

“High Speed Bandwidth for All” – BharatNet Project

**Request for Proposal (RFP) for Selection of Project
Implementing Agency for BharatNet Phase-II project
in the State of Gujarat under Gujarat Fibre Grid
Network Limited (Package A)**

RFP No: GFGNL/DST/BharatNet-PIA/2018/30



Issued by:

Gujarat Fibre Grid Network Limited (GFGNL)

A Government of Gujarat Company

Block No: 1, 8th Floor, Udyog Bhavan, Sector-11, Gandhinagar: 382010

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Glossary

Abbreviation/ Acronym	Description
ABD	As Built Diagram
ADSS	All-Dielectric Self-Supporting
BBNL	Bharat Broadband Network Limited
BG	Bank Guarantee
BoQ	Bill of Quantity
CPE	Customer Premise Equipment
DD	Demand Draft
DST	Department of Science and Technology, Government of Gujarat
DoT	Department of Telecommunication
EMD	Earnest Money Deposit
ESH	Extended Service Hour
Eth	Ethernet
FAT	Final Acceptance Test
FEC	Finance Evaluation Committee
FPA	Fourth Party Auditor
FTB	Fibre Termination Box
GFGNL	Gujarat Fibre Grid Network Limited
GoG	Government of Gujarat
GoI	Government of India
GPON	Gigabit Passive Optical Networks
GP	Gram Panchayat
HDPE	High-Density Polyethylene
INR	Indian Rupees
LCBS	Least-Cost Based Selection
LoI	Letter of Intent
MAF	Manufacturers Authorization Form
MoU	Memorandum of Understanding
N/w	Network
NDA	Non-Disclosure Agreement
NOC	Network Operation Center
O&M	Operation & maintenance
O/H	Overhead

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OEM	Original Equipment Manufacture
OFC	Optical Fibre Cable
OLT	Optical Line Terminal
ONT	Optical Network Terminal
OTDR	Optical Time-Domain Reflectometer
PBH	Primary Business Hour
PIA	Project Implementing Agency
PLB	Permanently Lubricated
PMA	Preferential Market Access
PoP	Point of Presence
PQC	Pre-Qualification Criteria
PSU	Public Sector Unit
RCC	Reinforced Cement Concrete
RF	Radio Frequency
RFP	Request for Proposal
RoW	Right of Way
SIA	State Implementing Agency
SLA	Service Level Agreement
SOR	Schedule of Requirements
SPV	Special Purpose Vehicle
TAC	Type Approval Certificate
TECGR	Telecommunication Engineering Center Generic Requirements
TPA	Third Party Auditor
TSEC	Technical Specification Evaluation Certificate
USOF	Universal Service Obligation Fund
VPN	Virtual Private Network
VRLA	Valve-Regulated Lead-Acid
Wi-Fi	Wireless Fidelity

Disclaimer

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

The purpose of this RFP is to provide interested parties with information that may be useful to them in eliciting their financial offers (the "Proposal") pursuant to this RFP. This RFP includes statements, which reflect various assumptions and assessments arrived at by the Tenderer, in relation to the RFP. Such assumptions, assessments and statements do not purport to contain all the information that each bidder may require. This RFP may not be appropriate for all persons, and it is not possible for Tenderer, its employees or Consultants to consider the investment objectives, financial situation and particular needs of each party who reads or uses this RFP. The assumptions, assessments, statements and information contained in this RFP, may not be complete, accurate, adequate or correct. Each bidder should, therefore, conduct its own surveys and analysis and should check the accuracy, adequacy, correctness, reliability and completeness of the assumptions, assessments, statements and information contained in this RFP and obtain independent advice from appropriate sources before filling up the RFP. Any deviation in the specification or proposed solutions will be deemed as incapability of the respective Agency and shall not be considered for final evaluation process.

Information provided in this document to the Bidder(s) is on a wide range of matters, some of which depends upon interpretation of law. The information given is not an exhaustive account of statutory requirements and should not be regarded as a complete or authoritative statement of law. The Tenderer accepts no responsibility for the accuracy or otherwise for any interpretation or opinion on law expressed herein.

The Tenderer - its employees and advisors make no representation or warranty and shall have no liability to any person, including any Applicant or Bidder 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 RFP or otherwise, including the accuracy, adequacy, correctness, completeness, delay or reliability of the RFP and any assessment, assumption, statement or information contained therein or deemed to form part of this RFP or arising in any way during the Bidding process.

Note to Bidders

Gujarat Fibre Grid Network Limited (GFGNL) issued Request for Proposal (RFP) (No. : GFGNL/DST/BharatNet – PIA/2018/26) dated 28th Feb 2018 for Selection of Project Implementing Agency for BharatNet Phase-II project in the State of Gujarat. Corrigendum to this RFP was also released on 12th Mar 2018. This RFP included scope of work for both Packages (Package – A : Rest of Gujarat & Package – B : Saurashtra).

This RFP is refloated as 2 separate RFPs. One for Package – A : Rest of Gujarat with No. : GFGNL/DST/BharatNet-PIA/2018/30 and second for Package – B : Saurashtra with No. : GFGNL/DST/BharatNet-PIA/2018/31. These both RFP documents includes scope of work for both Packages. Bidders are requested to consider the scope of work for the Package for which they want to bid.

1 Section I: Invitation to Bids

1.1 Invitation Details

- a. Gujarat Fibre Grid Network Limited (GFGNL) is inviting bids from the eligible bidders for “Selection of Project Implementing Agency (PIA) for implementation and O&M of BharatNet Phase-II in state of Gujarat”.
- b. GFGNL intends to select the PIA firm by inviting the proposals through Open Tender Process. Bidder shall upload their bids on <https://www.gfgnl.nprocure.com>. Bids complete in all respects should be uploaded on or before the bid due date
- c. The Bid Security and non-refundable bid processing fees in a separate sealed envelope superscribed with the bid document number to be submitted to GFGNL office.
- d. Tender documents are available only in electronic format which Bidders can download free of cost from the website <https://www.dst.gujarat.gov.in> and <https://gfgnl.nprocure.com>
- e. The bids have been invited through e-tendering route i.e. the eligibility criteria and financial stages shall be submitted online on the website <https://gfgnl.nprocure.com>
- f. Bidders who wish to participate in this bid will have to register on <https://gfgnl.nprocure.com>. Bidders who wish to participate in online bids will have to procure Digital Certificate as per Information Technology Act, 2000 using which they can sign their electronic bids.
- g. Bidders can procure the same from (n) code solutions – a division of GNFC Ltd., or any other agency licensed by Controller of Certifying Authority, Government of India. Bidders who already have a valid Digital Certificate need not procure a new Digital Certificate.
- h. In case of any clarifications required, please email your queries as per the format prescribed in the Bid @ gfgnl@bharatnet.gujarat.gov.in and pmc@bharatnet.gujarat.gov.in

Accessibility of Tender Document: The Tender Document to participate in e-Tender shall be available for downloading from 1st March, 2018 onwards from <https://gfgnl.nprocure.com>. The Tender document shall not be available for download on or after its submission/ closing date. Demand Draft of an amount of INR **INR 12,500/- (Twelve thousand and Five Hundred only)** for each package, in favour of “Gujarat Fibre Grid Network Limited” drawn on any scheduled bank and payable at Ahmedabad/Gandhinagar, shall have to be submitted towards Tender Fee along with the tender bid, failing which the tender bid shall be rejected.

1.2 Summary of Packages where work is to be performed through PIA on turnkey basis:

- a. The agency (PIA) shall be responsible for implementing entire project on EPC basis including but not limited to Survey, Design & Plan, Supply, Installation, testing, commissioning of OFC (Underground & Aerial) & its accessories (patch panel, cemented route marker, Rack Mounted splitter, splicer, joint connectors, mounting structure for Aerial, Pole [if required] etc.), PLB HDPE Duct, Manhole & Handhole, Joint chambers, Patch cords, Racks, UPS, GPON equipment, NOC equipment's (IT & Non-IT), Remote Fibre Management System, other Hardware/software as per detailed scope of work and its end-to-end integrations. Also, to undertake the responsibility for Operations & Maintenance (O&M) and service provisioning of the established network for 7 years from the date of Go-live on turnkey basis.
- b. The GPs to be connected under BharatNet Phase-II has been divided into two packages, each containing a group of GPs for convenience of implementation. These packages shall be treated as part of one tender, as the same are envisaged to be implemented in parallel/simultaneous mode.

Sr. No.	Scope	Package A (Rest of Gujarat)	Package B (Saurashtra)
1.	No. of districts – Phase 2	9	9
2.	No. of blocks – Phase 2	64	64
3.	No. of GPs – Phase 2	3409	3578
4.	No. of districts – Phase 1	3	1
5.	No. of blocks – Phase 1	6	1
6.	No. of GPs – Phase 1	415	120
7.	Total No. of GPs – (Phase 2+Transferred from Phase 1)	3824	3698
8.	Deleted		
9.	Planning of Network	Yes	Yes
10.	Design and route optimization using GIS	Yes	Yes
11.	Procurement of all required materials including below but not limited to: <ol style="list-style-type: none"> a. Duct b. Fibre cable c. Electronic components d. Measurement instruments 	Yes	Yes

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	<ul style="list-style-type: none"> e. Maintenance equipment f. All required accessories 		
12.	<p>Implementation up to GP including:</p> <ul style="list-style-type: none"> a. Procurement of RoW permissions. b. Digging/trenching/HDD c. Duct laying/duct pulling d. OFC laying e. Installation f. Commissioning g. Testing h. Connectivity and Integration of GP to NMS/State NOC/BBNL NOC i. Documentation 	Yes	Yes
13.	<p>Software</p> <ul style="list-style-type: none"> a. Network Management System including Remote Fibre Monitoring System(RFMS) integrated with GIS b. Project Management Tool including Workflow management, RoW Management and integrated with GIS c. GIS layered Network Information System (GIS NIS) that is network management, fibre management, inventory and asset mapping, GIS layer MIS d. Mobile interface (supporting Mobile and Tablet) for Project and O&M Phase e. Web Portal f. ERP 	<p>Yes</p> <p>Please refer Table – 1.2</p>	<p>Use services as required and assist in integration</p>
14.	<p>State Network Operations Center</p> <ul style="list-style-type: none"> a. Planning in collaboration with GFGNL b. Design in collaboration with GFGNL c. Procurement d. Implementation 	Yes	No

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	<ul style="list-style-type: none"> e. License Management [if required] f. Training & Support to Help Desk staff <ul style="list-style-type: none"> a. Tier 1 – Front Office b. Tier 2 – Back Office g. Integration with BBNL NOC h. SLA computation 		
15.	<p>Operations</p> <ul style="list-style-type: none"> a. Network Inventory management b. Service Provisioning c. Network Configuration/ Configuration Management d. Bulk bandwidth provisioning e. Dark fibre delivery & SLA monitoring f. Reporting 	Yes	Yes
16.	<p>Maintenance for a period of 7 years from date of Go-live</p> <ul style="list-style-type: none"> a. Incident Management b. Predictive maintenance c. Preventive maintenance d. Corrective Maintenance e. SLA compliance f. Problem Isolation, Determination, Troubleshooting and Resolution g. Reporting 	Yes	Yes

Table 1.1

Note: The PIA for Package B will assist the PIA for Package A in integration of software wherever required.

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Summary of software that are part of Package A (Rest of Gujarat) is given below:

Software	Procurement	Implementation	Feature Development	Operate	Maintenance
Network Management System • GIS integration • RFMS	✓	✓	✓	✓	✓
Project Management tool • Workflow Management • RoW Management	✓	✓	✓	✓	✓
GIS layered network management, fibre management, inventory and asset mapping, GIS layer MIS	✓	✓	✓	✓	✓
User Interface through Mobile Application for Project & O&M Phase	✓	✓	✓	✓	✓

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Software	Procurement	Implementation	Feature Development	Operate	Maintenance
Web Portal	✓	✓	✓	✓	✓
ERP <ul style="list-style-type: none"> • Finance and Billing • Asset Management • HRMS and Payroll for Workforce Management • Customer Relationship Management 	✓	✓	✓	✓	✓
OS and Database	✓	✓	-	✓	✓

Table 1.2

Note:

- a. The PIA will have to provide tablets / equivalent smart phones with GPS facility to field staff to operate mobile application during execution and O&M phase.
- b. The Bidders of both the packages are expected to conduct a comprehensive site survey before bidding to arrive at the actual route lengths, BoQ and other components efficiently and effectively.

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- c. Bidders are open to quote and implement/execute (upon arriving as L1 bidder) both the packages.
- d. GFGNL reserves the right to change/replace the aforementioned software. However, the successful bidder would be required to support implementation, and continue to maintain and operate the new software after receiving appropriate training.
- e. RFMS software to be provided by bidders of both package. However, PIA of Package A will be responsible for integration of RFMS software with his NMS and dashboard.

Package A (Rest of Gujarat) consists of:

1. Optical Fibre Cable (OFC-underground and aerial) Survey, Design & Plan, Supply, Installation, Testing, Commissioning, end to end integration, and Operations & Maintenance at 3824 Gram Panchayats (Annexure - C) as per the detailed scope of work specified in this tender document including:
 - a. Planning of network
 - b. Verification and optimization of routes designed based on GIS data and survey
 - c. Procurement of RoW permissions.
 - d. Procurement of duct, fibre cable and accessories
 - e. Digging, trenching/HDD and OFC laying.
 - f. Installation, commissioning and testing of OFC and related equipment.
 - g. Connectivity to GFGNL's State NOC at Gandhinagar, Gujarat along the specified route.
 - h. O&M of various components mentioned above, to ensure uptime of the network as per agreed SLAs for a period of 7 years from the date of Go-Live.
 - i. Service provisioning through dark fibre/shared bandwidth to ISP/TSP/etc at OLT/ONTs/NOC.
 - j. Bandwidth provisioning for each ONT, through OLT/NOC via either BSNL or GSWAN backhaul. This would entail all connections including connection with OCLAN.
2. Active electronics implementation and O&M
 - a. Planning, Procurement, Design, Implementation of active electronics at State NOC, OLT and ONT Locations (Block and GPs).
 - b. Planning, designing, procurement, installing, testing & commissioning of all required electrical utilities.
 - c. O&M for all central electronics components, to ensure uptime of the network as per agreed SLAs for a period of 7 years from the date of Go-Live.
 - d. Integration of Active electronics with State NOC at Gandhinagar, Gujarat.
3. State Network Operation Center & Software
 - a. Plan & Design, Supply, Installation, Testing, Commissioning and O&M of all the required IT and Non-IT Infrastructure including Software components as defined under the detailed scope of work section of this tender document for successful running of the entire NOC Operations for the period of seven years from the date of Go live.
 - b. Integration of State NOC with Central (BBNL) NOC.

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- c. Provide Tier 2 (defined as Front Office and Back Office respectively) support for network problem isolation, determination and resolution using NOC tools.
 - d. Design & Planning, procurement and implementation of NMS, RFMS, Project Management Tool, GIS, Mobile Application for Project & O&M Phase, Website/Web Portal, ERP. It is PIA of package A's responsibility to supply, install, test, commission and maintain required OS and Database.
 - e. Project Management Tool, Mobile Application (Project and O&M Phase), Web Portal, NMS, GIS-NIS and ERP should be supported perpetual licenses (including COTS / custom built). The solutions provided must migrate to open source and open standard platform after completion of project phase (without any additional cost for GFGNL).
 - f. PIA needs to intimate the compute requirement to GFGNL before deployment (i.e core, RAM and storage), which will be provisioned by GFGNL on State Data Centre. The software should be compatible with the virtualized environment.
 - g. Integration of all Network elements of package A into the NOC software.
 - h. Operation, Maintenance support for all central site software.
4. Provide necessary Deliverables and Documentation including but not limited to:
 - a. As Built Diagram, Fibre Layout, Periodic maintenance reports, Inspection Reports, Root Cause Analysis, Incident Reports.
 - b. Other Documents including but not limited to: User Acceptance Test Reports, Security Policy and System Security Plan, Incident Response Policy, Acceptable Use Policy, Asset(including spares) Inventory on GIS, Monitoring and Privacy Policy, Configuration and Change Management, Disaster Recovery, Business Continuity, and Contingency Planning, System Configuration and Procedures, Network Configuration, Risk Assessment and Management Plan
 5. Providing required manpower in NOC as specified in Clause 4.6.3 and extending all required field support for successful operations and maintenance of Network.

Package B (Saurashtra) consists of:

1. Optical Fibre Cable (OFC-underground and aerial) Survey, Design & Plan, Supply, Installation, Testing, Commissioning, End to End Integration, and Operations & Maintenance at 3698 Gram Panchayats (Annexure – C) as per the detailed scope of work specified in this tender document including:
 - a. Planning of network
 - b. Verification and optimization of routes designed based on GIS data and survey
 - c. Procurement of RoW permissions.
 - d. Procurement of duct, fibre cable and accessories
 - e. Digging, trenching/HDD and OFC laying
 - f. Installation, commissioning and testing of OFC and related equipment
 - g. Connectivity to GFGNL's State NOC at Gandhinagar, Gujarat along the specified route.
 - h. O&M of various components mentioned above, to ensure uptime of the network as per agreed SLAs for a period of 7 years from the date of Go-Live.
 - i. Service provisioning through dark fibre/shared bandwidth to ISP/TSP/etc at OLT/ONTs/NOC
 - j. Bandwidth provisioning for each ONT, through OLT/NOC via either BSNL or GSWAN backhaul. This would entail all connections including connection with OCLAN
2. Active electronics implementation and O&M
 - a. Planning, Procurement, Design, Implementation of active electronics at OLT and ONT locations (Block and GPs) for the package B across the entire state
 - b. Planning, designing, procurement, installing, testing & commissioning of all required electrical utilities
 - c. O&M for the period of seven years from the date of Go-live to ensure uptime of the network as per agreed SLAs terms and conditions.
 - d. Integration of Active electronics with State NOC at Gandhinagar, Gujarat.
3. Provide necessary Deliverables and Documentation including but not limited to:
 - a. As Built Diagram, Fibre Layout, Periodic maintenance reports, Inspection Reports, Root Cause Analysis, Incident Reports.
 - b. Other Documents including but not limited to: User Acceptance Test Reports, Asset(including spares) Inventory on GIS, Disaster Recovery, Business Continuity, and Contingency Planning, Network Configuration, Risk Assessment and Management Plan

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4. Providing required manpower in NOC as specified in Clause 4.6.3, extending all required field support for successful operations and maintenance of Network and integration of all Network elements of package B into the NOC software.

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1.3 Bid Data Sheet

Information	Details
Tender Number	GFGNL/DST/BharatNet – PIA/2018/30
Name of Tenderer	Gujarat Fibre Grid Network Limited
Tender Name	Selection of Project Implementing Agency for BharatNet Phase-II project in the State of Gujarat under Gujarat Fibre Grid Network Limited
Date of Issue/Publishing of the RFP	1 st March 2018
Document Download/Sale Start Date	1 st March 2018
Document Download/Sale End Date	16 th April 2018 (15:00 Hrs.)
Date for Pre-Bid Conference	15 th March 2018 (15:00 Hrs.)
Venue of Pre-Bid Conference	Gujarat Fibre Grid Network Limited (GFGNL), Block No: 1, 8th Floor, Udyog Bhavan, Sector-11, Gandhinagar: 382010
Date for 2nd Pre-Bid Conference	28 th March, 2018
Venue of 2nd Pre-Bid Conference	Conference Room-1, Block No-1, 4th Floor, New Sachivalaya, Gandhinagar.
Last Date and Time for Submission of Bids	20 th April 2018 (15:00 Hrs.)
Date and Time of Opening of Technical Bids	20 th April 2018 (17:00 Hrs.)
Date and Time of Opening of Financial Bids	To be communicated to bidders later
Tender Fee	INR 12,500/- (Twelve thousand and Five Hundred only) for each package
EMD	INR 15,00,00,000/- (Rupees Fifteen Crores only) for each package.
Bid Validity days	180 days from the date of submission of Bids
Validity of the Contract from the date of issuance of Award of Work	8 years (1 year for Implementation and Go-Live, and 7 years for Operations and Maintenance from the date of Go Live)

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Address for Communication	CFO, Gujarat Fibre Grid Network Limited (GFGNL), Block No: 1, 8th Floor, Udyog Bhavan, Sector-11, Gandhinagar: 382010 Phone No: 079 23259224, Fax No: 079 23238925 Email address : gfgnl@bharatnet.gujarat.gov.in pmc@bharatnet.gujarat.gov.in
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Table 1.3

2 Section II: General Instruction to Bidders

2.1 Procedure for Submission of Bids

1. Bids (Technical bid & Financial bid) shall be submitted online on <https://www.gfgnl.nprocure.com>.
2. The participating Bidders in the tender should register themselves on e-procurement portal, if not registered earlier.
3. The Bidders can login to e-procurement portal in secure mode only by signing through the Digital certificates.
4. The Bidders should scan and upload the respective documentary evidence as mentioned in Eligibility Criteria.
5. The bidders shall sign on all the statements, documents, certificates uploaded by them, owning responsibility for their correctness/authenticity.
6. The rates should be quoted in the financial bid format attached with the tender and upload online only.
7. The bidders should submit a priced BOQ as per Annexure 5.19 in a sealed envelope on 3rd day after the opening of Financial bid.
8. Bidders are required to upload the Scanned copy of Bank Guarantee and Demand draft for EMD and Tender Fee respectively **for each package** (as mentioned in this RFP) at online bidding portal. Further, original Bank Guarantee and Demand Draft for EMD and Tender Fee respectively, must be submitted in a sealed envelope mentioning “EMD and Tender fee” before due Date and Time for Submission of Bids as mentioned in Section I - “Invitation to Bids”.

2.2 Cost of Bidding

1. The Bidder shall bear all costs associated with the preparation and submission of its bid including survey and design. In any case State shall not be responsible or liable for those costs, regardless of the conduct or outcome of the tendering process.

2.3 Content of the RFP

1. The RFP includes:
 - a) Section I - Invitation to Bids
 - b) Section II - General Instructions to Bidders
 - c) Section III - General Conditions of the Contract and Service Level Agreement
 - d) Section IV - Scope of Work
 - e) Section V- Bid Submission Format
 - f) Annexure A – Technical Specifications (TEC GRs)
 - g) Annexure B - Engineering Instructions
 - h) Annexure C – List of GPs and Talukas
 - i) Annexure D – Details of work completed in Phase – 1 of BharatNet
 - j) Annexure E – Route Details**
2. The Bidder is expected to examine all instructions, terms & conditions, forms, Annexures and Scope of Work in the RFP and furnish all information as stipulated therein.

2.4 Clarifications in the Tender

1. A prospective Bidder requiring any clarification on the RFP may submit his queries, in writing on or before pre-bid meeting to CFO, GFGNL Block No: 1, 8th Floor, Udyog Bhavan, Sector-11, Gandhinagar: 382010 or through email at gfgnl@bharatnet.gujarat.gov.in and pmc@bharatnet.gujarat.gov.in.
2. The queries should be submitted in the following format (in Excel file,*.xls / any open office format) only for clarification:

S. No.	Section No.	Clause No.	Reference/Subject	Clarification Sought

Table 2.1

3. The responses to the pre-bid clarifications shall be notified on the website by means of Corrigendum to the RFP. No further clarification what so ever will be entertained after the pre- bid meeting date. Bidders are responsible for duly checking the website regularly for any clarifications

Note: Inputs/suggestions/queries submitted by bidders as part of the pre-bid meeting or otherwise shall be given due consideration by the Tender committee. However, State is neither mandated to accept any submission made by the bidder nor the bidder shall be

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given any written response to their submissions. If an input is considered valid by the committee the same shall be accepted and incorporated as part of the corrigendum.

2.5 Amendments to the RFP

1. At any time prior to the due date & time for submission of bids, the Tenderer, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, may modify the Tender Document by an amendment. The amendment shall be notified on <https://www.gfgnl.nprocure.com> and <https://www.dst.gujarat.gov.in> should be taken into consideration by the prospective bidders while preparing their bids.
2. In order to provide the prospective Bidders reasonable time to take the amendment into account in preparing their bids, the Tenderer may, at its discretion, extend the due date for the submission of Bids.

2.6 Language of the Bid

1. The Bids prepared by the Bidder and all correspondence and documents relating to the bids exchanged by the Bidder and the Tenderer, shall be written in English language, however, any printed literature furnished by the Bidder may be written in another language provided that the same is accompanied by its English translation in which case, for purposes of interpretation of the bid, the English translation shall govern.

2.7 Sections Comprising Bids

Part-I: Bid Security

Bidders are required to upload the Scanned copy of Bank Guarantee (Annexure 5.18) and Demand draft for EMD and Tender Fee respectively (as mentioned in this RFP) at online bidding portal. Further original Bank Guarantee and Demand Draft for EMD and Tender Fee respectively, must be submitted in a sealed envelope mentioning “EMD and Tender fee” before due Date and Time for Submission of Bids as mentioned in Section I- “Invitation to Bids”.

Part-II: Technical Bid

Pre-qualification bid must contain the following information in pdf format–

- a. Bid Submission Cover Letter – Annexure 5.20
- b. Response to Eligibility criteria: Eligibility Criteria which should contain all the supporting documents as asked for eligibility.

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- c. Detailed Survey Report
- d. Technical Design Document
- e. Project Approach Methodology including Detailed Project Plan
- f. Resource Staffing Plan for Project and Operations and Maintenance Phase
- g. Schedule of Requirement – SoR (Unpriced Bill of Quantities - BoQ) - Annexure 5.1
- h. Bidder's Profile - Annexure 5.2
- i. Technical Bid Letter - Annexure 5.3
- j. Details of Litigation(s) - Annexure 5.4
- k. Compliance Documents - Annexure 5.5
- l. RFP Acknowledge Letter - Annexure 5.7
- m. Details of Experience of Responding Firm - Annexure 5.8
- n. MAF (all applicable OEMs) - Annexure 5.12
- o. Declaration Proforma - Annexure 5.13
- p. Preferential Market Access (Affidavit of Self Certificate) - Annexure 5.14
- q. Power of Attorney executed by the Bidder in favor of Authorized Representative, certifying him as an authorized signatory for the purpose of this Tender - Annexure 5.15
- r. List of Subcontractors- Annexure 5.17

Part-III: Financial Bid

The Financial Bid shall comprise of the following:

1. Financial Bid Letter - Annexure 5.6
2. Duly filled Financial Bid (The format of the financial bid should be strictly in the prescribed format. Non-adherence may lead to rejection of the bid.) - Annexure 5.11

Part-IV: Priced BoQ

1. Each bidder must submit Priced BOQ –Annexure 5.19, on 3rd day from the date of financial bid opening in a sealed envelope.
2. Envelop of only L1 bidder of each package shall be opened and other bidder's envelops shall be returned back to them in received sealed condition only after 180 days from the date of opening of financial bid.

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Note : All pages of the bid documents must be signed by the authorized signatory of company. In case the bid is signed by the person other than the authorized signatory of company, the bidder should enclose authorization letter from Company Secretary of the company for the officer, who signed the bid.

2.8 Firm Prices

1. Prices quoted in the bid must be firm and final and shall not be subject to any upward modifications, on any account whatsoever. However, the Tenderer reserves the right to negotiate the prices quoted in the bid to effect downward modification. The Bid Prices shall be indicated in Indian Rupees (INR) only.
2. The Financial bid should clearly indicate the price to be charged and the taxes shall be applicable as per actual. It is mandatory that such charges wherever applicable/payable should be indicated separately in Annexure 5.11 – Financial Bid given in Section V – Bid Submission Format. In case there is a change in the applicable taxes, the same shall apply.

2.9 Discount

1. The Bidders are advised not to indicate any separate discount in the Financial Bid. Discount, if any, should be merged with the quoted prices. Discount of any type, indicated separately, shall not be taken into account for evaluation purpose. However, in the event of such an offer is found to be the lowest without taking into account the discount, the Tenderer shall avail such discount at the time of award of contract.

2.10 Bid Prices

1. The Bidder shall indicate in the prescribed proforma, total Bid Prices of the equipment / services, it proposes to provide under the Contract. Prices should be shown separately for each item as detailed in Annexure 5.11 - Financial Bid given in Section V – Bid Submission Format.
2. In the absence of above information as requested in above Clause, bid shall be considered as incomplete and be summarily rejected.
3. The Bidder shall prepare the bid based on the details provided in the RFP. It must be clearly understood that the Scope of Work is intended to give the Bidder an idea about the order and magnitude of the work and is not in any way exhaustive and guaranteed by the Tenderer. Entire contract is to be executed as EPC contract including Design, Procurement,

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Build and O&M of optical fibre network, Connecting NOC through OLT to ONT and having 11 dark fibres at every GP and one fibre on which OLT/ONT would be setup.

2.11 Bidder Qualification

1. The "Bidder" as used in the RFP shall mean the one who has signed the Tender Form. The Bidder may be either the Principal Officer or his duly Authorized Representative, in either cases him/she shall submit a certificate of authority. All certificates and documents (including any clarifications sought and any subsequent correspondences) received hereby, shall, be furnished and signed by the authorized representative and the principal officer.
2. It is further clarified that the individual signing the RFP or other documents in connection with the RFP must certify whether he/she signs as the Constituted attorney of the firm, or a company.
3. The authorization shall be indicated by written power-of-attorney accompanying the bid.
4. The power or authorization and any other document consisting of adequate proof of the ability of the authorized signatory to bind the Bidder shall be annexed to the bid.
5. Any change in the Principal Officer shall be intimated to GFGNL in advance.

2.12 Earnest Money Deposit (EMD)

1. The Bidder shall furnish, as part of its bid, an Earnest Money Deposit (EMD) of the amount **INR 15,00,00,000/-** (Rupees Fifteen Crores only) for each package.
2. The EMD must be submitted in the form of unconditional Bank Guarantee valid for period of 6 months from the date of bid submission, of any Scheduled Bank drawn in favor of "Gujarat Fibre Grid Network Limited", payable at Ahmedabad/Gandhinagar.
3. The EMD is required to protect the Tenderer against the risk of Bidder's conduct which would warrant the security's forfeiture, pursuant to Clause 2.12-(6).
4. Unsuccessful Bidder's EMD shall be returned after the award of contract to the PIA. No interest shall be paid by the Tenderer on the EMD.
5. The EMD of PIA shall be returned upon the execution of the Contract, pursuant to Clause 2.34 "Award of Contract" and furnishing the Bank Guarantee, pursuant to Clause 2.13. No interest shall be paid by the Tenderer on the EMD.
6. The EMD may be forfeited:
 - a. if bidder withdraws its bid during the period of bid validity specified by the Bidder in the Bid; or
 - b. If PIA fails to sign the Contract or to furnish the Bank Guarantee for contract performance in accordance with Clause 2.13.

2.13 Performance Bank Guarantee

1. The successful bidder/lead bidder shall furnish the Performance Bank Guarantees as mentioned below, towards faithful performance of the contract obligation and performance of the services during contract period. In case of breach/non-compliance of contract/SLA terms and conditions, Tenderer shall invoke the PBG.
2. The Bidder whose bids are accepted shall be required to submit two separate performance Bank Guarantees- one for the Project implementation phase and Maintenance Phase as below:
 - a. 1st Bank Guarantee- Project Implementation Phase: The PIA, within 15 days from the date of receipt of Notification of Award, shall furnish a Bank Guarantee equal to 10% of the CAPEX, valid till 100% go-live of the project/package or 18 months whichever is later. The Performance Bank Guarantee would be released upon submission of PBG for O&M Phase.
 - b. 2nd Bank Guarantee-O&M Phase: The PIA, within 15 days from the date of 100% Go Live, shall furnish a Bank Guarantee equal to 10% of the OPEX value of the project, valid up to 180 days beyond the expiry of contract.
3. In the event of termination, Tenderer may invoke the Performance Bank Guarantee to enforce the remedies available with the Tenderer as per the contract agreement against the damages from the Agency that may have resulted from such default and pursue such other rights and/or remedies as may be available to the Tenderer under law.

2.14 Period of Validity of Bids

1. Bids shall remain valid for 180 days after the date of opening of Technical Bids prescribed by the Tenderer. A bid valid for a shorter period may be rejected by the Tenderer as non-responsive.
2. In exceptional circumstances, the Tenderer may request the Bidder for an extension of the period of validity upto 180 days or more. The request and the responses thereto shall be made in writing (or through e-mail). The validity of EMD provided under Clause 2.14-(1) may also be extended if required.

2.15 Format and Signing of Bids

1. The original and all copies of the bid shall be typed or written in indelible ink. The original and all copies shall be signed by the Bidder or a person or persons duly authorized to bind the Bidder to the Contract in accordance with Clause 2.11 "Bidder Qualification". All pages of the bid, except for un-amended printed literature, shall be initialed and stamped by the person or persons signing the bid.
2. The response to the bid should be submitted along with legible, appropriately indexed, duly filled Information sheets and sufficient documentary evidence as per Checklist. Responses with illegible, incomplete Information sheets or insufficient documentary evidence shall be rejected.
3. The bid shall contain no interlineations, erasures or overwriting except as necessary to correct errors made by the Bidder, in which case such corrections shall be initialed by the person or persons signing the bid.
4. The Bidder shall duly sign and seal its bid with the exact name of the firm/company to whom the contract is to be issued.

2.16 Revelation of Prices

1. Prices in any form or by any reason before opening the Financial Bid should not be revealed, failing which the offer shall be liable to be rejected

2.17 Terms and Conditions of Bidders

1. Printed terms and conditions of the Bidders shall not be considered as forming part of their Bids.

2.18 Local Conditions

1. It shall be incumbent upon each Bidder to fully acquaint himself with the local conditions and other relevant factors at the proposed site which would have any effect on the performance of the contract and / or the cost.
2. The Bidder is expected to make a site visit to obtain for himself on his own responsibility, all information that may be necessary for preparing the bid and entering into contract. Obtaining such information shall be at Bidder's own cost.
3. Failure to obtain the information necessary for preparing the bids and/or failure to perform the activities that may be necessary for the providing services before entering into contract shall in no way relieve the PIA from performing any work in accordance with the RFP

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4. It shall be imperative for each Bidder to fully inform themselves of all legal conditions and factors which may have any effect on the execution of the contract as described in the bidding documents.
5. It is the responsibility of the Bidder that such factors have properly been investigated and considered while submitting the bid proposals and that no claim whatsoever including those for financial adjustment to the contract awarded under the bidding documents shall be entertained by the Tenderer and that neither any change in the time schedule of the contract nor any financial adjustments arising thereof shall be permitted by the Tenderer on account of failure of the Bidder to appraise themselves of local laws and site conditions.

2.19 Last Day for Receipt of Bids

1. Bids (Only hard copy of EMD and Tender Fee) shall be received by the Tenderer at the address specified under Section I – “Invitation of Bids” before the last date and time of submission of bids. In the event of the specified date for the receipt of Bids being declared a holiday for the Tenderer, only hard copy of EMD and Tender Fee shall be received up to the appointed time on the next working day.
2. The Tenderer may, at its discretion, extend the last date for the receipt of bids by amending the RFP in accordance with Clause 2.5 “Amendments to RFP”, in which case all rights and obligations of the Tenderer and Bidders previously subject to the last date shall thereafter be subject to the last date as extended.

2.20 Late Bids

1. Any bid received by the Tenderer after the last date and time for submission of bids prescribed by the Tenderer, pursuant to Section I – “Invitation to Bids”, shall be rejected.

2.21 Modifications and Withdrawal of Bids

1. No bid shall be altered / modified subsequent to the closing date and time for receipt of bids. Unsolicited correspondences from Bidders shall not be considered.
2. No bid shall be withdrawn in the interval between the last date for receipt of bids and the expiry of the bid validity period specified by the Bidder in the Bid. Withdrawal of a bid during this interval may result in the Bidder's forfeiture of its EMD.

2.22 Address for Correspondence

1. The Bidder shall designate the official mailing address, place, email address and fax number to which all correspondence shall be sent by the Tenderer.

2.23 Contacting the Tenderer

1. No Bidder shall contact the Tenderer on any matter relating to its bid, from the time of bid opening to the time the Contract is awarded.
2. Any effort by a Bidder to influence the Tenderer's bid evaluation, bid comparison or contract award decisions may result in the rejection of the Bidder's bid.

2.24 Opening of Technical Bids by Tenderer

1. The Tenderer shall convene a bid opening session as per time schedule where one representative from the Bidder, who has successfully submitted the bid, can participate. Subsequent to this, Tenderer shall further evaluate the Bid of only those agencies whose EMD is found to be in order.

2.25 Evaluation of Bids

1. A committee/s shall be formed for evaluation of the bids. Decision of the committee would be final and binding upon all the Bidders.
2. The evaluation process of the RFP proposed to be adopted by the Tenderer is indicated under RFP Clause No. 2.28 and 2.29. The purpose of this clause is only to provide the Bidder(s) an idea of the evaluation process that the Tenderer may adopt. However, the Tenderer reserves the right to modify the evaluation process at any time during the Tender process, without assigning any reason, whatsoever, and without any requirement of intimating the Bidder(s) of any such change.
3. Bidder must possess the requisite experience, strength and capabilities in providing the services necessary to meet the Tenderer's requirements, as described in the RFP. Bidder must possess the technical know-how and the financial wherewithal that would be required for successful Survey, Planning, Supply, Installation, end to end integration, testing and commissioning of OFC (Underground or Aerial) GPON network. Also, to undertake the responsibility for Operations & Maintenance (O&M) and facilitating service provisioning of the established network for 7 years from the date of Go-Live. The Bidder's bid must be complete in all respect and covering the entire scope of work as stipulated in the RFP.

2.26 Preliminary Examination

1. The Tenderer shall examine the bids to determine their responsiveness, i.e. whether they are complete, whether the bid format confirms to the RFP requirements, whether any computational errors have been made, whether required EMD and Tender Fee have been furnished, whether the documents have been properly signed, and whether the bids are generally in order.
2. A bid determined as not substantially responsive shall be rejected by the Tenderer and may not subsequently be made responsive by the Bidder by correction of the nonconformity.

2.27 Clarification

1. When deemed necessary, during the tendering process, the Tenderer may seek clarifications whenever, where ever required during the bid evaluation process on any aspect from any or all the Bidders. However, that would not entitle the Bidder to change or cause any change in the substance of the tender submitted or price quoted.
2. Tenderer reserves the right to seek clarifications on the already submitted documents.

2.28 Evaluation of Eligibility Criteria

1. In this part, the bids shall be reviewed for determining the Compliance of the general conditions of the contract and Eligibility Criteria as mentioned in the RFP. Any deviation from General Conditions of the Contract and Eligibility Criteria shall lead to rejection of the bid.
2. Bidders are expected to meet all the conditions of the RFP and the eligibility criteria as mentioned below. Bidders failing to meet these criteria or not submitting requisite supporting documents / documentary evidence in support of eligibility criteria are liable to be rejected summarily.
3. The invitation to the bids is open to all the bidders who qualify the eligibility criteria as follows:

S. No.	Eligibility Criteria	Documents Required
1.	a. The Sole Bidder and each of the Consortium members should be entity registered under Companies Act, 1956/2013 or as amended and should have been operating for at least last 3 years in India as on bid submission date.	The Sole Bidder or each of Consortium members:

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	<p>b. Sole Bidder or Lead Bidder (in case of consortium) should have an average annual turnover of at least following values in last three (3) audited financial years (2014-15, 2015-16 and 2016-17) :</p> <ul style="list-style-type: none"> • Rs 405.8 Crores for Package A • Rs 389.9 Crores for Package B <p>Note:</p> <ol style="list-style-type: none"> 1. In case the sole bidder or a Lead bidder (in case of Consortium) desires to bid for both the packages then the bidder must have average annual turnover criteria equal to cumulative value of both the packages i.e. INR 795.8 crore for the last three audited financial years (2014-15, 2015-16 and 2016-17) 2. If bidder bids for both the packages and it is found that his turnover is not meeting the cumulative turnover requirement as per above point no. 1, then in that case GFGNL reserve the right to consider his bid for Package B (Saurashtra). 3. Turnover considered would be a consolidated turnover of the company i.e. A parent Company can use the turnover of its child company (100% subsidiary of parent) but a child company cannot use parent company's turnover. 	<p>a) Copy of Certification of Incorporation / Registration Certificate</p> <p>b) PAN card</p> <p>c) GST Registration</p> <p>d) Audited financial statements for the last three financial years (2014-15, 2015-16 and 2016-17).</p> <p>e) Certificate from the Statutory Auditor/Company Secretary on turnover details for the last three (3) financial years (2014-15, 2015-16 and 2016-17).</p>
<p>2.</p>	<p>The selected sole bidder or any of the consortium members and its Parent Company / Child company shall not be allowed to bid in the tender for monetization of the network laid under this RFP (leasing of Dark Fibre or Bandwidth sharing). However, selected bidder bidding for one package can bid for the other package during the monetization bid that is planned for the future.</p>	<p>Self-declaration by the bidder or all the consortium partners on their letter head duly signed by authorized signatory along with the supporting documents of authorization shall be</p>

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		submitted along with the bid.
3.	<p>The Sole Bidder or Lead Bidder in case of a consortium should have experience of Laying, Installation, Testing and Commissioning of Optical Fibre Cable (Underground or Aerial), Duct and accessories as mentioned below of which at least 80% should be in underground OFC laying and 20% in aerial OFC laying, in last 3 years, as on bid submission date:</p> <p>Package A: 5100 Kms Package B: 4900 Kms</p> <p>In case the sole bidder or a Lead bidder (in case of Consortium) desires to bid for both the packages then the bidder must have experience of 10000 Kms, in Laying, Installation, Testing and Commissioning of Optical Fibre Cable (Underground or Aerial), Duct and accessories as mentioned below of which at least 80% should be in underground OFC laying and 20% in aerial OFC laying, in last 3 years as on bid submission date.</p> <p>Note:</p> <ol style="list-style-type: none"> 1. If bidder bids for both the packages and it is found that his experience is not meeting the work experience requirement of 10,000 Kms, as above, then in that case GFGNL reserve the right to consider his bid for Package B (Saurashtra). 	<p>The Sole Bidder or Lead Bidder in case of consortium:</p> <p>Work Completion Certificate (partial or full – not less than specified Kms in this clause in case of partial) clearly highlighting the scope of work/ Bill of Material in terms of quantity of work executed with the supporting documents such as Work order/Purchase order / Contract.</p>
4.	<p>Each of the consortium partner should have an average annual turnover of at least INR 100 Crores in last three (3) audited financial years (2014-15, 2015-16 and 2016-17)</p> <p>AND</p> <p>One Consortium partner can tie up with only one lead bidder for a particular package.</p>	<p>Audited financial statements for the last three financial years (2014-15, 2015-16 and 2016-17).</p>

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5.	The Sole Bidder or Lead Bidder, should have valid ISO 9001:2008/ ISO 9001:2015 for Quality Management System which should be valid as on bid submission date	The Sole Bidder or Lead Bidder: Copy of valid certificate
6.	The Sole Bidder and each of the Consortium members should not have been blacklisted by any Ministry/department of Govt. of India or by any State Government or any of the Government PSUs in India as on bid submission date.	The Sole Bidder or each of the Consortium members: An undertaking signed by CEO/ Country Head/ Authorized Signatory of the company to be provided on Non – judicial stamp paper of INR 100/- or such equivalent amount and document duly attested by notary public.
7.	The Sole Bidder/lead Bidder should submit valid letter from each of the OEM (one and only one OEM for each component) - confirming the following: OEM shall ensure that all equipment/components/sub- components being supplied by them shall be supported for entire contract period. If the same is de-supported by the OEM for any reason whatsoever, The bidder shall replace it with an equivalent or better substitute that is acceptable to Tenderer without any additional cost to the Tenderer and without impacting the performance of the solution in any manner whatsoever.	Documentary evidences such as Authorization letters, MAF (Annexure 5.12) from all OEM/Vendors whose products are being quoted by the Bidder need to be attached in the bid. Copy of valid Technical Specification Evaluation Certificate (TSEC) / Type Approval Certificate or copy of Application for fresh TSEC/TAC as applicable from each OEM whose products are being quoted by the Bidder.

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8.	The Sole Bidder or Lead Bidder should have a project Office in the State of Gujarat. However, if the local presence is not there in the State, the selected bidder should give an undertaking for establishment of a project office, within one month of award of the contract.	Self-certification duly signed by authorized signatory on company letter head.
9.	The Sole Bidder or Lead Bidder shall be the single point of contact and shall be solely responsible for all the Terms & Conditions of the RFP	Self-certification duly signed by authorized signatory on company letter head.
10.	The Sole Bidder or Lead Bidder through its consortium partner should comply with Preferential Market Access (PMA) guidelines notified by DoT and all its clarifications/amendments applicable on this RFP.	Affidavit of Self Certificate signed by authorized signatory as per the format provided in Annexure-5.14

Table 2.2

Note 1: All the tender items e.g. GPON OLT, ONT, OFC, **Rack Mounted** Splitters and Batteries, **and Charging Control Unit** should have valid Type Approval Certificate (TAC) from Telecom Engineering Centre (TEC), New Delhi or Technical Specification Evaluation Certificate (TSEC) from Quality Assurance Circle, BSNL, Bengaluru, against the respective technical specifications of this RFP. In case any of the quoted models does not have TAC/TSEC then it should be applied for TSEC to Quality Assurance Circle, BSNL, Bengaluru or to TEC, New Delhi for the model against the technical specifications, at least one day before the bid submission date. The registration number allotted for the TSEC purpose by Quality Assurance Circle, BSNL, Bengaluru or for TAC purpose by TEC, New Delhi shall be submitted along with the bid. However, only type approved products as per above specifications shall be accepted which shall have to be obtained before issuing Work Order by the Tenderer.

The TSEC obtained by the OEMs of bidders for the various tenders floated by BBNL/BSNL in the last two years shall be acceptable for the items which are part of this RFP provided that the technical specifications remains unchanged. In case of OFC, any change in the source of raw material shall be subject to fresh TSEC process of QA.

Note 2: Consortium Criteria:

1. In case of consortium, the Lead Bidder must be specified by the bidder.
2. Any lead bidder or member of consortium of a given package, cannot participate as a bidding entity (lead or consortium member) in the same package in any other consortium.

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However, the same lead bidder or member of consortium can participate in other package as a lead bidder or consortium member.

3. The one consortium partner can tie up with only one other bidder for a package. Parent or child of any consortium partner cannot tie up in any other consortium for the same package.
4. In case of a consortium, applicant consortia shall have a valid Memorandum of Understanding (MoU)/ Consortium Agreement among all the members signed by the CEO/ Country Head/Authorized Signatories of the companies dated prior to the submission of the bid. The MoU/ Consortium Agreement shall clearly state the composition of the consortium who shall be the Lead bidder, the complete description of the partner and roles & responsibilities of the partners.
5. The consortium bid submitted without valid MoU / Consortium Agreement shall be treated as non-responsive.
6. In case of a consortium, the maximum members should not be more than 3 including the Lead bidder.
7. By submitting the Bid, the Bidder shall also be deemed to have acknowledged and agreed that in the event of a change in control of a Consortium Member or an Associate whose Technical Capacity and/ or Financial Capacity was taken into consideration for the purposes of short-listing and technically qualified under and in accordance with this RFP, the Bidder shall be deemed to have knowledge of the same and shall be required to inform the competent authority forthwith along with all relevant particulars about the same and the competent authority may, in its sole discretion, disqualify the Bidder or withdraw the work order from the PIA, as the case may be. In the event such change in control occurs after signing of the Agreement but prior to sign off of the project, it would, notwithstanding anything to the contrary contained in the Agreement, be deemed to be a breach of the Agreement, and the same shall be liable to be terminated without the competent authority being liable in any manner whatsoever to the Bidder. In such an event, notwithstanding anything to the contrary contained in the Agreement, the competent authority shall be entitled to forfeit and appropriate the Bid Security and Performance Security, as the case may be, as damages, without prejudice to any other right or remedy that may be available to the competent authority under the Bidding Documents and/ or the Agreement or otherwise.
8. The bidder (each member of the consortium) shall have company registration certificate, registration under labour laws & contract act, valid GST registration certificate and

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Permanent Account Number (PAN) issued by Income Tax department, Memorandum of Association and Article of Association (copy of the same should be provided)

9. Attested copies in respect of company's financial statements for the last three audited financial years (2014-15, 2015-16 and 2016-17) shall be attached along with the bid. Bidder should submit an undertaking that Bidder (or each of the consortium members) should not have been blacklisted/debarred by any Govt. department or any PSU in India as on bid submission date.
10. The award of contract shall be signed with the Lead Bidder only and the Lead Bidder shall be single Point of Contact for this Project. PBG shall be submitted by the Lead Bidder
11. The payments for the said project shall be released only in the name of Lead Bidder.
12. Lead Bidder shall be solely responsible for any failure liable to the Government for the execution of the project in accordance with the terms & conditions of the bid document and a statement of this effect shall be included in the MoU/ Consortium Agreement.

Note – 3 : The bidder shall supply only such network equipment which, had those equipment been supplied for any defence communication project in India, would have been acceptable to the Indian defence authorities.

2.29 Evaluation of Financial bids

1. The bidder has to qualify the eligibility criteria for being eligible for opening of financial bid.
2. Evaluation of bids shall be done on Least Cost/Lowest Cost (L1) criteria as detailed. The bids quoted as per the financial bid format (Annexure 5.11) shall be considered for financial evaluation.

Further Financial Evaluation by the Tenderer shall be done on Net Present Value (NPV) of financial bid discounting at the rate of 9% of O&M shall be calculated on a yearly basis for all the GPs.

The NPV will be calculated using the formula below:

$$(NPV)_{Cb} = C_0 + \frac{C_1}{(1+r)^0} + \frac{C_2}{(1+r)^1} + \frac{C_3}{(1+r)^2} + \dots + \frac{C_7}{(1+r)^6}$$

Where,

- $C_0 \dots C_n$ are the yearly cash outflows as illustrated below

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- C_0 is the total cost of Capex for Project Phase
 - C_1 is total of Operations and Maintenance Cost for the 1st year after “Go-Live
 - C_2 is total of Operations and Maintenance Cost for the 2nd year after “Go-Live
 - C_7 is defined as: (Cost of Operations and Maintenance Services for the 7th year after “Go-Live”)
 - r is the Annual Discounting Rate (9%) as specified in Para (2) above.
3. The Bidder having the lowest value of NPV of financial bid shall be declared as “L1” for the corresponding package and shall be awarded the project for that region. Tenderer’s decision shall be final and binding.
 4. Bidders quoting unrealistic Project cost shall be rejected straightaway by the committee and EMD of such bidder shall be forfeited. Any bid found to have unsatisfactory response in any of the eligibility criteria as mentioned may be rejected and shall not be considered for further evaluation.

2.30 Final Bid Evaluation

1. If any bidder withdraws his bid, at any stage after the last date and time of bid submission till the final evaluation or declaration of the final selected bidder, it shall be declared a “defaulting bidder” and EMD of such defaulting bidder shall be forfeited. In such situation the tendering process shall be continued with the remaining bidders as per their ranking.
2. If the bidder defaults after being declared as selected bidder, it shall be declared as defaulting bidder and EMD / bank guarantee of such defaulting bidder shall be forfeited and Tenderer reserves right to blacklist/debarred such company for next 3 Years from participating in any GFGNL’s tender. In such situation, the tendering process shall be continued with the remaining bidders as per their ranking.

2.31 Tenderer’s Right to vary Scope of Contract

1. The Tenderer may at any time, by a written order given to the Bidder, make changes to the scope of the Contract as specified.
2. Change in scope means only addition of a new gram panchayat. Any variation in path for fibre lying or consequent change in route kilometre or change in GPON equipment set up will not be considered as change in scope – this being the EPC contract. Similarly changes in trenching / ducting / extra protection deliverables due to terrain; delays or route changes due to ROW challenges; or other reasons will not be considered as change in scope.

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3. In the case of increase or decrease in the number of GPs, payment would be done at per GP derived cost as mentioned below.

$$\text{Per GP derived cost} = \frac{\text{Total Package Cost}}{\text{Total no. of GPs in that package}}$$

4. Deleted

2.32 Tenderer's Right to Accept Any Bid and to Reject Any or All Bids

1. The Tenderer reserves the right to accept any or all bid, and to annul the tender process or reject all bids at any time prior to award of contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the Tenderer's action.

2.33 Notification of Award

1. Prior to the expiry of the period of bid validity, pursuant to Clause 2.14 "Period of Validity of Bids", the Tenderer shall notify the PIA in writing by fax, followed by registered letter to be confirmed in writing by registered letter, that its bid has been accepted.
2. The notification of award shall constitute the formation of the Contract.
3. Upon furnishing of Bank Guarantee equal to 10% of the capex value as per Clause 2.13 of this RFP, by the selected PIA, the Tenderer may notify each unsuccessful Bidder and shall refund their EMD, pursuant to Clause 2.12-(4) "Earnest Money Deposit".

2.34 Award of Contract

1. There shall be only one selected bidder for each package.
2. At the same time as the Tenderer notifies the PIA that his bid has been accepted, the Tenderer shall send the PIA a Proforma for Contract as per Annexure 5.10 "Contract" of Section V – Bid Submission Formats provided in the RFP.
3. Within 7 days of receipt of the Contract, the PIA shall sign and date the Contract and return it to the Tenderer.
4. The Bidder whose bids are accepted shall be required to submit a Performance Bank Guarantee as mentioned in the RFP along with acceptance of work order, within 15 days. PBG shall be in the form of Bank Guarantee (BG) from any Scheduled Bank and should be

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valid up to 180 days beyond the expiry of contract and thereafter the PBG shall be refunded to the PIA without any interest.

5. Tenderer may, at any time, terminate the contract by giving written notice to the PIA without any compensation, if the PIA becomes bankrupt or otherwise insolvent, provided that such termination shall not prejudice or affect any right of action or remedy which has accrued or shall accrue thereafter to Tenderer.
6. If at any point during the contract, if the PIA fails to deliver as per the RFP terms & conditions or any other reason amounting to disruption in services, the Termination and Exit Management clause shall be invoked.

2.35 Confidentiality of the Contract

1. The Contract is confidential and the PIA shall ensure that anything contained in the Contract shall not be disclosed in any manner, whatsoever.

2.36 Tender Related Conditions

1. The PIA shall confirm unconditional acceptance of full responsibility of completion of job and for executing the 'Scope of Work' of this RFP. This confirmation should be submitted as part of the Technical Bid. The Sole Bidder or Lead Bidder shall be the sole point of contact and shall be solely responsible for all purposes of the Contract.
2. The PIA should not be involved in any litigation that may have an impact of affecting or compromising the execution of work as required under this contract as per Annexure 5.4 given in Section V – Bid Submission Formats. If at any stage of tendering process any suppression / falsification is brought to the knowledge of the Tenderer, the Tenderer shall have the right to reject the bid or terminate the contract, as the case may be, without any compensation to the PIA.

2.37 Rejection Criteria

1. Besides other terms & conditions highlighted in the RFP, bids may be rejected under following circumstances:
- 2. General Rejection Criteria**
 - a. Bids submitted without or improper Tender fee and EMD.
 - b. Bids received through Telegraphic / Fax/E-Mail/ Hard copies except, wherever required.
 - c. Bids which do not conform to unconditional validity of the bids as prescribed in the RFP

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- d. If the information provided by the Bidder is found to be incorrect / misleading at any stage / time during the Contract period.
- e. Any effort on the part of a Bidder to influence the Tenderer's bid evaluation, bid comparison or contract award decisions
- f. Bids received by the Tenderer after the last date for receipt of bids prescribed by the Tenderer, pursuant to Section I - "Invitation to Bids".
- g. Bids without Power of Attorney and any other document consisting of adequate proof of the ability of the authorized signatory to bind the Bidder

3. Technical Rejection Criteria

- a. Technical Bid containing financial details.
- b. Revelation of Prices in any form or by any reason before opening of the Financial Bids
- c. Failure to furnish all information mentioned in the RFP or submission of a bid not substantially responsive to the RFP in every respect.
- d. Bidders not quoting for the complete scope of work as indicated in the RFP, addendum (if any) and any subsequent information given to the Bidder.
- e. Bidders not complying with the material, specifications and General Conditions of the Contract as stated in the RFP.
- f. The Bidder not conforming to unconditional acceptance of full responsibility of providing services in accordance with the Section III – "General Conditions of Contract and Service Level Agreements" and Section IV – "Scope of Work" of this RFP.
- g. If the bid does not conform to the timelines indicated in the RFP.

4. Financial Rejection Criteria

- a. Incomplete Financial Bid
- b. Financial Bids that do not conform to the RFPs' financial bid format.
- c. If there is an arithmetic discrepancy in the financial bid calculations, the Tenderer shall rectify the same. If the Bidder does not accept the correction of the errors, it may be rejected.

2.38 Placing of Work Orders

1. As mentioned in this RFP document, this is an EPC/Turnkey project wherein, bidder is required to propose an appropriate solution to meet the outcome envisaged. However, Bidder is responsible for any other components inadvertently missed out but it is required as per the proposed solution of the bidder and is essential for overall solution to successfully

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run during entire project duration than bidder has to consider the same in his proposed solution. GFGNL will not be liable for payment of any additional cost outside of Financial Bid.

2. Objection, if any, to the work order must be reported to the concerned section of Tenderer by the PIA within fifteen (15) working days counted from the date of issuance work order for modifications, otherwise it shall be assumed that the PIA has accepted the work order.
3. If the PIA is not able to do the complete work as mentioned in the scope of work within the specified period, the penalty clause shall be invoked.
4. The decision of Tenderer shall be final and binding on the PIA. Tenderer reserves the right to accept or reject an offer without assigning any reason whatsoever.

3 Section III: General Conditions of the Contract and Service Level Agreement

3.1 Definitions

In this RFP, the following terms shall be interpreted as indicated:

1. **“Applicable Laws”** means all applicable statutes, enactments, acts of legislature or laws, ordinances, rules, by-laws, regulations, notifications, guidelines, policies, directions, directives, requirement or other governmental restriction and orders or judgements of any Governmental authority, tribunal, board, court or other quasi-judicial authority or other governmental restriction or any similar form of decision applicable to the relevant Party and as may be in effect on the date of execution of Agreement and during the subsistence thereof, applicable to the Project;
2. **“Confidential Information”** means any information disclosed to or by any Party to this Contract and includes any information in relation to the Parties, a third party or any other person who is covered within the ambit of the Tenderer’s legislation including any such information that may come to the knowledge of the Parties hereto / PIA s’ Team by virtue of this Contract that:
 - a. is by its nature confidential or by the circumstances in which it is disclosed confidential; or

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- b. is designated by the disclosing Party as confidential or identified in terms connoting its confidentiality; but does not include information which is or becomes public knowledge other than by a breach of this Contract;
3. “**Contract**” means the Agreement entered into between the PIA and the Tenderer as recorded in the Contract form signed by the Tenderer and the PIA including all attachments and Annexes thereto, the RFP and all Annexes thereto and the agreed terms as set out in the bid, all documents incorporated by reference therein and amendments and modifications to the above from time to time;
 4. “**DC**” means District Collector Office;
 5. “**Deliverables**” means the products, infrastructure, licenses and services agreed to be delivered by the PIA in pursuance of the Contract as elaborated in the RFP and includes all documents related to the user manual, technical manual, designs, process documentations, the artefacts, the training materials, process and operating manuals, service mechanisms, policies and guidelines , inter alia payment and/or process related etc. and all their respective modifications;
 6. “**Document**” means any embodiment of any text or image however recorded and includes any data, text, images, sound, voice, codes or and databases or microfilm or computer generated micro fiche;
 7. “**End-to-End Connectivity**” means Complete Installation, Integration, Commissioning and Testing of the created network (duly approved by TPA) which shall include OTDR link test, Power On & Self Testing,)As Built Diagram (ABD reports), integration of GP ONT with State and BBNL NOC and Final acceptance certificate;
 8. “**GFGNL**” means the (Special Purpose Vehicle)SPV created by Government of Gujarat for execution of BharatNet Phase II project, under Department of Science and Technology
 9. “**Goods**” means all of the equipment, hardware, software, products accessories and/or other material / items which the PIA is required to supply, install and maintain under the contract;
 10. “**Go live**” means the date on which the proposed BharatNet Project corresponding to the respective package is successfully implemented as specified in the RFP and all the

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acceptance work, services, terms & conditions etc. as defined in the RFP are successfully concluded to the satisfaction of USOF;

11. **“GP”** means Gram Panchayat and includes TC and DC locations in the state of Gujarat, unless explicitly excluded.

12. **“Intellectual Property Rights”** means any patent, copyright, trademark, trade name, service marks, brands, propriety information, software whether arising before or after the execution of this Contract and the right to ownership and registration of these rights;

13. **“Maintenance”** refers to maintaining, repairing, and replacing if necessary devices, equipment, and supporting utilities by the PIA under the scope of this RFP. Scheduled inspections are also included as Maintenance.

14. **“Notice”** means:

a. a notice; or

b. a consent, approval or other communication required to be in writing under this Contract;

15. **“OEM”** means the Original Equipment Manufacturer of any equipment / product that is providing such goods to the PIA under the scope of this RFP / Contract;

16. **“Operations”** refers to proactive provisioning of bandwidth connectivity termination based on commercial needs. **“Parties”** means the Tenderer and the PIA and **“Party”** means either of the Parties;

17. **“Project Implementing Agency (PIA)”** means the successful bidder whose bid has been accepted by the Tenderer and with whom the order for “Selection of Project Implementing Agency (PIA) for BharatNet Phase – II” has been placed as per requirements and terms & conditions specified in this RFP and shall be deemed to include the Bidder’s successors, representatives (approved by the Tenderer), heirs, executors, administrators and permitted assigns, as the case may be, unless excluded by the terms of the contract;

18. **“PIAs’ Team”** means the Successful Bidder along with all of its partners / OEMs, who have to provide goods & services to the Tenderer under the scope of this RFP / Contract.

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This definition shall also include any authorized service providers/partners/agents and representatives or other personnel employed or engaged either directly or indirectly by the PIA for the purposes of this PIA / Contract;

19. **“Project Store”** means list of locations provided by the PIA to store the material as required in District/Block;
20. **“SIA”** (State Implementing Agency) means the nodal agency appointed by the Government of Gujarat, to ensure smooth implementation of the project and refers to GFGNL in this RFP;
21. **“TC “** means Taluka Mamlatdar Office;
22. **“Tenderer”** means Gujarat Fibre Grid Network Limited;
23. **“Tenderer’s Technical Representative”** means the Universal Service Obligation Funds (USOF) or persons appointed by the Universal Service Obligation Funds (USOF) from time to time to act on its behalf;
24. **“Work Order Value”** means the price come out after the site survey done by the PIA and the value payable to the PIA under this Contract for the full and proper performance of its contractual obligations;

3.2 Interpretation

In this RFP unless a contrary intention is evident:

- a. The clause headings are for convenient reference only and may not be part of this RFP;
- b. Unless otherwise specified a reference to a clause number is a reference to all of its sub-clauses;
- c. Unless otherwise specified a reference to a clause, sub-clause or section is a reference to a clause, sub-clause or section of this RFP including any amendments or modifications to the same from time to time;

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- d. A word in the singular includes the plural and a word in the plural includes the singular;
- e. A word importing a gender includes any other gender;
- f. A reference to a person includes a partnership and a body corporate;
- g. A reference to legislation includes legislation repealing, replacing or amending that legislation;
- h. Where a word or phrase is given a particular meaning it includes the appropriate grammatical forms of that word or phrase which have corresponding meanings.
- i. In the event of an inconsistency between the terms of this RFP and the Bid, the terms & conditions hereof shall prevail.

3.3 Sub-Contract

- 1. The PIA shall notify the Tenderer in writing of all subcontracts awarded under this contract if not already specified in its bid. Such notification, in its original bid or later shall not relieve the PIA from any liability or obligation under the Contract.
- 2. There shall be only one level of sub-contracting i.e. the sub-contractor, appointed by the PIA shall directly execute the work without further subcontracting the work.
- 3. The bidders shall submit a list of all subcontractors to be deployed by him as per Annexure 5.17.

