



**DEPARTMENT OF INFORMATION TECHNOLOGY (DOIT)
GOVERNMENT OF GOA**

Expression of Interest (EOI)

EOINo. No. 11/5/DOIT/2022-23/GBBN 2 .0 /845

Dated: 29.08.2022

for

**IMPLEMENTATION (DESIGN, LAYING,
TESTING, COMMISSIONING), OPERATIONS AND
MAINTENANCE OF STATE-WIDE FIBER OPTIC CABLE (OFC)
NETWORK IN THE STATE OF GOA**



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DISCLAIMER

The information contained in this Expression of Interest (EOI) or subsequently provided to the Applicant(s), whether verbally or in documentary or any other form by or on behalf of Department of Information Technology (DOIT) or any of its employees or advisors, is provided to the Applicant(s) on the terms and conditions set out in this EOI and such other terms and conditions subject to which such information is provided.

This EOI contains brief information about the Project and will assist the Authority to formulate the RFP for the process of selecting the Applicants during the RFP stage. This document is neither an agreement nor an offer by the purchaser/authority to the Applicants or any other person. The purpose of the document is to provide the Applicants with information to assist the formulation queries, feedback and suggestions towards the project.

The Authority, its employees and advisors make no representation or warranty and shall have no liability to any person, including any Applicant under any law, statute, rules or regulations or tort, principles of restitution or unjust enrichment or otherwise for any loss, damages, cost or expense which may arise from or be incurred or suffered on account of anything contained in this EOI or otherwise, including the accuracy, adequacy, correctness, sufficiency, completeness or reliability of this EOI and any assessment, assumption, statement or information contained therein or deemed to form part of this EOI.

The Authority also accepts no liability of any nature whether resulting from negligence or otherwise howsoever caused arising from reliance of any Applicant upon the statements contained in this EOI.

The Authority may in its absolute discretion, but without being under any obligation to do so, update, amend or supplement the information, assessment or assumptions contained in this EOI.

The Applicant shall bear all costs associated with or relating to the preparation and submission of its queries, feedback and suggestions including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by the Authority, or any other costs incurred in connection with or relating to its Application. All such costs and expenses will remain with the Applicant and the Authority shall not be liable in any manner whatsoever for the same or for any other costs or other expenses incurred by an Applicant in preparation or submission of the Application.



GLOSSARY

Authority	:	Department of Information Technology (DOIT), Goa.
Systems Integrator (SI)	:	The Successful Bidder entering into an Agreement with the Authority for undertaking the Project.
Go-Live Date	:	The date as declared by the Authority on which the proposed solution becomes operational after successful conclusion of all acceptance tests to the satisfaction of the Authority.
NIT	:	Notice Inviting Tender
Project	:	Implementation (Design, Laying, Testing, Commissioning), Operations and Maintenance of State-Wide Fiber Optic Cable (OFC) Network in the State of Goa
RFP	:	Request for Proposal
RoW	:	Right of Way
ISP	:	Internet Service Provider
OFC	:	Optical Fiber Cable
PoP	:	Point of Presence
GP	:	Gram Panchayat
Licensed Service Area	:	The territory of State of Goa



DESCRIPTION OF EOIPROCESS

- 1) The stage of Expression of Interest (EOI) is undertaken as an industry consultation to determine credible Applicants having requisite capability for undertaking the Scope of Work, to provide their inputs on the key parameters, through Pre-NIT conference, to be adopted by the Authority which would help determining the terms and conditions of the RFP. Pre-qualification of Applicants will not be done at this stage.
- 2) Subsequent to this EOI and the finalization of the Project details, the Authority proposes to issue a Request for Proposal (RFP) for selection of interested “Bidders” for the Project.
- 3) The Authority does not, in any manner whatsoever, warrant or represent that it will subsequently proceed to release the RFP and/or initiate the RFP Stage of the Bidding Process. Accordingly, the information regarding the RFP made in this EOI are indicative in nature, purely informative, and non-binding.
- 4) The Authority in its absolute discretion may cancel, change, alter or replace the RFP Stage of the Bidding Process and/or the Project itself, without according any reason thereof or providing any prior notice to any person including the Applicants or Bidders, as the case may be.
- 5) For further details contact:
Director, DIT
2nd Floor, IT Hub, Altinho,
Panaji - 403001, India
Ph: (0832)2221505 / 2221509
e-mail: dir-dit.goa@nic.in
- 6) The Applicants are required to send their written queries, feedback, or suggestions for Pre-NIT conference to:



SCHEDULE OF EOIPROCESS

The Director, Department of Information Technology, Government of Goa, on behalf of Governor of Goa invites EOI in online mode only from eligible bidders for“IMPLEMENTATION (DESIGN, LAYING, TESTING, COMMISSIONING), OPERATIONS AND MAINTENANCE OF STATE-WIDE FIBER OPTIC CABLE (OFC) NETWORK IN THESTATE OF GOA”as detailed under:-

Sr No	Item	Particulars
1	Description of the work	IMPLEMENTATION (DESIGN, LAYING, TESTING, COMMISSIONING), OPERATIONS AND MAINTENANCE OF STATE-WIDE FIBER OPTIC CABLE (OFC) NETWORK IN THE STATE OF GOA
2	Mode of Tendering	E-Tendering
3	E-Tendering Website	eprocure.goa.gov.in
4	EOI Document Fee	Rs 5000/- Rupees five thousand only (Non-Refundable)to be paid through online through e-payment mode via NEFT/RTGS/net banking (Axis Bank)with pre-printedchallan available on e-tendering website and directly credit the amount to ITG account as generated by challan and upload the scanned copy of NEFT/RTGS/net banking (Axis Bank) challan along with document.
5	EOI Processing Fee	Rs 3000/- Rupees three thousandonly (Non-Refundable) to be paid through online through e-payment mode via NEFT/RTGS/net banking (Axis Bank) with pre-printed challan available on e-tendering website and directly credit the amount to ITG account as generated by challan and upload the scanned copy of NEFT/RTGS/netbanking (Axis Bank) challan along with document.
6	Advertisement for Expression of Interest (EOI) issued by DOIT	30/08/2022
7	Last date for submission of pre-bid queries on email for clarification.	12/09/2022 up to 5:00 PM
8	Date of Pre-bid meeting	19/09/2022 at 3:00 PM at the Department of Information Technology, Government of Goa, 2 nd floor, IT Hub, Althino, Panjim-Goa.
9.	Last date for submission of EoI	22/09/2022 at 3.00 P.M
10.	Opening of the EoI	23/09/2022 at 3.00 P.M



9	Date of Release of RFP for the Project.	To be communicated.
10	Contact details	Department of Information Technology, Government of Goa, 2nd Floor, IT Hub, Althino, Panjim-Goa, 403001 Phone Nos.: +91 (832) 2221505 / 2221509 Fax No.: +91(832) 2221490 Email Id's: (1) dir-dit.goa@nic.in (2) harshad.pawar@nic.in For e-Tendering assistance: For e-Tendering assistance:0120-4001002 Email Id: support-eproc@nic.in

*****Any addendum/amendments/corrigendum to the EOI shall also be published on eprocure.goa.gov.in and goa.gov.in.



1. PROJECT BACKGROUND

- 1.1. Goa, located on the west coast of India, is its smallest state by area (3,702 Sq. Km.) and the fourth smallest by population (1,457,723 - Source: Census 2011). Goa is one of the popular tourist destinations in India. Goa is a small State with an area of 1,429 square miles (3,702 square km) divided into two districts; North Goa, with its headquarters (HQ) in Panjim and South Goa with its headquarter in Margao. Panjim also acts as the headquarter for the State of Goa. The two districts are comprised of 12 Talukas (6 in North Goa & 6 in South) and 13 Municipalities and a total of 419 villages.
- 1.2. Government of Goa envisions to create a reliable, accessible, secure and a fully connected digital services in the state that helps in offering Digital Infrastructure as a Utility to every Citizen, provision of Governance and Services on Demand and digital empowerment of Citizens.
- 1.3. Goa was the first state in India to successfully connect 100% Village panchayats i.e. 191 Village panchayats to its respective Taluka HQ @ 1 Gbps through network commissioned by Government of Goa under PPP model in 2009. The network consists of clustered partial mesh topology network (1 Gbps to 10 Gbps) of more than 1500 Kms of Optical Fiber was laid across the state. The network is used for communicating between the G2G, G2B, G2C, and other Government departments. Currently, all the equipment of the said existing network has either reached end of their life or out of warranty.
- 1.4. Accordingly, to realize the vision of GoI for usage of “Digital Infrastructure as a Utility to Every Citizen”, and to strengthen the reach of e-governance till grass root level, Govt. of Goa (GoG) through Department of Information Technology (DOIT) desires to provide new State-Owned OFC network in Goa with significantly higher bandwidth under state-led model.
- 1.5. The entire bidding process shall be based on EPC model wherein the Implementation of the project is by DOIT through a System Integrator who shall be responsible for Survey, Design, Plan, Supply, RoW applications, OFC laying, Installation, end to end integration, testing and commissioning of OFC (Underground and Aerial), installation and commissioning of Electronics, setting up and integration of NOC. SI would also be responsible for operations and maintenance of the network post 100% Go-Live.
- 1.6. The purpose of this EOI is to provide interested parties with the relevant information/invite regarding the project and understanding of the scope of the Project and invite feedback from interested private sector “Applicants”. The Applicants are advised to study this EOI document carefully before submitting their queries, feedback and suggestions in response to the EOI document. The feedback and suggestions received as part of the response from the industry participants to this EOI Document may or may not be used towards formalizing the RFP for the Project which is proposed to be released in the near future. No pre-qualification of Applicants is proposed to be done as part of this EOI.



