Section VII. Technical Specifications

Outside Plant (OSP) Maintenance and Repair Services for Luzon Bypass Infrastructure under Framework Agreement for DICT

Technical Specifications

[Bidders must state here either "Compliant" or "Not Compliant" against each of the individual parameters of each Specification stating the corresponding performance parameter of the equipment offered. Statements of "Comply" or "Not Comply" must be supported by evidence in a Bidders Bid and cross-referenced to that evidence. Evidence shall be in the form of manufacturer's un-amended sales literature, unconditional statements of specification and compliance issued by the manufacturer, samples, independent test data etc., as appropriate. A statement that is not supported by evidence or is subsequently found to be contradicted by the evidence presented will render the Bid under evaluation liable for rejection. A statement either in the Bidder's statement of compliance or the supporting evidence that is found to be false either during Bid evaluation, post-qualification or the execution of the Contract may be regarded as fraudulent and render the Bidder or supplier liable for prosecution subject to the applicable laws and issuances.]

Item	Specification	Statement of Compliance	
LOT A	**Outside Plant (OSP) Maintenance and Repair Services for Luzon Bypass Infrastructure under Framework Agreement for DICT's**	**Compliant**	**Non Compliant**
3.	**OBJECTIVE**		
	3.1. The main objective of this procurement is to ensure that DICT- Luzon Bypass Fiber Optic Network is operational 24/7 and immediate restoration/repair on the occasion that there is fiber network degradation and/or failure, including power cable.		
	3.2. The Project will secure services for the maintenance of the following OSP facilities:		
	3.2.1. Front-haul: Beach manhole to Cable Landing Station(CLS) with a total of 6 kilometers fiber optics, 3run-4 inches HDPE pipe, 33 manholes, and beach manholes, including power cable (8-15 KV-DC)		
	3.2.2. Terrestrial: Baler CLS to SFLU CLS with a total of 240.2 kilometers fiber optics, 2-ducts (7-way microduct and 40mm HDPE), combination of underground, trench and bridge attachment, 315 pcs. (manholes, service box and access box).		

	3.3. The winning bidder will supply labor and necessary materials needed in the maintenance of the network or otherwise provided by DICT.		
4.	**SCOPE OF THE PROJECT** Maintenance and repair services includes the following services/activities to be rendered by the Contractor to ensure the continuous operation of the DICT- Luzon Bypass Fiber Optic Network.		
	4.1. Detailed Scope of Works for Maintenance		
	4.1.1. All FOC routes under Luzon Bypass Fiber Optic Network shall be patrolled daily. Special cases, such as construction near the network routes and sites, will require daily visits to monitor 3rd party activities, ensure that there is no risk to the network, and to prevent any cable cuts. The patrolling activity shall be summarized in a weekly patrolling report and submitted to DICT including update of all construction near the duct facilities.		
	4.1.2. In the event that the contractor detects, or has been made aware, that a third party is working or intends to work close to DICT-Duct Facility and FOC Network, contractor shall but not limited to;		
	4.1.2.1. Inform DICT as soon as possible. DICT will be the one coordinating this to local government authority for appropriate action.		
	4.1.2.2. Duly fill a warning letter form, get it signed by the 3rd party/project owner and submit to DICT.		
	4.1.2.3. Document the third party name, route under risk, date/time, and expected action to take.		
	4.1.2.4. If the 3rd party has all permission, locate the cable route, monitor the 3rd party activities to ensure that there is no risk to the DICT network and to prevent any cable/duct cut or damage.		