3.4 Representation & Guarantee

- 1. In order to induce the Tenderer to enter into this Contract, the PIA hereby represents and guarantee as of the date hereof, the following:
 - a. That the PIA has the power and the authority that would be required to enter into this Contract and the requisite experience, the technical know-how and the financial wherewithal required to successfully implement the terms & conditions of this contract and to provide services sought by the Tenderer under this contract

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- b. That the PIA is not involved in any litigation or legal proceedings, pending, existing, potential or threatened, that may have an impact of affecting or compromising the performance or execution of the work under this Contract.
- c. That the representations and guarantee made by the PIA in its Bid, the Contract shall continue to remain true and fulfil all the requirements as are necessary for executing the obligations and responsibilities as laid down in the Contract and the RFP and unless the Tenderer specifies to the contrary, the PIA shall be bound by all the terms & conditions of the Bid and the contract throughout the period of the contract.
- d. That the PIA has the professional skills, personnel, infrastructure and resources/authorizations that are necessary for providing all such services as are necessary to fulfil the scope of work stipulated in the RFP and in the Contract.
- e. That there shall not be any privilege, claim or assertion made by a third party with respect to right or interest in, ownership, mortgage or disposal of any asset, property, movable or immovable as mentioned in any Intellectual Property Rights.
- f. That the execution of the scope of work and the Services herein is and shall be in accordance and in compliance with all applicable laws.
- g. That all conditions precedent under the Contract have been satisfied.
- h. That neither the execution and delivery by the PIA of the Contract nor the PIA's compliance with or performance of the terms and provisions of the Contract (i) will contravene any provision of any Applicable Law or any order, writ, injunction or decree of any court or Governmental Authority binding on the PIA, (ii) will conflict or be inconsistent with or result in any breach of any or the terms, covenants, conditions or provisions of, or constitute a default under any Contract, Contract or instrument to which the PIA is a party or by which it or any of its property or assets is bound or to which it may be subject or (iii) will violate any provision of the Memorandum and Articles of Association of the PIA.
- i. That the PIA certifies that all registrations, recordings, filings and notarizations of the Contract and all payments of any tax or duty, including but not limited to stamp duty, registration charges or similar amounts which are required to be effected or made by the PIA which is necessary to ensure the legality, validity, enforceability or admissibility in evidence of the Contract have been made.
- j. That the PIA confirms that there has not and shall not occur any execution, amendment or modification of any agreement/contract without the prior written consent of the Tenderer, which may directly or indirectly have a bearing on the Contract or the Project.

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- k. That the PIA owns or has good, legal or beneficial title, or other interest in, to the property, assets and revenues of the PIA on which it grants or purports to grant or create any interest pursuant to the Contract, in each case free and clear of any encumbrance and further confirms that such interests created or expressed to be created are valid and enforceable.
 - l. That the PIA owns, has license to use or otherwise has the right to use, which are required or desirable for performance of its services under this contract. All Intellectual Property Rights (owned by the PIA or which the PIA is licensed to use) required by the PIA for the performance of the contract are valid and subsisting. All actions (including registration, payment of all registration and renewal fees) required to maintain the same in full force and effect have been taken thereon and shall keep the Tenderer indemnified in relation thereto.
 - m. That the PIA shall at all times maintain sufficient manpower, resources, and facilities, to provide the Services in a workmanlike manner on a timely basis.
 - n. That in providing the Services or deliverables or materials, neither PIA or its agent, nor any of its employees, shall utilize information which may be considered confidential information of, or proprietary to, any prior employer or any other person or entity;
 - o. That the PIA shall provide adequate and appropriate support and participation, on a continuous basis.
2. Upon the occurrence of an Event of Default by the State/SIA, USOF/BBNL shall be fully authorized to take possession of the assets so created under the project. The PIA shall execute all the conditions mentioned in this RFP to the satisfaction of USOF/BBNL.

3.5 Scope of Work

1. Scope of the Work is as defined in Section IV - Scope of Work and Annexes thereto of this tender.
2. Tenderer has engaged the PIA for Survey, Planning, Design, Supply, Installation, Commissioning, End-to-End Integration and Testing of OFC (Underground or Aerial) GPON network and & also, to undertake the responsibility for Operations & Maintenance (O&M) and facilitating service provisioning of the established network for 7 years from the date of Go-Live. The PIA is required to provide such services, support and infrastructure as the Tenderer or Tenderer's representative may deem proper and necessary, during the term of this Contract, and includes all such processes and activities

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which are consistent with the proposals set forth in the Bid, the RFP and this Contract and are deemed necessary by the Tenderer, in order to meet its business requirements (hereinafter 'scope of work').

3. The Tenderer or Tenderer's representative reserves the right to amend any of the terms & conditions with mutual agreement in relation to the Scope of Work and may issue any such directions which are not necessarily stipulated therein if it deems necessary for the fulfilment of the Scope of Work pursuant to Clause 3.23

3.6 Key Performance Measurements

1. Unless specified by the Tenderer to the contrary, the PIA shall execute the work and carry out the scope of work in accordance with the terms & conditions of this Contract, Scope of Work and the service specifications as laid down in Section III – "General Conditions of the Contract and Service Level Agreement" of this RFP.
2. The Tenderer reserves the right to amend any of the terms & conditions in relation to the Contract and may issue any such directions which are not necessarily stipulated therein if it deems necessary for the fulfilment of the scope of work. These changes shall be carried as per mutual consent.

3.7 Performance Bank Guarantee

1. The successful bidder/ lead bidder shall furnish the Performance Bank Guarantees as mentioned below towards faithful performance of the contract obligation and performance of the services during contract period. In case of breach/non-compliance of contract/SLA terms and conditions, Tenderer shall invoke the PBG.
2. The selected PIA has to submit two separate performance Bank Guarantees- one for the Project implementation phase valid till 100% Go-live of the project/package and the second one for the Operations and Maintenance Phase valid up to 180 days beyond the expiry of the contract.
 - a. 1st Bank Guarantee- Project Implementation Phase: The PIA, within 15 days from the date of receipt of Notification of Award, shall furnish a Bank Guarantee equal to 10% of the CAPEX, valid till 100% go-live of the project/package or 18 months whichever is later. The Performance Bank Guarantee would be released upon submission of PBG for O&M Phase.
 - b. 2nd Bank Guarantee-O&M Phase: The PIA, within 15 days from the date of 100% Go Live, shall furnish a Bank Guarantee equal to 10% of the OPEX value of the project, valid up to 180 days beyond the expiry of contract.

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3. In the event of termination, Tenderer may invoke the Performance Bank Guarantee to enforce the remedies available with the Tenderer as per the contract agreement against the damages from the Agency that may have resulted from such default and pursue such other rights and/or remedies as may be available to the Tenderer under law.

3.8 Validity of Bank Guarantee for Contract Performance

1. In case of implementation order, the Bank Guarantee-Project Implementation shall remain valid till 100% go-live of the project/package or 18 months whichever is later.
2. In case of Operations & Maintenance order the Bank Guarantee shall, remain valid up to 180 days beyond the expiry of contract.

3.9 Commencement and Progress

1. The PIA shall proceed to carry out the activities / services with diligently and expeditiously in accordance with the stipulations regarding time, manner, mode, and method of execution contained in this RFP.
2. The PIA shall be responsible for and shall ensure that all Services are performed in accordance with the Contract, Scope of Work & Specifications. PIA shall comply with all Specifications and other standards, terms and other stipulations/conditions set out hereunder.
3. The items supplied under this Contract shall conform to the standards mentioned in Annexure A -Technical Specifications (TEC GR Nos). In other cases where no applicable standard is available such standards which are issued by the relevant certified agencies shall be applicable. Delivery of the items shall be made by the PIA in accordance with the terms specified by the Tenderer in its Notification of Award / Work Order.

3.10 Contract Administration

1. No variation or modification of the terms& conditions of the contract shall be made except by written amendment signed by the parties.
2. Either party may appoint any individual / organization as their authorized representative through a written notice to the other party. Each Representative shall have the authority to:
 - a. Exercise all of the powers and functions of his/her Party under this Contract other than the power to amend this Contract and ensure the proper administration and performance of the terms hereof; and

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- b. Bind his or her Party in relation to any matter arising out of or in connection with this Contract.
3. The PIA along with other members / third parties / OEMs shall be bound by all undertakings and representations made by the authorized representative of the PIA and any covenants stipulated hereunder, with respect to this Contract, for and on their behalf.
4. For the purpose of execution or performance of the obligations under this Contract, the Tenderer's representative would act as an interface with the nominated representative of the PIA. The PIA shall comply with all instructions that are given by the Tenderer's representative during the course of this Contract in relation to the performance of its obligations under the terms of this Contract and the RFP.

3.11 Tenderer's Obligations

1. The Tenderer's Representative shall interface with the PIA, to provide the required information, clarifications and to resolve any issues as may arise during the execution of the Contract. Tenderer shall provide adequate cooperation in providing details, assisting with coordinating and obtaining of approvals from various governmental agencies, in cases, where the intervention of the Tenderer is proper and necessary.

3.12 Intellectual property rights

1. Tenderer shall own and have Intellectual Property Rights of all the deliverables which have been developed by the PIA during the performance of Services and for the purposes of inter-alia use of such Services under this Contract. The PIA undertakes to disclose all Intellectual Property Rights arising out of or in connection with the performance of the Services to the Tenderer and execute all such agreements/documents and file all relevant applications, effect transfers and obtain all permits and approvals that may be necessary in this regard to effectively conserve the Intellectual Property Rights of the Tenderer.
2. Tenderer desires, Further, the PIA shall be obliged to ensure that all approvals, registrations which are inter-alia necessary for use of the infrastructure installed by the PIA, the same shall be acquired in the name of the Tenderer, prior to termination of this Contract and which shall be assigned by the Tenderer to the PIA for the purpose of execution of any of its obligations under the terms of the Bid, RFP or this Contract. However, subsequent to the term of this Contract, such approvals etc. Shall endure to the exclusive benefit of the Tenderer.
3. The PIA shall ensure that while it uses any hardware, processes or material in the course of performing the Services, it does not infringe the Intellectual Property Rights of any

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person and PIA shall keep the Tenderer indemnified against all costs, expenses and liabilities howsoever, arising out of any illegal or unauthorized use (piracy) or in connection with any claim or proceedings relating to any breach or violation of any permission/license terms or infringement of any Intellectual Property Rights by the PIA during the course of performance of the Services.

3.13 Record of Contract Documents

1. The PIA shall at all time make and keep sufficient copies of the specifications and Contract documents for him to fulfil his duties under the contract, in excess of his own requirement and those copies shall be available at all times for use by the Tenderer's Representative and by any other person authorized by the Tenderer's Representative.

3.14 Ownership of Equipment

1. The Tenderer shall own the services and items supplied by the PIA arising out of or in connection with this Contract only after the date of 100% Go- Live. In case of theft/physical damage (Repair not possible -RNP) to the Network components / equipment, the equipment shall be replaced on PIA's cost till full 100% Go-live and at Tenderer's cost after full 100% Go-live.

3.15 Indemnity

The PIA shall indemnify and defend GFGNL and its representatives & employees and hold GFGNL, its representatives, employees harmless from:

1. Damages and losses caused by its negligent or intentional act or omission or any damages and losses caused by the negligent act of any third party or sub-contractor or agency engaged by the PIA ;
2. Damages and losses resulting from the non-compliance with the established obligations; Third Party claim against GFGNL or its nominated agency that any Deliverables/Services/Equipment provided by the PIA infringes a copyright, trade secret, patents or other intellectual property rights of any third party in which case the PIA shall defend such claim at its expense and shall pay any costs or damages that may be finally awarded against GFGNL or its nominated agency. The PIA shall not indemnify GFGNL, however, if the claim of infringement is caused by
 - a. GFGNL misuse or modification of the Deliverables; or
 - b. GFGNL failure to use corrections or enhancements made available by the PIA; or

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- c. GFGNL use of the Deliverables in combination with any product or information not owned or developed or supplied by the PIA.
3. If any Deliverable is or likely to be held to be infringing, the PIA shall at its expense and option either
 - a. procure the right for GFGNL to continue using it, or
 - b. replace it with a non-infringing equivalent, or
 - c. modify it to make it non-infringing.
4. Any environmental damages caused by it and/or its representatives or employees or employees of any third party or sub-contractor or agency engaged by the PIA
5. Breach (either directly by it or through its representatives and/or employees) of any representation and guarantee declared herein by it;
6. From any and all claims, actions, suits, proceedings, taxes, duties, levies, costs, expenses, damages and liabilities, including attorneys' fees, arising out of, connected with, or resulting from or arising in connections with the services provided due to neglect, omission or intentional act.

3.16 Confidentiality

1. The PIA shall not use Confidential Information, the name or the logo of the Tenderer except for the purposes of providing the Service as specified under this RFP;
2. The PIA shall not, either during the term or 6 months after expiration of this Contract, disclose any proprietary or confidential information relating to the Services, Contract or the network architecture, Tenderer's business plan or operations without the prior written consent of the Tenderer.
3. The PIA may only disclose Confidential Information in the following circumstances:
 - i. with the prior written consent of the Tenderer;
 - ii. to a member of the PIA's Team ("Authorized Person") if:
 - a. the Authorized Person needs the Confidential Information for the performance of obligations under this contract;
 - b. the Authorized Person is aware of the confidentiality of the Confidential Information and is obliged to use it only for the performance of obligations under this contract
4. The PIA shall do everything reasonably possible to preserve the confidentiality of the Confidential Information including execution of a confidential agreement with the members of the, subcontractors and other service provider's team members to the satisfaction of the Tenderer.

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5. The PIA shall sign a Non-Disclosure Agreement (NDA) with the Tenderer on mutually agreed terms & conditions. The PIA and its antecedents shall be bound by the NDA. The PIA shall be responsible for any breach of the NDA by its antecedents or delegates.
6. The PIA shall notify the Tenderer promptly if it is aware of any disclosure of the Confidential Information otherwise than as permitted by this Contract or with the authority of the Tenderer.
7. The Tenderer reserves the right to adopt legal proceedings, civil or criminal, against the PIA in relation to a dispute arising out of breach of obligation by the PIA under this clause.

3.17 Taxes

The quoted offer should be exclusive of Taxes. Taxes shall be paid extra on actual, as applicable. The taxes prevailing at the time of raising the invoice shall be paid. GFGNL shall deduct appropriate tax as applicable at source from the payment against the delivery & services and corresponding TDS certificate shall be issued at the end of respective quarter.

3.18 Warranty

1. A comprehensive on-site warranty and Operations & Maintenance on all goods supplied under this contract shall be provided by the respective Original Equipment Manufacturer (OEM) through PIA till the end of the Contract.
2. Technical Support shall be provided by the respective OEM for till the end of the contract period.
3. The PIA shall warrant that the goods supplied under the Contract are new, non-refurbished, unused and recently manufactured; shall not be nearing End of Sale / End of Support; and shall be supported by the PIA and respective OEM along with service and spares support to ensure its efficient and effective operation for the entire duration of the contract.
4. The PIA warrants that the goods supplied under this contract shall be of the reasonably acceptable grade and quality and consisted with the established and generally accepted standards for materials of this type. The goods shall be in full conformity with the specifications and shall operate properly and safely. All recent design improvements in goods, unless provided otherwise in the Contract, shall also be made available.
5. The PIA further warrants that the Goods supplied under this Contract shall be free from all encumbrances and defects/faults arising from design, material, manufacture or

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workmanship (except insofar as the design or material is required by the Tenderer's Specifications)

6. The Tenderer shall promptly notify the PIA in writing of any claims arising under this warranty.
7. Upon receipt of such notice, the PIA shall, with all reasonable speed, repair or replace the defective Goods or parts thereof, without prejudice to any other rights which the Tenderer may have against the PIA under the Contract.
8. If the PIA, having been notified, fails to remedy the defect(s) within a reasonable period, the Tenderer may proceed to take such remedial action as may be necessary, at the PIA's risk & expense and without prejudice to any other rights which the Tenderer may have against the PIA under the Contract.

3.19 Stipulated Time Schedule

Project Implementation Schedule for GPs Installation:

Completion Timeline	Package A Deliverable/ Milestone	Package B Deliverable/ Milestone	Remarks
T	Issuance of Award of Work and work order	Issuance of Award of Work and work order	On selection of the PIA, Award of Contract and Work Order is issued
T+1 Month	Man and Material Mobilization	Man and Material Mobilization	PIA should apply for ROW permissions during this period as per the Approved Route Plans
T+2 Months	Man and Material Mobilization	Man and Material Mobilization	PIA should apply for ROW permissions during this period as per the Approved Route Plans
T+3 Months	Aggregate commissioning of 50 GPs	Aggregate Commissioning of 50 GPs	Site Installation Report, Testing Report approved by TPA, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report

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T+4 Months	Aggregate commissioning of 200 GPs	Aggregate Commissioning of 200 GPs	Site Installation Report, Testing Report approved by TPA, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+5 Months	Aggregate commissioning of 500 GPs	Aggregate Commissioning of 500 GPs	Site Installation Report, Testing Report approved by TPA, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+6 Months	Aggregate commissioning of 950 GPs	Aggregate Commissioning of 950 GPs	Site Installation Report, Testing Report approved by TPA, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+7 Months	Aggregate commissioning of 1400 GPs	Aggregate Commissioning of 1400 GPs	Site Installation Report, Testing Report approved by TPA, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+8 Months	Aggregate commissioning of 1950 GPs	Aggregate Commissioning of 1850 GPs	Site Installation Report, Testing Report approved by TPA, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+9 Months	Aggregate commissioning of 2500 GPs	Aggregate Commissioning of 2300 GPs	Site Installation Report, Testing Report approved by TPA, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+10 Months	Aggregate commissioning of 3050 GPs	Aggregate Commissioning of 2750 GPs	Site Installation Report, Testing Report approved by TPA, NMS Report, OTDR/LSPM link test reports, As Built

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			Diagram (ABD report), Monthly Progress Report
T+11 Months	Aggregate commissioning of 3500 GPs	Aggregate Commissioning of 3200 GPs	Site Installation Report, Testing Report approved by TPA, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+12 Months	Aggregate commissioning of 3824 GPs	Aggregate Commissioning of 3698 GPs	Site Installation Report, Testing Report approved by TPA, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report

Table 3.1

Delivery Timeline & Milestones for NOC and all Software:

Completion Timeline	Delivery Milestone
T	<ul style="list-style-type: none"> a. NMS Software, GIS(NIS) and Project Management to be procured and customized as per the RFP requirements. b. The PIA must also ensure availability of RoW Manager capability on the website/Webportal and integration with GIS layer.
T+2 Months	<ul style="list-style-type: none"> a. Installation, testing and commissioning of NMS tool. b. Deployment of NOC resources. c. Installation, Testing and commissioning of Workflow manager for ROW tracking to be made live. d. Supply, Installation, testing and Commissioning of ERP (Basic functionalities of all modules as per Scope of Work) to be made live. e. Preparation and Delivery of SOPs and Manuals for NOC operations. f. Supply, Installation, Testing and Commissioning of NOC Connectivity including but not limited to: Point to Point Leased Line, Internet Leased Lines, PRI for Voice, and SMS Gateway.

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	<p>g. Supply, Installation, Testing and Commissioning of NOC NON-IT Infrastructure including but not limited to : LAN Cabling, Operator Desktops, associated Electrical work, earthing.</p> <p>h. Installation, Testing and Commissioning of Mobile App for tracking and updating of fibre cable laid during implementation phase and integration with respective GIS layers.</p> <p>i. Supply, Installation, Testing and Commissioning of ERP base functionalities with at least HR module.</p>
T+6 Months	<p>a. Supply, Installation, Testing and Commissioning of Video Wall</p> <p>b. Helpdesk to be functional.</p>
T+12 Months	<p><u>Below Functionalities to be made live</u></p> <p>a. All Deliverable Milestones described above.</p> <p>b. API Integration of all other apps with ERP.</p> <p>c. Billing Module of ERP.</p> <p>d. Bulk e-Mail solution deployment(opensource client or exchange).</p> <p>e. Budgeting module of ERP.</p> <p>f. Supply, Installation, Testing and Commissioning of Mobile App for O&M phase integrated with NMS and ERP.</p> <p>g. CRM to be functional.</p>

Table 3.2

Note:

1. T is the date of Issuance of Award of Work in Table 3.1 and Table 3.2.
2. The prospective bidders should conduct a detailed site survey during the bidding stage.
3. Non-adherence to the aforementioned timelines/milestones shall attract penalty as detailed in Section 3.32 of this Tender.

3.20 Liquidated Damages

1. The PIA shall perform the Services and comply in all respects with the critical dates and the parties hereby agree that failure on part of the PIA to meet the critical dates without prejudice to any other rights that the Tenderer have, may lead to the imposition of such obligations as are laid down in the Delay and Deterrent Mechanism and/or levy of penalty as set and/or termination of the Contract at the discretion of the Tenderer.

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2. Penalties shall be capped as per Section 3.32, beyond which the Purchaser has the right to terminate the contract or a portion or part of the work thereof. The purchaser shall give 30 days' notice to the PIA of its intention to terminate the Contract and shall so terminate the Contract unless the Bidder initiates remedial action acceptable to the Purchaser during the 30 days' notice period.
3. The Tenderer may without prejudice to its right to effect recovery by any other method, deduct the amount of liquidated damages from any money belonging to the PIA in its hands (which includes the Tenderer's right to claim such amount against PIA's Bank Guarantee) or which may become due to the PIA. Any such recovery or liquidated damages shall not in any way relieve the PIA from any of its obligations to complete the Works or from any other obligations and liabilities under the Contract.
4. Delay not attributable to the PIA shall be considered for exclusion for the purpose of computing liquidated damages.

3.21 Term and Extension of Contract

1. The term of this Contract shall be initially for a period of 8 years (one year for implementation and 7 years for Operations & maintenance) from the date of issue of contract and Go live of the entire work, according to the time schedules specified in Clause 3.19
2. The Tenderer shall reserve the sole right to grant any extension to the term above mentioned and shall notify in writing to the PIA, at least 6 months before the expiration of the term hereof, whether it shall grant the PIA an extension of the term. The decision to grant or refuse the extension shall be at the Tenderer's discretion. Accordingly, the Bank Guarantee of the same amount shall be extended up to extended period of the Contract
3. Additional period up to 1 years as deemed appropriate (GFGNL reserves the right to extend the Contract with the PIA), terms & conditions for SLA, penalty and Prices for on premise services shall remain same as given for 1 (one) Year.
4. Where the Tenderer is of the view that no further extension of the term be granted to the PIA, the Tenderer shall notify the PIA of its decision at least 6 (six) months prior to the expiry of the Term. Upon receipt of such notice, the Bidder shall continue to perform all its obligations hereunder, until such reasonable time beyond the Term of the Contract within which, the Tenderer shall either appoint an alternative PIA or create its own infrastructure to operate such Services as are provided under this Contract. Tenderer shall make payment for work executed for the extended period post contract expiry.

3.22 Prices

1. Prices quoted must be firm and shall not be subject to any upward revision on any account whatsoever throughout the period of contract. Tenderer however reserves the right to review the charges payable for the Maintenance and Management of the infrastructure at any time at the request of Tenderer whichever is earlier to incorporate downward revisions as applicable and necessary.
2. If at any time, during the period of contract, the PIA offers identical services/products to any other Govt. Department/ Organization at prices lower than those chargeable under this contract, he shall notify the same to the Tenderer and extend such reduced prices to the Tenderer with immediate effect.

3.23 Change Orders/Alteration/Variation

1. In the case of increase or decrease in the number of villages/GPs, payment would be done at per GP derived cost

$$\text{Per GP derived cost} = \frac{\text{Total Package Cost}}{\text{Total no. of GPs in that package}}$$

3.24 Suspension of Work

1. The PIA shall, if ordered in writing by the Tenderer's Representative, temporarily suspend the works or any part thereof for such a period and such a time as ordered, then PIA shall not be entitled to claim compensation for any loss or damage sustained by him by reason of temporary suspension of the Works as aforesaid but shall be eligible for the payment (of products/services delivered and accepted) during the suspension period as per contract. An extension of time for completion, corresponding with the delay caused by any such suspension of the works as aforesaid shall be granted to the PIA, if request for same is made and that the suspension was not consequent to any default or failure on the part of the PIA. Both PIA and Tenderer acknowledges the suspension of work by Tenderer, if results in extension of contract, the extra cost shall be on account of Tenderer which shall be mutually agreed. In case the suspension of works, is not consequent to any default or failure on the part of the PIA, and lasts for a period of more than 2 months, the Bidder shall have the option to request the Tenderer to terminate the Contract with mutual consent.
2. In the event that the Purchaser suspends the progress of work for any reason not attributable to the PIA for a period in excess of 30 days in aggregate, rendering the PIA to extend his Bank Guarantee then Purchaser shall bear only the cost of extension of such

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bank guarantee for such extended period restricted to the normal bank rates as applicable in the international banking procedures subject to the PIA producing the requisite evidence from the bank concerned.

3.25 Time is of Essence

1. Time shall be of the essence in respect of any date or period specified in this RFP or any notice, demand or other communication served under or pursuant to any provision of this RFP and in particular in respect of the completion of the Services by the PIA by the completion date.

3.26 Completion of the Contract

1. Unless terminated earlier, pursuant to **Clauses 3.4, 3.12, 3.14, 3.16** the Contract shall terminate on the completion of term as specified in the Contract and only after the obligations mentioned in **Clause 3.30** are fulfilled to the satisfaction of the Tenderer.
2. Special Conditions of Contract Amendments of, and Supplements to, Clauses in the General Conditions of the Contract.

3.27 Payment Schedule

1. Payments shall be released only on satisfactory acceptance of the deliverables for each Task as per the following schedule:

Payment Schedule for GP Installations

Sr. No.	Deliverable (b)	Payment Milestones (c)	Payment (d)	Documentary Evidence (e)
1	Issuance of Award of Work and work order	NA	NA	Copy of Award of Work
2	Mobilization	NA	10% of Capex cost (As per Quoted in Table A.1 / B.1 of Financial Bid as per the package)	Against submission of additional BG of 110% of mobilization advance

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Sr. No.	Deliverable (b)	Payment Milestones (c)	Payment (d)	Documentary Evidence (e)
3	End-to-End connectivity for individual GPs	End-to-End connectivity for individual GPs	<p>a. 80% of Capex cost (discovered cost per GP from Financial Bid Table A.1 and B.1 from its respective package)* Number of Live GPs</p> <p>b. Of aforementioned part payment (point a) 70% will be paid on bill submission once GP is Lit ON. Remaining 30% of it will be paid post TPA audit and deduction in rates (if applicable) due to noncompliance with depth to be achieved for fibre cable laying for respective soil</p>	<ul style="list-style-type: none"> • Copy of Duly Signed and Stamped, Installation ,Commissioning and testing Report from NMS, • Certification by TPA authorized by GFGNL for the fibre laid. • OTDR link test reports, power on, post, FAT report approved and certificate issued along with configuration reports by TPA authorized by GFGNL, • As Built Diagram (ABD report), • Monthly Progress Report • For GP level billing, no. of GPs will be clubbed for a week period

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Sr. No.	Deliverable (b)	Payment Milestones (c)	Payment (d)	Documentary Evidence (e)
			strata type as defined in section 3.32) c. Deleted	
4	End-to-End connectivity for all GPs in a given block	GFGNL Authorized TPA's approval on Fibre Laid	10% of Capex cost (As per Quoted in Table A.1 / B.1 of Financial Bid as per the package)* Number of live GPs / Total Number of GPs	Certificate issued by GFGNL Authorized TPA's
5	O&M Cost	Post Go live of Project(all GPs included)	100% of O&M cost of respective year for specified package of the project to be paid in equal instalments on Quarterly basis in arrears, based on SLA achievements after deducting penalties if any.	Monthly SLA reports from NMS

Table 3.3

Payment Schedule for NOC and Other Applications:

Completion Timeline	Delivery Milestone	Payment Terms
T	<ul style="list-style-type: none"> NMS Software and Project Management Software (With RoW and Work Flow Manager Capability) to be procured and customised. 	-
T+2 Months	<ul style="list-style-type: none"> Installation, testing and commissioning of NMS tool. Deployment of NOC resources. Installation, Testing and commissioning of Workflow manager for ROW tracking to be made live. Supply, Installation, testing and Commissioning of ERP (Basic functionalities of all modules as per Scope of Work) to be made live. Preparation and Delivery of SOPs and Manuals for NOC operations. Supply, Installation, Testing and Commissioning of NOC Connectivity including but not limited to : Point to Point Leased Line, Internet Leased Lines and PRI for Voice and SMS Gateway. Supply, Installation, Testing and Commissioning of NOC IT Infrastructure including but not limited to: LAN Connectivity, Operator Desktops (with OS and necessary Software), UPS and Network Devices with Racks. Supply, Installation, Testing and Commissioning of NOC NON-IT Infrastructure including but not limited to : Lighting, Fixtures and Furniture for NOC, HVAC, associated Electrical work, earthing. Installation, Testing and Commissioning of Mobile App for tracking and updating of fibre cable laid during implementation phase. 	<p>15% of Capex of NOC (As per Quoted in Table A.2 of Financial Bid)</p>

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	<ul style="list-style-type: none"> • Supply, Installation, Testing and Commissioning of Mobile App for tracking and updating of fibre cable laid during implementation phase. • Supply, Installation, Testing and Commissioning of ERP base functionalities with at least HR module. 	
T+6 Months	<ul style="list-style-type: none"> • Supply, Installation, Testing and Commissioning of Video Wall • Helpdesk to be functional. • CRM to be functional. 	25% of Capex of NOC (As per Quoted in Table A.2 of Financial Bid
T+12 Months	<p><u>Below Functionalities to be made live:</u></p> <ul style="list-style-type: none"> • API Integration of all other apps with ERP. • Billing Module of ERP. • Bulk Mail solution deployment. • Budgeting module of ERP. • Supply, Installation, Testing and Commissioning of Mobile App for O&M phase integrated with NMS and ERP. 	40% of Capex of NOC (As per Quoted in Table A.2 of Financial Bid
T+24 Months		Post successful go-live of NOC components, remaining 20% of NOC & software components payment shall be paid with OPEX distributed equally across four quarterly invoices.

Table 3.4

Note:

- All payments shall be released after certification of Delivery and Implementation Milestones by GFGNL Appointed TPA

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- Since the project timelines are of utmost importance, DoT shall reserve the right to take over the project implementation, in case of the project milestones delayed by over 60 days of its agreed time. In this regard, the decision of the Empowered Committee shall be final and binding.
- All Payments shall be made in Indian Rupees Only and shall be subject to provisions of Clause 3.32.
- Invoices for payments of GP installations shall be submitted to GFGNL on a weekly basis.
- Payment shall be released by the Tenderer against the invoices raised by PIA within 30 calendar days on providing all the relevant documents timely and are complete in all reference.
- All payments shall be made through RTGS only.
- Payments should be subject to deductions of any amount for which the PIA is liable under the RFP conditions. Further, all payments shall be made subject to deduction of TDS (Tax deduction at Source) as per the current Income-Tax Act.

3.28 Event of default by the Bidder

1. The failure on the part of the PIA to perform any of its obligations or comply with any of the terms of this Contract which results in a material breach of the contract shall constitute an Event of Default on the part of the PIA. The events of default as mentioned above may include inter-alia the following:
 - a. the PIA has failed to adhere to any of the key performance indicators as laid down in the Key Performance Measures / Contract, or if the PIA has fallen short of matching such standards/targets as the Tenderer may have designated with respect to any task necessary for the execution of the scope of work under this Contract which results in a material breach of the contract. The above mentioned failure on the part of the PIA may be in terms of failure to adhere to timelines, specifications, requirements or any other criteria as defined by the Tenderer;
 - b. the PIA has failed to remedy a failure to perform its obligations in accordance with the specifications issued by the Tenderer, despite being served with a default notice which laid down the specific deviance on the part of the PIA to comply with any stipulations or standards as laid down by the Tenderer; or
 - c. the PIA /PIAs' team has failed to conform with any of the Service/Facility Specifications/standards as set out in the scope of work of this RFP or has failed to adhere to any amended direction, modification or clarification as issued by the

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Tenderer during the term of this Contract and which the Tenderer deems proper and necessary for the execution of the scope of work under this Contract

- d. the PIA has failed to demonstrate or sustain any representation or warranty made by it in this Contract, with respect to any of the terms of its Bid, the RFP and this Contract
 - e. There is an order from a court of competent jurisdiction for bankruptcy, insolvency, winding up or there is an appointment of receiver, liquidator, assignee, or similar official against or in relation to the PIA.
2. Where there has been an occurrence of such defaults inter alia as stated above, the Tenderer shall issue a notice of default to the PIA, setting out specific defaults / deviances / omissions and providing a notice of Sixty (60) days to enable such defaulting party to remedy the default committed.
 3. Where despite the issuance of a default notice to the PIA by the Tenderer the PIA fails to remedy the default to the satisfaction of the PIA, the Tenderer may, where it deems fit, issue to the defaulting party another default notice or proceed to adopt such remedies as may be available to the Tenderer.

3.29 Consequences of Event of Default

Where an Event of Default subsists or remains uncured the Tenderer may/shall be entitled to:

1. The PIA shall in addition take all available steps to minimize loss resulting from such event of default.
2. The Tenderer may, by a written notice of suspension to the PIA, suspend all payments to the PIA under the Contract, provided that such notice of suspension:
 - a. shall specify the nature of the failure; and
 - b. shall request the PIA to remedy such failure within a specified period from the date of receipt of such notice of suspension by the PIA
3. In all cases of risk purchase, the difference in cost shall be borne by defaulting PIA with capping of maximum 10% of the value of goods/services at contract.
4. Termination of the Contract in Part or Full
 - a. Retain such amounts from the payment due and payable by the Tenderer to the PIA as may be required to offset any losses caused to the Tenderer as a result of such event of default and the PIA shall compensate the Tenderer for any such loss, damages or other costs, incurred by the Tenderer in this regard. Nothing herein shall effect the continued obligation of the PIA and PIA's team to perform all their

obligations and responsibilities under this Contract in an identical manner as were being performed before the occurrence of the default.

- b. Invoke the Bank Guarantee and other Guarantees furnished hereunder, recover such other costs/losses and other amounts from the PIA as may have resulted from such default and pursue such other rights and/or remedies that may be available to the Tenderer under law.

3.30 Termination

1. The Tenderer may, terminate this Contract in full or in part by giving the PIA a prior and written notice indicating its intention to terminate the Contract under the following circumstances:
 - a. Where the Tenderer is of the opinion that there has been such Event of Default on the part of the PIA which would make it proper and necessary to terminate this Contract and may include failure on the part of the PIA to respect any of its commitments with regard to any part of its obligations under its Bid, the RFP or under this Contract.
 - b. Where it comes to the Tenderer's attention that the PIA (or the PIA's Team) is in a position of actual conflict of interest with the interests of the Tenderer, in relation to any of terms of the PIA's Bid, the RFP or this Contract
 - c. Where the PIA's ability to survive as an independent corporate entity is threatened or is lost owing to any reason whatsoever, including inter-alia the filing of any bankruptcy proceedings against the PIA, any failure by the PIA to pay any of its dues to its creditors, the institution of any winding up proceedings against the PIA or the happening of any such events that are adverse to the commercial viability of the PIA. In the event of the happening of any events of the above nature, the Tenderer shall reserve the right to take any steps as are necessary, to ensure the effective transition of the project to a successor PIA and to ensure business continuity
 - d. **Termination for Insolvency:** The Tenderer may at any time terminate the Contract by giving written notice to the PIA, without compensation to the PIA, if the PIA becomes bankrupt or otherwise insolvent, provided that such termination shall not prejudice or affect any right of action or remedy which has accrued or shall accrue thereafter to the Tenderer.
 - e. **Termination for Convenience:** The Tenderer, may, by prior written notice sent to the PIA at least 6 months in advance, terminate the Contract, in whole or

in part at any time for its convenience. The notice of termination shall specify that termination is for the Tenderer's convenience, the extent to which performance of work under the Contract is terminated, and the date upon which such termination becomes effective.

2. The PIA may, subject to approval by the Tenderer, terminate this Contract before the expiry of the term by giving the Tenderer a prior and written notice at least 12 months in advance indicating its intention to terminate the Contract.

3.31 Consequences of Termination

1. In the event of termination of this contract due to any cause whatsoever, the contract with stand cancelled effective from the date of termination of this contract.
2. In case of exigency, if the Tenderer gets the work done from elsewhere, the difference in the cost of getting the work done shall be borne by the PIA with capping of maximum 10% of the value of goods/services at contract
3. Where the termination of the Contract is prior to its stipulated term on account of a Default on the part of the PIA or due to the fact that the survival of the PIA as an independent corporate entity is threatened/has ceased, or for any other reason, whatsoever, the Tenderer through re-determination of the consideration payable to the PIA as agreed mutually by the Tenderer and the PIA or through a third party acceptable to both the parties may pay the PIA for that part of the Services which have been authorized by the Tenderer and satisfactorily performed by the PIA up to the date of termination. Without prejudice any other rights, the Tenderer may retain such amounts from the payment due and payable by the Tenderer to the PIA as may be required to offset any losses caused to the Tenderer as a result of any act/omissions of the PIA. In case of any loss or damage due to default on the part of the PIA in performing any of its obligations with regard to the execution of the scope of work under this Contract, the PIA shall compensate the Tenderer for any such loss, damages or other costs, incurred by the Tenderer. Additionally, other members of its team shall perform all its obligations and responsibilities under this Contract in an identical manner as were being performed before the collapse of the PIA as described above in order to execute an effective transition and to maintain business continuity. All third parties shall continue to perform all/any functions as stipulated by the Tenderer and as may be proper and necessary to execute the scope of work under the Contract in terms of the PIA s' Bid, the RFP and this Contract.

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4. Nothing herein shall restrict the right of the Tenderer to invoke the Bank Guarantee and other Guarantees furnished hereunder, enforce the Deed of Indemnity and pursue such other rights and/or remedies that may be available to the Tenderer under law.
5. The termination hereof shall not affect any accrued right or liability of either Party nor affect the operation of the provisions of this Contract that are expressly or by implication intended to come into or continue in force on or after such termination.

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

3.32 Penalty

Following penalties are applicable in case of in case of non-compliance:

1. Penalties applicable in case of Non-compliance with delivery timelines / Milestone as defined in Clause 3.19

	Package A		Package B		Penalty % of the CAPEX value of the pending GPs based on aggregate milestones							
	Monthly Milestones	Aggregate Milestones (Penalty will be calculated basis aggregate value)	Monthly Milestones	Aggregate Milestones (Penalty will be calculated basis aggregate value)	>0% - <=10% Pending	>10% - <=20% Pending	>20% - <=30% Pending	>30% - <=40% Pending	>40% - <=50% Pending	>50% - <=60% Pending	>60% - <=75% Pending	>75% Pending
T	Issuance of Award of Work and work order		Issuance of Award of Work and work order		NA	NA	NA	NA	NA	NA	NA	NA
T +1 Month	Man and Material Mobilization		Man and Material Mobilization		NA	NA	NA	NA	NA	NA	NA	NA
T +2 Months	Man and Material Mobilization		Man and Material Mobilization		NA	NA	NA	NA	NA	NA	NA	NA

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T+3 Months	Commissioning of 50 GPs	Aggregate commissioning of 50 GPs	Commissioning of 50 GPs	Aggregate Commissioning of 50 GPs	0.5%	1%	1.5%	2%	2.5%	3%	3.5%	4%
T+4 Months	Commissioning of 150 GPs	Aggregate commissioning of 200 GPs	Commissioning of 150 GPs	Aggregate Commissioning of 200 GPs	0.5%	1%	1.5%	2%	2.5%	3%	3.5%	4%
T+5 Months	Commissioning of 300 GPs	Aggregate commissioning of 500 GPs	Commissioning of 300 GPs	Aggregate Commissioning of 500 GPs	0.5%	1%	1.5%	2%	2.5%	3%	3.5%	4%
T+6 Months	Commissioning of 450 GPs	Aggregate commissioning of 950 GPs	Commissioning of 450 GPs	Aggregate Commissioning of 950 GPs	0.5%	1%	1.5%	2%	2.5%	3%	3.5%	4%
T+7 Months	Commissioning of 450 GPs	Aggregate commissioning of 1400 GPs	Commissioning of 450 GPs	Aggregate Commissioning of 1400 GPs	0.5%	1%	1.5%	2%	2.5%	3%	3.5%	4%
T+8 Months	Commissioning of 550 GPs	Aggregate commissioning of 1950 GPs	Commissioning of 450 GPs	Aggregate Commissioning of 1850 GPs	0.5%	1%	1.5%	2%	2.5%	3%	3.5%	4%
T+9 Months	Commissioning of 550 GPs	Aggregate commissioning of 2500 GPs	Commissioning of 450 GPs	Aggregate Commissioning of 2300 GPs	0.5%	1%	1.5%	2%	2.5%	3%	3.5%	4%
T+10 Months	Commissioning of 550 GPs	Aggregate commissioning of 3050 GPs	Commissioning of 450 GPs	Aggregate Commissioning of 2750 GPs	0.5%	1%	1.5%	2%	2.5%	3%	3.5%	4%
T+11 Months	Commissioning of 450 GPs	Aggregate commissioning of 3500 GPs	Commissioning of 450 GPs	Aggregate Commissioning of 3200 GPs	0.5%	1%	1.5%	2%	2.5%	3%	3.5%	4%

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T +12 Months	Commissioning of 324 GPs	Aggregate commissioning of 3824 GPs	Commissioning of 498 GPs	Aggregate Commissioning of 3698 GPs	0.5%	1%	1.5%	2%	2.5%	3%	3.5%	4%
T +13 Months	NA	Aggregate commissioning of 3824 GPs	NA	Aggregate Commissioning of 3698 GPs	0.5%	1%	1.5%	2%	2.5%	3%	3.5%	4%
T +14 Months	NA	Aggregate commissioning of 3824 GPs	NA	Aggregate Commissioning of 3698 GPs	0.5%	1%	1.5%	2%	2.5%	3%	3.5%	4%
T +15 Months	NA	Aggregate commissioning of 3824 GPs	NA	Aggregate Commissioning of 3698 GPs	0.5%	1%	1.5%	2%	2.5%	3%	3.5%	4%
T +16 Months	NA	Aggregate commissioning of 3824 GPs	NA	Aggregate Commissioning of 3698 GPs	0.5%	1%	1.5%	2%	2.5%	3%	3.5%	4%
T +17 Months	NA	Aggregate commissioning of 3824 GPs	NA	Aggregate Commissioning of 3698 GPs	0.5%	1%	1.5%	2%	2.5%	3%	3.5%	4%
T +18 Months	NA	Aggregate commissioning of 3824 GPs	NA	Aggregate Commissioning of 3698 GPs	0.5%	1%	1.5%	2%	2.5%	3%	3.5%	4%
T +19 months Onwards	NA	Aggregate commissioning of 3824 GPs	NA	Aggregate Commissioning of 3698 GPs	5%	5%	10%	10%	15%	15%	20%	20%

Table 3.5

a. The above table describes the penalty to be levied in case the PIA is unable to complete the specified GPs within the timelines.

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- b. T is the date of issuance of award of work order. The project is stipulated to end by the 12th Month.
- c. The penalty would not be levied for the 1st two months of implementation timeline, as the PIA is expected to mobilize the team and machinery in field locations, take approvals for ROW in 2 months.
- d. The cumulative GPs pending till that month, would be penalized at the rate applicable for the current month.
- e. Exclusion from penalty of late delivery milestone, shall not be accepted against reason such as rainy season or access rain or any similar situations, as such factors are already factored into stipulated project delivery timelines / milestones to be achieved.
- f. Penalty for deviation in delivery timelines / milestone to be achieved will be ceiling capped at 20% of total CAPEX of respective package.
- g. In case of delay in delivery milestone of GPs due to RoW approval not received in a month from the date of complete RoW application such GPs shall be excluded from calculation of penalties.
- h. Un-recovered penalty from previous bills would be recovered in subsequent bills submitted by the PIA. This clause shall be applicable to all penalties listed in this section

- **Illustration 1:**

- If the PIA for Package A is unable to complete 12% of the Aggregate GPs for Package A by the end of 4th month, then a penalty of 1% would be levied on the total CAPEX value of all aggregated pending GPs till the end of 4th month.
- Penalty Amount= (1% of total CAPEX Amount of aggregated pending nos. of GPs).

- **Illustration 2:**

- From T + 19th month onwards, If the PIA for Package A is unable to complete 46% of the total GPs for Package A by the end of 19th month, then a penalty of 15% would be levied on the CAPEX value of all pending GPs till the end of 19th month.
- Penalty Amount= (15% of total CAPEX Amount of aggregated pending nos. of GPs)

2. Penalty for Deviation from Standard Engineering Instructions for fibre laying (Underground and Aerial)

a. Underground Fibre Cable Laying

Normally depth of the trench should 1.65 m in normal & mix soil and 1.2m in hard soil. Deviations due to field conditions will be required to have necessary protections in case of less depth. The cases and solutions are as following;

1. Minimum depth of burial in general shall be 1.65m
2. In rocky area (including Murrum & soil mixed with stone or soft rock) depth of burial shall be 1.2m at the minimum.
3. In case of utility where depth is 90 to 120 cm then DWC protection is to be used in normal/mix soil case.
4. In some areas where the depth is 60cm, in those cases reinforced concrete casing of 4"(Four inch) round should be provided.
5. For hard strata/rock soil layer for 60 to 90 cm cases DWC with wire mess and PCC is to be used. However, for depth relaxation photograph (with GPS) proof and justification is required.
6. Above ground installation of ducts shall be limited to culvert and bridge crossings only. At such locations, ducts shall be installed inside GI pipe or HDPE DWC pipes with metal sheet protection (GI sheet wrapping) of appropriate size (4" to 6") suitable for number of ducts to be installed

The relaxation by the competent authority prescribed below shall be obtained giving reasons for not achieving standard depth;

Size/Type of Cable	Standard Depth (in cms)	Minimum Acceptable Depth without Relaxation	Powers Delegated for Relaxation, For Depth upto	
			Designated State/SIA Officer -1	Designated State/SIA Officer -2
OFC	165	90%	80%	70% As per latest EI and latest instructions with protection

Table 3.6

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In case, the Successful Bidder does not adhere to the mentioned Engineering Instructions (Annexure B) and does not provide requisite protection, then the Bidder is liable to penalty as per below as per below criteria :

1. PIA has to do a self-declaration of depth achieved in GIS report and installation report submitted and separate marking shall be done for depth achieved as per the soil strata type.
2. Appointed TPA will do on-field measurement by means of sample pits (2 pits per Kms.) Average depth will be calculated on per Km. basis and will be compared against the depth required for that respective soil type.
3. This may include main trunk cable route as well as distribution cable from **Rack Mounted** splitter to GP.
4. For penalty calculation purpose **under this clause**, Per Km. **approved rate** shall be considered at rate of 1,93,000/- Rs. per Km.
5. Based on the TPA assessment in sample pits if non adherence to the depth is identified then penalty will be applied on per running Km. basis as per below table and the identified amount shall be deducted against the invoice raised during that billing payment cycle.

Depth between	Less payment through Reduction in rates in case of self-declaration of non-achievement of required depth (Deduction Amount)	Penalty and less payment in billing through reduction in rates in case of non-compliance identified by TPA during inspection without prior declaration
<165cm. to ≥ 150cm.	12% of approved rate	12% of approved rates for per Km. + Rs. 20,000/- . Per pit with deficiency

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<150cm. to ≥ 130cm.	20% of approved rate	20% of approved rates+ Rs. 20,000/- Per pit with deficiency
<130cm. to ≥ 100cm.	35% of approved rate	35% of approved rates + Rs. 20,000/- Per pit with deficiency
<(Bellow)100 cm.	45% of approved rates	45% of approved rates + 20000/- Rs. Per pit with deficiency

Table 3.7

6. Penalty for deviation from Standard Engineering Instructions for fibre laying (Underground), is capped at 10% of CAPEX cost of the package. This penalty is separate and applicable in addition to 20% of penalty capping applied for non-compliance in delivery timeline or milestones achievement as per table 3.5 of this section.

Note: In case of depth below 1.2m, instructions as per latest EI and instructions for protection etc. will be followed.

Illustration:

Assuming that the standard depth required is 165 cm and as per consideration of fibre laying charges per running kms. is Rs.1,93,000/- for the standard depth (applicable for standard depth for different soil strata type as well).

Based on the field survey done by TPA there is a deviation identified in 2 pits per kms. and average depth identified is 100 cm., then penalty applicable is = $(1,93,000 \times .35) + (20,000) + (20,000)$ for that span and this penalty shall be deducted from the invoice raised by PIA during that billing period.

3. Aerial Laying

The pole installation and alignments will be recorded as per the Engineering Instruction. The Successful Bidders shall be required to provide all articles used for Aerial OFC laying. In case the Successful Bidder does not use any mandatory article, he shall be required to implement the articles mentioned in EI (as per Annexure B) and the payment will be not processed until the proper rectification has been completed.

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4. Penalties applicable in case of deficiency in Ongoing performance and service levels during Operations & Maintenance Phase

- In case of deficiency in Ongoing performance and service levels penalty shall be applied as per below criteria :

1	Proposed SLA Uptime Per Block	
Sr. No.	Network Uptime	Penalty
1	>= 99%	No Penalty
2	>= 98.0% to < 98.99%	2 % of the Quarterly OPEX of respective block
3	>= 96.0% to < 97.99%	5 % of the Quarterly OPEX of respective block
4	>= 94.0% to < 95.99%	10 % of the Quarterly OPEX of respective block
5	>= 92.0% to < 93.99%	15 % of the Quarterly OPEX of respective block
6	>= 90.0% to < 91.99%	20 % of the Quarterly OPEX of respective block
7	< 90.0%	25 % of the Quarterly OPEX of respective block

Table 3.8

2	SLA for NMS, ERP, Mobile App and Web Portal	
Sr. No.	Uptime	Penalty
1	>=99.00%	No penalty
2	<99.00% to >=98.50%	Penalty of 0.2% of total O&M charge to be paid per month
3	<98.50% to >=97.00%	Penalty of 0.4% of total O&M charge to be paid per month for NOC
4	<97.00%	Penalty of 2% of total O&M charge to be paid per month for NOC

Table 3.9

Note:

1. For the Calculation of SLA's , the Block shall be taken as Unit.
2. The performance report for all above shall be generated from the Measurement Tool (NMS, Helpdesk tool).
3. PIA shall submit the Reports on the performance and adherence to the SLA through these tools as per the MIS reports identified in Section 4.4.6.
4. All incidences reported by NMS should be registered in the Help Desk with Ticket ID.
5. Maximum penalty ceiling shall be 20% of Quarterly OPEX Value.
6. SLA below 95% for network as a whole, consecutively for three months will be a good ground to initiate termination of contract for default.
7. Payment shall be made (after deducting suitable penalty) as percentage of actual Uptime achieved.
8. Payment shall be made (after deducting suitable penalty) as percentage of actual Uptime achieved.
9. Per GP OPEX will be total OPEX divided by number of GPs.
10. 12 Hours of downtime per software per quarter is permissible for all software scheduled maintenance and 2 hour of downtime per device per quarter at GP level is permissible.
11. Following will not be considered for downtime calculation
 - a. Link down due to power failure and ONT (Optical Network Terminal) switch off at Gram Panchayats.(GPs)
 - b. Schedule maintenance by vendor with prior information to GFGNL
12. The payment shall be made on quarterly basis. For the Calculation of SLA's, the Block Shall be taken as Unit.

5. Penalties for not keeping man-power

If successful bidder does not deploy the required specified quantity & quality manpower as per tender document/RFP or a person deployed is not reporting to the duty, there would be a penalty per person per day as defined below and will be deducted from the quarterly payment without any maximum penalty cap. If the above incidence occurs two times in one year, Tenderer reserves the right to terminate the contract and no payment would be made for the services rendered in that particular Quarter.

Manpower penalties during the Operations Phase		
Sr. No.	Penalty Clause	Penalty
1	<ul style="list-style-type: none"> • Successful bidder has to ensure that the number of personnel required as per Manpower clause at the various operational levels of project. • The successful bidder shall ensure that alternate arrangements are made and leave for a staff is pre-sanctioned by Tenderer. If not, the penalties described in the following column shall apply <p>(Any deviation in qualification or in experience of the deployed manpower will be treated as non-deployment for the purpose of penalty calculation)</p>	<ol style="list-style-type: none"> 1. Manpower at NOC for O&M: Rs. 7000/- per day per person for un-sanctioned/non-reporting. 2. Field Resource/Manpower except FRT teams: Rs. 1000 per person per day of unsanctioned leave or non-reporting or non-deployment. 3. FRT Team: Rs. 10000 per day per FRT team of unsanctioned leave or non-reporting or non-deployment.

Table 3.10

Note:

1. Prior intimated leave of absence will be allowed: 24 days per designated post in a year.
2. If a resource preceding on leave or becoming absent is replaced with a resource approved by authority, then such substitution will not be treated as absence.
3. In exceptional cases, the tenderer may allow longer period of absence without penalty, provided prior approval is obtained.

6. Penalty for causing inconvenience to the Public

1. The bidder shall not be allowed to dump the empty cable drums/waste materials in Govt/public place, which may cause inconvenience to Govt/ Public. If the bidder does not dispose off the empty cable drums/waste materials within 3 days of becoming empty, TENDERER is at liberty to dispose off the drum/waste material in any manner deemed fit and the costs incurred by the TENDERER in disposing off such materials shall be borne by the Bidder. Over and above TENDERER may also levy a penalty up to Rs 1000 for each such default.

7. Penalty for cutting/damaging the existing cable/utilities:

1. During excavation of trench utmost care should be taken by the bidder, so that the existing underground cables/utilities are not damaged or cut. In-case any damage/ cut is done to the existing cables/utilities, a penalty of Rs. 50,000/- per cut will be levied and the same will be deducted from PIA's bills.
2. Besides the above penalty, the bidder shall carry out such repairs for restoration of the damaged cable/utilities free of charge. The cost of jointing kit shall also be borne by the bidder. If bidder fails to repair the damage, the cost of repair (including cost of labour + Jointing kit) shall be recovered from the bidder.

3.33 Arbitration

1. Except otherwise provided in this RFP in the event of any question or interpretation of any clause, dispute or difference or to any other claim, right, matter or thing whatsoever in any way arising out or relating to this RFP whether arose during the progress of the work or after the cancellation, termination, completion or abandonment thereof, shall be settled by the parties amicably through negotiation within a period of 30 days of the notice by other party, failing which, the dispute shall be referred to a three member committee appointed by the CMD, BBNL. The arbitration shall be conducted in accordance with the provisions of the Arbitration & Conciliation Act, 1996 or any statutory modification of re-enactment thereof and the rules made there under and for the time being in force shall apply to the arbitration proceedings. In case of dispute not getting resolved by the aforementioned three-member committee, the Chief Secretary of Government of Gujarat shall appoint an arbitrator. The arbitrator shall adjudicate on only such disputes as are referred to him by the appointing authority and give separate award against each dispute and claim referred to him and shall give reasons for the award. The fee payable to arbitrator shall be paid equally by both the parties.
2. Notwithstanding any dispute or claim of the pendency of any arbitration or other proceedings, State shall continue to Implement the project and provide the services for the whole duration of the RFP.

3.34 Insurance

1. The Goods supplied under this Contract shall be fully insured by the PIA, against any loss or damage during transit, upto the time it is installed at the Tenderer's designated location. For the Operations and Maintenance phase, the insurance taken should cover risks such as fire, earthquake and cyclone (for wind speeds greater than 80 kmph). The PIA shall submit to the Tenderer, certificate of insurance issued by the insurance company, indicating that such insurances have been taken.
2. The PIA shall bear all the statutory levies like customs, insurance, freight, etc. applicable on the goods during their shipment from respective manufacturing/shipment site of the OEM to the port of landing.
3. All charges like transportation charges, octroi, etc. that may be applicable till the goods are delivered at the respective site of installation shall also be borne by the PIA.

4. The PIA during the term of this contract undertakes to ensure that it has taken or shall take up all appropriate insurances for the delivery of goods that it is required to undertake under law as well as to adequately cover its obligations under this Contract: shall take out and maintain, at his own cost insurance with IRDA approved insurers against the risks, and for the coverage, as specified below: shall pay all premium in relation thereto and shall ensure that nothing is done to make such insurance policies void or voidable at the Tenderer's request, shall provide certificate of insurance to the Tenderer showing that such insurance has been taken out and maintained. Employer's liability and workers' compensation insurance in respect of the Personnel of the PIA / PIA's Team, in accordance with the relevant provisions of the Applicable Law, as well as, with respect to such Personnel, any such life, health, accident, travel or other insurance as may be appropriate; and Insurance against loss of or damage to (i) equipment or assets procured in full or in part for fulfilment of obligations under this Contract (ii) the PIA's assets and property used in the performance of the Services

3.35 Transfer of Ownership

1. The PIA must transfer all titles to the assets and goods procured for the purpose of the project to the Tenderer upon Go Live of the Project.
2. The asset(s) so created shall be a National Asset fully owned by the Government of India, and held on its behalf by GFGNL.

3.36 Limitation of the Bidder's Liability towards the Tenderer

1. Except in case of gross negligence or wilful misconduct on the part of the PIA or on the part of any person or company acting on behalf of the PIA in carrying out the Services, the PIA, with respect to damage caused by the PIA to Tenderer's resulting in bodily injury, death or damage to physical property with respect to all claims arising under this Contract, shall in aggregate not be liable to Tenderer
 - a. For any indirect or consequential loss or damage; and
 - b. For any direct loss or damage that exceeds the total payments payable under this contract to the PIA hereunder.
2. This limitation of liability shall not affect the PIA's liability, if any, for direct damage to Third Parties resulting in bodily injury, death or damage to physical property caused by the PIA or any person or firm/company acting on behalf of the PIA in carrying out the Services.

Notwithstanding anything stated to the contrary in the RFP, Limitation of liability, including for direct damage to Third Parties, shall be to the extent of 100% of the total cost of the project calculated up to and as on the date when such section / clause is required to be invoked.

3.37 Conflict of Interest

1. If the PIA found to have a Conflict of Interest shall be disqualified. In the event of disqualification, the Tenderer shall forfeit the EMD as mutually agreed, without prejudice to any other right or remedy that may be available to the Tenderer hereunder or otherwise. The PIA shall disclose to the Tenderer in writing, all actual and potential conflicts of interest that exist, arise or may arise (either for the PIA or the PIA's team) in the course of performing the Services as soon as practical after it becomes aware of that conflict.
2. The Tenderer requires that the PIA provides services which at all times hold the Tenderer's interests paramount, avoid conflicts with other assignments or its own interests, and act without any consideration for future work. The PIA shall not accept or engage in any assignment that would be in conflict with its prior or current obligations to other clients, or that may place it in a position of not being able to carry out the assignment in the best interests of the Tenderer.

3.38 Severance

1. In the event any provision of this Contract is held to be invalid or unenforceable under the applicable law, the remaining provisions of this Contract shall remain in full force and effect.

3.39 Governing Language

1. The Contract shall be written in English language. Subject to Clause 3.43(5) such language versions of the Contract shall govern its interpretation. All correspondence and other documents pertaining to the Contract that are exchanged by parties shall be written in English language only.

3.40 No Claim Certificate

1. The PIA shall not be entitled to make any claim, whatsoever against the Tenderer, under or by virtue of or arising out of, this contract, nor shall the Tenderer entertain or consider any such

claim, if made by the PIA after he shall have signed a “No claim” certificate in favour of the Tenderer in such forms as shall be required by the Tenderer after the works are finally accepted.

3.41 Publicity

1. The PIA shall not make or permit to be made a public announcement or media release about any aspect of this Contract unless the Tenderer first gives the PIA its written consent.

3.42 Force Majeure

1. If, at any time, during the continuance of this contract, the performance in whole or in part by either party of any obligation under this contract is prevented or delayed by reasons of any war or hostility, acts of the public enemy, civil commotion, sabotage, fires, floods, explosions, epidemics, quarantine restrictions, strikes, lockouts or act of God (hereinafter referred to as events) provided notice of happenings of any such eventuality is given by either party to the other within 21 days from the date of occurrence thereof, neither party shall by reason of such event be entitled to terminate this contract nor shall either party have any claim for damages against other in respect of such non-performance or delay in performance, and deliveries under the contract shall be resumed as soon as practicable after such an event come to an end or cease to exist, and the decision of the Tenderer as to whether the deliveries have been so resumed or not shall be final and conclusive. Further that if the performance in whole or part of any obligation under this contract is prevented or delayed by reasons of any such event for a period exceeding 60 days, either party may, at its option, terminate the contract.
2. Provided, also that if the contract is terminated under this clause, the Tenderer shall be at liberty to take over from the PIA at a price to be fixed by the Tenderer, which shall be final, all unused, undamaged and acceptable materials, bought out components and stores in course of manufacture which may be in possession of the PIA at the time of such termination or such portion thereof as the Tenderer may deem fit, except such materials, bought out components and stores as the PIA may with the concurrence of the Tenderer elect to retain.

3.43 General

1. Relationship between the Parties

- a. Nothing in this Contract constitutes any fiduciary relationship between the Tenderer and PIA /PIA s' Team or any relationship of employer employee, principal and agent, or partnership, between the Tenderer and PIA.
- b. No Party has any authority to bind the other Party in any manner whatsoever except as agreed under the terms& conditions of this Contract.
- c. The Tenderer has no obligations to the PIA s' Team except as agreed under the terms & Conditions of this Contract.

2. No Assignment

The PIA shall not transfer any interest, right, benefit or obligation under this Contract without the prior written consent of the Tenderer.

3. Survival

The provisions of the clauses of this Contract in relation to documents, property, Intellectual Property Rights, indemnity, publicity and confidentiality and ownership survive the expiry or termination of this Contract and in relation to confidentiality, the obligations continue to apply unless the Tenderer notifies the PIA of its release from those obligations.

4. Entire Contract

The terms & conditions laid down in the RFP and all the annexures thereto as also the Bid and any attachments/annexes thereto shall be read in consonance with and form an integral part of this Contract. This Contract supersedes any prior Contract, understanding or representation of the Parties on the subject matter.

5. Governing Law

This Contract shall be governed in accordance with the laws of India.

6. Jurisdiction of Courts

The courts of India at Delhi have exclusive jurisdiction to determine any proceeding in relation to this Contract.

7. Compliance with Laws

The PIA shall comply with the laws in force in India in the course of performing this Contract.

8. Notices

- a) A "notice" means:
 - i. A notice; or
 - ii. A consent, approval or other communication required to be in writing under this Contract.

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All notices, requests or consents provided for or permitted to be given under this Contract shall be in writing and shall be deemed effectively given when personally delivered or mailed by pre-paid certified/registered mail, return receipt requested, addressed as follows and shall be deemed received two days after mailing or on the date of delivery if personally delivered:

To Tenderer at:

GFGNL

<<Attn: XXXX, XXXX, GFGNL>>

[Phone:]

[Fax:]>>

To PIA at:

Attn:

[Phone:]

[Fax:]

Any Party may change the address to which notices are to be directed to it by notice to the other parties in the manner specified above.

A notice served on a Representative is taken to be notice to that Representative's Party.

9. Waiver

- a. Any waiver of any provision of this Contract is ineffective unless it is in writing and signed by the Party waiving its rights.
- b. A waiver by either Party in respect of a breach of a provision of this Contract by the other Party is not a waiver in respect of any other breach of that or any other provision.
- c. The failure of either Party to enforce at any time any of the provisions of this Contract shall not be interpreted as a waiver of such provision.

10. Modification

Any modification of this Contract shall be in writing and signed by an authorized representative of each Party.

11. Application

These General Conditions shall apply to the extent that provisions in other parts of the Contract do not supersede them.

3.44 Exit Management Plan

1. This clause sets out the provisions which shall apply upon completion of the contract period or upon termination of the contract for default of the PIA. An Exit Management plan shall be furnished by PIA in writing to the Tenderer within 60 days on completion of the contract period or termination of the contract for default of the PIA, which shall deal with at least the following aspects of exit management in relation to the contract as a whole and in relation to the Project Implementation and Service Level monitoring.
 - a. A detailed program of the transfer process that could be used in conjunction with a Replacement PIA 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;
 - b. Plans for provision of contingent support to Project and Replacement PIA for a reasonable period after transfer.
 - c. Exit Management plan in case of normal termination of Contract period
 - d. Exit Management plan in case of any eventuality due to which Project is terminated before the contract period.
 - e. Exit Management plan in case of termination of the PIA
2. Exit Management plan at the minimum adhere to the following:
 - a. Three (3) months of the support to Replacement PIA post termination of the Contract
 - b. Complete handover of the Planning documents, bill of materials, technical specifications of all equipment, user manuals, guides, IPR, network architecture, change requests if any reports, documents and other relevant items to the Replacement PIA / Tenderer
 - c. Certificate of Acceptance from authorized representative of Replacement PIA issued to the PIA on successful completion of handover and knowledge transfer
 - d. In the event of termination or expiry of the contract, Project Implementation or Service Level monitoring, both PIA and Tenderer shall comply with the Exit Management Plan.
 - e. During the exit management period, the PIA shall use its best efforts to deliver the services.

3.45 Service Level Agreement & Targets

SLAs and related penalties are mentioned in Section 3.32 Table 3.8 and Table 3.9

3.46 Exclusions

1. For the purpose of calculating SLA, the following faults or outage hours shall be excluded.
 - a. Periods where the GFGNL office staff is inaccessible to confirm the status of the system after fault clearance by the PIA.
 - b. Periods where any link is switched off at GFGNL or Govt. Office due its own reasons. The onus lies on GFGNL or respective Govt. establishment to ensure that the on-site equipment are powered ON and / or the Network Monitoring tools, if any, that are used by GFGNL should be able to filter out the time period of link being voluntarily switched off from the down time calculations.
 - c. Periods where the failure of any components or equipment belonging to GFGNL / Govt. office.