2. PROPOSED PROJECT

2.1. DOIT envisages to connect the State in two stages, to unlock the true digital connectivity potential in the state and to provide last mile internet connectivity:

- State Head Quarters in Panaji (“HQ”) to District HQ (North Goa and South Goa), 12 Talukas and 191 Gram Panchayats, at least 225 Govt. office building locations / termination points; and
- Extend the network from 191 Gram Panchayats to 228 villages in the state. Last mile connectivity of FTTX for every user.

2.2. The scope of work for the System Integrator will broadly include:

- A. **Creation:** Build network infrastructure across GP and Taluka locations and extend the network to connect villages.
- B. **Operations and Maintenance:** Maintain the newly deployed network infrastructure.

2.3. The estimated cost of the project in the Licensed area is INR 740 crore. The detailed scope of work is given below



2.4. Scope of Work of Systems Integrator

The Systems Integrator is required to undertake the following scope of work.

A. Creation of the OFC Network

- The Systems Integrator shall be responsible for survey, planning, design, supply, installation, civil construction, end-to-end integration, and commissioning of newly deployed network infrastructure including Optical Fiber Cable (OFC) network (underground and aerial), radio network or any alternate medium as per site requirement along with electronics infrastructure including Network Operation Centre (NOC).
- The Systems Integrator shall prioritize to connect the villages and GPs. The Systems Integrator shall deploy new network infrastructure and shall not be allowed to leverage any other network infrastructure for providing connectivity from Taluka to GPs/villages.

1. Site Survey and Planning

1.1 The Systems Integrator shall conduct the survey and finalize Bill of Quantity (BoQ). The Systems Integrator shall conduct an exhaustive site and route survey based on an optimal/shortest path to connect villages, GP and Taluka as defined under the scope of work and for preparing the Bill of Quantity (BoQ) for construction of the OFC network.

- The Systems Integrator shall conduct an actual Geographic Information System (GIS)-based survey for the area under scope of work.
- Systems Integrator shall carry out the site and route survey by capturing on-site coordinates at every 20-30 meters through GIS/Mobile application and related tools.
- Data generated during site and route survey shall be shared with the Authority and shall be integrated with the GIS application of the Authority.
- The data recorded by the Systems Integrator during site and route survey for the network to be created shall be developed into a suitable format such as KMZ/KML.
- During the survey, the Systems Integrator shall take into account connectivity till villages based on the optimal path for fiber layout covering maximum population end-route.
- A final exhaustive site survey report should be submitted including detailed BoQ for the network to be constructed.

2. Network Design

2.1 The Systems Integrator shall deploy and connect the state through OFC connectivity, ensuring the following bandwidth:

Location	Minimum Bandwidth
State Headquarters	100 Gbps
District	100 Gbps
Taluka	100 Gbps
Gram Panchayats	10 Gbps scalable up to 40 Gbps
Villages	Up to 10 Gbps

2.2 The Systems Integrator shall design a redundant and robust OFC network infrastructure connecting GPs and villages based on ring architecture/topology using Internet Protocol - Multi Protocol Label Switching (IP-MPLS) technology. Depending on the feasibility of OFC deployment, Systems Integrator may decide to deploy suitable network architecture other than ring architecture after the duly approval from authority. Performance requirements should not impact in any case.

2.3 Priority of network connectivity media should be fiber. The Systems Integrator may decide to deploy suitable alternate technology for a maximum of 5% of village after the



approval from authority, however, ensuring the performance requirements should not impacted.

- i. For any case, the Systems Integrator shall take approval from the Authority on case-by-case basis. In case the Systems Integrator selects to deploy alternate technology through wireless medium (licensed or unlicensed band radio), a provision of minimum 10Gbps bandwidth scalable up to 40 Gbps shall be made at each GP and villages.
 - ii. For deployment of alternate technology, license fee, spectrum charges or any other charges, shall be borne by the Systems Integrator.
- 2.4 The System Integrator shall deploy the OFC Network & infrastructure in such a way to support 5G during 5G Implementation.
- 2.5 The Systems Integrator shall design a robust, fault-tolerant and high-performance carrier-grade network based on the survey report, potential usage & subscription, and uptime KPIs as per Annexure C. The network architecture must also be deployed to meet the following:
- i. Redundancy across nodes and links (ports) to maintain higher uptime
 - ii. Optimal link utilisation
 - iii. Flexibility to allow easy insertion of new node/cards
 - iv. The network shall be designed to have the capability for seamless integration including but not limited to State-wide Area Network (SWAN), National Knowledge Network (NKN) etc and should be scalable to meet end user requirements.

3. OFC Implementation

- 3.1 The project implementation shall follow underground topology across the state. This includes:
- i. Minimum 96 Core underground fiber to be deployed to connect State SHQ to DHQ with two cut not out facility.
 - ii. Minimum 96 Core underground fiber to be deployed to connect DHQ to THQ.all respective Taluka with two cut not out facility.
 - iii. Minimum 96 Core underground fiber to be deployed to connect State Taluka to respective GPs in ring topology. SI may plan multiple ring depend on the size of Taluka and respective GPs.
 - iv. Minimum 48 Core underground fiber to be deployed to connect GPs to respective Villages in ring topology. SI may plan multiple ring depend on the size of GPs and respective villages after duly survey and understand the geographical condition and population.
 - v. Permit to use Aerial All-Dielectric Self-Supporting (ADSS) 12 core fiberfor last mile client connectivity from the feeder cable UG 48 Fiber to all client premises. Aerial cable should be in structure OH cable by using all required accessories.
 - vi. The Systems Integrator will lay one spare duct in different color with each fiber rings.
 - vii. The OFC connectivity should be given priority and the use of alternate technology should be minimised (subject to approval of Authority). A report on non-feasibility through OFC shall be shared with valid reason by the Systems Integrator post survey.
- 3.2 Based on the site survey report and network design, the Systems Integratoris required to initiate OFC implementation and comply with Specifications and Standards as provided by the Authority during RFP stage.The Systems Integrator shall be
- i. Responsible for supply, delivery, storage, warehousing and handling of optical fiber cable along with fittings and requisite items such as HDPE PLB duct, Pre cast RCC Chambers, FDMS, Joint Enclosures, Route Markers, Electronic Route Marker etc.
 - ii. The Systems Integratorwill lay the duct more than 90 % of project requirement through trenchless Technique (HDD) with the depth of entry and exit pit with 165 cm and intermediate depth should be less than 3 mtr.



- iii. The Systems Integrator may lay the duct for hard strata through Open Trench Technique (subject to approval of authority) with warning tape at the depth of 165 cm.
- iv. The Systems Integrator will use excel cutting Technique during splicing except straight joint to avoid unwanted loss of fiber.
- v. Complete implementation of all the sites along with connectivity till villages, within the stipulated time.
- vi. Conduct end-to-end testing of the OFC laid till villages along with TPA appointed by Authority. The Systems Integrator should submit all the detail and information like ABD, HDD Graph, OTDR Traces, LSPM, Blowing detail, ROW permission and NOC from concerned Authority to TPA/ Authority during PAT/FAT.

4. Network Operations Centre (NOC) Implementation

- 4.1 The Systems Integrator shall do civil construction (approximately 100 Sq mtr) for Equipment room, Server Room, UPS Room, NOC Room, Training Room with Manager Cabin and other required spaces at SHQ (Authority will provide the land). The Systems Integrator will provide Modular Technical Furniture & Chairs, Rodent Repellent system, CCTV System, Smoke Detector, Biometric access control systems, Electricity setup and operation, fire Alarm System, Structure Cabling on CAT-6 for inter connectivity, Falls Flooring & False Ceiling etc.
- 4.2 The Systems Integrator shall provide 50 KVA Silent DG with AMF Panel, 20 KVA Online UPS with battery bank, Required earth pits and electrical cables and accessories, Required Air Conditioner (Industrial Grade), Required 42 U Server Racks & 42 U Network racks with all accessories.
- 4.3 The Systems Integrator shall provide Network Operations Center (NOC) including Log server, Edge switch for local connectivity, Application Hosting for DC and DR on Cloud & security, OSS/BSS Server (for Billing etc.), Server for OFC monitoring, NMS Server, EMS Server, GIS Server, NOC Switch, Customized integrated EMS with integrated NMS for respective hardware to be monitored, Video Wall, Full HD (1920 x 1080) 50" matrix 3*2, Video wall Controller, Workstation Desktop, i5 processor, 8 GB RAM, 500 GB HDD, Next Generation Firewall - (Throughput 40 Gbps with 10 gig interface), Infrastructure and electronics of NOC - DR etc. Including 10 year warranty of active component only. The Systems Integrator shall setup a centralized NOC for managing the network and shall be responsible for the deployment of all requisite hardware, software, and manpower for monitoring, helpdesk, troubleshooting, etc.
- 4.4 SI should also take the responsibility to securing entire infrastructure security prospective.
- 4.5 The scope shall also include design, supply, installation, testing, commissioning, documentation, operations and maintenance of NOC along with workforce deployment, training, etc.
- 4.6 The passive infrastructure deployed should be certified by EN/UL/ISO/BIS/ISI, whichever is applicable.
- 4.7 The Systems Integrator shall submit details such as APIs', protocols, version, attributes etc. to the Authority.
- 4.8 The NOC shall also be required to comply with Specifications and Standards as per Annexure A.

