

Section V
Scope of Work

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SECTION V- SCOPE OF WORK**1. PROJECT BACKGROUND**

BharatNet is a flagship project of Government of India (GoI) funded by Universal Service Obligation Fund, Department of Telecommunications, Ministry of Communication to provide broadband connectivity at all GPs. Such broadband connectivity under this RFP is proposed to be provided by aerial OFC.

BharatNet project intends to provide internet access by laying optical fiber from Block to the Gram Panchayats and to enable the Govt. of India to provide e-service and e-applications nationally.

2. SCOPE OF WORK

USOF (DoT)/State intends to create digital highway by laying Optical Fiber Cable Connectivity from Block to Gram Panchayat, including supply of OLT, ONT, and Solar Panel to enable the intended services such internet, telephone, e-services and value added services.

The Implementation of the project is by State/SIA through a PIA who would be responsible for %Survey, Planning, Supply, Installation, end to end integration, testing and commissioning of OFC (Aerial) GPON Network. Also, to undertake the responsibility for Annual Maintenance Contract (AMC) of the created network for 5years+. For smooth implementation of this project SIA has split the entire project works in to TWO packages.

The scope of work is not limited to the respective bidding proposal (Price Schedule) submitted by the bidder. Any work which is not included in the Price Schedule, but specified in the Technical Specification or vice versa, is deemed to be included in the Scope of Works without any financial implication to the OWNER. However, if the same is not specified either in the Technical Specification and Price Schedule, it shall be executed by the PIA for completion of package(s)/works. The price of such works shall be decided mutually between the Contractor and OPTCL. In case there is any discrepancy in the item description between the BOQ of the Price Schedule and the Technical Specification, the Technical specification shall prevail and the Bidder(s) should quote accordingly.

Through this RFP, the selected Project implementing agency (PIA) shall ensure to undertake the following work:

1. **Provision of 1 Gbps bandwidth in case of wired media (OFC) at each GP.**
2. Provisioning of minimum 6 dark fibers in each Gram Panchayats
3. Medium of connectivity:
 - a) Stringing of fresh 48 Fibre ADSS from block to Gram Panchayat
 - b) Stringing of fresh 24 Fibre ADSS from block to Gram Panchayat using electric pole or nearest pole.
4. The provisioned bandwidth should have the capabilities to handle wide variety of e-services such as operational and social purposes, VPN networking, Internet (web browsing, e-mailing), VoIP, Video Store and forward high quality live video transmission, two-way video-conferencing, on board monitoring, chart updates.
5. An Indicative BoQ along with break up is provided in the RFP, however it may differ at the time of execution post the confirmation based on the site survey duly authenticated by State designated authorities.
6. The period for completion of Implementation would be one year, extended Guarantee period of 3 years and thereafter period of Annual Maintenance Contract would be for 5 years. The period of AMC may be extended thereafter on requirement basis, based on the satisfactory performance by the PIA.

7. The PIA shall form a project monitoring team to provide daily progress reports of implementation and also record the progress on project monitoring tool mandated by State Government and Central Government.
8. The PIA shall provide Monthly/Quarterly report to State / SIA regarding uptime details of Network. The SLA of minimum 95% to be met for the network availability including public holidays (SLAs defined in Section III . General Conditions of the Contract and Service Level Agreements).
9. PoP at Block shall be established at respective BSNL exchange for which power & other site requirements shall be provided by BSNL. The Power & other site requirements at Gram Panchayat shall be provided by State government. It would be the responsibility of PIA to carry out site survey to understand the level of preparedness in all respect. Through this RFP, USOF (DoT)/State/SIA also plans to provide Solar Power (SPV) (based upon the power requirement of the technology deployed at the site) along with other communication and IT equipment to power electronic equipment supplied through this tender. In cases, where the ONT has to be installed, does not have appropriate plug points/ wiring, the PIA shall draw the electrical wiring from the nearest junction box to the ONT/ Rack (with requisite plug points etc.) at no extra cost to State/SIA.
10. PIA shall undertake services during the Extended Guarantee period and Comprehensive Annual Maintenance Contract Period of network established under BharatNet. PIA would Besides the rural broadband infrastructure created implemented for BharatNet Phase II as part of this RFP, shall provide all necessary support and facilitation by PIAs onsite Project team on 24x7x365.
11. PIA is responsible for establishment of EMS/NMS. All the network elements i.e. OLT, ONT and SPV System should be manageable, configurable from the State/SIA NOC. Since, two nos. of PIA will be engaged under this project, the EMS/NMS shall be manageable and configurable to each other. For this purpose PIA shall not claim any additional cost for such integration.
12. Project Implementing Agencies shall provide access to the USOF (DoT)/BBNL or its authorised representatives to BharatNet assets as and when required for inspection and monitoring purpose.
13. Project Implementing Agencies shall be bound to follow the advisory and other directions issued by USOF (DoT) during the implementation of the project.