3.47 Fraud and Corrupt Practices

1. The Bidders and their respective officers, employees, agents and advisers shall observe the highest standards of ethics during the Bidding Process and subsequent to the issue of the Award of Work and during the subsistence of the Contract. Notwithstanding anything to the contrary contained herein, or in the Award of Work or the Contract, the Tenderer shall reject a Bid, withdraw the Award of Work, or terminate the Contract, as the case may be, without being liable in any manner whatsoever to the Bidder as the case may be, if it determines that the Bidder, as the case may be, has, directly or indirectly or through an agent, engaged in corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice in the Bidding Process. In such an event, the Tenderer shall forfeit and appropriate the Bid Security or Performance Security, as the case may be, as mutually agreed genuine pre-estimated compensation and damages payable to the Tenderer towards, inter alia, time, cost and effort of the Tenderer, without prejudice to any other right or remedy that may be available to the Authority hereunder or otherwise.
2. Without prejudice to the rights of the Tenderer under Clause 3.47(1) hereinabove and the rights and remedies which the Tenderer may have under the Award of Work or the Contract, if a Bidder, as the case may be, is found by the Authority to have directly or

indirectly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice during the Bidding Process, or after the issue of the Award of Work or the execution of the Contract, such Bidder shall not be eligible to participate in any RFP issued by the Tenderer during a period of 2 (two) years from the date such Bidder, as the case may be, is found by the Tenderer to have directly or indirectly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practices, as the case may be.

For the purposes of this Clause 45, the following terms shall have the meaning hereinafter respectively assigned to them:

- a. "Corrupt Practice" means (i) the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the actions of any person connected with the Bidding Process (for avoidance of doubt, offering of employment to or employing or engaging in any manner whatsoever, directly or indirectly, any official of the Tenderer who is or has been associated in any manner, directly or indirectly with the Bidding Process or the Award of Work or has dealt with matters concerning the Contract or arising therefrom
- b. "Fraudulent Practice" means a misrepresentation or omission of facts or suppression of facts or disclosure of incomplete facts, in order to influence the Bidding Process;
- c. "Coercive Practice" means impairing or harming or threatening to impair or harm, directly or indirectly, any person or property to influence any person's participation or action in the Bidding Process;
- d. "Undesirable Practice" means (i) establishing contact with any person connected with or employed or engaged by the Tenderer with the objective of canvassing, lobbying or in any manner influencing or attempting to influence the Bidding Process; or (ii) having a Conflict of Interest; and
- e. "Restrictive Practice" means forming a cartel or arriving at any understanding or arrangement among Bidder with the objective of restricting or manipulating a full and fair competition in the Bidding Process.

4 Section IV: Scope of Work

4.1 Project Background

1. BharatNet is a flagship project of Government of India (GoI) funded by Universal Service Obligation Fund, Department of Telecommunications, Ministry of Communication to provide OFC Backhaul connecting all GPs. Such OFC backhaul under this RFP is proposed to be provided by laying underground & aerial OFC.
2. BharatNet project intends to provide internet access by laying optical fibre from Block to the Gram Panchayats and to enable the Govt. of India to provide e-service and e-applications nationally. Besides, the OFC backhaul will also have surplus capacity that will be leveraged to share bandwidth or fibres on lease basis with other TSP/ISP/NLD etc., to strengthen communication infrastructure in villages to provide next generation data intensive services for community empowerment.
3. The National Optical Fibre Network (NOFN – earlier name of BharatNet) is a government project aimed at providing broadband connectivity to 2,50,000 Gram Panchayats in an effort to provide last mile connectivity as critical infrastructure. Bharat Broadband Network Limited (BBNL) was created to implement the project.
4. The NOFN's aim was to provide all necessary government services to citizens in an effort to allow then access to information which would lead to their empowerment and development. It was a result of the coming together of policy and a vision of managing a high quality network with a link to services to provide on-demand access to citizens. Testing the viability of such a large-scale network infrastructure project is imperative.
5. Recognizing the fundamental importance of broadband connectivity across the length and breadth of the country, GOI had taken up the National Optical Fibre Network (NOFN) project in 2011. The mission of NOFN project was to provide connectivity of 100 Mbps to 2.5 lakh Gram Panchayats across the country. The GOI appointed Expert Committee submitted its report to GOI on 31 March 2015 sighting recommendations on revamping NOFN, including renaming of the initiative as BharatNet.

6. BharatNet is proposed to be implemented in 3 models namely,
 1. State-led Model
 2. CPSU-led Model
 3. Private Sector-led model

Phases of BharatNet

1. The progress of the BharatNet project implementation has been slow due to a variety of reasons basis which Telecom commission has to come with revised strategy.
2. The Telecom commission approved a revised strategy for a three-phase implementation of the BharatNet Project.
3. The first phase envisaged providing one lakh gram panchayats with broadband connectivity by laying underground OFC lines by March 2017. This needed to be covered by BBNL.
4. The second phase will provide connectivity to all remaining gram panchayats in the country using an optimal mix of underground fibre over road network, power lines, radio and satellite media. It is to be completed by December 2018.

5. Deleted

4.2 Implementation Approach

1. With respect to the implementation model, the State of Gujarat has decided to opt for the State-led Implementation Model to implement the project in the State. Gujarat is one of the pioneers in leveraging various ICT technologies for efficient and effective governance. Given that the development of the ICT Sector and its extensive usage in the public and private sectors, it was strongly felt that choice of the State-led Model is the most appropriate model for Gujarat.
2. Under this model, the Government of Gujarat has setup an SPV namely “Gujarat Fibre Grid Network Limited (GFGNL)” to implement Phase-II of BharatNet Project in Gujarat. GFGNL was set up in September, 2016 under the Department of Science and Technology, Government of Gujarat.

Gujarat Fibre Grid Network Limited

1. The Gujarat Government is deeply aligned with the Nation's vision of a Digital India and is eager to be one of the leading States to embrace and deliver this vision to the people of Gujarat. Therefore, the State wants to establish Fibre Grid up to the village level under the umbrella of BharatNet so as to spur economic development, to provide Integrated Services to the Citizens and to lit up every household in future with access to video capable broadband at an affordable tariff.
2. The Project Title got named with "Gujarat Fibre Grid" and aligned with the respective Special Purpose Vehicle creation named as "Gujarat Fibre Grid Network Limited".
3. GFGNL will follow the BharatNet phase-II guidelines to rollout the underground laying of fibre optic network, as per the guidelines of the Committee.
4. As per current requirement, Gujarat is going ahead with BharatNet Phase-II wherein total 7522 Gram panchayats under 135 (128+7) Blocks from 22 (18+4) Districts to be connected on Fibre as per the guidelines provided by BBNL.
5. State has evaluated both models of Fibre laying (Aerial, Underground) and basis on reliability of the network, State has opted the underground fibre laying approach. The Technology chosen for this is GPON (Gigabit Passive Optic Network).
6. The implementation and Tracking of the Fibre grid project will be done by GFGNL. GFGNL will plan, appraise, approve, release funds, implement, manage, operate, monitor and evaluate the Fibre grid development project.
7. GFGNL intends to select PIA (Project Implementation Agency) for both the packages (Saurashtra & Rest of Gujarat) through this tender.
8. Detail scope of PIA for both these packages is mentioned in this section in following topics.
9. PIA will have to complete his roles and responsibilities as mentioned in this RFP with supervision from his own team. GFGNL will select one agency from the list of approved agencies (GoI has finalized a list of agencies approved for the work of TPA) as TPA (Third Party Auditor) who will carry out supervision of all field activities executed by PIA. PIA will have to extend all required support to TPA for audit of 100% Network.
10. GFGNL will also select a separate agency who will be an FPA (Fourth Party Auditor). Scope of FPA will be to audit on random basis up to 10 % of Network. This scope items will be selected

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randomly as described in detail in this section of RFP. FPA will check quality of fibre routes by excavating manual pits or by electronic method.

11. During the entire Project duration including execution and O&M phases, PIA will have to coordinate and extend required support to all stakeholders like GFGNL (SIA), PIA of other package area, TPA, FPA, USOF, BBNL DoT, DST and GoG.

4.3 Scope of Work

1. GFGNL intends to create OFC infra highway by laying Optical Fibre Cable connecting all Block with Gram Panchayat covering 7522 GPs, including supply of OLT, ONT, and **Rack Mounted** splitters to enable the intended services such as internet, e-services and **other** value added services. This GP count also include GPs from 7 blocks which have been transferred from Phase – 1 to Phase – 2 of BharatNet Project (as described in Section 4.3.1.2). Available details regarding progress of work in these 7 blocks are provided in this section. PIA will have to check the accessibility and present status of field assets during survey phase and plan the Network design accordingly before submitting final bid. List of districts, talukas and GPs is listed at annexure C.
2. The Implementation of the project is by GFGNL through a PIA who would be responsible for activities mentioned in below table including 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 NOC at Gandhinagar and integration with NOC of BBNL at Bangalore. PIA would also be responsible for Operations & Maintenance (O&M) for 7 years post 100% Go-Live.
3. The total work of covering 7522 GPs for the entire scope is proposed to be split in two packages (Rest of Gujarat and Saurashtra). While in respective areas the PIAs shall lay OFC and set up electronics along with all functionalities including the responsibility of O&M support for 7 years, the PIA responsible for the Rest of Gujarat area, shall also set up the NOC at Gandhinagar and will do O&M of the NOC along with co-ordination with the other PIA responsible for the Saurashtra region. During the O&M phase, the PIA for Rest of Gujarat shall be the principal agency for NOC monitoring and the PIA of Saurashtra shall work as its agent for the fault detection and remediation.

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

1. Provisioning of minimum 12 fibre in each Gram Panchayat.
2. Configuration of ONT at GP to support minimum 1 Gbps Bandwidth. One PON port of OLT will connect maximum 3 ONTs (through 1:4 **Rack Mounted** splitter) and bandwidth

provisioning per ONT will be flexible and configured as per requirement. Each OLT will connect with approx. 25-30 GPs (ONTs).

3. All OLTs will be kept at Telephone Exchanges owned by BSNL.
4. 12 fibres to be terminated at **FDMS**/FTB each at TC and DC center of GSWAN project in the respective geography **along with ONT installation** treating TC and DC each as a GP.
5. Bringing the 96 core fibre from the nearest OLT of the region towards Gandhinagar, to the NOC center at Gandhinagar, connecting and with termination at TC & DC enroute as specified in Section – 4.3.1.2.
6. Medium of connectivity:
 - a. Along major roads, beginning from Block Telephone Exchange (OLT) 96 core fibre cables will run in different directions towards GPs. At road intersections closer to GPs, 48 core OFC will take tapping to take forward 12 fibres each, to each GP. This will, in turn, with OLT location as central node, will create a star configuration of OFC of 96 core in different directions towards GPs. While 48 core fibre will take tapings closer to GPs, hence majority of backbone length along longitudinal section will be 96 core fibre and beyond cross or intersections, it will be 48 core fibre.
 - b. Laying of fresh 24F ADSS **Ribbon** Optical Fibre Cable (aerial connectivity) only from road intersection point to Gram Panchayat using electric pole or nearest pole (applicable only where underground connectivity is not feasible depending upon site survey), and limited to not more than 5% of total route kilometers of 48 core fibre scope of that package.
 - c. For every GP, one core of fibre cable will be lit connecting through the OLT and ONT. Remaining 11 fibres at every GP, corresponding fibres at OLT, and all 12 fibres at each of TC and DC location will be terminated on **FDMS**/FTB at respective sites **along with ONT installation**.
 - d. 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, and VLAN based bandwidth provisioning for customers.
7. The entire bidding process is based on EPC model wherein the PIA will do survey, route optimization, planning, procurement, installation, commissioning and will do both operations and maintenance of the network.

8. The period for completion of Implementation would be one year and thereafter period of Operations & Maintenance would be for 7 years and it may be extended thereafter on requirement basis, based on the satisfactory performance by the PIA and mutual consent.
9. The PIA shall form a project monitoring team to provide daily progress reports of implementation and also record the progress on Mobile Application & project monitoring tool mandated by State Government and Central Government. The PIA shall procure adequate number of Smart phones/tabs with GPS facility for their field staff to update the Project Status through the mobile Applications. The same shall be used by the Field Response Team during the Operations and Maintenance phase.
10. The PIA shall provide Weekly/Monthly/Quarterly report to State / SIA regarding uptime details of Network. The SLA as mentioned in Section – III (General Conditions of the Contract and Service Level Agreements) to be met for the network availability at all times.
11. PoP at Block shall be established at respective BSNL exchange for which power & other site requirements shall be provided by BSNL. BSNL will give a tapping point for electricity with 15 A plug from where arrangement of necessary cable, MCB, plug point etc will be scope of PIA along with the requisite onsite co-ordination. The raw 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. In cases, where the ONT has to be installed and 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. It is clarified that if the GP does not have electricity connection, then the electricity connection will be obtained and provided by the state government. From existing connection from the switch board to the place where ONT and FTB is set up, the cost of wiring and appropriate electric devices will be borne by the PIA and is part of current scope.

Further, GFGNL will negotiate with Energy department and GUVNL for rural areas to get unmetered connection for unhindered dedicated electricity supply for the infrastructure (Bypassing the GP connection), in such a case the co-ordination with electricity service provider and getting requisite connection up to the place of ONT/FTB will be in scope of PIA along with all costs.

12. For provision of services on network established under BharatNet by PIA, the PIA would beside the rural broadband infrastructure created for BharatNet Phase II as part of this RFP, shall

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provide all necessary support and facilitation to the service provisioning agencies. This service shall be provided by PIAs' onsite O&M team on 24x7x365 basis.

13. Development of State NOC in Gandhinagar by PIA of "Rest of Gujarat" package.
14. Integration with State NOC at Gandhinagar and Central NOC at Bangalore. Integration with Bangalore NOC will be through Gandhinagar NOC and therefore, will be in responsibility of the PIA of Rest of Gujarat. **The integration of NMS of state NOC with NMS of Central NOC, so as to provide the view of entire infrastructure at Central NOC.**
15. The assets will belong to GFGNL, which it will hold on behalf of DoT/USOF as true owners. USOF/BBNL shall be fully authorized to take possession of the assets so created under the project in case MoU between GFGNL & USOF/BBNL is terminated (in the event of GFGNL fails to oblige its responsibilities for this Project) and contract under this RFP will survive in its original form with USOF/BBNL/any other agency appointed or designated by DoT/USOF/BBNL. PIA shall always be obligated to follow all directives of GFGNL as well as DoT/USOF. PIAs shall provide access to the USOF (DoT)/BBNL or its authorized representatives to BharatNet assets as and when required for inspection, monitoring and monetizing purposes.
16. Project Implementing Agencies shall be bound to follow the advisory and other directions issued by USOF (DoT) during the implementation of the project.
17. The PIA shall provide a separate dedicated RoW team for filing, liaising, follow-up and escalation of RoW permission related matters

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

1. Plan, Design, Implement and Commissioning Phase
2. Operation of network phase as well as Maintenance Phase

4.3.1 Plan, Design, Implement and Commission Phase

1. The scope of work shall broadly comprise of GIS based planning as well as site survey, route optimization, due diligence; supply of fibre, duct, electronics, including all the accessories; RoW applications, follow-ups till receipt of permissions, trenching, duct laying, providing necessary protection as per Engineering Instructions wherever required, back filling, fibre blowing, splicing of fibre; live line installation and commissioning of optical fibre cable on the existing power distribution poles (Wherever required and underground not practical), route indicators, joining chambers, manhole chamber, cemented route markers, termination of remaining fibres at FDMS/FTB at each GP, TC and DC. If need arises for additional new poles (to facilitate aerial cabling) to follow optimal path/route, such additional new poles shall be installed by the PIA. The fibres shall be terminated at FTB at each GP and one of fibre, which will connect with OLT at exchange will connect with ONT 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 includes successful testing of connectivity from ONT (Gram Panchayat) to OLT (Block premises), as well as testing of each core of fibre laid from the PoP/Block to Gram Panchayat and continuity along with non-breakage of remaining fibres between FTB at remote location and FTB at exchange as per AT norms. AT norms for OFC links are mentioned in detail in Clause – 4.3.1.5.
2. Bidder should acknowledge that the digging trenching, which is an important component in OFC laying depends on the soil strata and topography. The PIA, before bidding is expected to do a detailed site survey and to gather soil strata type information to factor in the cost for trenching as per the standards provided in the specification norms. Since the bid is published as EPC contract and not an item rate contract, hence the bidder should factor in all uncertainties in his price bid including on account of difficult terrain, hard soil or rocky strata, RoW permission related challenges and delays. As part of EPC design, the bidder can, at the most, provision for a total of 5% (of 48 core fibre scope of that package) route kilometer length on aerial OFC network subject to following conditions:
 - a. Trunk line or main branches of star leaving from OLT cannot be aerial. Only branch line from intersection point to GP can be aerial
 - b. Even with aerial fibre, 12 cores will have to be dropped at each GP.
 - c. Deleted
 - d. 5% is not a mandatory requirement, it is an upper ceiling. The desirable architecture is to have 100% underground cabling.

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- e. In aerial fibre, if electricity pole is not available or if the pole does not have requisite bearing strength then the PIA will have to bring and set up his own poles dedicated for the OFC installation **along with necessary accessories as per the Engineering Instructions.**
3. The bidder is responsible for obtaining RoW permissions. The office of GFGNL will facilitate in coordination with respective Government agencies, however, the PIA shall have to prepare proposals in requisite format, submit it to relevant agencies for approval, and do necessary follow up. In case, there are penalties for executing work without ROW permission, then PIA shall bear that. State government has waived ROW charges. However approval for alignment with state agencies still needs to be done. PIA shall obtain ROW permissions from the central and state agencies such as national highways, Oil and gas pipelines, Railways etc. The PIA has to pay ROW charges to any agencies (Except Penalties for violation which PIA has to bear), then the GFGNL shall reimburse **within 30 days on receipt of complete and relevant documents.**

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

1. Detailed Site Survey (before bidding, GIS data related to GP locations and desktop based site survey, done by the tenderer, can be shared with perspective bidder upon signing of NDA with the tenderer.) and mapping of GIS data, route planning and optimization.
2. Designing the network
3. Project Planning for execution of project within stipulated timelines.
4. Installation and Commissioning of IT and non IT components
5. Installation and Commissioning of Physical Infrastructure components such as required electrical utilities and network cabling etc. as per requirements
6. Provision, development of and supplying, installation commissioning of all software / applications for the following functionalities :
 - i. ERP (Finance/Billing, CRM, Asset Management, HRMS/Work force management)
 - ii. Web portal
 - iii. Mobile app
 - iv. NMS including

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- a. GIS based dashboard for OFC and components monitoring
- b. Fibre monitoring system
- v. Project Management tool including workflow management with GIS tracking
7. 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 SIA. All documentation generated during planning, installation and commissioning phase shall always be made available to State /SIA.
8. Establishment of State NOC at Gandhinagar and development, installation and maintenance for period of 7 years for all IT systems required for successful implementation and operation of the project (scope of “Rest of Gujarat” package)
9. Integration with State NOC at Gandhinagar and existing BBNL NOC at Bangalore.
10. Operations & Maintenance of Network after commissioning for 7 years
 - i. Bidder should note that different GPs will be lit at different times as per the timeline for project implementation. The O&M phase shall begin only after all GPs in the scope have been lit. Nonetheless, the PIA shall be responsible to do O&M for the partially lit GPs which considering that to be O&M before zero day, will be paid in part on prorated basis.
 - ii. Prorate will be calculated as per below.
 - iii. Prorate to be paid for O&M before zero day = (50% of first year total O&M cost / total GPs) X (Total number of GPs made Live)

4.3.1.1 *Site Survey*

All bidders shall conduct exhaustive field site survey to derive optimal path of connectivity between OLT & ONTs for preparing the Bill of Quantity (BoQ) for each site, Taluka, District and state before submission of bids. Based on the site survey report and finalized BoQ, the PIA shall carry out the implementation of the work.

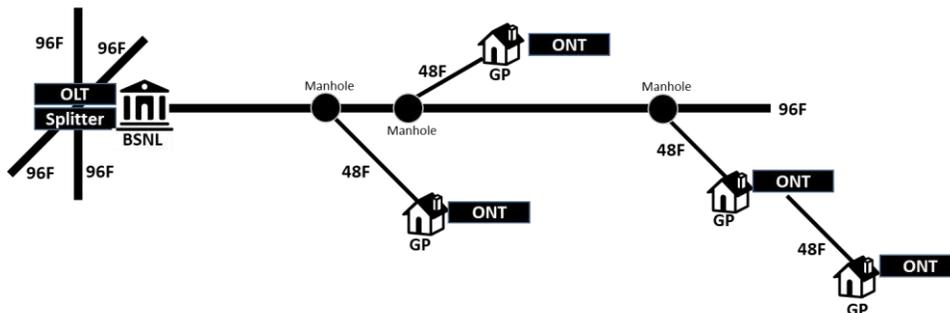
- a) All bidders are expected to conduct an actual detailed field survey before finalizing their bid and before bid submission.
- b) All bidders, as part of their bid, shall submit GIS based route optimization map in KMZ/KML/*.shp file.
- c) After selection of PIA, data generated by site survey shall be shared with State/SIA by PIA. Data shared should be integrated with GIS application and with Project Management tool.
- d) Designing, planning of passive optical network as well as creation of database for utility infrastructure (only in case of aerial part). The PIA shall prepare KMZ/KML/*.shp file as per the data recorded during site survey from Block to GP using optimized routes. This file should be compatible with NMS and Project Management tool.
- e) During the survey, all the bidders shall take into account connectivity to GP based on optimal path for fibre layout.
- f) All bidders will have to ensure in their respective Network design that maximum Fibre Rollout will be underground only. However, based on the actual site survey by the respective bidders, max 5% Aerial Fibre rollout (of 48 core fibre scope of a package) may be allowed due to the terrain challenges at the ground level. PIA may select any stretch in his package geography area for Aerial cabling within 5% of the total 48 core fibre route scope proposed for that package geography area.
- g) While route optimization, the bidder shall ensure to exclude private properties in its route.
- h) A final exhaustive site survey report should be submitted by all the bidders covering detail BoQ for each GPs and further consolidated at Block, district and state levels, (As per the Schedule of Requirements (SoR) format given in Section V – Bid Submission Format), 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. The bidders should submit a priced BOQ as per Annexure 5.19 in a sealed envelope on 3rd day after the opening of Financial bid. The sealed cover will be opened only for the winning bidder. The

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sealed cover will also be opened for those bidders who come in to consideration for award of work in case of failure of the financially L1 bidder. While the information will be in a sealed cover, non-delivery of the information will rule the bidder out of the consideration. For every bidder under consideration who is being considered for award of work being financially L1 of all remaining qualified bidders, non-supply of this information or illogical/ arbitrary non substantiated information will rule him out of consideration.

- i) In order to utilize the OLT at the PoP effectively, optical **Rack Mounted** splitters are required for connectivity and hence the requirement of the **Rack Mounted** splitters should be assessed during the survey. Based on its site survey report and BoQ, the PIA shall carry out the implementation of the work.

4.3.1.2 Network Design Criteria



Below mentioned are the GPON Network design criteria.

BSNL Exchange Location:

1. OLT will be installed at BSNL exchange inside 42U **ETSI** rack.
2. Each OLT will have **FE/GigE/1G optical/Ethernet** uplink / Network side connectivity from BSNL Network equipment installed at BSNL exchange to start the Network services at Day-1. **PIA will be responsible to arrange necessary hardware to make equipment port provided by BSNL compatible with OLT uplink port.** This connectivity will be provided by BSNL for approximately 6 months **(only for testing and monitoring purposes)**, after that period PIA will have to ensure uplink / Network side connectivity through GSWAN (available at TC and DC offices) / any other Network provided by GFGNL.
3. **Each OLT will have Total 32 ports(16PON Ports and 8*10 G and 8*1 G Network connectivity ports).The network connectivity Uplink Ports should be on redundant cards.**
4. **1:4 Rack Mounted Splitters will** only be planned & installed at BSNL exchange / block level.
5. RFMS will be planned at OLT locations to achieve 24X7 monitoring of OFC and PON live fibres. PIA will have to plan the footprint of fibre monitoring in any block / island in such a way that all 96F feeder cables must be covered under monitoring. Accordingly, number of RFMS units required in a block may be less than the number of OLT locations in that block. Details of RFMS is specified in NoC section.

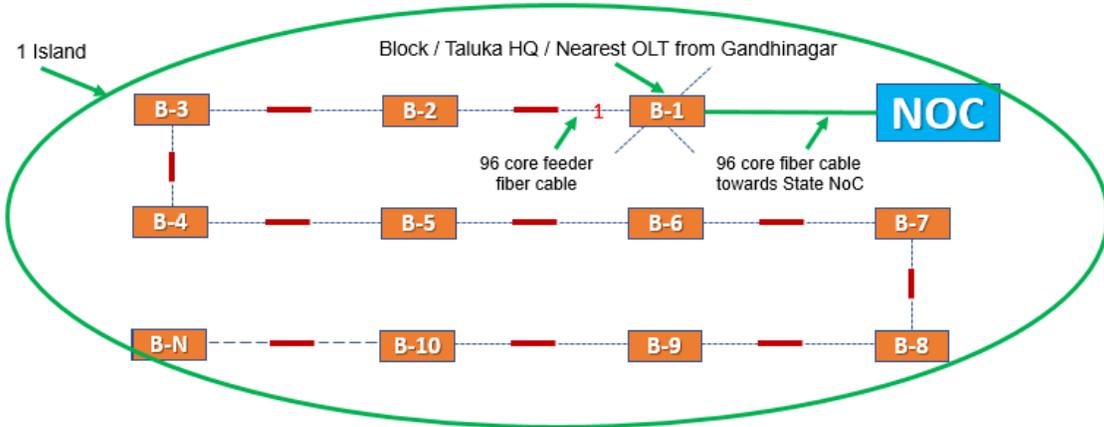
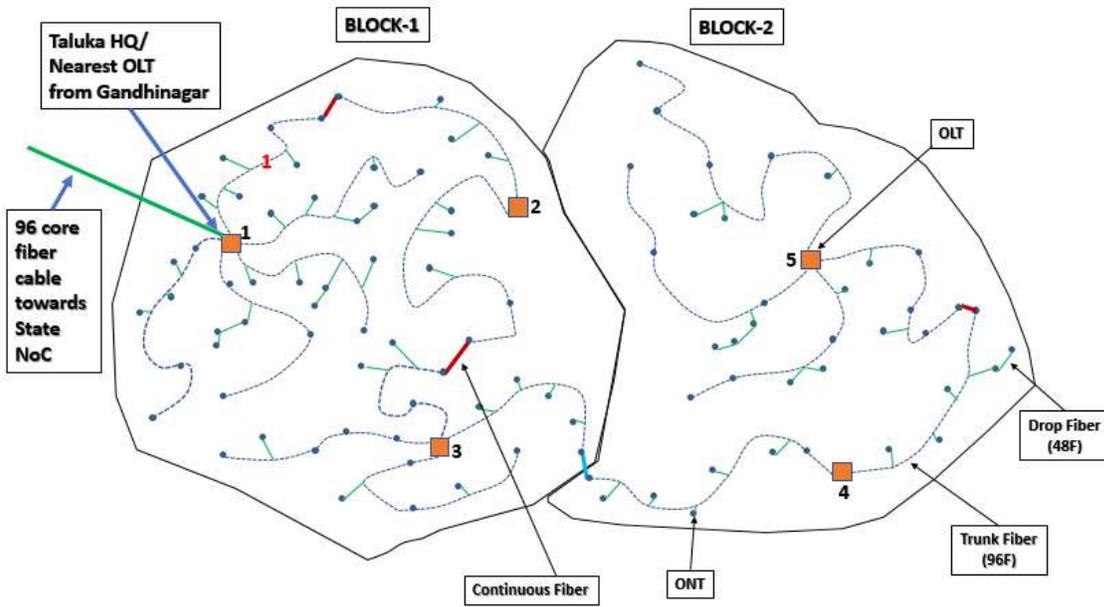
GPON (Gigabit Passive Optical Network):

1. No. of PLB HDPE duct to be laid : **1 No per OFC.**

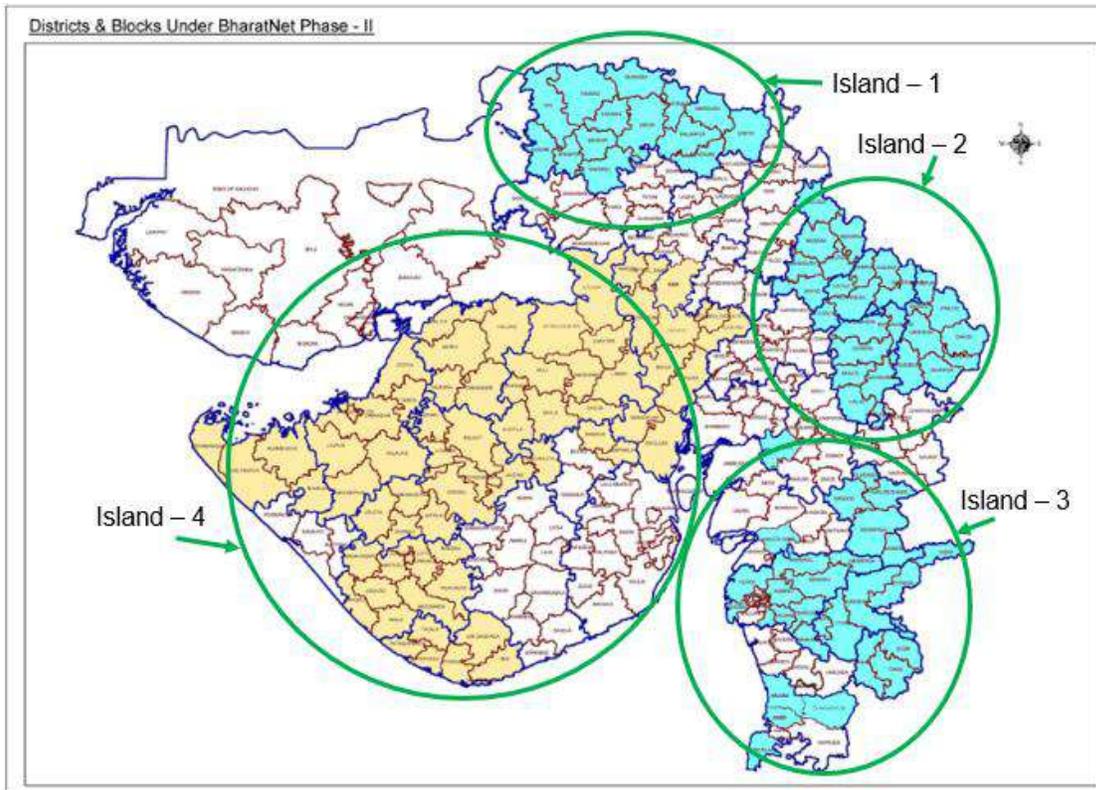
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2. 96F unarmoured Optical Fibre Cable (Ribbon) will be used as feeder cable from OLT / block location to road intersection location (where distribution cable from GP will meet feeder cable).
3. 48F unarmoured Optical Fibre Cable (Ribbon) will be planned as distribution cable from the Road intersection location to the village panchayat (GP).
4. The bidder shall ensure that, the type of ribbon fibre cable i.e. 1 ribbon consisting of 6 fibres or 12 fibres used in any Taluka should be consistent for that entire Taluka.
5. 24F ribbon ADSS cable will be used for aerial connectivity of GP in case UG fibre execution is not possible.
6. Maximum 5% (of 48 core fibre scope of a package) aerial cabling will be allowed in any package. Aerial cabling will not be allowed in 50 Km areas from coastal line and on 96F feeder routes.
7. All Optical Fibre Cables, equipment, passive and active components will meet technical requirement specified in respective TEC GR / tender as specified in Annexure – A.
8. 12 fibre cores (1 or 2 ribbon) will be dropped at each GP. Out of these 12 fibre cores, one fibre core will be energized as per DoT, GoI plan using OLT and ONT
9. 12 fibre cores (1 or 2 ribbon) will be dropped at TC (Taluka mamlatdar office) directly from OLT location and extra 12 fibre cores (1 or 2 ribbon) will also be dropped at the district collector office (called as DC office in GSWAN Network)
10. Fibre laying architecture will be Linear, running through, beginning at the OLT at the exchange, running through the villages dropping 12 fibres at each village (by splicing 1 or 2 no. ribbon totalling to 12 fibres between 96F cable & 48F cable).
11. 12 fibres will be further carried on to the neighbouring FDMS/FTB at next OLT for connectivity to Block / Taluka HQ as explained in below 2 diagrams. This Taluka is nearest to Gandhinagar. To achieve this, 12F ribbon of 96 core fibre will connect through to the opposing end FDMS/FTB of neighbouring OLT location (96 core fibre cable is a continuous cable between 2 OLTs, in which at least 1 or 2 no. ribbon totalling to 12 fibres will be continuous – running e2e between 2 OLTs) as shown with red colour in below diagrams (from physical OFC connectivity perspective only). In the example given in this diagram, continuity of 12 core fibres are maintained between OLT nos. 1, 2, 3, 4 & 5 on feeder branch no. 1 (red alphabet). In this fashion, all OLT locations planned in an island will be connected in serial mode by 12 core fibre continuity. In this example, N is total number of OLTs planned in this island.

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12. 4 Islands of group of districts (as indicated in below figure), through the nearest OLT from Gandhinagar in that island, will be connected with state DC in Gandhinagar by laying separate 96 core ribbon fibre cable. Such **minimum** 4 nos. 96 core fibre cables will be laid from 4 islands **(further OFC routes may be planned for protection requirement of transport layer as described below in this section)**. **Passive** Patching between this 96F cable, **transport layer equipment** and feeder route (the feeder route which is providing 12 core continuity between all OLTs in an island as described in above figure) of nearest OLT will ensure **12-F** connectivity to the **FTTB at NOC Data center** at Gandhinagar for all OLTs in an island.



13. While laying 96F cable between State DC and nearest OLT, intermediate DC and TC locations will be connected. At DC and TC enroute locations, all 96 cores from both directions will be terminated at 2 nos. FDMS. Detailed planning of 4 nos. of 96F cables from 4 islands to State DC is given in Annexure – E “Route Details”. Routes from Islands – 1, 2 & 3 are in scope of “Rest of Gujarat” PIA and route from Island – 4 is in scope of “Saurashtra” PIA.

14. Deleted

15. While planning all these 4 routes, PIA will have to ensure that all enroute cities with population of 1 lacs or more, will be connected on the respective route. Out of total scope within city minimum 60% of work should be done through HDD.

16. Bidder has to provide all necessary intermediate transport infrastructure and hardware to ensure bandwidth and data transmission up to all GPs which will be pumped from Gandhinagar state NOC.

Gram Panchayat (GP) Locations:

1. Each ONT will have 1 PON port and minimum 8 Ethernet ports (1000BaseT).
2. In ONT only 1 core of OFC will be terminated. All cores of OFC will be terminated at FDMS/FTB at GP in case there is only 1 GP on the distribution 48F/24F OFC path. In case of multiple GPs in series on any distribution 48F/24F OFC path, only 12 fibres each will be terminated at FDMS/FTB at all GPs except the last GP in series (with remaining fibres straight spliced in FDMS/FTB splice tray) and all fibres will be terminated at last GP. Both FDMS/FTB and ONT will be placed in same rack. Rack will be of minimum 12U size and will be wall mounted.
3. PIA will do all necessary power cabling and installation of MCB & power plug as per requirement of site. Raw power will be provided by State Government.
4. PIA will also install UPS at GP (except TC and DC) with minimum power backup of 2 Hrs.

NOC to ONT Bandwidth Charging:

The GFGNL will provide bandwidth of 100 Gbps (shared between the two packages or 50 Gbps each) at GFGNL NOC in Gandhinagar. The successful bidder will design intermediate transport layer to cause delivery of 100 mbps bandwidth (with concurrency of 1/8) per GP at ONT. The delivery will ride on OLT-ONT infra being built and will be on one fibre pair between NOC and each OLT. From the current laying of OFC in no case more than two fibres will be used anywhere between NOC and OLT. This bandwidth will be used for discovery and monitoring of OLT and ONT in the NMS.

State NOC:

1. State NOC will be set up at Gandhinagar as part of the Scope of Work of Package – A (Rest of Gujarat) to achieve 24X7 monitoring of all Network components installed in both the packages.
2. PIA of Package – B (Saurashtra) will have to extend required support for successful integration and monitoring of Network components installed in this package geography area. PIA of Saurashtra region will also depute his network personnel at NOC as per the qualification and type of manpower requirement mentioned in detail in NOC section.

Inclusion of 7 Blocks from Phase – 1:

Below mentioned blocks have been transferred from Phase – 1 to Phase – 2.

Sr. No.	Scope	Package A (Rest of Gujarat)	Package B (Saurashtra)
1.	No. of districts	3	1
2.	No. of blocks	6	1
3.	No. of GPs	415	121

Table 4.5

Blocks Transferred from Phase – 1				
Sr.No.	Name of District	Name of Block	No. of GPs	Total PLB laid (Km)
1	Valsad	Umergaon	49	0
2	Valsad	Dharampur	74	48.8
3	Valsad	Valsad	80	14.2
4	Valsad	Pardi	77	51.2
5	Mehsana	Kadi	121	43.5
6	Vadodara	Padra	75	0
7	Bharuch	Ankleshwar	60	14.3

Table 4.6

Ducting details, maps and contact details of representatives of Phase – 1 team are provided in Annexure – D. No fibre blowing and OLT installation activity is carried out in any of above blocks. PIA will have to check the accessibility and present status of field assets during survey phase and plan the Network design accordingly before submitting the final bid.

4.3.1.3 Fibre Implementation:

The PIA's scope will include following (not limited to):

1. The PIA shall be required to initiate fibre implementation immediately upon receipt of WO / LoI.
2. Once design is finalized and submitted as per RFP, there will not be changes in design. However, in case of difficulty of terrain or due to ROW challenges, if PIA wants to change design, it shall do so after approval of SIA subject to its own cost. Accordingly, the PIA shall factor in the uncertainty on account of ROW challenges or terrain issues as part of its price bid itself. The PIA is responsible for Supply, delivery to site, unloading, storing, warehousing and handling of Optical Fibre cable and equipment along with fittings and associated items as required, including the HDPE PLB duct, manholes, Rack Mounted splitters, OLT, ONT, FDMS etc. as per the detailed survey report.
3. Trenching, Duct Laying, providing necessary protection as per Engineering Instructions wherever required, Backfilling, Blowing, Splicing, Terminating, Installation and Commissioning of underground fibre as per the RFP requirement as per Annexure B – Engineering Instructions. (For underground fibre)
4. Live line Installation and Commissioning of Optical Fibre 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 subject to other limitations as specified in the RFP)
5. End-to-End testing of the connectivity thus laid from ONT at GP till Block OLT and further to State NoC & 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 Fibre optic network with State NOC as well as BBNL Network Operations Centre in Bangalore with the help of BBNL team.
9. All important information like no. of ducts, type of fibre, no. of healthy fibre cores, location of chambers, location of rack, model of equipment installed etc. along with location information will be maintained in attributes of different layers in GIS. The GIS functionality will be brought in by PIA based on open source software. The PIA shall procure adequate number of Smart phones/tabs with GPS facility for their field staff to update the Project Status through the

mobile Applications. The same shall be used by the Field Response Team during the Operations and Maintenance phase.

10. In likely event of no availability of Telephone exchange at Subir taluka in Dang district **or 3-4 such locations per package**, the PIA shall set up air conditioned temporary container cabin for housing OLT along with its associated power system. Concrete platform of suitable size (based on size of container) with minimum height of 1 mtr is to be constructed with required steps.

4.3.1.4 OLT, ONT and 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 (total 20 patch cords). The patch cords specification shall be as per TEC GR. The patch cords will be of LC/SC PC (point contact)/APC (Angular Point Contact) type based on specification of OLT optical port and FTB / FDMS ports. **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. Testing of traffic from the ONT at Gram Panchayat to the Block OLT and further to State NOC and BBNL central NOC.
5. General site readiness like provisioning of proper earthing, racks installations, rack grouting etc. shall be carried out by the PIA at no extra cost to State/SIA.
6. 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. Further, GFGNL will negotiate with Energy department and GUVNL for rural areas to get unmetered connection for unhindered dedicated electricity supply for the infrastructure (Bypassing the GP connection), in such a case the co-ordination with electricity service provider and getting requisite connection up to the place of ONT/FTB will be in scope of PIA along with all costs.

4.3.1.5 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 State NOC and BBNL NOC.
3. Acceptance testing would also include OTDR/ PON OTDR and LSPM testing of fibre cable.
4. OFC attenuation testing is used to verify the initial performance of the installed link.
5. 100% of the installed OFC links have to be tested and must pass the acceptance criteria.
6. The attenuation of the link is measured using the insertion loss method. This method uses an optical source and an optical power meter to compare the difference between two optical power levels.
7. When testing Single Mode optical fibre links with a Light Source and a Power Meter, this measurement kit has to be capable of operating at 1550 nm and 1310 nm for Single Mode fibre.
8. The test scenario with a Light Source and a Power Meter shall be of the following for each link: Bidirectional testing @ 1550 nm and @ 1310 nm for single mode fibre and calculating average of both readings.
9. When testing with basic optical source and power meter, the operator will fill up a report logging the time of the test, the link identification under test, the link length and attenuation.
10. The report shall also identify in which direction the testing was implemented.
11. Acceptable link attenuation/loss in dB per link (between 2 locations) to be calculated as per below.

For 1310 nm : 0.34 dB attenuation / Km + 0.1 dB / splice + 1 dB connector loss

For 1550 nm : 0.22 dB attenuation / Km + 0.1 dB / splice + 1 dB connector loss

12. The measured attenuation of the links shall have a lower value than the acceptable link attenuation calculated.
13. The PIA shall also provide bidirectional OTDR report for all fibre cores. Those tools are capable of producing a bidirectional report logging the time of the test, the link identification under test, the link length, the attenuation and the acceptable link attenuation. The report shall also identify in which direction the testing was implemented.

4.3.1.6 Go-Live for the network (Connectivity from Block to Gram Panchayat)

1. The Go-live for the entire Network shall be considered when 100% implementation and commissioning for all the defined GP locations within package geography along with Acceptance testing as envisaged has been completed. This will be considered as 100% Go-live which will start O&M phase of 7 years.
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 to 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. In this pre-zero day go live of individual GPs, O&M charges on pro-rata basis per GP will be paid.

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.

Note:

1. 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.
2. Any deviation from the standard EI, shall be liable for penalty as per Section 3.32.
3. 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.
4. PIA shall obtain necessary Right of Way (RoW) from State/Central agencies whichever applicable by completely following RoW application process of respective agencies. State/SIA shall facilitate the PIA in obtaining the same. **The PIA has to pay ROW charges to any agencies (Except Penalties for violation which PIA has to bear), then the GFGNL shall reimburse within 30 days on receipt of complete and relevant documents.**

4.3.1.7 Quality Assurance and Testing

1. The QA test schedule shall be issued by State/SIA.
2. Quality testing of 100% Network components as per BoM will be carried out by TPA (Third Party Auditor) selected by State/SIA from the list of approved agencies of GoI/BBNL (as detailed in Clause – 4.2 : Implementation Approach) as per the guideline provided by State/SIA.
3. Random quality testing of up to 10% Network components as per BoM will be carried out by FPA (Forth Party Auditor) appointed by State/SIA (as detailed in Clause – 4.2 : Implementation Approach).
4. All material will be inspected at factory site by TPA / FPA representative as directed by State/SIA/BBNL. Once the material is passed from TPA / FPA at factory and is delivered at site, random inspection of some samples of material will also be done at site by FPA / alternate agency appointed by State/SIA.
5. The supply shall be accepted only after Quality Assurance tests are carried out by appropriate Quality Testing Agencies as identified by State/SIA/BBNL.
6. 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. PIA will be custodian of all equipment / material till same is used for GP connectivity and to make it live. Only material consumed for GP connectivity will be transferred to custody of State/SIA after GP goes live.
7. 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.

4.3.2 Operations Phase

The PIA shall be responsible for the operations of the network entailing the following:

1. Network Inventory
 - a) The PIA would be required to maintain an inventory of all the components used in the network and the spares available at the different levels and locations in the ERP software
 - b) The PIA shall raise a request to reorder / replacements / replenishments / spares in case the stock level dips below specified % as specified in Clause – 4.3.3.2 or a faulty unit has been replaced with an operational one. The PIA needs to maintain the spare quantity for

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entire period. If spare quantity is used due to device fault/operational issue, the cost is to be borne by PIA (The discovery of cost for addition of spare will be done in case applicable as described in detail in Clause – 4.3.3.2).

- c) The PIA would be required to check all spares for faults half-yearly after taking permission from GFGNL

2. Service Provisioning

- a) The PIA shall be responsible for Network provisioning, Server provisioning and User provisioning
- b) Network provisioning: The services which are assigned to the customer in the customer relationship management (CRM) have to be provisioned on the network element which is enabling the service and allows the customer to actually use the service; the PIA would be responsible for the same
- c) Server provisioning: Server (Computing) and Storage for all software applications like NMS along with all other applications such as ERP, Project management tool, web portal mobile, etc. will be provided by GFGNL on state data centre. However required necessary OS licenses, Data base licenses or any other software license required shall be supplied, installed, configured and managed by PIA for entire tenure of the project. The PIA shall be responsible for selection of a server from a pool of available servers provided by GFGNL at SDC as per the sizing for required for each application software. Implementation, configuration and management is under PIA scope of work. Further, loading of the appropriate software (operating system, device drivers, middleware, and applications), appropriately customizing and configuring the system and the software to create or change a boot image for this server, and then change its parameters, such as IP address, IP Gateway to find associated network and storage resources assignment is under PIA scope of work.
- d) User provisioning: The PIA shall be responsible for change propagation, self-service workflow, consolidated user administration, delegated user administration, and federated change control; the PIA shall provide users access to data repositories/Software/Systems or grant authorization to systems, network applications and databases based on a unique user identity or as requested by GFGNL
- e) The PIA shall be responsible for end-to-end provisioning including but not limited to necessary VLAN creation (if required), IP assignment and bandwidth provisioning for all customer services.

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- f) The PIA shall be responsible for discovery of customer's device/port where bulk bandwidth is terminated from GFGNL Network and required SLA monitoring.
- g) The PIA shall also ensure that all software upgrades / patches / updates are applied to the network elements in a timely manner as soon as these upgrades/patches/updates become available.
- h) The PIA shall make available hardware resources, such as computers / laptops, mobile phones and tablets etc. required for the implementation and maintenance of the network for field resources as required.
- i) The PIA would be responsible for ensuring compliance of all network elements, applications and personnel to standards as specified in this RFP or GFGNL/BBNL/DoT

3. Network Configuration/ Configuration Management

- a) The PIA shall create a Maintenance Manual detailing the policies, procedures, techniques, and tools to manage, evaluate proposed changes, track the status of changes, and maintain an inventory of system and support documents as the system changes
- b) The PIA and its resources shall be responsible for adhering to the processes mentioned in the Maintenance manual

4. The PIA will assist GFGNL in complying DoT legal requirements.

5. The PIA will be responsible for all field activities of required fibre tapings and e2e testing of fibre in case of delivery of dark fibres to customers / partners and SLA monitoring.

6. Reporting

- a) The PIA shall provide daily, weekly, fortnightly, monthly, quarterly, half-yearly and annual reports as detailed in NOC section.

4.3.3 Maintenance Phase

After commissioning, the maintenance of the network as per the Service Level Agreement (SLA) shall be carried out for a period of 7 years from the date of 100% Go-live. However till that time, block declared as Go-live will be under extended O&M period and will be paid on pro-rata basis. The O&M paid to the PIA up to the overall go-live will be limited to 50% of the year 1 O&M apportioned to individual GPs. The apportionment to individual GPs will be calculated as – Year 1 O&M for respective package / number of GPs in the respective package. A block will be declared as Go-live once all the GPs & Exchanges of that particular block are lit.

4.3.3.1 Warranty Phase

To mitigate risk from power fluctuation, or aging or other causes of device failure, the PIA shall besides keeping the spares (as mentioned in clause 4.3.3.2 below), also obtain necessary warranty and AMC support from the manufacturers of passive components.

4.3.3.2 Periodical Maintenance

1. Periodical Maintenance: The PIA shall carry out periodical maintenance of the network commissioned with such frequency that each OLT and ONT is covered once every month. The PIA shall submit the report on quarterly basis during this phase.
2. Corrective Maintenance: If any issue is reported by the end user (GP, Block or through NMS or the monetizing partner) 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 OLT / ONT / **Rack Mounted** Splitter / FDMS / OFC / electrical utilities / other active or passive equipment installed by the PIA 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/physical damage (Repair not possible -RNP) to the Network components / equipment, the equipment shall be replaced on PIA's cost till full 100% Go-live and at SIA's cost after full 100% Go-live. Lodging of FIR will be done by the BSNL/Gram Panchayat/State/SIA/PIA.
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 the store and spares 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 100 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. Below 100 mtr of damage, PIA will bear all the cost of restoration including material and workmanship.
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) and other pole kits. But the PIA shall bear the cost of workmanship and other store like jointing kits etc.

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6. PIA will be responsible to replace a patch of OFC cable for suitable length if optical losses are increased due to added splice joints due to various cuts in one Km (more than 8 cuts) due to wear and tear and damage by external agency. GFGNL will bear all material and workmanship cost for above maintenance activity.
7. If road widening work is taken up by Government department in future on any stretch and additional work of fibre shifting that needs to be carried out is more than 50 Mtr, cost (material as well as workmanship) of all O&M activities will be borne by State/SIA. State/SIA will discover rates for these activities including material from OFC procurement tenders, the most recent tender during last 12 months issued by following agencies, in the hierarchy in which the names are written below shall be considered.
 - BSNL Gujarat circle
 - BSNL Delhi circle
 - BBNL Gujarat circle
 - BBNL Delhi circle
 - Railtel Gujarat circle
 - Railtel Delhi circle
 - Rajasthan BSNL circle
 - Maharashtra BSNL circle
 - Madhya Pradesh BSNL circle
8. During maintenance of the network, PIA will ensure that all fibre cores are spliced at the cut location (and not only live fibre cores) during rectification process. State/SIA/any third party as appointed may audit the health / continuity of all fibre cores at any time and PIA will have to facilitate this exercise by performing LSPM and OTDR testing in presence of this team.
9. The PIA shall be responsible for running the network infra over 7 years of O&M. At the time of completion of contract, he will hand over fully functional Network with any damaged or down devices either fully repaired or replaced. To meet the service obligation, he shall at all times, maintain a surplus inventory at Taluka HQ / District HQ level with minimum % of material as mentioned below. PIA will be responsible to maintain this stock as and when it is consumed in O&M activities.
 - OFC – 2% of total installed in Taluka

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- Duct – 1% of total installed in Taluka
 - OLT – 1 no. per District
 - ONT – 10% of total installed in Taluka
 - **Rack Mounted** Splitters – 5% of total installed in Taluka
 - Joint closures – 10% of total installed in Taluka
 - Patch cords – 5% of total installed in Taluka
10. The PIA will also provide his FRT (Fibre Restoration Teams) teams with 4 wheeler, splicer, helper, labors, splicing machine, OTDR/PON OTDR & LSPM, spares like joint closures, pigtailed, patch cords, **Rack Mounted** splitters etc.
11. **In case, if any other type of electronics equipment (to be installed at centralized as well as field locations) will be procured for this Network in future through separate tender, the PIAs of respective packages will be responsible to perform O&M of these devices. For this, 1% of centralized equipment cost and 2% of field equipment cost will be paid to respective PIAs per annum as O&M charges. This clause will apply only in case of equipment procured and set up in uplink layer above ONT. For horizontal connectivity at village level or from ONT, this clause will not apply.**

4.3.3.3 Audit and Security Services

1. The PIA shall be required to provide comprehensive support to State/SIA during the Third Party Audit, Forth 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 shall inspect, monitor and assess the progress and performance of the project besides by itself, also 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.

4.3.3.4 *MIS Reports*

Details of MIS reports to be submitted by PIA during execution and O&M phase is provided in **Section – 4.4.6.1.4**

4.3.3.5 *Third and Forth Party Agency for the Acceptance Testing Certification*

The quality check and acceptance Testing (AT) for the GPs shall be of Two Tier.

1. The First Tier – State/SIA/USOF shall have the right to appoint a TPA. TPA shall inspect, verify and certify the progress and completion of the project on 100% basis.
2. The Second Tier – State/SIA shall have the right to appoint an FPA to carry out the inspection of up to 10% work & integration of the GPs with NOC on sampling basis/randomly.

4.4 *Network Operation Centre*

1. Network Operations Centre (NOC) will be the central location situated in Gandhinagar from where network administrators supervise, monitor, control and maintain the GPON, Active and passive network. NOC will be located in a single premise from where detailed status of the network can be monitored and managed. GFGNL will provide a temporary place in Gandhinagar for NOC setup, however once final location is identified gradually NOC IT and NON-IT resources needs to be transferred at finalized location without adding any additional cost and creating any disruption in services of NOC. Transportation of all furniture would be undertaken by GFGNL at its own cost. However, all IT hardware, software and related accessories would have to be transferred by the PIA at no additional cost to GFGNL. This would be a one-time activity.
2. All the software such as, ERP, NMS, RFMS, GIS, etc. will be hosted at Gujarat State data centre, but will be access from NOC as it will be the focal point for activities such as network monitoring, network incident resolution, software distribution and its updates, OLT and ONT configuration, applications monitoring (ERP, GIS, etc.), network performance monitoring and coordination with affiliated vendors.
3. The NOC will have the capacity to monitor the active components like OLT, ONT, routers, switches, UTM, Servers, etc. on a video wall with dedicated team. The combined expertise will enable the State to have complete view of the network in the State.

4. It would have the capability of analysing problems, performing troubleshooting, communicating with site technicians and tracking problems until they are resolved. When necessary, NOC shall be able to escalate problems to the appropriate stakeholders. For severe conditions that are impossible to anticipate, such as a power failure or optical fibre cable cut, NOC will not only have the knowledge base but also well-defined procedures in place to immediately contact technicians to resolve the issue.

4.4.1 NOC Design

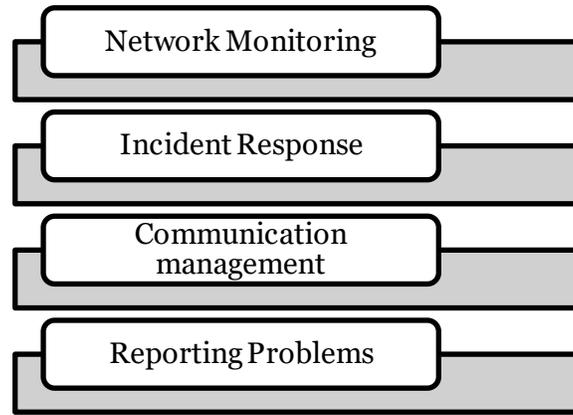
1. The typical design of the NOC that has been envisaged is that, it will have rows of desks facing video walls, which display overall status of the network & its performance parameters, significant alarm details and ongoing critical incidents. The back walls of network operation centre are normally glazed. The NOC area have some attached rooms, which are used by members of the team responsible for dealing all kind of network and systems incidents, i.e., from low severity to very critical/serious incidents.
2. Individual desks will normally be assigned to specific network, technology or area of operation. Technicians will have single or numerous workstations on their desks with extra monitors to observe and monitor the network & systems from their desk.

3. (Deleted)

4.4.2 NOC Functioning

1. NOCs function will be in a hierarchical manner where they have multiple tiers, which normally defines the skill of a NOC engineer. Thus, NOC handles issues in a hierarchical manner so that if an issue is not resolved within the stipulated time, it is escalated once again to the next level to ensure speedy resolution.
2. Primary responsibilities of the NOC team will include but not be limited to:

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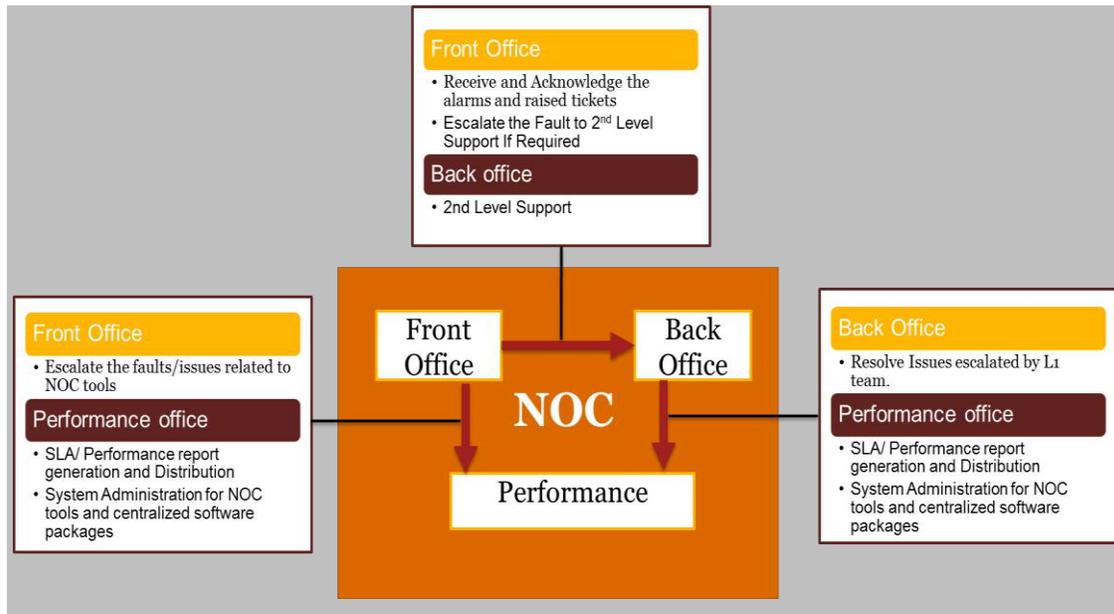


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NOC consists of three basic functions/departments:

1. Front Office (FO)
2. Back Office (BO)
3. Performance Office (PO)

The following diagram below depicts the fundamental activities performed between the functions:



4.4.3 NOC Monitoring Requirements

1. The core application of NMS will be hosted in the State Data Centre.
2. The Successful bidder shall Implement, operate and maintain, Network Management System (NMS), SLA & Performance Monitoring System for the complete BharatNet Phase -2 Network established.
3. In depth training shall be given to PIA resources by respective OEM of NMS.
4. In case any mentioned functionality of NMS is not available out of the box from day one, then PIA must ensure to develop and deliver any such functionality required by coordinating with NMS software provider.
5. As a part of the project implementation, Point of Presence (PoP) would be created at Taluka (Block Level) and GP level with an objective to enable the customers to have easy access to the network.

6. The NMS shall be configured to automatically discover all manageable elements of the scope till ONT on field side and till gateway device at State NOC as well as Active devices installed at SDC(including servers, routers, UTM, switches, etc.).
7. All network components shall be configured to alert the centralized NMS server in case of any events, so as to reflect real status of all network components and links across the network.
8. The NMS should be configured also to poll all network devices and other IT components through IP/SNMP/equivalent protocol at regular intervals in order to determine their status and working.

4.4.4 Integration with BBNL's NOC

1. Under BharatNet project, Integration with a BBNL(National) NOC (at Bangalore) is to be set up. This integration is required to enable monitoring of the State network status at National NOC.
2. The Gujarat state NOC being setup at Gandhinagar would also have the provision of connecting to the National NOC. Though, there may be different technologies deployed at National NOC and at State NOC, through mutual understanding there would be a rights based access to Gujarat NOC primarily for viewing the performance of the network.
3. PIA must ensure to develop/deliver the required APIs/Connectors and should also have the expertise to understand other systems and integrate it with the monitoring solution of NOC. PIA must ensure the compatibility with 3rd party active network devices from day one based on open standard protocols.
4. This implies that the National NOC shall be provided a view into the Gujarat NMS by providing them with user credentials that would enable them to have view only access for monitoring network status and health parameters into the State NMS and shall not be allowed to change or manage any of the devices. Further if required, the National NOC shall be provided with single consolidated view of certain features mutually agreed upon.

4.4.5 NOC - IT & Non – IT Infrastructure Requirement

- GFGNL will provide temporary area for setting up NOC with basic electrical, cooling, lighting, false ceiling and flooring. PIA needs to provision structured data cabling for the NOC resources, electrical cabling for video walls.
- PIA will provision operator consoles
- PIA has to provision for hosting of required IT equipment to support temporary NOC operations 42 U Racks.
- PIA will provision for UPS and battery bank to support all critical loads in the NOC room.
- Server (Computing) and Storage for NMS will be provided by GFGNL on State Data Centre.
- PIA must ensure to comply and provide components meeting mentioned minimum specific criteria and to provide any other required components required but not listed here with, for smooth and enable a full functional NOC.

Indicative Summary of NOC IT & Non IT Infrastructure

Sr No.	Category	Component/ Module	Description
1	NOC Build-up (Approx. 2000 Sq. Ft.)		<ul style="list-style-type: none"> Deleted
		Meeting rooms, Cabins for managers	<ul style="list-style-type: none"> LAN connectivity as per structured cabling standards for Meeting room and cabins for NOC operation manager
		Electrical Work	<ul style="list-style-type: none"> UPS for NOC.
2	Video Wall (5x3)	Video Wall Screen	<ul style="list-style-type: none"> LED HD Panels for 24x7 Operations etc.
		Video Wall Controller	<ul style="list-style-type: none"> Enables displaying of any type of video and data sources on video wall screen
		Video Wall Management Software	<ul style="list-style-type: none"> managing and monitoring of the input sources, displays & scaling, multi-view support and health of the video wall system
4	Staff Support System	Client System/ Desktop/ PC	<ul style="list-style-type: none"> For NOC Users/ Operators
5	IT & Network Infrastructure	Local Servers	<ul style="list-style-type: none"> Server for video wall software.
		Supply, Installation, Testing, Commission and Maintenance of application softwares	<ul style="list-style-type: none"> ERP, GIS based NIS, WEB Portal, Mobile Application, NMS including GIS capabilities and Remote Fibre Monitoring System

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		Deleted	• Deleted
6	Non-IT Infrastructure	Fixtures and Furniture	• Deleted
		Racks	• 42 U(to be placed in NOC)
7	LAN	LAN System	• Supply, installation, testing and commissioning of LAN Passive system
8	Data /Communication Network Services	Network Connectivity	• To be provided by GFGNL, for internet, NOC.

4.4.5.1 Video Wall

NOC will have large display screens on which various parameters of the network would be displayed. These large displays, known as Video wall, would not only display the reach of the network but would also help the NOC engineers during the time of exigencies.

Video wall system consists of three major components which are:

- a. Video Wall Screen consists of multiple LED ~~(Deleted)~~ HD panels tiled together to form a single screen
- b. Video Wall Controller is used to split single image into parts to be displayed on video wall screen, and
- c. Video Wall Management Software is used for managing and monitoring of the input sources, displays & scaling, multi-view support and health of the video wall system.

d. All the displays and controller should be 24x7 operational.

Video wall of (5X3 Matrix) 15 LED ~~(Deleted)~~ cubes of min 55” screen. The details specifications follows:

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Sr. No.	Parameter Description
Configuration	
1.	Full HD IPS LED /(Deleted) Display, Direct LED Backlight, Display suitable for use in video wall with bezel to bezel distance not more than 2 mm
2.	Screen Size 55” or higher
3.	Resolution Full High definition (1920 X 1080) 16:9 Widescreen
4.	Contrast Ratio 2000:1 or better
5.	Brightness 500 Cd/m2 or better
6.	Refresh Rate :60 Hz
7.	Response Time 12 ms or less
8.	Viewing Angle 160 degrees or higher
9.	Certification CE, FCC, UL/ETL/ANSI, BIS certified at the time of bidding
Interface	
	Standard Inputs 1x Digital DVI-I ; 1x Digital DVI-D/HDMI port, or Higher
	Standard Outputs 1x Digital DVI-D ; 1x DP 1.2,
	Control RS-232/RS-422/IR
Power	
	Consumption Not more than 300 Watt per display unit
	Power Supply AC 100 -240 V~ (+/-10 %), 50/60 Hz
General	
	Operating Temperature 5°C - 35°C
	Humidity 20% - 90%, non-condensing
Accessories	
	Cables - Dual Link DVI-D/DP cable, power cable for daisy chain, AC cable, Remote Controller
Display Controller	
	Video Distributor, Display controller to control Video wall in a matrix as per requirement with necessary software:
	Processor specs: Quad core 64-bit, 3.4 GHz CPU or latest
	RAM: 8 GB DDR3 minimum
	HDD: Min 500 GB Hard Disk (Hard disk Capacity should be upgradable)

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Sr. No.	Parameter Description
	Network support: Gigabit Ethernet Controller inbuilt, Support for Add on Network adapters.
	Videowall Display: Display multiple source windows in any size, anywhere on the wall
	Accessories: DVD-R,DVD+RW,, Keyboard, mouse
	OS Support: 64-bit Operating Systems Windows / Linux or equivalent industry standard
Video Wall Management Software	
	Display & Scaling : Display multiple sources anywhere on display up to any size
	Input Management : All input sources can be displayed on the video wall in freely resizable and movable windows
	Scenarios Management : Save and Load desktop layouts from Local or remote machines
	Layout Management : Support all Layout from Input Sources, Internet Explorer, Desktop and Remote Desktop Application
	Multi View Option: Multiple view of portions or regions of Desktop, Multiple Application Can view from single desktop
Other features	
	SMTP support
	Remote Control over LAN
	Alarm management
	Remote management
	Multiple concurrent client
	KVM support
Display Management	
	Display Health Monitoring
	Pop-Up Alert Service
	Graphical User Interface

4.4.5.2 Network rack Specifications

1. Wall mount 12U Network Rack (For ONT/GP Locations)

S/N	Specification
1.	12 U: 600 x 600 mm
2.	Front Door Steel Full Profile with lock
3.	PDU should have min 5 nos. of 5/15 Amp 5 socket
4.	Should have Min 1 no. Equipment Sliding Tray
5.	Should have sufficient perforation for ventilation of air with necessary Fan module at top
6.	To be provided with cable manager & patch panel

2. Floor Mount 42U Rack (For OLT Locations)

S/N	Specification
1.	42 U : 750 x 1070 x 1991 mm
2.	Door Steel Full Profile with lock
3.	Castor with ft break (2+2)
4.	Equipment Sliding Tray – 2 nos.
5.	Should have sufficient perforation for ventilation of air with necessary Fan module at top
6.	Should have min two nos. 32 Amp PDU, each having min six nos. C13 sockets and six nos. 3-pin round socket
7.	To be provided with cable manager & patch panel

4.4.5.3 Server and Storage

- a) PIA has to provide sizing of server required for various applications provided by them including – ERP (Finance / Billing, CRM, Asset Management, HRMS), web portal, Mobile Application, GIS based NIS, NMS.
- b) GFGNL will only provide computing and storage on Gujarat State Data Centre. Implementation, configuration and management is under PIA scope of work.