5. Electronics Installation



- 5.1 The Systems Integrator shall supply and install network solution or electronics infrastructure for the successful creation of a robust, redundant and carrier-grade network to facilitate high-speed internet, leased line and other similar network services.
- 5.2 The Systems Integrator shall provide Network and Infrastructure Elements at SHQ & DHQ, Core Router at SHQ, Core Router AT DHQ, Online UPS (5 KVA Capacity) at DHQ, Switch for connectivity to local end points, Aggregation Router (including SFP modules for connecting, THQs to DHQ,s), connectivity to local end points including horizontal institutions, Racks 42U floor mount with all accessories. Online UPS (5 KVA) per location, 16 Port OLT, ONT for FTTX connectivity in urban area, Horizontal connectivity for more than 225 govt offices, Access router including SFP modules for connectivity Taluka to GPs, Rack 15U wall mount with all accessories including 10 year warranty from the date of FAT.
- 5.3 The Systems Integrator shall provide all supply and installation including OLT, ONT/Terminal Equipment, Hardware for OF Cable and ONT/Terminal Equipment, PM WANI Access Point Hardware and associated equipment's, spares, other laying material, associated equipment/Material for GPs to Village connectivity Including 10 year warranty.
- 5.4 Adequate power back-up infrastructure shall be provided by the Systems Integrator subject to minimum 6 (six) hours of back-up, ensuring that the network up time is maintained as per defined SLA under Annexure C.
- 5.5 The Systems Integrator shall conduct acceptance testing of the electronics infrastructure created at villages. It shall also be required to comply with Specifications and Standards as provided in Annexure A.

6. Radio or Alternate Technology Implementation

- 6.1 The Systems Integrator shall deploy radio or any alternate technology as a medium of connectivity only in those area, where Wi-Fi is required. Based on the survey and detailed report, wherever the radio media is to be set up, the Systems Integrator shall undertake the following:
 - i. Submit a detailed feasibility report to the Authority and Third Party Auditor (the Authority reserves the right to nominate a technically competent agency for conducting final Acceptance testing and certification, the cost of Third Party Auditor shall be borne by the Systems Integrator) for the GPs and villages where radio network or alternate technology based network is planned.
 - ii. Based on the technical validation from the Third Party Auditor and approval from the Authority, the Systems Integrator shall deploy and install the network infrastructure.
 - iii. Be responsible for supply, delivery, unloading, storing, warehousing and handling of radio or any other equipment along with ancillary items as required as per the approved feasibility report.
 - iv. Manage and perform end-to-end installation of poles/tower, radio network or any other equipment along with the required civil work.
 - v. Be responsible for end-to-end testing of the network link from Taluka to GP or GP to village.
 - vi. It shall also be required to comply with Specifications and Standards as per Annexure A.

B. Operations and Maintenance of the Statewide OFC Network

1. The Systems Integrator shall undertake the responsibility for Operations & Maintenance (O&M) of the commissioned network and facilitate service provisioning through the same for the tenure of the project.



2. The O&M of the network shall be carried out as per the Key Performance Indicators (KPIs) provided as per Annexure C. The Systems Integrator shall be required to commence O&M for newly connected individual GPs/ villages immediately after the date of commissioning.
3. The Systems Integrator shall be solely responsible for ensuring network uptime and performance along with providing comprehensive support during the entire tenure of the project for the network created till village level. This shall also include the establishment of governance framework, and escalation procedures & matrix for network and customer support service on 365 x 24 x 7 basis.
4. As part of the maintenance, the Systems Integrator is required to maintain the up-time of the medium of connectivity, restoration of services, any other maintenance job required to meet the redundancy and KPIs.
5. The Systems Integrator shall extend access of the network management system or other equivalent systems along with network performance reports on a mutually agreed basis to the DOIT.
6. The services provided shall adhere and conform to applicable security policies and guidelines issued by DoT/TRAI/GoI.
7. The Systems Integrator shall prepare and maintain asset records listing the assets at site locations required for the performing the O&M and the same shall be shared with the Authority every quarter.
8. Systems Integrator shall undertake any replacement and upgrade of the OFC and equipment during the contract period (10 year), at its own cost.
9. The KPIs shall be monitored and reported by the Systems Integrator to the Authority on daily / monthly / quarterly basis, as required. Based on the performance of the network in the prior quarter, the penalty shall be computed as per the Annexure C and shall be payable by the Systems Integrator.

10. Periodic Maintenance

- 10.1 Once the Final Acceptance Testing (FAT) is completed by the Third Party Auditor, the Systems Integrator shall be solely responsible for the periodic maintenance of the network.
- 10.2 The corrective maintenance of the network shall also be done to ensure the network availability/ uptimes as per the KPI in Annexure C.
- 10.3 The KPIs shall be reviewed and updated by the Authority every year. In case the Systems Integrator needs to upgrade the network elements in order to meet a higher benchmark, then the Authority shall bear the cost required in upgrading the network. Any change in KPIs shall be done with the consent of both the Authority and the Systems Integrator.

11. Capacity Augmentation

- 11.1 Capacity augmentation shall happen at Systems Integrator's own assessment and risk and it shall be required to bear the cost for the same.
- 11.2 The Systems Integrator shall provide the required spares and service support for the supplied equipment in the Project. In case of any solution/ equipment reaching End of Life (EoL), the Systems Integrator shall be responsible for its replacement with equivalent / higher



specifications till the end of the contract period. In case of installation of products / material on account of capacity augmentation or replacement / repair the same shall be subject to Preliminary Acceptance Testing conducted by the Systems Integrator.

12. Quality of Service (QoS) Monitoring

- 12.1 The Systems Integrator shall ensure provision of reliable services to the customers as per the Quality of Service (QoS) standards issued by TRAI or any amendment thereafter. The Systems Integrator shall adhere to such QoS standards and provide timely information as required therein to the Authority.
- 12.2 The Authority, Third Party Auditor or any Authority appointed agency may carry out performance tests and also evaluate the QoS parameters at any time during the concession period. The Systems Integrator shall provide KPIs and other support including documents, instruments, equipment etc. for carrying out such performance tests for evaluation of Quality-of-Service parameters.
- 12.3 The Systems Integrator shall be responsive to the complaints lodged by the customers. The deficiencies shall be rectified and record of each installation, statistics and analysis on the overall maintenance status shall be maintained.
- 12.4 The proper arrangement should be made by the Systems Integrator for reporting/ booking service-related complaints along with digital dashboards for monitoring, managing and reporting performance of network and operational status across the same. This includes but not limited to network faults, incident, performance and quality metrics, security, services along with customer base, etc. The Systems Integrator shall maintain a contact center or helpdesk to log customer complaints across both enterprise and retail services along with providing the following:
 - i. shall provide flexibility of logging incident manually via windows GUI and web interface.
 - ii. the web interface console of the incident tracking system would allow viewing, updating and closing of incident tickets
 - iii. allow categorisation on the type of incident being logged
 - iv. provide classification to differentiate the criticality of the incident via the priority levels, severity levels and impact levels
 - v. provide audit logs and reports to track the updating of each incident ticket
 - vi. shall be able to log and escalate user-based requests
 - vii. shall allow ticket logging by email, chat, SMS or telephone.

2.5. Applicable Permits

The Systems Integrator shall obtain, as required under Applicable Laws, relevant Applicable Permits across access, data and carrier services as per DoT guidelines.

2.6. Terms of Reference

The indicative steps to be undertaken by the Successful Bidder on successful selection by the Authority are as follows:

- a) **Project Management Office (PMO):** A Project Management office will be set up on selection of Successful Bidder.
- b) **Site (Route) and Right of Way:**



- The Authority will facilitate the Right of Way to be granted to the Systems Integrator, commencing from the Appointed Date from the State Governments(s) or its agencies.
- The Site (Route) of the Project shall comprise the Right of Way which shall be granted as per the existing agreement with the State Government and facilitated by the Authority through introduction letters for creation of New Network during the Development Period. This shall be done in coordination with concerned State or central agency, as requested by the Systems Integrator.
- For the Operation and Maintenance Period (after Go-Live), the Systems Integrator shall be facilitated Right of Way by the Authority as per existing agreement with the State Government, only for replacement and repair of existing fiber deployed to maintain the OFC Network. Such request for facilitation would be assessed periodically and approved by the Authority or any agency appointed by the Authority.
- The license granted with respect to the Site (Route) to the OFC Network shall terminate automatically without the need for any action to be taken by the Authority to terminate the license on completion of term of the Project or termination of the Project.

c) Resource Requirement during Project Implementation Phase

- System Integrator has to ensure that the necessary manpower is deployed during the project implementation phase. System Integrator will plan the resource deployment as per the Scope of Work and project approach.
- The table below provides the minimum qualification of a Project team for entire Project implementation phase. The below team should be placed onsite for entire Project implementation phase.