	4.1.3. Report of damaged DICT facilities for the Luzon By-pass fiber network.		
	4.1.4. Follow up on all cut cases up to permanent repair and settlement is completed with third party/project owners.		
	4.1.5. Contractor shall execute proper and advance coordination with DICT for DICT to timely facilitate the needed permits from the government authorities and municipalities for them to carry out the preventive maintenance service.		
	4.1.6. Conduct cleaning and dewatering of manholes/service box at least twice (2) a year.		
	4.1.7. Sealing of vacant and occupied pipes with end cap/plug and simplex duct plug respectively.		
	4.1.8. Check and replace missing end caps, connectors (micro-duct).		
	4.1.9. Perform monthly link attenuation test on all dark fibers from ODF to ODF between Cable Landing Station to Relay Station and Relay Station to Relay Station to check if span loss is within acceptable limits.		
	4.1.10. Contractor should submit a Traffic Management Plan for every scheduled activity along the Luzon By-pass fiber network.		
	4.1.11. Submit weekly, monthly and quarterly reports as Key Performance Indicator (KPI).		
	4.2. Repair Services through Framework Agreement		
	4.2.1. Detailed Scope of Works		
	4.2.1.1. Secure 24/7 on-call/standby repair team for immediate response in case of network failure..		

	4.2.1.2. Regardless of the cause, the contractor should find out the fault, cut or damage the location and splice the working fibers (and High-Voltage power cable if fault is in the fronthaul) to restore the traffic as soon as possible. Splicing of the non-functioning fibers and couple the free ducts should be done on the permanent restoration;		
	4.2.1.3. Contractor shall prepare and submit an incident report, notice for cable cut\duct damage to DICT.		
	4.2.1.4. Restoration and replacements of damaged and/or stolen fiber optic cables.		
	4.2.1.5. Restoration and replacements of damaged and/or stolen power cables.		
	4.2.1.6. Restoration/Repair of broken duct/conduit system and other underground facilities including bridge attachments.		
	4.2.1.7. Installation of duct/conduit system including existing facility for the rerouting due to road widening and other related works.		
	4.2.1.8. Restoration and repair is not limited to fiber optic network link, but also to OSP facilities (ex. uplifting of manhole frame and cover, manhole repair).		
	4.2.1.9. Installation of aerial cable including all accessories, if necessary (for temporary restoration).		
	4.2.1.10. Pole installation including all accessories, if necessary (for temporary restoration).		
	4.2.1.11. For repair and restoration of fiber optic cable, the contractor must submit revised as-built plans (in PDF format and printed in A3 paper), test results (OTDR before and after and Optical Loss		

	Testing), material consumption and other necessary documents.		
	4.2.1.12. The contractor and/or DICT shall provide the respective materials for any corrective maintenance services to be performed by the contractor. The contractor shall provide all needed spare materials identified in the DICT approved Framework Agreement List.		
	4.2.1.13. Secure own warehouse for safe-keeping of spare materials and equipment.		
	4.2.1.14. Contractor should have a Traffic Management Plan in place during restoration/repair activity along the Luzon By-pass fiber network.		
	4.2.1.15. Contractor shall provide a three (3) months warranty from the date of permanent restoration during which time the Contractor shall remedy, free of charge, any failure, repair or restoration.		
	4.2.1.16. Contractor must be in constant coordination with the DICT from start to finish during restoration/repair and document everything for submission to DICT.		
	4.2.1.17. Contractor shall execute proper and advance coordination with DICT for DICT to timely facilitate the needed permits from the government authorities and municipalities for them to carry out any restoration/repair works.		
	4.2.2. Response and Report Time Target		
	4.2.2.1. Contractor considers all interruptions in service as urgent priority. Expected response and repair time are given in the table below:		

Hours / Days Coverage	*Level Type of Restoration*	*Response Time*	*Restoration Time*