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- c) However required necessary OS licenses, Data base licenses or any other software license required shall be supplied, installed, configured and managed by PIA for entire tenure of the project.

4.4.5.4 Non IT Infrastructure Requirements for NOC

It is PIA of package A's responsibility to provide non IT infrastructure including but not limited to Tables and Chairs (15 nos) for Helpdesk support staff in Network Operations Center (Video Wall Room). Further, PIA has to provide fixtures, cable trays and racks for the server/telecom room. All structured LAN cabling for entire NOC along with necessary accessories I/O, faceplate, backbox, cable trays, jack panels, switches, etc. shall be supplied, installed and commissioned by PIA of Package A.

4.4.5.4.1 ~~Operator Console Table & Ergonomic Chair: Deleted~~

4.4.5.5 Operator Workstations

Sr. No.	Parameter	Minimum Required Specifications
	Processor	Latest Quad Core i7 with 3 GHz or equivalent or higher
	Motherboard & Chipset	OEM Motherboard & Compatible 64 bit Chipset
	Video	Integrated Graphic controller with 2 GB video memory (non- shared)
	System Memory	Minimum 8 GB DDR3 or higher expandable up to 32 GB or more
	Ports	6 Nos. or Higher USB (min 2 USB3.0), 1XHDMI port, 1 VGA Port.
	Storage	500GB , SATA III HDD 7200 RPM with Flash Cache of 64GB SSD. Provision for installing more drives
	Monitor	21 Inches x 3Nos. , Wide LED Touch Screen , Resolution- 1920x1080, Aspect Ratio-16:9 , refresh rate 5ms or better , Touch Digital zoom capability

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		shall be available on screen to enlarge portion of an image to provide Zoom in / Zoom out functionality
	Keyboard	104 Keys or Higher Mechanical Keyboard
	Mouse	USB Optical Scroll Mouse
	Joystick	A dedicated joystick used for horizontal / vertical scrolling function
	OS Support	Pre Loaded Windows 10 with recovery disc or equivalent
	Certification	ENERGY STAR/BEE
	Warranty Support	Minimum from 7 years from the date of Commissioning

4.4.5.6 Online UPS for NOC Room

Sr. No.	Parameter	Minimum Specification
1.	Output Power Capacity	20KVA
2.	Technology	True On-line High-Frequency Design UPS with Double Conversion technology, Rectifier & Inverter both to be IGBT based PWM
3.	Certifications	UPS should meet CE, BIS and ROHS standards (Compliance to be submitted)
4.	Input Voltage Range	160-280 VAC @ 100% load, Three Phase
5.	Input Freq. Range	50Hz +/- 3 (auto sensing)
6.	Input Power Factor	0.99 (100% Load)

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7.	Input Protection	Thermal Circuit Breaker/Isolater with fuse
8.	Output Voltage	220/230/240 VAC +/- 1%
9.	Output Frequency	50Hz ± 0.5Hz
10.	Output Waveform	Pure Sinewave
11.	O/P Voltage Distortion	<3% for Linear, <6% for Non-Linear Load
12.	Output Connections	Output Connections: (1) Hard Wire 3-wire (H N + G),
13.	Efficiency (Overall)	> 85%
14.	Efficiency (Inverter)	> 90%
15.	Battery Type	SMF-VRLA (Sealed maintenance free valve regulated lead acid)
16.	Battery Backup	120min backup on Full Load
17.	Communication	Full-Functional SNMP Card should be present; RS 232 & USB port with software for UPS status monitoring
18.	Protection	Inherent protection should be provided for Output Short-circuit and Overload, Input Fault, Cold Start, Low battery, Battery Over and Under charge, Battery Disconnect, Battery self-test feature, Over Temperature, OVCD, External Transient Voltage Surge Suppressor, etc.
19.	LCD Display	Input Voltage, Input Frequency, Output voltage, Output Current, Output Frequency, Battery Voltage, UPS Status, Load Level, Battery Level, Discharge Timer, Battery Disconnect and Fault Conditions

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20.	By Pass	Manual and Automatic (Built-in) Bypass switch should be provided
21.	Environment	Noise Level – less than 60 dB at a distance of 1 meter
22.	Operating Temperature	0-45° C
23.	Relative Humidity	20-90%RH @0-400 C (Non-condensing)
24.	Miscellaneous	ECO Mode Operation with Enable/Disable function
		Cooling: Forces Air Cooling
		Emergency Power Off (EPO)
		BYPASS Mode Operation with Enable/Disable function
		Cables: With all necessary cables and plug and Battery links
		Rack: Suitable Metallic Rack for housing of SMF Batteries to be provided
25.	Battery Replacement	The successful bidder has to replace the UPS battery every 2 years for uninterrupted and smooth operations. OEM should confirm battery replacement in UPS at the end of 2nd year, 4th year and 6 th year respectively.

4.4.5.7 UPS for GP Locations

UPS at GP shall be installed using L bracket 5ft above the floor on wall and shall not be installed in rack.

S/N	Parameter	Minimum Specifications
1.	Capacity	1 KVA or more Line Interactive
2.	Technology	Automatic Voltage Regulation
3.	Input Frequency Range	50 Hz +/- 5%
4.	Output Frequency Range	50 Hz +/- 5%
5.	Output Voltage	180VAC - 230VAC
6.	Voltage Regulation	+/-5% (or better)
7.	Output Waveform	Modified sine Wave
8.	Output Power Factor	0.6 or more
9.	Battery Backup	Minimum backup of 120 Minutes on full load
10.	Battery Type	Lead acid Sealed Maintenance Free (SMF)
11.	General Operating Temperature	0 to 45 Degree Celsius
12.	Alarms & Indications	All necessary alarms & indications essential for performance monitoring of UPS like mains fail, low battery
13.	Bypass	Automatic, Manual Bypass Switch
14.	Protection	Fuse protection

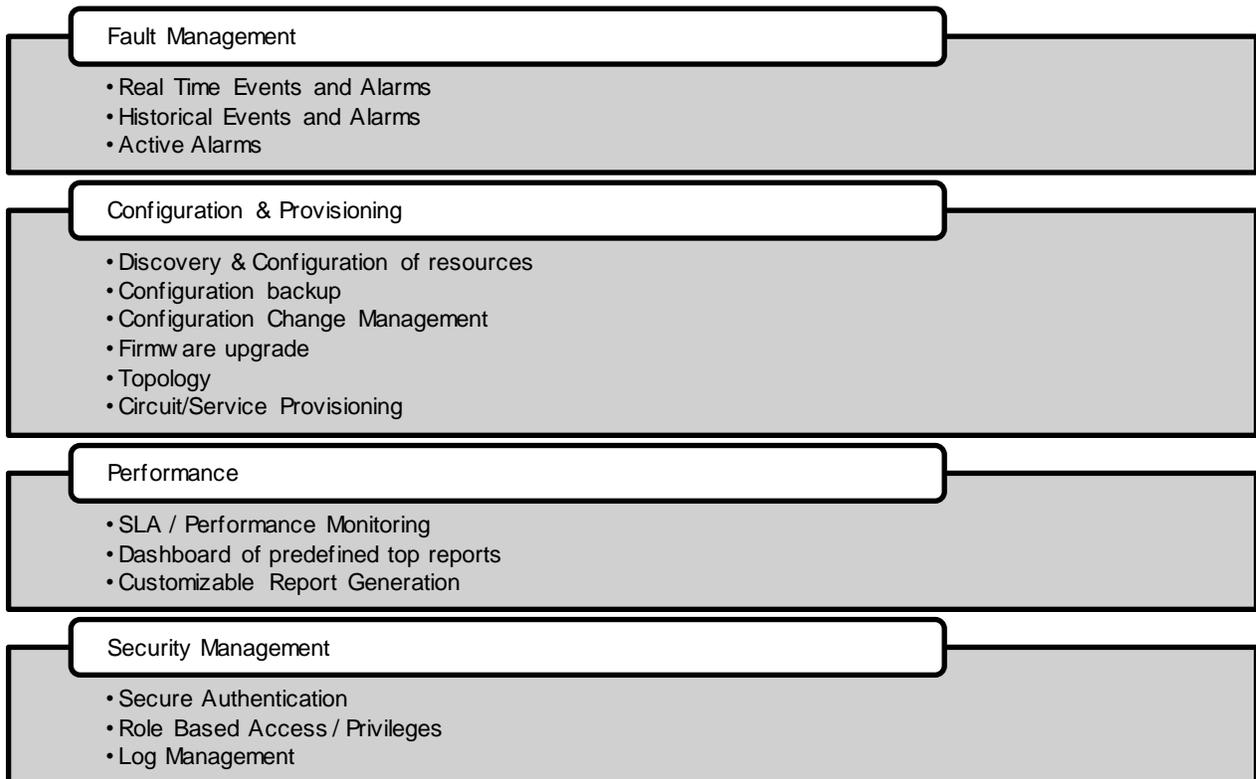
4.4.5.8 Desktop for other NOC Resources Except Helpdesk Operators

Sr. No.	Parameter	Minimum Required Specifications
1.	Processor	Latest Intel Core i5 with 2.8 GHz with 6MB L3 cache or equivalent or higher
2.	Motherboard & Chipset	OEM Motherboard & Compatible Chipset
3.	Video	Integrated Graphic controller : NVidia/Intel/Equivalent
4.	System Memory	Minimum 4 GB DDR3 or higher expandable up to 16 GB or more
5.	Ports	4 Nos. or Higher USB (min 2 USB3.0), 1XHDMI port, 1 VGA Port.
6.	Storage	500 GB , SATA II HDD 7200 RPM
7.	Monitor	21 Inches or Higher, Wide LED Screen , Resolution- 1920x1080, Aspect Ratio-16:9
8.	Keyboard	104 Keys or Higher Mechanical Keyboard
9.	Mouse	USB Optical Scroll Mouse
10.	OS Support	Windows 10
11.	Certification	RoHS, ENERGY STAR/Gold rating
12.	Warranty Support	Minimum from 7 years from the date of Commissioning

4.4.6 NOC Software Tools

4.4.6.1 Network Management System (NMS)

In order to achieve increased reliability and improved performance by seamless monitoring and management of the network, a NMS software shall be deployed at state data centre and shall be operated from NOC at Gandhinagar. The NOC operators would be able to access the network for effective monitoring and management. Key modules of NMS Applications are as below:



4.4.6.1.1 NMS Functional Modules and Requirements:

NMS will provide end-to-end network management functions for a multiple-supplier & multiple-technology environment.

a. **Fault Management:**

- i. Alarms isolation, Correlation and Root Cause Analysis
- ii. Service Problems Management & Automatic association/disassociation of services

- iii. Trouble Tickets generation and life cycle management for Network and Service problems
- iv. Alarms Binning for different types of alarms (resource alarms , service problems , fibre alarms , TCAs)
- v. Remote Ticket Status monitoring and Control through inward SMS

b. Configuration Management:

- i. Resource Inventory Management
- ii. Auto discovery and Mismatch reconciliations
- iii. OLT backup Management and Software Down load Management
- iv. Service template Management
- v. Service Provisioning and Network Provisioning – service provisioning and IP allocation shall happen through NMS and automatic entry of provisioned service shall be created in ERP through API integration.

c. Performance management:

- i. Network Performance Management (KPIs)
- ii. SLA Management
- iii. Service Quality Management
- iv. Thresholds Crossover Alerts across Network and Services

d. Security & Accounting Management:

- i. Role Based Access Control (RBAC)
- ii. Authentication & Authorization of Operators
- iii. Access Logs for Auditing
- iv. Online Operators Reporting
- v. Help desk for problem /issues management

e. Fibre Management System:

- i. Dynamic discovery of Logical Fibre Connectivity
- ii. Actual Fibre N/w Configuration based on discovered fibre N/w

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- iii. Fibre N/W representation as Tree Graph
- iv. Faulty Fibre segment identification through NE alarm correlation

f. **Asset Management System:**

- i. Procurement List ,Tender and Purchase Order Management
- ii. Consignment & Supply Lot Management and GUI to Vendors
- iii. Asset Commissioning , Inventory & Asset Life Cycle Management
- iv. AMC Contract Management (Docket Management with SLA for vendors , Penalty Computation)

g. **Reports :**

- i. Dash Board reports with drill down features
- ii. Tabular and Graphical reports
- iii. Fault and Performance Analysis Report
- iv. Location based reports

4.4.6.1.2 NMS Interfaces

- a. **Web Based User Interface:** This will enable NOC users, field users to access NMS through mobile.
- b. **Network Interface:** This will enable users to send alarms via email/SMS through NMS Applications.
- c. **GIS Interface:** NMS will have an integrated GIS capability such that entire network can be visualized on a GIS map. Operators shall be able to zoom in to particular incident event from map itself and shall be able generate incident trouble ticket with one click operations such that it gives ability of communicating to respective field engineer by means of different communication modes as – E-mail, SMS or Voice call on a click. GIS shall be used for providing Network Element/Service/Fibre ownership, location, status and its health.
- d. **Interface with different applications:** For integration with different Modules such as CRM, Billing, ERP, Project Management Tool.

4.4.6.1.3 NMS' SLA and Performance Reporting

- 1) PIA should submit the reports on a regular basis in a mutually decided format.
- 2) Softcopy of these reports shall be delivered automatically via email at specific frequency and to the pre-decided list of recipients.
- 3) The detailed list of reports as well as templates will be decided once the bidder is on-boarded.
- 4) Bidder should also submit certain information as part of periodic review as and when required by the GFGNL.
- 5) The minimum set of reports required are as given below. GFGNL may request such reports at any time irrespective of a predefined scheduled. Moreover, any new report may be requested by GFGNL during the tenure of the contract.

4.4.6.1.4 Indicative Summary of Reports to be submitted:

Sr. No.	Report Type	Periodicity
Reports During Execution Phase		
1	Summary of field activity wise progress tracker	Weekly
2	Summary of taluka (Block), district, package and state wise progress tracker	Weekly
3	Summary of issues/ complaints including resolved / unresolved / escalation status	Weekly
4	Summary of resolved/ unresolved and escalated issues/ complaints to vendors	Weekly
5	Summary of fault/complain reported and pending at State/SIA end	Weekly
6	Component wise IT infrastructure availability and resource utilization	Weekly
7	Execution SLA / (non) conformance report	Weekly
8	Billing status reports including number of bills raised with bill value, bills accepted, bills under process, bills paid etc.	Weekly
9	Material status report including material availability at central warehouse, material availability at district / taluka warehouse, material issued for site / consumed etc.	Fortnightly
10	Quality check reports including scope available for TPA/FPA for quality check, quality check completed, quality check in progress etc.	Fortnightly
11	Total manpower deployed status	Fortnightly
12	Network design documents including Network plan, fibre layout, GIS inventory, ABD (As-Built drawing with)	Monthly

Note: The PIA shall submit the periodical reports as mentioned above on a regular basis through Mobile App and Project Management tool as per the prescribed formats provided by the State/SIA. Bills will not be processed if above reports are not submitted in stipulated timeline.

MIS reports during O&M:

Sr. No.	Report Type	Periodicity
1.	Bandwidth Available: per GP/ONT, OLT wise, Total Taluka/Block wise, District wise and State wise	Daily
2.	Bandwidth utilization (max, min and average): per GP/ONT, OLT wise, Total Taluka/Block wise, District wise and State wise	
3.	Availability of Devices live vs faulty (ONT and OLT): Pop wise, Block wise, District wise and State wise	
4.	Total No. of complaints raised	
5.	Ageing Report of issues/Complaints/Incidents	
6.	Receive Signal Strength at ONT (indicating an alert if the signal strength is below the defined threshold)	
7.	Bandwidth Utilization (max, min and average) over last 7 days: per GP/ONT, OLT wise, Total Taluka/Block wise, District wise and State wise	Weekly
8.	Total No. of complaints raised	
9.	Ageing Report of issues/Complaints/Incidents	
10.	Receive Signal Strength at ONT (indicating an alert if the signal strength is below the defined threshold)	
11.	Total No. of complaints raised	Monthly
12.	Ageing Report of issues/Complaints/Incidents	
13.	Software upgrade/enhancement reports	
14.	Configuration change reports	
15.	Attendance report	
16.	SLA compliance reports	Quarterly
17.	Preventive maintenance reports	
18.	Scheduled maintenance reports	
19.	Configuration change reports	
20.	Inventory reports	

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21.	Bandwidth Utilization (max, min and average): per GP/ONT, OLT wise, Total Taluka/Block wise, District wise and State wise	
22.	Service Availability, Downtime, Usage/Utilization, Fault & rectification, Performance statistics-, Log of Network parameters along with Service down time and % uptime achieved	
23.	Network design documents including Network plan, fibre layout, GIS inventory, ABD (As-Built drawing)	Yearly
24.	Any other reports- As and when required by Tenderer	

4.4.6.2 Remote Fibre Monitoring System (RFMS)

Remote Fibre Monitoring System (RFMS) should be capable of doing in-band and out-of-band monitoring of fibre network.

1. RFMS will be installed at OLT location and shall be able to update central fibre management software installed at State NOC.
2. An OLT location will have 5 - 6 nos. 96F ribbon feeder cables terminated on FDMS.
3. PIA will have to plan the footprint of fibre monitoring in any block / island in such a way that all 96F feeder cables must be covered under monitoring. Accordingly, number of RFMS units required in a block may be less than the number of OLT locations in that block.
4. 12F continuity between different PON islands (OLT serving area) will be used to achieve fibre monitoring system design with reduced number of RFMS units.
5. RFMS should support on-line & off-line monitoring, **however only dark fibre monitoring will be done from Day - 1.**
6. Detects and locate fibre fault (fibre cut or removal of connector) along with its overlay of fault location (lat., long.) on GIS Map (private or public) taking satellite imagery as background.

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Sr. No.	Parameters	Minimum Specifications
1.	Optical ports	Minimum 16 nos. with SC/LC/PC/APC connectors
2.	Size	<= 2U
3.	Support of optical test cycle	Minimum 10 million
4.	Software user interface	Web based (on-site and remote provisioning through web based interface)
5.	Hardware interface	RJ45 Ethernet 10/100/1000 BaseT port for on-site provisioning
6.	PON monitoring	Should be able to test live Passive Optical Network (PON) for any split ratio.
7.	OTDR dynamic range	At least 30 dB
8.	Wavelength support	1625 nm , 1650 nm, 1310 nm and 1550 nm
9.	Attenuation Dead Zone	<=10 mtr
10.	Event dead zone	<=3 mtr
11.	Pulse width	10 ns / 30 ns / 100 ns / 300 ns / 1 us / 10 us / 20 us
12.	Storage capacity	Minimum 1 GB internal
13.	Compatibility	Should be compatible with open source NMS.
14.	Power supply	Dual power supply (should support both AC & DC input power supply)
15.	Alarm notification to users	By SMS & e-mail
16.	Rack mounting	Should be able to install in 19 and 21 inch equipment rack.
17.	Insertion loss of WDM coupler	<= 1 dB
18.	Other	In live fibre monitoring, OTDR test signal must not affect the traffic signal characteristics, BER and link performance.

4.5 Software and Applications

PIA of Package – A (Rest of Gujarat). The bidder shall provide for:

1. Project Management Tool
2. GIS
3. Mobile Application for Project and O&M phase
4. Web Portal
5. ERP (including HRMS & Payroll, Inventory Management, Document Management System, Customer Relationship Management and finance and Accounts)

4.5.1 General Instructions

1. PIA to assess storage and compute requirements and dimension the hardware accordingly; (dimensioning must be done to include requirements for both package A (Rest of Gujarat) and Package B – (Saurashtra). PIA needs to intimate the compute requirement to GFGNL before deployment (i.e Cores, RAM and storage). The compute will be provided on GoG's State Data Centre. The software should be compatible with the virtualized environment.
2. It is PIA of package A's responsibility to supply, install, test, commission and maintain required OS and Database (including licensing for the same).
3. Project Management Tool, Mobile Application (Project and O&M Phase), Web Portal, NMS, GIS-NIS and ERP should be supported perpetual licenses (including COTS / custom built). The solutions provided must migrate to open source and open standard platform after completion of project phase (without any additional cost for GFGNL)

In case of failure & termination of contract with PIA, GFGNL will be free to engage 3rd party SI to use, operate and maintain the software/applications. PIA will also be responsible to assist GFGNL to migrate all data to whatever platform that GFGNL will purchase after contract period (with or without extensions if any).

Total number of users and devices for the software licenses will be as below:

ERP – 600 users across modules

NMS – 35000 network devices

GISNIS – 600 users and concurrency 100

4. GFGNL shall have only one software package. Both PIA will also capture project progress in the same tool.

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5. PIA of Package – A to provide necessary training of all software, tools, processes and systems to all stakeholders.
6. 2 - person developer team to manage continuous development must be arranged for by the PIA (One for NMS, web portal, GIS and ERP and One for mobile app). Supplier has to provision developers to support User creation, control, role based access plus development of or customization of functionality.
7. All the software/applications should be made accessible through single login window for all users.

4.5.2 Project Management Tool

Sr. No.	Functional Requirement
1.	The selected PIA would be required to provide a project tracking and management web-based application accessible through a mobile app and available in offline mode also
2.	The web application should have a dashboard for viewing the status of the entire project at a glance at state level, district level; on-click deep-dive capabilities should also be available through the dashboard
3.	The application must have the capability to prioritize work items, track milestones, highlight delays and provide colour coded status/risk reports; the project management tool should allow dependencies, risks and issues to be identified against each of the project task
4.	The application must be capable of generating reports for tracking daily, weekly, fortnightly, monthly and quarterly progress; this should also be available in charts and graphs as well. The project management tool should be able to generate report which measure project performance based on planned tasks and actuals, and generate exception level reports at taluka level, district level and state level. The project management tool should be able to generate task level compliance for all stakeholders PIA, Government Department(s), PMC, TPA, etc across the organization structure
5.	The application must have the capability to upload project documents (acceptance reports, Equipment test reports, packing lists, etc)
6.	The application should have provision to send progress reports to stakeholders via e-mails; this should be automated once set
7.	The project management tool should allow to create work breakdown structures from overall packages to micro level field tasks to be performed at GP level. Such tasks should contain tasks from readiness, execution and evaluate phase (including the tasks to be performed by TPA) including but not limited to survey, RoW application, access to BSNL facilities, trenching, ducting, cabling,

Sr. No.	Functional Requirement
	resurfacing, civil inspection, OTDR check, Work Completion approvals, etc.
8.	The application should have workflow manager for tracking of all project related activities; the project management tool should allow tasks to be assigned to resources and managers with predefined timelines. The tasks should flow from the WBS and flow into the mobile application for the field level resources. The tasks should be defined from a geographical context – including location details. The project management tool should support creating of critical paths and activity charts automatically
9.	The details of field level resources with their location should be mapped and updated in the PM tool regularly
10.	The status of RoW permission must be tracked using the data from the Document Management System
11.	The PM tool must be integrated with GIS to transfer the data captured from the field to the GIS map (including lat-long, Activity status, Location Details, etc)
12.	The project management tool should allow configuration of SLAs defined in the tender document and generate the SLA adherence report based on compliance against the timelines
13.	The PM Tool should facilitate tracking of the field activities based on activities performed on the field. Such tracking should be facilitated through mobile updates from field including marking end points for activities and upload of geo-tagged pictures. The Tool should allow capturing spatial and non spatial information (depth, material used, time stamp, etc.)

4.5.3 GIS

For Optical Backhaul and Access Network layout planning, capturing of field data, tracking OFC route, auto computing project progress, viewing MIS reports from NMS and viewing web dashboard. Use GPS receiver for route-map plotting

S. No.	Functional Requirement
1.	The survey completed by both PIAs during the tender phase would have to be loaded on the GIS platform prior to start of project
2.	The GIS should facilitate creation of multiple layers on the base map, such layers should include minimum of topographic design, RoW permissions (All stages), HDD, trenching, ducting, fibre laying, reinstatement, passive optical components, electronics, civil TPA and OTDR results
3.	The GIS should allow generation of reports (for each layer such as topographic design, RoW permissions (All stages), HDD, trenching, ducting, fibre laying, reinstatement, passive optical components, electronics, and OTDR/LSPM results) for field activities area-wise (Village, Taluka, District)

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4.	The GIS system should interface with the project management tool to facilitate data exchange and mark completion of tasks allocated to the resources
5.	The GIS system should interface with the incident management system / ticketing system / NMS/OTDR to identify impact of a component failure during the O&M phase of the project
6.	The GIS should have a web based version and mobile based version with features to update in an offline mode
7.	Asset mapping and Fibre Management
8.	Inventory Creation and Maintenance
9.	Role Based Access Control
10.	Creation of multiple projects with option to merge as required
11.	Please consider following as user count for GIS based NIS: Concurrent Users – 100 ; Total Users - 600

4.5.4 Mobile Application

The SIA would like to have a single mobile application for both project and O&M phases

4.5.4.1 Project Phase

The purpose of the app is to collect the status of work, and evidence of completed work by the PIA that are rolling out the fibre network.

S.No.	Functional Requirement
1.	The Native Mobile Application must work on both, Android and iOS devices; the PIA shall be responsible for uploading the application to Google Play and App Store
2.	The app should be bi-lingual i.e. English and Gujarati
3.	The mobile application should be functional in 2G, 3G and 4G network
4.	The app should have role-based access – ‘Management’ and ‘Delivery’
5.	The app should be integrated to the web-portal, the inventory management module and the document management system where aggregate details captured can be viewed
6.	The should track the users working on different sites, the site details, provide process flow of different activities through checklists, Activity lists, etc and have provisions to enter equipment details such as BOM code, Equipment Manufacturer, Equipment code, lat-long, etc. along with facility to upload documents in PDF, JPG/JPEG format.
7.	Capability to capture the document through mobile devices along with indexing. Using mobile app the users should be able to upload letters, circulars directly to the document management system (RoW Permissions, TPA Reports)
8.	The app should provision to update activities completed, length of fibre laid, etc.

S.No.	Functional Requirement
9.	The app should be integrated with an open source GIS software to plot the laid fibre on a layer based on status and condition; a consolidated view should be available on the web portal
10.	The Dashboard, available on the web-portal, should also be available on the mobile app for specific roles after discussion with the department
11.	The mobile application should interface with the incident management to report closure of incidents. The same application should be used by patrol teams to report incidents to the central team during the installation / O&M phase of the project
12.	The application shall have option to push progress data manually and support automated push of the data every 8 hour
13.	No backdated status entry into the progress report would be allowed. Time stamping would be of the current date only. The data entered on the given date may be uploaded as a batchfile when internet access becomes available in subsequent

4.5.4.2 O&M Phase

- a. The purpose of the app is to facilitate leadership team and O&M team with viewing of data from NMS and Project Management tool during O&M phase and act as an interface for handling O&M activities. The PIA will have to provide tablets / equivalent smart phones to field staff to operate mobile application during O&M phase.

Sr. No.	Functional Requirement
1.	The app should provide role based access to leadership team and O&M engineers for viewing dashboards and key indicators.
2.	The Dashboard, available on the web-portal, should also be available on the mobile app.
3.	The app will act as interface for field O&M staff for O&M activities. The app will provide facility to O&M field staff to view complains.
4.	The app will provide view of route diagrams in between selected locations, asset related information like asset ID / Equipment code, equipment manufacturer, lat-long etc.
5.	The app will facilitate retrieving contact information of FRT teams and patrollers.

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Sr. No.	Functional Requirement
6.	The app will provide facility to O&M field staff to capture lat-long of fault location and lat-long of e2e restoration work completed.
7.	The app will provide facility to O&M field staff to capture field photos after fault restoration.
8.	The mobile application will interface with the incident management to report closure of incidents. The same application should be used by patrol teams to report incidents to the central team during O&M phase of the project.
9.	No backdated status entry would be allowed. Time stamping would be of the current date only. The data entered on the given date may be uploaded as a batch file when internet access becomes available in subsequent.
10.	The Native Mobile Application must work on both, Android and iOS devices; the PIA shall be responsible for uploading the application to Google Play and App Store.
11.	The app should be bi-lingual i.e. English and Gujarati.
12.	The mobile application should be functional in 2G, 3G and 4G network.

4.5.5 Web Portal

Sr. No.	Functional Requirements
1.	Web portal will be front end for the ERP/GIS/NMS(Help Desk)/ Project Management solutions
2.	Web portal must have updated static and dynamic data of GFGNL
3.	Web portal must allow users to raise service requests and update status of service provisioning
4.	Web portal shall allow users to download customized reports from the Project Management Tool and the Network Management System.
5.	Web portal shall allow the user to raise a request and track its status
6.	Help Desk Operators shall be able to login and update the status of grievance resolution and service provisioning

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7.	Web portal should have sections to upload Job Opening
8.	Web portal shall have a system for listing the latest tenders/EOIs floated by GFGNL. The user must be able to download the tender from here.
9.	Role-based access: Once the user is successfully authenticated, he will be redirected to the required software platform to access functionality. The user will be allowed to access functionalities as defined in his user based access policy.
10.	The Web portal shall have a section for updating RoW application status with appropriate documentation submitted to relevant authority. It shall capture the details of the application, the approving authority, the location of application along with a copy of the application in downloadable format. After upload, a soft copy of the application must be sent via e-mail to the respective stakeholders (approving authority and GFGNL). This is in addition to the hard copy which would be submitted at the approving authority's office. This is the front end to the ERP system.
11.	The requirements of the organization would continue to evolve and the PIA would have to accommodate the same.

4.5.6 Enterprise Resource Planning (ERP)

1. The ERP solution should seamlessly integrate with other system like ePayment, etc. to enable complete view of necessary information
2. If COTS, no additional license fee for users up to 600 (ERP).
3. The PIA should consider an indicative license count of 200. Excess licenses required during roll-out would be the responsibility of the PIA.

4.5.6.1 HRMS and Payroll

Sr. No.	Functional Requirement
1.	The system must be able to manage the entire recruitment process including but not limited to publishing of vacant positions on a web portal, support for

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	eligibility criteria for all grades, support for reservation norms of the Government (State and Central), ability to print call letters, appointment orders and regret letters for candidates, ability to route the manpower requirements through various levels of approvals, ability to monitor and compile the manpower requirement data of all the departments based on new recruitment, retirement, death etc.
2.	The system must have the ability to employee database such as maintain the employee master data covering all relevant fields and information, to incorporate the existing system for generation of employee ID, to automatically monitor dates for HR processes (for ex. Date of increment, date of joining from leave, date of performance review etc.), to maintain service file documents with all the personal details of the employee
3.	The system must be able to manage the entire employee lifecycle from processing employee bonds, managing the joining and onboarding process, managing probation, to managing performance appraisal and promotion, transfers and separation
4.	The system must be able to record medical and other reimbursements, compensation & benefits accorded to employees, provision for discipline management, manage trainings and related activities, manage legal aspects related to HR, Right to Information Act and queries from other Government Agencies such as CAG
5.	The system must be able to calculate employee salary on a daily basis, capture investment details of employees for income tax purposes, calculate, finalize, refund and make journal entries for settlement/bonus, prevent duplication of claims and calculate reimbursement, advances, encashment and allowances, and pay incentive/award through payroll
6.	The system must capture the Employees Master Data relating to payroll with a flexibility to override
7.	The system must comply with all statutory requirement (PF, etc.), Income Tax requirements applicable, State Tax related requirements – maintain registers, make entries, keep employee details related to accounts, etc.

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| 8. | The system must provide for manual update of attendance, capture leaves and related information, be capable of calculating leaves for employees at various levels and grades, integrate with a biometric attendance system |
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4.5.6.2 Inventory Management Module

Sr. No.	Functional Requirement
1.	Classification of Assets
	<ul style="list-style-type: none"> ○ The system must be able to record and maintain details and attributes of assets such as Cables, ONTs, OLTs, splicer, jointer, Maintenance Equipment, Vehicles, Furniture & Fixtures, Office Equipment, Other Equipment. Assets to be assigned codes based on BBNL guidelines and the same should be recorded ○ Capture Various details for the Assets (Ownership, Cost Details (Construction / Purchase / Transfer), Depreciation Principles, Other details to arrive at Current Value) <ul style="list-style-type: none"> ▪ Preparation of Opening Balance for Asset Valuation ▪ Insurance Details
2.	Masters
	<ul style="list-style-type: none"> ▪ Defining Various Items under each category ▪ Vendor List ▪ Price-list for the Rate Contract Items
3.	Rate Contracting or Individual Orders
	<ul style="list-style-type: none"> ▪ Tendering ▪ Proposal submission for Individual Orders ▪ Purchase Orders
4.	Indent Processing
	<ul style="list-style-type: none"> ▪ Facility to each department to indent material ▪ Issue of Material ▪ Order to vendor ▪ Material receipt forecast ▪ Reminder to vendor in case of delay in delivery ▪ Receipt of Material, Stock Update, Capture of Sr. No., Batch No.

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Sr. No.	Functional Requirement
	<ul style="list-style-type: none"> ▪ Maintenance of Reorder level i.e. procurement after reaching reorder level. ▪ Payment to Vendor
5.	Disposal of Dead Stock
	<ul style="list-style-type: none"> ▪ Department-wise submission of details ▪ Disposal of Dead Stock
6.	MIS
	<ul style="list-style-type: none"> ▪ List of Vendor-wise / Material-wise orders
	<ul style="list-style-type: none"> ▪ Material-wise, Department-wise consumption report
	<ul style="list-style-type: none"> ▪ Disposal of Dead Stock
	<ul style="list-style-type: none"> ▪ Status report to department w.r.t. their order
	<ul style="list-style-type: none"> ▪ Comparison of price bids with history prices
	<ul style="list-style-type: none"> ▪ Alerts if the Batch Nos or Sr. No. is not in order
	<ul style="list-style-type: none"> ▪ Asset Register
	<ul style="list-style-type: none"> ▪ Revenue Report

4.5.6.3 Document Management System

1. Objective is to create centralized Document Management repository which will allow easy archival and retrieval of the documents archived into the system.
2. It will primarily be used to track RoW permission status. Charges for RoW have been waived for this project, however, the PIA would follow the laid-down procedure of application and approval. The DMS is only for record keeping and dash boarding purposes.
3. The system would be accessible by citizens through portal, departmental officials and scanning operators etc.

Sr. No.	Functional Requirement
1	Document Management System (DMS)
	<ul style="list-style-type: none"> ▪ Centralized repository for all document, application forms, citizen documents, reports, operational manuals, etc. across GFGNL
	<ul style="list-style-type: none"> ▪ Platform independent and support open, scalable, Multi-tier architecture
	<ul style="list-style-type: none"> ▪ Capability to support separate Document/Image server for better management of documents and shall have capability to store only metadata information in database
	<ul style="list-style-type: none"> ▪ Seamless integration with all of the Core applications and interface with other systems implemented, to be implemented at GFGNL.
	<ul style="list-style-type: none"> ▪ Allow to export documents from scanner, email & Office Automation tools like Microsoft Office documents to DMS
	<ul style="list-style-type: none"> ▪ Allow creation of custom indexing field/tags for different documents at Folder & File level
	<ul style="list-style-type: none"> ▪ The departmental officials should be able to index folders, files, letters and documents on user-defined indexes like department, Letter No, file no, year, project Id etc.
	<ul style="list-style-type: none"> ▪ Scanning module so that the scanned documents can be directly exported into the repository

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Sr. No.	Functional Requirement
	<ul style="list-style-type: none"> ▪ Scanning Module should allow officers to scan single document as well as document in bulk with facility of segregation of scanned images as different document types like letter, circular etc.
	<ul style="list-style-type: none"> ▪ Capability to capture the document through mobile devices along with indexing. Using mobile app the users should be able to upload letters, circulars directly to the document management system.
	<ul style="list-style-type: none"> ▪ Provide the standard file hierarchy structure of folders and sub-folders to allow users and groups of users to manage and organize their documents.
	<ul style="list-style-type: none"> ▪ Allow version controlling of the documents with both minor (1.1, 1.2 etc.) and major version (1, 2 etc.) .System should show only the latest version of documents by default. All other version of the document will be visible to authorized users on need basis.
	<ul style="list-style-type: none"> ▪ Allow search based on different parameters like file name, folder name, project name, index fields, Full text & Wild card search
	<ul style="list-style-type: none"> ▪ Capability to save the search queries or search results.
	<ul style="list-style-type: none"> ▪ Capability to perform annotations such as highlight, sticky note, underline, hide certain text etc. on the documents image with user name, date and time of putting annotations.
	<ul style="list-style-type: none"> ▪ The system to be accessed from smart-phones/tablets. The users can search and view the documents in DMS from smart-phones/tablets.
	<ul style="list-style-type: none"> ▪ Facility to set notifications (e.g. notifying change of version of a file to all stakeholders) & Alarms (e.g. Delay in document Approval) by email.
	<ul style="list-style-type: none"> ▪ Comprehensive & easy to set access rights controls at Folders & File level as well as Groups and users with inheritance
	<ul style="list-style-type: none"> ▪ Allow defining multiple levels of access rights (Delete/ Edit/ View/ Print/ Copy or Download) to officers based on their profile.
	<ul style="list-style-type: none"> ▪ Maintain audit-trail of all activities being done in the system, documents etc. by users as well as administrators.

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Sr. No.	Functional Requirement
2	Business Process Management System (BPMS)
	<ul style="list-style-type: none"> ▪ Support definition of different level of rights for each level of user group involved in a process.
	<ul style="list-style-type: none"> ▪ Support a web based GUI through which workflows can be graphically designed by authorised users.
	<ul style="list-style-type: none"> ▪ Simultaneously support multiple types of workflow systems and should be able to manage and monitor multiple workflows concurrently.
	<ul style="list-style-type: none"> ▪ Support customisation of workflow components so that process model can be designed and / or modified by authorised users in special scenarios or as per change in the process of any scheme.
	<ul style="list-style-type: none"> ▪ The workflow shall allow multi-step approval routing.
	<ul style="list-style-type: none"> ▪ Capability to have an escalation matrix as defined by the designated authorities for effective management of work
	<ul style="list-style-type: none"> ▪ Assign unique IDs to workflow either automatically or manually.
	<ul style="list-style-type: none"> ▪ Allow workflows to be re-routed and /or activated based on time. The time thresholds for re-routing should be configurable.
	<ul style="list-style-type: none"> ▪ Allow workflows to be re-routed and /or triggered based on external events and data inputs for other systems.
	<ul style="list-style-type: none"> ▪ Support subsequent workflow steps to be activated automatically upon completion of previous steps.
	<ul style="list-style-type: none"> ▪ Provide facility of communication between the assignor and the assignee at any given point during the workflow, through the workflow communication (e.g. comments/notes).
	<ul style="list-style-type: none"> ▪ Provide the facility for configuring the rules for defining the flow of the process.
	<ul style="list-style-type: none"> ▪ Support subsequent workflow steps to be activated manually without requiring completion of previous steps in special cases. Only privileged user shall be allowed to override workflow and engine shall generate

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Sr. No.	Functional Requirement
	reports and send e-mail notifications of exceptions to designated authorities.
	<ul style="list-style-type: none"> ▪ Ability to view updates / reminders / alerts etc. as and when notified by designated authorities.
	<ul style="list-style-type: none"> ▪ Track the details of the time at which a user starts working on an assignment and finishes working on it.
	<ul style="list-style-type: none"> ▪ Support workflow processes for approval and send out notifications through multiple channels such as email, SMS, letters etc.
	<ul style="list-style-type: none"> ▪ System shall maintain separate to-do for each uses, groups etc.
	<ul style="list-style-type: none"> ▪ Allow users to register the work completion status of various assignments upon which they are working. The system should automatically capture the time spent on each assignment on a continuous basis.
	<ul style="list-style-type: none"> ▪ Provision for generating reports and track status of workflow instances.

4.5.6.4 Customer Relationship Management

Sr. No.	Functional Requirement
1	Enquiry Log (Ticketing System)
	<ul style="list-style-type: none"> ▪ Every communication and enquiry should be automatically logged in the CRM, stored against the individual contact(s) and company(s) involved and the activity being undertaken.
	<ul style="list-style-type: none"> ▪ Every communication or enquiry should work much like a ticketing system, whereby each instance is automatically assigned a unique reference which can then be used to transparently group each email and call log against a specific enquiry. All email replies by users and contacts should be picked up by the CRM using this method.
2	Customer Portal
	<ul style="list-style-type: none"> ▪ The system must allow adding customers to raise tickets for complaints and grievances through a web portal and view updated status of resolution
3	Reporting Requirements
	<ul style="list-style-type: none"> ▪ The new CRM should be capable of delivering both pre-defined and bespoke reports, ideally on any type of data held within the system. Aspirationally, the CRM will allow appropriated trained users to simply drag and drop fields from the available dataset, with both spreadsheet and graphical reports generated quickly and easily; at the very least, it should be reasonably simple for trained internal administrators with a solid grasp of the underlying technology to create reports for end users on request.
	<ul style="list-style-type: none"> ▪ Both detailed individual reports and the ability to create default and user-defined dashboard reports, showing high level information which can then be clicked through to the individual item
	<ul style="list-style-type: none"> ▪ The system must allow the use of analytics to identify top customers, trends in billing, etc.
	<ul style="list-style-type: none"> ▪ The system must be capable of generating a dashboard of the selected fields from the report

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	<ul style="list-style-type: none">▪ The system must allow reports to be exported in standard xls and pdf formats
4	Customer Data Base
	<ul style="list-style-type: none">▪ Contacts database, made up of individuals, roles and businesses
	<ul style="list-style-type: none">▪ The system must allow generation of invoices to customers on monthly, quarterly and half yearly and annual basis
	<ul style="list-style-type: none">▪ This system must be integrated with the Finance module Receivables

4.5.6.5 *Finance and Accounts*

Sr. No.	Functional Requirements
	Financials
	General Ledger
1.	The system must support general ledger functions such as creation, inactivation of account codes
2.	The system should support temporary locking of transactions and facility to not allow transactions after period is permanently closed
3.	Availability of Financial Statements including schedules (all value details and possible quantity details) from the system in accordance with the latest Companies Act provisions/IFRS/GST/Income Tax Act
	Payables
4.	The system should support payables features such as creation of advance order, approval/ validation of payables invoices, security deposits, penalty adjustment, freight payments, debit note/ credit note generation and retention money with multi-level hierarchy approval including work certification by user department
5.	Ability to interface with banking systems to facilitate e-payments
	Receivables
6.	The system should support centralized customer master with customer classification and capturing of registration details (PAN, GST, TAN, etc.) and automated generation of Debit Notes / Credit Notes raised/issued to customers against Order Acceptance, Work Order, etc
7.	Automatic calculation and accounting of incentives / commissions (including TDS) to dealers and customers by the system, based on policies that are revised periodically by raising credit notes.
8.	Ability to generate Pay - in -slips to facilitate deposits of cheques in to the bank as per accounting rules
	Assets
9.	Assets system integrated with payables and projects systems for asset creation including flexibility for stand-alone asset addition in the Assets system in

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Sr. No.	Functional Requirements
	accordance with Companies Act requirements and Income Tax Act requirements and IFRS compliance without duplication of effort.
10.	The system should have ability to forecast / projections and run analysis (including 'What If' analysis) for asset in fixed assets register and ability to revise asset information including depreciation and asset life.
11.	Enable project capitalization on completion or in phases
Cash Management	
12.	Integrate bank reconciliation system with the payment and collection recording modules to eliminate any duplicate data entry and ability to run automated daily cash/funds forecasting in system capturing inflows and outflows as per data in system
Inventory	
13.	Ability to create automated stock adjustment entries for the as per the inventory stock and consumption of material proportionally or in case of variation between material receipt and supplier's invoice
Taxation	
14.	Flexibility in the system to adopt all changes introduced by government towards statutory recovery and payments such as TDS GST, surcharges, duties, etc. and ensuring compliance (including accounting, reporting and filing) for taxes.
15.	Ability to generate invoices as per prevalent taxes and ability to apply TDS details as per the services provided by the vendor
Costing	
16.	Ability to handle process costing, standard costing, batch costing etc and support the analysis against budget forecast, target and prior year and preparation & maintenance of cost accounting records as prescribed by cost audit rules
Budgeting	
17.	Ability to support capital and revenue budget including maintaining budget at accounting code level, budget organization level

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Sr. No.	Functional Requirements
18.	Ability to identify the unutilized budgets, over utilized budget, automatically route budgets to necessary personnel, budget conversion, facilitate encumbrance budget

4.6 Resources

4.6.1 Resource Requirement during Project Implementation Phase

Each PIA of the package has to ensure that the necessary manpower is deployed during the project implementation phase. PIA will plan the resource deployment as per the Scope of Work and project approach. **However, the PIA has to provide minimum 2 member's team per district for ROW applications and follow-ups and a dedicated ROW coordinator to act as a SPOC for GFGNL.**

4.6.2 Resource Requirement for Field Operations during O&M Phase

Field Resource to be provided from each package				
Sr. No.	Designation	Qty	Desired Qualification	Roles & Responsibilities
1	Technical Assistant	1 at each OLT	ITI / Diploma	Responsible for Day to Day operational Activities
2	Junior Telecom Engineer	1 at each Taluka HQ	BE / B Tech	Responsible for Day to Day operational Activities
3	Senior Manager	1 at each District	BE/B Tech plus Min. 4 years of Experience (only whole district)	Responsible for Day to Day operational Activities
4	Fibre Restoration Team (FRT) - composition	1 at each Taluka	Must have relevant experience and skill sets required for fibre restoration	Take immediate action in case of faults. Carry out repairs and restoration of the fault so as to minimize downtimes. Coordinate with various agencies and central monitoring team

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5	Patrollers	2 at each Taluka	Must have relevant experience and skill sets required	Periodically check Fibre Route etc. and report for any anomalies found.
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4.6.3 Resource Requirement for NOC

The minimum required resources, their qualification and responsibility of each resource is given below. The bidder has to ensure that appropriate qualified manpower with requisite skill sets is deputed during the project tenure. The bidder shall depute the resources as per the requirements for carrying out the O&M Activity and maintaining the SLA. This is minimum indicative list of resources and based on actual requirements, the bidder may deploy any number of resources to meet the SLA. Tenderer shall not pay any cost for additional resources required to operate, maintain, monitor & manage the Project as per the SLA. In case support staff is not available or is on leave, the bidder is required to provide the alternative personnel with same or higher technical capabilities of the non-available personnel.

Sr. No.	Designation	Qty	Roles & Responsibilities	Desired Qualification
At Central Location-State NOC				
1	Project Director	1 (from Each Package)	Overall in-charge of Project Implementation, O&M of the complete project infrastructure. Coordinating with third party agencies and PIA of other package, vendors / operators and software/equipment's vendors. Should be the single point contact (SPOC) for	BE /B. Tech (EC or CS) with MBA Minimum 12 Years of Post Qualification Experience in large scale ICT infrastructure projects. Relevant Exp.: 8+ Years of experience as a project manager of large scale (1000 plus customer points) Telecom Projects having multiple cities/States/countries.

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Sr. No.	Designation	Qty	Roles & Responsibilities	Desired Qualification
			<p>managerial responsibilities and direct interface with GFGNL. Responsible for ensuring timely delivery of deliverables for each of the project components.</p>	
2	Dy. Director- Operations (Field)	2 (From each Package)	<p>Overall in-charge of Project Implementation, O&M of the complete project infrastructure for respective Package. He will be stationed at location where DGM Projects– GFGNL will be sitting. Should be responsible for effective Technical Resource management, System & Resource planning, based on business forecast. Responsible for ensuring timely delivery of deliverables for each of the project components.</p>	<p>BE /B. Tech (EC or CS) with MBA Minimum 10 Years of Post Qualification Experience in large scale ICT infrastructure projects. Relevant Exp.: 5+ Years of experience as a project manager of large scale Telecom Projects (500 plus customer points) having multiple cities/States.</p>
3	Technical Manager cum Network Expert	1 (From each Package)	<p>Responsible for overall management of the IT Infrastructure of the project.</p>	<p>BE /B. Tech (EC) with CCNP(or equivalent Network professional level certificate) or higher certification</p>

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Sr. No.	Designation	Qty	Roles & Responsibilities	Desired Qualification
			<p>Responsible for overall deployment, Integration, upkeep and maintenance of all the IT components including hardware, software, Databases etc.</p> <p>Responsible for end to end functioning and uptime of NOC and its related infrastructures</p>	<p>7+ Years of Post Qualification Experience in large scale ICT infrastructure projects.</p> <p>Relevant Exp.: 3+ Years of experience as a network manager of large scale (300 plus customer points) Telecom Projects.</p>
4	State NOC Monitors	3 (One from each Package for each shift)	<p>Overall In-charge Operation and Maintenance of NOC.</p> <p>Co-ordination with various stakeholders / agencies for resolution of issues/problems etc.</p> <p>Assignment of trouble ticket or incident to respective team.</p>	<p>BE /B. Tech (EC/IT) network certification</p> <p>3+ Years of Post Qualification Experience in large scale (200 plus customer points) ICT infrastructure projects.</p> <p>Relevant Exp.: Must have an experience of managing command and control center having multiple sub-systems.</p>
5	Server and OS admin	1(From Package A Only)	<p>Co-ordinate with SDC and responsible for:</p> <p>Backup of operating system, database and application as per stipulated policies.</p> <p>Monitoring and enhancement of the performance of scheduled backups, schedule regular testing of backups and</p>	<p>BE/B.Tech/MCA in computer science/ IT</p> <p>5+ years of Post Qualification experience</p> <p>3+ years of experience in server admin</p>

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Sr. No.	Designation	Qty	Roles & Responsibilities	Desired Qualification
			<p>ensure adherence to related retention policies.</p> <p>Managing server environment installed at SDC.</p> <p>Responsible for system configuration, scalability, performance, OS administration / management, troubleshooting & Debugging and monitoring of servers.</p>	
6	Database Administrator	1 (From Package A Only)	<p>Responsible for database administration, and application change management procedure.</p> <p>Responsible for management of Database repository, creation, deletion, modification, backup and restore of Databases and their tables.</p>	<p>BE /B. Tech (IT/CS) 5+ years of similar type post qualification experience</p> <p>Should have experience in MySQL or any equivalent database administration</p>
7	Developers	2 (From Package A Only)	<p>Application development during the O&M phase of the solution, for additional functionalities, variation in existing functionalities</p> <p>Support all applications e.g. ERP, GIS, NMS, etc.</p>	<p>Minimum 6 years of experience as developer in the programming language used for the applications. At least One developer should have experience of mobile app development.</p>

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Sr. No.	Designation	Qty	Roles & Responsibilities	Desired Qualification
8	Network Engineers	4 (From each package - 2 each in day time shift, 1 each for night time two shifts.)	Installation, commissioning, Troubleshooting, of all the network equipment Maintenance, Monitor & Support for network equipment Regular update of software patches, antivirus etc. Any other activities as and when required.	BE /B. Tech with CCNA(or equivalent Network administrator level certificate) or higher certification 2+ years of similar type post qualification experience
9	Security Expert	1 (From each Package)	Plan and Implement comprehensive security policies and practices for entire infrastructure. Signatures updating, blocking of unwanted traffic, Antivirus updates, Patch updates, managing the network security on day to day basis. Monitoring any flooding, DoS, Intrusion attempt in real time during the office hours.	BE /B. Tech with CISSP/or equivalent Network administrator level certificate or higher certification 5+ years of similar type post qualification experience
10	Backup and storage expert	1 (From Package A Only)	Monitoring and enhancement of the performance of scheduled backups, schedule regular testing of backups and	BE/B.Tech/MCA in computer science/ IT 5+ years of Post Qualification experience

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Sr. No.	Designation	Qty	Roles & Responsibilities	Desired Qualification
			<p>ensure adherence to related retention policies. Coordination with state SDC Team as and when required.</p> <p>Ensuring prompt execution of on-demand backups of volumes, files and database applications whenever required. Real-time monitoring, log maintenance and reporting of backup status on a regular basis. Prompt problem resolution in case of failures in the backup processes. Media management including, but not limited to, tagging, cross-referencing, storing, Retrieving, archival logging, testing, and vaulting in fire proof cabinets.</p>	<p>3+ years of experience in NAS/ SAN or TMS backup environment</p>

Note:

- It is clarified that the responsibilities and numbers mentioned against the position type are only indicative, it is the responsibility of bidder to provide requisite resources of right competency and experience to completely discharge functional requirements of Operations & management, Error reporting, SLA compliance, support (installation of applications, software, networking devices, OS, Storage,

Backup) and the cost of such manpower should be part of the bid being quoted by the bidder.

- Except the categories of O&M personnel listed under “field resources- sub section “B” of the above table all other remaining O&M resources deployed by the bidder should be on the bidders’ payroll. The bidder may outsource the deployment of personnel listed above. The complete set of manpower resources proposed by the Bidder shall be on-site manpower only and strictly dedicated for this contract. Non-compliance of such deployment would result into imposition of penalty / termination of the contract as per the terms and conditions of RFP.
- The manpower deployed by the bidder shall report to the respective nodal officers nominated by Tenderer.
- The Bidder has to provide supporting IT and Communication Infrastructure to such manpower, during entire contract period without any extra cost to the Tenderer. Workspace shall be made available to the bidder by the concerned offices. Bidder has to ensure that the Support personnel deputed during all stages of the project shall carry an Identity Card duly authenticated by the Tenderer.
- The bidder has to submit a detailed list of resources deployed for the O&M Activity. Resume/CV of the all the deployed resources should be provided and a proof of employment of the resource with the bidder.
- The PIA shall be responsible for the deployment, transportation, accommodation and other requirements of all its employees required for the execution of the work and for all costs / charges in connection thereof.
- The PIA shall provide and deploy manpower on the Site for carrying out the work, only those manpower resources who are skilled and experienced in their respective trades and who are competent to execute or manage / supervise the work in a proper and timely manner as per the RFP.
- Tenderer may at any time object to and require the PIA to remove forthwith from the site an employee of the PIA or any persons deployed by PIA or it’s sub-contracted agency, if in the opinion of Tenderer, the person in question has misconducted himself or his deployment is otherwise considered undesirable by Tenderer, the PIA shall forthwith remove and shall not again deploy the person in question of the work site without the written consent of Tenderer.

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- Tenderer may at any time request the PIA to remove from the work / Site the PIA supervisor or any other authorized representative including any employee of the PIA or its sub-contracting agency or any person(s) deployed by PIA or its sub-contracting agency for professional incompetence or negligence or for being deployed for work for which he is not suited. The PIA shall consider the request and may accede to or disregard it. Tenderer having made a request as aforesaid in the case of any person which the PIA has disregarded, may in the case of the same person at any time but on a different occasion and for a different instance of one of the reasons referred to above in this Clause object to and require the PIA to remove that person from deployment on the work which the PIA shall then forthwith do and shall not again deploy any person so objected to on the work or on the sort of work in question (as the case may be) without the written consent of Tenderer.
- Tenderer shall state to the PIA in writing its reasons for any request or requirement pursuant to this clause.
- The PIA shall maintain backup personnel and shall promptly provide replacement of every person removed pursuant to this section with an equally competent substitute from the pool of backup personnel.
- In case of change in its team composition owing to attrition the PIA shall ensure a reasonable amount of time-overlap in activities to ensure proper knowledge transfer and handover/takeover of documents and other relevant materials between the outgoing and the new member.
- Manpower for helpdesk operators will be provided by GFGNL. However, it is PIA of Package – A's responsibility to provide necessary training of NOC – access, tools, process and system to them.

4.7 Annexure A

4.7.1 Technical specifications as per TEC GR

1. Aerial OF Cable (ADSS Cable): 24 pair ADSS on power lines: As per TEC GR No. TEC/GR/TX/OFC-022/02/MAR-17 with latest amendments if any. (TEC GR No. : GR/OFC-03/03.JUN.2005 for type of ADSS cable)
2. HDPE: As per TEC GR No. TEC/GR/TX/CDS-008/03/MAR-11 with latest amendments, if any.
3. (Deleted)
4. FDMS (Indoor) Type 1, Type 3B - As per TEC GR No. GR/FDM-01/02. APR 2007 with Amendment Dated 02.05.2012, with latest amendments if any.
5. FDMS (Outdoor) - GR No. TEC/GR/TX/FDM-003/01 MAR 2012
6. FTB: As per GR No. TEC/GR/TX/FTB-02/02/APR-2010 – Type – II, with latest amendments if any.
7. (Deleted)
8. (Deleted)
9. TENSION POLE ASSEMBLY SET (TUBULAR): As per GR No. GR/OFA-01/02.Jul 2005, with latest amendments if any.
10. TENSION POLE ASSEMBLY SET (RAIL): As per GR No. GR/OFA-01/02.Jul 2005, with latest amendments if any.
11. SUSPENSION POLE ASSEMBLY SET (TUBULAR): As per GR No. GR/OFA-01/02.Jul 2005, with latest amendments if any.
12. SUSPENSION POLE ASSEMBLY SET (RAIL): As per GR No. GR/OFA-01/02.Jul 2005, with latest amendments if any.
13. FIXED ATTENUATOR: As per GR No. TEC/GR/TX/OPA-003/03/Oct 14, with latest amendments if any.
14. SPLITTERS 1:2: As per TEC GR No. TEC/GR/TX/OPT-001/01/ APRIL-12, with latest amendments if any.
15. SPLITTERS 1:4: As per TEC GR No. TEC/GR/TX/OPT-001/01/ APRIL-12 with latest amendments.
16. SPLITTERS 1:8: As per TEC GR No. TEC/GR/TX/OPT-001/01/ APRIL-12 with latest amendments.

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17. SPLITTERS 1:16: As per TEC GR No. TEC/GR/TX/OPT-001/01/ APRIL-12 with latest amendments.
18. BATTERY: As per TEC GR NO. GR/TX/BAT-001/04/068 JUL 2016 dated 29.07.2016 (with latest amendment)
19. PATCH CORD: As per TEC GR no. TEC/GR/TX/OFJ-01/05/Nov-09, with latest amendments if any.
20. GPON equipment: As per TEC GR no. GR/PON-01/02 APRIL 2008 with all amendments
21. GPON network: As per TEC GR no. GR/PON-01/02 APRIL 2008 with all amendments
22. Deleted
23. Deleted
24. TECHNICAL SPECIFICATIONS & GENERIC REQUIREMENT FOR 48F/96F METAL FREE RIBBON OPTICAL FIBER CABLE WITH DOUBLE HDPE SHEATH (G.652.D Fiber) AND ACCESSORIES

1. This section consists of detailed Technical Specifications of OF cable.

2. GR No. TEC/GR/TX/ORM-01/04 SEP.09 Specification for Raw Material used in

3. GR No. GR/OFT-01/03. APR 2006 manufacturing of OF Cables. Tools for installation & Operating the OFC & for assembly of the OF Splice Closures.

4. GR No. G/CBD-01/02. NOV 94 Drum specifications for Cable ends.

5. GR No. TEC/GR/TX/OJC-002/03/ APR-2010 Specifications for Splice Closure for Optical Fibre Cable

6. OTHER STANDARDS (EIA/IEC/Bell Core/CISPR/ISO etc.)

6.1 ITU-T G.652D ITU-T Recommendations

6.2 GR-20-CORE Issue4, 2013 Generic Requirement for Optical Fibre Cable (Bell Core)

6.3 IEC 811-5-1, IEC 794-1-2-E1 Test Methods for Optical Fibres
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,

6.4 EIA 598-C

Colour Standard

6.5 EIA 455-104,
EIA/TIA-455-73

EIA/TIA-455-181,

Test Method for Optical Fibre

6.6 ISO 175,

Test Methods for Optical Fibres

ISO 9001-2000

International Quality Management
System

6.7 FOTP-89, FOTP-181

Test Methods

6.8 ASTM D-566, ASTM D-790

Test Methods

ASTM D-1248, ASTM D-4565

DETAILED TECHNICAL SPECIFICATIONS / REQUIREMENTS FOR 48F/96F METAL FREE RIBBON OPTICAL FIBER CABLE WITH DOUBLE HDPE SHEATH (G.652D Fiber)

1 Introduction:

This document describes the generic requirements of Metal free Ribbon Optical fibre cable (Non-Nylon Ribbon type) for underground installation in ducts. The cable shall have double HDPE jacketing anti-termite & anti-rodent (Optional) with glass yarn in between as reinforcement. The optical fibre cable shall be suitably protected for the ingress of moisture by WS yarn and WS tape. The raw material used in the cable shall meet the requirements of the GR for raw materials (GR No. TEC/GR/TX/ORM-01/04 SEP-09).

2 Functional Requirement:

2.1 The design and construction of Optical fibre cable shall be inherently robust and rigid under all conditions of installation, operation, adjustment, replacement, storage and transport.

2.2 The Ribbon Optical fibre cable shall be able to work in a saline atmosphere in coastal areas and should be protected against corrosion.

2.3 Life of cable shall be at least 25 years. Necessary statistical calculations shall be submitted by the manufacturer, based upon life of the fibre and other component parts of the cable. The cable shall meet the cable aging test requirement.

2.4 It shall be possible to operate and handle the Ribbon Optical fibre cable with tools as per GR No. GR/OFT-01/03 APR 2006 and subsequent amendment, if any. If any

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special tool is required for operating and handling the optical fibre cable the same shall be provided along with the cable.

2.5 The Optical fibre cable supplied shall be suitable and compatible to match with the dimensions, fixing, terminating & splicing arrangement of the splice closure. The cable supplied shall also meet other requirement of splice closure (GR

No.TEC/GR/TX/OJC-002/03/APR-2010) and subsequent amendments, if any.

2.6 The manufacturer shall submit an undertaking that the optical and mechanical fibre characteristics shall not change during the lifetime of the cable against the manufacturing defects.

2.7 It is mandatory that the Optical fibre cable supplied in a particular route is manufactured from a single source of optical fibres.

2.8 The Optical fibre cable shall be manufactured so as to protect the cable from rodent and termite.

3.0 Technical Requirements of Optical Fibres:

Single Mode Optical Fibre used in manufacturing optical fibre cables shall be as per ITU-T Rec.G.652.D. The specifications of optical fibres are mentioned below:

3.1 Type of fibre : Single mode (Section -I of the GR No.TEC/GR/TX/ORM-01/04/SEP-09 and subsequent amendments, if any)
(Wavelength band optimized nominal 1310 nm)

3.2 Geometrical Characteristics:

3.2.1 MFD : 8.8-9.8 μm

3.2.2 Cladding Diameter : 125 μm +/- 1.0 μm

3.2.3 Cladding Non-circularity : < 1%

3.2.4 Core Clad concentricity error : \leq 0.6 μm

3.2.5 Diameter over primary coated with double UV cured acrylate : 245 μm +/- 10 μm
(Shall be measured on uncoloured fibre)

Note: The thickness of colour coating may be over and above the values specified above, if the manufacturer adopts separate UV cured colouring process (to colour the uncoloured fibres) other than the on line integrated colouring process (of secondary layer of primary coating) of the fibres, during fibre manufacturing.