Sr.No	Designation	Desired Qualification
1	Project Manager	<ul style="list-style-type: none"> • BE /B. Tech/M.Tech/MCA • Minimum 15 Years of Experience in large scale ICT infrastructure projects. • Relevant Exp.: Minimum 7 Years of experience as a project manager of large scale ICT infrastructure or WAN / MAN Projects. • Preference would be given to experts having PMP / Prince2 certification.
2	Network Design Expert / Solution Architect	<ul style="list-style-type: none"> • BE /B. Tech • Minimum 10 Years of Experience in large scale ICT infrastructure projects. • Relevant Exp.: Minimum 7 Years of experience in designing and implementing network solutions for at least 2 WAN / MAN projects. • Preference would be given to experts having CCNP certification.
3	Site Manager	<ul style="list-style-type: none"> • BE / B.Tech/ Diploma/ B. Sc. In computer Science, B. Sc. In IT • Minimum 5 Years of Experience in WAN / MAN projects.



4	Site Engineers	<ul style="list-style-type: none"> • BE / B.Tech/ Diploma/ B. Sc. In computer Science, B. Sc. In IT • Minimum 3 Years of Experience in WAN / MAN projects.
5	NOC Experts	<ul style="list-style-type: none"> • BE / B.Tech • Minimum 7 Years of Experience in WAN / MAN projects. • Should have experience in implementing BNG and CGNAT solutions.

- The Project Manager should be full time deployed at the PMO for regular co-ordination and monitoring of the Project.
- Site Manager will report to the Project Manager, in order to ensure that the correct information is communicated from the commencement of the project until the hand-over of the network to the client. The appropriate number of Site Managers to be deployed by SI as per the project requirements.
- SI will also deploy site engineers and supervisors to continuously monitor the work being executed simultaneously in different areas of the state. The appropriate number of Site Engineers and Supervisors to be deployed by SI as per the project requirements. SI will ensure availability of manpower resources having experience in both domains – Construction of passive network elements like fiber& shelter and installation, commissioning, configuration & integration of all active elements like routers, switches, electrical utilities, core routers in NOC, server in Data Centre etc. They will perform following activities but not limited to:
 - Supervise ongoing work to ensure that all specifications, standards and quality norms are followed.
 - Preparation of ITP (Inspection and Test Plans) reports, splicing reports, LSPM and bi-directional OTDR reports, Material Reconciliation.
 - Provide progress reports to Site Manager along with critical field issues and support required. Insure all safety measure should be follow like hording, barricading, caution tape, first add Box etc.
 - Coordinate timely active and passive material delivery at site.
 - Coordinate availability of all resources like HDD machine (in fully working condition), Compressor for DIT, OFC blowing machine, splicing machine, testing tools, labours etc. as per requirement.
 - Installation and commissioning of all active elements with required specifications.
 - Supervise establishment of all major PoP inside existing facilities and any additional set up required in existing NOC and Data Centre etc.

d) Operation & Maintenance (O&M) Team

- O&M would entail undertaking all activities to ensure uptime of the network as per agreed SLAs defined. This shall also apply to the entire supporting infrastructure such as NOC, NMS, etc.

Active Component: Active component shall be covered under 3 years of warranty from direct OEM & 10 years of Comprehensive AMC



e) Provision of the Operational Manpower at Network Operation Centre (NOC)

- The SI is required to provide suitable manpower to monitor the data feeds & helpdesk support at NOC as per following:
 - **1st shift (6:00 AM to 2:00 PM)**
 - Resource– 5 relevant professional + one shift manager
 - **2nd shift / General Shift (2:00 PM to 10:00 PM)**
 - Resource – 6 relevant professional + one NOC manager
 - **3rd shift (10:00 PM to 06:00 AM)**
 - 5 relevant professional + one shift manager
- The SI will increase the strength if it is required by the Authority. SI shall be required to provide such manpower meeting following requirements:
 - All such manpower shall be BE / B.Tech / MCA with minimum 3 years of experience in handling NOC operation.
 - System Integrator shall have to replace any person, if not found suitable for the job.
 - All the manpower shall have to undergo training from the System Integrator for at least 15 working days on the working of project.
 - Operational manpower shall work in shifts, with no person being made to see the feeds for more than 8 hours at a stretch.
- SI shall prepare the detail operational guideline document during implementation which shall specify detail responsibilities of these resources and their do's & don'ts.

f) Provision of the Field Operational Manpower and Resources

- SI shall work out the model to estimate the required field staff to maintain a state wide Optical Fiber Network including active, passive elements and associated services like Internet and Intranet services. It is proposed to deploy minimum 3 personnel in O&M phase, however SI to estimate the exact number of personnel to maintain the SLA requirement. SI shall also work out the other resources required for maintenance of the network and get it pre-approved from the Authority. Resources for Operation and Maintenance of the active and passive network elements would include following but not limited to:
 - Field engineers responsible to handle five FRTs (Field Restoration Team) which are station at respective Taluka. He is responsible to manage MTTR & KPI.
 - Each FRT should have splicer, Asst. Splicer, Required labour & Vehicle with driver.
 - FRT should have required tools & tackle including Splicing M/C, OTDR, LSPM, Locator, Charging unit, general tools, and emergency light.
 - SI may use two-wheeler for patrolling and deployment of each patroller should be for 100 KM OFC Route.
 - SI should deploy each FRT on 200 KM OFC Route. teams having tools and mobilization of other necessary resources Communication devices to issue reporting and resolution.
 - Material storage locations with adequate capacity in different areas of the city to speed up material delivery during fault to reduce MTTR.



- Spare material including all required active and passive elements in adequate quantity to be maintained at all time at all storage locations.
- Field engineers with networking certification to maintain active elements of the network including replacement, installation, configuration and integration.



3. TERM OF PROJECT

- 3.1. The Systems Integrator shall be granted the right to conduct the project for a period of 10 (Ten) years (“Term of Project”) from the Appointed Date (date of which Conditions Precedent are fulfilled).
- 3.2. The Systems Integrator shall fulfil the following conditions precedent within 120 (One hundred and twenty) days of signing the agreement.
 - a). Procure all the Applicable Permits / Licences / NOCs required for developing the OFC network.
 - b). conducted the route survey for the Project, finalised the bill of quantities and high level network design document for the Project and submitted such information and all relevant documents to the Authority, within 90 (ninety) days
 - c). developed a Project Execution Manual and Operation and Maintenance Manual (along with the asset lifecycle management process) and submitted it for the Authority’s approval
 - d). provided details of the Specifications and Standards for major material / product intended to be procured for the Project
- 3.3. On or after the Appointed Date, the Systems Integrator shall undertake the Development Works and in conformity with the Specifications and Standards set forth in Annexure A. The 521th (five hundred and twenty one) day from the Appointed Date shall be the scheduled date for completion of the Development Works and for achieving the date of Go-Live (Go-Live) of the OFC network (**the “Scheduled Completion Date of the OFC Network”**) and the Systems Integrator agrees and undertakes that the Project shall be completed on or before the Scheduled Completion Date of the OFC Network.
 - a). On and from the Appointed Date, the Systems Integrator is permitted to apply for and obtain the Right of Way to the Site (Route) from the State Government, based on network survey and design, or any other activities that the Systems Integrator may deem necessary prior to the Appointed Date.
 - b). The Systems Integrator shall apply for and obtain the Right of Way to the Site (Route) of the New Network which shall include making and filing applications, paying associated costs, liaising with Government Instrumentalities and agencies etc. Charges of permission will be responsibility of authority.
 - c). The Systems Integrator shall submit to the Authority (or Third-Party Auditor) its detailed project plan including project tasks / activities, schedule of construction and Acceptance Testing (AT) timelines along with submission of detailed network designs and project dependencies for completion of the Project in accordance with the Project Completion Schedule as set forth in Clause 6.2 of this EOI;
- 3.4. In the event that the Development Works are not completed, and the Go-Live of the OFC Network does not occur within the time period mention in project schedule. Authority shall be entitled to impose the penalty and terminate the Project, unless the delay is on account of reasons attributable to the Authority, or due to Force Majeure. Penalty in delay of the project will as per annexure ‘C’.