	24 X 7 X 365 Days Monday to Sunday	*LEVEL 1*	*Max. 2 hours* *(must be on site/work place)*	*8 hours from issuance of trouble ticket*		
		LEVEL 2		*6 Days from issuance of trouble ticket @ level 1*		
	Level 1: Temporary Restoration- cable re-routing (from underground to aerial and pole installation, fiber blowing on vacant tube). Level 2: Permanent Restoration- base on original plan. Count zero (0) is the time received of the trouble ticket by the contractor on Level 1. Notes: Failure to comply with the given restoration time will result in Liquidated Damages.					
5.	**PROJECT DELIVERABLES**					
	5.1. Maintenance Supplies/Materials and Equipment Contractor will provide all materials, labor and equipment needed for the maintenance and repair services of the Luzon-Bypass Fiber Optic Network or otherwise provided by DICT. *Note: All materials/supply to be used by the contractor is subject for approval of DICT and shall conform to Common Materials and Equipment Specifications in Annex B*					
	5.2. Reports, Specification, Practices and Procedures The following Reports, Practices and Procedures shall be prepared by the Contractor, called as the "Technical Documents" in this paragraph, to be approved by DICT.					
	5.2.1. Installation/Construction Practices					
	5.2.2. Restoration/Maintenance Procedures					

	5.2.3. Inspection and Acceptance Test Procedures, For Outside Plant System and Optical Fiber Cable Systems		
	5.2.4. KPI Report *Note: The Contractor shall submit to DICT all the technical documents both in hardcopy and softcopy (in original editable format) including all revised as-built plans and drawings involved in the project*		
	5.3. Manpower Work Requirements		
	5.3.1. **Manpower** Personnel must be properly trained to use such related equipment and do the maintenance and must be available on a moment's notice in cases of fiber cut/break. In order to effectively maintain the FOC Network, maintenance personnel, at the minimum, must include the following: a. One (1) Project Manager b. One (1) Project Engineer/Coordinator c. One (1) Warehouseman d. Two (2) Maintenance team that consists of seven (7) personnel **(1 team dedicated per Segment)** − One (1) OSP Supervisor − Two (2) Lineman − Two (2) Splicers/Commissioning personnel − Two (2) Support personnel e. Two (2) Repair/Restoration team that consists of the following personnel **(1 team allotted per Segment)** − One (1) OSP Supervisor − Two (2) Lineman − Two (2) Splicers/Commissioning personnel − Two (2) Support personnel − One (1) HDD Team		

	- One (1) Fiber Blowing Team *Note: All contractor personnel must have at least 3 year's related experience with respect to their positions except for the Project Manager and Project Engineer which must have a minimum 5 years' experience. All must have the necessary professional/trade certifications related to their field of specialization. Also, all personnel communication expenses should be shouldered by the contractor.*		
	5.3.2. **Satellite Office with Warehouse Capability** The contractor must establish or use existing satellite offices for each Segment of the Luzon Bypass Infrastructure to promptly carry out daily activities. The Satellite Office, where the technical team will be stationed, should have a Warehouse for storage of all materials provided by the Contractor and DICT. Contractor is required to update and maintain records of the list of supplies and materials, when stocks are being used or consumed and are readily available upon request of DICT. Segment A Satellite Office is responsible from Baler Front-haul to MH149 while Segment B Satellite Office is responsible from SFLU Front-haul to MH 149. The contractor has the option to choose the location of their offices along the Segment of the LBI, preferably midway of the Segment for better restoration response time. The contractor has the option to use its existing warehousing facilities provided they comply with the response time consistent with the SLA		
	5.3.3. **Personnel Protective Equipment (PPE) and Safety Devices** Contractor must also provide and ensure that all personnel are wearing proper PPE at all times and use safety devices in their working area to		

avoid any accident. Personnel should also wear proper uniforms and ID at all times.

Site/workplace must have proper warning devices/signage during restoration.

5.4. Tools and Equipment

As part of the maintenance activity, all necessary equipment and tools must be available at all times. Contractor must have the following common tools and equipment to do the maintenance activities in the duration of the contract.