3.2.6 Coating / Cladding Concentricity: \leq 12 μm

3.3 Transmission Characteristics:

3.3.1 Attenuation:

a) Fibre attenuation before Cabling

i) At 1310 nm: \leq 0.34 dB/Km

ii) Between 1285 to 1380 nm: \leq 0.37 dB/Km

iii) Between 1390 to 1525 nm: \leq Value at 1310nm

iv) At 1550 nm: \leq 0.21 dB/Km

v) Between 1525 to 1625 nm: \leq 0.24 dB/Km

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b) Water Peak Attenuation before cabling
Between 1380-1390nm: \leq Value at 1310nm

Note:

1. Attenuation in the band 1380-1390nm shall be checked at every 2nm after Hydrogen ageing as per IEC 60793-2-50. Hydrogen ageing test is to be carried out by CACT, Bangalore or any other recognized laboratory for type test.
2. Sudden irregularity in attenuation shall be less than 0.1 dB
3. The spectral attenuation shall be measured on un-cabled fibre.
4. The Spectral attenuation in the 1250 nm–1625 nm band shall be measured at an interval of **10nm** and the test results shall be submitted.

c) Fibre attenuation after cabling

- i) At 1310 nm: \leq 0.36 dB/km
- ii) At 1550 nm: \leq 0.23 dB/Km
- iii) At 1625 nm: \leq 0.26 dB/Km

3.3.2 Dispersion:

a) Total Dispersion

- i) In 1285-1330 nm band : \leq 3.5 ps/nm.km
- ii) In 1270-1340 nm band : \leq 5.3 ps/nm. Km
- iii) At 1550 nm: \leq 18.0 ps/nm. Km
- iv) At 1625 nm: \leq 22.0 ps/nm. Km

Note: The dispersion in the 1250 nm–1625 nm band shall be measured on un-cabled fibre at an interval of 10nm and the test results shall be submitted.

b) Polarization mode dispersion at 1310 & 1550 nm

- i) Fibre : \leq 0.2 ps/ $\sqrt{\text{km}}$
- ii) Cabled Fibre: \leq 0.3 ps/ $\sqrt{\text{km}}$

Note: Measurement on un-cabled fibre may be used to generate cabled fiber statistics and correlation established.

- c) Zero Dispersion Slope : \leq 0.092 ps/(nm² Km)
- d) Zero dispersion wave length range: 1300 -1324 nm

3.3.3 Cut off wavelength for fibres used in cables: 1320 nm Max.

Note: The above cut off wavelength is w.r.t. 2M sample length of fibre.

3.3.4 Cable Cut off wavelength : 1260nm Max.

3.4 Mechanical Characteristics:

3.4.1 Proof test for minimum strain level (Test method IEC–60793-1– 30): 1%

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3.4.2 Peak Stripability force to remove primary coating of the fibre. (Test method IEC-60793-1-32) : $1.3 \leq F \leq 8.9$ N

Note: The force required to remove 30 mm +/- 3 mm of the fibre coating shall not exceed

8.9 N and shall not be less than 1.3 N.

3.4.3 Dynamic Tensile Strength

(Test method IEC-60793-1-31)

a) Un-aged: ≥ 550 KPSI (3.80 GPa)

b) Aged : ≥ 440 KPSI (3.00 GPa)

3.4.4 Dynamic Fatigue (Test method IEC-60793-1-33) : ≥ 20

3.4.5 Static Fatigue (Test method IEC-60793-1-33) : ≥ 20

3.4.6 Fibre Macro bend

(Test method FOTP-62/ IEC-60793-1-47)

a) Change in attenuation when fiber is coiled with: ≤ 0.05 dB at 1550nm

100 turns on 30 +/- 1.0 mm radius mandrel: ≤ 0.5 dB at 1625nm

b) Change in attenuation when fiber is coiled with: ≤ 0.5 dB at 1550nm

1 turn around 32 +/- 0.5 mm diameter mandrel: ≤ 1.0 dB at 1625nm

3.4.7 Fibre Curl: ≥ 4 meters radius of curvature

(Test method as per IEC 60793-1-34)

3.5 Material Properties:

3.5.1 Fibre Materials:

a) The substances of which the fibres are made : To be indicated by the manufacturer

b) Protective material requirement:

i) The physical and chemical properties of the material used for the fibre primary coating and for single jacket fibre. clause No. 3.4.2

It shall meet the requirement of fibre coating Stripping force as per

ii) The best way of removing protective material. : To be indicated by the coating manufacturer

c) Group refractive Index of fibre: To be indicated by the manufacturer

Note: The manufacturer shall indicate the variation in group refractive index of fibre during bulk production.

3.6 Environmental Characteristic of Fibre (Type test):

3.6.1 Operating Temperature

(Test Method IEC - 60793 - 1-52)

Temperature Dependence of Attenuation

: - 60°C to +85°C

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Induced Attenuation at 1550 nm at -60°C to +85°C : ≤ 0.05 dB/km

3.6.2 Temperature – Humidity Cycling

(Test method /EIA/TIA-455-73)

Induced Attenuation at 1550 nm at -10°C to +85°C : ≤ 0.05 dB/km
and 95% relative humidity.

3.6.3 Water Immersion 23°C

(Test method IEC- 60793 – 1 -53)

Induced Attenuation at 1550 nm due to
Water Immersion at 23 +/- 2°C: ≤ 0.05 dB/km

3.6.4 Accelerated Aging (Temperature) 85°C

(Test method IEC- 60793 – 1 -51)

Induced Attenuation at 1550 nm due to
Temperature Aging at 85 +/- 2°C: ≤ 0.05 dB/km

3.6.5 Retention of Coating Color

(Test method IEC- 60793 – 1 - 51)

Coated Fiber shall show no discernible : 30 days at 85°C with
change in color, when aged for 95% Humidity and then
relative humidity. 20 days in 85°C dry heat.

3.7 Colour Qualification and Primary coating Test:

3.7.1 Colour Qualification Test:

a) MEK Rub Test (Methylene Ethyl Ketone Test):

To be tested by using soaked (Solvent) tissue paper for ten strokes unidirectional on 10 cm length of fibre. No colour traces shall be observed on the tissue paper after testing.

b) Water immersion Test (Type Test):

To be tested for coloured fiber for 30 days. After the test Colour qualification, Attenuation measurement & Strippability test are to be taken.

3.7.2 Primary coating Test:

a) Fourier Transform Infrared Spectroscopy (FTIR) Test:

To be tested to check the curing level of coating on the surface of natural fibre. The curing level shall be better than 90%.

b) Adhesion Test:

To be tested by using soaked (Solvent) tissue paper for ten strokes unidirectional on 10 cm length of fibre. No coating shall be observed on the tissue paper after testing.

3.8 Ribbon Structure:

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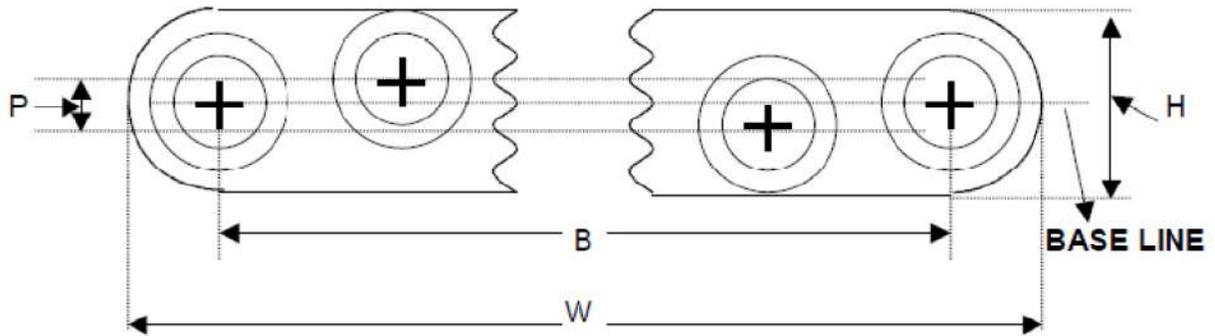
3.8.1 A group of primary coated fibres shall be arranged in ribbon structure. The fibres in the structure shall be parallel and shall not cross over each other along the entire length of the ribbon. The dimensions of 6 fibres ribbon shall be as per the Bell Core document no. GR-20-Core issue 4, 2013 with latest version and as given below:

3.8.2 Ribbon Dimensions:

The maximum dimensions of fibre ribbon shall be as follows and the cross section geometry of the fibre ribbon shall be as shown in the following figure

Table - Maximum Ribbon Dimensions

Number of Fibers per Ribbon	Ribbon Width w (μm)	Ribbon Height h (μm)	Fiber Alignment	
			Extreme Fibers b (μm)	Planarity p (μm)
6	1648	360	1310	50



Cross section of Fibre Ribbon

3.8.3 Ribbon Material:

The ribbon shall be manufactured using single mode optical fibres coloured with UV cured resin and the ribbon shall be encapsulated with a further layer of UV cured acrylate.

3.8.4 Ribbon mechanical properties:-

3.8.4.1 Ribbon Macro-bend

Change in attenuation when wrapped on a 60 mm diameter mandrel for 100 turns at 1310 & 1550 nm ≤ 0.05 dB

3.8.4.2 Ribbon Compression Resistance

Change in attenuation when subjected to a compressive load of 500 N at ≤ 0.05 dB

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1310nm & at 1550nm.

3.8.4.3 Ribbon Torsion Resistance

Change in attenuation (At 1310 nm & 1550 nm) : ≤ 0.05 dB

3.9 Ribbon Optical Fibre Cable Construction Specifications for Dry core

General: The Metal Free optical fibre cable shall be designed to the parameters mentioned in Table - I below. The manufacturer shall submit designed calculations and the same shall be studied and checked.

SN	Parameter	Unit	48F Ribbon Fibre cable	96F Ribbon Fibre cable
1	FRP Rod EAA Coated	mm	2.5 +0.1/-0.0	3.0 + 0.1/-0.0
2	FRP Up-coating thickness	mm	0	0
3	Tube ID (min)	mm	2.6	3.0
4	Tube OD	mm	3.4 ± 0.2	4.0±0.2
5	No of fibre / ribbon	No	6	6
6	No of Ribbon in a tube	No	2	4
7	Color of fibre per Ribbon		BL,OR,GR,BR,SL,WH	BL,OR,GR,BR,SL,WH
8	No of loose tubes	No	4 with 2 Ribbons	4 with 4 Ribbons
9	Colour of loose tubes		BL,OR,GR,BR	BL,OR,GR,BR
10	No of dummy cord	No	1	1
11	Tube stranding lay over length	mm	> 200	>400
12	Inner Sheath Thickness (min)	mm	0.9	0.9
13	Qty. of Impregnated Glass roving (min.)	Kg	27	27
14	Outer Sheath Thickness(min)	mm	1.5	1.5
15	Cable diameter	mm	16.0 ±1.0	17.8 ± 1.0
16	Cable weight	Kg/km	185 ± 8%	230 ± 8%
17	Cable to be designed to Fibre strain value of.	%	0.1	0.1
18	Cable to be tested at defined load for fibre strain value of	%	0.25	0.25

Table - I

TYPICAL STRUCTURAL DRAWING FOR 48 FIBRE OF DRY CORE CABLE



TYPICAL STRUCTURAL DRAWING FOR 96 FIBRE OF DRY CORE CABLE



3.9.1 Secondary Protection: The primary coated Ribbon fibres may be protected by loose packaging within tube, which shall be filled with thixotropic jelly. The dimensions of tube shall be as per Table – I above.

3.9.2 Number of fibres in cable: 48 & 96.

a. Number of fibres per ribbon: Six (6) Fibres.

b. The number of ribbons per loose tube in ribbon optical fibre cable shall be as follows:

No. of Fibres	Multi Loose type
48 Fibres	4 tubes and 1 Filler, 2 ribbon per tube
96 Fibres	4 tubes and 1 Filler, 4 ribbon per tube

(Type approval for a cable shall be issued depending on the no. of fibres in the cable)

3.9.3 Strength Member:

3.9.3.1 Solid FRP non - metallic strength member shall be used in the center of the cable core. The strength member in the cable shall be for strength and flexibility of the cable and shall have anti buckling properties. The FRP shall keep the fibre strain within permissible values. The size of FRP shall be as per Table – I above.

3.9.3.2 Impregnated Glass Fibre Reinforcement are used to achieve the required tensile strength of the optic fibre cables over the cable inner sheath to provide peripheral reinforcement along with Solid Rigid FRP Rod in the centre at cable core. These flexible strength members shall be **Non-water blocking type**. The use of Solid Rigid FRP Rod(s) is mandatory in Optical Fibre cable design. Impregnated Glass Fibre Reinforcement used shall be equally distributed over the periphery of the cable inner sheath. It shall be applied **helically** and shall provide full coverage to inner sheath to provide rodent protection. The quantity of the Impregnated Glass fibre Reinforcement used per km length of the cable along with its dimensions shall be as per Table - I. The specification of the glass roving shall be as per Section XII of GR No. TEC/GR/TX/ORM-01/04 SEP.09 and as per other details given in the Table –I.

3.9.4 Cable Core Assembly: Primary coated fibres in loose tubes stranded together around a central strength member using helical or reverse lay techniques shall form the cable core.

The dimensions of FRP and stranding pitch shall be as per Table - I.

3.9.5 Core Wrapping: The main cable core containing Ribbon fibres shall be wrapped by a layer / layers of Water Swellable tape. The nylon/polyester binder tape/thread/PP tape shall be used to hold the tape, if required. The core wrapping shall not adhere to the secondary fibre coating and shall not leave any kink marks over the loose tube.

3.9.6 Moisture barrier (protection): The main cable core (containing loose tubes stranded around central strength member) shall be protected by water swellable yarns over FRP (central strength member) and by a layer of water swellable tape.

3.9.7 Filling compound: The filling compound used in the loose tube shall be compatible to fibre, secondary protection of fibre, core wrapping and other component part of the cable. The drip point shall not be lower than +70°C. The fibre movement shall not be constrained by stickiness & shall be removable easily for splicing. Reference test method to measure drop point shall be as per ASTM D 566. The thixotropic filling compound (jelly) shall be as per the GR No. TEC/GR/TX/ORM-01/04/SEP-09 and subsequent amendment issued, if any.

3.9.8 Inner Sheath: A non-metallic moisture barrier sheath may be applied over and above the cable core. The core shall be covered with tough weather resistant High Density Polyethylene (HDPE) sheath, black in colour (UV Stabilized) and colour shall confirm to Munsell colour standards. Thickness of the sheath shall be uniform & shall not be less than **0.9 mm**. The sheath shall be circular, smooth, free from pin holes,

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joints, mended pieces and other defects. Reference test method to measure thickness shall be as per IEC 189 para 2.2.1 and para 2.2.2.

Note: HDPE material, black in colour, from the finished cable shall be subjected to following tests (on sample basis) and shall confirm to the requirement of the material as per GR No. TEC/GR/TX/ORM-01/04 SEP.09.

- i) Density
- ii) Melt flow index
- iii) Oxidative Induction time
- iv) Carbon black content
- v) Carbon black dispersion
- vi) ESCR
- vii) Moisture content
- viii) Tensile strength and elongation at break

3.9.9 Glass Reinforcement: Impregnated Glass Fibre Reinforcement are used to achieve the required tensile strength of the optic fibre cables over the cable inner sheath to provide peripheral reinforcement along with Solid Rigid FRP Rod in the centre at cable core. These flexible strength members shall be **Non-water blocking type**. The use of Solid Rigid FRP Rod(s) is mandatory in Optical Fibre cable design. Impregnated Colour Coated Glass Fibre Reinforcement used shall be equally distributed over the periphery of the cable inner sheath. It shall be applied **helically** and shall provide full coverage to inner sheath to provide rodent protection. The quantity of the Impregnated Glass fibre Reinforcement used per km length of the cable along with its dimensions shall be as per Table - I. The specification of the glass roving shall be as per Section XII of GR No. TEC/GR/TX/ORM-01/04 SEP.09 and as per other details given in the Table -I.

3.9.10 Outer Sheath: A non-metallic moisture barrier sheath (black in colour) shall be applied over the inner sheath, which shall consist of tough weather resistant made High Density Polyethylene compound (HDPE) which is Anti-termite. The outer sheath shall be UV stabilized and the colour shall confirm to Munsell colour standards. The thickness of the outer sheath shall not be less than **1.5 mm**. The outer sheath shall be uniform, circular, smooth, free from pin holes, joints mended pieces and other defects. The reference test method to measure thickness shall be as per IEC 811-5-1.

Note: HDPE material from finished product shall be subjected to following tests (on sample basis) and shall confirm to the requirement of the material as per the GR no. TEC/GR/TX/ORM-01/04/SEP-09 (Section-III):

- i) Density
- ii) Melt flow index
- iii) Oxidative Induction time
- iv) Carbon black content
- v) Carbon black dispersion
- vi) ESCR
- vii) Moisture content

viii) Tensile strength and elongation at break

Note: The outer jacket of HDPE shall be able to protect the cable from attack by termites. Manufacturer shall provide the details of doping material used and same shall be verified during bulk testing. The outer sheath shall be termite protected. The surface of the sheath shall be smooth and free of defects such as cracks, blisters, etc. The cable shall be rodent protected. As specified in various clauses of the Technical specifications of the OF cable, it is to be clarified that the HDPE Outer Jacket shall be anti-termite with/without dopants. Addition of dopants for anti-rodent property is optional. The tests as per clause 4.28 shall be carried out as applicable.

3.9.11 Cable diameter: The finished cable diameter shall be as per Table – I.

3.9.12 Cable Weight: The nominal cable weight shall be as per Table – I.

3.9.13 RIP Cord:

a) Four suitable ripcords shall be provided in the cable, which shall be used to open the both HDPE sheath of the cable. Two ripcords shall be placed diametrically opposite to the each other at below the outer Jacket & two ripcords shall be placed at below inner sheath. It shall be capable of consistently slitting the sheath without breaking for a length of 1 meter at the installation temperature. The ripcords (3ply & twisted for outer sheath and suitable ripcord for inner sheath) shall be properly waxed to avoid wicking action and shall not work as water carrier.

b) The ripcords used in the cable shall be readily distinguishable from any other components utilized in the cable construction.

4.0 Mechanical Characteristics and Tests on Optical Fibre Cable:

(Note: All observations are to be taken at 1550nm wavelengths. Change in attenuation value at 1550nm to be taken after conducting all mechanical tests.)

4.1 Tensile strength Test:

Objective: This measuring method applies to optical fibre cables which are tested at a particular tensile strength in order to examine the behaviour of the attenuation as a function of the load on a cable which may occur during installation.

Method: IEC 60794-1-2-E1.

Test Specs.: The cable shall have sufficient strength to withstand a load of value T (N) = 3000 Newton. The load shall be sustained for 10 minutes and the strain of the fibre monitored.

Requirement: The load shall not produce a strain exceeding 0.25% in the fibre and shall not cause any permanent physical and optical damage to any component of the cable. The attenuation shall be noted before strain and after the release of strain. The

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change in attenuation of each fibre after the test shall be ≤ 0.05 dB both for 1310 nm and 1550 nm wavelength.

4.2 Abrasion Test:

Objective: To test the abrasion resistance of the sheath and the marking printed on the surface of the cable.

Method: IEC-60794-1-2-E2 or by any other international test method

Test Specs.: The cable surface shall be abraded with needle (wt. 150 gm) having diameter of 1 mm with 500 grams weight (Total weight more than equal 650 gms.)

No. of cycles:100

Duration: One minute (Nominal)

Requirement: There shall be no perforation & loss of eligibility of the marking on the sheath.

4.3 Crush Test (Compressive Test):

Objective: The purpose of this test is to determine the ability of an optical fibre cable to withstand crushing.

Method: IEC 60794-1-2-E3.

Test Specs.: The fibres and component parts of the cable shall not suffer permanent damage when subjected to a compressive load of 2000 Newton applied between the plates of dimension 100 x 100 mm. The load shall be applied for 60 Secs. The attenuation shall be noted before and after the completion of the test.

Requirement: The change in attenuation of the fibre after the test shall be ≤ 0.05 dB both for 1310 nm and 1550 nm wavelength.

4.4 Impact Test:

Objective: The purpose of this test is to determine the ability of an optical fibre cable to withstand impact.

Method: IEC 60794-1-2-E4.

Test Specs: The cable shall have sufficient strength to withstand an impact caused by a mass weight of 50 Newton, when falls freely from a height of 0.5 meters.

The radius R of the surface causing impact shall be 300 mm. 10 such impacts shall be applied at the same place. The attenuation shall be noted before and after the completion of the test.

Requirement: The change in attenuation of the fibre after the test shall be ≤ 0.05 dB both for 1310 nm and 1550 nm wavelength.

4.5 Repeated Bending:

Objective: The purpose of this test is to determine the ability of an optical fibre cable to withstand repeated bending.

Method: EIA-455-104.

Test Specs.: The cable sample shall be of sufficient length (5 m minimum) to permit radiant power measurements as required by this test. Longer lengths may be used if required.

Parameters:

Weight: 5 Kg

Minimum distance from Pulley centre to holding device : 216mm

Minimum distance from Wt. to Pulley centre : 457mm

Pulley Diameter (D - cable diameter) : 20 D

Angle of Turning : 90°

No. of cycles : 30

Time Required for 30 cycles : 2 min

Requirement: During the test no fibre shall break and The attenuation shall be noted before and after the completion of the test. The change in attenuation of the fibre after the test shall be ≤ 0.05 dB both for 1310 nm and 1550 nm wavelength.

4.6 Torsion Test:

Objective: The purpose of this test is to determine the ability of an optical fibre cable to withstand torsion.

Method: IEC 60794-1-2-E7.

Test Specs.: The length of the specimen under rest shall be 2 meters and the load shall be 100 N. The sample shall be mounted in the test apparatus with cable clamped in the fixed clamp sufficiently tight to prevent the movement of cable sheath during the test. One end of the cable shall be fixed to the rotating clamp which shall be rotated in a clock wise direction for one turn. The sample shall then be returned to the starting position and then rotated in an anti-clock wise direction for one turn and returned to the starting position. This complete movement constitutes one cycle. The cable shall withstand 10 such complete cycles. The attenuation shall be noted before and after the completion of the test.

Requirement: The cable shall be examined physically for any cracks tearing on the outer sheath and for the damage to other component parts of the cable. The twist mark shall not be taken as damage. The change in attenuation of the fibre after the test shall be ≤ 0.05 dB both for 1310 nm and 1550 nm wavelength.

4.7 Kink Test:

Objective: The purpose of this test is to verify whether kinking of an optical fibre cable results in breakage of any fibre, when a loop is formed of dimension small enough to induce a kink on the sheath.

Method: IEC 60794-1-2-E10.

Test Specs.: The sample length shall be 10 times the minimum bending radius of the cable. The sample is held in both hands, a loop is made of a bigger diameter and by stretching both the ends of the cable in opposite direction, the loop is made to the minimum bend radius so that no kink shall form. After the cable comes in normal condition, the attenuation reading is taken.

Requirement: The kink should disappear after the cable comes in normal condition. The change in attenuation of the fibre after test shall be ≤ 0.05 dB both for 1310 nm & 1550 nm wavelength.

4.8 Cable Bend Test:

Objective: The purpose of this test is to determine the ability of an optical fibre cable to withstand repeated flexing. The procedure is designed to measure optical transmittance changes and requires an assessment of any damage occurring to other cable components.

Method: IEC 60794-1-2-E11 (Procedure-I).

Test Specs.: The fibre and the component parts of the cable shall not suffer permanent damage when the cable is repeatedly wrapped and unwrapped 4 complete turns of 10 complete cycles around a mandrel of 20 D, where D is the diameter of the cable. The attenuation shall be noted before and after the completion of the test.

Requirement: The change in attenuation of the fibre after the test shall be ≤ 0.05 dB both for 1310 nm and 1550 nm wavelength. Sheath shall not show any cracks visible to the naked eye when examined whilst still wrapped on the mandrel.

4.9 Temperature Cycling (Type Test):

Objective: To determine the stability behaviour of the attenuation of a cable subjected to temperature changes which may occur during storage, transportation and usage.

Method: IEC 60794-1-2-F1 (To be tested on Standard cable length & drum i.e 2Km +/- 10%)

Test Specs.: The permissible temperature range for storage and operation will be from -20°C to $+70^{\circ}\text{C}$. The rate of change of temperature during the test shall be 1°C per minute approx. The cable shall be subjected to temperature cycling for 12 Hrs. at each temperature as given below:

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TA2 temp.: -20°C

TAt temp.: - 10°C.

TB1 temp.: + 60°C.

TB2 temp.: + 70°C.

The test shall be conducted for 2 cycles at the above temperatures.

Requirement: The change in attenuation of the fibre under test shall be ≤ 0.05 dB for 1310 nm and 1550 nm wave length respectively for the entire range of temperature.

4.10 Cable aging Test (Type Test):

Objective: To check the cable material change dimensionally as the cable ages.

Method: At the completion of temperature cycle test, the test cable shall be exposed to 85 +/- 2 degree C for 168 hours. The attenuation measurement at 1310 & 1550 nm wave length to be made after stabilization of the test cable at ambient temperature for 24 hours.

Requirement: The increase in attenuation allowed: ≤ 0.05 dB at 1310 and 1550 nm.

Note: The attenuation changes are to be calculated with respect to the base line attenuation values measured at room temperature before temperature cycling.

4.11 Water Penetration Test (Type Test):

Objective: The aim of this test is to determine the ability of a cable to block water migration along a specified length.

Method: IEC 60794-1-2-F5

Test Specs. A circumferential portion of the inner HDPE cable end shall face the water head. The water tight sleeve shall be applied over the cable. The cable shall be supported horizontally and one meter head of water, containing a sufficient quantity of water soluble fluorescent dye for the detection of seepage, shall be applied on the inner HDPE sheath for a period of 7 days at ambient temperature. No other coloured dye is permitted.

Note: For bulk testing, 24 hours as duration of test shall be considered.

Requirement: No dye shall be detected when the end of the 3m length of the cable is examined with ultraviolet light detector. The cable sample under test shall be ripped open after the test and then it shall be examined for seepage of water into the cable and the distance to be noted.

4.12 Test of Figure of 8 (Eight) on the cable (Type Test):

Objective: Check of easiness in formation of figure of 8 of the cable during installation in the field.

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Test Method: 1000 meter of the cable shall be uncoiled from the cable reel and shall be arranged in figure of 8 (eight) shape. The diameter of each loop of the figure of 8 shall be maximum 2 meters.

Requirement: It shall be possible to make figure of 8 of minimum 1000 meters of the cable uncoiled from the cable reel without any difficulty. No visible damage shall occur.

4.13 Flexural Rigidity Test on the optical fibre cable (Type Test):

Objective: To check the Flexural Rigidity of the metal free optical fibre cable.

Method: To be tested as per ASTM D –790

Test Specs: The fibre and the component parts of the cable shall not suffer permanent damage in the cable subjected to Flexural Rigidity Test as per the above method. The attenuation shall be noted after and before the completion of the test.

Requirement: The change in attenuation of the fibre after the test shall be < 0.05 dB at 1310nm and 1550nm wavelengths. The sheath shall not show any cracks visible to the naked eye.

4.14 Static Bend test (Type Test):

Objective: To check the Cable under Static Bend.

Method: As per the clause no 4.8 of the GR alternatively as per ASTM D790.

Test Specs: The cable shall be subjected to static bend test. The optical fibre cable shall be bend on a mandrel having a Diameter of 10 D (D is diameter of the cable).

Requirement: The change in attenuation of the fibre after the test shall be ≤ 0.05 dB for 1310 nm and 1550 nm wavelengths. Sheath shall not show any cracks visible to the naked eye when examined whilst still wrapped on the mandrel.

4.15 Cable Jacket Yield Strength and Ultimate Elongation:

Objective: To determine the yield strength and elongation of the polyethylene (HDPE) cable sheath (jacket).

Test Method: FOTP-89 or ASTM 1248 Type III class

Test Condition:

1. Sample shall be taken from a completed cable. The aged sample shall be conditioned at $100 \pm 2^\circ\text{C}$ for 120 hours before testing.
2. The cross-head speed shall be 50 mm per minute.

Requirement:

Jacket Material	Minimum Yield Strength		Minimum Elongation (%)
	(MPa)	(psi)	
HDPE un-aged	16.5	2400	400
HDPE aged	12.4	1800	375

4.16 To Check of the quality of the loose tube (containing ribbon optical fibre) (Type Test):

a. Embrittlement Test

This test method is based on bending by compression and reflects embrittlement much better than the other tensile tests. This test is independent of wall thickness of the loose tube.

Sample: The minimum length of the test sample depends on the outside diameter of the loose tube and should be 85 mm for tubes up to 2.5 mm outside dia. The length of the bigger tubes should be calculated by using the following equation:

$$L_0 > 100 \times [(D_2 + d_2)]^{1/2} \text{ where}$$

4

L_0 = Length of tube under test.

D = Outside dia of loose tube.

d = Inside dia of loose tube.

Procedure: Both the ends of a buffer tube test sample may be mounted in a tool, which is clamped in jaws of a tensile machine which exerts a constant rate of movement. The movable jaw may move at a rate of 50 mm per minute toward the fixed jaw. Under load, the tube will bend so that it is subjected to tensile and compressive stresses. The fixture for holding the tube should be designed in a manner that the tube might bend in all directions without further loading.

Requirement: The tube should not get embrittled. No kink should appear on the tube up to the safe bend diameter of tube (15 D), where D is the outside diameter of the loose tube. There should also not be any physical damage or mark on the tube surface.

b. Kink Resistance Test on the Loose Tube

Objective: To safeguard the delicate optical fibers, the quality of the loose tube material should be such that no kink or damage to the tube occur while it is being handled during installation and in splicing operations.

Procedure: To check the kink resistance of the loose tube, a longer length of the loose tube is taken (with fiber and gel), a loop is made and loop is reduced to the

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minimum bend radius of loose tube i.e. 15 D (where D is the outside diameter of the loose tube). This test is to be repeated 4 times on the same sample length of the loose tube.

Requirement: No damage or kink should appear on the surface of the tube.

4.17 Ribbon Dimension Measurements test (Type Test):

Objective: To check the fibres in ribbon structure, fibres cross over and fibre identity to ensure the transmission performance and mechanical service life of the fibre in the ribbon structure.

Test method: FOTP-123 (Video Gray Scale Analysis (VGSA) or Microscopic method).

Requirement: It shall meet the dimensional requirements given in clause no.3.8.2 of this GR. The fibres in the entire length of the ribbon shall not cross over at any point.

4.18 Ribbon Resistance to Twist (Robustness) test (Type Test):

Objective: To check the robustness of the fibre ribbons to withstand the twist during installation conditions and to check the structural integrity of the ribbon over the deployed length for mid-span entry, maintenance purposes, consideration in rearrangements and housekeeping.

Test method: FOTP-141.

Requirement: The un-aged and aged (at 85 ± 2°C with uncontrolled humidity for a period of 30 days) completed ribbon shall not show any separation of individual fibres from the ribbon structure after completion of the twist test when observed under 5X magnification.

4.19 Ribbon Residual Twist (Flatness) Test (Type Test):

Objective: To check the dimensional integrity of the ribbon without twisting to allow rearrangements and to limit the potential attenuation increases due to a macro-bending caused by twisting of the fibre ribbon.

Test Method: FOTP-131.

Requirement: The aged (at 85 ± 2°C with uncontrolled humidity for a period of 30 days) ribbon residual twist (if any) shall have a pitch: > 400 mm.

4.20 Ribbon Separation Test (Type Test):

Objective:

a) To check the separation of individual fibres, separation of sub-unit of fibres and mid span separation from a fibre ribbon.

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b) To check the retention of sufficient colorant for identification for any 2.5 cm length of fibre after separation for individual and sub-unit of fibres.

Test to be conducted for:

a) Separation of any single fibre or a multi-fibre subgroup by a tool or by hand from a ribbon for a length of 1 meter. Midspan separation from a 2 meter sample, separated close to middle for at least 0.5 meter (both single fibre and the three fibre sub – units) for un-aged ribbon.

Requirement: The un-aged ribbon of minimum length of a 0.3 meter (1.0foot) of an individual fibre and a sub group of three fibres shall be separated from the ribbon without breaking the fibres or damaging the fibre coating. The force required to perform separation shall not exceed 4.4 N. The area at the separation shall not show any damage to the fibre coating when examined under 5X magnification.

b) Retention of the Colour and Fibre Identification after separation.

Requirement: Individual fibre colour identification shall be maintained after the separation test. It shall retain sufficient colorant that any 2.5 cm length is readily identifiable.

c) Removal of Ribbon matrix material to access individual fibres.

Requirement: No damage shall occur either to fibre coating or the fibres. The coating shall not sustain any swelling self-stripping, cracking or splitting when examined under 5X magnification.

Note: The manufacturer shall recommend the procedure for the removal of ribbon matrix.

4.21 Ribbon Stripability Test (Type Test):

Objective: Check of removal of the matrix material and the fibres protective coating mechanically with commercial stripping tools from un-aged and aged ribbons.

Test Method: GR-20-CORE issue 4, 2013

Pre Conditioning:

a. **Aged samples:** The humidity of aged ribbons shall be soaked at 85 +/- 2 °C and a non-condensing humidity of 85 +/- 5% for a period of 30days.

b. **Water aged samples:** The water aged ribbons shall be soaked in deionizator distilled water at a temperature of 23 +/- 5 °C for a period of 14 days. The fibre ribbon strip-ability testing shall be conducted at standard atmospheric conditions. The un-aged, humidity –aged, and water aged ribbons shall be tested within eight hours after aging.

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Requirement: There shall be no fibre breakage and any coating residue shall be removable with a single isopropyl alcohol wipe when at least 25 mm of the matrix material and the fibre Protective coating is mechanically removed with commercial stripling tools from un-aged and aged ribbons.

4.22 Ribbon Macro-bend Performance

Objective: To check the macro-bend performance of a ribbon.

Method: One hundred turns of ribbon are wound around a 60 mm diameter ribbon and the loss increase at 1310 nm & 1550 nm shall be measured.

Requirement: The change in attenuation of the fibre shall be ≤ 0.05 dB, for 1310 nm and 1550 nm wavelengths.

4.23 Torsion Resistance of the ribbon Test (Type Test):

Objective: To check the torsion resistance of the ribbon.

Method: One meter length of ribbon is twisted to through five revolutions of 360° and measurement is taken.

Requirement: The change in attenuation of the fibre shall be ≤ 0.05 dB, for 1310 nm and 1550 nm wavelengths.

4.24 Crush Resistance of Ribbon (Type Test):

Objective: To check the crush resistance of the ribbon.

Method: A 50 mm² sample is subjected to a load of 500 N and the attenuation measurement taken for both 1310 nm & 1550 nm wavelengths.

Requirement: The change in attenuation of the fibre shall be ≤ 0.05 dB, for 1310 nm and 1550 nm wavelengths.

4.25 Drainage Test for Loose Tube and Drip test on the cable (Type Test):

a. Drainage Test for loose Tube

Sample Size: 30 cm tube length.

Test procedure:

1. Cut the tube length to 40 cm.
2. Fill the tube with the tube filling gel ensuring that there are no air bubbles and the tube is completely full.
3. Place the filled tube in a horizontal position on a clean worktop and cut 5 cm from either end so that the finished length of the sample is 30 cm.
4. Leave the filled tube in a horizontal position at an ambient temperature for 24 hrs. (This is necessary because the gel has been sheared and the viscosity has been reduced during the filling process).
5. The sample tube is then suspended vertically in an environment heat oven over a weighed beaker. It is left in the oven at a temperature of 70° C for a period of 24 Hrs.

6. At the end of the 24 hrs period the beaker is checked and weighed to see if there is any gel in the beaker.

Results:

1. If there is no gel or oil in the beaker the tube has PASSED the drainage test.
2. If there is gel or oil in the beaker the tube has FAILED the drainage test.

b. Drip test on the cable

Objective: The purpose of this test is to determine the ability of jelly in the O.F. cable to withstand a temperature of 70 degree C.

Method: Take a sample of 30 cm. length of the cable with one end sealed by end cap. Remove outer black sheath, binder tapes for 5 cm from open end of the sample. Clean the jelly. Then the sample is kept vertically with open end downwards in the oven for 24 hours at 70° C with a paper under the sample.

Test Specs: Examine the paper placed below the cable inside the oven for dripping of the jelly after 24 hours. There should be no jelly drip or oily impression on the paper.

4.26 Check of easy removal of sheath:

Objective: Check of the easy removal of sheath of the fiber optic cable by using normal sheath removal tool.

Procedure: To check easy removal, the sheath shall be cut in circular way and the about 300 mm length of the sheath should be removed in one operation. It should be observed during sheath removal process that no undue extra force is applied and no component part of the cable is damaged. One should be able to remove the sheath easily.

4.27 Check of the effect of aggressive media on the cable (Acidic and Alkaline Behaviour) (Type Test):

Procedure: To check the effect of aggressive media, solution of PH4 and PH10 shall be made. The two test samples of the finished cable, each of 600 mm in length, are taken and the ends of the samples are sealed. These test samples are put in the PH4 and PH10 solutions separately. After 30 days these samples are taken out from the solutions and examined for any corrosion etc on the sheath and other markings of the cables. (Test method no. ISO175).

Requirement: The sample should not show any effect of these solutions on the sheath and other marking of the cable.

4.28 Termite & Rodent Test (Type Test):

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The Anti-rodent (Optional) test shall be checking the uniformity of application of glass roving yarns around the periphery of inner sheath. The test shall be carried out by BSNL QA during type testing or can be carried out at any recognized lab on finished cable and in addition, manufacturer shall also give an undertaking in this respect.

The reports shall be submitted by the manufacturers. Termite resistance shall be provided with an additive/without additive in outer sheath and rodent protection shall be provided with Glass roving yarns around the periphery of inner sheath and these yarns should be spread uniformly around the periphery of inner sheath.

The following minimum parametric tests on Anti termite / Anti rodent dopants shall be carried out during the TSEC testing

1. Non-toxicity
2. Thermal Stability
3. Long life Span / half-life
4. Compatibility
5. Efficacy

The thermal stability of the dopant should not deteriorate during cable execution process. The life of the dopant should be equal or better than the life of the cable specified in the technical specification herein. Appropriate certificate in this regard from any neutral lab accredited with NABL/ Government BBNLTender Laboratory / Institute should be produced.

Similarly other parameters such as non-toxicity, efficacy and compatibility shall be certified in any neutral lab accredited with NABL/ Government Laboratory / Institute and test report is to be submitted during TSEC testing.

Note:

1. All the materials as above have to be TSEC/Type approved by BSNL QA/TEC against mentioned TEC GR or as per the approval procedure of BBNL for which TEC GR not there.
2. **Deleted**
3. **Deleted**
4. **All the GRs are to be considered with latest amendments (if any). Tenderer's functional requirement mentioned in this tender will be considered final in case of any difference between GR details and Tenderer's functional requirement.**

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4.8 Annexure B

4.8.1 Engineering Instructions for Under Ground Optical Fibre Cable Laying Works

4.8.1.1 SCOPE

The Engineering Instructions spelt out in this document deal with the methods to be adopted for underground Optical Fibre Cable laying in PLB HDPE ducts and termination of OFC at Gram Panchayats(GPs) for BharatNet Phase- II

4.8.1.2 OF CABLE LAYING APPROACH

On the basis of the survey reports done by PIA, routes for OF cable laying shall be finalized. Road Cutting Permission shall be obtained from road and rail authorities for laying the Optical Fibre Cable along the finalized roads and at rail / road crossing along the route. Generally, O.F. Cable may preferably be laid straight as far as possible along the road near the boundaries, away from the burrow pits. When the O.F. Cable is laid along the National Highways, Cable should run along the road land boundary or at a minimum distance of 15 meters from the center line of the road where the road land is wider as the OFC carries high capacity traffic and is planned for about 25 to 30 years of life. It is essential that the cable is laid after obtaining due permission from all the concerned authorities to avoid any damage (which may result in disruption of services / revenue loss) and shifting in near future due to their planned road widening works. For obtaining RoW State/SIA will facilitate the PIA.

In special cases where it may be necessary to avoid burrow pits or low lying areas, the Cable may be laid underneath the shoulders at a distance of 0.6 meter from the outer edge of the road embankment provided the same is located at least 4.5 meters away from centre line of road.

4.8.1.3 GENERAL

Soil Classification

Soil shall be classified under two broad categories Rocky and Non Rocky, The soil is categorized as rocky if the cable trench cannot be dug without blasting and / or chiseling. All other types of soils shall be categorized as Non Rocky including Murrum & soil mixed with stone or soft rock.

Rocky soil.

The terrain which consists of hard rocks or boulders where blasting/ chiseling is required for trenching such as quartzite, granite, basalt in hilly areas and RCC (reinforcement to be cut through but not separated) and the like.

Non Rocky soils

This will include all types of soil- soft soil/hard soil/Murrum i.e. any strata, such as sand, gravel, loam, clay, mud, black cotton murrum, shingle, river or nullah bed boulders, soling of roads, paths etc. (All such soils shall be sub-classified as kachcha soil) and hard core, macadam surface of any description (water bound, grouted tarmac etc.), CC roads and pavements, bituminous roads, bridges, culverts (All such soils shall be classified as Pucca soils)

4.8.1.4 The Optical Fibre Cable shall be laid through PLB HDPE Ducts buried at a nominal depth of 165cm. The steps involved in OF Cable laying are as under

Excavation of trench up to a nominal depth of 165 cm in non-Rocky soil, according to construction specifications along National/State Highways/other roads and in built up /rural areas. Under exceptional conditions/ genuine circumstances due to site constraints/ soil conditions, relaxation can be granted

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat by the competent authority for excavation of trench to a depth lesser than 165cm. Such relaxation shall be given as per the laid down norms/ procedures being set by State/SIA and with the approval of the competent authority. The payment in such cases shall be made on pro-rata basis as per the laid down norms adopted by the concerned State/SIA.

Laying of PLB HDPE Ducts/coils coupled by sockets in excavated trenches, on bridges and culverts, as per construction specification and sealing of PLB HDPE Ducts pipe ends at every manhole by end-plugs of appropriate size.

Providing additional protection by R.C.C. Pipes/GI pipes and/or concreting/chambering, wherever required according to construction specification.

Fixing of GI pipes/troughs with clamps on culverts/bridges and/or chambering or concreting of G.I. Pipes/troughs, wherever necessary.

Laying Protection Pipes on Bridges and Culverts. In case trenching and pipe laying is not possible on the culverts, the pipes shall be laid on the surface of the culverts/bridges after due permission from the competent authority within the concerned State/SIA as per construction specification

Back filling and Dressing of the Trench according to construction specifications.

(Deleted) Manhole of size (2.0 m length x 1.0 m width x 1.65 m Depth) to be installed as loop chamber at following locations (but not limited to) as per industry best practice,

1. Every Km

2. At both sides of road crossings, culvert and bridge crossings.

A loop of minimum 25 meter of OFC will be left in every manhole. Sealing of both ends of the PLB HDPE pipe in manhole by hard rubber bush of suitable size to avoid entry of rodents into the PLB HDPE Ducts, (Deleted)

Digging of pit of size 2 meter x 2 meter x 1.8 meter (depth) for fixing of Jointing chambered-cast RCC cover or stone of suitable size on jointing chamber to protect the Joint and backfilling of jointing chamber with excavated soil.

Digging of pits 50 cm to 100 cm towards jungle side at every manhole and jointing chamber along the route to a depth of 75cm fixing of route Indicator/joint indicator, concreting and backfilling of pits. Painting of route indicators with Blue colour and joint Indicator by Grey colour and sign writing denoting route/joint indicator number and marked as "GFGNL", as per construction specification.

4.8.1.5 Specifications of Materials to be used

PLB HDPE Duct

Optical Fibre Cables should be pulled through Permanently Lubricated HDPE Duct of 40mm/33 mm size conforming to the specifications as per TEC GR No. TEC/GR/TX/CDS-008/03/MAR-11 with latest Amendments. The Ducts shall be of any single colour per each island and have the identification markings as per TEC GR wherein "Gujarat Fibre Grid (GFGNL)" shall be marked as Tenderer's name.

4.3.2. PLB HDPE Duct Accessories

Push fit Coupler

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Push Fit couplers shall be used for coupling PLB HDPE ducts/coils. The specifications of the couplers shall be as per TECGR no TEC/GR/TX/CDS-008/03/Mar11 with latest amendments.

PP Rope

Should confirm to TEC GR No.TEC/GR/TX/CDS-008/03/MAR-11 with latest Amendments. However, this is optional and CPSUs may use the same on need basis. The PP rope can be ordered along with the PLB duct as required. In this case PP ropes drawn through the HDPE/PLB pipes/coils and safely tied to the end caps at either ends with hooks to facilitate pulling of the OF cables at a later stage. The rope used is 3 strands Polypropylene Para Pro rope having yellow colour and size of 4 mm diameter. It should have a minimum breaking strength of 550 kgs. The length of each coil of rope should be 5 meter more than the standard length of duct(or as ordered) and it should conform to (i) BS 4928 Part-II of 1974 (ii) IS 5175 of 1982. It should be of special grade and should have ISI certificate mark. It should be manufactured out of industrial quality Polypropylene.

End Cap

End Cap shall be used for sealing the ends of the empty ducts, prior to installation of the OF Cable and shall be fitted immediately after laying the duct to prevent the entry of any dirt, water, moisture, insects/rodents etc. It should confirm to TEC GR No. TEC/GR/TX/CDS-008/03/MAR-11with latest amendments. The ends of the PLB HDPE ducts/coils laid in the manholes should be closed with End Caps. The End Caps used should be suitable for closing 40mm/33mm PLB HDPE ducts/coils. A suitable arrangement should be provided in the End Cap to tie PP Rope. (See figure-1 for details)

Cable sealing Plug

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This shall be used to seal the end of the ducts perfectly, after the OF cable is pulled in the duct. For pulling the cable through the ducts, it is necessary to provide manholes at that location and also at bends and corners wherever required. The ends of the PLB HDPE ducts/coils are closed with Cable sealing Plugs. The End Plugs used should be suitable for closing 40mm/33mm PLB HDPE ducts/coils. The Cable sealing plug shall conform to TEC GR No. TEC/GR/TX/CDS-008/03/MAR-11 with latest amendments. (Wherever blowing technique is used for laying OF Cable, at the discretion of the CPSUs concerned, the hand holes/manholes required for accessing the cable during cable laying can be at longer distances depending upon requirement.)

RCC Full Round Pipes: Reinforced cement concrete pipes (spun type) coupled with RCC collars sealed with cement mortar used to provide additional protection to PLB HDPE Ducts/coils at lesser depths should be of full round, NP-2 class and size 100 mm (internal diameter), conforming to IS standard 458-1988 with latest amendments. The pipes should have a nominal length of 2 meters.

The RCC collars should be properly sealed using cement mortar 1:3 (1:53 grade cement of reputed brand, 3: fine sand without Impurities). In case of long spans, every third joint will be embedded in a concrete block of size 60 cm (L) x 40 cm (W) x 25 cm (H) of 1:2:4 cement concrete mix (1: cement, 2: coarse sand, 4: stone aggregate of 20 mm nominal size) so that the alignment of RCC pipes remain firm and intact. Also, both ends of RCC pipes spans will be sealed by providing concrete block of size 40 cm (L) x 40 cm (W) x 25 cm (H) of 1:2:4 cement concrete mix to avoid entry of rodents.

RCC Split Pipes: The split Reinforced cement concrete pipes (spun type) with in-built collars are used to provide additional protection to PLB HDPE Ducts/coils should be of 100mm internal dia. (Spotted), Class--NP-3, Thickness: 25mm,

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Length: 2 Meters with inbuilt collaret one end, Conforming to ISI Specification

IS: 458, 1988 with latest amendment

G.I. Pipes: G.I. pipes should be of medium duty class having inner diameter of 50mm and should conform to specifications as per IS 554/1985 (revised upto date) IS 1989 (Part-I), 1900 Sockets (revised up to date) & IS 1239 (Part-II) 1992 (revised upto date).

DWC Pipes: Use of normal duty DWC (Double walled corrugated) HDPE pipe – confirming to TEC GR no.GR/DWC-34/01 Sep.2007 with latest amendments shall be preferably utilized as first choice for protection of Optical Fibre Cable instead of GI pipes. The DWC pipes used shall be of size 75/61mm as per table 2 of the said TEC GR.

M.S. Weld Mesh: The PLB HDPE Ducts can also be protected by embedding it in concrete of size of 25 cm x25 cm reinforced with MS weld mesh. The MS weld mesh used should be of 50 mm x 100mm size, 12 SWG, 120 cm in width in rolls of 50m each. One meter of MS weld mesh caters to approx. 3 meters of concreting. (See figure ‘2’ for details). The strength of RCC/CC is dependent on proper curing, therefore, it is imperative that water content of CC/RCC mix does not drain out into the surrounding soil. In order to ensure this, the RCC/CC work should be carried out by covering all the sides by yellow PVC sheets of weight not less than 1 kg per 8 sqm to avoid seepage of water into the soil.

Joint Chamber: The Joint chamber shall be provided at every joint location to keep the OF cable joint well protected and also to house extra length of cable which may be required in the event of faults at a later date. The Joint chamber shall be of pre-cast RCC type as per construction specification. Brick chamber can also be made with prior permission of State/SIA.

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Rubber Bush: To prevent entry of rodents into PLB HDPE DUCTS, the ends of PLB HDPE DUCTS are sealed at every manhole and joint using rodent resistant hard rubber bush (cap) after optical Fibre cable is pulled. The rubber bush should be manufactured from hard rubber with grooves and holes to fit into 40 mm PLB HDPE DUCTS pipe, so that it should be able to prevent the entry of insects, rodents, mud, and rainwater into the PLB HDPE DUCTS pipe. It should conform to TEC GR with latest amendments. (See Figure-3)

Route/Joint Indicator: The Route/Joint indicators are co-located with each manhole/joint chamber. In addition Route indicators are also to be placed where route changes direction like road crossings etc. Either RCC/Pre-cast or Stone based route indicators can be used. The detailed specification and design of the same shall be as per construction specification. Generally, Stone Route indicators shall be used for the BharatNet Phase- II project

4.8.1.6 EXCAVATION OF TRENCHES

Trenching

Location and Alignment of the Trench: In built up areas, the trench will normally follow the foot-path of the road except where it may have to come to the edge of the carriage way cutting across road with specific permissions from the concerned authorities maintaining the road (such permissions shall be obtained by the department as per MOU signed with respective State Govt.). Outside the built up limits the trench will normally follow the boundary of the roadside land. However, where the road side land is full of burrow pits or afforestation or when the cable has to cross culverts/ bridges or streams, the trench may come closer to the road edge or in some cases, over the embankment or shoulder of the Road (permissions for such deviations for cutting the embankment as well as shoulder of the road shall be obtained). The alignment of the trench will be decided by a responsible official of the State/SIA

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Once the alignment is marked, no deviation from the alignment is permissible except with the approval of State/SIA. While marking the alignment only the center line will be marked and the PIA shall set out all other work to ensure that, the excavated trench is as straight as possible. The PIA shall provide all necessary assistance and labor, at his own cost for marking the alignment. PIA shall remove all bushes, undergrowth, stumps, rocks and other obstacles to facilitate marking the centre line without any extra charges. It is to be ensured that minimum amount of bushes and shrubs shall be removed to clear the way and the PIA shall give all, consideration to the preservation of the trees.

The line-up of the trench must be such that PLB pipe(s) shall be laid in a straight line, both laterally as well as vertically except at locations where it has to necessarily take a bend because of change in the alignment or gradient of the trench, subject to the restrictions mentioned elsewhere.

Line-Up: The line-up of the trench must be such that PLB HDPE Ducts shall be laid in a straight line except at locations where it has to necessarily take a bend because of change in the alignment or gradient of the trench, subject to the restrictions mentioned elsewhere.

Method of Excavation

In built up areas, the PIA shall resort to use of manual labour / HDD only to ensure no damage is caused to any underground or surface installations belonging to other public utility services and/or private parties.

However, along the Highways and cross country there shall be no objection to the PIA resorting to mechanical means of excavation, provided that no underground installations existing the path of excavation, if any, are damaged.

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There shall be no objection to resort to horizontal boring to bore a hole of required size and to push through G.I. Pipe (50 mm ID) through horizontal bore at road crossing or rail crossing or small hillocks etc.

All excavation operations shall include excavation and 'getting out'. 'Getting out' shall include throwing the excavated materials at a distance of at least one meter or half the depth of excavation, whichever is more, clear off the edge of excavation. In all other cases 'getting out' shall include depositing the excavated materials as specified.

In Rocky strata excavation shall be carried out by use of electro mechanical means like breakers/ jack hammers or by blasting wherever permissible with express permission from the competent authority. If blasting operations are prohibited or not practicable, excavation in hard rock shall be done by chiselling/ jack hammers.

Trenching shall as far as possible be kept ahead of the laying of pipes. PIA shall exercise due care that the soil from trenching intended to be loose for back filling is not mixed with loose debris. While trenching, the PIA should not cause damage to any underground installations belonging to other agencies and any damage caused should be made good at his own cost and expense.

Necessary barricades, night lamps, warning board and required watchman shall be provided by the PIA to prevent any accident to pedestrians or vehicles. While carrying out the blasting operations, the PIA shall ensure adequate safety by cautioning the vehicular and other traffic. The PIA shall employ sufficient manpower for this with caution boards, flags, sign writings etc.

The PIA should provide sufficient width at the trench at all such places, where it is likely to cave in due to soil conditions without any extra payment. A minimum

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free clearance of 15 cm should be maintained above or below any existing underground installation. No extra payment will be made towards this. In order to prevent damage to PLB HDPE DUCTS over a period of time, due to the growth of trees, roots, bushes, etc., the PIA shall cut them when encountered in the path of alignment of trench without any additional charges.

In large burrow pits, excavation may be required to be carried out for more than 165 cm in-depth to keep gradient of bed less than 15 degrees with horizontal. If not possible as stated above, alignment of trench shall be changed to avoid burrow pit completely.

Depth and Size of the Trench

The depth of the trench from top of the surface shall not be less than 165 cm unless otherwise relaxation is granted by State/SIA under genuine circumstances.

In rocky terrain, less depth shall be allowed only in exceptional circumstances with additional protection where it is not possible to achieve the normal depth due to harsh terrain/ adverse site conditions encountered. This shall be done only with the approval of the State/SIA. This shall be properly documented. In all cases, the slope of the trench shall not be less than 15 degrees with the horizontal surface. The width of the trench shall normally be 45 cm at the top & 30 cm at the bottom.

In case, additional pipes (HDPE/GI/RCC Pipes) are to be laid in some stretches, the same shall be accommodated in this normal size trench.

When trenches are excavated in slopes, uneven ground and inclined portion, the lower edge shall be treated as top surface of land and depth of trench will be measured accordingly. In certain locations, such as uneven ground, hilly areas and all other Places, due to any reason whatsoever it can be ordered to excavate beyond standard depth of 165 cm to keep the bed of the trench as smooth as

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possible. Near the culverts, both ends of the culverts shall be excavated more than 165 cm to keep the gradient less than 15 degree with horizontal. For additional depth in excess of 165 cm, no additional payment shall be applicable.

If excavation is not possible to the minimum depth of 165 cm, as detailed above, full facts shall be brought to the notice of the State/SIA in writing giving details of location and reason for not being able to excavate that particular portion to the minimum depth.

Approval shall be granted by the State/SIA in writing under genuine circumstances. The decision of the State/SIA shall be final and binding on the PIA. All the relaxations granted as specified above shall be dealt with as per the laid down norms and procedure of State/SIA.

Dewatering: The PIA shall be responsible for all necessary arrangements to remove or pump out water from trench. The PIA should survey the soil conditions encountered in the section and make his own assessment about dewatering arrangement that may be necessary. No extra payment shall be admissible for this.

Wetting: Wherever the soil is hard due to dry weather conditions, if watering is to be done for wetting the soil to make it loose, the same shall be done by the PIA. No extra payment shall be admissible for this.

Blasting: For excavation in hard rock, where blasting operations are considered necessary, the PIA shall obtain approval of the State/SIA in writing for resorting to blasting operation. The PIA shall obtain license from the State/SIA for undertaking blasting work as well as for obtaining and storing the explosive as per the Explosive Act, 1884 as amended up to date and the explosive Rules, 1983. The PIA shall purchase the explosives fuses, detonators, etc. only from a licensed dealer. Transportation and storage of explosive at site shall conform to the aforesaid Explosive Act and Explosive Rules. The PIA shall be responsible for the safe custody and proper accounting of the explosive materials. Fuses and

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detonators shall be stored separately and away from the explosives. The State/SIA or his authorized representative shall have the right to check the PIA's store and account of explosives. The PIA shall provide necessary facilities for this. The PIA shall be responsible for any damage arising out of accident to workmen, public or property due to storage, transportation and use of explosive during blasting operation. Blasting operations shall be carried out under the supervision of a responsible authorized agent of the PIA (referred subsequently as agent only), during specified hours as approved in writing by the State/SIA. The agent shall be conversant with the rules of blasting. All procedures and safety precautions for the use of explosives drilling and loading of explosives before and after shot firing and disposal of explosives shall be taken by the PIA as detailed in IS: 4081 safety code for blasting and related drilling operation.

Trenching Near Culverts/ Bridges: The PLB HDPE Ducts shall be laid in the bed of culvert at the depth not less than 165 cm protected by RCC pipes as decided by State/SIA. Both ends of culverts shall be excavated more than 165 cm in depth to keep the gradient of not less than 15 degree with horizontal. The bed of trench should be as smooth as possible.

While carrying out the work on bridges and culverts, adequate arrangement for cautioning the traffic by way of caution boards during day time and danger lights at night shall be provided. In case of small bridges and culverts, where there is a likelihood of their subsequent expansion and remodelling, the cable should be laid with some curve on both sides of the culvert or the bridge to make some extra length available for readjustment of the cable at the time of reconstruction of culvert or the bridge.

4.8.1.7 Laying OF PLB HDPE Ducts

After the trench is excavated to the specified depth, the bottom of the trench has to be cleared of all stones or pieces of rock and levelled up properly. A layer of

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soft soil/or sand (in case the excavated material contains sharp pieces of rock/stones) of not less than 5 cm is required for levelling the trench to ensure that the cable when laid will follow a straight alignment. Adequate care shall be exercised while laying so that the OF cables are not put to undue tension/pressure after being laid as this may adversely affect the optical characteristics of cables with passage of time.

The PIA shall ensure that trenching and pipe laying activities are continuous, without leaving patches or portions incomplete in between. In case intermediate patches are left, measurement of the completed portions will be taken only after work in such left over patches are also completed in all respects.

Preparatory to aligning the pipe for jointing, each length of the PLB HDPE Ducts shall be thoroughly cleaned to remove all sand, dust or any other debris that may clog, disturb or damage the optical Fibre cable when it is pulled at a later stage. The ends of each pipe and inside of each Socket shall be thoroughly cleaned of any dirt or other foreign materials.

After the trench is cleaned the PLB HDPE Ducts/Coil shall be laid in the cleaned trench, jointed with Sockets. Drawing up of PP rope is optional as per TEC GR. In case of use of PP Rope, at every manhole approximately at every 200m or at bends or turns the PP rope will be tied to the HDPE end caps used for sealing the PLB HDPE Ducts, to avoid entry of rodents/mud etc.

At the end of each day work, the open ends of the pipes sections shall be tightly closed with endcaps to prevent the entry of dirt/mud, water or any foreign matter into PLB HDPE Ducts until the work is resumed. In built up area falling within Municipal/Corporation limits, the PLB HDPE Ducts shall be laid with protection using RCC Pipes/ Concreting reinforced with weld mesh (only in exceptional cases).

For lesser depths requiring additional protection in built up areas, towns and cities falling within the municipal limits, suitable protection shall be provided to PLB HDPE pipes/coils using RCC/DWC full round/split pipes or GI pipes or cement concreting reinforced with MS weld mesh or a combination of any of these as per the site requirement. This shall be done only with the prior

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Moreover, in cross country routes, if depth is less than 1.2 meters, protection by using RCC/DWC Pipe shall be provided. State/SIA shall decide about such stretches and type of protection to be provided in view of the site requirements. Normally 100 mm RCC /DWC Pipes shall be used for protecting PLB HDPE Ducts but if more than one PLB pipe is to be laid and protected, RCC/DWC Pipe of suitable size to accommodate the required number of PLB Pipes shall be used.

The PLB HDPE Ducts shall be laid in RCC Full Round spun Pipes/GI Pipes as required at Road crossings. The RCC pipes/GI pipes shall extend at least 3 meters on either side of the road at Road crossings. At Road crossings, extra GI/PLB HDPE Ducts may be laid as per the direction of the State/SIA. On Rail bridges and crossings, the PLB HDPE Ducts shall be encased in suitable cast iron as prescribed by the Railway Authorities.

Wherever RCC pipes are used for protection, the gaps between the RCC collars and the RCC pipes shall be sealed using cement mortar 1:3 (1:53 grade cement of reputed brand, 3: fine sand without impurities) to bar entry of rodents. Every third collar of RCC pipes (normally of 2 meters length) and also both ends of RCC Pipes will be embedded in a concrete block of size 40 cm (L)x 40 cm(W) x 25 cm (H) of 1:2:4 cement concrete mix (1:53 grade cement of reputed brand, 2: coarse sand, 3: stone aggregate of nominal size of 20 mm) so that the alignment of RCC pipes remain firm and intact and to avoid entry of rodents.

Wherever GI pipes are used, special care should be taken to ensure that G.I. Pipes are coupled properly with the sockets so as to avoid damage to PLB pipe and eventually the OF Cable in the event of pressure coming on the joint and G.I. Pipe joint giving its way. Rubber bushes shall be used at either ends of the GI pipes to protect PLB pipe. Both the ends of G.I. Pipe will be embedded in a concrete block of size 40 cm (L) x 40 cm ((W) x 25 cm (H) of 1:2:4 cement concrete mix (1:53 grade cement of reputed brand, 2: coarse sand, 3: stone aggregate of nominal size of 20 mm) so that the alignment of G.I. Pipes remain firm and intact and to avoid entry of rodents.

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In case of protection by concreting at site, the nominal dimension of concreting shall be 250 mm x250 mm section. Cement Concrete Mixture used shall be of 1:2:4 composition i.e. 1:53 grade Cement of a reputed company, 2: Coarse Sand, 4: Graded Coarse Stone aggregate of 20 mm nominal size, reinforced with MS weld mesh. As the RCC is cast at site, it is imperative to ensure that special care is taken to see that proper curing arrangements are made with adequate supply of water. The PIA shall invariably use mechanical mixer at site for providing RCC protection, to ensure consistency of the mix.

For carrying out concreting work in trenches, yellow PVC sheets of width not less than 1.0 M and of weight not less than 1 kg. Per 8 sq. meters shall be spread and nailed on sides of the trench to form trapezoidal section for concreting in the cleaned trench, to avoid seepage of water into the soil.

A bed of cement concrete mixture of appropriate width and 75 mm thickness shall be laid on the PVC sheet, before laying PLB HDPE ducts. The PLB HDPE Ducts shall then be laid above this bed of concrete. After laying the PLB HDPE Ducts, MS weld mesh is wrapped around and tied and concrete mix is poured to form the cross sectional dimensions as instructed by the State/SIA.

The strength of RCC is dependent on proper curing therefore, it is imperative that water content of RCC mix does not drain out into the surrounding soil. Portions where cement concreting has been carried out shall be cured with sufficient amount of water for reasonable time to harden the surface. After curing, refilling of the balance depth of the trench has to be carried out with excavated soil.

The PLB HDPE Ducts/RCC/GI Pipes shall be laid only in trenches accepted by State/SIA or his representative. The PIA shall exercise due care to ensure that the PLB HDPE Ducts are not subjected to any damage or strain.

Water present in the trench at the time of laying the PLB HDPE Ducts shall be pumped out by the PIA before laying the pipes in the trench to ensure that no mud or water gets into the pipes, thus choking it.

In case of nallahs, which are dry for nine months in a year, the PLB HDPE Ducts shall be laid inside the RCC Pipes laid at a minimum depth of 165 cm, as

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Notwithstanding anything contained in clauses referred above, the State/SIA may order, based on special site requirements, that the PLB HDPE Ducts may be encased in reinforced cement concrete, as detailed, *ibid*. While laying the pipes, a gap of 2 M is kept at convenient locations approx. 200 m apart and at the bends and turns, which will be used as manholes during OF cable pulling. Ends of the PLB HDPE Ducts at the manholes shall be sealed using end caps after tying the PP rope to the end caps to avoid choking of the pipes. In a similar manner, manholes shall be kept while approaching bridges, road crossings etc., as instructed by the State/SIA. The location of the manholes will be decided by the State/SIA

Warning Tap :

Warning tap to be laid in trench as per industry standard.

Laying Protection Pipes on Bridges and Culverts:

In case trenching and pipe laying is not possible on the culverts, the pipes shall be laid on the surface of the culverts/bridges after due permission from the State/SIA. Of late the bridge construction authorities are providing channel ducts on the footpaths on the bridges for various services. The RCC/DWC/ G.I. Pipes can be laid in these ducts for pulling cables. However, for laying cables on existing bridges, where duct arrangement does not exist, one of the following methods may be adopted.

In case of the Bridges/Culverts, where there are no ducts and where the cushion on the top of the Arch is 50 cm to 100 cm or more, G.I. Pipe (Carrying PLB HDPE pipe and cable) may be buried on the top of the Arch adjoining the parapet wall, by digging close to the wheel guards. Every precaution shall be taken to see that no damage occurs to the arch of the culvert. After burying the GI pipe, the excavated surface on the arch shall be restored.