Project Area & Brief Scope of Works:

Scope of works- Pkg-1				
SI.No	Name of District	No of Blocks	No of GPs	Estimated Route Length (in KM)
1	Koraput	14	240	1277
2	Anugul	8	225	1197
3	Nawarangpur	10	174	926
4	Malkangiri	7	101	537
5	Keonjhar	4	106	564
6	Mayurbhanj	4	82	436
7	Rayagada	11	181	963
8	Balasore	11	71	378
9	Bhadrak	7	30	160
10	Boudh	2	6	32
11	Cuttack	11	31	165
12	Dhenkanal	6	14	74
13	Gajapati	5	20	106
14	Ganjam	13	28	149
15	Jagatsinghpur	3	4	21

16	Jajpur	7	31	165
17	Kendrapada	5	19	101
18	Kandhamal	9	19	102
19	Khurda	8	22	117
20	Nayagarh	7	19	102
21	Puri	11	38	202
	Total	163	1461	7774

Scope of works- Pkg-2				
Sl.No	Name of District	No of Blocks	No of GPs	Estimated Route Length (in KM)
1	Bolangir	14	316	1681
2	Sundargarh	17	281	1495
3	Bargarh	12	256	1362
4	Sambalpur	9	150	798
5	Kalahandi	7	152	899
6	Nuapada	5	132	704
7	Subarnapur	6	109	580
8	Jharsuguda	5	78	415
9	Deogarh	3	10	53
	Total	78	1484	7987

The scope of work shall comprise of two phases as follows:

- **Plan, Design, Implement and Commissioning along with Extended Guarantee Phase.**
- **Comprehensive Annual Maintenance Contract Phase.**

2.1. PLAN, DESIGN, IMPLEMENT AND COMMISSIONING ALONG WITH EXTENDED GUARANTEE PHASE:

The scope of work shall broadly comprise of site survey; due diligence; supply of ADSS fiber including Hardware & fittings for ADSS, electronics equipment and accessories; trenching, laying, blowing, splicing of fiber, back filling; live line installation and commissioning of optical fiber cable on the existing power distribution poles. If need arises for additional new poles to follow optimal path/route, such additional new poles shall be installed by the PIA. The fiber shall be terminated at ONT/Switch supplied through this contract at respective Gram Panchayat. The PIA shall be required to supply, install, commission and test the overall deployment at each site which include successful testing of connectivity from ONT (Gram Panchayat) to OLT (BSNL Exchange in Block Head Quarter), as well as testing of each core of fiber laid from the PoP/Block to Gram Panchayat.

The broad scope of work during this phase shall include the following, but is not limited to;

- Site Survey
- Designing the network
- Project Planning for execution of project within stipulated timelines
- Installation and Commissioning of IT and non IT components
- Installation and Commissioning of Physical Infrastructure components and network cabling etc. as per requirements
- Commissioning and Acceptance testing of the required components and making the network available to the GP level for service provisioning and/or utilization as per the framework specified by PIA
- All documentation generated during planning, installation and commissioning phase shall always be made available to State /SIA
- Establishment of State NOC

- Integration of State NOC with existing BBNL NOC
- Provide extended Guarantee of the equipment established under the project
- Annual Maintenance Contract of the established Network

2.1.1. SITE SURVEY

The PIA shall conduct exhaustive site survey based on optimal path for preparing the Bill of Quantity (BoQ) for each site. Once the Award of Work is issued to the Bidder, for successful implementation and completion of the site, the PIA needs to finalise a site survey report and BoQ within 2 months of issuance of Award of Work. Based on the site survey report and finalised BoQ, the PIA shall carry out the implementation of the works based on the revised work order.