4. MINIMUM ELIGIBILITY EXPERIENCE

4.1 During the RFP stage, the Applicant who fulfils the following minimum eligibility experience (“Eligible Bidder”) shall be considered by the Authority for technical evaluation of their bids.

a) **The Applicant should be a Legal Entity:**

Minimum Eligibility	Mandatory documents required in support of minimum eligibility
<ul style="list-style-type: none"> Independent private legal entity incorporated / registered in India -proprietorship, partnership firm, Limited Liability Partnership (LLP), private limited company registered under Companies Act 1956/2013, public limited company registered under Companies Act 1956/2013 including government-owned entities. A group of entities (the “Consortium”), a combination of the above legal entities, with a formal intent to enter into a Consortium agreement subject to maximum of 3 (three) members. A foreign entity that is constituted under respective foreign law and not having a registered office / manufacturing facility / operation in India may participate in this tender as a member of consortium along with an Indian legal entity as specified above. 	<ul style="list-style-type: none"> Certificate of Incorporation / equivalent proof of legal registration of entity. GST Registration certificate issued by GSTN authorities. PAN Card. Board Resolution (only in the case of Company) allowing the Company to participate in the EOI. The Board Resolution is not mandatory in case of Proprietorship and Partnership firms.

b) **The Applicant should have prior experience of:**

Minimum Eligibility	Mandatory documents required in support of minimum eligibility
<ul style="list-style-type: none"> The Applicant shall have experience of laying, installation, testing and commissioning of underground or aerial of Optical Fiber Cable anywhere in the world in the last 5 (five) years before the bid due date of <ul style="list-style-type: none"> at least 2,000 (Two thousand) Kilometers own fiber network in India <p>OR</p> <ul style="list-style-type: none"> at least 2,000 (two thousand) Kilometers of fiber network for other customers in India The Applicant shall have experience of implementation (install, commissioned and gone live) of at least 250 (two-hundred and fifty) Active Network Elements* anywhere in the world in the last 5 (five) years before the 	<ul style="list-style-type: none"> In case of ownership of network**, Self-certification, along with the documentation demonstrating the Technical Capability in respect of quantity and successful performance of the project/network deployed. In case of non-ownership of network, Completion certificate to the extent of minimum requirement mentioned in the Technical Capability, issued and signed by the competent authority of the client entity demonstrating the Technical Capability and successful performance of the project along with the supporting documents such as contract/ work order/ purchase order. All documentary evidence for technical experience must be certified by Chartered Accountant.



<p>bid due date.</p> <p><i>*Active Network Elements shall comprise of active nodes / network infrastructure components / devices visible on Network Operations Centre (NOC). This shall exclude equipment / devices installed at customer / last mile end user premises.</i></p> <ul style="list-style-type: none"> The Applicant should have valid ISO9001:2008/ ISO 9001:2015 certification for Quality Management System which should be valid as on bid submission date. 	<ul style="list-style-type: none"> For evaluation, any member of the Consortium exhibiting the highest relevant technical experience will be considered. In case, a consortium is formed for meeting technical experience, the applicant shall ensure that each of the technical experience criteria is met either by one of the members of consortium solely or by different members of consortium meeting individual criterion separately.
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- In the event that the Applicant does not have the requisite experience as mentioned above, it shall enter into an agreement (before signing of the Service Agreement) with an entity having aforementioned experience (the “Technical Partner”) and shall submit an undertaking in this regard. It is hereby clarified that the Technical Partner shall not be required to be a Member of the Consortium, in case the Bidder is a Consortium or have any equity contribution in the Systems Integrator.
- In case separate Technical Partner(s) are engaged by the Bidder for meeting experience mentioned at (a) and (b) above, Bidder to ensure that each of the eligibility criteria is met either by one of the Technical Partner(s) solely or by different Technical Partner(s) meeting individual criterion separately.

*** In case of single entities, Aggregating the financial and technical capability of any Associates of the Applicant for the purpose of meeting the respective Qualifications Criteria required by the Applicant shall be permitted. For the purpose hereof, the word “Associate” shall mean, in relation to the Applicant, an entity which controls the Applicant (i.e. Parent) or is controlled by the Applicant (i.e. subsidiary) or is under the common control with the Applicant (i.e. sister concern). As used here, the expression “control” means, with respect to Applicant entity which is a company, the ownership of common shareholders, directly or indirectly (i.e. together with one or more of its subsidiaries / Holding companies), of at least 50% of the voting shares / shareholding of the entity. As used here, the expression “control” means, with respect to applying firm which is a partnership, the rights of common partners to at least 50% of the profits of the firm in question.*

g) The Applicant should have a minimum financial strength:

Minimum Eligibility	Mandatory documents required in support of minimum eligibility
<ul style="list-style-type: none"> Average turnover of any 3 (three) of the 5 (five) financial years i.e 2017-18, 2018-19, 2019-20, 2020-21 and 2021-22 should be at least INR 200,00,00,000/- (INR Two-hundred Crore only). Minimum Net Worth as on 31 March 2022 shall be INR 100,00,00,00/- INR One-hundred Crore only). 	<ul style="list-style-type: none"> Chartered Accountant (CA) certificate certifying net worth In case of a Consortium, the combined Financial Capacity of only those Members, who shall have a share of at least 26% (twenty-six per cent) each in the subscribed and paid-up equity of SPV should satisfy the above condition of eligibility.

h) The Applicant should not have any pending litigations, conflict of interest or blacklisting as on bid due date:

Minimum Eligibility	Mandatory documents required in support of minimum eligibility



<p>The Applicant / technical partner / associate:</p> <ol style="list-style-type: none">1) Should not be involved in any major litigation such as fraud, FEMA violations.2) Should not be involved in any conflict-of-interest situation.3) Should not have been blacklisted by any Central Government / State Government / PSU in India.4) Should not have defaulted in any supply or O&M contracts with any Government / Government entities or PSUs or private clients in the last 5 years.5) Should not have been blacklisted / debarred by DOIT / any entity of Government of Goa in the past.	<ul style="list-style-type: none">• Certificate from the Applicant / technical partner / associate
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5. FINANCIAL EVALUATION

5.1. During the RFP stage, the financial evaluation for the project shall be conducted based on the Least Cost/Lowest Cost for commissioning and maintenance of the state-wide OFC network.

5.2. The Bidders are required to quote as follows

i. CAPEX

- a. Cost of Survey, Planning, Supply, Installation, end to end integration, testing and commissioning of Passive Components UG OFC material with all accessories in per mtr cost and total cost.
- b. Cost of Survey, Planning, Supply, Installation, end to end integration, testing and commissioning of Passive Components OH OFC material with all accessories in per mtr cost and total cost.
- c. Cost of Item-wise Supply, Installation, Testing and Commissioning of Active Components (NOC and Software Components).

ii. OPEX

- a. Operation and Maintenance for Passive Components (OFC cable and Ducts) for 10 years.
- b. Operation and Maintenance for Active Components (NOC and Software Components) for 10 years.

5.3. To evaluation of the financial bid, Net Present Value (NPV) of the Maintenance for Passive Components (OFC cable and Ducts) and Maintenance for Active Components (NOC and Software Components) quoted for 10 years each shall be calculated. To arrive at 10-year NPV, a discounting rate of 10% shall be used.

5.4. For the purposes of evaluation only, the “Net Present Value of Fiber Connectivity” of the project shall be determined as follows:

$$\text{Net Present Value of Fiber Connectivity} = \text{CAPEX} + \text{NPV for OPEX}$$

5.5. The Qualified Bidder offering the Lowest Net Present Value of Fiber Connectivity shall be declared as the “SUCCESSFUL BIDDER”.

5.6. The proposed timeline for payment to the System Integrator is as follows:

Sr.No	Milestones	Payment Percentage
1	CAPEX against supply, installation and commissioning of Network Operating Center (NOC), SHQ, DHQ & Taluka	10%
2	CAPEX against supply of All Active Components other than NOC	10%
3	CAPEX against the Go Live of Core ring	40%
4	CAPEX against Go Live of Complete Network	30%
5	CAPEX in equal half yearly instalments in 1 year after Go Live of complete network	10%
Total		100%

5.7. The quarterly payment shall be due for OPEX at the end of every three months starting from the date of Go-Live of complete network.

5.8. The payments shall be subject to meeting of SLA’s failing which the appropriate deductions as per SLA.



6. OTHER GENERAL CONDITIONS

- 6.1. The Systems Integrator shall affect and maintain at its own cost, during the term of the agreement, such insurances for such maximum sums as may be required under the Financing Agreements and Applicable Laws, and such insurances as may be necessary or prudent in accordance with Good Industry Practice.
- 6.2. The expected Project Completion Schedule for state-wide OFC network in as follows:

S.no	Project Milestones	Schedule
1	Signing of Agreement	T
2	Submission of Performance Security	T+45 days
3	Completion of GPS Survey by Systems Integrator and design the fiber route as per requirement and get the approval from Authority. Identify & finalized the warehouses, Apply ROW to authority for permission.	T+120 days
4	Procurement the required material and accessories. Arrangement of Tools & Tackle. Mobilization of team.	T+120 days
5	Commencement of Construction for Civil & OFC	T+120 days
6	Completion of construction of SHQ, NOC, DHQ and all THQ. Completion of Connectivity from SHQ to DHQ, DHQ to all THQ, all govt offices (225) and 100 priority GP's (DOIT will share the priority list)	T+ 8 Month
7	Completion of connectivity for balance GP's, All village connectivity from respective GP's, Last mile connectivity on OH fiber for all villages and users. Integration, commissioning & configuration. Operational of NOC etc. Hiring of resources, Training and GO live entire Network.	T+ 16 Month
8	Commencement of Maintenance for the Network created by the Systems Integrator. Joint Inspection with TPA/ DOIT. HOTO Activity	T + 17 Months
9	Joint Inspection for Hand Back	T + 137 months
10	Systems Integrator to receive list of required maintenance and repair work	T + 137 months
11	Transfer of Assets to Authority(DOIT)	T + 137 months

Note:

A Any link or premises shall be considered completed when the Provisional Acceptance Certificate has been issued by the Authority.