Where the thickness of the Arch is less than 50 cm, the pipe must be buried under the wheel guard masonry and the wheel guard rebuilt.

If neither of the two methods is possible, the G.I. Pipes/GI Troughs must be clamped on the parapet wall with the clamps. If necessary, the pipes may be taken through the parapet wall at the ends where the wall diverges away from the road.

Methods cited in above clauses should be carried out under close supervision of Road authorities.

The surface to be concreted should be thoroughly cleaned and levelled before concreting. At both ends of the Bridges/Culverts, where the GI Pipes /GI Troughs slope down and get buried, the concreting should be extended sufficiently to ensure that no portion of the GI Pipes/GI Troughs is exposed as approved by the State/SIA to protect the pipe/trough from any possible externally caused damage.

Where white wash/colour wash is existing on the Bridges/ Culverts, the same should also be carried out on the concreted portion to ensure uniformity.

4.8.1.8 Back Filling and Dressing of the Trench

Provided that the PLB HDPE pipes have been properly laid in the trench at the specified depth, the back filling operation shall follow as early as practicable. The earth used for filling shall be free from all roots, Grass, shrubs, vegetation, trees, saplings and any other kind of garbage or pebbles. The back filling operation shall be performed in such a manner so as to provide firm support under and above the pipes and to avoid bend or deformation of the PLB HDPE pipes when the pipes get loaded with the back filled earth.

At locations where the back filled materials contains stones/sharp objects which may cause injury to the PLB HDPE pipes and where the excavated or rock

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fragments are intended to refill the trench in whole or in part, the trench should be initially filled, with a layer of ordinary soil or loose earth (free from any stones/pebbles) not less than 10 cm thick over the pipes.

Back filling on public, roads, railway crossings, footpaths in city areas shall be performed immediately after laying the HDPE pipes. Back filling at such locations shall be thoroughly rammed, so as to ensure original condition so that it is safe for the road traffic. All excess soil/ material left on road/ footpath/railway crossing shall be removed by PIA. However, along the highways and in country side, the excess dug up material left over after refilling should be kept in a heap above over the trench.

In city limits, at any given time not more than 50 Meters length of trench should be kept open and in all places where excavation has been done, no part of the trench should be kept open over night to avoid occurrence of any mishap or accident in darkness.

4.8.1.9 Restoration of Road Surface

Road restoration work to be made with bituminous macadam for semi grouting 50 mm thick and premix carpet surfacing 25 mm thick over the grouted surface (total up to 75 mm thick) including supply of asphalt etc. to evenly match the road, including consolidation and rolling as per standard specification of DSR 1997. This is responsibility of PIA for all restoration work.

Road restoration work with cement concrete 1:4:8 mix for thickness varying from 150 mm to 225 mm, including supply of concrete to be made to evenly match the road.

4.8.1.10 CABLE PULLING AND JOINING/SPLICING

CABLE PULLING

Manholes marked during PLB HDPE Ducts pipe laying of approx. size of 2.0 m length x 1.0 m width x 1.65 m depth shall be excavated for pulling the cables. There may be situations where addition manholes are required to be excavated,

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for some reasons, to facilitate smooth pulling of cable. Excavation of additional manholes will be carried out, without any extra cost. De-watering of the manhole, if required, will be carried out without any extra costs. Dewatering/ De-gasification of the Ducts, if required, will be carried out without any extra costs.

The Optical Fibre cable drums in lengths of approx. 2 km shall be used. The cables shall be blown / manually pulled (in exceptional cases) through already laid PLB HDPE DUCTS. This work is to be carried out under the strict supervision of site in-charge. It shall be ensured that during the blowing / pulling of Cable the tension is minimum and there is no damage to the Cable/Optical Fibres. The PIA will ensure that manufacturer's guidelines for minimum bend radius and tension are followed while installing the OFC. The PIA will handle the Optical Fibre Cable drums as per instructions given by the manufacturer.

After pulling of the drum is completed, both ends of the PLB HDPE DUCTS pipe in each Manhole should be sealed by hard rodent resistant rubber bush, to avoid entry of rodents/mud into PLBHDPE Ducts.

The Manholes are prepared by providing 40 mm split PLB HDPE DUCTS pipe of 2.5 to 3m length and closing the split PLB HDPE Ducts by providing necessary clamps/ adhesive tape as per the directions of State/SIA. Afterwards, the split/cut PLB HDPE DUCTS pipe are covered with 100 mm split RCC pipe of 2m length and sealing the ends of RCC pipe with lean cement solution for protecting bare cable in the manhole . After fixing of RCC Split Pipes necessary back filling/reinstatement and dressing of manholes should be carried out as referred under trenching. The location of the pulling manhole should be recorded for preparation of documentation.

Jointing/ Splicing

Optical Fibre Cable Joints between 96F feeder cable and 48F distribution cable will be at varying distances depending upon the road intersection point from where distribution fibre to be laid for connecting Panchayats. The 12 fibres are

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to be spliced at every Joint between feeder and distribution cables to provide each GP with minimum 12F connectivity & at both ends (Terminations) in the equipment room as directed by the State/SIA. The Infrastructure required for cable splicing i.e.

Splicing machine

OTDR

LSPM

Optical talk set

Tool kit etc.

Will be arranged by the PIA and also any additional accessories. e. g. Engine etc. required at site for splicing will also be arranged by the PIA.

The Optical Fibre Cable thus jointed end-to-end will be tested by the State/SIA/TPA officer of Acceptance Testing unit of the concerned State/SIA for splice losses and transmission parameters as specified by BBNL and prevalent at that time. The through Optical Fibre should meet all the technical parameters, specified and no relaxation will be granted.

The PIA will seal and install the Fibre Splice Joint closure assembly as per TEC norms

The PIA will carry one hour of leakage/ water penetration test on Fibre Splice Joint closures after installation.

The PIA will attach Cable tags to all OFC which are entering the Fibre Splice Joint Closure and OFC readings shall be recorded for updating in the As-build and GIS drawings.

The PIA will maintain an As-build route diagram and details for splicing of OFC for each GP through GIS tool having **accuracy of 50 cm**. The diagram shall indicate the cores from all OFC with their color coding and numbering. PIA will provide As-build route diagram every quarter during implementation phase and on 1st Jan of every year during O&M phase, then only next payment will be

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The As-build should incorporate Geo Coordinates (Lat-Long) of all the Point and Line assets as under:

Sr. No.	Layer	Features	Detailed information to be Captured
1	Optical Fiber Cable	Position of OFC Route @ every 10 Meter from the offset, Centre of Road	Lat Long of entire OFC route/ path up to 6 decimal / meter level accuracy, Position of OLT, ONT, FPOI, Splitter, OFC Joints, Couplers, Manholes, Milestones, Culverts, Bridges/nallah, water bodies, cross roads, railway crossings, fly overs and public places like temples/mosque, bus stop, PHC, Post office, School, College, shops & other important landmarks etc
		OFC Cable Specifications and Deployment Details	Depth of OFC (Recorded at the time of deployment), count of terminated and spare fibers, loop, make and size of cable deployed, Logical diagram, OTDR readings, Light Source Power Meter readings, Optical test results for each fibre.
		Route marker details	Cement Route Marker (Lat-Long) details & Route Marker Identification.
		OFC Alignment Details:	Overhead or Underground alignment, type of execution (HDD, OT, Aerial etc.), OFC protection used. ABDs shall be prepared in two parts, Part I: showing the overall cable laying routes for a block or tree from OLT to the ONT/FTB which shall identify the various cable laying sections and assets. Part II: shall contain detailed drawings of the various cable sections as depicted in Part I mentioned above. i.e. OFC route to be bifurcated in number of Grids of 200 to 250 meters and each Grid to be prepared in

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			separate sheet (A4) with complete details. Each sheet to be assigned a unique number
		RoW	Railway authority, NH, Forest authority and any other authority limits shall be recorded along with OFC path. Information should be shown in drawing as text (aligned to road centreline) at start/end of every 400 meters drawing or at authority change within 400 meters
		Road features	Length, width and type (RCC, Kuchha, pakka etc.). Variation in width of road may be recorded in meters taking offset from the centre of the road.
		Other Operators/Utility:	Presence of underground OFC of other operators, utility pipes, transmission cable etc. to be captured in map
2	OLT	OLT	Name, Code, Block, District, State, Make, PON ports, Power, Earthing, FDMS, L14 Diagram
3	ONT	ONT	Name, Code, Block, District, State, Parent OLT, Make, Ports, FTB, Power etc.
4	Fibre splicing	Fibre splicing	Location, Fiber details
5	Splitters	Splitters	Make, Type, Fiber details
6	Joints and Couplers	Joints and Couplers	Location, number, depth, Type, Loop, loss detail
7	Codification	Codification	Codification of all BharatNet assets as per BBNL/NIC coding instructions.
<p>Note:</p> <ol style="list-style-type: none"> 1. As Built Drawings (ABDs) shall be uploaded in the GIS platform in GIS format (Shape File, .shp). 2. Readings should invariably be recorded at every bend on the road, road/railway crossings, culverts, diversion etc. at every 5 meters. 3. For point feature like poles, trees, sewerage man holes, other utility chambers, transformers, bore well etc. which are approximately less than 1m diameter/length, shall be captured as a point and if the feature is more than 1m diameter/length, need to take the boundary. Every feature within survey corridor should be shown in drawing. 4. Separate sheets shall be used for recording details of cable sections where cable are laid by open trench, in duct and by HDD method. 			

- Separate diagrams (in blown-up details) may be prepared for major road/rail intersections for better clarity of details.
5. For all the linear features, geo coordinates shall be recorded at every turning point.
 6. For all the utilities above ground viz. Poles, Manholes and telephone exchanges etc, details shall be recorded in a corridor of 50m (25m on either side of the road centerline or ROW of road whichever is more).
 7. To and/or from direction to village, town, city etc. shall be recorded for all roads.
 8. All the road KM stones shall be recorded and shown in drawing using symbol provided.
 9. All the property boundaries with in the corridor shall be recorded and shown in drawing.
 10. All features in the drawings shall be plotted with respect to drawing origin as 0,0,0 using UTM coordinates.
 11. Three point's references need to be shown for every joint chamber/Pull through Chamber/Manholes.
 12. The details of various assets to be tabulated.
 13. Collection of data (Custodianship of GPON equipment, location of school, college, hotels, post office, other Govt. offices, key contacts in GP etc.) in each Gram Panchayat and other important locations. Contact numbers of all the above Offices to be indicated.
 14. The GIS mapped lengths shall be calibrated with OTDR measurements.
 15. All the diagrams shall bear the signatures of the contractor and the project manager as a proof of accuracy of the details. The diagrams shall be bound in A-4 size book with cover. The cover sheets shall be laminated and should have the following details.
 - a. Name of the Project Organization.
 - b. Name of the OFC Link with ID.
 - c. Name of the Contractor.
 - d. Name of Survey Agency Rep as part of Acceptance Test.
 - e. Name of BBNL Rep as part of Acceptance Test.
 - f. Date of commencement of work.
 - g. Date of completion of work.

The PIA will use Mid-Span Access Buffer Tube Slitter during mid-span splicing to ensure that buffer jackets of fibre tubes are cut longitudinally to access all ribbons / fibres inside tube and then only required ribbon / fibre cores will be cut for splicing.

During maintenance of the network, PIA will ensure that all fibre cores are spliced at the cut location (and not only live fibre cores) during rectification process. State/SIA/any third party as appointed may audit the health / continuity of all fibre cores at any time and PIA will have to facilitate this exercise by performing LSPM and OTDR testing in presence of this team.

4.8.1.11 Construction of Jointing Chamber :

The joint chambers are provided at every joint to keep the O.F.C. joint well protected and also to keep extra length of cable, which may be, required to attend the faults at a later date. Jointing chambers are to be prepared at the Fibre Point of Interconnect (FPIO) or normally at distance of every 2 km. Actual location of jointing chamber depends on length of cable drum and appropriateness of location for carrying out jointing work, tapping point for 96/48 connection.

The jointing chambers are constructed by way of fixing pre-cast RCC chambers/Brick Chambers and covers as per the instructions from State/SIA.

Pre cast RCC chamber

For fixing pre cast RCC chamber, first a pit of size 2 m x 2 m x 1.8 m depth shall be required to be dug. Pre cast RCC chamber shall consist of three parts (i) round base plate of 140 cm diameter and 5 cm thickness in two halves (ii) full round RCC joint chamber with diameter of 120 cm and height of 100 cm and thickness of 5 cm (iii) round top cover will be in two halves with diameter of 140 cm and thickness of 5 cm having one handle for each half in centre and word 'GFGNL OFC' engraved on it. (See figure '4'). After, fixing the pre cast RCC joint chamber, the joint chamber is filled with clean sand before closing. Back filling of joint chamber pit with excavated soil shall be carried out in the end.

Brick Chamber

For constructing brick chamber, first a pit of size 2m x 2 m x 1.8 m depth is shall be required to be dug, then, base of the chamber shall be made using concrete mix of 1:5:10 (1 cement, 5 coarse sand, 10 graded stone aggregate of 40mm nominal size) of size of 1.7m x 1.7 m and 0.15 m thickness. Wall of brick chamber should be constructed on this base having wall thickness of 9" using cement mortar mix of 1:5 (1: cement, 5: fine sand). The chamber should have internal dimensions of 1.2 m x 1.2 m and 1 m height. The bricks to be used for this purpose

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should be of size 9" x 4.5" x 3", best quality available and should have smooth rectangular shape with sharp corners and shall be uniform in colour and emit clear ringing sound when struck.

The joint chamber should be so constructed that PLB pipe ends remain protruding minimum 5 cm inside the chamber on completion of plastering. The PLB pipes should be embedded in wall in such a way that, the bottom brick should support the pipe and upper brick should be provided in a manner that PLB HDPE pipe remains free from the weight of the construction. The joint chamber should be plastered on all internal surfaces and top edges with cement mortar of 1:3 (1: cement, 3: coarse sand), 12 mm thick finished with a floating coat of complete cement as per standard. Pre-cast RCC slab with two handles to facilitate easy lifting, of size 0.7 m x 1.4 m and of thickness of 5 cm having one handle for each half in centre and word 'OFC' engraved on it are to be used to cover the joint chamber. Two numbers of such slabs are required for one joint chamber. This pre-cast slab should be made of cement concrete mix of 1:2:4 (1: cement, 2: coarse sand, 4: stone aggregate 6 mm nominal size) reinforced with steel wire fabric 75 x 25 mm mesh of weight not less than 7.75 Kg per sq. Meter. The joint chamber is filled with clean sand before closing. Back filling of joint chamber pit with excavated soil shall be carried out in the end

Fixing of Route Indicators / Joint Indicators

Pits shall be dug **50 cm to 100 cm** towards jungle side at every Manhole and Jointing chamber for fixing of Route/Joint Indicator. In addition, Route Indicators are also required to be placed where O.F. Cable changes directions like road crossing etc.

The pits for fixing the indicator shall be dug for a size of 60 cm x 60 cm and 75 cm (depth).

The indicator shall be secured in upright position by ramming with stone and murrum up to a depth of 60 cm and concreting in the ratio of 1:2:4 (1: cement, 2: coarse sand, 4 stone aggregate 20 mm nominal size) for the remaining portion

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of 15 cm. Necessary curing shall be carried out for the concreted structure with sufficient amount of water for reasonable time to harden the structure.

RCC/Pre cast Route Indicators

The route /joint indicator made of pre-cast RCC should have the following dimensions

Base - 250 mm x 150 mm Top - 200 mm x 75 mm Height - 1250 mm (See Figure '5')

Stone based Route Indicators

The route /joint indicators made of Sand/lime Stone Should have the following dimension. The word 'GFGNL OFC' should be engraved on the Route/Joint indicators.

Stone to be used (Sand/lime Stone)

Indicator Top surface to be rounded

Base 155 mm × 100 mm

Upper 500 mm length to be Tapered width wise as shown in the drawing and homogeneously finished.

Height 650mm (Straight) + 400 mm (Tapered)

The route indicators should be engraved with word 'OFC' of size 80mm length & 50mm, width.

Length 3.5 Ft., top 4"x4" dressed 1Ft. from top & tapered.

(See figure '6' for details of Stone Route Indicators)

The route indicators are to be placed at every 200 mts. and at every place where the cable changes direction. The Route indicators shall painted Blue and placed

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat at 50 to 100 cm away from the centre of the trench towards jungle side. The Joint indicators are placed at OFC joints and placed at 50 to 100 cm away from wall of the joint chamber facing jungle side and are painted Grey. The engraved word “GFGNL OFC” should be painted in white, on route as well as joint indicators. Numbering of route indicators/joint indicators should also be done in white paint. The numbering scheme for route indicators will be Joint No./Route Indicator No. for that joint. For example, 2/6 marking on a route indicator means 6th route indicator after 2nd joint. Additional joints on account of faults at a later date should be given number of preceding joint with suffix A, B, C, and D. For example sign writing 2A on a joint indicator means, additional joint between joint No. 2 and 3. The numbering of existing route/joint indicator should not be disturbed on account of additional joints. Enamel paints of reputed brand should be used for painting and sign writing of route as well joint indicators.

The route and joint indicator shall be painted with primer before painting with oil paint. The material used should bear ISI mark. The size of each written letter should be at least 3.5 cm. The colours of painting and sign writing is as under:

For Joint Indicator: Grey colour

For Route Indicator: Blue colour

For GFGNL OFC & Nos: White colour.

Documentation

The documentation, consisting of the following shall be prepared for each Block and the Panchayats connected to the Block. 4 sets of documentation shall be provided both in Electronic format on CD as well as Hard binded copy.

Route Index Diagrams – General: This diagram shall consist of Cable Route Details on Geographical Map drawn to scale with prominent land marks and alignment of cable with reference to road. This shall be prepared on A-3 sheets of 80 GSM.

Route Index Diagrams –Profile

These diagrams will contain

Make and size of the cable.

Offset of cable from centre of the road at every 10 meters

Depth profile of Cable at every 10 meter;

Details of protection with type of protection depicted on it;

Location of culvert and bridges with their lengths and scheme of laying of PLB HDPE Ducts pipe thereon.

Important landmarks to facilitated locating the cable in future; Location of Joints and pulling manholes.

These diagrams shall be prepared on A-4 sheets of 80 GSM. On one sheet profile of maximum 400 meters shall be given to ensure clarity.

Joint Location Diagram

This diagram will show

Geographical location of all the joints.

Depth of Joint Chamber covers from ground level

Type of chamber (Brick/Pre-cast)

Length of O.F. Cable kept inside the joint chamber from either direction. This shall be prepared on A-4 sheets of 80 GSM.

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All the diagrams (1), (2) & (3) shall bear the signatures of the PIA, the State/SIA as a proof of accuracy of the details. The diagrams shall be bound in A-4 size book with cover.

The cover sheets shall be of 110 GSM and laminated. The front cover shall have the following details.

Name of the State/District/Block

Name of the Panchayats connected

Name of the **GFGNL** with logo

Name of the PIA

Date of commencement of work

Date of completion of work

For each Block 1 sets of above mentioned document shall be submitted to **GFGNL**.

SAFETY PRECAUTIONS

Safety Precautions when excavating or working in excavations close to electric cables

The Officer in charge (State/SIA) of the work should get full information from Electricity undertaking regarding any electric cables, which are known or suspected to exist near the proposed excavation and unless this is done, excavation should not be carried out in the section concerned. The electricity undertaking should be asked to send a representative and work should be preceded with close consultation with them.

Only wooden handled hand tools should be used until the electric cables have been completely exposed. Power Cables, not laid in conduits, are usually protected from above by a cover slab of concrete, brick or stone. They may or may not be protected on the sides. It is safer, therefore, always to drive the point

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of the pick axe downwards then uncovering a cable, so that there is less chance of missing such warning slabs. No workman should be permitted to work alone where there are electric cables involved. At least one more man should be working nearby so that help can be given quickly in case of an accident. If disconnection of power could be arranged in that section it will be better. No electric cables shall be moved or altered without the consent of the Electric Authority and they should be contacted to do the needful. If an electric cable is damaged even slightly, it should be reported to the Electric Authority and any warning bricks disturbed during excavation should be replaced while back filling the trench. Before driving a spike into the ground, the presence of other underground properties should be checked. Information on plans regarding the location of power cables need not to be assumed as wholly accurate. Full precautions should be taken in the vicinity until the power cable is uncovered. All electric cables should be regarded as being live and consequently dangerous. Any power is generally dangerous, even low voltage proving fatal in several cases.

Electric shock-Action and treatment :

Free the victim from the contact as quickly as possible. He should be jerked away from the live conductors by dry timber, dry rope or dry clothing. Care should be taken not to touch with bare hands as his body may be energized while in contact. Artificial respiration should begin immediately to restore breathing even if life appears to be extinct. Every moment of delay is serious, so, in the meanwhile, a doctor should be called for.

Safety Precautions while working in public street and along railway lines :

Where a road or footpath is to be opened up in the course of work, special care should be taken to see that proper protection is provided to prevent any accidents from occurring. Excavation work should be done in such a manner that it will not unduly cause inconvenience to pedestrians or occupants of buildings or obstruct road traffic. Suitable bridges over open trenches should be so

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planned that these are required for the minimum possible time. Where bridges are constructed to accommodate vehicular traffic and is done near or on railway property, it should be with the full consent and knowledge of the competent railway authorities.

Danger from falling material

Care should be taken to see that apparatus, tools or other excavating implements or excavated materials are not left in a dangerous or insecure position so as to fall or be knocked into the trench thereby injuring any workman who may be working inside the trench.

Care when working in Excavations

Jumping into a trench is dangerous. If it is deep, workmen should be encouraged to lower themselves. Workers should work at safe distance so as to avoid striking each other accidentally with tools. If the walls of the trench contain glass bits, corroded wire or sharp objects they should be removed carefully. If an obstruction is encountered, it should be carefully uncovered and protected if necessary. If an obstruction is encountered, it should be carefully uncovered and protected if necessary. Care must be taken to see that excavated material is not left in such a position that it is likely to cause any accident or obstruction to a roadway or waterway. If possible the excavated material should be put between the workmen and the traffic without encroaching too much on the road.

Danger of cave in

When working in deep trenches in loose soil, timbering up/shoring the sides will prevent soil subsidence. The excavated material should be kept at sufficient distance from the edge of the trencher pit. Vehicles or heavy equipment must not be permitted to approach too close to the excavation.

When making tunnelled opening, it should be ensured that the soil is compact enough to prevent cave in even under adverse conditions of traffic. Extra care

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should be taken while excavating near the foundations of buildings or retaining walls. In such cases, excavation should be done gradually and as far as possible in the presence of the owners of the property.

Protection of Excavations

Excavations in populated areas, which are not likely to be filled up on the same day should be protected by barriers or other effective means of preventing accidents and the location of all such openings must in any event be indicated by red flags or other suitable warning signs. During the hours from dusk to dawn, adequate number of red warning lamps should be displayed. Supervisory officers should ensure that all excavations are adequately protected in this manner as serious risk and responsibility is involved. Notwithstanding adoption of the above mentioned precautions, works involving excavations should be so arranged as to keep the extent of opened ground and the time to open it to a minimum.

Precautions while working on roads

The period between half an hour after sun-set and half an hour before sunrise, and any period of fog or abnormal darkness may also be considered as night for the purpose of these instructions, for the purpose of providing the warning signs.

Excavation liable to cause danger to vehicles or the public must at all times be protected with fencing of rope tied to strong uprights or bamboo poles at suitable height or by some other effective means. Any such temporary erection which is likely to cause obstructions and which is not readily visible should be marked by posts carrying red flags or boards with a red background by day and by continuously lighted lamps at night.

The flags and the lamps should be placed in conspicuous positions so as to indicate the pedestrians and drivers of vehicles the full expanse i.e. both width and length of the obstruction. The distance between lamps or between floors should not generally exceed 1.25 m along the width and 6m along length of the

obstruction in non-congested areas, but 4 meters along the length in congested areas.

If the excavation is extensive, sufficient notice to give adequate warning of the danger, should be displayed conspicuously not less than 1.25 m above the ground and close to the excavation. Where any excavation is not clearly visible for a distance of 25m to traffic approaching from any direction or any part of the carriage way of the road in which the excavation exists, a warning notice should be placed on the kerb or edge of all such roads from which the excavation or as near the distance as is practicable but not less than 10 m from the junction of an entering or intersecting road in which the excavation exists. All warnings, in these should have a red background and should be clearly visible and legible. All warning lamps should exhibit a red light, but white lights may be used in addition to facilitate working at night. Wherever required a passage for pedestrians with footbridge should be provided. At excavations, cable drums, tools and all materials likely to offer obstructions should be properly folded round and protected. This applies to jointer's tents as well. Leads, hoses etc. stretched and across the carriageway should be guarded adequately for their own protection and also that of the public.

Traffic Control

The police authorities are normally responsible for the control of traffic and may require the setting up of traffic controls to reduce the inconvenience occasioned by establishment of a single line of traffic due to restriction in road width or any other form of obstruction caused by the work. As far as possible, such arrangements should be settled in advance. If there are any specific regulations imposed by the local authorities, these should be followed.

Work along Railway Lines

Normally all works at Railway crossing is to be done under supervision of the railway authorities concerned, but it is to be borne in mind that use of white, red or green flags by the Departmental staff is positively forbidden to be used when

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working along a railway line as this practice may cause an accident through engine drivers mistaking them for railway signals. When working along double line of railway, the men should be warned to keep a sharp look on both the “UP” and’ DOWN” lines to avoid the possibility of any accident when trains pass or happen to cross one another near the work spot.

Procedure and Safety Precautions for use of explosives during blasting for trenching

In areas where the cable trench cannot be done manually on account of boulders and rocks, it is necessary to blast the rocks by using suitable explosives. The quality of explosive to be used depends on the nature of the rocks and the kind of boulders. A few types of explosive fuses and detonators normally used for making trenches for cable works are detailed below:

Gun powder

Nitrate Mixture

Gelatine

Safety fuse

Electric Detonator

Ordinary Detonator

Procedure

A detailed survey of the route is to be done to assess the length of the section where trenching is to be done with the help of blasting. A route diagram of the rocky section may be prepared indicating the length of the route where the explosives are to be used. For the purpose of obtaining license, a longer length

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of route should be given in the application as in many cases, after digging, rocks appear which was not initially anticipated.

Next a license will have to be obtained for use and storing of explosive in that section. If the area falls under a police commissioner, the authority for granting such license is the police commissioner of the concerned area. When the route does not fall in the jurisdiction of a police commissioner, the authority for issuing license is the District Magistrate.

The concerned State/SIA authority should be applied in prescribed form with a route map. The concerned authority will make an enquiry and issue license for using/storing explosives for cables trenching work. Such license will be valid for 15 days only. The license should be got renewed if the blasting operation needs to be extended. Once the license is granted, it is the responsibility of the holders of the license for the proper use of explosives, its transportation and storing.

Method of using

The safest explosive is the Gelatin and electric detonator. Gelatin is in the form of a stick. Electric detonator is a type of fuse used for firing the explosive electrically. Holes are made at suitable intervals on rocky terrain or boulders either by air compressor or by manual chipping. The depth of the holes should be 2 to 3 ft. Fill up the holes with small quantity of sand for about 6". First the electric detonator is to be inserted into the Gelatin and the Gelatin is to be inserted into the holes keeping the + ve and - ve wirings of electric detonators outside the holes. Again refill the holes with sand. These +ve and -ve insulated wires of detonator are then extended and finally connected to an EXPLODER kept at a distance of not less than 100 m.

Now the explosive is ready for blasting. But, before connecting wires to exploder for blasting, all necessary precautions for stopping the traffic, use of red flags, exchange of caution signals, etc. should be completed and only then Exploder should be connected and operated.

Operation of exploder (IDL schaffler type 350 type exploder)

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The type 350 blasting machine consists of a bearing block with blasting machine system and the explosion proof light- alloy injection moulded housing. The exploder is held with the left hand. The twist handle is applied to the drive pin, clapped with the right hand turned in the clock wise direction in continuous measurements at the highest speed from the initial position until it reached to a stop. At this stage an indication lamp will glow. When the indication lamp glows, “press button switch” should be pressed. This will extend the electric current to detonator and Gelatin will be detonated. The rock will be blasted out of the trench. Number of holes can be blasted in a single stroke by connecting all such detonators in series connection and finally to the exploder. After blasting, again mazdoors are engaged on the work to clear the debris. If the result of the first blasting is not satisfactory, it should be repeated again on the same place.

Warning

There may be two reasons for unsatisfactory results of the blasting

Misfire of Gelatin due to leakage of current from detonator.

Over loading because of overburdens.

Never pull the broken wire pieces from the holes in such cases. Attempt should not be made to reblast the misfired Gelatin. The safest way is to make a fresh hole by its side and put fresh Gelatin in that hole and blast it.

Precautions

The abstract of Explosives Rules 1983 which are relevant to our work is given below:

Restriction of delivery and dispatch of explosives

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No person shall deliver or dispatch any explosives to anyone other than a person who is the holder of a license to possess the explosives or the agent of a holder of such a license duly authorized by him in writing on his behalf?

OR

Is entitled under these rules to possess the explosives without a license.

The explosives so delivered or dispatched shall in no case exceed the quantity, which the person to whom they are delivered or dispatched is authorized to possess with or without a license under these rules.

No person shall receive explosives from any person other than the holder of a license granted under these rules. No person shall receive from or transfer explosives to any person for a temporary storage or safe custody in a licensed premise unless prior approval is obtained from the Chief Controller.

A person holding license for possession of explosives granted under these rules shall store the explosives only in premises specified in the license.

Protection from Lightning During Storing

Every magazine shall have attached there to one or more efficient lightning conductors designed and erected in accordance with the specification laid down in Indian Standard Specifications No.2309 as amended from time to time. The connections to various parts of earth resistance of the lightning conductor terminal on the building to the earth shall be tested at least once in every year by a qualified electrical engineer or any other competent person holding a certificate of competency in this behalf from the State Electricity Department. A certificate showing the results of such tests and the date of the last test shall be hung up in conspicuous place in the building.

Precautions during thunder-storm

When a thunder- storm appears to be imminent in the vicinity of a magazine or store house every person engaged in or around such magazine and store house shall be withdrawn to a safe distance from such magazine or store house and the magazine and store house shall be kept closed and locked until the thunder storm has ceased or the threat of it has passed.

Maintenance of records

Every person holding a license granted under these rules for possession, sale or use of explosives shall maintain records in the prescribed form and shall produce such record on demand to an Inspection Officer.

Explosives not to be kept in damaged boxes

The licensee of every magazine or store house shall ensure that, the explosives are always kept in their original outer package. In case, the outer package gets damaged so that the explosive contained therein cannot be stored or transported, such explosives shall be repacked only after the same are examined by controller of explosives.

Storage of explosives in excess of the licensed quantity

The quantity of any kind of explosives kept in any licensed magazine or store house shall not exceed the quantity entered in the license against such kind of

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

explosives. No explosives in excess of the licensed quantity shall be stored in the magazine or store house unless a permit in this behalf is obtained from the licensing authority by a letter or telegram.

Precautions to be observed at Site

The electric power at the blasting site shall be discontinued as far as practicable before charging the explosives. No work other than that associated with the charging operations shall be carried out within 10 meters of the holes unless otherwise specified to the contrary by the licensing authority.

When charging is completed, any surplus explosive detonators and fuses shall be removed from the vicinity of the hole and stored at a distance which should prevent accidental detonation in the event of a charge detonating prematurely in any hole. The holes which have been charged with explosive shall not be left unattended till the blasting is completed. Care shall be taken to ensure that fuse or wires connected to the detonation are not damaged during the placing of stemming materials and tamping.

Suitable warning procedure to be maintained

The licensee or a person appointed by the licensee to be in charge of the use of explosives at the site shall lay down a clear warning procedure consisting of warning signs and suitable signals and all persons employed in the area shall be made fully conversant with such signs and signals.

Precautions to be observed while firing

The end of the safety fuse (if used in place of a detonator should be freshly cut before being lighted. The exploders shall be regularly tested and maintained in

a fit condition for use in firing. An exploder shall not be used for firing a circuit above its rated capacity. The electric circuits shall be tested for continuity before firing. All persons other than the shot-firer and his assistant, if any, shall be withdrawn from the site before testing the continuity.

For the purpose of jointing, the ends of all wires and cables should have the insulation removed for a maximum length of 5 cm. and should, then be made clear and bright for a minimum length of 2.5 cm. and the ends to be joined should be twisted together so as to have a positive metal contact.

Then these should be taped with insulation to avoid leakage when in contact with earth. In case of blasting with dynamite or any other high explosive, the position of all the bore holes to be drilled shall be marked in circles with white paint. These shall be inspected by the PIA's agent. Bore holes shall be of a size that the cartridge can easily pass down. After the drilling operation, the agent shall inspect the holes to ensure that drilling has been done only at the marked locations and no extra hole has been drilled. The agent shall then prepare the necessary charge separately for each bore hole. The bore holes shall be thoroughly cleaned before a cartridge is inserted. Only cylindrical wooden tamping rods shall be used for tamping. Metal rods or rods having pointed end shall never be used for tamping. One cartridge shall be placed in the bore hole and gently pressed but not rammed down. Other cartridges shall then be added as may be required to make up the necessary charge for the bore hole. The top most cartridge shall be connected to the detonator which shall in turn be connected to the safety fuses of required length. All fuses shall be cut to the length required before being inserted into the holes. Joints in fuses shall be avoided.

Where joints are unavoidable, a semi-circular niche shall be cut in one piece inserted into the niche. The two pieces shall then be wrapped together with string. All joints exposed to dampness shall be wrapped with rubber tape.

The maximum of eight bore holes shall be loaded and fired at one occasion. The charges shall be fired successively and not simultaneously. Immediately before firing, warning shall be given and the agent shall see that all persons have retired

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to a place of safety. The fuses of the charged holes shall be ignited in the presence of the agent, who shall see that all the fuses are properly ignited.

Careful count shall be kept by the agent and other of each blast as it explodes. In case all the charged bore holes have exploded, the agent shall inspect the site soon after the blast but in case of misfire the agent shall inspect the site after half an hour and mark red crosses (X) over the holes which have not exploded. During this interval of half an hour, nobody shall approach the misfired holes. No driller shall work near such bore until either of the following operations has been done by the agent for the misfired boreholes.

The PIA's agent shall very carefully (when the tamping is a damp clay) extract the tamping with a wooden scraper and withdraw the primer and detonator.

The holes shall be cleaned for 30 cm of tamping and its direction ascertained by placing a stick in the hole. Another hole shall then be drilled 15 cm away and parallel to it. This hole shall be charged and fired. The misfired holes shall also explode along with the new one.

Before leaving the site of work, the agent of one shift shall inform the agent relieving him for the next shift, of any case of misfire and each such location shall be jointly inspected and the action to be taken in the matter shall be explained to the relieving agent. The State/SIA shall also be informed by the agent of all cases of misfire, their cause and steps taken in that connection.

General Precautions

For the safety of persons red flags shall be prominently displayed around the area where blasting operations are to be carried out. All the workers at site, except those who actually ignite the fuse, shall withdraw to a safe distance of at least 200 metre from the blasting site. Audio warning by blowing whistle shall be given before igniting the fuse.

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

Blasting work shall be done under careful supervision and trained personnel shall be employed. Blasting shall not be done within 200 meters of an existing structure, unless specifically permitted by the State/SIA in writing.

Precautions against misfire

The safety fuse shall be cut in an oblique direction with a knife. All saw dust shall be cleared from inside of the detonator. This can be done by blowing down the detonator and tapping the open end. No tools shall be inserted into the detonator for this purpose. If there is water present or if the borehole is damp, the junction of the fuse and detonator shall be made water tight by means of tough grease or any other suitable material. The detonator shall be inserted into the cartridge so that about one-third of the copper tube is left exposed outside the explosive. The safety fuse just above the detonator shall be securely tied in position in the cartridge. Water proof fuse only shall be used in the damp borehole or when water is present in the borehole. If a misfire has been found to be due to defective fuse, detonator or dynamite, the entire consignment from which the fuse, detonator or dynamite was taken shall be got inspected by the State/SIA or his authorized representative before resuming the blasting or returning the consignment.

Precaution against stray currents

Where electrically operated equipment is used in locations having conductive ground or continuous metal objects, tests shall be made for stray current to ensure that electrical firing can proceed safely.

ALLIED ACTIVITIES

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

Storing/Warehousing of Materials: PIA will be responsible for storing and warehousing of all the material and accessories, but not limited to, supplied by him at his own cost. No storing/warehouse shall be provided by State/SIA.

Transportation of Materials: The PIA shall be responsible for transporting the materials, to be supplied by the **GFGNL** or otherwise to execute the work under the contract, to site at his/ their own cost. The costs of transportation are subsumed in the standard quoted Rates and therefore no separate charges are payable on this account.

Disposal of Empty Cable Drums: The PIA shall be responsible to dispose of the empty cable drums after laying of the cables. The cost of various sizes of empty cable drums recoverable from the PIA will be fixed taking into account the prevailing market rates.

It shall be obligatory on part of the PIA to dispose of the empty cable drums at his/their level and the amount fixed for various empty cable drums shall be recovered from the bill for the work for which the drum (s) was/were issued or from any other amount due to the PIA or the Security Deposit.

The PIA shall not be allowed to dump the empty cable drums in Govt. /Public place which may cause inconvenience to the **GFGNL** / public. If the PIA does not dispose of the empty cable drums within 3 days of becoming it empty, the **GFGNL** shall be at liberty to dispose off the drums in any manner deemed fit and also recover the amount fixed in this contract from the bill/security deposit/ any other amount due to the PIA.

Supply of Materials: There are some materials (Accessories) other than as mention in BoQ required to be supplied by the PIA for execution of work under this contract like Bricks, Cement, Wire Mesh and Steel for protection, etc.,

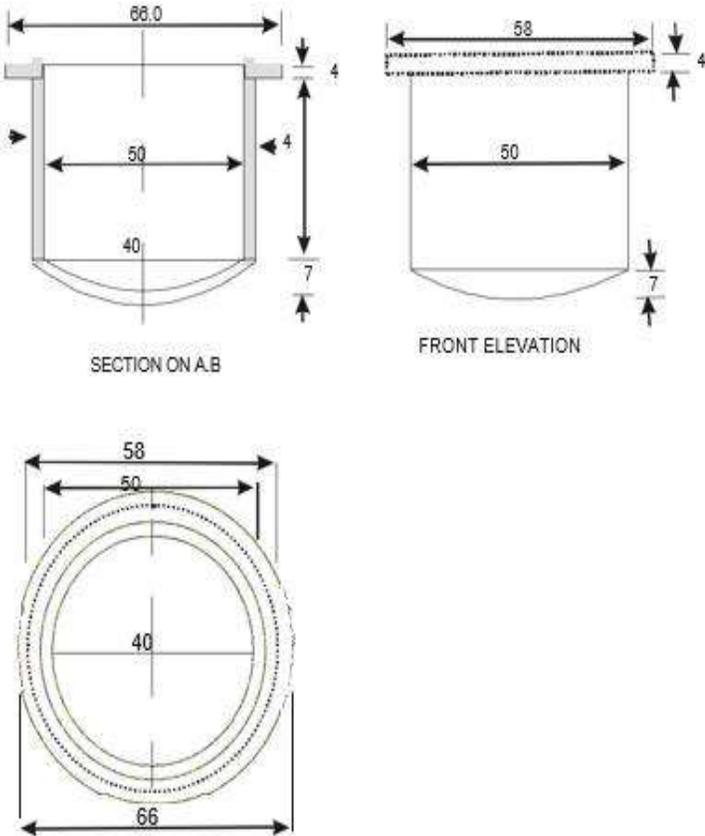
Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat besides using other consumables which do/don't become the part of the asset. The PIA shall ensure that the materials supplied are of best quality and workmanship and shall be strictly in an accordance with the specifications.

Social auditing: While carrying out the execution work of cable/Eqpt. ,videography may be carried out on sample basis for duration of 15 to 30 minutes per Gram Panchayat which may also involve the local people of the Gram Panchayats and villages including the Gram Panchayat Pradhan (If possible) and same may be submitted in a form of CD along with the documentation sets for information.

Note: All the materials as above have to be TSEC/Type approved by BSNL QA/TEC against mentioned TEC GR or as per the approval procedure of executing State/SIA for which TEC GR not there.

Figure 1

HDPE END CAPS



Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

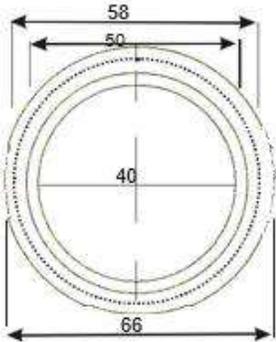
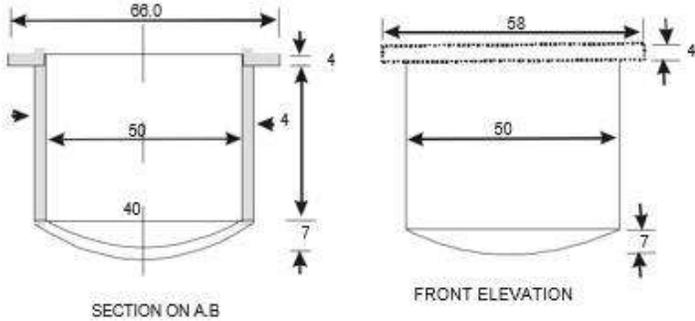
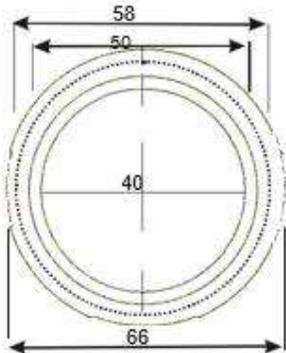
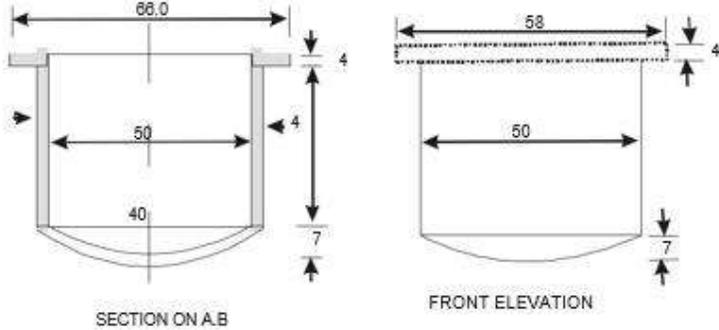
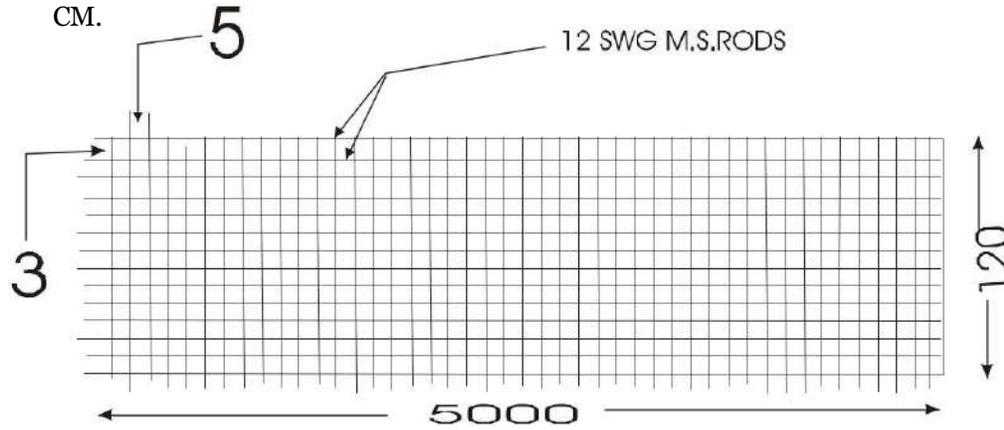


Figure2

M.S. WELDMESH

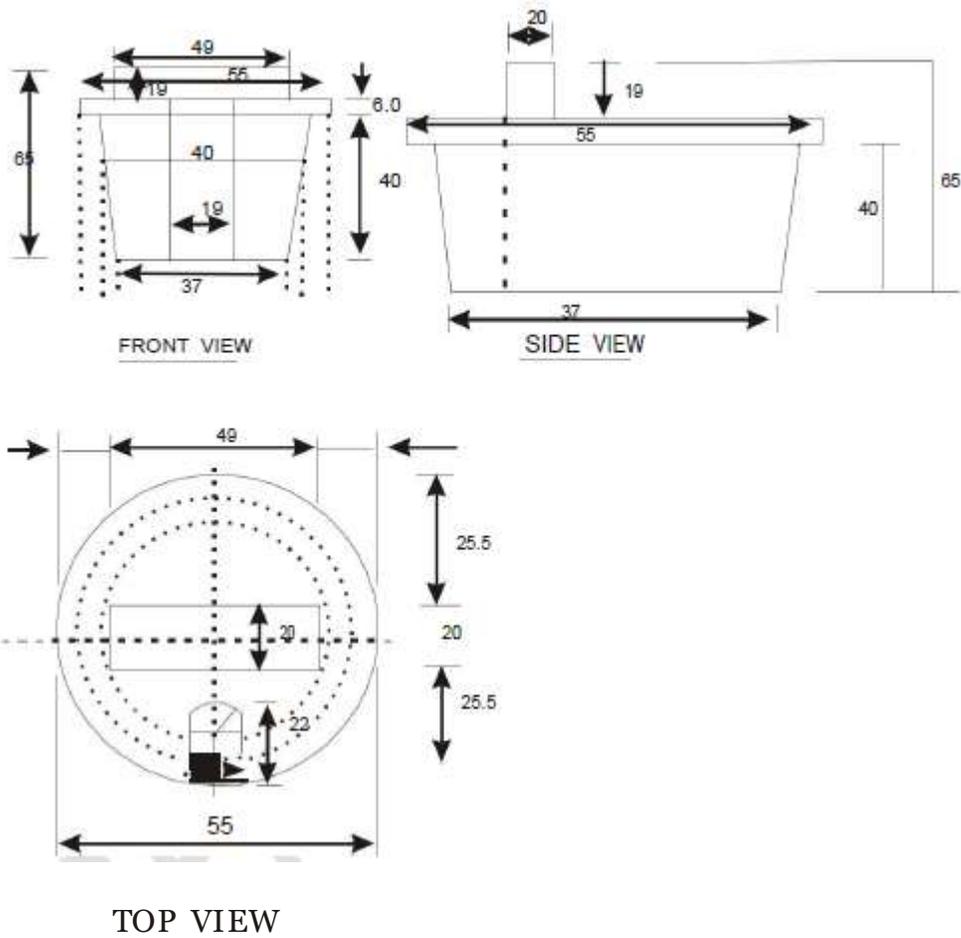
DETAILS OF 100 MM X 50 MM, 12 SWG MILD STEEL WELDMESH HAVING WIDTH OF 120 CM.



Note: All measurements are in centimetres.

Figure 3

Rubber Cork

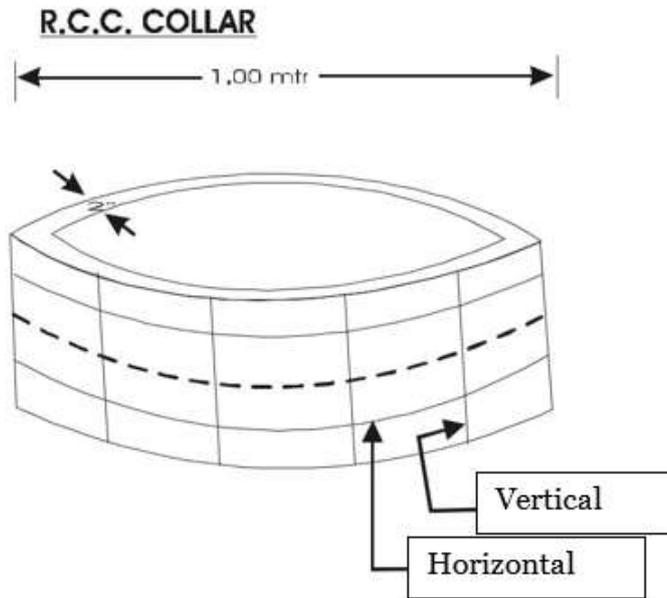


NOTE:

1. ALL DIMENSIONS ARE IN MM.
2. DIMENSIONS ARE ONLY FOR GUIDENCE. TAPPER SHOULD BE SUCH THAT IT SHOULD TIGHTLY FIX. INTO TYPE A & TYPE B HOPE 50 mm OO PIPES.

Figure 4

SPECIFICATION AND REINFORCEMENT DETAILS OF R.C.C. JOINT PROTECTION CHAMBERS



Specifications:

1. Diameter: 1.0 Mtr (Inner)
2. Thickness: 5cm
3. Height : 50 cm.
4. 6 mm Horizontal Iron round rings – 4 Nos
5. 6 mm vertical bars Iron – 12 mm Nos
6. 12 gauge GI wire mesh to be wrapped before reinforcing the concrete.

Note:

- a) Concrete 'Mix. 1: 2:3 (1 Cement : 2 Sand : 3 graded Stone aggregate 20 mm nominal size.
- b) Finishing : Smooth

Figure 5

RCC Route Indicator

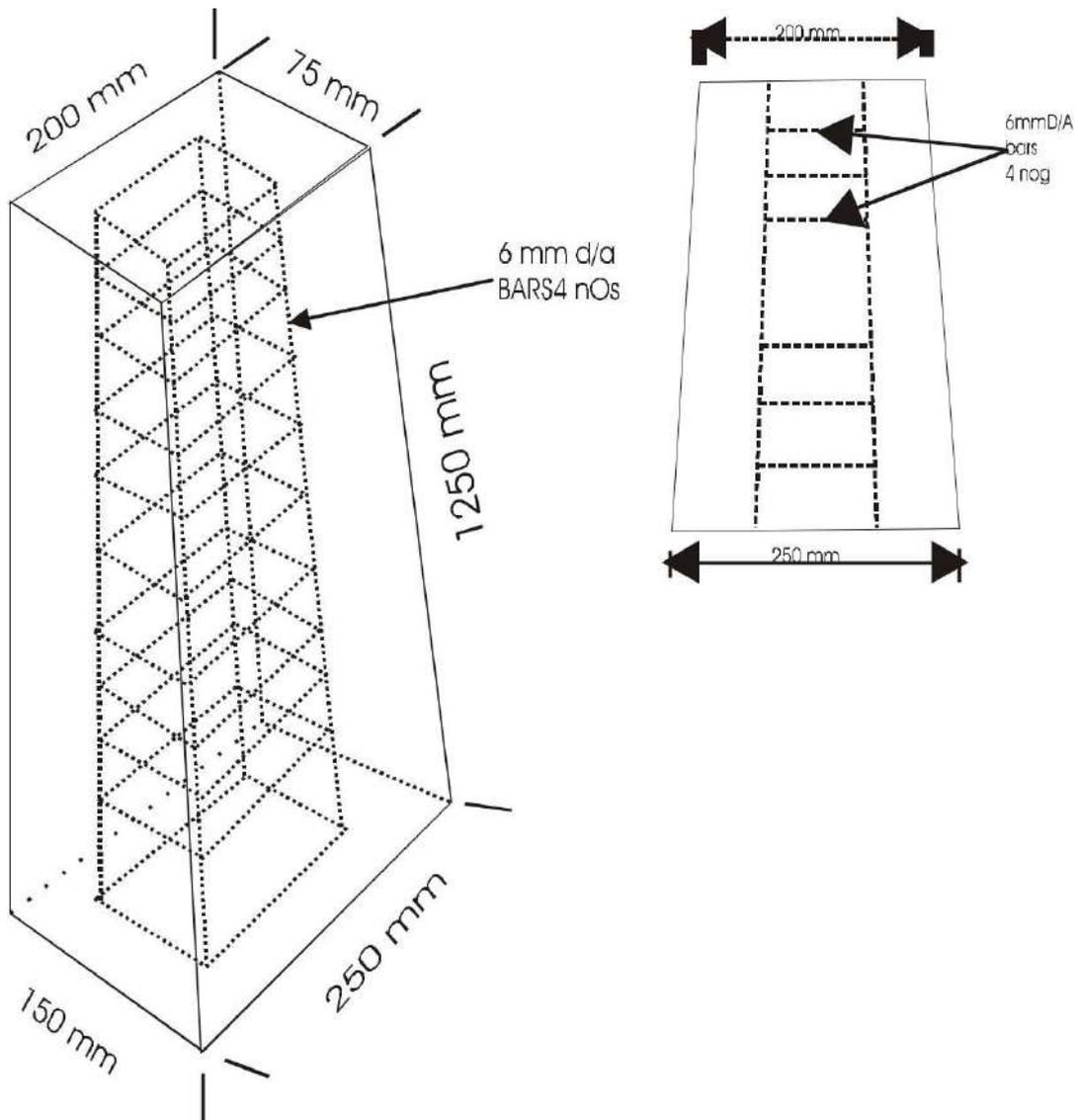
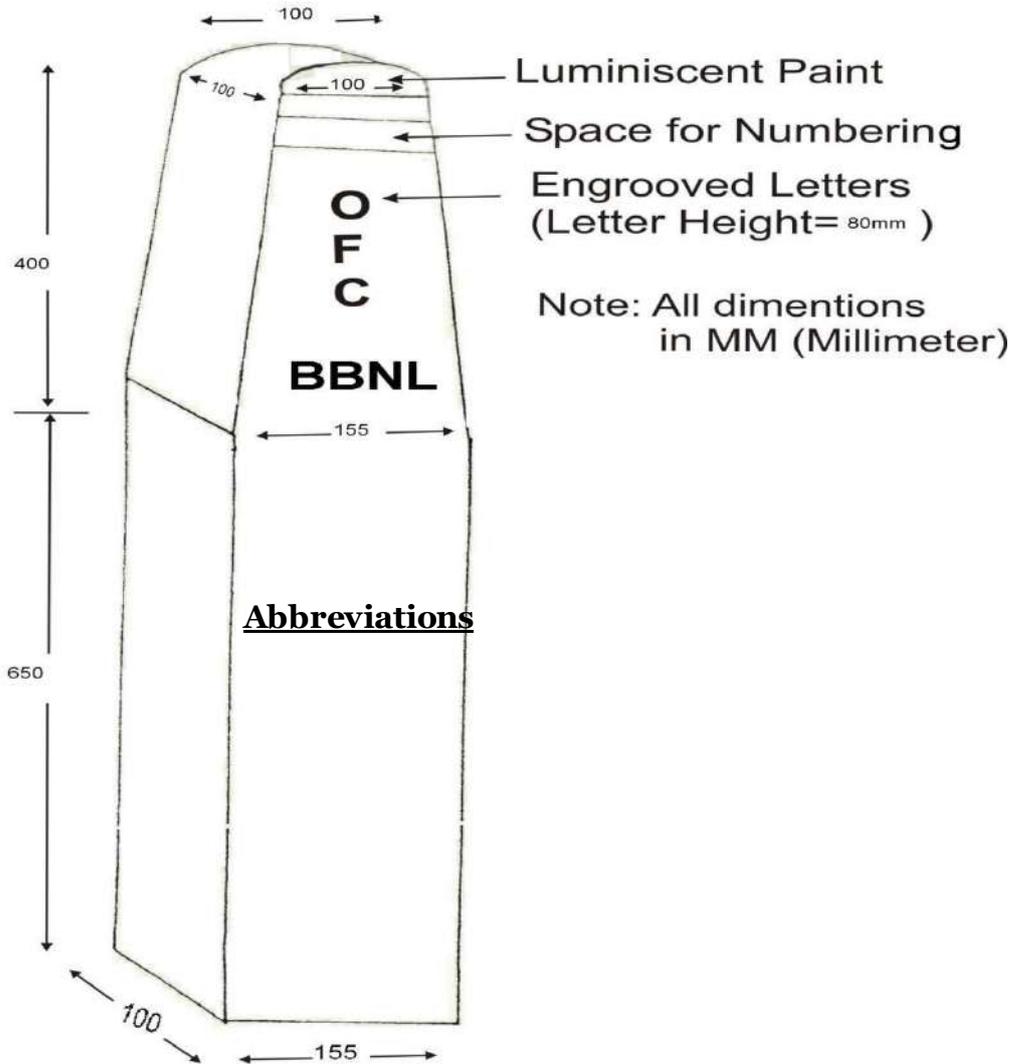


Figure 6

1. Stone OFC Route Indicator



4.8.2 Annexure B (1)-Engineering Instructions for Installation of Aerial OFC

INSTALLATION PRACTICE OF SELF SUPPORTING METAL FREE AERIAL OPTICAL FIBRE CABLE

SCOPE:

This Engineering Instruction (EI) deals with the guidelines and the installation practice for installing self-supporting metal free aerial optical Fibre cable.

GENERAL:

Department Of Telecommunication has already introduced self-supporting metal free aerial optical Fibre cable for local junctions and short haul trunk working. This is particularly useful in situations where underground cable laying is not possible. It is also recommended for short term working.

ROUTE SURVEY:

The route should be inspected before the actual installation of optical Fibre cables. Survey of the aerial route should be carried out pole by pole.

OVER HEAD ALIGNMENT:

The existing route alignment wherever available should be used. On new routes, alignment should be erected. The span length must not exceed above 90 metres.

LINE DIAGRAM:

A line diagram should be prepared to mark the poles & the actual distance between the poles in a splice section (Normally 15 poles per km are recommended). Additional poles should be erected if required to keep the span length within the specified limits. Care should be taken that the alignment is easily accessible from the road. It is necessary to keep a clear head way (Ground clearance) of 12 to 15 feet in a section. A complete line diagram should be prepared i.e. from station A to station B. The number of road crossings, canals or nallahs, electric lines should be clearly marked in the route diagram.

HILLY REGIONS:

Line erection rules must be strictly followed. Additional poles may be erected for better support to optical Fibre cable & to avoid sharp curves & bends. Span lengths should be reduced to avoid sags in case of steep slopes.

TENSION POLES:

Tension poles are dead end or termination poles. The tension poles shall have dead end fittings. The Dead end fittings offer a continuous run of the aerial optical Fibre cable. These fittings relieve the optical Fibre cable of its compressive, bending & clamping stresses. The performed dead end fittings are suitably gritted for excellent tensile holding strength.

SELECTION OF TENSION POLES;

Selection of tension poles depends upon the actual site location of the route. Every fifth pole should be a tension pole in straight alignment. Splicing location poles should be tension poles or wherever alignment takes a sharp turn (more than 15 degrees) should also be a tension pole.

SUSPENSION POLES:

The suspension pole assembly is designed to offer cushion to aerial optical Fibre cable against the dynamic stress of Aeolian vibration at the suspension point. They also reduce static stresses at the Support point.

SELECTION POLES:

Selection of suspension poles also depends upon actual site location of route.

All the intermediate poles between two tension poles will be suspension poles.

SELECTION OF SPLICE LOCATION:

The splice box of the aerial optical cable should be buried underground. Therefore it is necessary to fix & determine the splicing location as per the designated cable drum length.

AERIAL OPTICAL FIBRE CABLE SPECIFICATIONS:

Maximum span length	:	100 metres
Maximum ice loading	:	1 Kg per meter
Operational wind velocity	:	75Kms per hour
Maximum sag allowed (Without excess load)	:	2% of span length
Maximum sag allowed (With excess load)	:	3% of span length
Temperature range : operation & storage	:	-30 to +70 degree C
installation	:	-15 to +50 degree C

Minimum bend radius : 2D (D- Dia of cable)

Tensile force

During installation : $9.81 \times 1.3 \times w$

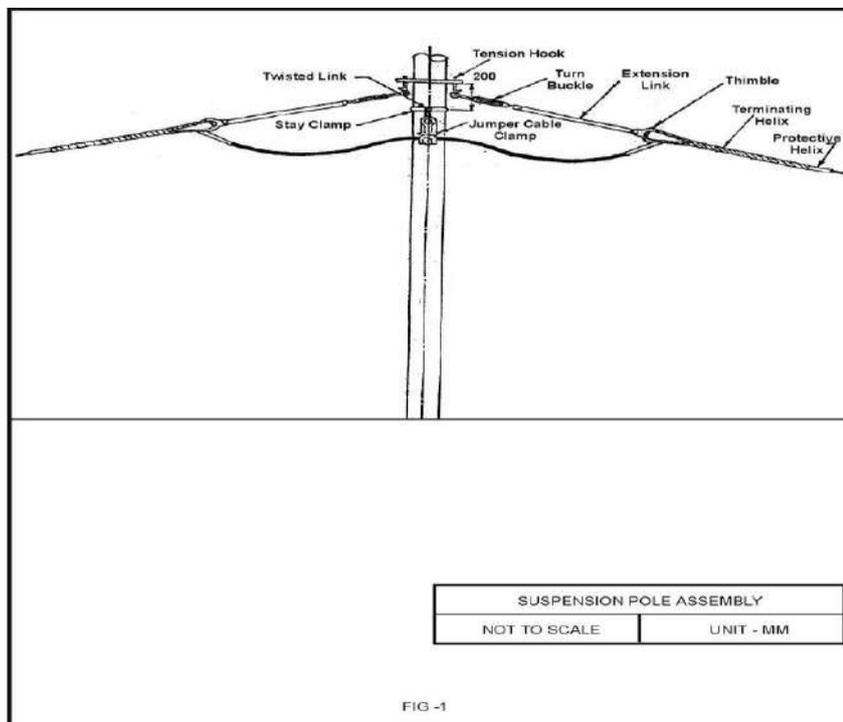
Permanent with ice & wind load: $9.81 \times 3 \times w$

(Where w is the mass of 1 km length of cable, in kg)

TYPES OF ACCESSORIES AND FIXTURES:

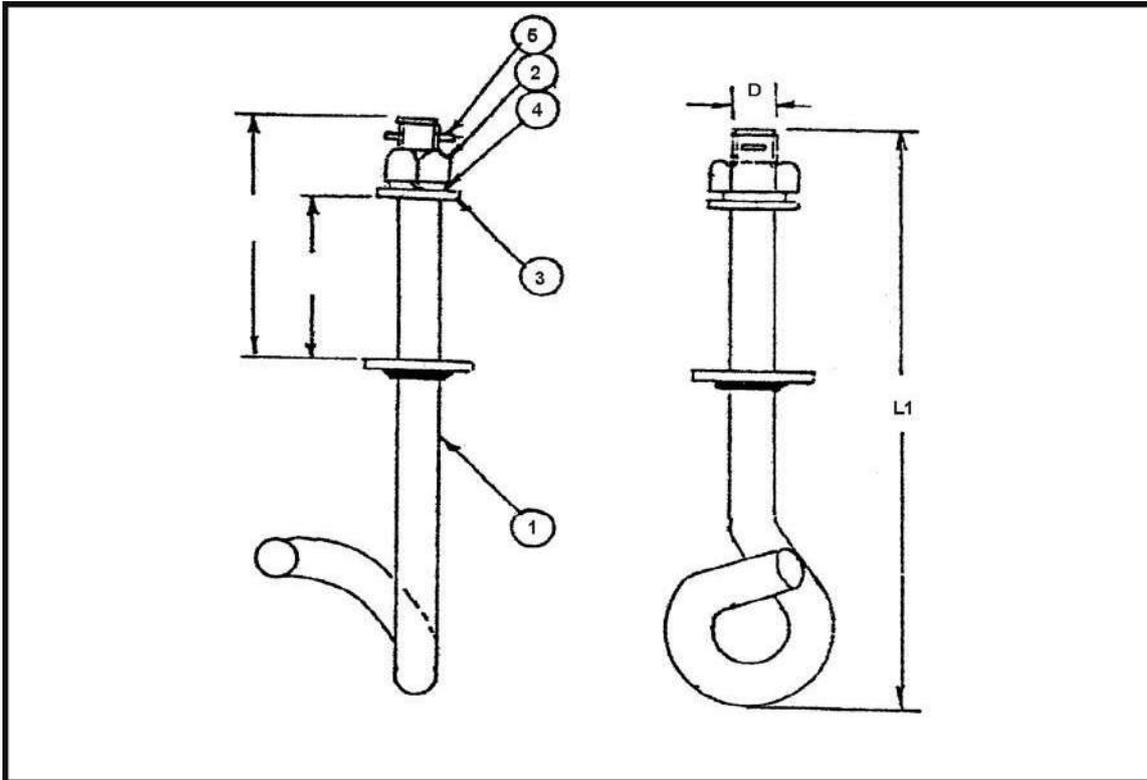
FORMED OFC DEAD END AND TERMINATION FITTINGS:

These fittings are used at tension/termination poles (dead end poles), or poles where splices are located and the poles where the overhead alignment takes a turn, (angle exceeding more than 15 degrees) as shown in below fig. 1.



J-SHAPED TENSION HOOK:

J - Shaped tension hook is for the installation on cross arm channel C (C-Bracket) of the poles as shown in fig. 6.



