102	Rudraprayag - Mana	79.21548000	30.26238000
103	Rudraprayag - Mana	79.21870000	30.26322000
104	Rudraprayag - Mana	79.22799000	30.27318000

S.No.	Route Name	Longitude	Latitude
105	Rudraprayag - Mana	79.23093000	30.27464000
106	Rudraprayag - Mana	79.23777000	30.27654000
107	Rudraprayag - Mana	79.24073833	30.27798526
108	Rudraprayag - Mana	79.24915651	30.28387221
109	Rudraprayag - Mana	79.25777000	30.28806000
110	Rudraprayag - Mana	79.27247000	30.28813000
111	Rudraprayag - Mana	79.28012000	30.29016000
112	Rudraprayag - Mana	79.28729000	30.29182000
113	Rudraprayag - Mana	79.29458000	30.28995000
114	Rudraprayag - Mana	79.29586000	30.29171000
115	Rudraprayag - Mana	79.29805000	30.29263000
116	Rudraprayag - Mana	79.29861000	30.29417000
117	Rudraprayag - Mana	79.30117000	30.29199000
118	Rudraprayag - Mana	79.30149000	30.29660000
119	Rudraprayag - Mana	79.30115000	30.29924000
120	Rudraprayag - Mana	79.29905000	30.30557000
121	Rudraprayag - Mana	79.30537000	30.30852000
122	Rudraprayag - Mana	79.30639641	30.31056574
123	Rudraprayag - Mana	79.30897000	30.31661000
124	Rudraprayag - Mana	79.31004000	30.32843000
125	Rudraprayag - Mana	79.31238000	30.32974000
126	Rudraprayag - Mana	79.31612000	30.33068000
127	Rudraprayag - Mana	79.32152000	30.32652000
128	Rudraprayag - Mana	79.32082000	30.33431000
129	Rudraprayag - Mana	79.31685000	30.34046000
130	Rudraprayag - Mana	79.31983000	30.34486000
131	Rudraprayag - Mana	79.31989000	30.34919000
132	Rudraprayag - Mana	79.31833000	30.35764000
133	Rudraprayag - Mana	79.31280000	30.36563000
134	Rudraprayag - Mana	79.31786000	30.37553000

S.No.	Route Name	Longitude	Latitude
135	Rudraprayag - Mana	79.32187115	30.38155509
136	Rudraprayag - Mana	79.32339000	30.39255000
137	Rudraprayag - Mana	79.33060000	30.40431000
138	Rudraprayag - Mana	79.34743000	30.40749000
139	Rudraprayag - Mana	79.35420000	30.40591000
140	Rudraprayag - Mana	79.36563000	30.41237000
141	Rudraprayag - Mana	79.38091000	30.40729000
142	Rudraprayag - Mana	79.38953000	30.40924000
143	Rudraprayag - Mana	79.39026000	30.41164000
144	Rudraprayag - Mana	79.40210000	30.41248000
145	Rudraprayag - Mana	79.40986000	30.41319000
146	Rudraprayag - Mana	79.42197000	30.41710000
147	Rudraprayag - Mana	79.43015000	30.41956000
148	Rudraprayag - Mana	79.42340000	30.42113000
149	Rudraprayag - Mana	79.42719000	30.42867000
150	Rudraprayag - Mana	79.43244000	30.43258000
151	Rudraprayag - Mana	79.42884000	30.43301000
152	Rudraprayag - Mana	79.42895000	30.43684000
153	Rudraprayag - Mana	79.42867000	30.44319000
154	Rudraprayag - Mana	79.43698000	30.46686000
155	Rudraprayag - Mana	79.44440000	30.46244000
156	Rudraprayag - Mana	79.44894000	30.46447000
157	Rudraprayag - Mana	79.45823000	30.46642000
158	Rudraprayag - Mana	79.46090000	30.47790000
159	Rudraprayag - Mana	79.46732000	30.47784000
160	Rudraprayag - Mana	79.47535000	30.48724000
161	Rudraprayag - Mana	79.48832000	30.48565000
162	Rudraprayag - Mana	79.48077000	30.49089000
163	Rudraprayag - Mana	79.48646000	30.50089000
164	Rudraprayag - Mana	79.48813000	30.50671000

S.No.	Route Name	Longitude	Latitude
165	Rudraprayag - Mana	79.49153000	30.50869000
166	Rudraprayag - Mana	79.49544583	30.51768077
167	Rudraprayag - Mana	79.49799000	30.51935000
168	Rudraprayag - Mana	79.50828000	30.52580000
169	Rudraprayag - Mana	79.52015000	30.53388000
170	Rudraprayag - Mana	79.51537000	30.53082000
171	Rudraprayag - Mana	79.51803000	30.52900000
172	Rudraprayag - Mana	79.51970758	30.52947064
173	Rudraprayag - Mana	79.52357000	30.52835000
174	Rudraprayag - Mana	79.52850000	30.52866000
175	Rudraprayag - Mana	79.52357809	30.53756032
176	Rudraprayag - Mana	79.52522000	30.53893000
177	Rudraprayag - Mana	79.53765000	30.55246000
178	Rudraprayag - Mana	79.54281000	30.55539000
179	Rudraprayag - Mana	79.55076000	30.55823000
180	Rudraprayag - Mana	79.55176000	30.56245000
181	Rudraprayag - Mana	79.55555000	30.56682000
182	Rudraprayag - Mana	79.57677000	30.56316000
183	Rudraprayag - Mana	79.57005000	30.58357000
184	Rudraprayag - Mana	79.56937000	30.60594000
185	Rudraprayag - Mana	79.55911000	30.62038000
186	Rudraprayag - Mana	79.55708000	30.62292000
187	Rudraprayag - Mana	79.54281000	30.63564000
188	Rudraprayag - Mana	79.53156000	30.64298000
189	Rudraprayag - Mana	79.51745000	30.66860000
190	Rudraprayag - Mana	79.51238286	30.68943564
191	Rudraprayag - Mana	79.50433000	30.69962000
192	Rudraprayag - Mana	79.51381000	30.69612000
193	Rudraprayag - Mana	79.50317000	30.70589000
194	Rudraprayag - Mana	79.49899000	30.71340000

S.No.	Route Name	Longitude	Latitude
195	Rudraprayag - Mana	79.49961000	30.71555000
196	Rudraprayag - Mana	79.49852000	30.71685000
197	Rudraprayag - Mana	79.49754000	30.71717000
198	Rudraprayag - Mana	79.49653000	30.72789000
199	Rudraprayag - Mana	79.49309000	30.73459000
200	Rudraprayag - Mana	79.49585000	30.73953000
201	Rudraprayag - Mana	79.49782000	30.74657000
202	Rudraprayag - Mana	79.49957000	30.75839000
203	Rudraprayag - Mana	79.49889000	30.76734000
204	Uttarkashi - Rishikesh	78.43542208	30.72684225
205	Uttarkashi - Rishikesh	78.40902000	30.73650000
206	Uttarkashi - Rishikesh	78.35986000	30.74515000
207	Uttarkashi - Rishikesh	78.35955000	30.74311000
208	Uttarkashi - Rishikesh	78.35918000	30.74388000
209	Uttarkashi - Rishikesh	78.34969000	30.73676000
210	Uttarkashi - Rishikesh	78.33063000	30.64840000
211	Uttarkashi - Rishikesh	78.31859000	30.59665000
212	Uttarkashi - Rishikesh	78.31936000	30.59692000
213	Uttarkashi - Rishikesh	78.34324000	30.53367000
214	Uttarkashi - Rishikesh	78.35293000	30.52114000
215	Uttarkashi - Rishikesh	78.37732000	30.49993000
216	Uttarkashi - Rishikesh	78.38218000	30.49776000
217	Uttarkashi - Rishikesh	78.36021000	30.48307000
218	Uttarkashi - Rishikesh	78.35325000	30.47985000
219	Uttarkashi - Rishikesh	78.35075000	30.47635000
220	Uttarkashi - Rishikesh	78.35219000	30.47362000
221	Uttarkashi - Rishikesh	78.34756000	30.47071000
222	Uttarkashi - Rishikesh	78.35787000	30.47100000
223	Uttarkashi - Rishikesh	78.36176000	30.47171000
224	Uttarkashi - Rishikesh	78.36522000	30.47120000

S.No.	Route Name	Longitude	Latitude
225	Uttarkashi - Rishikesh	78.36723000	30.47016000
226	Uttarkashi - Rishikesh	78.37058000	30.46634000
227	Uttarkashi - Rishikesh	78.37393000	30.46913000
228	Uttarkashi - Rishikesh	78.37507000	30.47184000
229	Uttarkashi - Rishikesh	78.38235000	30.47545000
230	Uttarkashi - Rishikesh	78.38435000	30.47598000
231	Uttarkashi - Rishikesh	78.38469000	30.47694000
232	Uttarkashi - Rishikesh	78.38655000	30.47958000
233	Uttarkashi - Rishikesh	78.38945000	30.48210000
234	Uttarkashi - Rishikesh	78.39693000	30.48650000
235	Uttarkashi - Rishikesh	78.39932000	30.48429000
236	Uttarkashi - Rishikesh	78.39854000	30.48721000
237	Uttarkashi - Rishikesh	78.39987000	30.48243000
238	Uttarkashi - Rishikesh	78.42116000	30.45564000
239	Uttarkashi - Rishikesh	78.41411000	30.44973000
240	Uttarkashi - Rishikesh	78.43289000	30.44550000
241	Uttarkashi - Rishikesh	78.42175000	30.44272000
242	Uttarkashi - Rishikesh	78.42368000	30.44118000
243	Uttarkashi - Rishikesh	78.42234000	30.43320000
244	Uttarkashi - Rishikesh	78.42535000	30.43311000
245	Uttarkashi - Rishikesh	78.42848000	30.42896000
246	Uttarkashi - Rishikesh	78.42771000	30.42546000
247	Uttarkashi - Rishikesh	78.43086000	30.42600000
248	Uttarkashi - Rishikesh	78.44133000	30.41671000
249	Uttarkashi - Rishikesh	78.44100000	30.41560000
250	Uttarkashi - Rishikesh	78.44233000	30.41422000
251	Uttarkashi - Rishikesh	78.44370000	30.41174000
252	Uttarkashi - Rishikesh	78.44612000	30.40990000
253	Uttarkashi - Rishikesh	78.43544000	30.40713000
254	Uttarkashi - Rishikesh	78.46678000	30.38911000

S.No.	Route Name	Longitude	Latitude
255	Uttarkashi - Rishikesh	78.47515000	30.37806000
256	Uttarkashi - Rishikesh	78.47334000	30.38007000
257	Uttarkashi - Rishikesh	78.47148000	30.38147000
258	Uttarkashi - Rishikesh	78.47149000	30.38133000
259	Uttarkashi - Rishikesh	78.46141000	30.38304000
260	Uttarkashi - Rishikesh	78.46322000	30.38392000
261	Uttarkashi - Rishikesh	78.45093000	30.38233000
262	Uttarkashi - Rishikesh	78.45035000	30.38269000
263	Uttarkashi - Rishikesh	78.44771000	30.38220000
264	Uttarkashi - Rishikesh	78.44473000	30.38261000
265	Uttarkashi - Rishikesh	78.44458000	30.38277000
266	Uttarkashi - Rishikesh	78.44346000	30.38322000
267	Uttarkashi - Rishikesh	78.44073000	30.38273000
268	Uttarkashi - Rishikesh	78.43916000	30.38198000
269	Uttarkashi - Rishikesh	78.43338000	30.37271000
270	Uttarkashi - Rishikesh	78.43154000	30.37291000
271	Uttarkashi - Rishikesh	78.43114000	30.37264000
272	Uttarkashi - Rishikesh	78.42162000	30.35680000
273	Uttarkashi - Rishikesh	78.41474000	30.34928000
274	Uttarkashi - Rishikesh	78.40989000	30.34589000
275	Uttarkashi - Rishikesh	78.40309000	30.34003000
276	Uttarkashi - Rishikesh	78.40294000	30.33673000
277	Uttarkashi - Rishikesh	78.39615000	30.34331000
278	Uttarkashi - Rishikesh	78.39700000	30.34204000
279	Uttarkashi - Rishikesh	78.39477000	30.34543000
280	Uttarkashi - Rishikesh	78.39914000	30.33398000
281	Uttarkashi - Rishikesh	78.39478000	30.33161000
282	Uttarkashi - Rishikesh	78.39513000	30.32106000
283	Uttarkashi - Rishikesh	78.38726000	30.32517000
284	Uttarkashi - Rishikesh	78.38539000	30.32567000

S.No.	Route Name	Longitude	Latitude
285	Uttarkashi - Rishikesh	78.38120000	30.32713000
286	Uttarkashi - Rishikesh	78.36986000	30.33017000
287	Uttarkashi - Rishikesh	78.36569000	30.26081000
288	Uttarkashi - Rishikesh	78.32643000	30.20484000
289	Uttarkashi - Rishikesh	78.32069000	30.20005000
290	Uttarkashi - Rishikesh	78.30261000	30.17238000
291	Uttarkashi - Rishikesh	78.29258000	30.16104000
292	Uttarkashi - Rishikesh	78.29353000	30.16467000
293	Uttarkashi - Rishikesh	78.28630000	30.15734000
294	Uttarkashi - Rishikesh	78.29130000	30.15178000
295	Uttarkashi - Rishikesh	78.27550000	30.14459000
296	Uttarkashi - Rishikesh	78.28410000	30.13798000
297	Uttarkashi - Rishikesh	78.28456000	30.13738000
298	Uttarkashi - Rishikesh	78.28767000	30.13777000
299	Uttarkashi - Rishikesh	78.29565000	30.12038000
300	Uttarkashi - Rishikesh	78.29385000	30.12084000
301	Uttarkashi - Rishikesh	78.28529230	30.11586770
302	Uttarkashi - Rishikesh	78.29456000	30.12826000
303	Uttarkashi - Rishikesh	78.29175000	30.12929000
304	Uttarkashi - Rishikesh	78.29177000	30.13081000
305	Uttarkashi - Rishikesh	78.28931000	30.13321000
306	Uttarkashi - Rishikesh	78.28924000	30.13677000
307	Uttarkashi - Rishikesh	78.28662000	30.13652000
308	Uttarkashi - Rishikesh	78.28325000	30.14103000
309	Uttarkashi - Rishikesh	78.28004000	30.14239000
310	Uttarkashi - Rishikesh	78.27956000	30.14383000
311	Uttarkashi - Rishikesh	78.27654000	30.14738000
312	Uttarkashi - Rishikesh	78.27602000	30.14859000
313	Uttarkashi - Rishikesh	78.27670000	30.14794000
314	Uttarkashi - Rishikesh	78.27746000	30.14629000

S.No.	Route Name	Longitude	Latitude
315	Uttarkashi - Rishikesh	78.28333000	30.14880000
316	Uttarkashi - Rishikesh	78.28261000	30.14520000
317	Uttarkashi - Rishikesh	78.28822000	30.14267000
318	Uttarkashi - Rishikesh	78.29410000	30.14476000
319	Uttarkashi - Rishikesh	78.28633000	30.14806000
320	Uttarkashi - Rishikesh	78.28962000	30.14726000
321	Uttarkashi - Rishikesh	78.28902000	30.15086000
322	Uttarkashi - Rishikesh	78.28723000	30.15037000
323	Uttarkashi - Rishikesh	78.28363000	30.15220000
324	Uttarkashi - Rishikesh	78.28213000	30.15422000
325	Uttarkashi - Rishikesh	78.28467000	30.16001000
326	Uttarkashi - Rishikesh	78.29094000	30.15974000
327	Uttarkashi - Rishikesh	78.29617000	30.16754000
328	Uttarkashi - Rishikesh	78.29831000	30.16938000
329	Uttarkashi - Rishikesh	78.30242000	30.17078000
330	Uttarkashi - Rishikesh	78.30320000	30.17391000
331	Uttarkashi - Rishikesh	78.30275000	30.17648000
332	Uttarkashi - Rishikesh	78.30052000	30.17834000
333	Uttarkashi - Rishikesh	78.30044000	30.17939000
334	Uttarkashi - Rishikesh	78.31072000	30.18192000
335	Uttarkashi - Rishikesh	78.31358000	30.18550000
336	Uttarkashi - Rishikesh	78.31571000	30.18715000
337	Uttarkashi - Rishikesh	78.31951000	30.18677000
338	Uttarkashi - Rishikesh	78.32055000	30.18873000
339	Uttarkashi - Rishikesh	78.31952000	30.19337000
340	Uttarkashi - Rishikesh	78.32001000	30.19747000
341	Uttarkashi - Rishikesh	78.31729000	30.19978000
342	Uttarkashi - Rishikesh	78.31986000	30.19922000
343	Uttarkashi - Rishikesh	78.32528000	30.20352000
344	Uttarkashi - Rishikesh	78.32532000	30.20962000

S.No.	Route Name	Longitude	Latitude
345	Uttarkashi - Rishikesh	78.33205000	30.21560000
346	Uttarkashi - Rishikesh	78.33365000	30.21883000
347	Uttarkashi - Rishikesh	78.33404000	30.22838000
348	Uttarkashi - Rishikesh	78.33860000	30.22663000
349	Uttarkashi - Rishikesh	78.34440000	30.22751000
350	Uttarkashi - Rishikesh	78.35332000	30.23052000
351	Uttarkashi - Rishikesh	78.35529000	30.23291000
352	Uttarkashi - Rishikesh	78.35574000	30.23808000
353	Uttarkashi - Rishikesh	78.35889000	30.24278000
354	Uttarkashi - Rishikesh	78.36223000	30.24066000
355	Uttarkashi - Rishikesh	78.36461000	30.25161000
356	Uttarkashi - Rishikesh	78.36636000	30.25306000
357	Uttarkashi - Rishikesh	78.36910000	30.25913000
358	Uttarkashi - Rishikesh	78.36727000	30.25951000
359	Uttarkashi - Rishikesh	78.36291063	30.26247932
360	Uttarkashi - Rishikesh	78.36240000	30.26589000
361	Uttarkashi - Rishikesh	78.36552000	30.26312000
362	Uttarkashi - Rishikesh	78.36903000	30.26385000
363	Uttarkashi - Rishikesh	78.36591000	30.27625000
364	Uttarkashi - Rishikesh	78.36838000	30.28570000
365	Uttarkashi - Rishikesh	78.35903000	30.29170000
366	Uttarkashi - Rishikesh	78.34882000	30.29796000
367	Uttarkashi - Rishikesh	78.34438000	30.30538000
368	Uttarkashi - Rishikesh	78.34746000	30.31229000
369	Uttarkashi - Rishikesh	78.35025000	30.32103000
370	Uttarkashi - Rishikesh	78.36339000	30.33076000
371	Uttarkashi - Rishikesh	78.36890000	30.32942000
372	Uttarkashi - Rishikesh	78.37279000	30.32944000
373	Uttarkashi - Rishikesh	78.37596000	30.32961000
374	Uttarkashi - Rishikesh	78.39077000	30.32449000

S.No.	Route Name	Longitude	Latitude
375	Uttarkashi - Rishikesh	78.39377000	30.32520000
376	Uttarkashi - Rishikesh	78.39128000	30.32682000
377	Uttarkashi - Rishikesh	78.39349000	30.32949000
378	Uttarkashi - Rishikesh	78.39294000	30.33348000
379	Uttarkashi - Rishikesh	78.39952000	30.33637000
380	Uttarkashi - Rishikesh	78.40039000	30.33912000
381	Uttarkashi - Rishikesh	78.39515000	30.34225000
382	Uttarkashi - Rishikesh	78.40235000	30.34372000
383	Uttarkashi - Rishikesh	78.40630000	30.33961000
384	Uttarkashi - Rishikesh	78.41207000	30.34341000
385	Uttarkashi - Rishikesh	78.41655000	30.35208000
386	Uttarkashi - Rishikesh	78.42510000	30.35681000
387	Uttarkashi - Rishikesh	78.43025000	30.35671000
388	Uttarkashi - Rishikesh	78.42551000	30.36023000
389	Uttarkashi - Rishikesh	78.43157000	30.36576000
390	Uttarkashi - Rishikesh	78.42577000	30.36864000
391	Uttarkashi - Rishikesh	78.43637000	30.37658000
392	Uttarkashi - Rishikesh	78.43653000	30.37964000
393	Uttarkashi - Rishikesh	78.43951000	30.38284000
394	Uttarkashi - Rishikesh	78.44113000	30.38275000
395	Uttarkashi - Rishikesh	78.45169000	30.38262000
396	Uttarkashi - Rishikesh	78.45887000	30.38489000
397	Uttarkashi - Rishikesh	78.46310000	30.38179000
398	Uttarkashi - Rishikesh	78.47419000	30.37984000
399	Uttarkashi - Rishikesh	78.47186000	30.38414000
400	Uttarkashi - Rishikesh	78.46250000	30.39453000
401	Uttarkashi - Rishikesh	78.46036000	30.39625000
402	Uttarkashi - Rishikesh	78.45988000	30.39978000
403	Uttarkashi - Rishikesh	78.45544000	30.40636000
404	Uttarkashi - Rishikesh	78.45294000	30.41226000