- a) PIA shall conduct an actual GIS based survey within 2 months from issuance of Award of work.
- b) PIA shall carry out the site survey by capturing on site coordinates at every 20-30 mtrs/ Pole through GIS/Mobile application and related tools.
- c) Data generated by site survey shall be shared with State/SIA and it shall be integrated with GIS application and with Project Management tool of State/SIA/Centre whichever is applicable.
- d) Designing, planning of passive optical network as well as creation of database for utility infrastructure. The PIA shall prepare KMZ/KML file as per the data recorded during site survey from Block to GP using optimised routes.
- e) During the survey, the PIA shall take into account connectivity to GP based on optimal path for fiber layout covering maximum population en-route.
- f) A final exhaustive site survey report should be submitted covering detail BoQ for each GPs and further consolidated at Block level, deviation from indicative BoQ, risks involved to execute the work along with mitigation plan, resources required as well as a quality assurance plan indicating expected deviations along with the project execution strategy. A comprehensive documentation folder in soft copy (in Video format, KMZ format and MS Excel) to be submitted on the completion of the survey
- g) State/SIA shall validate, vet and approve the site survey report and BoQ as prepared by the PIA.
- h) In order to utilize the OLT at the PoP effectively, optical splitters may be required for connectivity and hence the requirement of the splitters should be assessed during the survey.

In case there is a deviation between the BoQ prepared by the PIA after exhaustive site survey and indicative BoQ given in this RFP, the following terms shall prevail:

- a) If BoQ provided by the PIA is less than the indicative BoQ then BoQ provided by the PIA shall be approved by State Level Implementation Committee of the State/SIA.
- b) If BoQ provided by the PIA is higher and within 10% of indicative BoQ then a third party auditor/ project management committee appointed by State/SIA shall validate the deviation and on providing reasonable justifications, State Level Implementation Committee of the State/SIA may approve the BoQ.
- c) If BoQ provided by PIA is higher and greater than 10% of indicative BoQ then the PIA shall provide a detailed report to State/SIA and State Level Implementation Committee of the State/SIA may approve the same for further implementation, if found accurate. This shall be dealt on case to case basis on providing reasonable justification

Note: In any case site survey and BoQ provided by PIA shall be inspected and validated by SIA. Based on approved site survey the revised work order shall be issued to PIA.

2.1.2. FIBER IMPLEMENTATION:

1. Based on the approved site survey report, the PIA shall be required to initiate fiber implementation.
2. Supply, delivery to site, unloading, storing, warehousing and handling of Optical Fiber cable equipment along with fittings and associated items as required, including the HDPE PLB duct, splitters, ONT, FDMS etc. as per the approved survey report.
3. Trenching, Laying, Backfilling, Blowing, Splicing, Terminating, Installation and Commissioning of underground fiber from Block to GP as per Annexure B . Engineering Instructions. (For underground fibre)
4. Live line Installation and Commissioning of Optical Fiber Cable on the existing power distribution poles from the nearest Block PoP to Gram Panchayat using appropriate pole clamping and accessories as per Annexure B . Engineering Instructions. (For Aerial fibre)
5. End-to-End testing of the connectivity thus laid from ONT at GP till Block OLT and further to BBNL NOC.
6. Testing of each core of the fibre.
7. The PIA shall complete all the implementation of the sites in the allocated district/block within the stipulated time.
8. The PIA shall also have to integrate the Fiber optic network with State NOC as well as BBNL Network Operations Centre in New Delhi or Bangalore with the help of BBNL team.