DIMENSIONS IN MM :

L1	L2	L3	D
177	75	50	12

NOTE :- TOLERANCE SHALL BE AS PER IS : 2102
 (DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)
 TO BE USED HERE C-BRACKET IS AVAILABLE ON POLE FOR FITMENT OF TENSION HOOK
 HOT DIP GALVANISED AS PER IS : 2629

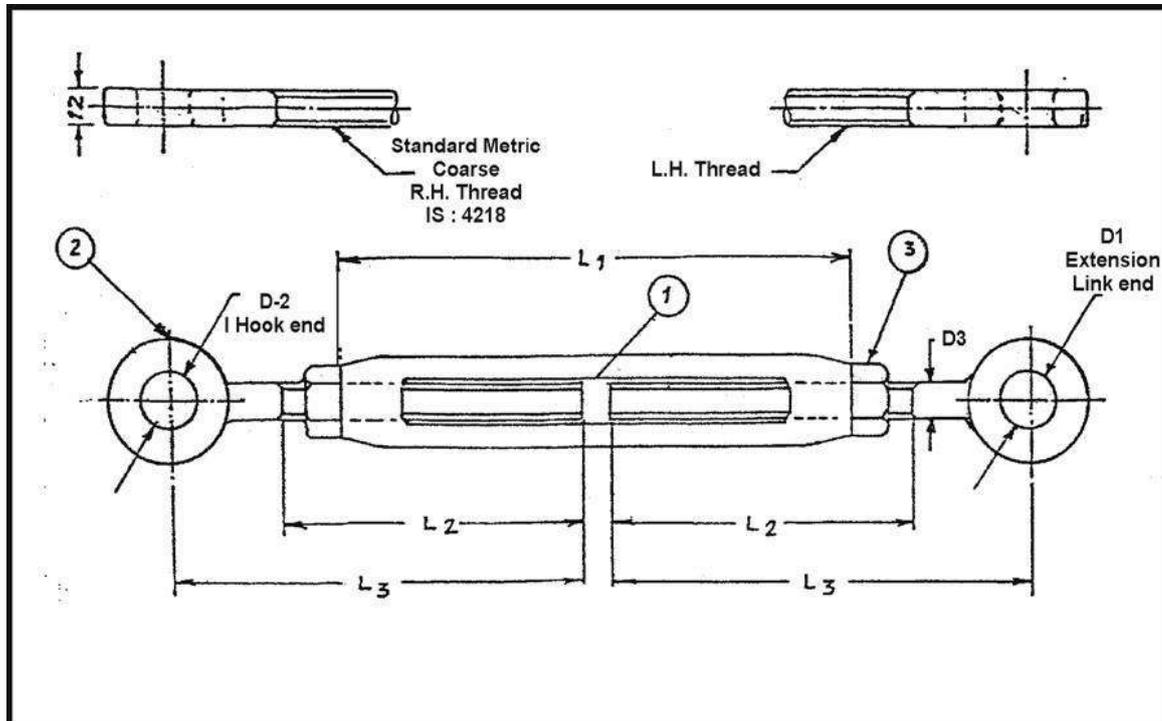
DESCRIPTION	MATERIAL	REF. Spec.	Qty.
1 BODY	ALLOY STEEL GALVANISED	IS : 2004	1
2 NUT	MILD STEEL GALVANISED	IS : 1363	1
3 PLAIN WASHER	MILD STEEL GALVANISED	IS : 2016	1
4 SPRING WASHER	SPRING STEEL GALVANISED	IS : 3063	1
5 SPLIT PIN	STAINLESS STEEL	IS : 549	1

TENSION HOOK	
NOT TO SCALE	UNIT - MM

FIG - 6

TURN BUCKLE:

Galvanized forged steel turn - buckle is used at the dead end and at tension positions (for adjusting the sag & tension) as shown in fig. 7.



DIMENSIONS IN MM :

L1	L2	L3	D1	D2	D3
170	100	140	18	18	12

NOTE :- TOLERANCE SHALL BE AS PER IS : 2102
(DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)

MIN. LENGTH : 290 MM
MAX. LENGTH : 400 MM
RANGE OF ADI : 110 MM
HOT DIP GALVANISED AS PER IS : 2629

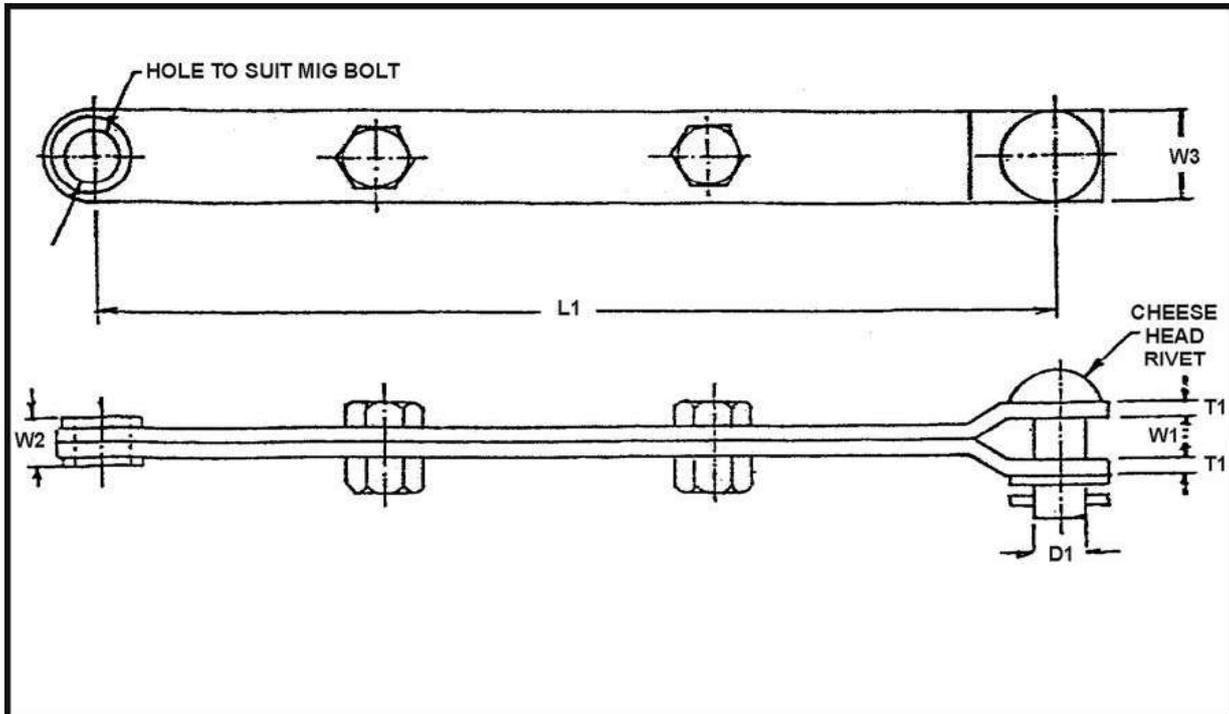
DESCRIPTION	METERIAL	REF. Spec.	Qty.
1 BODY	MILD STEEL FORGED GLAV.	IS : 2004	1
2 NUT BOLT	MILD STEEL FORGED GLAV.	IS : 2062	2
3 NUT	MILD STEEL	IS : 1363	2

TURN BUCKLE	
NOT TO SCALE	UNIT - MM

FIG - 7

EXTENSION LINK:

Galvanized steel extension link is used along with turn buckle as shown in fig. 8.



DIMENSIONS IN MM :

L1	T1	W1	W2	W3	D1
465	5	14	16	30	16

NOTE :- TOLERANCE SHALL BE AS PER IS : 2102
(DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)

HOT DIP. GALVANISED AS PER IS : 2629

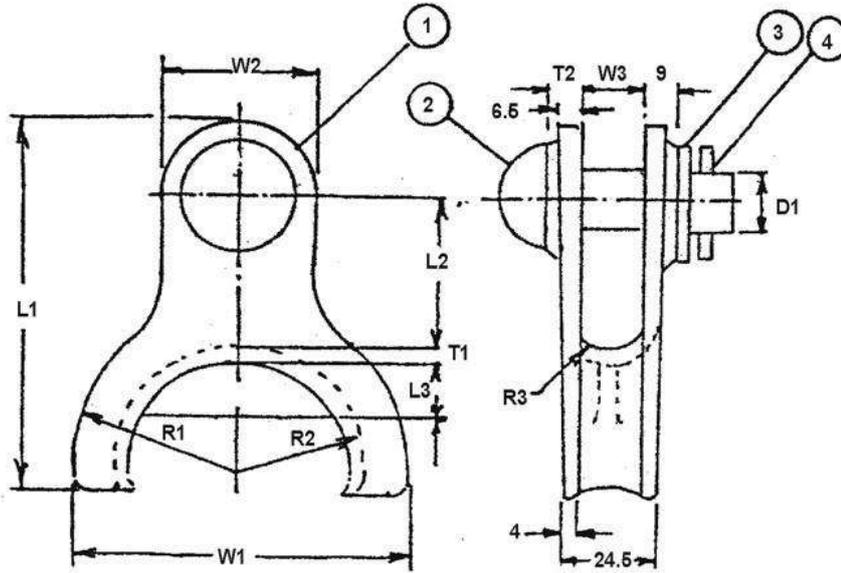
DESCRIPTION	METERIAL	REF. Spec.	Qty.
1 STRAP	MILD STEEL GALVANISED.	IS : 2067	1
2 RIVET & WASHER	MILD STEEL GALVANISED	IS : 2016	1
3 SPLIT PIN	STAINLESS STEEL	IS : 549	1
4 BOLT & NUT M 16	MILD STEEL GALVANISED	IS : 1363	1

EXTENSION LINK	
NOT TO SCALE	UNIT - MM

FIG - 8

CLEVIS THIMBLE:

Aluminum alloy die cast thimble is used to attach the extension link and for accommodating the loop of the helically formed terminating helix at the other and its smooth internal contour as shown in fig.9.



DIMENSIONS IN MM :

L1	L2	L3	T1	T2	R1	R2	R3	W1	W2	W3	D1
102	42	15	4	9	23	15	8	92	40	18	16

NOTE :- TOLERANCE SHALL BE AS PER IS : 2102
(DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)

FEROUS PARTS ARE HOR DIP GALVANISED
AS PER IS : 2629

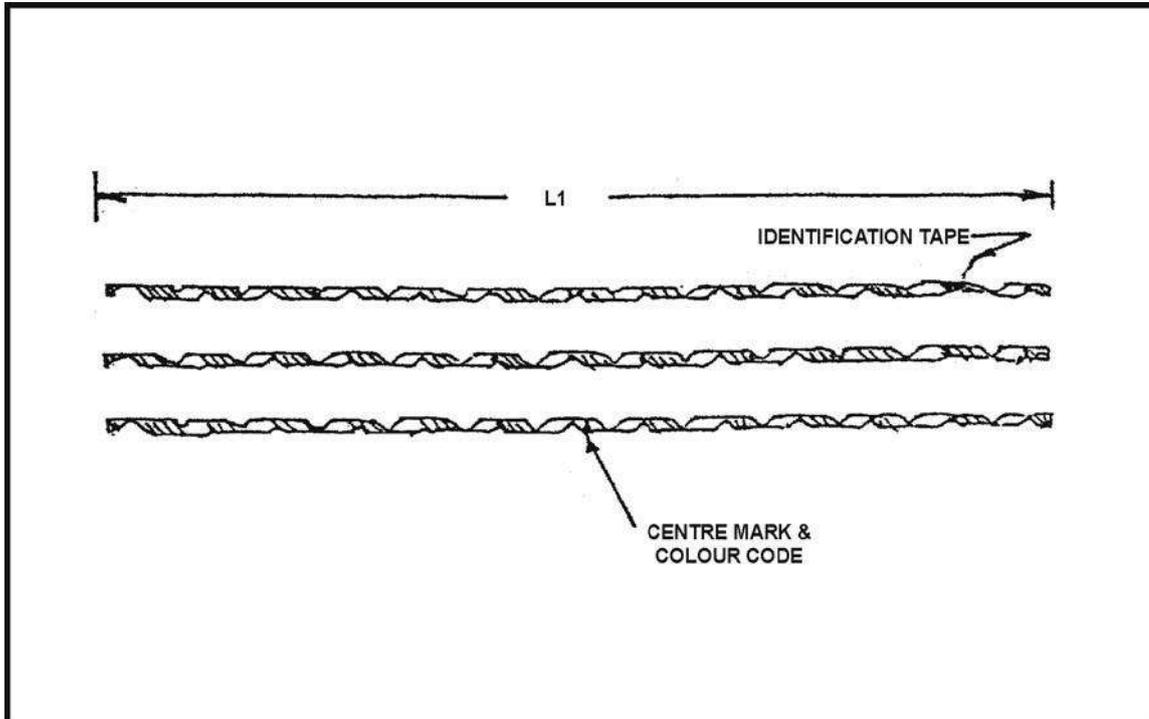
DESCRIPTION	METERIAL	REF. Spec.	Qty.
1 CLAMP	ALUMINIUM ALLOY GDC.	IS : 617	1
2 RIVET M16 x 45	GALV. STEEL	IS : 2016	1
3 WASHER	GALV. STEEL	IS : 2016	1
4 SPLIT PIN	STAINLESS STEEL	IS : 549	1

CLEVIS THIMBLE	
NOT TO SCALE	UNIT - MM

FIG - 9

PROTECTIVE HELIX (T):

Set of aluminum alloy helically formed protective helix having predetermined spiral shape is used & making them conveniently applied on the optical Fibre cable without excessive clamping pressure at any point. See fig. 11.



FOR EXAMLE
DIMENSIONS (FOR CABLE SIZE, D - 14.4 MM)

- I. DIA. OF EACH WIRE - 3.2 ± 0.1
- II. NO. OF SETS - 3
- III. NO. OF WIRE PER SET - 5
- IV. LENGTH OF HELIX - 1000

DIMENTION DETAILS FOR OTHER CABLE SIZE SHALL BE INDICATED BY THE MANUFACTURER INCLUDING THE PITCH OF HELIX

NOTE : ENDS OF RODS SHALL BE DEBURRED TOLERANCE SHALL BE AS PER IS : 2102 (DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)

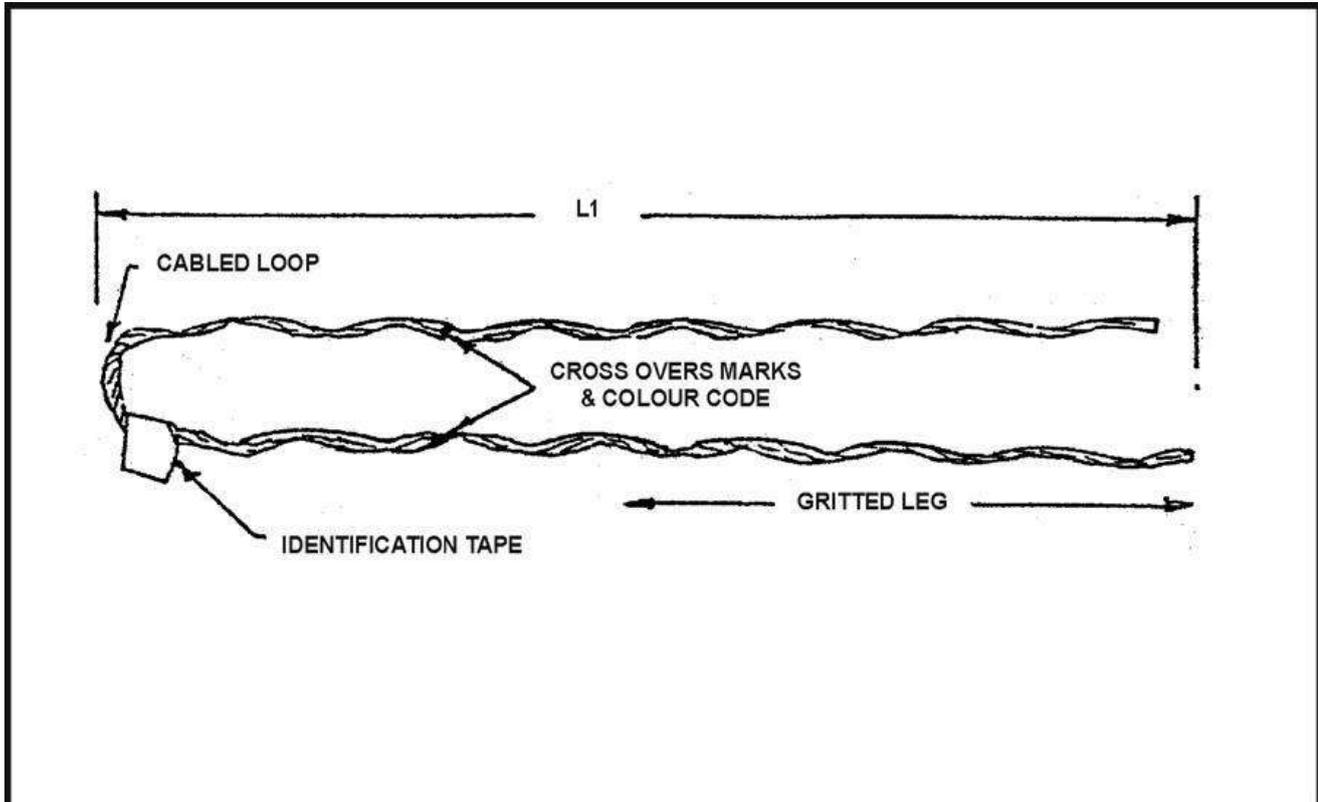
DESCRIPTION	METERIAL	REF. Spec.	Qty.
1 PROTECTIVE HELIX	ALUMINIUM ALLOY 6061		

PROTECTIVE HELIX (T)	
NOT TO SCALE	UNIT - MM

FIG - 11

TERMINATING HELIX:

Helically formed terminating helix of Aluminized steel having a prefabricated loop shall be to fit into the grooved contour of the thimble and for fixing over protective helix over the optical Fibre cable. See fig.12.



DIMENSIONS FOR EXAMPLE

L1	T1
1000	2.2±0.1

D IS DIA OF EACH WIRE ROD
NO. OF WIRES USED 5

NOTE : TOLERANCE SHALL BE PER IS : 2102
(DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)

DIMENSION DETAIL FOR DIFFERE CABLE SIZES TO BE DECIDED AP TYPE TEST APPROVAL
FOR EXAMPLE CABLE SIZE
ENDS OF RODS SHALL BE DEBUR LENGTH OF TERMINATING HELIX 1000 MM,
TER MINATING HELIX TO BE USED WITH THIMBLE C DIA - 14.4 MM

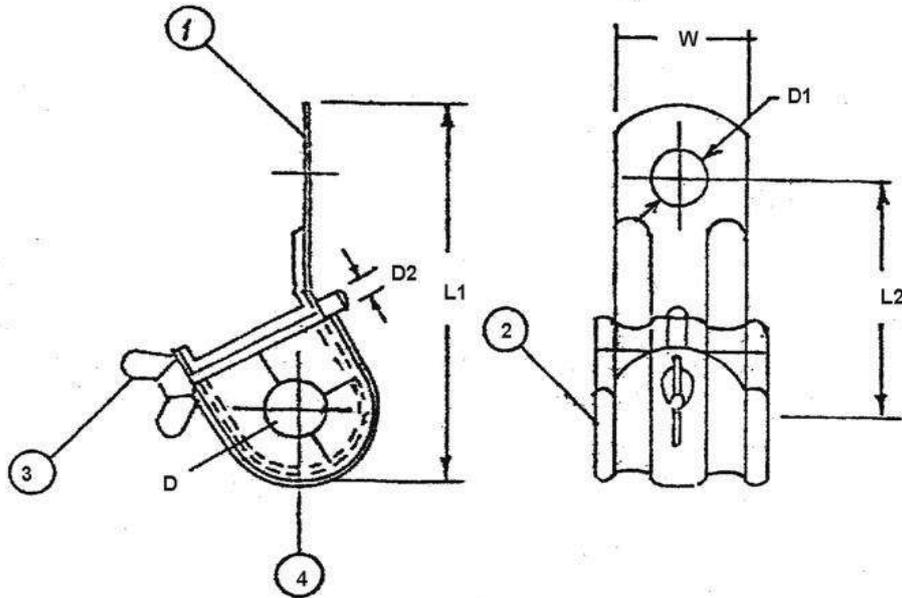
DESCRIPTION	METERIAL	REF. Spec.	Qty.
1 DEADEHD GRIP	ALUMINISED STEEL		

TERMINATING HELIX	
NOT TO SCALE	UNIT - MM

FIG - 12

JUMPER CABLE CLAMP:

Galvanized steel jumper cable clamp is used to support the through length of optical Fibre cable at the intermediate tension poles as shown in fig. 15.



DIMENSIONS IN MM

L1	L2	D1	D2	W
105	65	17.5	5-6	35

DIMENSIONS IN MM OF INSERT PAD

L	INNER DIA	OUTER DIA
40	15	30

NOTE : TOLERANCE SHALL BE AS PER IS : 2102
(DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)
INSERT IN TOW HALVES D TO SUIT CABLE DIA FERROUS PARTS ARE HOT DIP GALVASIED AS PER IS : 2629

DESCRIPTION	METERIAL	REF. Spec	Qty.
1 STRAP	MILD STEEL GALY	IS : 2062	1
2 INSERT	POLYCHLORADPRENE COMPOUNDED		1
3 WING BOLT	MILD STEEL GALY	IS 2062	1

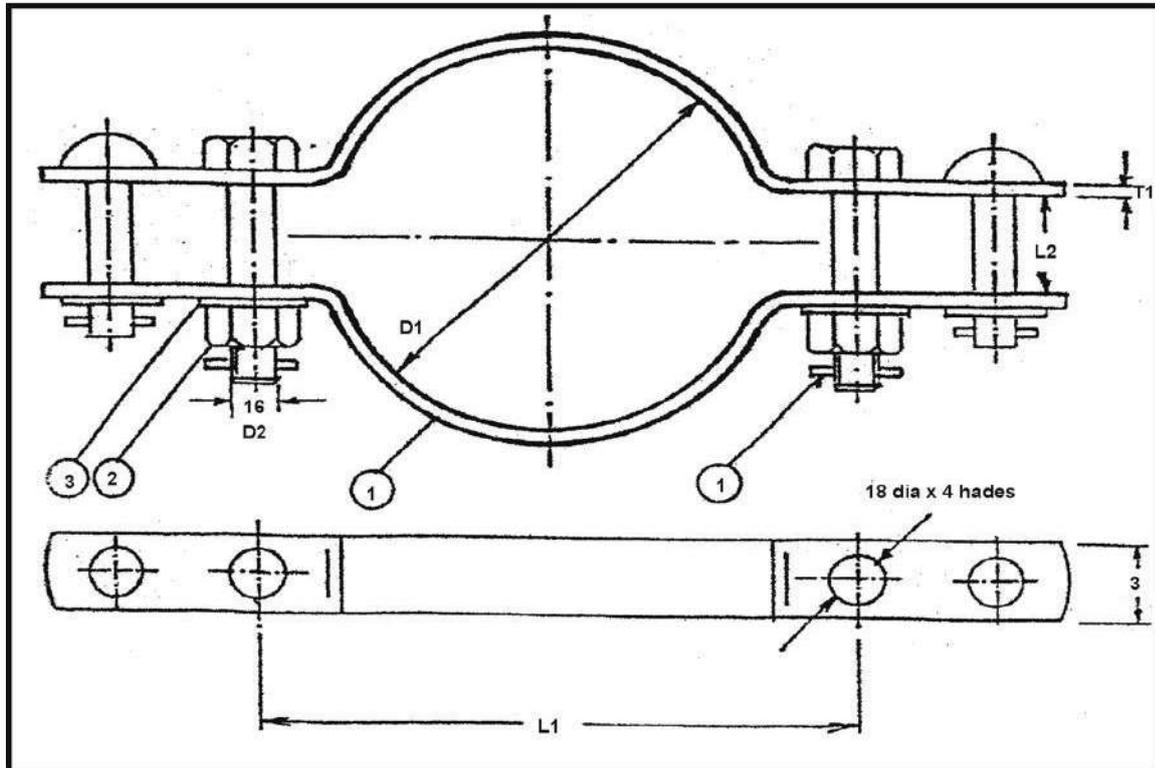
JUMPER CABLE CLAMP	
NOT TO SCALE	UNIT - MM

FIG - 15

POLE MOUNTED STAY CLAMP (RAIL) OR POLE MOUNTED STAY CLAMP (TUBULAR)

Galvanized mild steel pole mounted stay clamp should be used at the pole for the fixing with a twisted eye & turn buckle; see figs.4 & 5. The selection of the type of stay clamp will depend upon the type of poles.

POLE MOUNTED STAY CLAMP (RAIL)



POLE MOUNTED STAY CLAMP (RAIL)

L1	L2	L3	L4	L5	L6	L7	L8	T1	T2	D1	W1
270	170	251	151	20	32	50	120	5	20	16	60

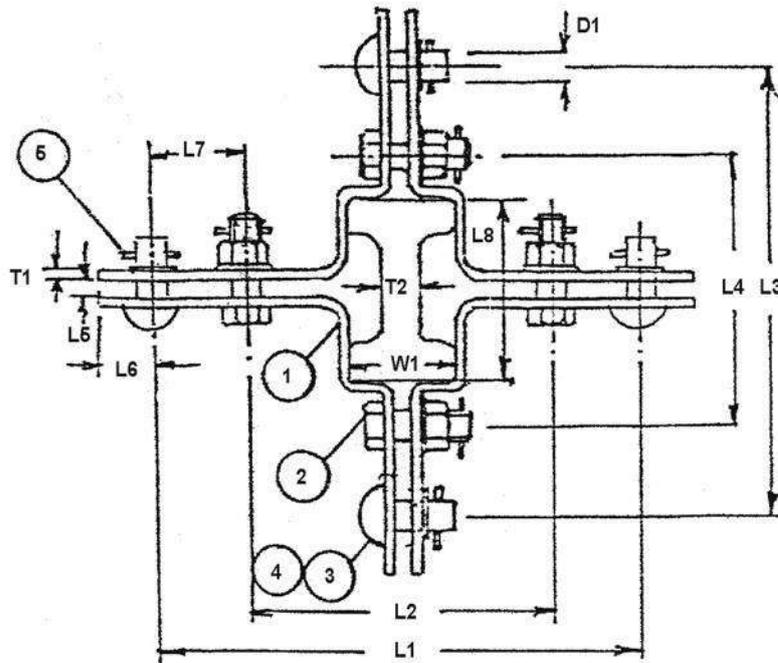
NOTE :- TOLERANCE SHALL BE AS PER IS : 2102
(DETAIL AS PER GR UNLESS UNTILL SPECIFIED)
HOT dIP Galvanised as per is : 2629

DESCRIPTION	METERIAL	REF. Spec.	Qty.
1 CLAMP	MILD STEEL GALVANISED	IS : 2062	1 SET
2 BOLT & NUT M 16	MILD STEEL GALVANISED	IS : 1363	2
3 RIVET 16	MILD STEEL GALVANISED	IS : 2016	2
4 WASHER	MILD STEEL GALVANISED	IS : 2016	4
5 SPILT PIN	STAINLESS STEEL	IS : 549	4

POLE COLLAR CLAMP	
NOT TO SCALE	UNIT - MM

FIG - 4

POLE MOUNTED STAY CLAMP (TUBULAR)



DIMENSIONS IN MM :
POLE MOUNTED STAY CLAMP TUBULAR

L1	L2	D1	D2	T1	W
210	20	150	16	5	30

NOTE :- TOLERANCE SHALL BE AS PER IS : 2102
(DETAIL AS PER GR UNLESS UNTILL SPECIFIED)
HOT DIP GALVANISED AS PER IS : 2629

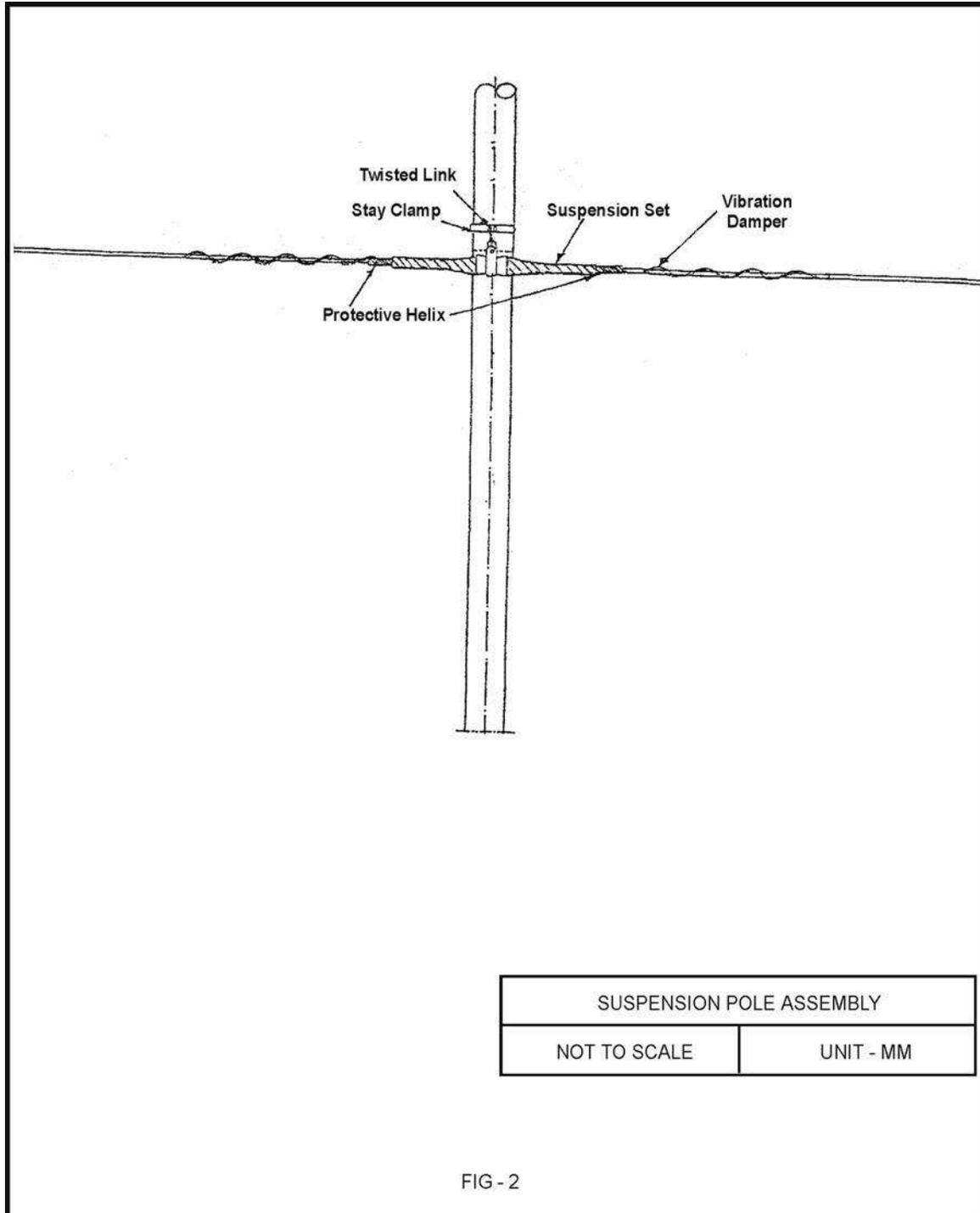
DESCRIPTION	MATERIAL	REF. Spec.	Qty.
1 CLAMP	MILD STEEL GALVANISED	IS : 2062	1 SET
2 BOLT & NUT M 16	MILD STEEL GALVANISED	IS : 1363	4
3 RIVET 16	MILD STEEL GALVANISED	IS : 2016	4
4 WASHER	MILD STEEL GALVANISED	IS : 2016	8
5 SPLIT PIN	STAINLESS STEEL	IS : 549	8 SET

POLE COLLAR CLAMP (R)	
NOT TO SCALE	UNIT - MM

FIG - 5

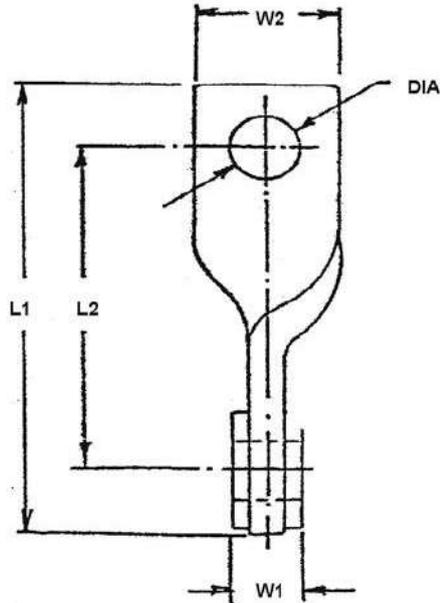
OFC SUSPENSION FITTINGS:

Helically formed suspension fittings along with the elastomeric pads inserts strapped by a galvanized steel eye-band is used to hang from the twisted eye-link connected to a pole mounted stay clamp or on the tension hook (J-shaped) installed on the C bracket at the intermediate poles as shown in fig. 2.



TWISTED EYE LINK:

The twisted eye link is used for installing suspension fitting on stay clamp or on tension hook as shown in fig. 14.



DIMENSIONS IN MM

L1	L2	W1	W2	DIA
138	100	27	38	18

NOTE : TOLERANCE SHALL BE AS PER IS : 2102
 (DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)
 HOT DIP GALVANISED AS PER IS : 2629

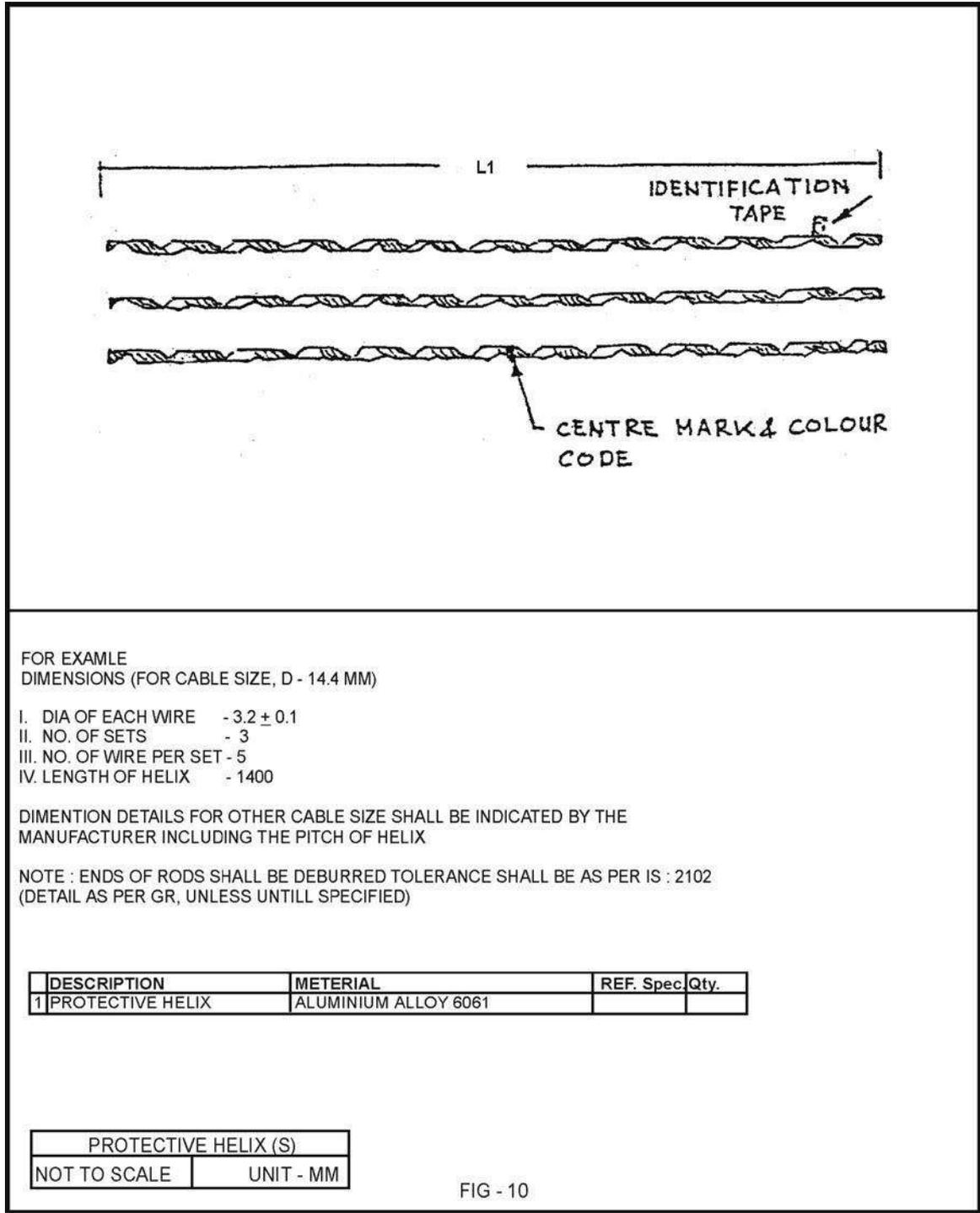
DESCRIPTION	MATERIAL	REF. Spec.	Qty.
1 LINK	MILD STEEL	IS : 2062	1

TWISTED EYE LINK	
NOT TO SCALE	UNIT - MM

FIG - 14

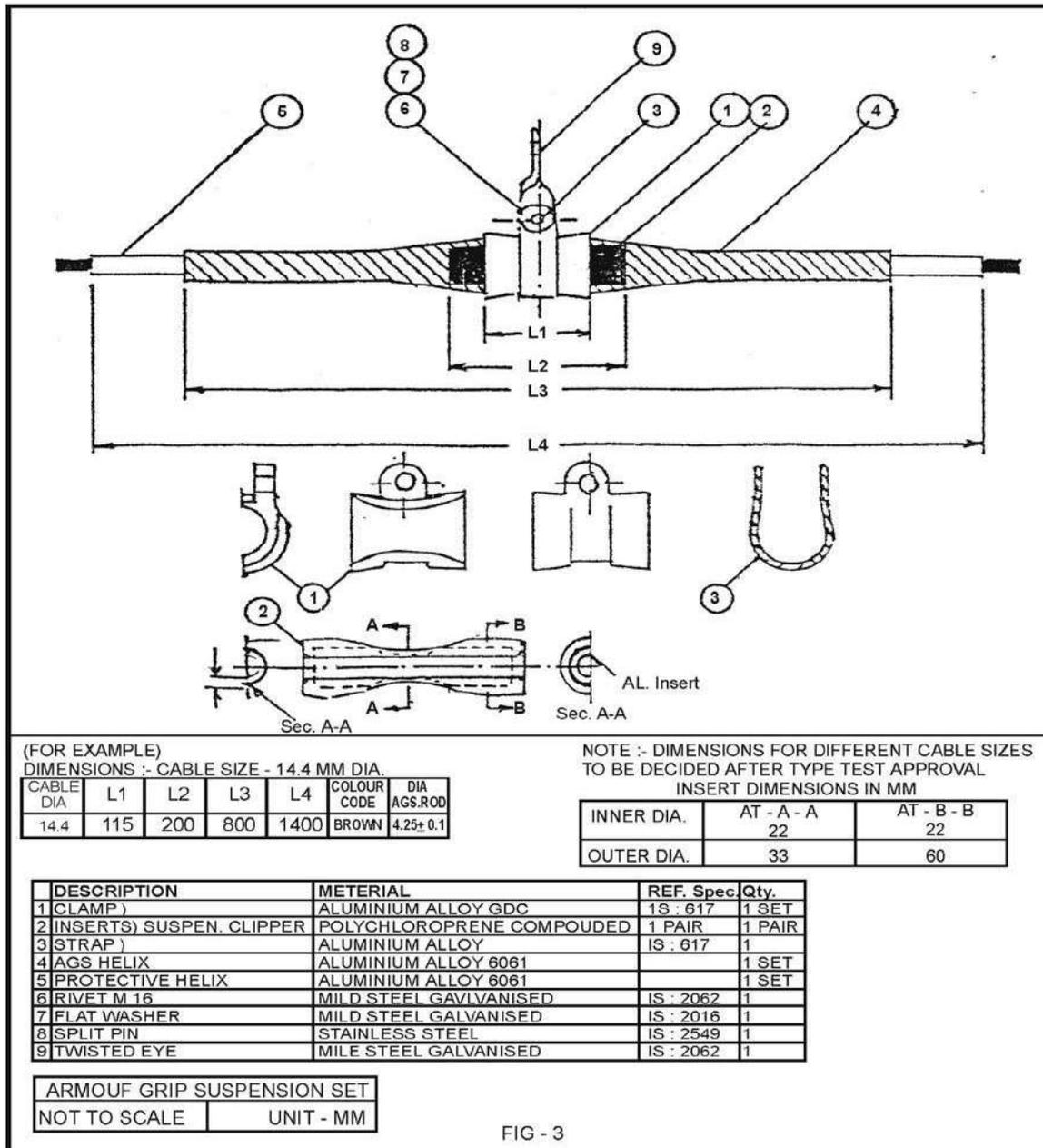
PROTECTIVE HELIX (S)

Set of aluminum alloy helically formed protective helix having predetermined spiral shape is used & making them conveniently applied on the optical Fibre cable without excessive clamping pressure at any point. See fig. 10.



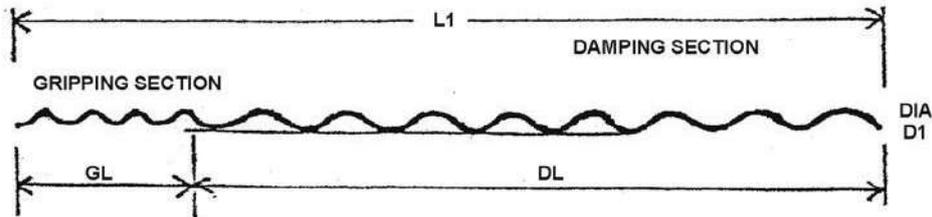
ARMOUR GRIP HELIX:

Set of aluminum alloy armour grip helix is used or fixing on the profile shaped elastomer pad for proper strut action, grip & bird caging as shown in fig, 3.



SPIRAL VIBRATION DAMPER (SVD)

Helically formed spiral vibration dampers are used on both sides of suspension fittings as shown in fig. 13.



DIMENSIONS IN MM

L1	GL	DL	D1
1346	446	900	12±1

NOTE : TOLERANCE SHALL BEAS PER IS : 2102
(DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)

DESCRIPTION	METERIAL	REF. Spec.	Qty.
1 SPIRAL VISRATION DAMPER	POLYVINYL COKPOUNDED		

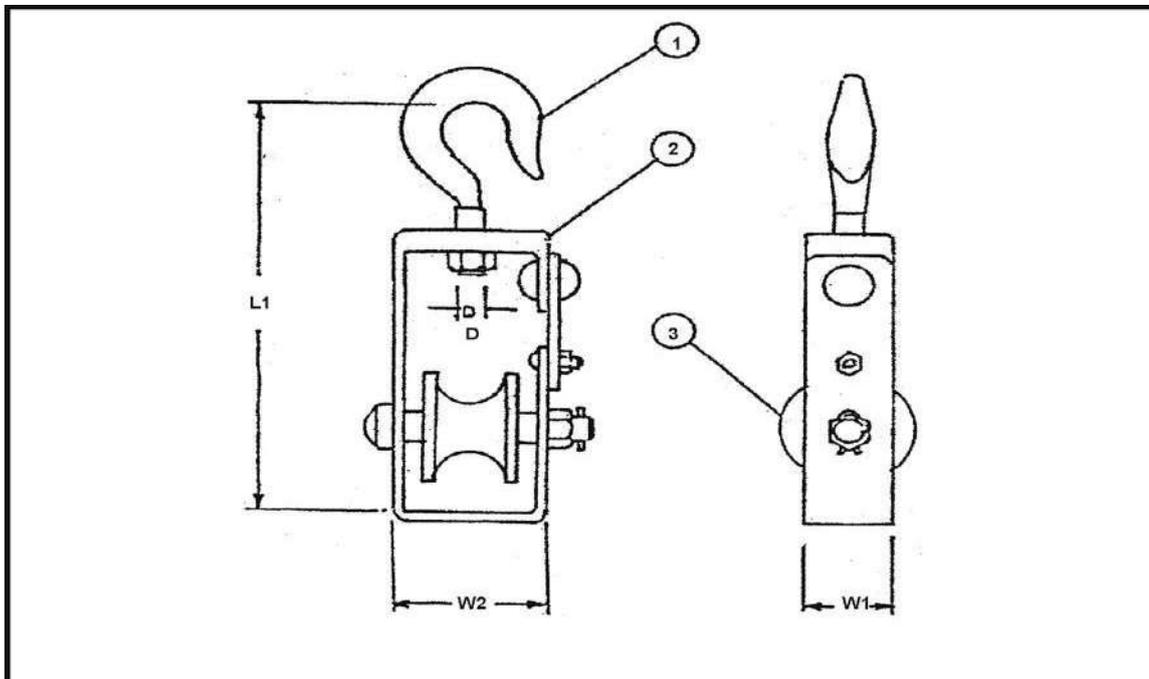
SPIRAL VIBRATION DEMPER	
NOT TO SCALE	UNIT - MM

FIG - 13

DEMOUNTABLE PULLEY:

Demountable pulleys are used during the installation of aerial optical Fibre cables see fig.16.

These are made from mild steel & the contour of the wheel is coated with rubber or any other suitable material for free movement of cable.



DIMENSIONS IN MM

L1	W1	W2	D
280	50	92	12

NOTE : TOLERANCE SHALL BE AS PER IS : 2102
(DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)
FEFFOUS PARTS ARE HOT DIP GALVANISED AS PER IS : 2629

DESCRIPTION	METERIAL	REF. Spec.	Qty.
1 HOOK	GALVANISED STEEL		
2 BODY	GALVANISED STEEL		1 SET
3 SPOOL	ALUMINIUM COATED NEOPRENE		

DEMOUNTABLE PULLEY	
NOT TO SCALE	UNIT - MM

FIG - 16

Joint Enclosure and Splicing:

The ADSS cables would be required to be spliced at every joint, normally at a distance of every 2 kilometre. Splicing can be placed overhead or underground. The choice of placement of joint as overhead or underground buried would depend upon the field conditions & the decision of the executing agency based on the suitability as indicated below.

Overhead placement of joint:

The placement of joint overhead on the poles may be preferred choice of splicing in cases where power utilities are carrying out the work as most Power distribution companies may be more comfortable with aerial joint placement as compared to underground.

The overhead joints shall be placed with proper mounting arrangements on the poles.

Proper tool/arrangement should be made available during maintenance for overhead joints.

Underground buried joint:

Underground buried joint is an established and field proven practice and is being used by BSNL since very long.

This would be safer and better suited methodology in cases where the workmanship of overhead joints may not be of desired quality and that chances of damage due to this may be higher.

During maintenance, the handling of underground joints would be easier as compared to Aerial placement of joints.

Features

Standard fibre count 24 F



Universal type i.e. suitable for all type of cable (ADSS OFC, Armoured and metal free cable)

Provide scope for straight / branch joints

Resistant to chemicals and corrosive atmosphere.

Easy re-entry and closing with mechanical plastic clamp.

Shall be water and air proof.

Ribs on the body for extra strength

6 Cable entry port & 1 oval port

Suitable for cable size upto-30mm

Mounting Bracket for erecting on pole vertically straight.

Dome type

Dimensions

Length-395mm $\pm 5\%$

Outer diameter-273mm $\pm 5\%$

MATERIAL REQUIREMENT OF INSTALLATION ACCESSORIES AND FIXTURES:

FOR DOUBLE TENSION POLES:

DESCRIPTION	QUANTITY
J-shaped tension hook (For C-bracket)	2
Turn buckle	2
Extension link	2
Clevis thimble	2
Protective helix (T)	2 sets
Terminating helix	2 sets
Jumper cable clamp	

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

- | | |
|--------------------------------------|----------------------------|
| a) Pole mounted stay clamp (Tubular) | 1 (Pole having C-bracket) |
| b) Pole mounted stay clamp (Tubular) | 2 (Pole without C-bracket) |

OR

- | | |
|--------------------------------|----------------------------|
| Pole mounted stay clamp (Rail) | 1 (Pole having C- bracket) |
| Pole mounted stay clamp (Rail) | 2 (pole having C-bracket) |

FOR SUSPENSION (INTERMEDIATE POLES)

DESCRIPTION

QUANTITY

- | | |
|--|------------------------------------|
| 1) a) Pole mounted stay clamp (Tubular) | |
| b) Pole mounted stay clamp (Tubular) | |
| OR | |
| Pole mounted stay clamp (Rail) | |
| Pole mounted stay clamp (Rail) | |
| Twisted eye link | |
| Suspension clamp consisting of the following: | |
| i) Protective Helix (S) | 1 set |
| ii) Armour grip helix | 1 set |
| iii) Suspension clipper with
Elastomer pad etc. | 1 set |
| iv) Spiral vibration damper | 2 |
| v) J-shaped tension hook | 1 (Pole with C-bracket) |
| 4) Demountable pulley | One per pole in the splice section |

ENTRY OF THE O.F. CABLE IN THE BUILDING:

Normal methods for leading in and precautions recommended for leading-in of the optical Fibre cable should be followed. A conduit pipe should be laid for leading-in the O.F. cable.

Inside the building; the cable may also be taken directly from the nearby overhead pole to inside of the building for termination.

PREPARATION:

Before the installation the O.F. cable should be tested.

As per requirement install the additional new poles.

Each pole should be checked for its strength. Provide extra stays if more strength is required.

The Aerial O.F. Cable is recommended to be installed on the outermost hole of bracket towards road on the existing bracket/new bracket on the poles.

Replace weak and other poles for clear ground clearance and strength as per the field conditions.

Provide ground clearance of 12 feet in non-obstructing areas.

Raise the height to minimum 16 feet at all the road crossings.

Maintain the alignment as straight as possible.

Construct splice chambers.

SPLICE LOCATIONS:

For the cases, where field splices are to be buried underground, the cable should be brought down through a 40mm diameter GI pipe clamped on the pole. Proper bends (120-135 degree) are recommended for negotiating the bend. Wooden/hard rubber bushes shall be used at the entry and exit points of the GI pipe to avoid damage to the cable. A splice chamber as per the standard practice shall be made.

The selection of the splice point shall depend upon the availability of space and the cable length.

CALCULATION OF SECTION LENGTH:

Aerial O.F. cable is supplied as per TEC GR in a length of 2 Kms + 10%.

To arrive at the section length and allocating a particular reel of the cable to a particular section following consideration are required.

SECTION LENGTH:

Actual section length measured.

Allowance for sag 2% for each span length.

Cable at each through tension pole (4 meters).

Drop length.

Extra spare cable for coiling at the splice location (10 meters).

INSTALLATION MATERIAL REQUIRED DURING INSTALLATION:

- | | | |
|-----------------------------------|---|--|
| 1. Demountable pulleys | : | 1 each for each pole in the installation section |
| 2. Jack for cable drum | : | 1 set |
| 3. Ladders | : | For each pole |
| 4. Tools | : | Screw drivers C&T pliers Spanner set & hammer etc. |
| Manila rope 12 mm diameter | : | 250 meters |
| 6. Cable pulling winch machine | : | 1 |
| with tension monitoring device | | |
| 7. Anti-twist device | : | 1 |
| 8. Cable pole fork | : | 10 |
| 9. Flat twin open type cable grip | : | 2 |

Communication link to connect feeding, pulling and intermediate points.

40 mm 61 pipe, bends, bushes & clamps for fixing the pipe at the splice location.

First aid box.

INSTALLATION OF AERIAL OPTICAL FIBRE CABLE:

The following steps are recommended:

Install the accessories and fixtures as per the requirement of the individual poles its tension and suspension fittings.

Install the demountable pulley on all the poles in the section before pulling the cable.

Keep the cable drum over the jack near the 1st pole at the beginning of the section.

Attach anti twist device and the shackle hook along with the rope to the front end of the cable on pulling eye or on the cable grip. Carry the attached rope over the demountable pulleys for pulling the cable.

Depute one person at each pole to monitor and in case it is required to guide the cable over the demountable pulley during pulling operation.

The cable should be pulled till the cable reaches the last pole of the section.

Wherever in the pulling section; through pulling is difficult; half section or one fourth, action pulling method may be adopted by using figure of a techniques.

The feeding and pulling of the cable should be synchronized by using communication link. Care is required to be taken so that the cable is not accumulated at any one point during pulling operation and sharp bends are avoided.

Once the cable reaches the other end actual tensioning of the cable and fixing the installation of the accessories and fixtures shall be taken up with the help of cable pulling winch. The pulling tension must be monitored during tensioning.

Install the tension fittings and accessories at the 1st pole.

Fix a flat twin open type cable grip on the cable after tension pole for tensioning the cable in the preceding tension section.

The cable shall be tensioned to a tension of 1-3 to 1-6 times of the cable weight. The Sag shall be Monitored and kept between 0.25 to 0.5% of the span length.

The cable should be lifted between two poles by using cable pole fork during tensioning and fixing of the cable.

During the fixing operation the cable shall remain under required tension for minimizing the sag in the splice section.

Now install tension fitting and accessories at the all tensioned pole at the end of the tension section.

Install the suspension fitting and accessories on the intermediate poles in the tensioned section.

Similarly installation should be carried out in each tension pole in the entire section and the tension and suspension fittings are installed.

At the Through tension poles the cable shall be kept loose and shall be supported by cable jumper clamp.

At the end pole where the cable reel is kept; the cable to be taken through GI pipe (fixed to the pole) to the splice location in case of underground splicing.

Extra care for the aerial O.F. Cable may be taken at the bends and at entry and at the exit of the pipe. About 10 meters of cable shall be kept at the splice location for coiling (spare cable) and jointing requirement.

Test the installed OF Cable.

Coil the OF Cable and keep it safe in the splice location for splicing.

PRECAUTIONS:

Provide display boards.

Provide sufficient number of road sign and traffic cones.

Avoid sharp bending of the OF cable during installation.

The OF cable should not be given extra tension than the permissible tension limits.

While crossing the overhead electric installations, safety measures should be taken. Also provide guard wire.

To avoid man made damages, safety measures should be taken for each pole.

REFERENCE:

- TEC GR on Planning Guidelines and the Installation Practices for the installation of self-supporting metal free Aerial optical Fibre cable.

ABBREVIATION:

Aeolian vibration:	Wind induced (Aeolian) vibrations of conductors and overhead shield wires (OHSW) on transmission and distribution lines can produce damage that will negatively impact the reliability or serviceability of these lines.
C-Bracket	
D-Dia of cable,	
degree C	: Degree Centigrade
EI	: Engineering Instruction
OF cable	: Optical Fibre Cable
SVD	: SPIRAL VIBRATION DAMPER
TEC GR	: Generic Requirements issued by the Telecommunication Engineering Centre New Delhi.

GUIDELINE FOR INSTALLATION OF ADSS AERIAL OPTICAL FIBRE CABLE

Scope

This document is intended to provide guidelines for selection of appropriate methodology for aerial installation of ADSS optical Fibre Cable on Existing Electrical Poles of **(Deleted)**33/11 KV Lines and LT lines as per the route map and network design.

Installation Techniques

The techniques used in installation of Aerial ADSS Optical Fibre Cables are described here. With the proper installation hardware and skilled resource, any of these methods can be used to install ADSS cable. Many a times, it will become necessary to use a combination of these methods to achieve full installation.

Selection of the specific technique (i.e. Moving Drum method, Stationary Drum method or Manual Installation method), or a combination thereof, shall largely depend on the actual site conditions. The PIA shall select the most appropriate installation technique suitable to the site conditions.

Moving Drum method

In this method the cable is pulled directly from the cable drum mounted on a moving vehicle as it drives along the pole line. The cable drum must be mounted on a proper support to allow easy cable pay off. At the dead-end point, the cable is terminated using Termination Assembly sets and tensioned using turnbuckles to maintain cable sag within permissible value.

To start installation, park the vehicle with the cable drum approximately 15 - 20 meters away from the pole facing away from it down the pole line. The cable must pay off from top of the drum towards the rear of the vehicle.

Install the termination supports and temporary hooks on the poles at the starting point and subsequent poles. Pull off the necessary amount of slack, lift the dead-end to the top of the pole and mount on the termination assembly.

Once the cable is fixed at both ends with at the terminating assemblies, carry out tensioning. After the cable section is properly tensioned and secured at both ends lift the cable out of the hooks at each of the intermediate pole and support it with the suspension set assemblies.

Stationary Drum Method

In this method of aerial cable installation, the cable is pulled along the cable route through temporary support hardware. Stationery drum installation method requires installation of temporary support hardware such as pulley blocks.

A rope wound on the tension limiting winch is passed through the pulleys and connected to the cable on the drum installed on a stand which allows free rotation of the drum. The pulling load should normally not exceed 60% of the maximum permissible cable tension recommended by cable supplier.

The cable drum and winch locations must have vehicular access. The cable drum should always be placed on levelled ground so that its flanges are vertical thus avoiding rubbing of cable against flanges. The orientation should be such that the cable pay-off is directly in the direction of pull. Always pay-out the cable from top of the drum and not from bottom. The drum should

have provision to allow controlled pay-out of cable. Cable pay-out needs to be controlled to prevent free running or jerking.

Once the cable is completely pulled end to end, it is then ready for installation of permanent supporting system of terminating and suspension set assemblies at required locations and tensioning for sag control.

Manual Installation method

Manual installation method technique is similar to stationary drum method, except that in this case the cable is uncoiled from the drum and placed on the ground in the shape of 8.

The pulling operation is same as in stationary drum method. The hardware requirement and pulling equipment also remains same.

For pulling in both directions, two loops of shape of 8 can be made and each can be pulled in separate directions. Loops of size 4 to 5m x 1.5m should be sufficient in most cases.

Installation of Accessories

Pole Clamp

Prior to fixing any temporary supports / stringing blocks or permanent cable suspension / termination assemblies, it is necessary to fix pole clamps. Appropriate type of pole clamps will be required depending on the shape of the pole. The two halves shall be opened and fixed at the specified height using tightening bolts.

Terminating (or dead End) Assembly

Termination assemblies are required at dead ends locations where:

Cable needs to be terminated at the end facility

loops are to be kept for future maintenance activities

For double sided termination assembly 2 sets would be required.

To fix a termination Assembly following accessories are required:

Protective Helix on the cable,

Terminating Helix with a thimble,

Clevis Thimble,

Spiral Vibration Damper

Suspension Assembly

ADSS optical Fibre cable shall be supported on all intermediate poles between two terminating poles using the pole clamp and a suspension assembly set.

To fix a suspension Assembly following accessories are required:

Protective Helix on the cable,

Suspension Helix,

Clevis Thimble,

Spiral Vibration Dampers

Installation Cable Loop / storage / Joint Closure

Cable loops are to be provided for future maintenance purposes at regular spacing. A fixture is required to be installed. Excess cable is then wound & kept on support. The fixture provides a means to ensure Proper bend radius is maintained. Separate clamp is required for installation of Joint Closures.

Supporting Jumper Cable Clamp

Jumper cable hanging between a pair of Termination Assemblies installed at locations where there is sharp change in direction need to be supported with a special twisted link. To support jumper cable, use already installed clamp.

Cable Tensioning

After the required Length of cable has been placed, the cable shall be properly tensioned before it is permanently secured into suspension assemblies.

The temporary dead end should be installed 4 to 5 m from the pole so that after complete tension is applied, appropriate permanent termination assembly set can be installed while the cable is in tension. The chain hoist will also need to be tied to the pole directly using a sling and on to pole clamp.

Once the cable sanction are under the required tension and the sag is within limits (i.e. less than 1% of span), the “free” end of the cable used for tensioning is fitted with termination assembly set and terminated. Once the load is transferred on to permanent termination end, the temporary arrangement shall be removed.

Machinery / Equipment / Tools

Ropes and Light weight ladder for installation of termination / suspension assemblies, clamps etc.

Temporary supports, dynamometer, chain hoists, temporary dead ends steel cables, etc. required during cable laying and / or cable pulling and cable preparation kits, etc. as applicable will have to be arranged by the PIA.

Van with portable splicing machines and OTDR, power meter, cable preparation kits, etc. for splicing and testing of installed ADSS Optical Fibre Cable.

Other tools and tackles shall include wrenches, spanners, screwdrivers, hummer, ropes etc.

All safety equipment such as safety belts, insulating and cotton gloves and hard hats, fluorescent vests etc. as required.

4.9 Annexure C

List of Gram Panchayats is attached separately on online bidding portal along with this RFP. Bidders are requested to refer the same.

4.10 Annexure D

Bharat Net Phase – 1 details is attached separately on online bidding portal along with this RFP. Bidders are requested to refer the same.

4.11 Annexure E – Route Details

Island 1			
Route 1		Route 2	
DC Name	TC Name	DC Name	TC Name
Banaskantha	Bhabhar	Banaskantha	Danta (Last GP)
Patan	Radhanpur	Sabarkantha	Khedbrahma
Patan	Sami	Sabarkantha	Vadali
Patan	Harij	Sabarkantha	Satlasana
Patan	Chanasma	Sabarkantha	kheralu
Patan	DC - Patan	Sabarkantha	Vadnagar
Patan	Patan_Local	Sabarkantha	Idar
Patan	Sidhpur	Sabarkantha	DC - Himmatnagar
Mehsana	Unjha	Sabarkantha	TC - Himmatnagar
Mehsana	Visnagar	Sabarkantha	Prantij
Mehsana	Vijapur	Gandhinagar	SDC
Gandhinagar	Mansa		
Gandhinagar	SDC		
Island 2			
Route 3		Route 4	
DC Name	TC Name	DC Name	TC Name
Dahod	Devgad baria (Last GP - Madav)	Modasa	Dhanusara (Last GP)
Chhota Udaipur	DC Office	Sabarkantha	Talod
Chhota Udaipur	JetpurPavi TC	Gandhinagar	SDC
Chhota Udaipur	Bodeli TC		
Vadodara	Dabhoi TC		
Vadodara	Waghodia TC		
Vadodara	Makarpura GIDC		
Vadodara	Vadodara DC/TC		
Vadodara	Savli		
Vadodara	Desar		
Kheda	Thasar		
Kheda	Galteshwar		
Kheda	Kapadvanj		
Gandhinagar	Dehgam		
Gandhinagar	SDC		
Island 3			
Route 5		Route 6	
DC Name	TC Name	DC Name	TC Name
Part A		Part A	
Valsad	Umergaon	Narmada	Dediapada (last GP)
Valsad	Chanod Gidc	Bharuch	Netrang
Valsad	Vapi	Bharuch	Jhagadia
Part B		Bharuch	Sinor
Valsad	Valsad	Vadodara	Karjan
Navsari	Chikhli	Vadodara	Padra (last GP - Chansad)

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Navsari	Gandevi
Navsari	Navsari
Navsari	Jalalpore
Surat	Sachin, GIDC
Surat	Surat TC
Surat	Surat DC
Surat	Olpad
Part C	
Bharuch	Ankleshwar
Bharuch	bharuch (DC/TC)
Vadodara	Amod
Anand	Jambusar
Anand	Borsad
Anand	Petlad
Kheda	Vaso
Kheda	Nadiad
Kheda	Mahemdabad
Ahmedabad	Odhav
Gandhinagar	SDC

Part B	
Vadodara	Padra (last GP - Mahuvad)
Anand	Anklav
Anand	Anand DC/TC
Anand	Umreth
Kheda	Dakor
Kheda	Mahudha
Kheda	Kathlal
Gandhinagar	SDC

Island 4

Route 7	
DC Name	TC Name
Surendranagar	Dasada
Patan	Shankheshwar
Mehsana	Becharaji
Mehsana	Modhera
Mehsana	Mehsana DC/TC
Mehsana	Jotana
Gandhinagar	Chhatral GIDC
Gandhinagar	Kalol
Gandhinagar	Adalaj
Ahmedabad	Collector Office
Gandhinagar	SDC

Route 8	
DC Name	TC Name
Part A	
Junagadh	Visavadar (last GP)
Amreli	Bagasara
Amreli	Amreli
Amreli	Lathi
Amreli	Gariadhar
Bhavnagar	Palitana
Bhavnagar	Sihor
Bhavnagar	Bhavnagar
Bhavnagar	Valbhipur
Bhavnagar	Barwala (Last GP)
Part B	
Ahmedabad	Dholka (last GP)
Kheda	Tarapur
Kheda	Matar
Kheda	Kheda
Kheda	Mehmadabad
Gandhinagar	SDC

5 Section V: Bid Submission Format

5.1 Annexure 5.1 Schedule of Requirements (SOR)

SOR for Package A

A Supply - Passive Infrastructure (Underground Cable) (As per technical specifications given in Annexure-A TEC GR No.)			
Sr. No.	Item Description	UOM	QTY
1	Optical fibre Cable 96 core (Ribbon)	Kms.	
2	Optical fibre Cable 48 core (Ribbon)	Kms.	
3	Supply of Duct	Kms.	
4	Supply of Jointing Chamber / Manhole	Nos.	
5	Supply of joint indicator	Nos.	
6	Rack Mounted Splitters 1:4	Nos.	
7	96F FDMS (Fully loaded including enclosure)	Nos.	
8	48F FDMS (Fully loaded including enclosure)	Nos.	
9	Fibre Patch cord (2M)	Nos.	
10	Electronic Route Indicators	Nos.	
11	Full DWC Pipe (63 mm) of OFC Route Depth .6mts	Kms.	
12	GI Pipe (63 mm) Class-B Medium as per ISI MARK	Kms.	
13	Any other component	Lumpsum	

B Supply - Passive Infrastructure (Aerial Cable)			
1	ADSS Optical fibre Cable 24 core ribbon	Kms.	
2	24F FTB (Fully loaded including enclosure)	Nos.	
3	RCC poles (8 meters) (for Aerial Fibre laying)	Nos.	
4	Pole clamping Kit (Aerial Fibre laying)	Nos.	
5	Tension Poles, with necessary accessories and foundation	Nos.	
6	Suspension Poles, with necessary accessories and foundation	Nos.	