S.No.	Route Name	Longitude	Latitude
405	Uttarkashi - Rishikesh	78.45084000	30.40673000
406	Uttarkashi - Rishikesh	78.44340000	30.40137000
407	Uttarkashi - Rishikesh	78.43956000	30.39978000
408	Uttarkashi - Rishikesh	78.43228000	30.39986000
409	Uttarkashi - Rishikesh	78.42815000	30.39644000
410	Uttarkashi - Rishikesh	78.42763000	30.39816000
411	Uttarkashi - Rishikesh	78.44423000	30.40748000
412	Uttarkashi - Rishikesh	78.44476000	30.41130000
413	Uttarkashi - Rishikesh	78.44437000	30.41320000
414	Uttarkashi - Rishikesh	78.43762000	30.41741000
415	Uttarkashi - Rishikesh	78.43588000	30.42028000
416	Uttarkashi - Rishikesh	78.42514000	30.42333000
417	Uttarkashi - Rishikesh	78.42664000	30.43142000
418	Uttarkashi - Rishikesh	78.42607000	30.43979000
419	Uttarkashi - Rishikesh	78.42761000	30.44480000
420	Uttarkashi - Rishikesh	78.43310000	30.44790000
421	Uttarkashi - Rishikesh	78.42194000	30.44890000
422	Uttarkashi - Rishikesh	78.41970000	30.45310000
423	Uttarkashi - Rishikesh	78.42122000	30.45975000
424	Uttarkashi - Rishikesh	78.41082000	30.46089000
425	Uttarkashi - Rishikesh	78.41923000	30.46178000
426	Uttarkashi - Rishikesh	78.41880000	30.46589000
427	Uttarkashi - Rishikesh	78.40953000	30.46569000
428	Uttarkashi - Rishikesh	78.40532000	30.46677000
429	Uttarkashi - Rishikesh	78.40213000	30.46904000
430	Uttarkashi - Rishikesh	78.40264000	30.47433000
431	Uttarkashi - Rishikesh	78.40577000	30.47979000
432	Uttarkashi - Rishikesh	78.40035000	30.48479000
433	Uttarkashi - Rishikesh	78.39875000	30.48289000
434	Uttarkashi - Rishikesh	78.39030000	30.48427000

S.No.	Route Name	Longitude	Latitude
435	Uttarkashi - Rishikesh	78.38298000	30.47854000
436	Uttarkashi - Rishikesh	78.37962000	30.47691000
437	Uttarkashi - Rishikesh	78.37680000	30.47529000
438	Uttarkashi - Rishikesh	78.37234059	30.46830275
439	Uttarkashi - Rishikesh	78.37147000	30.46977000
440	Uttarkashi - Rishikesh	78.36751000	30.47467000
441	Uttarkashi - Rishikesh	78.36257475	30.47253103
442	Uttarkashi - Rishikesh	78.35879000	30.47376000
443	Uttarkashi - Rishikesh	78.35138000	30.47296000
444	Uttarkashi - Rishikesh	78.34909000	30.47353000
445	Uttarkashi - Rishikesh	78.34659000	30.47250000
446	Uttarkashi - Rishikesh	78.35351000	30.47752000
447	Uttarkashi - Rishikesh	78.35948000	30.48099000
448	Uttarkashi - Rishikesh	78.36746000	30.48366000
449	Uttarkashi - Rishikesh	78.37178000	30.48674000
450	Uttarkashi - Rishikesh	78.38011000	30.48810000
451	Uttarkashi - Rishikesh	78.39025000	30.48997000
452	Uttarkashi - Rishikesh	78.38937000	30.49490000
453	Uttarkashi - Rishikesh	78.38575000	30.49721000
454	Uttarkashi - Rishikesh	78.38157000	30.49920000
455	Uttarkashi - Rishikesh	78.37672000	30.50205000
456	Uttarkashi - Rishikesh	78.37416000	30.50395000
457	Uttarkashi - Rishikesh	78.36913000	30.50387000
458	Uttarkashi - Rishikesh	78.36937766	30.50761187
459	Uttarkashi - Rishikesh	78.36626000	30.50937000
460	Uttarkashi - Rishikesh	78.36596000	30.51462000
461	Uttarkashi - Rishikesh	78.35630000	30.51949000
462	Uttarkashi - Rishikesh	78.35173000	30.52212000
463	Uttarkashi - Rishikesh	78.34595443	30.51816280
464	Uttarkashi - Rishikesh	78.34978000	30.52406000

S.No.	Route Name	Longitude	Latitude
465	Uttarkashi - Rishikesh	78.34730000	30.52799000
466	Uttarkashi - Rishikesh	78.34039000	30.53066000
467	Uttarkashi - Rishikesh	78.34050000	30.53600000
468	Uttarkashi - Rishikesh	78.33504000	30.53924000
469	Uttarkashi - Rishikesh	78.33890317	30.54544291
470	Uttarkashi - Rishikesh	78.33563000	30.54916000
471	Uttarkashi - Rishikesh	78.33601000	30.55162000
472	Uttarkashi - Rishikesh	78.33247000	30.55851000
473	Uttarkashi - Rishikesh	78.32312000	30.55349000
474	Uttarkashi - Rishikesh	78.31938000	30.55155000
475	Uttarkashi - Rishikesh	78.32751455	30.55973262
476	Uttarkashi - Rishikesh	78.32486000	30.56394000
477	Uttarkashi - Rishikesh	78.32948000	30.57523000
478	Uttarkashi - Rishikesh	78.32407000	30.58722000
479	Uttarkashi - Rishikesh	78.31495000	30.60040000
480	Uttarkashi - Rishikesh	78.31650000	30.60487000
481	Uttarkashi - Rishikesh	78.31603000	30.61011000
482	Uttarkashi - Rishikesh	78.32592000	30.61849000
483	Uttarkashi - Rishikesh	78.33027000	30.62972000
484	Uttarkashi - Rishikesh	78.32687000	30.64075000
485	Uttarkashi - Rishikesh	78.32773000	30.64499000
486	Uttarkashi - Rishikesh	78.33233000	30.65168000
487	Uttarkashi - Rishikesh	78.33826000	30.66255000
488	Uttarkashi - Rishikesh	78.34328000	30.67446000
489	Uttarkashi - Rishikesh	78.34640000	30.67864000
490	Uttarkashi - Rishikesh	78.35398000	30.69106000
491	Uttarkashi - Rishikesh	78.34882000	30.70109000
492	Uttarkashi - Rishikesh	78.34845000	30.71362000
493	Uttarkashi - Rishikesh	78.36054000	30.72339000
494	Uttarkashi - Rishikesh	78.35094000	30.73151000

S.No.	Route Name	Longitude	Latitude
495	Uttarkashi - Rishikesh	78.35171000	30.73801000
496	Uttarkashi - Rishikesh	78.35873000	30.73955000
497	Uttarkashi - Rishikesh	78.36051000	30.74241000
498	Uttarkashi - Rishikesh	78.37230000	30.73924000
499	Uttarkashi - Rishikesh	78.38730000	30.73940000
500	Uttarkashi - Rishikesh	78.40736000	30.73362000
501	Uttarkashi - Rishikesh	78.41706000	30.73302000
502	Uttarkashi - Rishikesh	78.42671000	30.73332000
503	Uttarkashi - Rishikesh	78.43260000	30.73107000
504	Uttarkashi - Gangotri	78.92912000	30.99862000
505	Uttarkashi - Gangotri	78.86897000	31.02790000
506	Uttarkashi - Gangotri	78.86721000	31.02736000
507	Uttarkashi - Gangotri	78.86742000	31.02502000
508	Uttarkashi - Gangotri	78.85335000	31.04008000
509	Uttarkashi - Gangotri	78.85506000	31.03601000
510	Uttarkashi - Gangotri	78.84614000	31.04301000
511	Uttarkashi - Gangotri	78.83353000	31.04346000
512	Uttarkashi - Gangotri	78.71230000	31.01199000
513	Uttarkashi - Gangotri	78.70982000	31.01046000
514	Uttarkashi - Gangotri	78.70725000	31.01714000
515	Uttarkashi - Gangotri	78.70442000	31.02143000
516	Uttarkashi - Gangotri	78.70732000	31.01265000
517	Uttarkashi - Gangotri	78.69490000	30.99766000
518	Uttarkashi - Gangotri	78.69703000	30.99154000
519	Uttarkashi - Gangotri	78.69686000	30.99698000
520	Uttarkashi - Gangotri	78.70743000	30.99974000
521	Uttarkashi - Gangotri	78.70021000	30.99314000
522	Uttarkashi - Gangotri	78.70017000	30.99499000
523	Uttarkashi - Gangotri	78.70409000	30.99727000
524	Uttarkashi - Gangotri	78.70286000	30.99436000

S.No.	Route Name	Longitude	Latitude
525	Uttarkashi - Gangotri	78.70151000	30.99418000
526	Uttarkashi - Gangotri	78.70328000	30.99526000
527	Uttarkashi - Gangotri	78.68720000	30.94549000
528	Uttarkashi - Gangotri	78.68754000	30.94573000
529	Uttarkashi - Gangotri	78.68147000	30.92174000
530	Uttarkashi - Gangotri	78.68196000	30.91367000
531	Uttarkashi - Gangotri	78.67899000	30.90490000
532	Uttarkashi - Gangotri	78.60157000	30.77484000
533	Uttarkashi - Gangotri	78.60012000	30.77384000
534	Uttarkashi - Gangotri	78.58664000	30.76291000
535	Uttarkashi - Gangotri	78.54343000	30.74207000
536	Uttarkashi - Gangotri	78.45535000	30.76066000
537	Uttarkashi - Gangotri	78.43712000	30.72887000
538	Uttarkashi - Gangotri	78.43489000	30.72862000
539	Uttarkashi - Gangotri	78.44357000	30.73056000
540	Uttarkashi - Gangotri	78.45500000	30.74335000
541	Uttarkashi - Gangotri	78.45230000	30.74964000
542	Uttarkashi - Gangotri	78.45668000	30.75840000
543	Uttarkashi - Gangotri	78.46984000	30.75297000
544	Uttarkashi - Gangotri	78.47691000	30.75478000
545	Uttarkashi - Gangotri	78.48332000	30.74979000
546	Uttarkashi - Gangotri	78.48780000	30.74264000
547	Uttarkashi - Gangotri	78.49819000	30.73774000
548	Uttarkashi - Gangotri	78.50976000	30.73562000
549	Uttarkashi - Gangotri	78.52044000	30.73716000
550	Uttarkashi - Gangotri	78.52767000	30.74202000
551	Uttarkashi - Gangotri	78.53032000	30.73926000
552	Uttarkashi - Gangotri	78.53549863	30.74024644
553	Uttarkashi - Gangotri	78.55077000	30.74811000
554	Uttarkashi - Gangotri	78.55977000	30.75475000

S.No.	Route Name	Longitude	Latitude
555	Uttarkashi - Gangotri	78.56868000	30.75522000
556	Uttarkashi - Gangotri	78.57961000	30.75692000
557	Uttarkashi - Gangotri	78.58165973	30.76273239
558	Uttarkashi - Gangotri	78.59198000	30.76544000
559	Uttarkashi - Gangotri	78.59273000	30.76699000
560	Uttarkashi - Gangotri	78.60659000	30.77820000
561	Uttarkashi - Gangotri	78.61270000	30.78224000
562	Uttarkashi - Gangotri	78.61672000	30.78680000
563	Uttarkashi - Gangotri	78.61385000	30.79348000
564	Uttarkashi - Gangotri	78.61709000	30.80156000
565	Uttarkashi - Gangotri	78.61890000	30.80707000
566	Uttarkashi - Gangotri	78.62070000	30.81318000
567	Uttarkashi - Gangotri	78.61843000	30.82303000
568	Uttarkashi - Gangotri	78.62258000	30.83135000
569	Uttarkashi - Gangotri	78.62721000	30.84283000
570	Uttarkashi - Gangotri	78.62462000	30.83859000
571	Uttarkashi - Gangotri	78.62829000	30.84280000
572	Uttarkashi - Gangotri	78.63746000	30.84838000
573	Uttarkashi - Gangotri	78.63792000	30.85094000
574	Uttarkashi - Gangotri	78.64338000	30.85534000
575	Uttarkashi - Gangotri	78.65140000	30.86054000
576	Uttarkashi - Gangotri	78.65221000	30.86555000
577	Uttarkashi - Gangotri	78.65834000	30.87102000
578	Uttarkashi - Gangotri	78.66368000	30.87963000
579	Uttarkashi - Gangotri	78.67248000	30.88807000
580	Uttarkashi - Gangotri	78.67277000	30.89227000
581	Uttarkashi - Gangotri	78.67828000	30.89656000
582	Uttarkashi - Gangotri	78.68062000	30.91871000
583	Uttarkashi - Gangotri	78.68301000	30.92111000
584	Uttarkashi - Gangotri	78.68451000	30.92933000

S.No.	Route Name	Longitude	Latitude
585	Uttarkashi - Gangotri	78.68543000	30.93676000
586	Uttarkashi - Gangotri	78.68657000	30.94218000
587	Uttarkashi - Gangotri	78.68895000	30.94988000
588	Uttarkashi - Gangotri	78.69115000	30.95602000
589	Uttarkashi - Gangotri	78.69776000	30.96634000
590	Uttarkashi - Gangotri	78.69630000	30.97720000
591	Uttarkashi - Gangotri	78.69946000	30.98660000
592	Uttarkashi - Gangotri	78.70160000	30.99312000
593	Uttarkashi - Gangotri	78.70324000	30.99365000
594	Uttarkashi - Gangotri	78.70330000	30.99416000
595	Uttarkashi - Gangotri	78.70216000	30.99504000
596	Uttarkashi - Gangotri	78.70011000	30.99412000
597	Uttarkashi - Gangotri	78.69955000	30.99426000
598	Uttarkashi - Gangotri	78.69976000	30.99554000
599	Uttarkashi - Gangotri	78.70129000	30.99569000
600	Uttarkashi - Gangotri	78.70238000	30.99816000
601	Uttarkashi - Gangotri	78.70367000	30.99977000
602	Uttarkashi - Gangotri	78.70125000	30.99914000
603	Uttarkashi - Gangotri	78.69644000	30.99397000
604	Uttarkashi - Gangotri	78.69555000	30.99381000
605	Uttarkashi - Gangotri	78.69839000	31.00233000
606	Uttarkashi - Gangotri	78.70332000	31.00401000
607	Uttarkashi - Gangotri	78.70555000	31.00660000
608	Uttarkashi - Gangotri	78.70755000	31.01102000
609	Uttarkashi - Gangotri	78.70588000	31.01841000
610	Uttarkashi - Gangotri	78.70611000	31.01893000
611	Uttarkashi - Gangotri	78.70684000	31.01553000
612	Uttarkashi - Gangotri	78.70807000	31.01436000
613	Uttarkashi - Gangotri	78.70782000	31.01530000
614	Uttarkashi - Gangotri	78.70883000	31.01711000

S.No.	Route Name	Longitude	Latitude
615	Uttarkashi - Gangotri	78.70866000	31.01791000
616	Uttarkashi - Gangotri	78.70851000	31.01577000
617	Uttarkashi - Gangotri	78.70884000	31.01453000
618	Uttarkashi - Gangotri	78.71094000	31.01339000
619	Uttarkashi - Gangotri	78.71173000	31.01527000
620	Uttarkashi - Gangotri	78.71369000	31.01723000
621	Uttarkashi - Gangotri	78.71388000	31.01918000
622	Uttarkashi - Gangotri	78.71689000	31.02688000
623	Uttarkashi - Gangotri	78.71724000	31.02937000
624	Uttarkashi - Gangotri	78.72037000	31.03221000
625	Uttarkashi - Gangotri	78.72667000	31.03629000
626	Uttarkashi - Gangotri	78.73932000	31.03699000
627	Uttarkashi - Gangotri	78.74678000	31.03504000
628	Uttarkashi - Gangotri	78.75221000	31.03367000
629	Uttarkashi - Gangotri	78.76519000	31.03846000
630	Uttarkashi - Gangotri	78.77466000	31.04133000
631	Uttarkashi - Gangotri	78.78112000	31.04083000
632	Uttarkashi - Gangotri	78.79454000	31.03957000
633	Uttarkashi - Gangotri	78.81040000	31.04368000
634	Uttarkashi - Gangotri	78.82151000	31.04655000
635	Uttarkashi - Gangotri	78.84088000	31.04379000
636	Uttarkashi - Gangotri	78.85229000	31.03973000
637	Uttarkashi - Gangotri	78.85433000	31.03777000
638	Uttarkashi - Gangotri	78.85807000	31.03602000
639	Uttarkashi - Gangotri	78.86412000	31.03148000
640	Uttarkashi - Gangotri	78.86870000	31.02883000
641	Uttarkashi - Gangotri	78.87071000	31.02276000
642	Uttarkashi - Gangotri	78.87638000	31.01640000
643	Uttarkashi - Gangotri	78.88519000	31.00852000
644	Uttarkashi - Gangotri	78.89820000	31.00174000

S.No.	Route Name	Longitude	Latitude
645	Uttarkashi - Gangotri	78.91355000	31.00075000
646	Uttarkashi - Gangotri	78.92052000	30.99909000
647	Uttarkashi - Gangotri	78.93208000	30.99782000
648	Uttarkashi - Gangotri	78.90663000	31.00138000
649	Uttarkashi - Gangotri	78.87248000	31.02058000
650	Uttarkashi - Gangotri	78.83989000	31.04269000
651	Uttarkashi - Gangotri	78.76051000	31.03491000
652	Rudraprayag - Gaurikund	78.97662000	30.34510000
653	Rudraprayag - Gaurikund	79.07686000	30.46321000
654	Rudraprayag - Gaurikund	79.08590000	30.48022000
655	Rudraprayag - Gaurikund	79.08463000	30.51703000
656	Rudraprayag - Gaurikund	79.08075000	30.50970000
657	Rudraprayag - Gaurikund	79.08605000	30.52924000
658	Rudraprayag - Gaurikund	79.08158000	30.52310000
659	Rudraprayag - Gaurikund	79.08394000	30.53540000
660	Rudraprayag - Gaurikund	79.06173000	30.56245000
661	Rudraprayag - Gaurikund	79.05038000	30.57607000
662	Rudraprayag - Gaurikund	79.03464000	30.58689000
663	Rudraprayag - Gaurikund	79.02720000	30.59294000
664	Rudraprayag - Gaurikund	79.01701000	30.60521000
665	Rudraprayag - Gaurikund	79.01882000	30.60847000
666	Rudraprayag - Gaurikund	79.01262000	30.61151000
667	Rudraprayag - Gaurikund	79.01556000	30.61527000
668	Rudraprayag - Gaurikund	78.99870000	30.62353000
669	Rudraprayag - Gaurikund	78.99721000	30.63717000
670	Rudraprayag - Gaurikund	78.98199000	30.28497000
671	Rudraprayag - Gaurikund	78.98370000	30.28548000
672	Rudraprayag - Gaurikund	78.98430848	30.28714791
673	Rudraprayag - Gaurikund	78.98089681	30.28830643
674	Rudraprayag - Gaurikund	78.97899208	30.29600695

S.No.	Route Name	Longitude	Latitude
675	Rudraprayag - Gaurikund	78.97764000	30.29806000
676	Rudraprayag - Gaurikund	78.97930634	30.30183964
677	Rudraprayag - Gaurikund	78.98068000	30.30611000
678	Rudraprayag - Gaurikund	78.97946000	30.31316000
679	Rudraprayag - Gaurikund	78.97215962	30.31308800
680	Rudraprayag - Gaurikund	78.97179000	30.31615000
681	Rudraprayag - Gaurikund	78.96629000	30.32095000
682	Rudraprayag - Gaurikund	78.96774000	30.33147000
683	Rudraprayag - Gaurikund	78.96895000	30.33741000
684	Rudraprayag - Gaurikund	78.96863000	30.34115000
685	Rudraprayag - Gaurikund	78.97760000	30.35168000
686	Rudraprayag - Gaurikund	78.97874000	30.35916000
687	Rudraprayag - Gaurikund	78.98306000	30.36669000
688	Rudraprayag - Gaurikund	78.98847512	30.36766053
689	Rudraprayag - Gaurikund	78.99519000	30.36817000
690	Rudraprayag - Gaurikund	79.00834000	30.38181000
691	Rudraprayag - Gaurikund	79.01621000	30.38577000
692	Rudraprayag - Gaurikund	79.03232000	30.39445000
693	Rudraprayag - Gaurikund	79.04270000	30.40022000
694	Rudraprayag - Gaurikund	79.04992000	30.41007000
695	Rudraprayag - Gaurikund	79.05286668	30.40842144
696	Rudraprayag - Gaurikund	79.05461000	30.40820000
697	Rudraprayag - Gaurikund	79.06206000	30.41549000
698	Rudraprayag - Gaurikund	79.06930000	30.42496000
699	Rudraprayag - Gaurikund	79.06842000	30.42600000
700	Rudraprayag - Gaurikund	79.07216191	30.43440076
701	Rudraprayag - Gaurikund	79.07628000	30.44948000
702	Rudraprayag - Gaurikund	79.07406000	30.45412000
703	Rudraprayag - Gaurikund	79.07648000	30.45947000
704	Rudraprayag - Gaurikund	79.07814000	30.46382000