2.1.3. OLT, ONT AND SOLAR PANEL (SPV) INSTALLATION & COMMISSIONING AT BLOCK AND GRAM PANCHAYAT

1. PIA shall supply all the accessories required like lugs, fuses (at the power plant end), cable tray, support iron structure, Power Cable, Earthing Cable, and Attenuators etc. Length of Power & Earthing Cable, Number of Attenuators are site specific and PIA needs to supply as per site survey.
2. The number of patch cords to be supplied with the OLTs shall be four more than the number of PON ports for each type of OLT (i.e. 8, 12, 20 respectively). The patch cords specification shall be as per TEC GR. Design and specification of accessories at OLT site shall be finalized by State/SIA in consultation with PIA
3. Installation of OLT, ONT at the Block and Gram Panchayat respectively in coordination with State /SIA. Installation of FDMS and Rack (wherever applicable)
4. PIA shall install and commission Solar Panel (As per State plan and specification) in the respective Gram Panchayat
5. Testing of traffic from the ONT at Gram Panchayat to the Block OLT and further to BBNL central NOC.
6. General site readiness like provisioning of proper earthing, racks installations etc. shall be carried out by the PIA at no extra cost to State/SIA.
7. Additionally, in case the Gram Panchayat end point where the ONT has to be installed, does not have appropriate plug points/ wiring, the PIA shall draw the electrical wiring from the nearest junction box to the ONT (with requisite plug points etc.) at no extra cost to State/SIA.
8. The PIA Must ensure proper electrical wiring and earthing for necessary safeguard of all equipments installed in GP/Panchayat level.

2.1.4. ACCEPTANCE TESTING (COMMISSIONING) FOR THE NETWORK (CONNECTIVITY FROM BLOCK TO GRAM PANCHAYAT)

1. The final acceptance (commissioning) shall cover 100% of the network for the Gram Panchayat at Block level, after successful testing by State/SIA or its third party agency (TPA)
2. FAT would include installations and commissioning of IT equipment and non-IT equipment at Block and Gram Panchayat, commissioning of all network links and necessary site refurbishments (Earthing, electrical connectivity, structure cabling etc. as applicable) as well as testing of traffic from the ONT at Gram Panchayat to Block OLT and further to BBNL NOC.

2.1.5. GO-LIVE FOR THE NETWORK (CONNECTIVITY FROM BLOCK TO GRAM PANCHAYAT)

1. The Go-live for the connectivity from Gram Panchayat at Block level shall be considered when 100% implementation and commissioning for the defined locations along with Acceptance testing as envisaged has been completed.
2. The PIA would submit a Go-Live report to State/SIA in this regard detailing the completeness of the activities for the connectivity of GP at Block level. The Go-Live report shall be vetted by State/SIA in order to prove that the traffic is flowing through OLT from the respective Gram Panchayat.
3. The connectivity for GP at Block level could be declared Go-Live once ONT of GP is accessible from central BBNL NOC and the report regarding the same has been submitted and accepted by State/SIA.

Basic Requirements:

1. The PIA shall be responsible for provisioning of proper earthing for active equipment (OLT, ONTs etc.) in cases where earthing is not present as per earthing standards.
2. For aerial, 48/24 ADSS fiber shall be used depending on the topology of GPs at each Block.

Note:

1. In case any associated component is required not covered in the BoM, State/SIA may ask the PIA to procure the associated component so required. The price shall be determined by State/SIA and upon approval, the PIA shall install the associated equipment. This shall be dealt on case to case basis.
2. The PIA shall be required to follow the Technical Specification & Testing Parameters as mentioned in Annexure A, Engineering Instructions (EI) (Annexure B) for implementation of the project.
3. Any deviation from the standard EI, shall be liable for penalty as per **Annexure B (2)**.
4. In case there are any changes in the standard engineering instructions PIA may be asked to execute the work as per the latest engineering instructions.
5. PIA shall obtain necessary Right of Way (RoW) from State/Central agencies whichever applicable. State/SIA shall endeavour all facilitation to the PIA in obtaining the same. The cost incurred in obtaining RoW (Statutory Payments) shall be reimbursed on actuals on giving necessary/relevant documents.