All documentation generated during planning, installation and commissioning phase shall always be made available to the Authority.

The Systems Integrator shall complete the installation, commissioning, preliminary acceptance testing of the network infrastructure built and offer the Authority/TPA for acceptance with regards to the network element, link and ring based on designed topology.

- 6.3. Any non-adherence to the above delivery schedule will attract fines / penalties as per Annexure C.



- 6.4. From the Go-Live, the Systems Integrator shall, no later than 5 (five) days after the close of each month, furnish a report stating in reasonable detail the compliance of the Project with all the Key Performance Indicators Annexure C along with an analysis of the reasons for failures, if any, and the strategies for addressing the same and for otherwise improving the operational performance of the Project.
- 6.5. The Systems Integrator shall ensure compliance to the Key Performance Indicators in Annexure C. In case of any shortfall in performance, not an account of Force Majeure, the Systems Integrator shall pay penalties as set out in Annexure C, subject to a maximum of 10% (ten per cent) of the Performance Security for each month.
- 6.6. Performance Bank Guarantee
- The successful bidder shall furnish the Performance Bank Guarantees towards faithful performance of the contract obligation and performance of the services during tenure of the Project.
 - The Successful Bidder has to submit two separate performance Bank Guarantees- one for the Project implementation phase valid till 100% Go-live of the project and the second one for the Operations and Maintenance Phase valid up to 180 days beyond the expiry of the tenure of the Project.

The value performance bank guarantee shall be provided during RFP stage

- 6.7. The Systems Integrator shall provide the Authority with a recommended exit management plan ("Exit Management Plan") which shall deal with at least the following aspects of exit management in relation to the Project Implementation, and the Operation and Management SLA.
- A detailed program of the transfer process that could be used in conjunction with a Replacement of Systems Integrator including details of the means to be used to ensure continuing provision of the services throughout the transfer process or until the cessation of the services and of the management structure to be used during the transfer.
 - Plans for the communication with such of the Systems Integrator's sub-contractors, staff, suppliers, customers and any related third party as are necessary to avoid any material detrimental impact on the network operations as a result of undertaking the transfer.

In the event of termination or expiry of MSA, and Project Implementation, each Party shall comply with the Exit Management Plan.

- 6.8. The quantity, if any, defined during the RFP shall be estimated and the actual quantity shall be executed based on the actual site survey by the System Integrator at the time of project implementation. The successful bidder shall not object to the upward or downward variation in quantities and the quoted rate shall remain unchanged.
- If required additional quantity over and above may be executed on later stage, the payment for such additional quantities shall be made at tender rates and the tender rates shall be valid for 5 years. After 5 year rates can be consider for revision by DOIT as per the industry standard.
 - No claim shall be entertained or become payable for price variation of differential quantities.
- 6.9. The terms conditions pertaining to Force Majeure, Termination, divestment, dispute resolution shall in line with the Service Agreement and shall be detailed out during the RFP stage.



7. RIGHT TO CANCEL THE EOI PROCESS

- 7.1. The Authority may cancel this EOI process at any stage without assigning any reasons whatsoever and will not be liable to compensate any Applicant on any grounds whatsoever. The Applicants shall not be entitled to refund of cost of documents or other costs in case the EOI is cancelled for whatsoever reason or without assigning any reason.



8. ANNEXURES

8.1 ANNEXURE A

Tentative Specifications and Standards

All material supplied shall conform to the technical specifications defined in their relevant Generic Requirements issued by the Telecommunication Engineering Centre New Delhi(TEC / GR) duly updated from time to time. Details of such GRs (not limited to the indicative list given below) are included in the table for reference. Any new GR published against the material proposed to be supplied in future under this contract shall also be applicable. In addition, equivalent / higher standards issued internationally by ITU/IEEE, ETSI can also be followed, subject to the approval of the Authority in case of major deviations.

Specifications and Standards

S. No.	Type of Material	Technical Specifications
1	Aerial OF Cable (ADSS Cable): 12F ADSS on own pole	Mention TEC GR No.
2	Underground OFC: 96/48F armored ribbon type OFC. 6 fiber per ribbon, two ribbon in one tube, 4 tube in 48 F cable & 8 tube in 96 Fiber Cable.	Mention TEC GR No.
3	Aerial Drop Optical Fiber for FTTH application	TEC GR No. TEC/GR/TX/OFC-026/01/APR-18 with latest amendments, if any.
4	Self-Supporting Metal Free Aerial Optical Fiber Cable (For Hilly & Rural Areas)	TEC GR No. TEC/GR/TX/OFC-003/04/APR-18 with latest amendments, if any.
5	Fixed Attenuator	GR No. TEC/GR/TX/OPA-003/03/Oct 14, with latest amendments if any.
6	Splitters (1:2, 1:4, 1:8,)	TEC GR No. TEC/GR/TX/OPT-001/01/ APRIL-12 with latest amendments.
7	Solar Panel	TEC/GR/FA/SPV-02/04.MAR 2016, with latest amendments if any.
8	Battery	TEC GR NO. GR / TX / BAT – 001/04 Jan 2011 with amendment dated 24.7.2012
9	Patch Cord	TEC GR no. TEC/GR/TX/OFJ-01/05/Nov-09, with latest amendments if any.
10	GPON equipment	TEC/GR/FA/PON-01/03.MAR 2017 with all amendments if any.
11	Radio Modem	TEC/GR/R/ISM-MOD-001/04.MAR2016 with all amendments if any.
12	Specification for Raw Material used in Manufacturing of Cables for 96F and 48F Metal Free Optical Fiber Cable with	TEC/GR/TX/ORM-001/05/DEC-17 with all amendments if any.



	Double HDPE Sheath (G.652D Fiber)	
13	Tools for installation & Operations of OFC & for assembly of the OF Splice Closures	GR No. GR/OFT-01/03. APR 2006 with all amendments if any.
14	Wooden Cable Drum for Telecom Cables	GR No. G/CBD-01/02. NOV 94 with all amendments if any.
15	Splice Closure for Optical Fiber Cables	GR No. TEC/GR/TX/OJC-002/03/APR-2010 with all amendments if any.
16	OTHER STANDARDS, as applicable (EIA/IEC/Bell Core/CISPR/ISO etc.)	
16.1	Generic Requirement for Optical Fiber Cable (Bell Core)	GR-20-CORE Issue4, 2013
16.2	ITU-T Recommendations	ITU-T G.652D
16.3	Test Methods for Optical Fibers	IEC 811-5-1, IEC 794-1-2-E1, IEC 794-1-2-E2, IEC 794-1-2-E3, IEC 794-1-2-E4, IEC 794-1-2-E7, IEC 794-1-2-E10, IEC 794-1-E11, IEC 794-1-2-F1, IEC 794-1-2-F3, IEC 794-1-2-F5, IEC 60793-1-30, IEC 60793-1-31, IEC 60793-1-32, IEC 60793-1-33, IEC 60793-1-34, IEC 60793-1-47, IEC 60793-1-51, IEC 60793-1-52, IEC-60793-1-53, IEC - 60793-2-50, EIA 598-C,
16.4	Colour Standard	
16.5	Test Method for Optical Fiber	EIA 455-104, EIA/TIA-455-73 EIA/TIA-455-181
16.6	ISO 9001-2000 Test Methods for Optical Fibers, International Quality Management System	ISO 175
16.7	Test Methods	FOTP-89, FOTP-181 & ASTM D-566
		ASTM D-790 ASTM D-1248
		ASTM D-4565
17	Patch Cord Optical Fiber Jumpers	TEC GR No TEC/GR/TX/OFJ-01/05. NOV 2009
18	Fiber Termination Box	TEC GR No. GR/TX/FTB-02/02 APR-2010
19	PLB HDPE Duct	TEC/GR/FA/CDS-008/04/AUG-19 with latest Amendments if any
20	PLB HDPE Duct Accessories Push fit Coupler	PLB GRTEC/GR/FA/CDS-008/04/AUG-19 with latest amendments if any
21	End Cap	PLB GRTEC/GR/FA/CDS-008/04/AUG-19 with latest amendments if any
22	Raw material used in the cable	TEC/GR/TX/ORM-001/05/DEC-17 with all amendments if any.
23	Installation Accessories and fixtures of Self-Supporting Metal free Optical Fiber Cable	TEC GR No. TEC/GR/TX/OAF-001/03 Mar 2017 with latest amendments if any