S.No.	Route Name	Longitude	Latitude
705	Rudraprayag - Gaurikund	79.08229000	30.46769000
706	Rudraprayag - Gaurikund	79.08258000	30.47665000
707	Rudraprayag - Gaurikund	79.08510000	30.47871000
708	Rudraprayag - Gaurikund	79.08568000	30.48429000
709	Rudraprayag - Gaurikund	79.08418000	30.49209000
710	Rudraprayag - Gaurikund	79.08807000	30.49470000
711	Rudraprayag - Gaurikund	79.08738000	30.50396000
712	Rudraprayag - Gaurikund	79.08393000	30.51003000
713	Rudraprayag - Gaurikund	79.08265000	30.51140000
714	Rudraprayag - Gaurikund	79.08116000	30.51156000
715	Rudraprayag - Gaurikund	79.08321000	30.52385000
716	Rudraprayag - Gaurikund	79.08343000	30.52601000
717	Rudraprayag - Gaurikund	79.08186000	30.52575000
718	Rudraprayag - Gaurikund	79.08296000	30.53120000
719	Rudraprayag - Gaurikund	79.08028000	30.53772000
720	Rudraprayag - Gaurikund	79.07458000	30.54087000
721	Rudraprayag - Gaurikund	79.07180612	30.54435657
722	Rudraprayag - Gaurikund	79.07520000	30.55049000
723	Rudraprayag - Gaurikund	79.05910000	30.55635000
724	Rudraprayag - Gaurikund	79.06514000	30.55309000
725	Rudraprayag - Gaurikund	79.04903000	30.55333000
726	Rudraprayag - Gaurikund	79.05546000	30.55906000
727	Rudraprayag - Gaurikund	79.06276000	30.56529000
728	Rudraprayag - Gaurikund	79.05580000	30.57500000
729	Rudraprayag - Gaurikund	79.04691000	30.57630000
730	Rudraprayag - Gaurikund	79.04111000	30.57651000
731	Rudraprayag - Gaurikund	79.02305000	30.58249000
732	Rudraprayag - Gaurikund	79.01997000	30.59465000
733	Rudraprayag - Gaurikund	79.02278000	30.60292000
734	Rudraprayag - Gaurikund	79.01778000	30.61315000

S.No.	Route Name	Longitude	Latitude
735	Rudraprayag - Gaurikund	79.01022000	30.61975000
736	Rudraprayag - Gaurikund	79.00579000	30.62536000
737	Rudraprayag - Gaurikund	78.99696000	30.62292000
738	Rudraprayag - Gaurikund	79.00060000	30.62808000
739	Rudraprayag - Gaurikund	78.99950000	30.62821000
740	Rudraprayag - Gaurikund	78.99966318	30.63559711
741	Rudraprayag - Gaurikund	79.00426000	30.63722000
742	Rudraprayag - Gaurikund	79.01691000	30.64391000
743	Rudraprayag - Gaurikund	79.02396931	30.64775790
744	Rudraprayag - Gaurikund	79.02489000	30.65222000
745	Rudraprayag - Gaurikund	78.99884000	30.63591000
746	Rudraprayag - Gaurikund	79.01208000	30.61672000
747	Rudraprayag - Gaurikund	79.01743000	30.60997000
748	Rudraprayag - Gaurikund	79.03054000	30.58969000
749	Rudraprayag - Gaurikund	79.03174000	30.58587000
750	Rudraprayag - Gaurikund	79.05184000	30.57509000
751	Dharasu - Yamunotri	78.45447000	30.98964000
752	Dharasu - Yamunotri	78.44874000	30.98534000
753	Dharasu - Yamunotri	78.44917000	30.98509000
754	Dharasu - Yamunotri	78.44656000	30.98374000
755	Dharasu - Yamunotri	78.43811000	30.97649000
756	Dharasu - Yamunotri	78.43845000	30.97632000
757	Dharasu - Yamunotri	78.43131000	30.97040000
758	Dharasu - Yamunotri	78.43205000	30.97072000
759	Dharasu - Yamunotri	78.42947000	30.96562000
760	Dharasu - Yamunotri	78.43104000	30.96608000
761	Dharasu - Yamunotri	78.42627000	30.95925000
762	Dharasu - Yamunotri	78.42658000	30.95990000
763	Dharasu - Yamunotri	78.42468000	30.95899000
764	Dharasu - Yamunotri	78.42544000	30.95945000

S.No.	Route Name	Longitude	Latitude
765	Dharasu - Yamunotri	78.42300000	30.95728000
766	Dharasu - Yamunotri	78.42145000	30.95843000
767	Dharasu - Yamunotri	78.42272000	30.95911000
768	Dharasu - Yamunotri	78.40506000	30.94000000
769	Dharasu - Yamunotri	78.40516000	30.94142000
770	Dharasu - Yamunotri	78.36978000	30.91630000
771	Dharasu - Yamunotri	78.35921000	30.90303000
772	Dharasu - Yamunotri	78.36218000	30.90577000
773	Dharasu - Yamunotri	78.35894000	30.90439000
774	Dharasu - Yamunotri	78.33885000	30.90653000
775	Dharasu - Yamunotri	78.33562000	30.90756000
776	Dharasu - Yamunotri	78.32604000	30.89795000
777	Dharasu - Yamunotri	78.32626000	30.89994000
778	Dharasu - Yamunotri	78.32720000	30.89793000
779	Dharasu - Yamunotri	78.30497000	30.88800000
780	Dharasu - Yamunotri	78.29997000	30.87292000
781	Dharasu - Yamunotri	78.30374000	30.87381000
782	Dharasu - Yamunotri	78.30425000	30.87412000
783	Dharasu - Yamunotri	78.28753000	30.85792000
784	Dharasu - Yamunotri	78.28664000	30.86108000
785	Dharasu - Yamunotri	78.28513000	30.85579000
786	Dharasu - Yamunotri	78.28584000	30.85496000
787	Dharasu - Yamunotri	78.28639000	30.85534000
788	Dharasu - Yamunotri	78.22639000	30.81653000
789	Dharasu - Yamunotri	78.21946000	30.80751000
790	Dharasu - Yamunotri	78.23470000	30.79462000
791	Dharasu - Yamunotri	78.24064000	30.79530000
792	Dharasu - Yamunotri	78.23393000	30.80804000
793	Dharasu - Yamunotri	78.23245000	30.80763000
794	Dharasu - Yamunotri	78.23119000	30.80953000

S.No.	Route Name	Longitude	Latitude
795	Dharasu - Yamunotri	78.24753000	30.80108000
796	Dharasu - Yamunotri	78.24992000	30.80016000
797	Dharasu - Yamunotri	78.25331000	30.79665000
798	Dharasu - Yamunotri	78.25752000	30.79377000
799	Dharasu - Yamunotri	78.26285000	30.79250000
800	Dharasu - Yamunotri	78.25723000	30.77350000
801	Dharasu - Yamunotri	78.26086000	30.77288000
802	Dharasu - Yamunotri	78.27303000	30.76782000
803	Dharasu - Yamunotri	78.27354000	30.76222000
804	Dharasu - Yamunotri	78.27510000	30.76207000
805	Dharasu - Yamunotri	78.27646000	30.76068000
806	Dharasu - Yamunotri	78.27788000	30.75880000
807	Dharasu - Yamunotri	78.26934000	30.75726000
808	Dharasu - Yamunotri	78.27369000	30.75156000
809	Dharasu - Yamunotri	78.27966000	30.74897000
810	Dharasu - Yamunotri	78.27366000	30.74465000
811	Dharasu - Yamunotri	78.27114000	30.74694000
812	Dharasu - Yamunotri	78.26691000	30.75199000
813	Dharasu - Yamunotri	78.26503000	30.75516000
814	Dharasu - Yamunotri	78.26883000	30.74250000
815	Dharasu - Yamunotri	78.27852000	30.73071000
816	Dharasu - Yamunotri	78.28695000	30.71948000
817	Dharasu - Yamunotri	78.28910000	30.71975000
818	Dharasu - Yamunotri	78.30086000	30.70080000
819	Dharasu - Yamunotri	78.29912000	30.68747000
820	Dharasu - Yamunotri	78.30035000	30.67997000
821	Dharasu - Yamunotri	78.30155000	30.67714000
822	Dharasu - Yamunotri	78.29912000	30.66885000
823	Dharasu - Yamunotri	78.30122000	30.66842000
824	Dharasu - Yamunotri	78.30266000	30.66103000

S.No.	Route Name	Longitude	Latitude
825	Dharasu - Yamunotri	78.30370000	30.65571000
826	Dharasu - Yamunotri	78.33021000	30.62984000
827	Dharasu - Yamunotri	78.45277896	30.98898115
828	Dharasu - Yamunotri	78.44699000	30.98396000
829	Dharasu - Yamunotri	78.44322000	30.98161000
830	Dharasu - Yamunotri	78.43909000	30.97808000
831	Dharasu - Yamunotri	78.43316000	30.97343000
832	Dharasu - Yamunotri	78.42979000	30.96816000
833	Dharasu - Yamunotri	78.43010000	30.96185000
834	Dharasu - Yamunotri	78.42393000	30.95856000
835	Dharasu - Yamunotri	78.42120000	30.95796000
836	Dharasu - Yamunotri	78.41060000	30.94810000
837	Dharasu - Yamunotri	78.40411000	30.93752000
838	Dharasu - Yamunotri	78.39894000	30.93233000
839	Dharasu - Yamunotri	78.38580564	30.92560044
840	Dharasu - Yamunotri	78.38445000	30.92268000
841	Dharasu - Yamunotri	78.37491000	30.91953000
842	Dharasu - Yamunotri	78.36508000	30.90697000
843	Dharasu - Yamunotri	78.36326485	30.90677334
844	Dharasu - Yamunotri	78.36089000	30.90558000
845	Dharasu - Yamunotri	78.34672000	30.90579000
846	Dharasu - Yamunotri	78.34242000	30.90373000
847	Dharasu - Yamunotri	78.33114000	30.91106000
848	Dharasu - Yamunotri	78.32853000	30.90576000
849	Dharasu - Yamunotri	78.32809847	30.90164310
850	Dharasu - Yamunotri	78.31757000	30.89295000
851	Dharasu - Yamunotri	78.30686000	30.88780000
852	Dharasu - Yamunotri	78.30855000	30.87858000
853	Dharasu - Yamunotri	78.29656000	30.86462000
854	Dharasu - Yamunotri	78.28823000	30.86198000

S.No.	Route Name	Longitude	Latitude
855	Dharasu - Yamunotri	78.27865000	30.84731000
856	Dharasu - Yamunotri	78.26422308	30.83904996
857	Dharasu - Yamunotri	78.25394000	30.83219000
858	Dharasu - Yamunotri	78.24491341	30.81995035
859	Dharasu - Yamunotri	78.24298000	30.82068000
860	Dharasu - Yamunotri	78.21662370	30.81199352
861	Dharasu - Yamunotri	78.22414000	30.80422000
862	Dharasu - Yamunotri	78.22559000	30.80066000
863	Dharasu - Yamunotri	78.24227000	30.79260000
864	Dharasu - Yamunotri	78.23954000	30.80076000
865	Dharasu - Yamunotri	78.23752000	30.80158000
866	Dharasu - Yamunotri	78.23366000	30.81112000
867	Dharasu - Yamunotri	78.23740000	30.81401000
868	Dharasu - Yamunotri	78.24156000	30.81025000
869	Dharasu - Yamunotri	78.24393908	30.80617931
870	Dharasu - Yamunotri	78.25223000	30.80041000
871	Dharasu - Yamunotri	78.25433000	30.79260000
872	Dharasu - Yamunotri	78.26406533	30.77864253
873	Dharasu - Yamunotri	78.26004000	30.77818000
874	Dharasu - Yamunotri	78.25666959	30.77109741
875	Dharasu - Yamunotri	78.26513000	30.77217000
876	Dharasu - Yamunotri	78.26859000	30.77050000
877	Dharasu - Yamunotri	78.26948000	30.76798000
878	Dharasu - Yamunotri	78.27221425	30.76296508
879	Dharasu - Yamunotri	78.27478000	30.74635000
880	Dharasu - Yamunotri	78.26908000	30.74934000
881	Dharasu - Yamunotri	78.26580705	30.75518180
882	Dharasu - Yamunotri	78.26595140	30.75027999
883	Dharasu - Yamunotri	78.26684105	30.74780196
884	Dharasu - Yamunotri	78.26887000	30.74407000

S.No.	Route Name	Longitude	Latitude
885	Dharasu - Yamunotri	78.27395000	30.73831000
886	Dharasu - Yamunotri	78.27491000	30.73230000
887	Dharasu - Yamunotri	78.28043170	30.73104516
888	Dharasu - Yamunotri	78.28276604	30.72455396
889	Dharasu - Yamunotri	78.28747000	30.71650000
890	Dharasu - Yamunotri	78.29499000	30.70721000
891	Dharasu - Yamunotri	78.29696000	30.70115000
892	Dharasu - Yamunotri	78.30123000	30.69794000
893	Dharasu - Yamunotri	78.30348000	30.69767132
894	Dharasu - Yamunotri	78.30497173	30.69234933
895	Dharasu - Yamunotri	78.29730000	30.68202000
896	Dharasu - Yamunotri	78.30440000	30.65023000
897	Dharasu - Yamunotri	78.30641669	30.64631086
898	Dharasu - Yamunotri	78.30855000	30.63869000
899	Dharasu - Yamunotri	78.31396000	30.63431000
900	Dharasu - Yamunotri	78.32025000	30.61890000
901	Dharasu - Yamunotri	78.31863000	30.61659000
902	Rishikesh - Rudraprayag	78.30101000	30.10819000
903	Rishikesh - Rudraprayag	78.33863000	30.13813000
904	Rishikesh - Rudraprayag	78.37659000	30.12040000
905	Rishikesh - Rudraprayag	78.38776000	30.13511000
906	Rishikesh - Rudraprayag	78.38739000	30.13465000
907	Rishikesh - Rudraprayag	78.43512000	30.11448000
908	Rishikesh - Rudraprayag	78.45601000	30.06984000
909	Rishikesh - Rudraprayag	78.51117000	30.06271000
910	Rishikesh - Rudraprayag	78.53430000	30.08141000
911	Rishikesh - Rudraprayag	78.53733000	30.09056000
912	Rishikesh - Rudraprayag	78.55300000	30.08350000
913	Rishikesh - Rudraprayag	78.57387000	30.08615000
914	Rishikesh - Rudraprayag	78.57777000	30.11188000

S.No.	Route Name	Longitude	Latitude
915	Rishikesh - Rudraprayag	78.58393000	30.12101000
916	Rishikesh - Rudraprayag	78.59176000	30.13420000
917	Rishikesh - Rudraprayag	78.59626000	30.14772000
918	Rishikesh - Rudraprayag	78.60181000	30.15314000
919	Rishikesh - Rudraprayag	78.61726000	30.17774000
920	Rishikesh - Rudraprayag	78.61819000	30.17979000
921	Rishikesh - Rudraprayag	78.69698000	30.23786000
922	Rishikesh - Rudraprayag	78.70749000	30.23450000
923	Rishikesh - Rudraprayag	78.74315000	30.21719000
924	Rishikesh - Rudraprayag	78.75139000	30.21497000
925	Rishikesh - Rudraprayag	78.75221000	30.21376000
926	Rishikesh - Rudraprayag	78.91804000	30.24287000
927	Rishikesh - Rudraprayag	78.95610000	30.27064000
928	Rishikesh - Rudraprayag	78.97985000	30.28603000
929	Rishikesh - Rudraprayag	78.97868000	30.28623000
930	Rishikesh - Rudraprayag	78.29157000	30.11457000
931	Rishikesh - Rudraprayag	78.32006000	30.12814000
932	Rishikesh - Rudraprayag	78.32069000	30.12760000
933	Rishikesh - Rudraprayag	78.32435000	30.12989000
934	Rishikesh - Rudraprayag	78.32476000	30.13171000
935	Rishikesh - Rudraprayag	78.32616000	30.13324000
936	Rishikesh - Rudraprayag	78.32842000	30.13365000
937	Rishikesh - Rudraprayag	78.33125000	30.13635000
938	Rishikesh - Rudraprayag	78.33642000	30.13677000
939	Rishikesh - Rudraprayag	78.34176000	30.13595000
940	Rishikesh - Rudraprayag	78.34854000	30.13220000
941	Rishikesh - Rudraprayag	78.35996000	30.12527000
942	Rishikesh - Rudraprayag	78.36479000	30.12191000
943	Rishikesh - Rudraprayag	78.37431000	30.11919000
944	Rishikesh - Rudraprayag	78.38030000	30.12354000

S.No.	Route Name	Longitude	Latitude
945	Rishikesh - Rudraprayag	78.38751000	30.12357000
946	Rishikesh - Rudraprayag	78.39049000	30.12592000
947	Rishikesh - Rudraprayag	78.39067000	30.12853000
948	Rishikesh - Rudraprayag	78.38566000	30.13070000
949	Rishikesh - Rudraprayag	78.38770000	30.13578000
950	Rishikesh - Rudraprayag	78.38888000	30.13764000
951	Rishikesh - Rudraprayag	78.39611000	30.13868000
952	Rishikesh - Rudraprayag	78.41692000	30.13263000
953	Rishikesh - Rudraprayag	78.42170000	30.12958000
954	Rishikesh - Rudraprayag	78.42246000	30.12349000
955	Rishikesh - Rudraprayag	78.42347000	30.11854000
956	Rishikesh - Rudraprayag	78.43385000	30.11609000
957	Rishikesh - Rudraprayag	78.43680000	30.11562000
958	Rishikesh - Rudraprayag	78.43635000	30.11405000
959	Rishikesh - Rudraprayag	78.44069000	30.10856000
960	Rishikesh - Rudraprayag	78.43632000	30.10207000
961	Rishikesh - Rudraprayag	78.43514000	30.08550000
962	Rishikesh - Rudraprayag	78.43807000	30.07946000
963	Rishikesh - Rudraprayag	78.44076500	30.07795000
964	Rishikesh - Rudraprayag	78.44279000	30.07826000
965	Rishikesh - Rudraprayag	78.45167000	30.07043000
966	Rishikesh - Rudraprayag	78.45389000	30.07065000
967	Rishikesh - Rudraprayag	78.46567000	30.06816000
968	Rishikesh - Rudraprayag	78.47011500	30.06791500
969	Rishikesh - Rudraprayag	78.47101000	30.06909000
970	Rishikesh - Rudraprayag	78.47467000	30.06967000
971	Rishikesh - Rudraprayag	78.47637000	30.06927000
972	Rishikesh - Rudraprayag	78.48008200	30.06698700
973	Rishikesh - Rudraprayag	78.48173400	30.06016300
974	Rishikesh - Rudraprayag	78.48503000	30.05927000

S.No.	Route Name	Longitude	Latitude
975	Rishikesh - Rudraprayag	78.48908000	30.06764000
976	Rishikesh - Rudraprayag	78.49451000	30.07643000
977	Rishikesh - Rudraprayag	78.50195000	30.07322000
978	Rishikesh - Rudraprayag	78.50371000	30.07239000
979	Rishikesh - Rudraprayag	78.50083000	30.06972000
980	Rishikesh - Rudraprayag	78.50069000	30.06573000
981	Rishikesh - Rudraprayag	78.50885000	30.05903000
982	Rishikesh - Rudraprayag	78.51097700	30.05914300
983	Rishikesh - Rudraprayag	78.50989000	30.06681000
984	Rishikesh - Rudraprayag	78.51181000	30.07033000
985	Rishikesh - Rudraprayag	78.51661000	30.06942000
986	Rishikesh - Rudraprayag	78.51776000	30.07241000
987	Rishikesh - Rudraprayag	78.52066700	30.07592500
988	Rishikesh - Rudraprayag	78.52418000	30.08098000
989	Rishikesh - Rudraprayag	78.52671000	30.08082000
990	Rishikesh - Rudraprayag	78.52918000	30.08123000
991	Rishikesh - Rudraprayag	78.53536100	30.08350400
992	Rishikesh - Rudraprayag	78.53826000	30.08721000
993	Rishikesh - Rudraprayag	78.54134000	30.09494000
994	Rishikesh - Rudraprayag	78.54591000	30.09179000
995	Rishikesh - Rudraprayag	78.54801000	30.08593000
996	Rishikesh - Rudraprayag	78.54942000	30.08916000
997	Rishikesh - Rudraprayag	78.55356000	30.08613000
998	Rishikesh - Rudraprayag	78.55963000	30.08191000
999	Rishikesh - Rudraprayag	78.55997000	30.08006000
1000	Rishikesh - Rudraprayag	78.56359000	30.07899000
1001	Rishikesh - Rudraprayag	78.56838000	30.07754000
1002	Rishikesh - Rudraprayag	78.56991000	30.08113300
1003	Rishikesh - Rudraprayag	78.57278000	30.08139000
1004	Rishikesh - Rudraprayag	78.57666000	30.08243000