2.1.6. QUALITY ASSURANCE AND TESTING

1. The QA test schedule shall be issued by State/SIA.
2. The supply shall be accepted only after Quality Assurance tests are carried out by appropriate Quality Testing Agencies as identified by State/SIA.
3. Only for the completed supplies, as per work order issued during delivery period shall be considered to have been supplied within the scheduled delivery period.
4. In case of any Quality issue, the manufacturers shall be required to replace the defective/inferior material, in full, by good material duly passed by QA.
5. The QA units of BSNL/TPA, as specified by BBNL in the Work Order, while clearing the equipment/ stores shall be strictly adhere to the package discipline for all item in the Bill of Material mentioned in the Work Order. Supplies made in full, ~~as~~ per the work order, during delivery period only shall be deemed to have been supplied within the schedule delivery period.

2.2 GUARANTEE PHASE:

1. After commissioning, the maintenance of the network as per the Service Level Agreement (SLA) shall be carried out for a period of 03 years from the date of commissioning.
2. The extended guarantee of the equipment supplied shall be 3 years from the date of completion of the project works.
3. The maintenance phase shall commence once the FAT is issued by State/SIA and after extended guarantee period.

2.3 COMPREHENSIVE ANNUAL MAINTENANCE CONTRACT PHASE:

1. Periodical Maintenance: The PIA shall carry out periodical maintenance of the network commissioned and shall submit the report on quarterly basis during this phase.
2. Corrective Maintenance: If any issue is reported by the end user (GP, Block) with regards to the services, then the issue shall be reported to centralized help desk of NOC of State/SIA and if there is any issue in the network connectivity, the issue shall be forwarded to the respective PIA. These issues shall be rectified so as to restore the services as per the SLA. Issues pertaining to the ONT/Splitter/FDMS/OFC/ other active or passive equipment (installed by the PIA except OFC/PLBE) shall be handled by the PIA. However, if there are issues with State/SIA, it shall be reported to respective stakeholders. In case of theft/ physically damaged (Repair not possible (RNP), the equipment shall be replaced on State/ SIA cost after due recommendation of TPA/PMC and lodging of FIR by the Gram Panchayat/ State/SIA.
3. In issues pertaining to OFC/PLBE Cable due to poor workmanship and other technical reason the fault has to be rectified or cable/PLBE pipe has to be replaced by PIA. In case of cable cut due to any reason the fault to be rectified by the PIA and services to be restored as per SLA. All costs required for such restoration to be borne by PIA except in cases of the following condition after supervision report of TPA/PMC.
4. If the OFC cable cut is such that the cable has been damaged for distance more than 10 meter by any external agency then State/SIA shall bear cost of cable/PLBE. But the PIA shall bear the cost of workmanship and other store like splicing, jointing kits etc.
5. If the pole has fallen down or replaced by electricity department/external agency and cable has been damaged such that it cannot be used further, then State/SIA shall bear cost of cable, Pole (if required) other pole kits. But the PIA shall bear the cost of workmanship and other store like jointing kits etc.
6. Due to various cut (more than 8 cut sin one km) due to wear and tear and external agency, OFC cable shall be replaced and State/SIA shall bear the cost of Cable. But the PIA shall bear the cost of workmanship and other store like jointing kits etc.

3. AUDIT AND SECURITY SERVICES

1. The PIA shall be required to provide comprehensive support to State/SIA during the Third Party Audit and Security Audit etc. The PIA shall be responsible in getting the required readiness built in the network during audit for security solutions.
2. State/SIA reserves the right to inspect, monitor and assess the progress and performance of the project either itself or through another designated agency as it may deem fit, throughout the course of the Contract. State/SIA may demand and upon such a demand being made, State/SIA shall be provided with any document, data material or any other information which it may require, to enable it to assess the progress of the project.
3. State/SIA shall also have the right to conduct, either itself or through another agency as it may deem fit, an audit to monitor the performance of the PIA of its obligations/ functions in accordance with the standards committed to or required by State/SIA and the PIA undertakes to cooperate with and provide to State/SIA or any other agency appointed by

USOF (DoT)/State/SIA, all documents and other details as may be required by them for this purpose.