24	FDMS (Indoor)	As per TEC GR No. GR/FDM-01/02. APR 2007 with Amendment Dated 02.05.2012, with latest amendments if any.
25	FDMS (Outdoor) if required	GR No. TEC/GR/TX/FDM-003/01 MAR 2012
26	SJC	TEC GR No. TEC/GR/TX/OJC-002/03/APR-2010, with latest amendments if any
27	BJC	TEC GR No. TEC/GR/TX/OJC-002/03/APR-2010, with latest amendments if any
28	Tension Pole Assembly Set (Tubular)	TEC/GR/TX/OAF-001/03/MAR-17, with latest amendments if any
29	Tension Pole Assembly Set (RAIL)	TEC/GR/TX/OAF-001/03/MAR-17, with latest amendments if any
30	Suspension Pole Assembly Set (Tubular)	TEC/GR/TX/OAF-001/03/MAR-17., with latest amendments if any
31	SMPS Hybrid Solar Photo Voltaic Power Supply	TEC GR No. TEC/GR/TX/HPS-001/01/March-17 with latest amendments if any
32	Optical Router	TEC/GR/SA/DCA-22/03.MAR-11 with latest amendments if any
33	Data Storage Infrastructure	TEC/GR/IT/DSI001/04/DEC 2015 with latest amendments if any
34	Ethernet electrical to optical media converter	TEC/GR/IT/EOC-001/04/SEP 2014 with latest amendments if any
35	Firewall System	TEC/GR/IT/FWS-001/04/MAR-14 2014 with latest amendments if any
36	Lan Switch	TEC/GR/IT/LSW-01/05/MAR 2014 with latest amendments if any
37	Layer 4-7 Load Balancer Switch	TEC/GR/IT/LSW-002/03/MAR-2015 with latest amendments if any
38	Network Management System	TEC/GR/IT/NMS-003/01/NOV 2015 with latest amendments if any
39	MPLS Router	TEC/GR/IT/TCP-004/01.FEB2014 with latest amendments if any
40	Integrated Gateway Router	TEC/GR/IT/TCP-005/01. MAR 2014 with latest amendments if any
41	Suspension Pole Assembly Set (RAIL)	TEC/GR/TX/OAF-001/03/MAR-17, with latest amendments if any



Broader perspective of NOC

1. The NOC should follow high-efficiency design in equipment type/ capacity selection to achieve high availability, flexibility, scalability and modularity.
2. The Systems Integrator shall ensure that the design of the NOC should meet the following industry standard:
 - a. Cooling standards
 - b. IEEE standards for electrical
 - c. NFPA, UL and local fire codes for Safety and security
 - d. ISO standards for processes and procedures
 - e. Tier – 3/4 redundancy
3. The NOC should be in protected premises with secured application and data server as Government data would be running on the network
4. Safety and Security requirement should be deployed as the best industry practice/ standards. Following components shall be included:
 - a. Software Addressable Fire Alarm System
 - b. Early smoke detection system
 - c. Fire Suppression System
 - d. Access Control System
 - e. Alarm System
 - f. Rodent Repellent System
 - g. Water Leak Detection System
5. NOC should be operational 24x7 with skilled manpower, adequate number of workstations, helpdesk with dedicated helpline/ IVRS number and Video wall for monitoring the network.



8.2 ANNEXURE B

Inspection and Acceptance Testing

During the Project, Authority and Third-Party Auditor (TPA) shall have the right to inspect, test and audit the network infrastructure and modalities across processes to construct, operate, maintain and utilize the network till villages during development and operation period i.e. throughout the lifecycle of the project.

For determining that the Development Works conform to the Agreement and Specifications and Standards, the TPA shall require the Systems Integrator to carry out or cause to be carried out Tests, at such time and frequency and in such manner as may be specified by the Third-Party Auditor from time to time in accordance with Good Industry Practice, Specifications and Standards, and Acceptance Testing Template for quality assurance. These Tests would include testing of all the installed electronics and passive infrastructure along with its ancillary items deployed under creation of the network infrastructure as per the scope of work. This shall also include all network links along with testing of network traffic from the GP to Taluka and from GP to village, and further to NOCs and Authority's NOC and DR-NOC.

The Systems Integrator shall facilitate and perform the following with regards to testing activities.

- Before the Appointed Date, the Systems Integrator shall submit an undertaking to the Authority certifying that product / material supplied for the Project will adhere to Specifications and Standards as per Annexure A and design requirements. The Systems Integrator shall ensure to maintain relevant certificates from Original Equipment Manufacturers (OEM) in this regard. Further, the Systems Integrator shall also provide the Specifications and Standards of major material / product intended to be procured for the Project.
- During the Tenure of the Project, the Systems Integrator shall obtain from Original Equipment Manufacturers (OEM), the relevant certificates or documents with relevant test results, certifying that the product / material supplied for the Project conforms to the Specifications and Standards and submit the same to the Authority and the Third-Party Auditor within 7 days of receipt of such certificates or documents from OEMs. In case the product / material supplied for the Project does not conform to the Specifications and Standards or is deficient in terms of relevant certificates / documents / test results, as inspected by the Authority or Third-Party Auditor, then the costs to be incurred on any replacement of such product / material shall be borne solely by the Systems Integrator. Third Party Auditor shall have the right to check the material and its conformity to the Specifications and Standards.
- The Systems Integrator shall progressively self-conduct and perform Preliminary Acceptance Testing (PAT) for network infrastructure being created and shall utilize the network as per the scope of work
- Once the Systems Integrator performs the PAT, it shall offer network infrastructure within a Taluka subject to minimum 20% GPs / villages completed and visible on the NOC for testing purposes to the TPA for Final Acceptance Test (FAT).
- The schedule for such testing shall be based on a project plan and the timelines for the same shall be agreed between TPA and Systems Integrator. In case of any changes in the schedule or plan, Systems Integrator shall notify the TPA 10 (ten) working days prior to the scheduled date.
- The TPA shall perform tests in at least 10% of offered samples aggregated at Taluka level in accordance with Good Industry Practice, Specifications and Standards, and Acceptance Testing Template. Sample sites and its routes to be checked shall be decided by the Third-Party Auditor (TPA) and approved by Authority.



- Result of TPA's inspection and audit shall only be valid for GPs and villages which were offered for testing under a Taluka. If Systems Integrator offers a Taluka for inspection more than once, TPA and Authority reserves the right to include or exclude the test of previously completed villages and GPs as well.
- The overall result(s) of the FAT conducted by TPA shall be indicated as "Satisfactory" or "Unsatisfactory" as judged at the time of inspection on merits of each case. The results of the Test shall be jointly signed by the authorized personnel of the Systems Integrator and TPA. In case of classifying the work as "Unsatisfactory", the Systems Integrator shall highlight the reason for non-compliance as per the Specifications and Standards set forth under Annexure A along with design requirements under the scope of work. The results of the FAT conducted shall include submission of all relevant documents such as measurement book, Acceptance Testing Template report etc. Further, "Unsatisfactory" cases shall be communicated to the Systems Integrator by the TPA for its rectification.
- During a FAT, if more than 20% discrepancies across sampled site route or locations across GPs/villages are observed within a Taluka which may be attributed due to negligence on the part of the Systems Integrator, under such circumstances, the FAT may be rejected. Further, the Systems Integrator shall get the work redone in a time bound manner and re-submit FAT report compliance, upon which TPA shall have to recheck the sample, and may also extend the sample size of site route or location across SHQ/DHQ/Taluka/GPs/ villages for discrepancies and record its observations. However, if the discrepancies are less than 20% within a SHQ/DHQ/Taluka, then TPA shall provide a provisional acceptance, and issue a Provisional Acceptance Certificate. The Systems Integrator is obligated to rectify the outstanding item or Punch List in a time bound manner to receive a Final Acceptance Certificate. In this process, the Systems Integrator shall comply with the timelines of the construction milestone and shall be responsible for delays on the re-work on its scope.
- In case any inspected or tested components/site route fail to conform to the Specifications and Standards or design requirements, the Systems Integrator shall either replace the rejected components or make all alterations necessary to meet specification/ requirements without any additional cost to the Authority.
- If any equipment or any part thereof is found to be defective or fails to fulfil the requirements, the Authority shall give notice to the Systems Integrator setting forth details of such defects or failure and the Systems Integrator shall at their own cost make the defective equipment good or alter the same to make it comply with the requirements forthwith, within a period not exceeding one month of the initial report. These replacements shall be made by the Systems Integrator free of all charges at site and route locations.
- The cost of all associated works regarding testing as per the scope of work such as digging pits at sample sites for connectivity across SHQ/DHQ/Taluka/GPs and villages, its restoration, and arrangement of testing instruments such as OTDR etc. shall be borne by the Systems Integrator. Inspection work for FAT within a State shall be offered only after completion of PAT of the route and site location.
- All reasonable facilities and assistance like testing instruments and other test devices including access to drawings and other details shall be furnished, by the Systems Integrator to the TPA and the Authority.

8.3 ANNEXURE C

KEY PERFORMANCE INDICATORS

A. Construction



All the villages should be connected as per the scope of work defined. The Penalties applicable for not meeting the Key Performance Indicators (KPIs) as summarized below:

SNo.	Delay in meeting defined construction schedule	Penalty %
1	Up to 60 days	At the rate of 0.01% of the Performance Security for each month of delay for each incomplete Taluka/GPs/villages, until such Project Milestone is achieved.
2	From 61 days – 120 days	At the rate of 0.02% of the Performance Security for each month of delay for each incomplete Taluka/GPs/villages, until such Project Milestone is achieved
3	From 121 days – 180 days	At the rate of 0.03% of the Performance Security for each month of delay for each incomplete Taluka/GPs/villages, until such Project Milestone is achieved
4	Beyond 181 days	At the rate of 0.05% of the Performance Security for each month of delay for each incomplete Taluka/GPs/villages, until such Project Milestone is achieved. Delay in project beyond 181 days, DOIT has right to terminate the contract.