S.No.	Route Name	Longitude	Latitude
1005	Rishikesh - Rudraprayag	78.58356000	30.08652000
1006	Rishikesh - Rudraprayag	78.58007000	30.09157000
1007	Rishikesh - Rudraprayag	78.57454000	30.09470000
1008	Rishikesh - Rudraprayag	78.57676000	30.09819000
1009	Rishikesh - Rudraprayag	78.57286400	30.09999300
1010	Rishikesh - Rudraprayag	78.57562000	30.10160000
1011	Rishikesh - Rudraprayag	78.57541000	30.10532000
1012	Rishikesh - Rudraprayag	78.58633000	30.10883000
1013	Rishikesh - Rudraprayag	78.58513700	30.11446000
1014	Rishikesh - Rudraprayag	78.58914000	30.12407000
1015	Rishikesh - Rudraprayag	78.59332000	30.12449000
1016	Rishikesh - Rudraprayag	78.59845000	30.12681000
1017	Rishikesh - Rudraprayag	78.59464000	30.13808000
1018	Rishikesh - Rudraprayag	78.59947000	30.14604000
1019	Rishikesh - Rudraprayag	78.60483000	30.14535000
1020	Rishikesh - Rudraprayag	78.61054000	30.15160000
1021	Rishikesh - Rudraprayag	78.61756000	30.16625000
1022	Rishikesh - Rudraprayag	78.62447000	30.18325000
1023	Rishikesh - Rudraprayag	78.63537000	30.18808000
1024	Rishikesh - Rudraprayag	78.64137000	30.19531000
1025	Rishikesh - Rudraprayag	78.63923000	30.19784000
1026	Rishikesh - Rudraprayag	78.64349100	30.20753100
1027	Rishikesh - Rudraprayag	78.64723000	30.20940000
1028	Rishikesh - Rudraprayag	78.65391000	30.20839000
1029	Rishikesh - Rudraprayag	78.66637400	30.21253700
1030	Rishikesh - Rudraprayag	78.67940000	30.21077000
1031	Rishikesh - Rudraprayag	78.68097000	30.22074000
1032	Rishikesh - Rudraprayag	78.67810000	30.22216000
1033	Rishikesh - Rudraprayag	78.67901500	30.22416700
1034	Rishikesh - Rudraprayag	78.68086500	30.23771500

S.No.	Route Name	Longitude	Latitude
1035	Rishikesh - Rudraprayag	78.68997000	30.23982000
1036	Rishikesh - Rudraprayag	78.69963300	30.23744200
1037	Rishikesh - Rudraprayag	78.70923000	30.23341000
1038	Rishikesh - Rudraprayag	78.71775000	30.23936000
1039	Rishikesh - Rudraprayag	78.72405000	30.23268000
1040	Rishikesh - Rudraprayag	78.72549000	30.23264000
1041	Rishikesh - Rudraprayag	78.73902000	30.22150000
1042	Rishikesh - Rudraprayag	78.74525000	30.21791000
1043	Rishikesh - Rudraprayag	78.75838000	30.21427000
1044	Rishikesh - Rudraprayag	78.76427700	30.21624300
1045	Rishikesh - Rudraprayag	78.78550800	30.22301100
1046	Rishikesh - Rudraprayag	78.79489000	30.22099000
1047	Rishikesh - Rudraprayag	78.80777000	30.21870000
1048	Rishikesh - Rudraprayag	78.82281000	30.22892000
1049	Rishikesh - Rudraprayag	78.82431000	30.23055000
1050	Rishikesh - Rudraprayag	78.82567000	30.23975000
1051	Rishikesh - Rudraprayag	78.83754000	30.23461000
1052	Rishikesh - Rudraprayag	78.84881800	30.23772200
1053	Rishikesh - Rudraprayag	78.85897000	30.24130000
1054	Rishikesh - Rudraprayag	78.86144000	30.24208000
1055	Rishikesh - Rudraprayag	78.86157000	30.24024000
1056	Rishikesh - Rudraprayag	78.86911000	30.24243000
1057	Rishikesh - Rudraprayag	78.87617000	30.24331000
1058	Rishikesh - Rudraprayag	78.87242000	30.24648000
1059	Rishikesh - Rudraprayag	78.87550000	30.24818000
1060	Rishikesh - Rudraprayag	78.87981700	30.25814300
1061	Rishikesh - Rudraprayag	78.89641200	30.25077100
1062	Rishikesh - Rudraprayag	78.89911000	30.24290000
1063	Rishikesh - Rudraprayag	78.90864000	30.24213000
1064	Rishikesh - Rudraprayag	78.90787300	30.24392100

S.No.	Route Name	Longitude	Latitude
1065	Rishikesh - Rudraprayag	78.91304000	30.24952000
1066	Rishikesh - Rudraprayag	78.91538400	30.24945700
1067	Rishikesh - Rudraprayag	78.92121000	30.25774000
1068	Rishikesh - Rudraprayag	78.92813000	30.25011000
1069	Rishikesh - Rudraprayag	78.93107000	30.25814000
1070	Rishikesh - Rudraprayag	78.93389000	30.25854000
1071	Rishikesh - Rudraprayag	78.93652800	30.26882400
1072	Rishikesh - Rudraprayag	78.94651000	30.26725000
1073	Rishikesh - Rudraprayag	78.97157000	30.28121000
1074	Dharasu - Rudraprayag	78.97582000	30.34489000
1075	Dharasu - Rudraprayag	78.95907000	30.35794000
1076	Dharasu - Rudraprayag	78.93556000	30.36151000
1077	Dharasu - Rudraprayag	78.92751000	30.36459000
1078	Dharasu - Rudraprayag	78.92224000	30.36091000
1079	Dharasu - Rudraprayag	78.92149000	30.35919000
1080	Dharasu - Rudraprayag	78.91822000	30.35758000
1081	Dharasu - Rudraprayag	78.90980000	30.36186000
1082	Dharasu - Rudraprayag	78.91207000	30.36303000
1083	Dharasu - Rudraprayag	78.90890000	30.36720000
1084	Dharasu - Rudraprayag	78.90073000	30.36970000
1085	Dharasu - Rudraprayag	78.89140000	30.37440000
1086	Dharasu - Rudraprayag	78.89349000	30.37674000
1087	Dharasu - Rudraprayag	78.90432000	30.37341000
1088	Dharasu - Rudraprayag	78.90438000	30.37439000
1089	Dharasu - Rudraprayag	78.90305000	30.37417000
1090	Dharasu - Rudraprayag	78.90324000	30.37313000
1091	Dharasu - Rudraprayag	78.89318000	30.38218000
1092	Dharasu - Rudraprayag	78.89074000	30.38187000
1093	Dharasu - Rudraprayag	78.88305000	30.38631000
1094	Dharasu - Rudraprayag	78.88099000	30.38797000

S.No.	Route Name	Longitude	Latitude
1095	Dharasu - Rudraprayag	78.88315000	30.39081000
1096	Dharasu - Rudraprayag	78.88212000	30.39758000
1097	Dharasu - Rudraprayag	78.87670000	30.40201000
1098	Dharasu - Rudraprayag	78.86380000	30.40248000
1099	Dharasu - Rudraprayag	78.86173000	30.40673000
1100	Dharasu - Rudraprayag	78.85824000	30.40711000
1101	Dharasu - Rudraprayag	78.84773000	30.40758000
1102	Dharasu - Rudraprayag	78.83900000	30.40430000
1103	Dharasu - Rudraprayag	78.84583000	30.40173000
1104	Dharasu - Rudraprayag	78.84983000	30.39019000
1105	Dharasu - Rudraprayag	78.83094000	30.39076000
1106	Dharasu - Rudraprayag	78.81493000	30.38429000
1107	Dharasu - Rudraprayag	78.81561000	30.39380000
1108	Dharasu - Rudraprayag	78.81381000	30.39267000
1109	Dharasu - Rudraprayag	78.81132000	30.39149000
1110	Dharasu - Rudraprayag	78.80759000	30.39062000
1111	Dharasu - Rudraprayag	78.78840000	30.38399000
1112	Dharasu - Rudraprayag	78.76709000	30.38185000
1113	Dharasu - Rudraprayag	78.75703000	30.38627000
1114	Dharasu - Rudraprayag	78.73275000	30.39223000
1115	Dharasu - Rudraprayag	78.73034000	30.39469000
1116	Dharasu - Rudraprayag	78.70465000	30.40454000
1117	Dharasu - Rudraprayag	78.65107000	30.42623000
1118	Dharasu - Rudraprayag	78.60826000	30.40119000
1119	Dharasu - Rudraprayag	78.60529000	30.40011000
1120	Dharasu - Rudraprayag	78.60465000	30.39615000
1121	Dharasu - Rudraprayag	78.60181000	30.39639000
1122	Dharasu - Rudraprayag	78.59147000	30.37157000
1123	Dharasu - Rudraprayag	78.57401000	30.37019000
1124	Dharasu - Rudraprayag	78.54372000	30.37684000

S.No.	Route Name	Longitude	Latitude
1125	Dharasu - Rudraprayag	78.54175000	30.37792000
1126	Dharasu - Rudraprayag	78.54247000	30.37825000
1127	Dharasu - Rudraprayag	78.54084000	30.37934000
1128	Dharasu - Rudraprayag	78.52657000	30.39052000
1129	Dharasu - Rudraprayag	78.51873000	30.38729000
1130	Dharasu - Rudraprayag	78.51230000	30.39160000
1131	Dharasu - Rudraprayag	78.50598000	30.39680000
1132	Dharasu - Rudraprayag	78.50756000	30.39819000
1133	Dharasu - Rudraprayag	78.51056000	30.40140000
1134	Dharasu - Rudraprayag	78.51025000	30.40177000
1135	Dharasu - Rudraprayag	78.50113000	30.40722000
1136	Dharasu - Rudraprayag	78.48228000	30.42512000
1137	Dharasu - Rudraprayag	78.47828000	30.44287000
1138	Dharasu - Rudraprayag	78.47413000	30.44235000
1139	Dharasu - Rudraprayag	78.46841000	30.43567000
1140	Dharasu - Rudraprayag	78.45973000	30.44334000
1141	Dharasu - Rudraprayag	78.46553000	30.44876000
1142	Dharasu - Rudraprayag	78.45427000	30.45596000
1143	Dharasu - Rudraprayag	78.45715000	30.45770000
1144	Dharasu - Rudraprayag	78.44063000	30.45911000
1145	Dharasu - Rudraprayag	78.42509000	30.47582000
1146	Dharasu - Rudraprayag	78.44963000	30.47259000
1147	Dharasu - Rudraprayag	78.45128000	30.47113000
1148	Dharasu - Rudraprayag	78.45314000	30.47540000
1149	Dharasu - Rudraprayag	78.45105000	30.47509000
1150	Dharasu - Rudraprayag	78.45086000	30.47247000
1151	Dharasu - Rudraprayag	78.44838000	30.47374000
1152	Dharasu - Rudraprayag	78.45108000	30.47594000
1153	Dharasu - Rudraprayag	78.44986000	30.47494000
1154	Dharasu - Rudraprayag	78.44661000	30.47627000

S.No.	Route Name	Longitude	Latitude
1155	Dharasu - Rudraprayag	78.44825000	30.47720000
1156	Dharasu - Rudraprayag	78.43926000	30.48463000
1157	Dharasu - Rudraprayag	78.43603000	30.48541000
1158	Dharasu - Rudraprayag	78.42973000	30.49088000
1159	Dharasu - Rudraprayag	78.42800000	30.48383000
1160	Dharasu - Rudraprayag	78.42088000	30.48426000
1161	Dharasu - Rudraprayag	78.40984000	30.49693000
1162	Dharasu - Rudraprayag	78.40601000	30.49918000
1163	Dharasu - Rudraprayag	78.40955000	30.50092000
1164	Dharasu - Rudraprayag	78.40857000	30.50426000
1165	Dharasu - Rudraprayag	78.40339000	30.50160000
1166	Dharasu - Rudraprayag	78.39102000	30.51699000
1167	Dharasu - Rudraprayag	78.37940000	30.52317000
1168	Dharasu - Rudraprayag	78.37536000	30.52442000
1169	Dharasu - Rudraprayag	78.36420000	30.53164000
1170	Dharasu - Rudraprayag	78.36172000	30.53431000
1171	Dharasu - Rudraprayag	78.35933000	30.53694000
1172	Dharasu - Rudraprayag	78.35705000	30.53759000
1173	Dharasu - Rudraprayag	78.36542000	30.54470000
1174	Dharasu - Rudraprayag	78.34804000	30.55291000
1175	Dharasu - Rudraprayag	78.34458000	30.55666000
1176	Dharasu - Rudraprayag	78.33216000	30.56710000
1177	Dharasu - Rudraprayag	78.98226000	30.28508000
1178	Dharasu - Rudraprayag	78.98338000	30.28602000
1179	Dharasu - Rudraprayag	78.98396113	30.28801446
1180	Dharasu - Rudraprayag	78.98032000	30.28883000
1181	Dharasu - Rudraprayag	78.97731000	30.29731000
1182	Dharasu - Rudraprayag	78.97923000	30.30177000
1183	Dharasu - Rudraprayag	78.98204000	30.30323091
1184	Dharasu - Rudraprayag	78.98127000	30.30666000

S.No.	Route Name	Longitude	Latitude
1185	Dharasu - Rudraprayag	78.97946000	30.31316000
1186	Dharasu - Rudraprayag	78.97201000	30.31311000
1187	Dharasu - Rudraprayag	78.97141000	30.31696000
1188	Dharasu - Rudraprayag	78.96816000	30.32424000
1189	Dharasu - Rudraprayag	78.96922000	30.33698000
1190	Dharasu - Rudraprayag	78.97341000	30.34391000
1191	Dharasu - Rudraprayag	78.97328000	30.34906000
1192	Dharasu - Rudraprayag	78.96538000	30.34972000
1193	Dharasu - Rudraprayag	78.96157334	30.35409033
1194	Dharasu - Rudraprayag	78.95987131	30.35291372
1195	Dharasu - Rudraprayag	78.95624000	30.35626000
1196	Dharasu - Rudraprayag	78.95377494	30.35713595
1197	Dharasu - Rudraprayag	78.95317000	30.36022000
1198	Dharasu - Rudraprayag	78.94941501	30.36042276
1199	Dharasu - Rudraprayag	78.94508000	30.35658000
1200	Dharasu - Rudraprayag	78.94201000	30.35893000
1201	Dharasu - Rudraprayag	78.93798000	30.35994000
1202	Dharasu - Rudraprayag	78.93176191	30.36389238
1203	Dharasu - Rudraprayag	78.92453127	30.36351064
1204	Dharasu - Rudraprayag	78.92207000	30.35486000
1205	Dharasu - Rudraprayag	78.90395000	30.36575000
1206	Dharasu - Rudraprayag	78.90187726	30.36658343
1207	Dharasu - Rudraprayag	78.89787000	30.36961000
1208	Dharasu - Rudraprayag	78.89399000	30.37263000
1209	Dharasu - Rudraprayag	78.88858000	30.37489000
1210	Dharasu - Rudraprayag	78.89843000	30.37378000
1211	Dharasu - Rudraprayag	78.90503000	30.37016000
1212	Dharasu - Rudraprayag	78.90412000	30.37232000
1213	Dharasu - Rudraprayag	78.90400000	30.37365000
1214	Dharasu - Rudraprayag	78.89872000	30.37523000

S.No.	Route Name	Longitude	Latitude
1215	Dharasu - Rudraprayag	78.89604000	30.37892000
1216	Dharasu - Rudraprayag	78.89752000	30.37509000
1217	Dharasu - Rudraprayag	78.88749000	30.37886000
1218	Dharasu - Rudraprayag	78.88382000	30.39089000
1219	Dharasu - Rudraprayag	78.88159000	30.39188000
1220	Dharasu - Rudraprayag	78.88116000	30.39559000
1221	Dharasu - Rudraprayag	78.87882000	30.39722000
1222	Dharasu - Rudraprayag	78.87777000	30.40009000
1223	Dharasu - Rudraprayag	78.87501000	30.41067000
1224	Dharasu - Rudraprayag	78.87391000	30.41068000
1225	Dharasu - Rudraprayag	78.87199000	30.40397000
1226	Dharasu - Rudraprayag	78.86839000	30.40512000
1227	Dharasu - Rudraprayag	78.85362000	30.40717000
1228	Dharasu - Rudraprayag	78.85087359	30.40930440
1229	Dharasu - Rudraprayag	78.85130000	30.40676000
1230	Dharasu - Rudraprayag	78.84506173	30.40574035
1231	Dharasu - Rudraprayag	78.84362000	30.40337000
1232	Dharasu - Rudraprayag	78.85154000	30.40149000
1233	Dharasu - Rudraprayag	78.85383000	30.39815000
1234	Dharasu - Rudraprayag	78.85072000	30.39416000
1235	Dharasu - Rudraprayag	78.84448000	30.39315000
1236	Dharasu - Rudraprayag	78.84078336	30.39026397
1237	Dharasu - Rudraprayag	78.83573000	30.39042000
1238	Dharasu - Rudraprayag	78.82804000	30.39081000
1239	Dharasu - Rudraprayag	78.82194000	30.38691000
1240	Dharasu - Rudraprayag	78.81687000	30.38539000
1241	Dharasu - Rudraprayag	78.81938000	30.39204000
1242	Dharasu - Rudraprayag	78.81214569	30.39196000
1243	Dharasu - Rudraprayag	78.80949318	30.39056909
1244	Dharasu - Rudraprayag	78.80700000	30.39259000

S.No.	Route Name	Longitude	Latitude
1245	Dharasu - Rudraprayag	78.80244000	30.39202000
1246	Dharasu - Rudraprayag	78.79921000	30.38957000
1247	Dharasu - Rudraprayag	78.79946000	30.39307000
1248	Dharasu - Rudraprayag	78.79548072	30.39028144
1249	Dharasu - Rudraprayag	78.79623728	30.38779437
1250	Dharasu - Rudraprayag	78.79352000	30.38483000
1251	Dharasu - Rudraprayag	78.79104000	30.38040000
1252	Dharasu - Rudraprayag	78.78485000	30.38063000
1253	Dharasu - Rudraprayag	78.78291829	30.37819455
1254	Dharasu - Rudraprayag	78.77811000	30.37963000
1255	Dharasu - Rudraprayag	78.77865000	30.38329000
1256	Dharasu - Rudraprayag	78.77654000	30.38557000
1257	Dharasu - Rudraprayag	78.77556000	30.38321000
1258	Dharasu - Rudraprayag	78.77103000	30.37978000
1259	Dharasu - Rudraprayag	78.76486000	30.38257000
1260	Dharasu - Rudraprayag	78.76146000	30.38567000
1261	Dharasu - Rudraprayag	78.75849884	30.38589475
1262	Dharasu - Rudraprayag	78.74948196	30.39106711
1263	Dharasu - Rudraprayag	78.75260000	30.38799000
1264	Dharasu - Rudraprayag	78.74490000	30.38970000
1265	Dharasu - Rudraprayag	78.74215000	30.39006000
1266	Dharasu - Rudraprayag	78.74170000	30.39168000
1267	Dharasu - Rudraprayag	78.73769000	30.39079000
1268	Dharasu - Rudraprayag	78.73495000	30.39172000
1269	Dharasu - Rudraprayag	78.72742663	30.39354542
1270	Dharasu - Rudraprayag	78.72013000	30.39615000
1271	Dharasu - Rudraprayag	78.71979000	30.39836000
1272	Dharasu - Rudraprayag	78.71548000	30.40080000
1273	Dharasu - Rudraprayag	78.70772000	30.40079000
1274	Dharasu - Rudraprayag	78.69769000	30.40900000

S.No.	Route Name	Longitude	Latitude
1275	Dharasu - Rudraprayag	78.68997000	30.41186000
1276	Dharasu - Rudraprayag	78.68686000	30.41158000
1277	Dharasu - Rudraprayag	78.68284000	30.41313000
1278	Dharasu - Rudraprayag	78.67803000	30.41660000
1279	Dharasu - Rudraprayag	78.67440000	30.41713000
1280	Dharasu - Rudraprayag	78.66586000	30.42407000
1281	Dharasu - Rudraprayag	78.65326777	30.42896000
1282	Dharasu - Rudraprayag	78.65072000	30.42775000
1283	Dharasu - Rudraprayag	78.64866000	30.42457000
1284	Dharasu - Rudraprayag	78.64649000	30.42443000
1285	Dharasu - Rudraprayag	78.64367000	30.42729000
1286	Dharasu - Rudraprayag	78.64203000	30.42581000
1287	Dharasu - Rudraprayag	78.64110000	30.42093000
1288	Dharasu - Rudraprayag	78.64297000	30.41649000
1289	Dharasu - Rudraprayag	78.63668000	30.41637000
1290	Dharasu - Rudraprayag	78.63160000	30.41460000
1291	Dharasu - Rudraprayag	78.62028000	30.41385000
1292	Dharasu - Rudraprayag	78.61603183	30.41257219
1293	Dharasu - Rudraprayag	78.61624000	30.40824000
1294	Dharasu - Rudraprayag	78.61134000	30.40468000
1295	Dharasu - Rudraprayag	78.60546000	30.40309000
1296	Dharasu - Rudraprayag	78.60422000	30.39945000
1297	Dharasu - Rudraprayag	78.59590000	30.39551000
1298	Dharasu - Rudraprayag	78.59170000	30.38815000
1299	Dharasu - Rudraprayag	78.59693012	30.38639831
1300	Dharasu - Rudraprayag	78.59239000	30.38020000
1301	Dharasu - Rudraprayag	78.58821000	30.37677000
1302	Dharasu - Rudraprayag	78.58255000	30.37246000
1303	Dharasu - Rudraprayag	78.57481000	30.36597000
1304	Dharasu - Rudraprayag	78.56752000	30.37225000