Description
*Arc Fusion Machine
*Optical Loss Test Set (Power Meter & Light Sou
*Optical Time Domain Reflectometer (OTDR)
Fiber Blowing machines (w/complete accessorie
HDD machines (w/ complete accessories)
Splicing Tools/Equipment
Micro-duct jointing tools
Submersible pump
Lineman Tool Kits
Cable jack/trailer or Boom truck
Jack hammer
Air Compressor
Fiber Extension Ladder
Digging Tools / Carpentry
Other necessary tools/ equipment for maintenar

Note: All test equipment that will be used for this project such as Items 1, 2, and 3, shall have

	updated calibration certificates (issued by any third party) to ensure accuracy of results		
	5.5. Maintenance vehicles Contractor must have the following minimum vehicles (in good working condition) to mobilize necessary tools and materials that will be used in the maintenance and repair of the network in the duration of the contract. 1) Two (2) Splicing Van with Ladder rack/holder 2) One (1) Fiber Blowing Vehicle 3) One (1) Bucket Truck 4) One (1) Set HDD machine (including other vehicle needed for HDD works) 5) One (1) Boom Truck 6) Two (2) Service Vehicles with Ladder rack/holder 7) Two (2) Patrolling Vehicles with GPS *Note: Maintenance Vehicle should already be inclusive of all expenses (i.e., petrol, maintenance, toll fees, LTO registration).*		
	5.6. Compatibility / Interoperability with the Existing Technology The specification of the fiber optic cable, (underground and aerial) must be in compliance with the DICT fiber optic requirements which is ITU-T G.652D. All other Outside Plant materials shall conform with the latest Telco standard.		
	5.7. Testing and Acceptance The contractor is responsible in the performance of all civil and cable network pre-test requirement but not limited to: Fiber Optic Cable (FOC) – attenuation and all its related testing, power meter test, and grounding test and all other tests that may need to perform to complete the FOC test requirements.		

	5.7.1 Acceptance tests shall be performed to all fiber optic cable to confirm the manufacturer's tests. As per ITU-T G.652D the fiber loss/km: at wavelength 1310nm loss shall be **0.4 dB/km** or less; at 1550nm shall be **0.3dB/km** or less.		
	5.7.2. End-to-end attenuation is the amount of optical power loss between cable system connector tips. This will include the fiber and splice /connector loss in the cable system after it has been installed Splice acceptance tests *(individual splice insertion losses)* − splice loss shall not be above **0.1 dB for fusion;** − connectors shall have insertion losses of **0.5 dB or less.**		
	5.7.3. All OSP installation/construction and materials shall conform with the latest Telco standard.		
	5.7.4. DICT will issue certification of acceptance on all civil and cable network testing done by the contractor.		
	8.2. Payment for repairs will be on the basis of Call-Off made. Reports/Documents for payment of Purchase Order: 1. List of materials used (witness by DICT personnel) 2. Repair and Test report (before and after) restoration 3. Pictures before and after restoration 4. Revised/updated as-built plan/drawing with GPS reading/landmark		
9.	**PROJECT TIMEFRAME** Upon receipt of Notice to Proceed, the duration of the contract is one (1) year for maintenance of		

	the Luzon Bypass FOC network. While the maintenance materials and equipment must be available and inspected within 60 days upon receipt of Notice to Proceed.		
10.	**Annex B: Common Materials and Equipment Specifications**		
	10.1.1. **Fiber Optic Cable Requirements** Contractor must provide to DICT the detailed specification of their offered fiber optic cable (FOC) vis-a-vis compliance with ITU-T Recommendation G.652d.		
	10.1.1.1. Cable Construction: General considerations The basic purpose is to keep transmission and mechanical strength properties stable in the course of the cable manufacturing process, cable installation work and operation. Optical fiber cables offered must be able to withstand all possible weather conditions in the Philippines when used in an outside plant and installed underground or aerial. The optical fiber cables and accessories offered must be mechanically strong and chemically resistant to be suitable for use under extreme external conditions. Cable sheath marking shall be as follows; ***Property of DICT Philippines;*** ***Manufacturer's Name and Fiber Count;*** ***Date of Manufacture;*** ***Length Marker; and*** ***Fiber type: SM***		
	10.1.1.2. Design Consideration		
	10.1.1.2.1 Underground Fiber Blowing (mini cable)		