4. MIS REPORTS

The PIA shall submit the periodical reports on a regular basis as per the prescribed formats provided by the State/SIA.

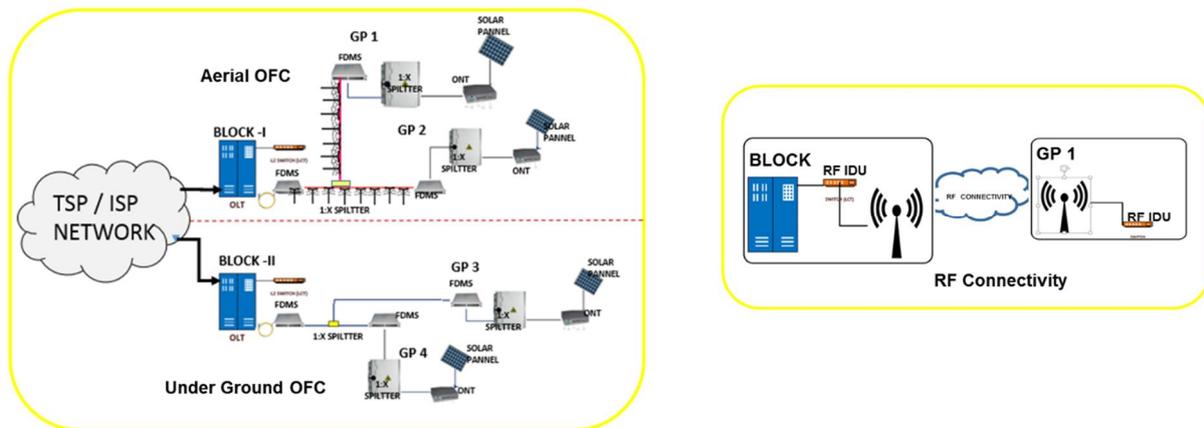
***Indicative report may inter-alia includes the following reports:**

- i. Summary of issues/ complaints
- ii. Summary of resolved/ unresolved and escalated issues/ complaints
- iii. Summary of resolved/ unresolved and escalated issues/ complaints to vendors
- iv. Summary fault/complain reported and pending at State/SIA end.
- v. Component wise IT infrastructure availability and resource utilization
- vi. Consolidated SLA/ (non) conformance report

5. THIRD PARTY AGENCY FOR THE ACCEPTANCE TESTING CERTIFICATION

The Acceptance Testing (AT) for the GPs shall be of Two Tier.

1. The First Tier . State/SIA shall have the right to appoint a TPA to carry out the inspection of work & integration of the GPs with NOC. TPA shall submit the Acceptance Testing Report and Certificate to State Government/BBNL which shall further be shared with USOF (DoT).
2. The Second Tier - USOF shall have the right to appoint a TPA other than the TPA appointed by the State/SIA. TPA shall randomly inspect, verify and certify the progress and completion of the project on sample basis and shall submit such reports both physical and financial to USOF (DoT).

Network Design Architecture from Block to GP (State wise)**Write on Network Design Architecture (State wise)**

Design assumption: Each GP should have minimum 6 core dedicated Fiber connectivity (from Block to GP). Out of 6 core fiber, 1 core fiber maybe used to lit the GP (GPON-ONT) and remaining 5 core dark fiber shall be used for monetization and revenue generation.

Example: If one block have 15 GP and each GP needs 6 core dedicated fiber connectivity then total number of fiber terminated **at block** shall be minimum $15 \times 6 = 90$ core. Out of 90 core **$15 \times 5 = 75$ cores shall be dark fiber** (block to GP: minimum 5 core each GP) and remaining 15 cores shall be used for GPON connectivity to lit each GP. Fiber core required for GPON at Block level may be decrease based on the network design proposed and approved for each block.

RF connectivity shall be considered for only those GPs, which are not feasible on Fiber connectivity.

Note: Project implementation agency shall complete detailed site survey of each block and shall propose Network design for each block with detailed BoM for material and services. State or State appointed TPA shall approve the design and BoM based on the confirmation of minimum available dark and lit fiber per GP.