S.No.	Route Name	Longitude	Latitude
1305	Dharasu - Rudraprayag	78.56396000	30.37009000
1306	Dharasu - Rudraprayag	78.55401000	30.37386000
1307	Dharasu - Rudraprayag	78.55066000	30.37203000
1308	Dharasu - Rudraprayag	78.53320000	30.38024000
1309	Dharasu - Rudraprayag	78.52330000	30.38782000
1310	Dharasu - Rudraprayag	78.51344000	30.38602000
1311	Dharasu - Rudraprayag	78.50832000	30.39297000
1312	Dharasu - Rudraprayag	78.50880000	30.39961000
1313	Dharasu - Rudraprayag	78.50248000	30.39932000
1314	Dharasu - Rudraprayag	78.50573000	30.40841000
1315	Dharasu - Rudraprayag	78.49737000	30.40442000
1316	Dharasu - Rudraprayag	78.49242000	30.40232000
1317	Dharasu - Rudraprayag	78.48849000	30.40476000
1318	Dharasu - Rudraprayag	78.48842000	30.41301000
1319	Dharasu - Rudraprayag	78.48306000	30.41419000
1320	Dharasu - Rudraprayag	78.47424000	30.42682000
1321	Dharasu - Rudraprayag	78.47640857	30.42334002
1322	Dharasu - Rudraprayag	78.47765000	30.43284000
1323	Dharasu - Rudraprayag	78.48040000	30.43831000
1324	Dharasu - Rudraprayag	78.47882000	30.44342000
1325	Dharasu - Rudraprayag	78.47559000	30.44308000
1326	Dharasu - Rudraprayag	78.47178000	30.43937000
1327	Dharasu - Rudraprayag	78.46581000	30.43661000
1328	Dharasu - Rudraprayag	78.46467000	30.44151000
1329	Dharasu - Rudraprayag	78.46084000	30.44514000
1330	Dharasu - Rudraprayag	78.46274000	30.44592000
1331	Dharasu - Rudraprayag	78.46215000	30.44900000
1332	Dharasu - Rudraprayag	78.45728000	30.45105000
1333	Dharasu - Rudraprayag	78.45211000	30.44838000
1334	Dharasu - Rudraprayag	78.45358000	30.45504274

S.No.	Route Name	Longitude	Latitude
1335	Dharasu - Rudraprayag	78.44824000	30.45636000
1336	Dharasu - Rudraprayag	78.44644000	30.45854000
1337	Dharasu - Rudraprayag	78.43372657	30.46082472
1338	Dharasu - Rudraprayag	78.43717000	30.46366000
1339	Dharasu - Rudraprayag	78.43401000	30.46917000
1340	Dharasu - Rudraprayag	78.43084001	30.47253236
1341	Dharasu - Rudraprayag	78.43316000	30.47673000
1342	Dharasu - Rudraprayag	78.43095000	30.47612000
1343	Dharasu - Rudraprayag	78.42894240	30.47586729
1344	Dharasu - Rudraprayag	78.43981000	30.47264000
1345	Dharasu - Rudraprayag	78.44667000	30.47004000
1346	Dharasu - Rudraprayag	78.44983000	30.47119000
1347	Dharasu - Rudraprayag	78.45312000	30.47088000
1348	Dharasu - Rudraprayag	78.45156000	30.47482000
1349	Dharasu - Rudraprayag	78.44997495	30.47584198
1350	Dharasu - Rudraprayag	78.45579440	30.47835367
1351	Dharasu - Rudraprayag	78.44388000	30.47750000
1352	Dharasu - Rudraprayag	78.44328000	30.48100000
1353	Dharasu - Rudraprayag	78.44277000	30.48056000
1354	Dharasu - Rudraprayag	78.44076000	30.48254000
1355	Dharasu - Rudraprayag	78.43228000	30.48644000
1356	Dharasu - Rudraprayag	78.42853000	30.48719000
1357	Dharasu - Rudraprayag	78.42393000	30.48380000
1358	Dharasu - Rudraprayag	78.41661000	30.48115000
1359	Dharasu - Rudraprayag	78.41190000	30.47396000
1360	Dharasu - Rudraprayag	78.40927196	30.47441079
1361	Dharasu - Rudraprayag	78.40983000	30.48285000
1362	Dharasu - Rudraprayag	78.40796000	30.49089000
1363	Dharasu - Rudraprayag	78.40599000	30.49469000
1364	Dharasu - Rudraprayag	78.40610000	30.49772000

S.No.	Route Name	Longitude	Latitude
1365	Dharasu - Rudraprayag	78.40344125	30.50665031
1366	Dharasu - Rudraprayag	78.40062000	30.50891000
1367	Dharasu - Rudraprayag	78.39214000	30.51212000
1368	Dharasu - Rudraprayag	78.39062000	30.51343000
1369	Dharasu - Rudraprayag	78.38607000	30.51528000
1370	Dharasu - Rudraprayag	78.38394000	30.51978000
1371	Dharasu - Rudraprayag	78.38242104	30.52212940
1372	Dharasu - Rudraprayag	78.36960000	30.52663000
1373	Dharasu - Rudraprayag	78.36763000	30.52675000
1374	Dharasu - Rudraprayag	78.36656353	30.53023471
1375	Dharasu - Rudraprayag	78.36240000	30.53285000
1376	Dharasu - Rudraprayag	78.36232000	30.54184000
1377	Dharasu - Rudraprayag	78.36065000	30.54274000
1378	Dharasu - Rudraprayag	78.35267338	30.54577985
1379	Dharasu - Rudraprayag	78.34392000	30.55485000
1380	Dharasu - Rudraprayag	78.33985942	30.56355794
1381	Dharasu - Rudraprayag	78.33598000	30.57336000
1382	Dharasu - Rudraprayag	78.33383000	30.58342000
1383	Dharasu - Rudraprayag	78.32657000	30.59612000
1384	Dharasu - Rudraprayag	78.32381245	30.60077249
1385	Dharasu - Rudraprayag	78.32181000	30.60804000
1386	Dharasu - Rudraprayag	78.33060000	30.58815000

DRAFT FORM OF CONTRACT AGREEMENT

1. DRAFT CONTRACT AGREEMENT

No. ……..

This Contract Agreement (hereinafter called the "Contract") is made on this …….. day of the month of ……., 2024.

BETWEEN

Ministry of Road Transport and Highways (MoRTH), having its head office at Transport Bhavan, 1, Sansad Marg, New Delhi-110001 (hereinafter referred to as the "MoRTH", which expression shall, unless repugnant to or inconsistent with the context, mean and include its successors and assigns) of the first part.

AND

M/s…….. , a company incorporated under the provisions of the Companies Act, 1956 and having its registered office at .... (for and on behalf of Consortium comprising …….. and (collectively the "Consortium") with ..... as its lead member (the "Lead Member")) (hereinafter referred to as the "Contractor" which expression shall unless repugnant to or inconsistent with the context, mean and include its successors and assigns) of the OTHER PART.

WHEREAS

(a) the Contractor, in the ordinary course of its business, is engaged in providing similar services to their clients, and have represented to MoRTH through their bids, against RFP for the "Selection of System Integrator for Design, Supply, Installation, Testing, Commissioning and Operation & Maintenance of Traffic Incident Management System on Chardham Mahamarg" that they have the required professional skills, personnel and technical resources to provide the required Services;

(b) on the basis of the said Tender, MoRTH has adjudged the Contractor as a Successful FP and issued Letter of Award (LoA) No. …… dated _._.2024 for the same;

(c) the Contractor has agreed through their letter of acceptance No …….. dated …….. to provide the said Services on the terms and conditions set forth in this Contract Agreement and has also submitted performance bank guarantee equivalent to ..... (Rs. ……..) such that it remains valid until one year beyond completion of the contract.

NOW THEREFORE, in consideration of the foregoing and the respective covenants and agreements set forth in this Contract Agreement, the receipt and sufficiency of which is hereby acknowledged, and intending to be legally bound hereby, the Parties hereby agree as follows:

1. The mutual rights and obligations of the Contractor and MoRTH shall be as set forth in this Contract Agreement, in particular:

a) The Contractor shall carry out the Services in accordance with the provisions of the Contract; and
b) MoRTH shall make payments to the Contractor in accordance with the provisions of the Contract.

2. The following schedules/ appendices shall be deemed to form and be read and construed as part of this Contract Agreement viz.

	General conditions of the Contract
Schedule A	The Site
Schedule B	The Proposed TIMS Facilities
Schedule C	Standards and Indicative Technical Specifications
Appendices:	
Appendix A	Copy of Financial Bid of the Contractor
Appendix B	Letter of Award issued by MoRTH
Appendix C	Letter of Acceptance submitted by the Contractor
Appendix D	Copy of the Performance Security submitted by the Contractor including copies of confirmation provided by the respective bank.
Appendix E	Copy of the Technical Bid and/or any subsequent correspondence of the Contractor/ MoRTH
Appendix F	Copy of RFP Document and subsequent amendment / addendum including Minutes of Pre-bid Meeting, if any

IN WITNESS WHEREOF, the parties hereto have caused this Contract Agreement to be executed by their respective authorized representatives on the day and year first before written.

SIGNED, SEALED AND DELIVERED

For and on behalf of

Ministry of Road Transport & Highways (MoRTH)
(Authorized Representative)

SIGNED, SEALED AND DELIVERED

For and on behalf of

(M/s _____)
(Authorized Representative)

(Signature) _____

(Name) _____

(Designation) _____

(Address) _____

(Signature) _____

(Name) _____

(Designation) _____

(Address) _____

WITNESSES

1. Signature:

Name:

Address:

2. Signature:

Name:

Address:

2. General Conditions of Contract

2.1 Definitions

The words and expressions beginning with capital letters and defined in this Contract Agreement shall, unless the context otherwise requires, have the meaning ascribed thereto herein and the words and expressions defined in the Schedules and used therein shall have the meaning ascribed thereto in the Schedules annexed hereto. Words used in capitals and not defined herein but defined in the RFP shall have the meaning as ascribed thereto in the RFP.

2.2 Interpretation

2.2.1 In this Contract Agreement, unless the context otherwise requires,

(a) references to any legislation or any provision thereof shall include amendment or re-enactment or consolidation of such legislation or any provision thereof so far as such amendment or re-enactment or consolidation applies or is capable of applying to any transaction entered into hereunder;

(b) references to laws of India or Indian law or regulation having the force of law shall include the laws, acts, ordinances, rules, regulations, bye laws or notifications which have the force of law in the territory of India and as from time to time may be amended, modified, supplemented, extended or re-enacted;

(c) references to a "person" and words denoting a natural person shall be construed as a reference to any individual, firm, company, corporation, society, trust, government, state or agency of a state or any association or partnership (whether or not having separate legal personality) of two or more of the above and shall include successors and assigns;

(d) the table of contents, headings or sub-headings in this Contract Agreement are for convenience of reference only and shall not be used in, and shall not affect, the construction or interpretation of this Contract Agreement;

(e) the words "include" and "including" are to be construed, without limitation and shall be deemed to be followed by "without limitation" or "but not limited to" whether or not they are followed by such phrases;

(f) any reference to any period of time shall mean a reference to that according to Indian Standard Time;

(g) any reference to day shall mean a reference to a calendar day;

(h) references to a "business day" shall be construed as a reference to a day (other than a Sunday and holidays) on which banks in their respective States are generally open for business;

(i) any reference to month shall mean a reference to a calendar month as per the Gregorian calendar;

(j) references to any date, period or time shall mean and include such date, period or time as may be extended pursuant to this Contract Agreement;

(k) any reference to any period commencing "from" a specified day or date and "till" or "until" a specified day or date shall include both such days or dates; provided that if the last day of any period computed under this Contract Agreement is not a business day, then the period shall run until the end of the next business day;

(l) the words importing singular shall include plural and vice versa;

(m) "lakh" means a hundred thousand (100,000) and "crore" means ten million (10,000,000);

(n) references to the "winding-up", "dissolution", "insolvency", or "reorganization" of a company or corporation shall be construed so as to include any equivalent or analogous proceedings under the law of the jurisdiction in which such company or corporation is incorporated or any jurisdiction in which such company or corporation carries on business including the seeking of liquidation, winding-up, reorganization, dissolution, arrangement, protection or relief of debtors;

(o) save and except as otherwise provided in this Contract Agreement, any reference at any time to any agreement, deed, instrument, license or document of any description shall be construed as reference to that agreement, deed, instrument, license or other document as amended, varied, supplemented, modified or suspended at the time of such reference; provided that this Sub-clause shall not operate so as to increase liabilities or obligations of MoRTH hereunder or pursuant hereto in any manner whatsoever;

(p) any agreement, consent, approval, authorization, notice, communication, information or report required under or pursuant to this Contract Agreement from or by any Party shall be valid and effective only if it is in writing under the hand of a duly authorized representative of such Party, as the case may be, in this behalf and not otherwise;

(q) the Schedules and Recitals to this Contract Agreement form an integral part of this Contract Agreement and will be in full force and effect as though they were expressly set out in the body of this Contract Agreement;

(r) references to Recitals, Articles, Clauses, Sub-clauses or Schedules in this Contract Agreement shall, except where the context otherwise requires, mean references to Recitals, Articles, Clauses, Sub-clauses and Schedules of or to this Contract Agreement and references to a Paragraph shall, subject to any contrary indication, be construed as a reference to a Paragraph of this Contract Agreement or of the Schedule in which such reference appears; and

(s) the damages payable as set forth in this Contract Agreement, whether on per diem basis or otherwise, are mutually agreed genuine pre-estimated loss and damage likely to be suffered and incurred by the Party entitled to receive the same and are not by way of penalty (the "Damages");

(t) "Arbitration Act" means the Arbitration and Conciliation Act, 1996 and shall include modifications to or any re-enactment thereof as in force from time to time;

(u) "SYSTEM" means "TIMS System"

(v) "Effective Date" shall mean date of this Contract Agreement;

2.2.2 Any word or expression used in this Contract Agreement shall, unless otherwise defined or construed in this Contract Agreement, bear its ordinary English meaning and, for these purposes, the General Clauses Act 1897 shall not apply.

2.3 Definitions

AI/ML	Artificial Intelligence/Machine Learning
ATMS	Advanced Traffic Management System
BIS	Bureau of Indian Standards
BS	British Standard
CIF	Common Interface Format
CCTV	Closed Circuit Television
DLP	Defects Liability Period
DM	Disaster Management
DDMA	District Disaster Management Authority
ECB	Emergency Call Box
ERT	Emergency Road side Telephone
EN	European Standard
FAT	Factory Acceptance Tests
FPS	Frames Per Second

GUI	Graphical User Interface
HDPE	High-density polyethylene
HVAC	Heating Ventilation and Air conditioning
IRC	Indian Roads Congress
ITM	Integrated Traffic Management
ITS	Intelligent Transport Systems
ITU-T	Telecommunication Standardization Sector of the International Telecommunication Union
JPEG	Joint Photographic Experts Group
LAN	Local Area Network
MET	Meteorological Data Systems
MoRTH	Ministry of Road Transport and Highways
MTBF	Mean Time between Failures
MTTR	Mean Time to Repair
NAS	Network-Attached Storage
NDMA	National Disaster Management Authority
NDRF	National Disaster Response Force
NMS	Network Management System
NHAI	National Highways Authority of India
NVR	Network Video Recorder
OF	Optic Fibre
OFC	Optic Fibre Cable
O&M	Operation and Maintenance
PIJF	Polythene Insulated Jelly-filled

PTZ Pan, Tilt, Zoom
SAT Site Acceptance Tests
SDMA State Disaster Management Authority
SIT System Integration Test
Solar PV Solar Photo voltaic
TIMS Traffic Incident Management System
TEC Telecommunication Engineering centre of the Government of India
TIMS PMU Traffic Incident Management System Project Management Unit
UPS Uninterruptible Power Supply
VMS Variable Message Signs
WAN Wide Area Network
WIM Weigh-in-motion
WPC Wireless Planning Council
Note: The document uses "TIMS Contractor", "Service Provider" and "Service Integrator" interchangeably. They refer to the Agency engaged by MoRTH for execution of TIMS works.

2.4 Arithmetic conventions

All calculations shall be 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.

2.5 Priority of Agreements, Clauses and Schedules

2.5.1 In case of inconsistency between the provisions of this Contract Agreement and the RFP, the terms of this Contract Agreement shall prevail to the extent of such inconsistency.

2.5.2 In case of ambiguities or discrepancies within this Contract Agreement, the following shall apply:

(a) between two or more Clauses of this Contract Agreement, the provisions of a specific Clause relevant to the issue under consideration shall prevail over those in other Clauses;

(b) between any two Schedules/Articles, the Schedule / Article relevant to the issue shall prevail;
(c) between the Clauses of this Agreement and the Schedules, the Clauses shall prevail and between Schedules and Annexes, the Schedules shall prevail
(d) between the written description on the drawings/design documents, if any, and the Specifications and Standards, the latter shall prevail; and
(e) between any value written in numerals and that in words, the latter shall prevail

2.6 Scope of The Project

Under this Agreement, the scope of the Project shall mean and include:

(a) Construction of the TIMS Facility on the Site set forth in Schedule- A with provision of Facilities as specified in Schedule-B in conformity with the Specifications and Standards set forth in Schedule-C
(b) Operations & maintenance of the Traffic Incident Management System in accordance with the provisions of this Agreement and in conformity with the requirements set forth in Schedule-C; and
(c) performance and fulfilment of all other obligations of the Contractor in accordance with the provisions of this Agreement and matters incidental thereto or necessary for the performance of any or all of the obligations of the Contractor under this Agreement.

2.7 Relationship between the Parties

Nothing contained herein shall be construed as establishing a relationship of master and servant or of principal and agent as between MoRTH and the Contractor. The Contractor, subject to this Contract Agreement, has complete charge of Personnel performing the Services and shall be fully responsible for the Services performed by them or on their behalf hereunder. Contractor shall alone be responsible for the remuneration and statutory compliance with respect to its employees, contractors or representatives. MoRTH has no liability w.r.t. the representatives/ employees of the Contractor. Contractor will keep MoRTH fully indemnified in this regard.

2.8 Governing Law and Jurisdiction

This Contract Agreement shall be construed and interpreted in accordance with and governed by the laws of India, and the courts at Delhi/Nainital shall have exclusive jurisdiction over matters arising out of or relating to this Contract Agreement.

2.9 Language

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

2.10 Effectiveness of Contract

This Contract Agreement shall come into effect on the date the Contract is signed by both the Parties. The date, the Contract comes into effect is defined as the Effective Date.

2.11 Commencement of Services

The Contractor shall commence the Services from the date of Handing over the site.

2.12 Expiration of Contract

The term of this Contract Agreement shall be for a period of 6 (six) years from Effective Date. Any additional implementation work awarded during the contract period shall be adjusted as implementation and O&M in such a manner that the said period does not exceed beyond the initial six years or additional extended period thereof, if approved by MoRTH, as the case may be.

2.13 Assignment

This Contract Agreement shall not be assigned by the Contractor to any person / agency except with the prior consent in writing of MoRTH and MoRTH shall be entitled to decline without assigning any reason whatsoever. Notwithstanding anything to the contrary contained in this Contract Agreement, MoRTH may, after giving 30 days' notice to the Contractor, assign and/ or transfer any of its rights and benefits and/or obligations under this Contract Agreement to an assignee who is, in the reasonable opinion of MoRTH, capable of fulfilling all of the MoRTH's then outstanding obligations under this Contract Agreement.

2.14 Severability

If for any reason whatsoever any provision of this Contract Agreement is or becomes invalid, illegal or unenforceable or is declared by any court of competent jurisdiction or any other instrumentality to be invalid, illegal or unenforceable, the validity, legality or enforceability of the remaining provisions shall not be affected in any manner, and the Parties will negotiate in good faith with a view to agreeing to one or more provisions which may be substituted for such invalid, unenforceable or illegal provisions, as nearly as is practicable to such invalid, illegal or unenforceable provision. Failure to agree upon any such provisions shall not be subject to the Dispute Resolution Procedure set forth under this Contract Agreement or otherwise.