	- Mini cable (Air blown) 144c ITU-TG652d - Black HDPE, a compound of PE and carbon black shall be used for the cable sheath. - Mini Cable must be fully water blocked and contain a fiber reinforced plastic (FRP) central strength member :1200N - Cable Fiber Attenuation: 0.35dB/km.max @ 1310nm; 0.22/km.max @1550nm - Product work with low friction tube bundles for optimum blowing performances. - Maximum outer diameter is 8.5mm, with maximum central strength member of 3.5mm		
	10.1.1.2.2. Client FOC specs - The fiber optic cable incorporates loose buffer tubes filled with gel that are stranded via the reverse oscillating lay method around a dielectric central strength member, sheath strength elements which function as the primary strength member, a single electrically chrome-coated steel (ECCS) armor with water blocking material applied to the armor and a polyethylene jacket for overall protection of the cable core - The central strength member is a glass/epoxy composite dielectric rod that functions as a strength member and anti-buckling element. Water blocking thread is placed longitudinally along the central member. - The buffer tubes are made of flexible tube material (FTM) and can contain up to 12 fibers in each tube. The individual fibers and buffer tubes are color coded for ease of identification.		

	– Gel-filled buffer tubes are filled with a water blocking material that is compatible with the buffer tube material, fiber coating, and fiber color. The material is non-nutritive to fungus, non-hygroscopic, electrically non conductive, homogeneous, and free from dirt and foreign matter. – In order to create a round cable, filler rods of the same diameter as the buffer tubes may be used to fill empty positions. Filler rods are made out of high-density polyethylene (HDPE) and are natural in color. – Fiberglass strength elements are applied over the cable core to provide the cable with the required tensile strength. – An outer medium-density polyethylene (MDPE) jacket, usually black in color, is applied over the cable to provide overall mechanical protection. – For ease of jacket removal, a clearly identifiable aramid ripcord is placed underneath the armor layer.		
	10.1.1.2.3. Aerial Cable – Cable Sheath (for the 48-core FOC) – Black HDPE, a compound of PE and carbon black shall be used for the cable sheath. – The moisture barrier shall consist of a longitudinally applied laminate of polymer coated aluminum foil. – A rip cord shall be laid beneath the outer sheath to facilitate access to the fiber. – The completed cable shall have sequentially numbered length markers at regular intervals of one meter (1.0m). – One or more strength members shall be incorporated into a cable structure designed to carry the tensile load associated with installation.		

- The fiber reinforced plastic (FRP), serving mainly as the central strength member must be laminated with an MDPE-Jacket to prevent disintegration/breakage of plastic materials use

10.1.1.2.4. Identification

The color coding of the loose tubes and the individual fibers within each loose tube shall be as follows:

Tube No./ Fiber No.	**Fiber Color**	**Tube Color**
1	Blue	Blue
2	Orange	Orange
3	Green	Green
4	Brown	Brown
5	Slate	Slate
6	White	White
7	Red	Red
8	Black	Black
9	Yellow	Yellow
10	Violet	Violet
11	Rose	Rose
12	Aqua blue	Aqua Blue

	Packing of Cables Cable protection shall include, as a minimum, a covering placed between the cable reel flanges and over the exposed layer of the cable. The covering shall be weather resistant and shall limit solar heating of the cable such that the cable surface temperature does not exceed 10°C above ambient temperatures under maximum solar radiation. The cable ends shall be accessible for testing, and securely fastened to the reel to prevent the cable from becoming loose in transit or during cable installation. End caps shall be securely installed to both cable ends to prevent escape of filling compound and entry of moisture during shipping, handling, and storage. The manufacturer shall state the sizes of cable drums used for the purpose of packing the offered single mode optical fiber cables. The minimum diameter of spool of the cable drums shall be at least 20 times the cable diameter		
	10.1.1.2.5. Contractor must submit a manufacturer's ISO Certification or other internationally accepted third party certifying authority of their offered FOC.		
	10.1.2. **High-Voltage (HV) Power Cable (8-15KV DC)** HV land cable consists of the following layers, starting from the center and moving toward the outer jacket: seven-strand copper wire No. 6 AWG conductor, semiconducting strand sheath, insulation, semiconducting insulation sheath, helically applied		