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7	Any other hardware/component required to meet the RFP requirements	Lumpsum	
C	Supply - Active Infrastructure		
1	OLT	Nos.	
2	ONT	Nos.	
3	Electronics of State NOC	Nos.	
4	RFMS	Nos.	
5	UPS at GPs	Nos.	
6	Deleted (UPS at Blocks)	Nos.	
7	12U Wall mount Rack	Nos.	
8	42U Floor mount Rack	Nos.	

D	Supply - Network Operations Centre (NOC)		
1	ERP (with necessary software, licenses, etc.)	Lumpsum	
2	UPS with Battery bank at NOC for (Video Wall, Operator Desktop, network devices and NOC room luminance)	Lumpsum	
3	Web portal	Lumpsum	
4	Mobile Application for O&M phase	Lumpsum	
5	Video wall, servers, desktop for operators, NOC centre furniture etc.	Lumpsum	
6	Fixtures and Furniture required for NOC	Lumpsum	
7	Any other hardware/software required to meet the RFP requirements	Lumpsum	

E	Services- Passive Infrastructure (As per technical specifications given in Annexure-A TEC GR No. and Engineering Instruction)		
Sr. No.	Item Description	UOM	QTY
1	Excavation of trench for HDPE - PLB pipe laying, HDPE-PLB pipe laying, Backfilling,	Kms.	

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

	Reinstatement and Compaction after laying of HDPE-PLB pipe.		
2	laying / blowing of optical Fibre Cable inside laid HDPE-PLB pipe	Kms.	
2.a	96 core unarmoured optical fibre cable (Ribbon) blowing for connectivity planned as feeder cable from OLT / block location to road intersection location (where distribution cable from GP terminates with feeder cable). The cost shall include fixing of joint chamber, manhole, splice closure, Fixing, painting and sign writing of Route /Joint Indicators, termination at FTB and all the relevant accessories etc. and end to end testing of dark and lit fibre per GP (For Underground laying) (As per the Engineering Instruction issued by BBNL)	Kms.	
2.b	48 core unarmoured optical fibre cable (Ribbon) blowing for connectivity planned as distribution cable from Road Intersection Location to Village Panchayat (GP) The cost shall include fixing of joint chamber, manhole, splice closure, Fixing, painting and sign writing of Route /Joint Indicators, termination at FTB and all the relevant accessories etc. and end to end testing of dark and lit fibre per GP (For Underground laying) (As per the Engineering Instruction issued by BBNL)	Kms.	
2.c	24 Core ADSS Ribbon aerial fibre laying on existing / new poles planned as distribution cable from Road Intersection Location to Village Panchayat (GP) The cost shall include fixing of Poles, splice closure, termination at FTB and all the relevant accessories etc. and end to end testing of dark and lit fibre per GP (For Aerial	Kms.	

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

	laying) (As per the Engineering Instruction issued by BBNL)		
3	Splicing and jointing of Optical Fibre Cable including Acceptance Testing, commissioning and makeover of the routes.	Nos.	
4	Road / bridge crossing, laying of HDPE- PLB inside DWC pipe, wherever required and obtaining Right-of-Way (RoW) permissions.	Kms.	

F	Services - Active Infrastructure		
1	Installation, integration and commissioning of Electronics at Block (OLT)	Nos.	
2	Installation, integration and commissioning of ONT (Including enclosure)	Nos.	
3	Built, Installation, integration and Commissioning of NOC (State/Centre) software including – NMS, ERP, Web Portal, Mobile Apps, Project Management Tool, GIS, Video Wall Software	Lumpsum	
4	Built, Installation, integration and Commissioning of NOC (State) hardware including – UPS, Video Wall, Operator Desktops, etc.	Lumpsum	

SOR for Package B

A	Supply - Passive Infrastructure (Underground Cable) (As per technical specifications given in Annexure-A TEC GR No.)		
Sr. No.	Item Description	UOM	QTY
1	Optical fibre Cable 96 core (Ribbon)	Kms.	
2	Optical fibre Cable 48 core (Ribbon)	Kms.	
3	Supply of Duct	Kms.	
4	Supply of Jointing Chamber / Manhole	Nos.	
5	Supply of joint indicator	Nos.	
6	Rack Mounted Splitters 1:4	Nos.	
7	96F FDMS (Fully loaded including enclosure)	Nos.	
8	48F FDMS (Fully loaded including enclosure)	Nos.	
9	Fibre Patch cord (2M)	Nos.	
10	Electronic-Route Indicators	Nos.	
11	Full DWC Pipe (63 mm) of OFC Route Depth .6mts	Kms.	
12	GI Pipe (63 mm) Class-B Medium as per ISI MARK	Kms.	
13	Any other component	Lumpsum	

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

B	Supply - Passive Infrastructure (Aerial Cable)		
1	ADSS Optical fibre Cable 24 core ribbon	Kms.	
2	24F FTB (Fully loaded including enclosure)	Nos.	
3	RCC poles (8 meters) (for Aerial Fibre laying)	Nos.	
4	Pole clamping Kit (Aerial Fibre laying)	Nos.	
5	Tension Poles, with necessary accessories and foundation	Nos.	
6	Suspension Poles, with necessary accessories and foundation	Nos.	
7	Any other hardware/component required to meet the RFP requirements	Lumpsum	

C	Supply - Active Infrastructure		
1	OLT	Nos.	
2	ONT	Nos.	
3	RFMS	Nos.	
4	UPS at GPs	Nos.	
5	Deleted (UPS at Blocks)	Nos.	
6	12U Floor mount Rack	Nos.	
7	42U Floor mount Rack	Nos.	

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

D	Services - Passive Infrastructure (As per technical specifications given in Annexure-A TEC GR No. and Engineering Instruction)		
Sr. No.	Item Description	UOM	QTY
1	Excavation of trench for PLB pipe laying, PLB pipe laying, Backfilling, Reinstatement and Compaction after laying of PLB pipe. The work also includes	Kms.	
2	laying / blowing of optical Fibre Cable inside laid PLB pipe	Kms.	
2.a	96 core unarmoured optical fibre cable (Ribbon) blowing for connectivity planned as feeder cable from OLT/ block location to road intersection location (where distribution cable from GP terminates with feeder cable). The cost shall include fixing of joint chamber, manhole, splice closure, Fixing, painting and sign writing of Route /Joint Indicators, termination at FTB and all the relevant accessories etc. and end to end testing of dark and lit fibre per GP (For Underground laying) (As per the Engineering Instruction issued by BBNL)	Kms.	
2.b	48 core unarmoured optical fibre cable (Ribbon) blowing for connectivity planned as distribution cable from Road Intersection Location to Village Panchayat (GP) The cost shall include fixing of joint chamber, manhole, splice closure, Fixing, painting and sign writing of Route /Joint Indicators, termination at FTB and all the relevant accessories etc. and end to end testing of dark and lit fibre per GP (For Underground laying) (As per the Engineering Instruction issued by BBNL)	Kms.	
2.c	24 Core ADSS Ribbon aerial fibre laying on existing / new poles planned as distribution cable from Road Intersection Location to Village Panchayat (GP) The cost shall include fixing of Poles, splice closure, termination at FTB and all the relevant accessories etc. and end to	Kms.	

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

	end testing of dark and lit fibre per GP (For Aerial laying) (As per the Engineering Instruction issued by BBNL)		
3	Splicing and jointing of Optical Fibre Cable including Acceptance Testing, commissioning and makeover of the routes.	Nos.	
4	Road / bridge crossing, laying of PLB inside DWC pipe, wherever required and obtaining Right-of-Way (RoW) permissions.	Kms.	

E	Services - Active Infrastructure		
1	Installation, integration and commissioning of Electronics at Block (OLT)	Nos.	
2	Installation, integration and commissioning of ONT (Including enclosure)	Nos.	
3	Integration and Commissioning with NOC (State/Centre) software	Lumpsum	

5.2 Annexure 5.2 – Bidder’s Profile

PIA Particulars for <RFP No> dated <DD/MM/YYYY>

Sr. No.	Area of the details to be provided		Responding Firm’s/Company Details to be provided
1.	Name of the PIA		
2.	Address of the PIA		
3.	Telephone number of the Firm/company		
4.	PIAs’ RFP number and date		
5.	Name of the contact person to whom all references shall be made regarding this RFP		
6.	Designation of the person to whom all references shall be made regarding this RFP		
7.	Address of the person to whom all references shall be made regarding this RFP		
8.	E-mail address of the Firm/company		
9.	Fax number of the Firm/company		
10.	Website address of the Firm/company		
11.	Details of Registration	1. Registration Number of the Firm/company 2. Name of the place where the firm/company was registered 3. Date when the company was registered 4. Product /Service for which registered 5. Validity Period, if applicable	
12.	Goods and Service Tax Registration No. (GST No.)		
13.	PAN No.		

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

Sr. No.	Area of the details to be provided	Responding Firm's/Company Details to be provided		
14.	<ul style="list-style-type: none"> Average Annual Turnover for the last three (3) audited financial Years (2014-15,2015-16 and 2016-17) 			
15.	Details of ownership of the firm (Name and Address of the Board of Directors, Partners etc.)			
16.	Name of the authorized signatory who is authorized to quote in the RFP and enter into the Contract (Power of Attorney to be submitted)			
17.	Name of the Bankers along with the branch (as appearing in MICR cheque) & Account #			
18.	Status of Firm/company like Pvt. Ltd. etc.			
19.	<table border="0"> <tr> <td style="vertical-align: top;">Locations and addresses of the offices.</td> <td style="vertical-align: top;"> <ol style="list-style-type: none"> Delhi or NCR region The corporate address The official address of the service delivery centre. </td> </tr> </table>	Locations and addresses of the offices.	<ol style="list-style-type: none"> Delhi or NCR region The corporate address The official address of the service delivery centre. 	
Locations and addresses of the offices.	<ol style="list-style-type: none"> Delhi or NCR region The corporate address The official address of the service delivery centre. 			
20.	<table border="0"> <tr> <td style="vertical-align: top;">Name and contact details of the Project Manager</td> <td style="vertical-align: top;"> <ol style="list-style-type: none"> Name of the Project Manager assigned for Contact details viz; telephone number, official address of the Project Manager assigned. </td> </tr> </table>	Name and contact details of the Project Manager	<ol style="list-style-type: none"> Name of the Project Manager assigned for Contact details viz; telephone number, official address of the Project Manager assigned. 	
Name and contact details of the Project Manager	<ol style="list-style-type: none"> Name of the Project Manager assigned for Contact details viz; telephone number, official address of the Project Manager assigned. 			

Witness:

PIA:

Signature -----

Signature -----

Name -----

Name -----

Address -----

Designation -----

Company Seal -----

Date -----

Date -----

5.3 Annexure 5.3 – Technical Bid Letter

To

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Sir/Mam

Subject: “Selection of Project Implementing Agency (PIA) for BharatNet Phase-II”

Reference: RFP No. <RFP No.> Dated <DD/MM/YYYY>

We, the undersigned PIA, having read and examined in detail all the RFP in respect of “Selection of **Project Implementing Agency (PIA) for BharatNet Phase-II**”, do hereby propose to provide the services as specified in the RFP number <RFP No.> Dated <DD/MM/YYYY> along with the following

1. EARNSET MONEY DEPOSIT (EMD)

We have enclosed an EMD in the form of a Bank Guarantee for the sum of **Rs 150,000,000 /- (Rupees Fifteen Crore only)** per package. This EMD is liable to be forfeited in accordance with the provisions of the **Section III - General Conditions of the Contract and Service Level Agreement**

2. CONTRACT PERFORMANCE GUARANTEE BOND

We hereby declare that in case the contract is awarded to us, we shall submit the Bank Guarantee for contract performance in the form prescribed in **Annexure**

5.9 Pro forma and as specified under **Clause of Section III - General Conditions of the Contract and Service Level Agreement.**

We hereby declare that our bid is made in good faith, without collusion or fraud and the information contained in the bid is true and correct to the best of our knowledge and belief.

We understand that our bid is binding on us and that you are not bound to accept a bid you receive.

Thanking you,
Yours faithfully,

(Signature of the PIA)

Printed Name

Designation

Seal

Date:

Place:

Business Address:

Witness:

Signature -----

Name -----

Address -----

Date -----

PIA:

Signature -----

Name -----

Designation-----

Company Seal-----

Date -----

5.4 Annexure 5.4 – Details of Litigation(s)

1. The PIA should provide the undertaking/details of litigations it is currently involved in, or has been involved in, for the last three years:

Details of Litigation (s)

Party in dispute with:	
Year of initiation of dispute:	
Detailed description of dispute:	
Resolution / Arrangement arrived at (if concluded):	

5.5 Annexure 5.5 – Compliance Document

Following are the compliance and reference documents for “**Selection of Project Implementing Agency (PIA) for BharatNet Phase-II Gujarat**” against RFP No. <RFP No.> Dated <DATE>.

S. No.	Eligibility Criteria	Documents Required
11.	<p>c. The Sole Bidder and each of the Consortium members should be entity registered under Companies Act, 1956/2013 or as amended and should have been operating for at least last 3 years in India as on bid submission date.</p> <p>d. Sole Bidder or Lead Bidder (in case of consortium) should have an average annual turnover of at least following values in last three (3) audited financial years (2014-15, 2015-16 and 2016-17) :</p> <ul style="list-style-type: none"> • Rs 405.8 Crores for Package A • Rs 389.9 Crores for Package B <p>Note:</p> <p>4. In case the sole bidder or a Lead bidder (in case of Consortium) desires to bid for both the packages then the bidder must have average annual turnover criteria equal to cumulative value of both the packages i.e. INR 795.8 crore for the last three audited financial years (2014-15, 2015-16 and 2016-17)</p> <p>5. If bidder bids for both the packages and it is found that his turnover is not meeting the cumulative turnover requirement as per above point no. 1, then in that case GFGNL reserve the right to consider his bid for Package B (Saurashtra).</p>	<p>The Sole Bidder or each of Consortium members:</p> <p>a) Copy of Certification of Incorporation / Registration Certificate</p> <p>b) PAN card</p> <p>c) GST Registration</p> <p>d) Audited financial statements for the last three financial years (2014-15, 2015-16 and 2016-17).</p> <p>e) Certificate from the Statutory Auditor/Company Secretary on turnover details for the last three (3) financial years (2014-15, 2015-16 and 2016-17).</p>

	<p>6. Turnover considered would be a consolidated turnover of the company i.e. A parent Company can use the turnover of its child company (100% subsidiary of parent) but a child company cannot use parent company's turnover.</p>	
<p>12.</p>	<p>The selected sole bidder or any of the consortium members and its Parent Company / Child company shall not be allowed to bid in the tender for monetization of the network laid under this RFP (leasing of Dark Fibre or Bandwidth sharing). However, selected bidder bidding for one package can bid for the other package during the monetization bid that is planned for the future.</p>	<p>Self-declaration by the bidder or all the consortium partners on their letter head duly signed by authorized signatory along with the supporting documents of authorization shall be submitted along with the bid.</p>
<p>13.</p>	<p>The Sole Bidder or Lead Bidder in case of a consortium should have experience of Laying, Installation, Testing and Commissioning of Optical Fibre Cable (Underground or Aerial), Duct and accessories as mentioned below of which atleast 80% should be in underground OFC laying and 20% in aerial OFC laying, in last 3 years, as on bid submission date: Package A: 5100 Kms Package B: 4900 Kms In case the sole bidder or a Lead bidder (in case of Consortium) desires to bid for both the packages then the bidder must have experience of 10000 Kms, in Laying, Installation, Testing and Commissioning of Optical Fibre Cable (Underground or Aerial), Duct and accessories as mentioned below of which atleast 80% should be in underground OFC laying and 20% in aerial OFC laying, in last 3 years as on bid submission date. Note:</p>	<p>The Sole Bidder or Lead Bidder in case of consortium: Work Completion Certificate (partial or full – not less than specified Kms in this clause in case of partial) clearly highlighting the scope of work/ Bill of Material in terms of quantity of work executed with the supporting documents such as Work order/Purchase order / Contract.</p>

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

	<p>2. If bidder bids for both the packages and it is found that his experience is not meeting the work experience requirement of 10,000 Kms, as above, then in that case GFGNL reserve the right to consider his bid for Package B (Saurashtra).</p>	
14.	<p>Each of the consortium partner should have an average annual turnover of at least INR 100 Crores in last three (3) audited financial years (2014-15, 2015-16 and 2016-17) AND One Consortium partner can tie up with only one lead bidder for a particular package.</p>	<p>Audited financial statements for the last three financial years (2014-15, 2015-16 and 2016-17).</p>
15.	<p>The Sole Bidder or Lead Bidder, should have valid ISO 9001:2008/ ISO 9001:2015 for Quality Management System which should be valid as on bid submission date</p>	<p>The Sole Bidder or Lead Bidder: Copy of valid certificate</p>
16.	<p>The Sole Bidder and each of the Consortium members should not have been blacklisted by any Ministry/department of Govt. of India or by any State Government or any of the Government PSUs in India as on bid submission date.</p>	<p>The Sole Bidder or each of the Consortium members: An undertaking signed by CEO/ Country Head/ Authorized Signatory of the company to be provided on Non – judicial stamp paper of INR 100/- or such equivalent amount and document duly attested by notary public.</p>
17.	<p>The Sole Bidder/lead Bidder should submit valid letter from each of the OEM (one and only one OEM for each component) - confirming the following: OEM shall</p>	<p>Documentary evidences such as Authorization letters, MAF (Annexure</p>

	<p>ensure that all equipment/components/sub-components being supplied by them shall be supported for entire contract period. If the same is de-supported by the OEM for any reason whatsoever, The bidder shall replace it with an equivalent or better substitute that is acceptable to Tenderer without any additional cost to the Tenderer and without impacting the performance of the solution in any manner whatsoever.</p>	<p>5.12) from all OEM/Vendors whose products are being quoted by the Bidder need to be attached in the bid. Copy of valid Technical Specification Evaluation Certificate (TSEC) / Type Approval Certificate or copy of Application for fresh TSEC/TAC as applicable from each OEM whose products are being quoted by the Bidder.</p>
<p>18.</p>	<p>The Sole Bidder or Lead Bidder should have a project Office in the State of Gujarat. However, if the local presence is not there in the State, the selected bidder should give an undertaking for establishment of a project office, within one month of award of the contract.</p>	<p>Self-certification duly signed by authorized signatory on company letter head.</p>
<p>19.</p>	<p>The Sole Bidder or Lead Bidder shall be the single point of contact and shall be solely responsible for all the Terms & Conditions of the RFP</p>	<p>Self-certification duly signed by authorized signatory on company letter head.</p>
<p>20.</p>	<p>The Sole Bidder or Lead Bidder through its consortium partner should comply with Preferential Market Access (PMA) guidelines notified by DoT and all its clarifications/amendments applicable on this RFP.</p>	<p>Affidavit of Self Certificate signed by authorized signatory as per the format provided in Annexure-5.14</p>

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

Witness:

PIA:

Signature -----

Signature -----

Name -----

Name -----

Address -----

Designation -----

Company Seal -----

Date -----

Date -----

5.6 Annexure 5.6 – Financial Bid Letter

To

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Sir/ Madam,

Subject:“ Selection of Project Implementing Agency (PIA) for BharatNet Phase-II”

Reference: RFP No: <RFP No.> Dated <DD/MM/YYYY>

We, the undersigned PIA, having read and examined in detail all the RFP in respect of “**Selection of Project Implementing Agency (PIA) for BharatNet Phase-II (Gujarat)**” do hereby propose to provide services as specified in the RFP number <RFP NUMBER> Dated <DD/MM/YYYY>

1. PRICE AND VALIDITY

- i. All the prices mentioned in our Bid are in accordance with the terms & conditions as specified in the RFP. The validity of bid is 180 days from the date of opening of the RFP.
- ii. We are an Indian Firm and do hereby confirm that our prices excludes all taxes. However, all the taxes are quoted separately under relevant sections and shall be applicable as per actual

2. We have studied the clause relating to Indian Income Tax Department and hereby declare that if any income tax, surcharge on Income Tax, Professional and any other Corporate Tax is altered under the law, we shall pay the same.

3. UNIT RATES

We have indicated in the relevant schedules enclosed, the unit rates for the purpose of RFP requirement ~~on account of payment as well as for price adjustment in case of any increase to / decrease from the scope of work~~ under the contract.

4. EARNEST MONEY DEPOSIT (EMD)

We have enclosed an EMD in the form of a Bank Guarantee for a sum of **Rs. 150,000,000/- (Rupees Fifteen Crore Only) per package**. This EMD is liable to be forfeited in accordance with the provisions of the ***Section III - General Conditions of the Contract and Service Level Agreements***.

5. TENDER PRICING

We further confirm that the prices stated in our bid are in accordance with your Instruction to Bidders included in RFP.

6. QUALIFYING DATA

We confirm having submitted the information as required by you in your Instruction to Bidders. In case you require any other further information/documentary proof in this regard before evaluation of our Bid, we agree to furnish the same in time to your satisfaction.

7. BID PRICE

We declare that our Bid Price is for the entire scope of the work as specified in the Schedule of Requirements. These prices are indicated in **Annexure 5.11 of Section V – Bid Submission Formats** attached with our Financial Bid as part of the Bid Response.

8. CONTRACT PERFORMANCE GUARANTEE BOND

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

We hereby declare that in case the contract is awarded to us, we shall submit the Bank Guarantee for contract performance in the prescribed format given in **Annexure 5.9 Pro forma.**

We hereby declare that our Bidis made in good faith, without collusion or fraud and the information contained in the Bidis true and correct to the best of our knowledge and belief.

We understand that our Bid is binding on us and that you are not bound to accept a Bid you receive.

We confirm that no Technical deviations are attached here with this financial offer.

Thanking you,

Yours faithfully,

(Signature of the PIA)

Printed Name

Designation

Seal.

Date:

Place:

Business Address:

Witness:

Signature -----

Name -----

Address -----

Date -----

PIA:

Signature -----

Name -----

Designation -----

Company Seal -----

Date -----

5.7 Annexure 5.7 – RFP Acknowledgement Letter

Dated.....

To,

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.....
.....
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Dear Sir/Madam

We hereby acknowledge receipt of a complete set of RFP consisting of 5 Sections (along with three Annexures) enclosed pertaining to “**Selection of Project Implementing Agency (PIA) for BharatNet Phase-II**” against **RFP No. : XXXXX** Dated **<DATE>**

1. We have noted that the closing date of receipt of the bids is **<DATE OF SUBMISSION OF BID>** at **<TIME OF SUBMISSION>** hrs. We have also noted the important dates provided in **Section I- Invitation to Bids**.
2. We guarantee that the contents of the above said RFP are non-transferable and shall be kept confidential within our company and text of the said documents shall remain the property of State/SIA and that the said documents are to be used only for the purpose intended by State/SIA.

Our address for further correspondence on this RFP shall be as under:

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

Email Address:

Fax No. :

Telephone No (with STD code):

Personal attention of:

(If required)

Yours faithfully,

(PIA)

Note: A copy of this form should be returned along with the Bid duly signed

Witness:

PIA:

Signature -----

Signature -----

Name -----

Name -----

Address -----

Designation -----

Company Seal -----

Date -----

Date -----

5.8 Annexure 5.8– Details of Experience of responding firm

In response experience for the last five (5) years

As per the format below the responding firm should provide information w.r.t. each project on the similar assignments required for evaluation of eligibility criteria.

Sr. No.	Items	Details
General Information		
1	Customer Name	
2	Name of the contact person and contact details for the client of the assignment	
Project Details		
1	Project Title	
2	Start Date/End Date	
3	Current Status (work in progress/completed)	
4	Number of staff deployed in the assignment	
Size of the project		
	Order Value of the project (INR)	
Enclosures Required		
<p>Enclosure A: <i>Narrative Description of the Project (attach separate sheet if required)</i></p> <p>Enclosure B: Completion Certificate issued & signed by the competent authority of the client entity along with the supporting documents such as Work order/Purchase order OR Contract clearly highlighting the scope of work Bill of Material and value of the contract/ order</p>		

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

Witness:

PIA:

Signature -----

Signature -----

Name -----

Name -----

Address -----

Designation -----

Company Seal -----

Date -----

Date -----

5.9 Annexure 5.9 - Bank Guarantee for Contract Performance

(To be typed on non-judicial stamp paper)

In consideration of the _____, _____ having agreed to exempt _____ (hereinafter called 'the said PIA') from the demand under the terms & conditions of an agreement/ Advance Work Order No _____ dated _____ made between _____ and _____ for the "Selection of Project Implementing Agency for BharatNet Phase – II"(hereinafter called "the said Contract"), of security deposit for the due fulfilment by the said PIS of the terms & conditions contained in the said Contract, on production of the bank guarantee for _____ we, (name of the bank) _____ (hereinafter refer to as "the bank") at the request of _____ (PIA) do hereby undertake to pay to the State/SIA an amount not exceeding _____ against any loss or damage caused to or suffered or would be caused to or suffered by GFGNL by reason of any breach by the said PIA of any of the terms & conditions contained in the said Contract.

2. We (name of the bank) _____ do hereby undertake to pay the amounts due and payable under this guarantee without any demure, merely on a demand from the State/SIA by reason of breach by the said PIA' of any of the terms & conditions contained in the said Contract or by reason of the PIA' failure to perform the said Contract. Any such demand made on the bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee where the decision of State/SIA in these counts shall be final and binding on the bank. However, our liability under this guarantee shall be restricted to an amount not exceeding _____.

3. We undertake to pay to the GFGNL any money so demanded notwithstanding any dispute or disputes raised by the PIA in any suit or proceeding pending before any court or tribunal relating thereto our liability under this present being absolute and unequivocal. The payment so made by us under this bond shall be valid discharge of our liability for payment there under and the PIA shall have no claim against us for making such payment.

4. We (name of the bank) _____ further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and that it shall continue to be enforceable till all the dues of the State/SIA under or by virtue of the said Contract have been fully paid and its claims satisfied or

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

discharged or till _____ (office/ Department) State/SIA certifies that the terms & conditions of the said Contract have been fully or properly carried out by the said PIA and accordingly discharges this guarantee. Unless a demand or claim under this guarantee is made on us in writing on or till 60 days post contract period (as specified in Work Order) from the date hereof, we shall be discharged from all liabilities under this guarantee thereafter.

5. We (name of the bank) _____ further agree with the GFGNL that the State/SIA shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms & conditions of the said Contractor to extend time of performance by the said PIA from time to time or to postpone for any time or from time to time any of the powers exercisable by the GFGNL against the said PIA and to forbear or enforce any of the terms & conditions relating to the said Contract and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said PIA or for any forbearance, act or omission on the part of the GFGNL or any indulgence by the GFGNL to the said PIA or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee shall not be discharged due to the change in the constitution of the Bank or the PIA.

7. We (name of the bank) _____ lastly undertake not to revoke this guarantee during its currency except with the previous consent of the GFGNL in writing.

Place:

Date:

(Signature of the Bank Officer)

Rubber stamp of the bank:

Authorized Power of Attorney Number:

Name of the Bank officer:

Designation:

Complete Postal address of Bank:

Telephone Numbers

Fax numbers.....

(Bank's common seal)

5.10 Annexure 5.10 - Contract

THIS AGREEMENT made the _____ day of _____ 2018

BETWEEN

The **State/SIA** (hereinafter referred to as “the Tenderer”) which expression shall unless repugnant to the context or meaning thereof mean and be deemed to include its authorized agents, representatives and permitted assigns of the First Part.

AND

The Party _____ (hereinafter referred to as “the PIA”) which expression shall unless repugnant to the context or meaning thereof mean and be deemed to include their successors and permitted assigns having its registered office at _____ of the Second Part.

WHEREAS

- (a) The Tenderer had invited Bids *vide* their Tender _____ (hereinafter referred to as “RFP”) for “**Selection of Project Implementing Agency (PIA) for BharatNet Phase-II**”
- (b) The PIA had submitted its proposal dated _____ (hereinafter referred to as the ‘Bid’) for the provision of such services in accordance with its proposal as set out in its Bid and in accordance with the terms & conditions of the RFP and this Contract.
- (c) The Tenderer has agreed to select the PIA for the provision of such services and the PIA has agreed to provide services as are represented in the RFP, including the terms & conditions of this Contract, the Schedules attached hereto and in accordance with the terms & conditions of the RFP and in terms of the discussions, negotiations and clarifications in relation to the implementation of the scope of work.

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

(d) In consideration of the foregoing and the mutual covenants and promises contained herein and other good and valuable consideration the receipt and adequacy of which is hereby acknowledged, the parties intending to be bound legally.

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the General Conditions of the Contract referred to.
2. The entire RFP (No. _____) and related corrigendum/addendum (if any) along with the Tenderer's Notification of Award shall be deemed to form and be read and construed as part of this Agreement
3. In consideration of the payments to be made by the Tenderer to the PIA as hereinafter mentioned, the PIA hereby covenants with the Tenderer to provide the Services and to remedy defects therein in conformity in all respects with the provisions of the Contract.
4. The Tenderer hereby covenants to pay the PIA in consideration of the provision of the Services and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with their respective laws the day and year first above written

Signed, Sealed and Delivered by the said _____

(For the Tenderer in the presence of: _____ (WITNESS))

Signed, Sealed and Delivered by the said _____

(For the Bidder) in the presence of: _____ (WITNESS)

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

5.11 Annexure 5.11- Financial Bid

PACKAGE –A

Table A.1 (Survey, Planning, Supply, Installation, end to end integration, testing and commissioning for all GPs included in package A)

Sr. No.	Item	UOM	Qty	Price (Exclusive of Tax)	Taxes and Duties (As applicable)
1	One time charges for Survey, Planning, Supply, Installation, end to end integration, testing and commissioning of all GPs included in package A, including OFC, OLT, ONT, RFMS, Couplers, Rack Mounted Splitters and all other material as per the scope of work, functional and technical requirement specified in the bid document	Lumpsum	1		
Grand Total (A.1)					

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Table A.2 (NOC and Software Components)

Sr No	Item	UOM	Qty	Price (Exclusive of Tax)	Taxes and Duties (As applicable)
1	One time charges for Survey, Planning, Supply, Installation, end to end integration, testing and commissioning of NOC and all Software listed for package A, As per the scope of work, functional and technical requirement specified in the bid document	Lumpsum	1		
Grand Total (A.2)					

Table A.3 (O&M for GPs included in package A)

Sr No	Item	Yearly Charge	Discount Rate	NPV of Yearly Charges	Taxes and Duties (As applicable)
-	A	B	C	D=B/C	E
1	Operations and Maintenance for all GPs included in Year 1		1.00		
2	Operations and Maintenance for all GPs included in Year 2		1.09		
3	Operations and Maintenance for all GPs included in Year 3		1.188		
4	Operations and Maintenance for all GPs included in Year 4		1.295		
5	Operations and Maintenance for all GPs included in Year 5		1.412		
6	Operations and Maintenance for all GPs included in Year 6		1.539		
7	Operations and Maintenance for all GPs included in Year 7		1.677		
Grand Total (A.3)					

Table A.4 (O&M for NOC and Software)

Sr No	Item	Yearly Charge	Discount Rate	NPV of Yearly Charges	Taxes and Duties (As applicable)
-	A	B	C	D=B/C	E
1	Operations and Maintenance for NOC and Software in Yr. 1		1.00		
2	Operations and Maintenance for NOC and Software in Yr. 2		1.09		
3	Operations and Maintenance for NOC and Software in Yr. 3		1.188		
4	Operations and Maintenance for NOC and Software in Yr. 4		1.295		
5	Operations and Maintenance for NOC and Software in Yr. 5		1.412		
6	Operations and Maintenance for NOC and Software in Yr. 6		1.539		
7	Operations and Maintenance for NOC and Software in Yr. 7		1.677		
Grand Total (A.4)					

For Package A, L1 will be the lowest sum Total of Grand Total of Table A.1, A.2, A.3 and A.4 without Taxes.

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PACKAGE - B

Table B.1 (Survey, Planning, Supply, Installation, end to end integration, testing and commissioning for all GPs included in package B)

Sr No	Item	UOM	Qty	Price (Exclusive of Tax)	Taxes and Duties (As applicable)
1	One time charges for Survey, Planning, Supply, Installation, end to end integration, testing and commissioning of all GPs included in package B, including OFC, OLT, ONT, RFMS, Couplers, Rack Mounted Splitters and all other material as per the scope of work, functional and technical requirement specified in the bid document	Lumpsum	1		
Grand Total (B.1)					

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Table B.2 (O&M for GPs included in package B)

Sr No	Item	Yearly Charge	Discount Rate	NPV of Yearly Charges	Taxes and Duties (As applicable)
-	A	B	C	D=B/C	E
1	Operations and Maintenance for all GPs included in Year 1		1.00		
2	Operations and Maintenance for all GPs included in Year 2		1.09		
3	Operations and Maintenance for all GPs included in Year 3		1.188		
4	Operations and Maintenance for all GPs included in Year 4		1.295		
5	Operations and Maintenance for all GPs included in Year 5		1.412		
6	Operations and Maintenance for all GPs included in Year 6		1.539		
7	Operations and Maintenance for all GPs included in Year 7		1.677		
Grand Total (B.2)					

For Package B, L1 will be the lowest sum Total of Grand Total of Table B.1 and B.2 without Taxes.

Instructions to fill the Financial Bid:

1. Prices in Financial Bid should be quoted in the provided format. All prices should be quoted in Indian Rupees and indicated both in figures and words. Price in words shall prevail, in the event of any mismatch.
2. Bidder should provide all prices as per the prescribed format under this Annexure. Bidder should not leave any field blank.
3. All the prices are to be entered in Indian Rupees ONLY (%age values are not allowed)
4. Tenderer reserves the right to ask the Bidder to submit proof of payment against any of the taxes, duties, levies indicated.
5. Tenderer shall take into account that all Taxes, Duties & Levies shall be paid as per actual.
6. For the purpose of evaluation of Financial Bids the Tenderer shall make appropriate assumptions to arrive at a common bid price for all the Bidders. This however shall have no co-relation with the Contract value or actual payment to be made to the Bidder. The soft copy of the financial bid should be in excel format to be uploaded online.
7. The O&M value quoted should be minimum 35% of sub total cost of the respective Capex table (For O&M table A.3, table A.1 will be considered as Capex table; for O&M table A.4, table A.2 will be considered as capex table value in column of O&M table; For O&M table B.2, table B.1 will be considered as capex table). In case of any deviation, the bid would be rejected.
8. During the initial installation phase, post go-live of an individual GP upto the overall go-live for all the GPs within a package, the O&M paid to the PIA up to the overall go-live will be limited to 50% of the year 1 O&M apportioned to individual GPs. The apportionment to individual GPs will be calculated as – Year 1 O&M for respective package / number of GPs in the respective package.
9. The discount rate for calculation of NPV is assumed @ 9%.
10. For evaluation purpose NPV charges are considered however the quoted O&M charges will be considered at the time of issue of order.

PIA:

Signature -----

Name -----

Designation -----

Company Seal -----

5.12 Annexure 5.12: MAF

Manufacturer’s Authorization Format (MAF) From OEM

Ref:

Date:

To

.....,

.....,

.....,

Subject: Manufacturer Authorization Letter for RFP No.

Sir,

We, <OEM Name> having our registered office at <OEM address>, hereinafter referred to as OEM are an established manufacturer of the following items quoted by <Bidder Name> having their registered office at <Bidder address>, hereinafter referred to as Bidder.

We <OEM Name> authorize <Bidder’s name> to quote our product for above mentioned tender as our Authorized Indian Agent.

We confirm that we have understood the delivery & installation time lines defined in the tender. We confirm that we have worked out all necessary logistics and pricing agreement with <PIA name>, and there won’t be any delay in delivery, installation and support due to any delay from our side. Our full support as per pre-purchased support contract is extended in all respects for supply, warranty and maintenance of our products. We also ensure to provide the required spares and service support as pre-purchased for the supplied equipment for a period of 7 years from date of supply of the equipment as per tender terms. In case of any difficulties in logging complaint at bidder end, user shall have option to log complaint at our call support centre.

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We also undertake that in case of default in execution of this Contract by PIA, we shall provide necessary support in identifying another authorized partner with similar certifications/capabilities and extend support to the new partner in accordance with OEM's agreement with the new partner. In case PIA is unable to fulfil the obligations given under this Contract, OEM shall be responsible to replace the PIA with an alternate Indian Authorized agent to facilitate to get the requisite work done. OEM shall also ensure that the alternate Indian Authorized Agent in this case shall abide by all the terms & conditions laid down under the Contract and during the Award of Work to the PIA for the quoted OEM products.

If any product is declared end of sale, we shall proactively ensure that a suitable equivalent or higher roll over product is offered through the existing PIA to GFGNL for due approval, contract and order executions thereafter.

We understand that any false information/commitment provided here may result in <OEM's Name> getting blacklisted/debarred from doing business with GFGNL.

Thanking You

For <OEM/ Manufacturer name>

< (Authorized Signatory)>

Name:

Designation:

Contact Details:

Seal of the Company

NOTE:

1. *The letter should be submitted on the letter head of the manufacturer / OEM and should be signed by the authorized signatory.*
2. *Any deviation would lead to summarily rejection of bids.*

5.13 Annexure 5.13 – Declaration Pro forma

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

{Place}

{Date}

To,

.....

.....

.....

.....

Ref: RFP No. : XXXXXXXXXXXXXXXX dated XXXXX

Subject: Declaration for not being under an ineligibility for corrupt or fraudulent practices or blacklisted/debarred with any of the Government or Public Sector Units

Dear Sir/Madam,

We, the undersigned, hereby declare that we are not involved in any litigation with any client which would materially affect our ability to perform obligations as per the RFP and are not under a declaration of ineligibility for corrupt or fraudulent practices or blacklisted/debarred with any of the Government or Public Sector Units as on bid submission date.

For and on behalf of

Signature:

(Authorized Signatory)

Name of the person:

Designation:

Name of the Respondent:

Address of the Respondent:

Company seal:

5.14 Annexure 5.14 - Self Certification on PMA

Format for Affidavit of Self Certificate regarding Domestic Value Addition in quoted items on INR 100/- Stamp Paper.

Date:

I _____ S/o, D/o, W/o _____ resident of _____ do hereby solemnly affirm and declare as under.

That I will agree to abide by the terms and conditions of the policy of the Government of India issued vide notification no. 8(78)/2012-IPHW dated 10/02/2012.

That the information furnished hereinafter correct to best of my knowledge and belief and I undertake to produce relevant records before the procuring agency or any authority so nominated by the Ministry of Electronics and Information Technology, Government of India for the purpose of assessing domestic value addition.

That the domestic value addition for all inputs which constitute the quoted item(s) has been verified by me and I am responsible for the correctness of the claims made therein.

That in event of the domestic value addition of the quoted product is found to be incorrect and not meeting the prescribed domestic value addition norms, based on assessment of an authority so nominated by the Department of Telecommunications, Government of India for the purpose of assessing domestic value addition. I will be disqualified from any Government Tender for period of 36 months. In addition, I will bear all costs of such an assessment.

That I have complied with all the conditions referred to in the notification no. 8(78)/2012-IPHW dated 10/02/2012, wherein preference to domestically manufactured electronic products in Government procurement is provided and that the procuring agency is hereby authorized to forfeit and adjust my EMD and other security amount toward such assessment cost and I undertake the balance, if any, forthwith.

I agree to maintain the following information in the Company's record for a period of 8 years and shall make this available to any statutory authorities.

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

1. Name and details of domestic manufacture (Registered office, Manufacturing unit location, nature of legal entity)
2. Date on which this certificate issued
3. Electronic Product for which the certificate is produced
4. Procuring agency to whom the certificate is furnished
5. Percentage of domestic value addition claimed
6. Name and contact details of the unit of the manufacturer
7. Sale price of the product
8. Ex-factory price of the product
9. Freight, insurance and handling
10. Total Bill of Material
11. List and total cost value of inputs used for manufacture of the domestic product
12. List and total cost value of inputs which are domestically sourced. Please attach the certificate from supplier, if the input is not in-house
13. List and total cost value of inputs imported, directly or indirectly.

For and on behalf of _____ (Name of firm/entity)

Authorized Signatory (To be duly authorized by Board of Directors)

<Insert Name, Designation and Contact No.>

5.15 Annexure 5.15 - Form Of Power Of Attorney for Consortium

(On Non –Judicial Stamp Paper of Appropriate value to be purchased in the Name of CONSORTIUM)

KNOW ALL MEN BY THESE PRESENTS THAT WE, the Members whose details are given hereunder..... Have formed a CONSORTIUM and having our Registered Office (s)/Head Office (s) at(hereinafter called the ‘Consortium’ which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators and assigns) do hereby constitute, nominate and appoint M/s..... a company/Electrical Contractor incorporated under the laws ofand having its Registered/Head Office atas our duly constituted lawful Attorney (hereinafter called “Lead Member ”) to exercise all or any of the powers for and on behalf of the CONSORTIUM in regard to bid document No..... For supply..... for which bids have been invited by the Owner namely (DISCOM), to undertake the following acts:

- (i) To submit proposal, participate and negotiate in respect of the aforesaid Bid – Specification of the Owner on behalf of the “Consortium”.
- (ii) To negotiate with Owner the terms and conditions for award of the contract pursuant to the aforesaid Bid and to sign the contract with the Owner for and on behalf of the “Consortium”.
- (iii) To do any other act or submit any document related to the above.
- (iv) To receive, accept and execute the contract for and on behalf of the “Consortium”.
- (v) To submit the contract performance security in the form of an unconditional irrecoverable Bank guarantee in the prescribed format and as per terms of the contract. It is clearly understood that the Lead Member shall ensure performance of the contracts (s) and if one or more Member fail to perform their respective portion of the contracts (s), the same shall be deemed to be a default by all the Members. It is expressly understood that this power of Attorney shall remain valid binding and irrevocable till completion of the Defect or liability period in terms of the contract.

The CONSORTIUM hereby agrees and undertakes to ratify and confirm all the whatsoever the said Lead Member quotes in the bid, negotiates and signs the Contract with the Owner and / or proposes to act on behalf of the CONSORTIUM by virtue of this Power of Attorney and the same shall bind

Selection of Project Implementing Agency (PIA) for BharatNet Phase-II in Gujarat

the CONSORTIUM as if done by itself.

IN WITNESS THEREOF the Members Constituting the CONSORTIUM as aforesaid have Executed these presents on this day of Under the Common Seal (s) of their Companies for and on behalf of the Members of CONSORTIUM

1.

2.

3.

4.

The Common Seal of the above Members of the CONSORTIUM:

The Common Seal has been affixed there unto in the presence of:

WITNESS

1. Signature

Name

Designation

Occupation

2. Signature

Name

Designation

Occupation

(Annexure-....)

5.16 Annexure 5.16 – Non Disclosure Agreement for Exchange of Confidential Information

This Non-Disclosure Agreement for Exchange of Confidential Information (the “Agreement”) is entered into as of _____ DD, 2018 (the “Effective Date”) by and between **Gujarat Fibre Grid Network Limited(GFGNL)**

hereinafter referred to as ‘**Nodal Agency**’ referred as the Nodal Agency company having its registered office at Block No: 1, 8th Floor, Udyog Bhavan, Sector-11, Gandhinagar: 382010

And

<***>, a Company incorporated under the Companies Act, 1956, having its registered office at <***> (hereinafter referred to as ‘**the Project Implementation Agency**’ (**PIA**) which expression shall, unless the context otherwise requires, include its permitted successors and assigns).

Each of the parties mentioned above are collectively referred to as the ‘Parties’ and individually as a ‘Party’.

Whereas:

Nodal Agency is desirous to implement the project of “BharatNet Phase-II in the State of Gujarat”

The Nodal Agency and Implementation Agency have entered into a Master Services Agreement dated <***> (the “PIA”) as well as a Service Level Agreement dated <***> (the “SLA”) in furtherance of the Project.

Whereas in pursuing the Project (the “Business Purpose”), a Party (“Disclosing Party) recognizes that they will disclose certain Confidential Information (as defined hereinafter) to the other Party (“Receiving Party”).

Whereas such Confidential Information (as defined hereinafter) belongs to Receiving Party as the case may be and is being transferred to the Disclosing Party to be used only for the Business Purpose and hence there is a need to protect such information from unauthorized use and disclosure.

1. Term: This Agreement shall have a term of eight (8) years from the Effective Date. Either Party may request for an extension of the Term by giving a renewal notice to the other Party. The Parties may agree to extend the Term of Agreement by an instrument in writing.

2. SCOPE OF THE AGREEMENT

a. This Agreement shall apply to all confidential and proprietary information disclosed by Disclosing Party to the Receiving Party and other information which the disclosing party identifies in writing or otherwise as confidential before or within (30) thirty days after disclosure to the Receiving Party (“Confidential Information”). Such Confidential Information consists of certain specifications, documents, software, prototypes and/or technical information, and all copies and derivatives containing such Information that may be disclosed to the Disclosing Party for and during the Business Purpose, which a party considers proprietary or confidential.

b. Such Confidential Information may be in any form or medium, tangible or intangible, and may be communicated/disclosed in writing, orally, or through visual observation or by any other means to the Receiving Party.

3. Purpose: The Parties intend to share Confidential Information for a potential business relationship with respect to implementation of “BharatNet Phase-II project in the State of Gujarat” (“Purpose”).

4. Discloser & Recipient: Either Party, including its Affiliates, may disclose Confidential Information under this Agreement for the Purpose and shall be referred to as “Discloser” hereunder. The other Party, including its Affiliates, receiving Confidential Information hereunder shall be referred to as “Recipient”. For the purpose of this Agreement, “Affiliates” shall mean any legal entity which, is directly or indirectly controlling, controlled by or under the common control of the Party.

5. Confidential Information: The information disclosed by Discloser to Recipient hereunder relating to Discloser’s business, including, without limitation, computer programs, technical drawings, algorithms, know-how, processes, designs, reports, specifications, ideas, trade secrets, inventions, schematics, pricing information, and other technical, business, financial, customer and product development plans, strategies or any other information which is reasonably understood to be

confidential or proprietary based on the circumstances of disclosure or the nature of the information itself, such information is hereinafter referred to as “Confidential Information” of the Discloser.

6. Information which is orally or visually disclosed, or is disclosed in writing without being marked as confidential, shall constitute Confidential Information, if Discloser within seven (7) days after such disclosure, delivers to Recipient, a written document(s) describing such Information and referencing the place and date of such oral or visual disclosure and the names of the employees or officers of the Recipient to whom such disclosure was made.

7. Confidential Information shall not include any information that is a) lawfully known by the Recipient at the time of disclosure without any obligation to keep the same confidential; b) or becomes, through no fault of the Recipient, known or available to the public; c) independently developed by the Recipient without use or reference to such Confidential Information; or d) rightfully disclosed to Recipient by a third party without any restrictions on disclosure.

8. Confidentiality Obligation: Discloser shall observe the duty of reasonable care while disclosing any Confidential Information to the Recipient. Recipient agrees that it shall a) not use any such Confidential Information except for the Purpose of this Agreement; b) hold the Confidential Information in confidence and shall take all reasonable precautions to protect such Confidential Information from unauthorized disclosure including all precautions that Recipient employs to protect its own confidential material; c) not divulge any such Confidential Information to any third party without prior approval of Discloser; and d) not copy or reverse engineer any such Confidential Information. Recipient may permit access to Confidential Information to its employees, consultants, vendors and agents, on a need to know basis and to the extent required to meet the Purpose, and shall ensure that they are bound to maintain confidentiality of such Confidential Information to the same extent as provided under this Agreement.

9. Survival, Exception & Return: Confidentiality obligations under this Agreement shall survive for a period of five (5) years following the expiry of this Agreement, provided that the obligations shall be perpetual with regard to any source code or trade secret that may be disclosed hereunder.

10. Recipient may make disclosures to the extent required by law or by order of any court or regulatory body, provided the Recipient promptly notifies the Discloser in writing about such requirement to disclose.

11. Recipient will return to Discloser, upon request, any Confidential Information under its possession or control and/or destroy all documents or media containing any such Confidential Information provided that Recipient may retain a copy of Confidential Information to the extent necessary to meet any statutory requirements.

12. Disclaimer: Parties acknowledges that providing or receiving Confidential Information under this Agreement shall not constitute an offer, acceptance, or promise to enter into or amend any other contract.

13. To the extent permitted by law, Confidential Information is disclosed on “as is” basis, without any express or implied warranties and in particular, without any limitation, as to fitness for the intended Purpose.

14. The ownership of all intellectual property rights (IPRs) in Confidential Information disclosed hereunder shall remain with its original owner and no grant of license or conveyance of any IPRs in such Confidential Information is to be implied from exchange or sharing of any such information under this Agreement.

15. Injunctive Relief: Recipient acknowledges that due to the unique nature of the Discloser’s Confidential Information, any breach of its obligations hereunder will result in irreparable harm to the Discloser, and therefore, upon any such breach or threat thereof, the Discloser shall be entitled to appropriate equitable relief including the relief of injunction and/or specific performance, in addition to any other remedies available at law.

16. General: The Parties agree to be bound by any applicable export control regulations while sharing Confidential Information hereunder.

17. This Agreement shall be governed by the laws of India and shall be subject to the exclusive jurisdiction of courts in Delhi.

Neither party may assign or transfer any rights or obligations arising out of this Agreement without the prior written consent of the other party.

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No failure or delay in enforcing any right will be deemed a waiver unless made in writing and signed by a duly authorized representative of such Party.

Any notice under this Agreement shall be in writing and shall be sent at the registered addresses of the Parties specified in this Agreement.

This Agreement may be modified only by an amendment executed in writing by a duly authorized representative of both Parties.

This Agreement constitutes the entire agreement between the Parties and supersedes all prior discussions or agreements relating to subject matter hereof.

For Gujarat Fibre Grid Network Limited(GFGNL)

Signature: _____

Name: _____

Designation: _____

Date: _____

For Project Implementation Agency (PIA)

Signature: _____

Name: _____

Designation: _____

Date: _____

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~~5.17 Annexure 5.17 List of Sub-Contractors~~

Sno.	Name of Sub Contractor's Company	Type of Primary Work	District
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

5.18 Annexure 5.18 – Format for Bank Guarantee format for Earnest Money Deposit EMD

To
.....
.....
.....
.....

Dated:

Whereas ----- (here in after called "the Bidder") has submitted its bid dated ----- in response to the Tender no: GFGNL/DST/BharatNet – PIA/2018/26 for

KNOW ALL MEN by these presents that WE -----
----- having our registered office at -----
----- (hereinafter called "the Bank") are bound unto the _____, Gujarat Fibre Grid Network Limited in the sum of ----- for which payment well and truly to be made Gujarat Fibre Grid Network Limited , the Bank binds itself, its successors and assigns by these presents. Sealed with the Common Seal of the said Bank this -----day of ----- -2018.

THE CONDITIONS of this obligation are:

- The EMD may be forfeited, In case of a Bidder if:
- 1) The bidder withdraws its bid during the period of bid validity.
 - a. The Bidder does not respond to requests for clarification of their Bid.
 - b. The Bidder fails to co-operate in the Bid evaluation process.
 - c. The bidder, fails to furnish Performance Bank Guarantee in time.
 - 2) The bidder fails to Sign the contract in accordance with this RFP
 - 3) The bidder is found to be involved in fraudulent and corrupt practices

We undertake to pay to the GFGNL up to the above amount upon receipt of its first written demand, without GFGNL having to substantiate its demand, provided that in its demand GFGNL will specify that the amount claimed by it is due to it owing to the occurrence of any of the above-mentioned conditions, specifying the occurred condition or conditions.

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This guarantee will remain valid up to 6 months from the last date of bid submission. The Bank undertakes not to revoke this guarantee during its currency without previous consent of the GFGNL and further agrees that the guarantee herein contained shall continue to be enforceable till the GFGNL discharges this guarantee

The Bank shall not be released of its obligations under these presents by any exercise by the GFGNL of its liability with reference to the matters aforesaid or any of them or by reason or any other acts of omission or commission on the part of the GFGNL or any other indulgence shown by the GFGNL or by any other matter or things.

The Bank also agree that the GFGNL at its option shall be entitled to enforce this Guarantee against the Bank as a Principal Debtor, in the first instance without proceeding against the BIDDER and notwithstanding any security or other guarantee that the GFGNL may have in relation to the BIDDER's liabilities.

Dated at _____ on this _____ day of _____ 2018.

Signed and delivered by

For & on Behalf of

Name of the Bank & Branch &

Its official Address with seal

Approved Bank: All Nationalized Bank including the public sector bank or Private Sector Banks or Commercial Banks or Co-Operative & Rural Banks (operating in India having branch at Ahmedabad/ Gandhinagar) as per the G.R. no. EMD/10/2015/508/DMO dated 27.04.2016 issued by Finance Department or further instruction issued by Finance department time to time.

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5.19 Annexure 5.19 – Priced BOQ Format

1. Quantity for each line item in Column “B” to be filled by Bidder with respect to their Network design / site survey done.
2. Each bidder must submit priced BOQ in below format on 3rd day from the date of financial bid opening in a sealed envelope.
3. Envelop of only L1 bidder of each package shall be opened and other bidder’s envelops shall be returned back to them in received sealed condition only after 180 days from the date of opening of financial bid.

Priced BoQ format for Package A

A Supply - Passive Infrastructure (Underground Cable) (As per technical specifications given in Annexure-A TEC GR No.)						
Sr. No.	Item Description	UOM	QTY	Unit Price (Tax Exclusive)	Total Price(Tax Exclusive)	Tax as Applicable
		A	B	C	D=B*C	E
1	Optical fibre Cable 96 core (Ribbon)	Kms.				
2	Optical fibre Cable 48 core (Ribbon)	Kms.				
3	Supply of Duct	Kms.				
4	Supply of Jointing Chamber	Nos.				
5	Supply of Route & joint indicator	Nos.				
6	Rack Mounted Splitters 1:4	Nos.				
7	96F FTB (Fully loaded including enclosure)	Nos.				

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8	48F FTB (Fully loaded including enclosure)	Nos.				
9	Fibre Patch cord (2M)	Nos.				
10	Electronic Route Indicators	Nos.				
11	Full DWC Pipe (63 mm) of OFC Route Depth .6mts	Kms.				
12	GI Pipe (63 mm) Class-B Medium as per ISI MARK	Kms.				
13	Any other component	Lumpsum				

B		Supply - Passive Infrastructure (Aerial Cable)				
1	ADSS Optical fibre Cable 24 core ribbon	Kms.				
2	24F FTB (Fully loaded including enclosure)	Nos.				
3	RCC poles (8 meters) (for Aerial Fibre laying)	Nos.				
4	Pole clamping Kit (Aerial Fibre laying)	Nos.				
5	Tension Poles, with necessary accessories and foundation	Nos.				
6	Suspension Poles, with necessary accessories and foundation	Nos.				

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7	Any other hardware/component required to meet the RFP requirements	Lumpsum				
---	--	---------	--	--	--	--

C		Supply - Active Infrastructure				
1	OLT	Nos.				
2	ONT	Nos.				
3	Electronics of State NOC	Nos.				
4	RFMS	Nos.				
5	UPS at GPs	Nos.				
6	UPS at Blocks	Nos.				
7	12U Wall mount Rack	Nos.				
8	42U Floor mount Rack	Nos.				

D		Supply - Network Operations Centre (NOC)				
1	ERP (with necessary software, licenses, etc.)	Lumpsum				
2	Project Management Tool	Lumpsum				
3	Webportal	Lumpsum				
4	Mobile Application					
5	GIS					
6	UPS with Battery bank at NOC for (Video Wall, Operator Desktop, network devices and NOC)	Lumpsum				
7	Video wall, servers, desktop for operators,	Lumpsum				

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8	Any other hardware/software required to meet the RFP requirements	Lumpsum				
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E		Services- Passive Infrastructure (As per technical specifications given in Annexure-A TEC GR No. and Engineering Instruction)				
1	Excavation of trench for PLB pipe laying, PLB pipe laying, Backfilling, Reinstatement and Compaction after laying of PLB pipe. The work also includes	Kms.				
2	laying / blowing of optical Fibre Cable inside laid PLB pipe	Kms.				
2.a	96 core unarmoured optical fibre cable (Ribbon) blowing for connectivity planned as feeder cable from OLT / block location to road intersection location (where distribution cable from GP terminates with feeder cable). The cost shall include fixing of joint chamber, manhole, splice closure, Fixing,	Kms.				

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	<p>painting and sign writing of Route /Joint Indicators, termination at FTB and all the relevant accessories etc. and end to end testing of dark and lit fibre per GP (For Underground laying) (As per the Engineering Instruction issued by BBNL)</p>					
2.b	<p>48 core unarmoured optical fibre cable (Ribbon) blowing for connectivity planned as distribution cable from Road Intersection Location to Village Panchayat (GP) The cost shall include fixing of joint chamber, manhole, splice closure, Fixing, painting and sign writing of Route /Joint Indicators, termination at FTB and all the relevant accessories etc. and end to end testing of dark and lit fibre per</p>	Kms.				

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	GP (For Underground laying) (As per the Engineering Instruction issued by BBNL)					
2.c	24 Core ADSS Ribbon aerial fibre laying on existing / new poles planned as distribution cable from Road Intersection Location to Village Panchayat (GP) The cost shall include fixing of Poles, splice closure, termination at FTB and all the relevant accessories etc. and end to end testing of dark and lit fibre per GP (For Aerial laying) (As per the Engineering Instruction issued by BBNL)	Kms.				
3	Splicing and jointing of Optical Fibre Cable of constructed OFC Route and Acceptance Testing, commissioning and	Nos.				

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	makeover of the routes.					
4	Road / bridge crossing, laying of PLB inside DWC pipe, wherever required and obtaining Right-of-Way (RoW) permissions.	Kms.				

F		Services - Active Infrastructure				
1	Installation, integration and commissioning of Electronics at Block (OLT)	Nos.				
2	Installation, integration and commissioning of ONT (Including enclosure)	Nos.				
3	Built, Installation, integration and Commissioning of NOC (State/Centre) software including – NMS, ERP, Web Portal, Mobile Apps, Project Management Tool, GIS, Video Wall Software	Lumpsum				
4	Built, Installation, integration and Commissioning of	Lumpsum				

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	NOC (State) hardware including – UPS, Video Wall, Operator Desktops, etc.					
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Priced BoQ Format for Package B

A Supply - Passive Infrastructure (Underground Cable) (As per technical specifications given in Annexure-A TEC GR No.)						
Sr. No.	Item Description	UOM	QTY	Unit Price (Tax Exclusive)	Total Price(Tax Exclusive)	Tax as Applicable
		A	B	C	D=B*C	E
1	Optical fibre Cable 96 core (Ribbon)	Kms.				
2	Optical fibre Cable 48 core (Ribbon)	Kms.				
3	Supply of Duct	Kms.				
4	Supply of Jointing Chamber and manhole	Nos.				
5	Supply of joint indicator	Nos.				
6	Rack Mounted Splitters 1:4	Nos.				
7	96F FTB (Fully loaded including enclosure)	Nos.				
8	48F FTB (Fully loaded including enclosure)	Nos.				
9	Fibre Patch cord (2M)	Nos.				
10	Electronic Route Indicators	Nos.				

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11	Full DWC Pipe (63 mm) of OFC Route Depth .6mts	Kms.				
12	GI Pipe (63 mm) Class-B Medium as per ISI MARK	Kms.				
13	Any other component	Lumpsu m				

B	Supply - Passive Infrastructure (Aerial Cable)					
1	ADSS Optical fibre Cable 24 core ribbon	Kms.				
2	24F FTB (Fully loaded including enclosure)	Nos.				
3	RCC poles (8 meters) (for Aerial Fibre laying)	Nos.				
4	Pole clamping Kit (Aerial Fibre laying)	Nos.				
5	Tension Poles, with necessary accessories and foundation	Nos.				
6	Suspension Poles, with necessary accessories and foundation	Nos.				
7	Any other hardware/compon ent required to	Lumpsu m				

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	meet the RFP requirements					
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C		Supply - Active Infrastructure				
1	OLT	Nos.				
2	ONT	Nos.				
3	RFMS	Nos.				
3	UPS at GPs	Nos.				
4	UPS at Blocks	Nos.				
5	12U Wall mount Rack	Nos.				
6	42U Floor mount Rack	Nos.				

D		Services - Passive Infrastructure (As per technical specifications given in Annexure-A TEC GR No. and Engineering Instruction)				
Sr. No.	Item Description	UOM	QTY			
1	Excavation of trench for PLB pipe laying, PLB pipe laying, Backfilling, Reinstatement and Compaction after laying of PLB pipe. The work also includes	Kms.				
2	laying / blowing of optical Fibre Cable inside laid PLB pipe	Kms.				
2.a	96 core unarmoured	Kms.				

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	<p>optical fibre cable (Ribbon) blowing for connectivity planned as feeder cable from OLT / block location to road intersection location (where distribution cable from GP terminates with feeder cable). The cost shall include fixing of joint chamber, manhole, splice closure, Fixing, painting and sign writing of Route /Joint Indicators, termination at FTB and all the relevant accessories etc. and end to end testing of dark and lit fibre per GP (For Underground laying) (As per the Engineering Instruction issued by BBNL)</p>					
2.b	<p>48 core unarmoured optical fibre cable</p>	Kms.				

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	<p>(Ribbon) blowing for connectivity planned as distribution cable from Road Intersection Location to Village Panchayat (GP) The cost shall include fixing of joint chamber, manhole, splice closure, Fixing, painting and sign writing of Route /Joint Indicators, termination at FTB and all the relevant accessories etc. and end to end testing of dark and lit fibre per GP (For Underground laying) (As per the Engineering Instruction issued by BBNL)</p>					
2.c	<p>24 Core ADSS Ribbon aerial fibre laying on existing / new poles planned as distribution cable from Road Intersection</p>	Kms.				

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	<p>Location to Village Panchayat (GP)</p> <p>The cost shall include fixing of Poles, splice closure, termination at FTB and all the relevant accessories etc. and end to end testing of dark and lit fibre per GP (For Aerial laying) (As per the Engineering Instruction issued by BBNL)</p>					
3	<p>Splicing and jointing of Optical Fibre Cable of constructed OFC Route and Acceptance Testing, commissioning and makeover of the routes.</p>	Nos.				
4	<p>Road / bridge crossing, laying of PLB inside DWC pipe, wherever required and obtaining Right-of-</p>	Kms.				

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	Way (RoW) permissions.					
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E		Services - Active Infrastructure				
1	Installation, integration and commissioning of Electronics at Block (OLT)	Nos.				
2	Installation, integration and commissioning of ONT (Including enclosure)	Nos.				
3	Integration and Commissioning with NOC (State/Centre) software applications	Lumpsu m				

5.20 Annexure 5.20 Bid Submission Cover Letter

Date: dd/mm/yyyy

To

<Insert complete postal address>

Sub : <Project Name>

Ref : Bid No: <No> Dated <DD/MM/YYYY>

Dear Sir,

Having examined the bid, the receipt of which is hereby duly acknowledged, we, the undersigned, offer to provide the professional services as required and outlined in the bid for the <insert Name of the bid/project>

We attach hereto our responses to pre-qualification requirements and technical and commercial bids as required by the bid. We confirm that the information contained in these responses or any part thereof, including the exhibits, and other documents and instruments delivered or to be delivered to Gujarat Fibre Network Grid Limited, are true, accurate, verifiable and complete. This response includes all information necessary to ensure that the statements therein do not in whole or in part mislead the Corporation in its short-listing process.

We fully understand and agree to comply that on verification, if any of the information provided here is found to be misleading the selection process, we are liable to be dismissed from the selection process or termination of the contract during the project, if selected to do so.

We agree for unconditional acceptance of all the terms and conditions set out in the bid document and also agree to abide by this bid response for the bid validity period as mentioned in the RFP. We hereby declare that in case the contract is awarded to us, we shall submit the contract performance guarantee bond in the form prescribed in the bid.

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We agree that you are not bound to accept any bid response you may receive. We also agree that you reserve the right in absolute sense to reject all or any of the products/ services specified in the bid response.

It is hereby confirmed that I/We are entitled to act on behalf of our company/ corporation/ firm/ organization and empowered to sign this document as well as such other documents, which may be required in this connection.

Signature of Authorized Signatory (with official seal)

Name :

Designation :

Address :

Telephone and Fax :

E-mail address :