2.15 Notices

Any notice, request or consent required or permitted to be given or made pursuant to this Contract Agreement shall be in writing. Any such notice, request or consent shall be deemed to have been given or made when delivered in person to an authorized representative of the Party to whom the communication is addressed, or when sent to such Party at the address specified below. The mode of service of any notice shall be either courier or registered post or e-mail or fax or by hand.

<u>The addresses for service of Notice shall be:</u>

MoRTH: CE-Regional Office, Dehradun, Ministry of Road Transport and Highways

Address: 1st Floor, The Institution of Engineers India Building, Near ISBT Sharanpur Road Dehradun 248001

E-mail: ro.ddn-morth@gov.in

Contractor: ……..

Attention: ……..

Address: ……

E-mail:……

2.16 Time Schedule

The timeline for phase-wise implementation with end dates for each milestone is as follows

(T = selection of System Integrator) –

- Phase 1 –
    - Capex: Deployment Design + Implementation: T + 9 months
    - Integration & Testing + Go-Live: T + 9 months
    - Operation & Maintenance: Till T + 72 months

Decision for go-ahead for Phase-2 to be taken at T + 12 months

- Phase 2 –
    - Capex: Deployment Design + Implementation: T + 21 months
    - Integration & Testing + Go-Live: T + 21 months
    - Operation & Maintenance: Till T + 72 months

Decision for go-ahead for Phase-3 to be taken at T + 24 months

- Phase 3 –
    - Capex: Deployment Design + Implementation: T + 33 months
    - Integration & Testing + Go-Live: T + 33 months
    - Operation & Maintenance: Till T + 72 months

The final timelines for implementation, the share of phase-wise works and the go-ahead for Phase 2 and Phase 3 shall be approved by the Governance and Steering Committee.

2.17 Key performance Measurements

- Unless specified by the MoRTH to the contrary, the System Integrator shall implement the infrastructure, perform the Services and carry out the Scope of Work in accordance with the terms of this Contract, Scope of Work and the Service Specifications as laid down under Service Level Agreement.

- If the Contract/Service Specification include more than one document, then unless the MoRTH specifies to the contrary, the later in time shall prevail over a document of earlier date to the extent of any inconsistency.

2.18 Commencement & Progress

The System Integrator shall commence the performance of its obligations in a manner as specified in the Scope of Work.

- The System Integrator shall proceed to carry out the activities / services with diligence and expedition in accordance with any stipulation as to the time, manner, mode, and method of execution contained in this Contract.
- The System Integrator shall be responsible for and shall ensure that all activities/ services are performed in accordance with the Contract, Scope of Work and that the System Integrator's Team complies with such specifications and all other standards, terms and other stipulations/conditions set out hereunder.
- The System Integrator shall perform the activities / services and carry out its obligations under the Contract with due diligence, efficiency and economy, in accordance with generally accepted techniques and practices used in the industry and with professional engineering and consulting standards recognized by international professional bodies and shall observe sound management, engineering and security practices. It shall employ appropriate advanced technology and engineering practices and safe and effective equipment, machinery, material and methods.
- The System Integrator shall always act, in respect of any matter relating to this Contract, as faithful advisors to the MoRTH and shall, at all times, support and safeguard the MoRTH's legitimate interests in any dealings with Third parties.

2.19 Damages

2.19.1 Penalty for non- achievement of SLA Requirement during CapEX Cycle

Any delay in the delivery of the project deliverables (solely attributable to vendor) would attract the following damages –

- liquidated damage per week of 0.25% of the CAPEX estimate of contract value of that phase for first 4 weeks and
- liquidated damage per week of 0.3% of the CAPEX estimate of contract value of that phase per week for every subsequent week

If delay is during Phase-1: Liquidated damages incurred shall be calculated as:

- 10% x Contract Value X 0.25% for the first 4 weeks.
- 10% X Contract Value X 0.3% for every subsequent week.

If delay is during Phase-2: Liquidated damages incurred shall be calculated as:

- 17.5% X Contract Value X 0.25% for the first 4 weeks.

- 17.5% X Contract Value X 0.3% for every subsequent week.

If delay is during Phase-3: Liquidated damages incurred shall be calculated as

- 22.5% X Contract Value X 0.25% for the first 4 weeks.
- 22.5% X Contract Value X 0.3% for every subsequent week.

If the liquidated damages during any phase reach 7% of the CAPEX estimate of the contract value of that phase, Authority may invoke the termination clause.

2.19.2 Delays in remedying the system

In case of general non-performance, failure by the System Integrator to have remedied all reported system defects within the cure period of 7 days shall result in the application of the penalties for delays.

- The penalty will be applied at 0.5% of the O&M estimate of the contract value (for that phase) for every 3 calendar days of delay in system commissioning or delay in completion of any of the milestones, up to a maximum of 10% of the O&M estimate of the contract value (for that phase).
- Once the liquidated damages reach the maximum limit, MoRTH may consider terminating the contract and forfeiting the performance security deposit. MoRTH also reserves the right to debar the System Integrator from further participation in MoRTH's subsequent tenders due to its nonperformance for a period it decides.
- Upon termination of the Agreement due to service defaults, MoRTH may allocate the site to any other System Integrator within the 60-day timeframe following the issuance of a termination notice at its sole discretion as per this contract.

In case of delays attributable to a Force Majeure event upon such request from the System Integrator or recommendation from the Operating Committee and TIMS PMU, MoRTH (or its representatives) may, in its sole discretion, consider a suitable extension of time (EOT) without imposing any liquidated damages upon the System Integrator.

- The System Integrator shall submit such a request at least 10 days before the completion schedule/timeline/ milestone. In case of a delay in submitting a request for EOT, the penalty will be applied at 0.5 % of the contract value of that phase per week of delay in submitting the request for EOT.
- Any corrective maintenance and replacement of equipment attributable to a Force Majeure event which entails additional capital expenditure shall be mutually decided based on, schedule of payment, and timelines for such works. SI shall be paid for replacing the damaged equipment on the affected stretch, post adjusting any insurance proceeds received by the SI, and the payment shall be estimated basis based on equipment deployed on such affected stretch as per design document/layout submitted to MoRTH.

- Once the extension of time expires and if the SI fails to remedy defects, MoRTH may consider termination of the contract as per the termination clause and forfeiture of the performance security deposit. MoRTH also reserves the right to debar the System Integrator from further participation in MoRTH's subsequent tenders due to its nonperformance for a period decided by it.

In case of delays attributable to other unforeseen events i.e., theft, vandalism, damage due to accident/mishap, network issues attributable to the ISP (to be determined through investigation by the TIMS PMU and/or Operating Committee) and power shutdown beyond 24 hours, and upon such request from the System Integrator or recommendation from the Operating Committee and TIMS PMU, MoRTH (or its representatives) may, in its sole discretion, consider a suitable extension of time (EOT) without imposing any liquidated damages upon the System Integrator.

- The System Integrator shall submit such a request at least 10 days before the completion schedule / timeline/ milestone. In case of a delay in the submission of a request for EOT, the penalty will be applied at 0.5 % of the contract value of that phase, per week of delay in submission of request for EOT.
- Any corrective maintenance and replacement of equipment attributable to an unforeseen event which entails additional capital expenditure shall be mutually decided based on scope, schedule of payment, and timelines for such works. SI shall be paid for replacing the damaged equipment on the affected stretch after adjusting any insurance proceeds received by the SI, and the payment shall be estimated based on the equipment deployed on such affected stretch as per the design document/layout submitted to MoRTH.
- Once the extension of time expires and if the SI fails to remedy defects, MoRTH may consider termination of the contract as per the termination clause and forfeiture of the performance security deposit. MoRTH also reserves the right to debar the System Integrator from further participation in MoRTH's subsequent tenders due to its nonperformance for a period decided by it.

2.19.3 Non-compliance to Safety Standards at Site

Failure by the System Integrator's personnel in maintaining the safety standards at the site at any time shall attract penalty on every instance noticed by the MoRTH (or its representatives).

- Staff working without safety gears – penalty of INR 10,000 per instance. In case of repeated instance by the same staff member of the System Integrator, the penalty shall be doubled per instance. The System Integrator shall have to replace the repeated offenders / sub-System Integrator (safety lapses more than 3 times) with immediate effect.
- Improper safety measures at site / safety hazard to the commuters due to poor workmanship, etc., / System Integrator's vehicle wrongly parked at site / System Integrator's vehicle moving in wrong direction / working during low visibility hours or at

night time without proper safety measures warning signages and lighting/ improper traffic diversion / non-standard warning signages etc. / unauthorized lane closure / traffic rule violation – minimum penalty of INR 1,00,000 per instance shall be imposed on recommendation of the MoRTH (or its representatives). In case of repeated instance, the penalty shall be doubled per instance. The System Integrator shall have to replace the repeated offenders / sub-System Integrator (safety lapses more than 2 times) with immediate effect. MoRTH or its representatives shall reserve the right to take legal action against the errant staff / sub-System Integrator of the System Integrator, as such safety lapses may lead to major safety concern / hazard for the road users as well as the workers.

2.19.4 Penalty for Delay in Staff Mobilization

Delay in submission of detailed written statements and/or mobilization of aforesaid Key Personnel shall attract penalty @ INR 10,000/- (Rupees Ten Thousand) per day per Key Personnel. In case the delay is more than 3 weeks, MoRTH reserves the right to invoke the Bid Securing Declaration and PBG towards the aforesaid penalty and may proceed with the revocation of LOA or termination of the project, as the case may be.

2.19.5 Other Penalties

The Service Provider would be penalized for non-compliance of scope for Operations as well as Maintenance of the Project. Any penalty levied by MoRTH or MoRTH's representative shall be applicable and deducted from the monthly payable amount. The Service Provider should enable and facilitate continuous measurement of all-round performance of the VIDS System and not just event-based performance. The penalties are detailed here under:

For non-availability of video recording of any accident/ incident/ violation/ vehicle / vehicle identification etc., the penalty shall be imposed as follows:

S.No.	Penalty per instance (in INR) per location	Non-availability of any accident/ incident/ violation/ vehicle etc. in a month (in numbers)
1.	1,00,000	First 5 instances
2.	2,00,000	6 to 10 instances
3.	3,00,000	11 to 15 instances
4.	5,00,000	16 to 20 instances

Further, MoRTH may consider termination of TIMS Contract and forfeiture of performance bank guarantee, in case of any non-availability of video feed of 21 or more events during any month.

2.20 Payments

2.20.1 Contract Price

i. MoRTH shall make payments to the Contractor on the basis of the lump sum price quoted by the bidder and accepted by the Authority in consideration of the obligations specified in this Agreement for an amount of INR … … … … (INR) (the "Contract Price"), which shall be paid as per the Scheduled Milestone.

ii. Except for the Goods and Service Tax (GST), the Contract Price includes all duties, taxes, royalty, cess, charges, and fees that may be levied in accordance with the laws and regulations in force. The GST shall be paid extra upon submitting the proof of deposition.

iii. Unless otherwise stated in this Agreement, the Contract Price covers all the Contractor's obligations for the Works under this Agreement and all things necessary for the Construction, Operation and Maintenance and the remedying of any Defects in the TIMS.

2.20.2 Payment Schedule

The payment will be disbursed on a pro-rata basis for each quarter with 50% of payment after implementation for each phase (i.e., on Go-live) and 50% of payment over the Operation & Maintenance period for that phase. Operation & Maintenance phase to run from go-live for each phase till the end of the 6-year contract period. The payment schedule shall be as follows –

1. Phase-1 (indicative value of 20% of the entire project value)
   a) Go-live phase – 50% of Phase 1 value
   b) Operation & Maintenance – 50% of Phase 1 value

2. Phase-2 (indicative value of 35% of the entire project value)
   a) Go-live phase – 50% of Phase 2 value
   b) Operation & Maintenance – 50% of Phase 2 value

3. Phase-3 (indicative value of 45% of the entire project value)
   a) Go-live Phase – 50% of Phase 3 value
   b) Operation & Maintenance – 50% of Phase 3 value

Contract value for O&M to be disbursed in quarterly installments over the O&M period. The final timelines for implementation and share of phase-wise works shall be aligned with the MoRTH appointed TIMS PMU, and the Operating Committee and be approved by the Governance and Steering Committee.

2.21 Change Management and Control

2.21.1 Change Orders / Alterations / Variations

- SI agrees that the requirements given in the Bidding Documents are minimum requirements and are only indicative. The vendor would need to etch out the details at the time of preparing the design document prior to actual implementation. It shall be the responsibility of SI to meet all the requirements of technical specifications contained in the Contract and any upward revisions and/or additions of quantities,

specifications sizes given in the Bidding Documents required to be made during execution of the works, shall not constitute a change order and shall be carried out without a change order and shall be carried out without any time and cost effect to MoRTH.

- Further upward revisions and or additions required to make SI's selected equipment and installation procedures to meet Bidding Documents requirements expressed and to make entire facilities safe, operable and as per specified codes and standards shall not constitute a change order and shall be carried out without any time and cost effect to MoRTH.

- Any upward revision and/or additions consequent to errors, omissions, ambiguities, discrepancies in the Bidding Documents which SI had not brought out to the MoRTH's notice in his bid shall not constitute a change order and such upward revisions and/or addition shall be carried out by SI without any time and cost effect to MoRTH.

2.21.2 Change Order

- The Change Order will be initiated only in case (i) MoRTH / Governing Committee directs in writing SI to include any addition to the scope of work covered under this Contract or delete any part of the scope of the work under the Contract, (ii) SI requests to delete any part of the work which will not adversely affect the operational capabilities of the facilities and if the deletions proposed are agreed to by MoRTH and for which cost and time benefits shall be passed on to MoRTH, (iii) MoRTH directs in writing SI to incorporate changes or additions to the technical specifications already covered in the Contract.
- Any changes required by MoRTH over and above the minimum requirements given in the specifications and drawings etc. included in the Bidding Documents before giving its approval to detailed design or Engineering requirements for complying with technical specifications and changes required to ensure systems compatibility and reliability for safe operation (As per codes, standards and recommended practices referred in the Bidding Documents) and trouble free operation shall not be construed to be change in the Scope of work under the Contract.
- Any change order comprising an alteration which involves change in the cost of the works (which sort of alteration is hereinafter called a "Variation") shall be mutually decided basis scope, cost, schedule of payment, and timelines to be carried out by the SI.
- Any change order shall be duly approved by MoRTH in writing.
- Within ten (10) working days of receiving the comments from MoRTH or the drawings, specification, purchase requisitions and other documents submitted by SI for approval, SI shall respond in writing, which item(s) of the Comments is/are potential changes(s) and shall advise a date by which change order (if applicable) will be submitted to MoRTH.

2.22 Project Administration

The MoRTH designates CE-RO, Dehradun, MoRTH as its coordinator, who will be responsible for the coordination of activities under this Contract Agreement, for acceptance and finalisation of the services and of other deliverables by MoRTH and for receiving and approving invoices for the payment. MoRTH may appoint Supervision Consultant to act on its behalf.

2.23 Fraud and Corruption

2.23.1 Definition

It is MoRTH's policy that MoRTH as well as Contractors observe the highest standard of ethics during the selection and execution of such contracts. In pursuance of this policy, MoRTH defines, for the purpose of this provision, the terms set forth below as follows:

i. "corrupt practice" means the offering, receiving, or soliciting, directly or indirectly, of anything of value to influence the action of a public official in the selection process or in contract execution;

ii. "fraudulent practice" means a misrepresentation or omission of facts in order to influence a procurement process or execution of a contract with MoRTH; and includes collusive practice among bidders, prior to or after bid submission, designed to establish bid prices at artificially high or non-competitive levels and to deprive MoRTH of the benefits of free and open competition;

iii. "collusive practices" means a scheme or arrangement between two or more bidders, with or without the knowledge of MoRTH, designed to establish prices at artificial, non- competitive levels;

iv. "coercive practices" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in a procurement process, or affect the execution of a contract;

v. "unfair trade practices" means supply of services different from what is ordered on, or change in the Scope of Work which was not agreed to; and

vi. "restrictive practices" means forming a cartel or arriving at any understanding or arrangement among bidder(s) with the objective of restricting or manipulating a full and fair competition in the bidding process.

2.23.2 Measures to be Taken by MoRTH

i. MoRTH may terminate the contract if it determines at any time that representatives of the Contractor were engaged in corrupt, fraudulent, collusive or coercive practices during the selection process or the execution of that contract, without the Contractor having taken timely and appropriate action satisfactory to MoRTH to remedy the situation;

ii. MoRTH may also sanction against the Contractor, including blacklisting / declaring the Contractor ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that the Contractor has, directly or through an agent, engaged in corrupt, fraudulent, collusive or coercive practices in competing for, or in executing, a contract with MoRTH.

2.24 Confidentiality of the Assignment/Findings

The Contractor shall not, during the term of this Contract Agreement and within three years after its expiration or termination, disclose or permit to be disclosed any proprietary or confidential information relating to the services, this Contract Agreement or the MoRTH's business or operations without the prior written consent of MoRTH to any third party other than its agents, consultants, or subcontractors who need to know in connection with the purpose for which it was disclosed and who are bound to preserve the confidentiality thereof, to any person outside its organization, any Proprietary Information. The Contractor and its personnel shall use such Proprietary Information only for the purpose for which it was disclosed and shall not use or exploit such Proprietary Information for its own benefit or the benefit of another without the prior written consent of the MoRTH. Without limitation of the foregoing, Contractor shall not cause or permit reverse engineering of any Proprietary Information or recompilation or disassembly of any information or software programs which are part of the Proprietary Information received by it under this Contract Agreement. For the purposes of this Contract Agreement Proprietary information shall include but not be limited to terms of this Contract Agreement, strategies, official secrets, actual and anticipated research, developments or plans, services, software, source codes, inventions, processes, discoveries, formulas, architectures, concepts, ideas, designs, drawings, personnel, financial information, demonstrations, operations, records, assets, technology, data and information derived whether existing or derived / analysed out of the information made available to the Contractor in form of raw data or reports, in any form whatsoever. The Contractor alone shall be responsible to ensure the maintenance of confidentiality as contemplated above and shall be responsible to employ sufficient measures to prevent any unauthorised access of the Proprietary information.

2.25 Insurance cover to be maintained

i. The Contractor shall ensure to maintain proper insurance coverage of all the equipment, materials, establishment against fire, theft, vandalism or any other perceived risk(s) / natural disaster etc during the entire duration of the contract period.

ii. In addition to material and equipment, the Contractor shall also ensure to have adequate insurance for all its personal working/ deployed under this Contract Agreement. The insurance shall also fully cover the personnel / workers / labourers of sub-contractors. In case any worker / labourer claim is not covered by the insurance company, the Contractor shall be responsible for covering the entire expenses for medical, transportation, wages, compensation etc. of the personnel in case of any incident / accident/ mishap / death, etc. Suitable compensation shall be paid by the Contractor to the personnel deployed at the project in case of any

incident / accident/ mishap / death, etc. if any happened on the site/ project or in transit, irrespective of the reason. Hence the insurance policy shall be comprehensive and shall cover all types of risks and compensation.

iii. The Contractor shall indemnify MoRTH against any damage/ loss of property or personnel of Contractor working on any site under this Contract Agreement.

iv. The Contractor shall submit the copy of insurance policies to MoRTH within 15 days of issuance of LOA renewal policy within 15 days of the expiry of the policy till the end of the Contract period. Penalty of INR 10,000 shall be levied on the Contractor for delay of each working day from the due day of submission / expiry of the insurance policy documents.

2.26 Labour Laws

a) The Contractor shall obtain all relevant labour registrations and comply with all relevant labour laws applying to its employees, and shall duly pay them and afford to them all their legal rights.
b) The Contractor shall make all deductions of tax at source and all contributions to the Payment of Gratuity, Provident Fund (including Employees' contribution) and Employees' State Insurance Scheme as may be required by Applicable Laws and deposit the aforesaid contributed amount with the appropriate authority/(s).
c) The Contractor shall require all personnel engaged in the Works to obey all Applicable Laws and regulations. The Contractor shall permit Authority to witness labour payments for the Contractors direct labour, or the Subcontractors labour. The Contractor shall ensure that all its Sub-contractors strictly comply with all labour laws.
d) Documentary evidence confirming the above compliance, as may be required from time to time, shall be provided to the MoRTH's Representative.
e) MoRTH shall not be liable for any delay/default of the Contractor in compliance of the labour laws

2.27 No partnership

This Contract Agreement shall not be interpreted or construed to create an association, joint venture or partnership between the Parties, or to impose any partnership obligation or liability upon either Party and neither Party shall have any right, power or authority to enter into any agreement or undertaking for, or act on behalf of, or to act as an agent or representative of, or to otherwise bind, the other Party.

2.28 Trademarks, Publicity

Neither Party may use the trademarks of the other Party without the prior written consent of the other Party. Neither Party shall publish nor did permit to be publish either along with or in conjunction with any other person any press release, information, article, photograph, illustration or any other material of whatever kind relating to this Agreement, the SLA or the business of the Parties without prior reference to and approval in writing from the other Party.