Illustrative - SLA calculation for Network Creation

$$\text{Calculation of penalty in \%} = \frac{\text{DHQ/Taluka/GPs/villages not connected as planned} \times 100}{\text{Total GP's / villages Targeted}}$$

B. Operation and Maintenance

Following table depicts the penalty to be deducted, depending on network uptime. The penalties for Operation and Maintenance provided below shall not be applicable for the period of 17 months from Appointed Date. The KPIs shall be reviewed and updated by Authority every year.

i. SLAs for Active Network Elements connected on Ring topology

S.No	Uptime at taluka level	Penalty %
1	>=99.9%	No Penalty
2	>=85% to <99.9%	Equal to 0.010% (zero point zero one per cent) of the amount of weighted Performance Security per taluka per month
3	>=75% to <85%	Equal to 0.02% (zero point zero one five per cent) of the amount of weighted Performance Security per taluka per month
4	>=65% to <75%	Equal to 0.030% (zero point zero two per cent) of the amount of weighted Performance Security per taluka per month. DOIT has right to terminate the agreement contract if uptime will be less than 65% uptime,

ii. SLAs for Active Network Elements connected on Spur (linear) topology UG/OH at Village

S.No	Uptime at taluka level	Penalty %
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1	$\geq 99.9\%$	No Penalty
2	$\geq 85\%$ to $< 99.9\%$	Equal to 0.010% (zero point zero one per cent) of the amount of weighted Performance Security per taluka per month
3	$\geq 75\%$ to $< 85\%$	Equal to 0.02% (zero point zero one five per cent) of the amount of weighted Performance Security per taluka per month
4	$\geq 65\%$ to $< 75\%$	Equal to 0.030% (zero point zero two per cent) of the amount of weighted Performance Security per taluka per month. DOIT has right to terminate the agreement contract if uptime will be less than 65% uptime,

Note:

Detail SLA and Penalty % will be dependent on UPTIME For each Last user/Village/Taluka/DHQ. Intent of DOIT is not the impose the penalty on System Integrator, but same time DOIT don't want to compromise on UPTIME. TPA/DOIT will mention in detail at time of RFP.

8.4 ANEXURE D

LIST OF VILLAGES

a) North Goa

IMPLEMENTATION (DESIGN, LAYING, TESTING, COMMISSIONING), OPERATIONS AND MAINTENANCE OF STATE-WIDE FIBER OPTIC CABLE (OFC) NETWORK IN THE STATE OF GOA



Aldona (CT)	Marna	Velguem	Cotorem	Edorem	Gancim
Calvim	Siolim (CT)	Agarvado	Govanem	Maloli	Carambolim
Corjuem	Siolim (CT)	Chopdem	Malpona	Nagargao	Chimbel (CT)
Ponolem	Sodiem	Alorna	Siranguli	Nanorem	Morambi-O-Grande (Merces) (OG)
Anjuna (CT)	Sircaim	Arambol (CT)	Sirsodem	Satorem	Ambarim
Arpora	Socorro (CT)	Amberem	Velguem	Satrem	Caraim
Nagoa	Tivim	Casnem	Xelopo-Curdo	Signem	Chorao
Assagao	Paliem	Poroscodem	Choraundem	Ustem	Corlim (CT)
Assonora	Punola	Chandel	Dongurli	Vainguinim	Cumbarjua (CT)
Moitem	Ucassaim	Corgao	Golauli	Xelopo-Buzruco	Gandaulim
Bastora	Canca	Dargalim	Ivrem-Buzruco	Zarani	Bambolim (CT)
Calangute (CT)	Verla	Ibrampur	Ivrem-Curdo	Codiem	Curca
Camurlim	Adwalpale	Cansarvornem	Naneli	Cumarconda	Goalim Moula
Calangute (CT)	Agone	Querim	Pale	Pissurlem	Talaulim
Candolim (CT)	Cudnem	Tiracol	Rivem	Ponocem	Goltim
Marra	Harvalem	Mandrem (CT)	Surla	Vaguriem	Navelim
Colvale (CT)	Carapur (CT)	Morjim (CT)	Conquirem	Podocem	Morambi-O-Grande (Merces) (OG)
Guirim (CT)	Sarvona	Ozorim	Damocem	Poriem	Morambi-O-Pequeno (Merces) (OG)
Moira (CT)	Latambarcem	Paliem	Guleli	Anjunem	Murda (CT)
Nachinola	Aturli	Parcem (CT)	Melauli	Gonteli	Renovadi (OG)
Nadora	Maem	Mopa	Buimpal	Gululem	Neura-O-Grande
Nerul (CT)	Vainguinim	Tamboxem	Onda (CT)	Ponsuli	Neura-O-Pequeno
Oxel	Dumacem	Uguem	Saleli	Quelaudem	Siridao
Parra	Mencurem	Torxem	Sonus-Vonvoliem	Querim	Mercurim (CT)
Penha-de-Franca (CT)	Mulgao	Tuem	Compordem	Ravona	Capao
Marra	Narao	Varconda	Dabem	Siroli	Malar
Pilerne (CT)	Navelim	Virnora	Mauzi	Carambolim-Bozruco	Narao
Pirna	Curchirem	Advoi	Naguem	Caranzol	Bainguinim
Olaulim	Maulinguem North	Ansolem	Zormen	Codvol	Ella
Pomburpa	Ona	Birondem	Morlem	Cudcem	Panelim (OG)
Salvador do Mundo (CT)	Cotombi	Padeli	Ambedem	Pendral	Goa Velha (CT)
Reis Magos (CT)	Pale (CT)	Sanvorcem	Bombodem	Sanvordem	Calapor (CT)
Revora	Piligao	Vantem	Carambolim- Brama	Sonal	Cujira (OG)
Saligao (CT)	Salem	Ambeli	Codal	Azossim	Jua (CT)
Salvador do Mundo (CT)	Sirigao	Assodem	Davem	Mandur	Durgawadi (OG) (Part)
Sangolda	Surla	Codqui	Derodem	Batim	Taleigao (OG) (Part)



b) South Goa

Agonda	Cortalim (CT)	Priol (CT)	Molcozona	Sirlim	Curdi
Cola	Quelossim	Velinga	Nagvem	Guirdolim	Curpem
Cotigao	Sancoale (CT)	Savoi-Verem	Undorna	Loutulim	Porteem
Gadongrem	Issorcim	Vagurbem	Zanodem	Macasana	Boma
Anjadip	Pale	Volvoi	Morpila	Calata	Calem
Loliem	Velsao	Ambaulim	Naquerim	Majorda	Costi
Poinguinim	Bandora (CT)	Assolda	Quitol	Utorda	Dongurli
Canacona	Betora	Odar	Sirvoi	Nagoa	Dudal
Caranzol	Codar	Xelvona	Xeldem (CT)	Navelim (CT)	Maulinguem
Colem	Conxem	Xic-Xelvona	Ambelim	Nuven (CT)	Oxel
Sigao	Nirancal	Avedem	Aquem (CT)	Orlim	Netorli
Sonauli	Betqui	Chaifi	Assolna	Mulem	Nundem
Darbandora	Candola (CT)	Cotombi	Adsulim	Paroda	Verlem
Piliem	Adcolna	Adnem	Benaulim (CT)	Rachol	Vichundrem
Bandoli	Boma	Bali	Cana	Raia (CT)	Colomba
Camarconda	Borim (CT)	Bendordem	Betalbatim	Davorlim (CT)	Rivona
Codli	Candepar	Cordem	Gonsua	Sarzora	Antorlim
Cormonem	Curti (CT)	Tiloi	Camurlim	Duncolim	Comproi
Moissal	Durbhat	Barcem	Carmona	Seraulim	Coranginim
Molem	Cundaim	Gocoldem	Cavelossim	Sao Jose de Areal (CT)	Rumbrem
Sangod	Marcaim (CT)	Padi	Cavorim	Talaulim	Santona
Agrote	Ponchavadi	Quedem	Chandor	Varca (CT)	Sanvordem (CT)
Sancordem	Quela (CT)	Quisconda	Chinchinim (CT)	Velim	Cotarli
Surla	Querim	Cavorem	Deussua	Verna (CT)	Muguli
Arossim	Siroda	Cazur	Colva	Bati	Patiem
Cansaulim	Telaulim	Corla	Gandaulim	Cumbari	Salauli
Cuelim	Vadi	Maina	Sernabatim	Dongor	Uguem
Chicalim (CT)	Orgao (CT)	Mangal	Vanelim	Naiquinim	Xelpem
Dabolim	Tivrem	Pirla	Curtorim (CT)	Potrem	
Sao Jacinto Island	Gangem	Sulcorna	Davorlim (CT)	Sigonem	
Sao Jorge Island	Usgao (CT)	Fatorpa	Dicarpale	Tudou	
Chicolna	Cuncolem	Molcarnem	Dramapur	Viliena	



8.5 ANNEXURE F

Format for submission of pre-NIT queries

Sr.No	Clause Reference	Page Reference	Clause Description	Query / Suggestion / Request with Justification
1.				
2.				

««« END OF EOI Document »»»