2.29 Data and Equipment Ownership

All the data created as the part of the project would be owned by MoRTH and System Integrator. The System Integrator shall take utmost care in maintaining security, confidentiality and backup of this data. The System Integrator, however, has the right to use the data to fulfil its obligations under this contract and otherwise to improve operations, but cannot use it for other purposes.

Infrastructure deployed along with any other hardware equipment, customized software, firmware, and licenses deployed for the purpose of the scope of works of this Contract shall be passed on to MoRTH at the end of the contract, and the Authority shall continue to operate and maintain the system.

2.30 Force Majeure

For the purpose of this Contract the expression "Force Majeure" or "Force Majeure Event" includes any act, event or circumstance, or combination of acts, events or circumstances, which may affect the affected Party's performance of its obligations pursuant to the terms of this Contract, but only if and to the extent that such acts, events or circumstances are not within the affected Party's reasonable control, were not reasonably foreseeable and could not have been prevented or overcome by the affected Party through the exercise of reason able skill or care.

Any act, event, circumstance or combination thereof meeting the description of Force Majeure that has the same effect upon the performance of the System Integrator which directly, materially and adversely affects the performance by MoRTH or the System Integrator of its obligations in whole or in part under this Contract shall constitute Force Majeure with respect to the MoRTH or the System Integrator respectively.

The Force Majeure Event shall comprise the acts, events and circumstances, such as

- act of war, invasion, armed conflict or act of foreign enemy, blockade, embargo, revolution, riot insurrection, civil commotion, act of terrorism or sabotage, in each case occurring inside or directly involving India;
- strikes or lockouts occurring within India or at the Site as part of a nation-wide, industry, wide or state-wide strike or local strike, or lock out (excluding such events which are Site specific and attributable to the System Integrator);
- radioactive contamination or ionizing radiation or chemical contamination specifically affecting the Facility or resulting from another Force Majeure Event;
- Flood, Landslides, Cyclone, Lightning, Earthquake, Drought, Storm, Pandemic, Epidemics, Lockdown/Shutdown Restrictions, Quarantine Restrictions;
- any action by competent governmental instrumentality having jurisdiction over the Project, MoRTH or the System Integrator resulting in a loss of access to the Site;
- an act of God
- any other act or event or circumstance of an analogous nature.
- any state/national govt order interrupting day to day operations or any other extreme effect of the natural elements

2.31 Exceptions to Force Majeure

Notwithstanding the foregoing, Force Majeure shall not include:

- any delay, default or failure (direct or indirect) by the System Integrator in any agreement entered by it; and
- any act, event, or occurrence resulting in financial hardship, including any delay or rejection of an insurance claim, shall not constitute a Force Majeure Event.

2.32 Effect of Force Majeure Event

Neither MoRTH nor the System Integrator shall be considered in default or in contractual breach to the extent that performance of obligations is prevented by a Force Majeure Event, which arises after the Effective Date. An extension of time to the Construction Date shall be agreed upon by the Parties, provided the System Integrator proves to MoRTH that;

- The execution of Works is actually and necessarily delayed by an Force Majeure Event; and
- The effect of such Force Majeure Event could not have been prevented or avoided or removed despite exercise of reasonable due diligence whether before, after or during the Force Majeure Event
- Also, in the event of Force Majeure, System integrator agrees to MoRTH deferring the payments for the Force Majeure period provided MoRTH agrees to pay the deferred amount immediately after the Force Majeure period is over.

2.33 Excused Performance

If either Party is prevented from rendering performance of its obligations, whether wholly or partially under this Contract for reasons of a Force Majeure Event, then that Party will be excused from the performance so affected by the Force Majeure Event to the extent so affected provided that:

- The affected Party gives the other Party written notice of the occurrence of the Force Majeure Event as soon as practicable and in any event within 15 (fifteen) Days from the date of occurrence of the Force Majeure Event, giving full particulars of such occurrence, including an estimation of its expected duration, impact on the performance of such Party's obligations here under, and thereafter continues to furnish there to timely regular reports with respect to continuation of the Force Majeure Event and measures which the affected Party has taken or proposes to take to mitigate the impact of the Force Majeure Event and to resume performance of such of its obligations affected thereby and the Completion Date shall be suitably extended.

- The suspension of performance shall be of no greater scope and of no longer duration than is reasonably required by the Force Majeure Event.

- Upon the occurrence of any circumstances of Force Majeure Event, the System Integrator shall use all reasonable endeavors to continue to perform its obligations under the Contract and to minimize the adverse effects of such circumstances. The System Integrator shall also use all reasonable means and best endeavors to ensure that the loss caused by the Force Majeure Event is minimized as far as possible.

- An event of Force Majeure does not relieve a Party from liability for an obligation which arose before the occurrence of that event.

2.34 Dispute Resolution

- Any dispute or difference whatsoever arising between the parties and of or relating to the construction, interpretation, application, meaning, scope, operation or effect of this Contract Agreement or the validity or the breach thereof, shall be referred to the Society for Affordable Resolution of Disputes (SAROD) and the award made in pursuance thereof shall be final and binding on the parties subject to Provisions of The Arbitration and Conciliation Act, 1996.

- This Contract Agreement shall be governed by, and construed in accordance with, the laws of India and courts at New Delhi / Nainital shall have exclusive jurisdiction over all disputes arising under, pursuant to and/or in connection with this Contract Agreement.

2.35 Events of default by the Contractor

The failure on the part of the System Integrator to perform any of its obligations or comply with any of the terms of this Contract shall constitute an Event of Default on the part of the System Integrator. The events of default as mentioned above may include inter-alia of the following:

- When the System Integrator does not adhere to 'Go-Live' in the committed timeline for each of the phases, in spite of a written notice from MoRTH.
- When there is a critical breach on the scope and even after 2 months of MoRTH providing a written notice to the System Integrator, the critical breach has not been rectified.
- The Contractor's Team has failed to demonstrate or sustain any representation or warranty made by it in this Contract, with respect to any of the terms of its Bid, the Tender, and this Contract.
- There is a proceeding for bankruptcy, insolvency, winding up or there is an appointment of receiver, liquidator, assignee, or similar official against or in relation to the System Integrator.
- The Contractor's team has failed to comply with or is in breach or contravention of any applicable laws.
- The Contractor's team are involved in fraud/willful misconduct.

2.36 Consequences of Default

Where an Event of Default subsists or remains uncured then MoRTH shall be entitled to:

- Impose any such obligations and conditions and issue any clarifications as may be necessary to inter alia ensure smooth continuation of project and the Services which the System Integrator shall be obliged to comply with. The System Integrator shall in addition take all available steps to minimize loss resulting from such event of default.

- Where there has been an occurrence of such defaults inter alia as stated above, the MoRTH shall issue a notice of default to the System Integrato, setting out specific defaults / deviances / omissions / non-compliances / non-performances and providing a notice of Sixty (60) days to enable such defaulting party to remedy the default committed.

2.37 Termination

If the System Integrator fails to carry out any obligation under the Contract, Governance and Steering Committee/MoRTH may notify the System Integrator to rectify the failure and to remedy it within the timelines defined under Section 6 "Service Level Agreements and Penalties".

Governance and Steering Committee/MoRTH is entitled to terminate the System Integrator at any time, a portion or part of the work thereof, with a written notice of termination. Such notice of termination shall be effective after a period of 60 days from the date of receipt of notice by the System Integrator. System Integrator shall be terminated if:

- The System Integrator fails to complete the entire work before the scheduled completion date or the extended date;
- The System Integrator has insolvency, receivership, reorganization, bankruptcy, or proceedings of a similar nature brought against it and the proceedings are not dismissed or effectively stayed within 30 (thirty) days of such commencement;
- The System Integrator does not maintain a valid instrument of Performance Security (and additional performance security, if any), as prescribed;
- Any of the default points covered under Section 6, "Service Level Agreements and Penalties" come into existence;
- Any of the Contract clauses are not implemented and in case of nonadherence of implementation within the timelines.

In case the project is terminated, the System Integrator is entitled to receive all outstanding payments according to the payment terms outlined in this Contract, subject to Service Level Agreements and Penalties.

The terminated system integrator must forfeit any infrastructure deployed along with any other hardware equipment, customized software, firmware, and licenses deployed for the purpose of the scope of works of this Contract and transfer complete ownership to MoRTH immediately.

All Intellectual Property of the Contractor existing before the date of signing of the agreement shall continue to vest with them.

The SI shall be responsible for continuing the maintenance as per the scope of the contract during the Termination period of 60 days as per the SLAs.

MoRTH is entitled to impose any such obligations and conditions and issue any clarifications as may be necessary to ensure an efficient transition and effective continuity of the services. System Integrator is obligated to comply with these requirements and undertake all measures to mitigate losses stemming from the termination. The System Integrator shall extend full cooperation and assistance to MoRTH and/or the subsequent vendor, as required, for the continued execution of contractual obligations.

Within the 60-day timeframe following the issuance of a termination notice, MoRTH may allocate the site to any other System Integrator at its sole discretion and forfeit the Performance Security Deposit of defaulting System Integrator.

If the Termination of the Project is at the discretion of MoRTH and due to any reasons not attributable to the System Integrator, then the System Integrator shall be entitled to get all payments due as per the Payment Terms of this Contract. In Addition, the SI shall be entitled to get compensated for the CapEX deployed. The value of the CapEX deployed will be assessed by TIMS PMU in line with estimates made by Operating Committee, and any additional amount shall be paid to the SI.

The System Integrator acknowledges that the said compensation shall be a reasonable estimation of loss suffered due to such termination. Pursuant to payment of such compensation, the System Integrator shall have no further claim against MoRTH w.r.t. this Contract Agreement.

Termination due to Force Majeure Event

- In case a Force Majeure event affecting any Party subsists for a continuous period of 180 (one hundred eighty) days, then either Party may issue a notice of termination to the other Party. Upon receipt of this notice, the Parties shall have a period of 15 (fifteen) Days to agree on the manner in which the Contract may be progressed upon cessation of the Force Majeure event and the variations, if any, required to the Contract to address the consequences of the Force Majeure event. If on the expiry of the 15(fifteen) Day period, the Parties fail to arrive at an agreement, either Party may immediately terminate this Contract by written notice to the other Party.

- Notwithstanding anything to the contrary in this Contract, in case of occurrence of a Force Majeure event which affects one or more parts of the project but not the entire Contract, the Contract may be partially terminated with respect to the affected parts by such Force Majeure event. Such partial termination shall not impact the validity of the Contract or the obligations of the System Integrator with regard to the parts that are not affected by the Force Majeure event.

2.38 Extension of timelines

Without prejudice to any other provision of this Agreement for and in respect of extension of time, the System Integrator shall be entitled to extension of time in the Project Completion

Schedule (the "Time Extension") to the extent that completion of any Project Milestone is or will be delayed by any of the following, namely:

a) delay in providing the stretch by the Authority for installation of TIMS;
b) Change of Scope;
c) occurrence of a Force Majeure Event; and;
d) any delay, impediment or prevention caused by or attributable to the Authority, the Authority's personnel or the Authority's other contractors on the Site.

The System Integrator shall, no later than 15 (fifteen) business days from the occurrence of an event or circumstance specified above, inform the TIMS PMU by notice in writing, with a copy to the Authority, stating in reasonable detail with supporting particulars, the event or circumstances giving rise to the claim for Time Extension in accordance with the provisions of this Agreement. Provided that the period of 15 (fifteen) business days shall be calculated from the date on which the System Integrator became aware, or should have become aware, of the occurrence of such an event or circumstance. Provided further that notwithstanding anything to the contrary contained in this Agreement, Time Extension shall be due and applicable only for the Works which are affected by the aforesaid events or circumstances and shall not in any manner affect the Project Completion Schedule for and in respect of the Works which are not affected hereunder.

On the failure of the System Integrator to issue to the TIMS PMU a notice within the time specified above, the System Integrator shall not be entitled to any Time Extension and shall forfeit its right for any such claims in future. For the avoidance of doubt, in the event of failure of the System Integrator to issue notice, the Authority shall be discharged from all liability in connection with the claim.

The TIMS PMU shall, examine the claim expeditiously within the time frame specified herein. In the event the TIMS PMU requires any clarifications to examine the claim, It shall seek the same within 15 (fifteen) days from the date of receiving the claim. The System Integrator shall, on receipt of the communication of the TIMS PMU requesting for clarification, furnish the same within 10 (ten) days thereof. The TIMS PMU shall, within a period of 30 (thirty) days from the date of receipt of such clarifications, forward in writing to the System Integrator its determination of Time Extension. Provided that when determining each extension of time under this Clause, the TIMS PMU shall review previous determinations and may increase, but shall not decrease, the total Time Extension.

If the event or circumstance giving rise to the notice has a continuing effect:

i. a fully detailed claim shall be considered as interim;
ii. the System Integrator shall, no later than 10 (ten) days after the close of each month, send further interim claims specifying the accumulated delay, the extension of time claimed, and such further particulars as the TIMS PMU may reasonably require; and
iii. the System Integrator shall send a final claim within 30 (thirty) days after the effect of the event or the circumstance ceases. Upon receipt of the claim hereunder, the TIMS PMU shall examine the same within a period of 30 (thirty) days of the receipt thereof

2.39 Extension of Contract

MoRTH, at sole discretion, may extend this contract for another two years beyond the current term, subject to satisfactory services and continued requirement of MoRTH. MoRTH reserves the right to extend this contract at commercial rates mutually agreed at the time of such extension.

2.40 Risk and Cost

In case the System Integrator fails to deliver the services under this contract as stipulated in the delivery schedule, MoRTH reserves the right to terminate the contract along with forfeiture of the Performance Security Deposit.

2.41 Sub-contract

- The System Integrator, whether Joint Venture or sole, shall not sub-contract any Works in more than 49% of the Contract Price and shall carry out Works directly under its own supervision and through its own personnel and equipment in at least 51% of the Contract Price. Procurement of any equipment such as cameras and manpower deployed for the purpose of execution of the project shall not be in scope of sub-contracting. The Parties further agree that all obligations and liabilities under this Agreement for the entire project shall at all times remain with the System Integrator.
- In the event any sub-contract for Works, or the aggregate of such sub-contracts with any Sub-contractor, exceeds 5% (five percent) of the Contract Price, the System Integrator shall communicate the name and particulars, including the relevant experience of the Sub-contractor, to the Governance and Steering Committee prior to entering into any such sub-contract. The Committee shall examine the particulars of the Sub- contractor from the national security and public interest perspective and may require the System Integrator, no later than 15 (fifteen) business days from the date of receiving the communication from the System Integrator, not to proceed with the sub-contract, and the System Integrator shall comply therewith.
- In the event any sub-contract for works exceeds 5% and relates to a Sub- contractor who has, over the preceding 3 (three) years, not undertaken at least one work of a similar nature with a contract value exceeding 40% (forty per cent) of the value of the sub-contract to be awarded hereunder, and received payments in respect thereof for an amount equal to at least such 40% (forty per cent), the Committee may, no later than 15 (fifteen) business days from the date of receiving the communication from the System Integrator, require the System Integrator not to proceed with such sub-contract, and the System Integrator shall comply therewith without delay or demur.

- It is expressly agreed that the System Integrator shall, at all times, be responsible and liable for all its obligations under this Agreement notwithstanding anything contained in the agreements with its Sub-contractors or any other agreement that may be entered into by the System Integrator, and no default under any such agreement shall excuse the System Integrator from its obligations or liability under this Agreement. However,

in case of non-compliance of the System Integrator towards his obligations for payments to the approved Sub-contractor(s), which is likely to affect the progress of works, the authority reserves the right to intervene and direct the System Integrator to release such outstanding payments to approved Sub-contractor(s) out of the payments due for the completed Works in the interest of work.

2.42 Change in Law

- If as a result of Change in Law, the System Integrator suffers any additional costs in the execution of the Works or in relation to the performance of its other obligations under this Agreement, the System Integrator shall, within 15 (fifteen) days from the date it becomes reasonably aware of such addition in cost, notify the Authority with a copy to the TIMS PMU and Operating Committee of such additional cost due to Change in Law.
- If as a result of Change in Law, the System Integrator benefits from any reduction in costs for the execution of this Agreement or in accordance with the provisions of this Agreement, either Party shall, within 15 (fifteen) days from the date it becomes reasonably aware of such reduction in cost, notify the other Party with a copy to the TIMS PMU and Operating Committee of such reduction in cost due to Change in Law.
- The TIMS PMU and Operating Committee shall, within 15 (fifteen) days from the date of receipt of the notice from the System Integrator or the Authority, determine any addition or reduction to the Contract Price, as the case may be, due to the Change in Law.

"Change in Law" means the occurrence of any of the following after the Bid Due Date:

- The enactment of any new Indian law;
- The repeal, modification or re-enactment of any existing Indian law;
- The commencement of any Indian law which has not come into effect until the Bid Due Date; or
- A change in the interpretation or application of any Indian law by a judgement of a court of record which has become final, conclusive and binding, as compared to such interpretation or application by a court of record prior to the Bid Due Date.

2.43 Limitation of Liability

- Neither Party shall be liable to the other Party for loss of use of any Works, loss of profit, loss of any contract or for any indirect or consequential loss or damage which may be suffered by the other Party in connection with this Agreement, save and except as provided under the Temination Clause.

- The total liability of one Party to the other Party under and in accordance with the provisions of this Agreement, save and except as provided in the Termination Clause, shall not exceed the Contract Price. For the avoidance of doubt, this Clause shall not limit the liability in any case of fraud, deliberate default or reckless misconduct by the defaulting Party.

2.44 Survival of rights

Notwithstanding anything to the contrary contained in this Contract Agreement, any Termination pursuant to the provisions of this Contract Agreement shall be without prejudice to the accrued rights of either Party including its right to claim and recover money damages, security deposits, and other rights and remedies which it may have in law or contract.

2.45 Indemnification

a) The Contractor shall indemnify, defend, save and hold harmless, MoRTH and its Officers, Agents, Engineer, against any direct loss, damage, claims, cost and expense of whatever kind and nature (including without limitation, legal fees, claims and expenses incurred in connection with any suit, action or proceeding or any claim asserted, such as fees and expenses incurred), joint or several, that arise out of or are based upon any order passed by any statutory authority including courts, tribunals or other judicial/ quasi – judicial authorities, on account of breach of the Contractor's obligations under this Contract Agreement or any other related agreement or otherwise, any fraud or negligence attributable to the Contractor or its Agents or Sub-Contractors, under contract or tort or on any other ground whatsoever, all eventualities of theft, dacoity, robbery, etc., except to the extent that any such suits, proceedings, actions, demands and claims has arisen due to any breach or default of this Contract Agreement on the part of MoRTH.
b) The Contractor shall indemnify MoRTH of all legal obligations of its professionals deployed. MoRTH also stand absolved of any liability on account of death or injury sustained by the Contractor's staff during the performance of their work and also for any damages or compensation due to any dispute between the Contractor and its staff.
c) The remedies provided under this Article are not exclusive and shall not limit any rights or remedies that may otherwise be available to MoRTH Indemnified Party at law or in equity.
d) The provisions of this Article shall survive Termination

2.46 Representation and warranties of the Contractor

The Contractor declares, represents, and warrants as follows:

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 this Contract Agreement and to carry out the works and provide services contemplated hereby;
2. It has taken all necessary corporate actions under Applicable Laws to authorize the execution and delivery of this Contract Agreement and to validly exercise its rights and perform its obligations under this Contract Agreement;
3. It has obtained all necessary internal/external approvals, registrations and certifications required from relevant authorities and other entities for fulfilling its obligations as set out in this Contract Agreement;

4. It has not violated any of the conditions subject to which such approvals, registrations and certifications have been granted or any other applicable regulations and / or guidelines or directives or statutes;
5. It shall ensure that such approvals, registrations and certifications will remain in force, including, by taking prompt steps for timely renewal of the same;
6. It undertakes to continue to comply with all Applicable Laws with respect to its roles / obligations under this Contract Agreement;
7. There are no actions, suits, proceedings, or investigations pending before any court or before any other judicial, quasi- judicial or other authority, the outcome of which may result in the breach of this Contract Agreement or which individually or in the aggregate may result in any material impairment of its ability to perform any of its obligations under this Contract Agreement;
8. No representation or warranty by the Contractor contained herein or in any other document furnished by it to MoRTH in relation to Applicable Laws contains or will contain any untrue or misleading statement of material fact or omits or will omit to state a material fact necessary to make such representation or warranty not misleading;
9. No sums, in cash or kind, have been paid or will be paid, by or on behalf of the Contractor, to any person by way of fees, commission or otherwise for securing the award of this Contract Agreement or for entering into this Contract Agreement or for influencing or attempting to influence any officer or employee of MoRTH in connection therewith.

2.47 Compensation for default by the Contractor

1. In the event of the Contractor being in breach of this Contract Agreement, unless such default or delay is on account of Force Majeure or through no fault of the Contractor, the Contractor shall pay to MoRTH, all direct costs suffered or incurred by MoRTH as a consequence of such breach, within 30 days of receipt of the demand supported by necessary particulars thereof.

2. The Contractor shall pay to MoRTH all direct costs suffered or incurred by MoRTH incurred as a result of any and all losses, claims, damages and liabilities (including, without limitation, legal fees and other expenses incurred in connection with any suit, action or proceeding or any claim asserted, such as fees and expenses incurred), joint or several, that arise out of, or based upon:

    a. any untrue statement or misrepresentation of a material fact provided by the Contractor or an omission to state a material fact required to be communicated;

    b. any non-performance or breach of the roles, responsibilities, representations, warranties, undertakings and declarations contained herein by the Contractor or its directors, employees, personnel or representatives.

c. negligence, fraud or misconduct of the Contractor or any of its employees, agents, affiliates or advisors.

2.48 Completion Certificate

2.48.1 Tests on Phase Completion

1. At least 30 (thirty) days before the likely completion of the Go-live Stage for each Phase of the Project, the System Integrator shall notify the Authority of its intent to subject the TIMS Equipment to Tests. The date and time of each of the Tests shall be determined by the TIMS PMU in consultation with the System Integrator, and notified to the Authority who may designate its representative to witness the Tests. The System Integrator shall either conduct the Tests as directed by the TIMS PMU/Authority or provide such assistance as the TIMS PMU may reasonably require for conducting the Tests. In the event of the System Integrator and the TIMS PMU failing to mutually agree on the dates for conducting the Tests, the System Integrator shall fix the dates by giving not less than 10 (ten) days' notice to the TIMS PMU.

2. The TIMS PMU shall either conduct or observe, monitor, and review the Tests conducted by the System Integrator, as the case may be, and review the results of the Tests to determine compliance of the TIMS, with Specifications and Standards and if it is reasonably anticipated or determined by the Authority or its representatives during the course of any Test that the performance of the TIMS does not meet the Specifications and Standards, it shall have the right to suspend or delay such Test and require the System Integrator to remedy and rectify the Defect or deficiencies. Upon completion of each Test, the TIMS PMU shall provide to the System Integrator and the Authority copies of all Test data including detailed Test results. For the avoidance of doubt, it is expressly agreed that the TIMS PMU may require the System Integrator to carry out or cause to be carried out additional Tests, in accordance with Good Industry Practice, for determining the compliance of the TIMS with the Specifications and Standards.

2.48.2 Completion Certificate

1. Upon completion of each phase of TIMS, and the TIMS PMU determining the Tests to be successful and after the receipt of notarized true copies of the certificate(s) of insurance, copies of insurance policies, and premium payment receipts in respect of insurance, it shall, at the request of the System Integrator forthwith issue to the System Integrator and the Authority a Completion Certificate for that phase of the project.

2. Upon receiving the Completion Certificate, the System Integrator shall remove its materials, debris, and temporary works from the Site within a period of 30 (thirty)

days thereof, failing which the Authority may remove or cause to be removed, such materials, debris and temporary works and recover from the System Integrator an amount equal to 120% (one hundred and twenty per cent) of the actual cost of removal incurred by the Authority.

3. Without prejudice to the obligations of the System Integrator, the property and ownership of TIMS shall vest in the Authority.

2.48.3 Rescheduling of Tests

If the TIMS PMU certifies to the Authority and the System Integrator that it is unable to issue the Completion Certificate, as the case may be, because of events or circumstances on account of which the Tests could not be held or had to be suspended, the System Integrator shall be entitled to re-schedule the Tests and hold the same as soon as reasonably practicable.

SCHEDULE A

Site of the Project

The implementation plan, in proposed chronological order, across highway stretches with approximate highway lengths is as follows:

1. **Phase 1 (142 Km) –**

a. NH 7 Rishikesh-Rudraprayag 142 Km

2. **Phase 2 (258 Km) –**

a. NH 34 Rishikesh-Uttarkashi 120 Km
b. NH 7 Rudraprayag-Mana 138 km

3. **Phase 3 (434 Km) –**

a. SH 15 Uttarkashi-Ghansali-Tilwara 171 Km
b. NH 107 Rudraprayag-Kedarnath 76 Km
c. NH 134 Dharasu-Yamunotri 76 Km
d. NH 34 Uttarkashi-Gangotri 111 Km

The system Integrator shall be responsible for the O&M of TIMS for the above sites till the completion of six years from the effective date of this contract.

SCHEDULE B

1. Development of the TIMS Project

Development of the TIMS Project shall include design, development, implementation, operation, and maintenance of a Traffic Incident Management System (TIMS) on the Chardham Mahamarg.

2. Description of the TIMS Project

MoRTH has envisaged to install a comprehensive system to detect and respond to any traffic incidents in a timely and effective manner. Said traffic incidents may include accidents, congestion, and roadblocks due to reasons including but not limited to natural disasters.

The TIMS shall consist of appropriate surveillance technology and integrated Command Centers set up to be maintained and operated by the System Integrator. The TIMS system envisaged is to make use of intelligent transportation systems as an effective tool to enhance road/user/commuter safety via early detection of incidents and initiating emergency response including medical, traffic management, etc. as defined in the Annex-I to this Schedule B.

3. Specifications and Standards

The TIMS Project shall be designed and constructed in conformity with the as per the functional and indicative technical specifications mentioned in Schedule C.

Annex-I to Schedule B

1. Traffic Incident Management System

The System Integrator is required to Design, Supply, Install, Test, Commission and Operate and Maintain the Traffic Incident Management System (TIMS) for Chardham Mahamarg. The Traffic Incident Management System (TIMS) shall be provided as per functional and indicative technical specifications specified in the Schedule-C and shall be operated and maintained throughout the contract period.

The TIMS components to be deployed shall inter alia include:

1.1. General

The TIMS Project shall broadly include the following components to be provided as per the functional and indicative technical specifications mentioned in Schedule-C):

a. Central Processing System (CPS)

b. Traffic Monitor Camera System (TMCS)

c. Accident and Incident Detection System (AID)

d. Deleted

e. Power and Other Cables, and Power conditioning equipment

f. Digital Transmission System (DTS)

g. Facility Monitoring System (FMS)

h. Variable Message Sign (VMS)

i. Emergency Call Boxes (ECB)

The entire system should function efficiently as an integrated solution during the entire O&M period.

The project shall be a complete turnkey solution with provision of skilled resources at all locations for operations. The period of engagement shall initially be 6 years.

The RFP describes functional requirements envisaged by MoRTH. In addition, the indicative technical specifications have been prescribed in this document. The Contractor is responsible for the design of complete project and the system architecture to deliver state-of-the-art solution to MoRTH fully complying to the functional requirement specified in the RFP and site conditions. Any consideration affecting safety, security, redundancy, and compliance to stipulated provision prescribed by Government Authorities is the responsibility of the Contractor and shall be duly taken care of to ensure adherence to functional and indicative technical requirement stipulated in this document as well as the SLA parameters.

1. The 'TIMS System Integrator' hereafter may be called as 'System Integrator' shall conduct the field survey, preparation of design drawings and supply of TIMS equipment and materials, spare parts, test equipment, tools and materials, factory inspection (inspection of equipment & materials upon delivery), training, transportation and site delivery, civil works on space provided for Command Center and integrations with existing Command Centers/Control Rooms, preparation of as-built drawings, testing and commissioning of equipment and overall Operations and Maintenance of the TIMS project.
2. The scope of the works under this document is deployment of TIMS (including operations & maintenance) for approximately six years across approx. 834 Km of highways (~660 kms under the Chardham Mahamarg Pariyojana, and ~170 kms of Uttarkashi-Ghansali-Tilwara route) in the state of Uttarakhand.
3. The implementation plan, in proposed chronological order, across highway stretches with approximate highway lengths is as follows:
    a. Phase 1 (142 Km) –
        i. NH 7 Rishikesh-Rudraprayag 142 Km
    b. Phase 2 (258 Km) –
        i. NH 34 Rishikesh-Uttarkashi 120 Km
        ii. NH 7 Rudraprayag-Mana 138 km
    c. Phase 3 (434 Km) –
        i. SH 15 Uttarkashi-Ghansali-Tilwara 171 Km
        ii. NH 107 Rudraprayag-Kedarnath 76 Km
        iii. NH 134 Dharasu-Yamunotri 76 Km
        iv. NH 34 Uttarkashi-Gangotri 111 Km

However, the above list is indicative and the plan for final highway stretches, and associated timelines will be decided and finalized in conjunction by the Operating Committee, TIMS PMU and the System Integrator and be approved by the Governance and Steering Committee.

MoRTH may at any time withdraw any works forming part of this Agreement. If MoRTH is unable to transfer any segment of the road stretch to the TIMS System Integrator, then that specific segment shall be excluded from the project scope. The exclusion will be in accordance with the ratio of cameras planned for that segment, based on the system design initially submitted to and approved by the TIMS Project Management Unit (PMU)/Operating Committee. The Contract Price shall be reduced by an amount equal to 90 (ninety) percent of the value of the Works withdrawn and the System Integrator shall not be entitled to any other compensation or Damages for the withdrawal of Works. Provided that if any Works are withdrawn after the commencement of such works, MoRTH shall pay to the System Integrator

110% (one hundred and ten percent) of the fair value of the work done, as assessed by the TIMS PMU and Operating Committee.

4. The TIMS System Integrator shall set up the Hub Command Center during Phase-1 at the Uttarakhand Transport Department Office, Kulhan, Sahastradhara Road, Dehradun (or alternate location finalized by the Governance and Steering Committee). The TIMS System Integrator shall also set up Other Command Centers in a phased manner at each of the following locations – Uttarkashi, Tehri Garhwal, Chamoli, Pauri Garhwal and Rudraprayag. The requisite space for setting up the Other Command Centers shall be provided to the System Integrator. The Hub and Other Command Centers shall include the following:

    a. Operation area

    b. Server area

    c. UPS area

    d. Data center area

    e. Project Manager area – *(Optional, shall be decided in conjunction with TIMS PMU/Operating Committee)*

The scope of any additional civil works, interior works, MEP works, for setting up the Command Centers, including all additional related electrical, lighting, electrical connection, DG set, power backup, HVAC works, access control, building CCTV, PTZ cameras outside building, firefighting system, alarm, fire extinguishers, raised floor, housekeeping, building cleaning, maintenance, recurring charges including electricity bills, telephone bills, DG fuel, servicing, security, etc. shall be undertaken by the System Integrator.

5. The TIMS System Integrator shall also create integrations with existing Command Centers and Control Rooms under different departments & entities, as follows –

    a. Video feed and console for incident alerts (linked to Command Center software) at 112 Control Rooms operated by Police

        v. Uttarkashi

        vi. Tehri Garhwal

        vii. Chamoli

        viii. Pauri Garhwal

        ix. Rudraprayag

        x. Any other control room setup by the Police

    b. Console for incident alerts and updates (linked to Command Center Software) for District Emergency Operations Centers (DEOC) operated by District Disaster Management Authority

xi. Uttarkashi

xii. Tehri Garhwal

xiii. Chamoli

xiv. Pauri Garhwal

xv. Rudraprayag

xvi. Any other control room/ center setup by USDMA

c. Console for incident alerts and updates (linked to Command Center Software/ dashboards)

xvii. Uttarakhand Health Department Command Center

xviii. USDMA State Emergency Operations Center

xix. Tourism Department Command Center

xx. Any other Command Center/Control Room as decided upon by TIMS PMU and Operating Committee of Chardham Mahamarg TIMS

d. Additional Software integrations (details to be finalized by TIMS PMU)

xxi. 1033 Control Center

xxii. Vahan Database

xxiii. Deleted

xxiv. Deleted

xxv. Early Warning Systems by USDMA

xxvi. Deleted

xxvii. Tourism Command Center

xxviii. Health Command Center

xxix. Any additional software integrations as mutually agreed upon by the Operating Committee, TIMS PMU and the System Integrator

e. The System Integrator shall ensure that TIMS is designed to be modular, enabling it to integrate with any preventive systems such as landslide prevention systems that may be deployed on the Chardham Mahamarg in the state of Uttarakhand during the term of the System Integrator.

6. The TIMS System Integrator is also expected to take on works that may not be explicitly outlined in this document but are essential to meet the existing scope of work, service levels and outcomes mentioned in this RFP.

7. The TIMS System Integrator shall coordinate with TIMS PMU, Operating Committee and relevant departments of Uttarakhand State Government (viz. Disaster Management, Police, Transport, Health, Tourism, etc.) and/or their agencies to finalize the SOP for notification of any incidents, their key responsibilities and associated integrations/ interfacing with relevant systems/ offices of the Departments that are critical to ensure the efficient operations of the TIMS.

8. The requirements stated herein shall be construed as minimum requirement and meeting the respective requirements shall not relieve the TIMS System Integrator from the responsibility of supplying the TIMS that functions efficiently as a system and carry out its Operation & Maintenance for the stipulated period.

9. Deleted.

10. The TIMS System Integrator shall provide the entire system and facilities on a "single responsibility" basis such that the Contract Price covers all TIMS System Integrator's obligations mentioned in or to be reasonably inferred from this document in respect of the design, manufacture, procurement, construction, installation, adjustment and testing of the Works and remedying any defect therein. This includes all requirements under the TIMS System Integrator's responsibilities for testing and commissioning of the systems and facilities, and where required by this document, the acquisition of all permits, approvals and license, etc.; the training services and such other items and services as may be specified in this document.

11. The TIMS solution deployed by the TIMS System Integrator shall fully comply with the Traffic Management Data Dictionary (TMDD) Standard v3.1 or latest for the Center-to-Center (C2C) Communications released by Institute of Transportation Engineers (ITE). The proposed TIMS solution shall also be fully compatible with similar standards / protocol released by Government of India / IRC / IEEE for integration and seamless transfer / exchange of data from Command Center to Control Center of different projects.

12. In order to ensure that the proposed TIMS delivers on the objectives, it is important that the TIMS System Integrator perform a detailed Concept of Operations including Standard Operating Procedure for day-to-day operations of the TIMS (and generate the relevant 'CONOPS' document with the involvement of all stakeholders with final approval to be provided by the Operating Committee) in line with established engineering practices (ref: Systems Engineering Guidebook for Intelligent Transportation systems published by the US Department of Transportation, Federal Highway Administration, Version 3.0). Once the system has been installed and commissioned it shall be operated as per the above evolved Concept of Operations in order to validate it for its ability to deliver with respect to its objectives.

13. The component systems comprising TIMS to be constructed under the Contract shall include but not be limited to the following component systems:

    a. Central Processing System (CPS)

b. Traffic Monitor Camera System (TMCS)

c. Accident and Incident Detection System (AID)

d. Deleted

e. Power and Other Cables, and Power conditioning equipment

f. Digital Transmission System (DTS)

g. Facility Monitoring System (FMS)

h. Variable Message Sign (VMS)

i. Emergency Call Boxes (ECB)

The System Integrator shall also implement an effective monitoring and management system for the system. It is proposed that a proven Enterprise Management System is proposed by the System Integrator for efficient management of the system, reporting, SLA monitoring and resolution of issues. Various key components of the EMS to be implemented as part of the engagement are –

14. Network Management System - Solution should provide fault & performance management of the cameras, server-side infrastructure and should monitor IP/SNMP enabled devices like Routers, Switches, etc. (i.e., all devices supplied as part of RFP scope). This system shall also help monitor key KPI metrics like availability, in order to measure SLAs. Following are key functionalities that are required to assist administrators to monitor network faults & performance degradations in order to reduce downtimes, increase availability and take proactive actions to remediate & restore network services.

    i. The proposed solution must automatically discover manageable elements connected to the infrastructure and map the connectivity between them. Solution should provide centralized monitoring console displaying network topology map.

    ii. Proposed solution should provide customizable reporting interface to create custom reports for collected data

    iii. The system must use advanced root-cause analysis techniques and policy-based condition correlation technology (at network level) for comprehensive analysis of infrastructure faults.

    iv. The system should be able to clearly identify configuration changes and administrators should receive an alert in such cases.

    v. The solution should support multicast protocols too, if the overall project solution offered includes multicast.

    b. Server Monitoring System –

        i. The proposed tool should integrate with Network Management System and support operating system monitoring for various platforms supplied as part of this Project.

ii. The proposed tool must provide information about availability and performance for target server nodes.

iii. The proposed tool should be able to monitor various operating system parameters such as processors, memory, files, processes, file systems, etc. where applicable.

iv. If the offered server/computing solution includes virtualisation, then the server performance monitoring solution must include virtualisation monitoring capabilities.

c. Helpdesk System

i. Helpdesk system should provide incident management, problem management templates along with helpdesk SLA system for tracking SLA's pertaining to incident resolution time for priority / non-priority incidents.

ii. System should also automatically create tickets based on alarm type

iii. The proposed helpdesk solution must provide flexibility of logging, viewing, updating and closing incident via web interface for issues related to the project

iv. IT Asset database should be built and managed by the bidder, in order to carry out the scope of work items.

The solution should provide a unified web-based console which allows role-based access to the users.

15. The System Integrator shall provide necessary support to the State Government/ relevant departments in their activities (incl. integrated/ otherwise app development). To this effect, the SI shall:

    a. Cooperate in the building of a unified platform architecture to ease integrations with health and other state departments

    b. Share discrete data points/logs real-time with the state departments whenever required

    c. Share relevant data (e.g., number plate identification, logs in real-time format, other relevant data, etc.) and cooperate in meeting any other requirements/integrations during the tenure of the contract

16. The System Integrator shall implement all phases of the project as finalized by the TIMS PMU. At the completion of installation of each phase and one quarter of Operation & Maintenance, the performance of the System Integrator shall be evaluated on the basis of timely completion of work, deliverables and adherence to defined Service Level Requirements. The TIMS PMU and Operating Committee shall determine satisfactory performance of the System Integrator along the defined parameters. In case of unsatisfactory performance during any period of time, MoRTH/Governance and Steering Committee retain the authority to replace the existing System Integrator.

1.2. Indicative Equipment Location

The Bidder shall conduct the site survey and propose the TIMS sub-system location in the Technical Proposal. The location provided in this document shall be treated as indicative, The successful Bidder, in consultation with the MoRTH/MoRTH representative, have to ascertain the indicative locations and propose the appropriate equipment location during the design phase of the Contract. The successful bidder during design phase of the contract shall provide equipment locations duly marked in the KMZ file of the project highway.

1.2.1. Traffic Monitoring Camera Systems

The Contractor shall refer to the **Indicative Camera Locations specified in Section 13** of the RFP for "Selection of System Integrator for Implementing and Maintaining Traffic Incident Management System on the Chardham Mahamarg"

1.2.2. Accident and Incident Detection Systems

The Contractor shall refer to the **Indicative Camera Locations specified in Section 13** of the RFP for "Selection of System Integrator for Implementing and Maintaining Traffic Incident Management System on the Chardham Mahamarg"

1.2.3. Variable Message Signs (VMS)

VMS shall be provided at all such locations, at a distance not more than 20 km from one another, as finalized by the System Integrator after approval from TIMS PMU and Operating Committee.

1.2.4. Emergency Call Boxes (ECB)

- Potential zones of Telecommunication black spots shall be identified on the project highway for locating the Emergency Call Boxes.
- On longer (> 2 km) stretches suffering from telecommunication blackspots and other locations as finalized by the System Integrator after approval from TIMS PMU and Operating Committee, ECBs shall be installed at intervals of 2 Km (+/- 100m) on both sides of the highway such that a distance of 1km (+/- 50m) is the maximum one has to travel to reach the nearest available ECB.

1.2.5. Operation and Maintenance

1. The O & M period after the successful completion of works shall include Operation & Maintenance of the entire TIMS Facility as per the Service Level Agreement (SLA) mentioned in Schedule-C including supply of adequate spares, parts, consumables and maintenance equipment required for the facility. The Contractor shall maintain required spare parts to maintain required service levels.
2. The Contractor shall have sufficient infrastructure and capability to keep/store spares required for maintenances and will at all times during the contract period maintain a

sufficient inventory of spares and consumables for operating and maintaining the ATMS and to meet the Service Level Agreement.

3. Before the start of the O&M Period, the Contractor shall deploy the O&M Personal with prior approval of the Authority.
4. Standard Operating Procedure ("SOP"): The TIMS Contractor shall design a detailed SOP Manual listing all the steps that need to be undertaken by the personnel in the Command Centre and the on-road units for all incident types and sub-types. The SOP Manual needs to be submitted to MoRTH and/or its representative for review and approval.

1.3. Governance Structure

The Contractor shall refer to the **Governance Structure specified in Section 5** of the RFP for "Selection of System Integrator for Implementing and Maintaining Traffic Incident Management System on the Chardham Mahamarg"

SCHEDULE C

Standards and Indicative Specifications

The Contractor shall comply with the **Functional Requirement and Indicative Technical Specifications listed in Section 7 and Guidelines Regarding Compliance of Systems/Equipment listed in Section 8 of the RFP** for "Selection of System Integrator for Implementing and Maintaining Traffic Incident Management System on the Chardham Mahamarg"

In addition, all **Service Level Agreements and Penalties detailed in Section 6 and standards listed in Section 2.3 of the RFP** for "Selection of System Integrator for Implementing and Maintaining Traffic Incident Management System on the Chardham Mahamarg" shall apply to the System Integrator.