	copper shielding tape, and outer polyethylene jacket. Weight (kg/m): 0.44 Outer diameter (mm): 18 Minimum bend radius (cm): 22 Pulling tension (ken): 1.11 Voltage rating (kV DC-conductor to ground): 15 Current-carrying capacity (A): >50 Conductor resistance at 25degC (ohms/km): 1.345		
	10.1.3. **Micro-duct (7-way)** Micro-duct size OD/ID: 16mm/12mm diameter (with tolerance of ± 1%) Outer sheath made from HDPE and color orange Micro-duct must be metal free and can be installed direct buried Minimum working pull strength of 2500 lbs. Minimum pressure test is 15 bar Color of 7-tubes (white, blue, green, rose, yellow, violet and brown)		
	10.1.4. **HDPE pipes** **3.a HDPE- 4 inches' diameter** Outer sheath made from HDPE and color black SDR 11 diameter or equivalent to market available Minimum pull strength of 17,500 psi **3.b 40 mm HDPE** HDPE size OD/ID: 40mm/32mm diameter HDPE inside: rib type Outer sheath made from HDPE and color black Minimum pull strength of 3200 psi. Minimum pressure test is 15 bar.		
	10.1.5. **Micro-duct connector** Micro-duct connector size OD/ID: 16mm/12mm diameter Connector Outer shell is made from acrylate (clear) or polypropylene		

	Connector must be resistant in corrosion, most chemical and dirt Minimum pressure test is 15 bar with locking clips		
	10.1.6. **HDPE Connector** **a. 4 inches HDPE** Connector for 4 inches pipes either butt fusion or coupler. Connection must be water and dirt resistant **b. 40mm HDPE (Compression coupling)** Compression coupling size OD/ID: 40mm/32mm diameter Connector must be resistant in corrosion, moist chemical and dirt Minimum pressure test is 15 bar Seal way: Rubber ring		
	10.1.7. **Fiber Optic Cable Splicing Closure, Dome-Type** Minimum capacity:144 fiber (for underground) Minimum capacity: 48 fiber (for aerial) Seal way: Rubber ring high-strength engineering plastic shell that can endure harsh conditions such as vibration, impact, tensile cable distortion and strong temperature changes Reusable components to open seal in order to ensure a good airtight waterproof performance. Does not require special tools, easy to install and open the duplicate. Applicable aerial, direct-buried, wall-mounting, duct-mounting, and other accessories.		
	10.1.8. **Micro-duct joint closure (E/E pit)** Either Heat Shrinkable or Cold Seal Jointing capacity: 7 tubes		
	10.1.9. **Handheld Optical Time Domain Reflectometer (OTDR)** Support Single-mode Optical Time Domain Reflectometer		

	Using "PDA" technology, combining a simple user interface with the features of a mini-OTDR in a "micro" package. Highly portable OTDR to document and trouble-shoot fiber links works. Items should comply with parameters listed below, additional features are accepted. Wavelength of 1310/1550/1625 ns Distance range up to 250 km		
	10.1.10. **Optical Loss Tester** All-in-one light source and optical power meter supporting Single Mode (SM) [1310 nm/1550 nm] and Multi-Mode (MM) [850 nm/1300 nm] fiber Compact and lightweight Measures +23 dBm maximum optical power 20 hours of battery (dry cell) operation Useful fiber identification modulation function [270 Hz, 1 kHz, 2 kHz and continuous Wave (CW)] Items should comply with parameters listed below, additional features are accepted. Wavelength 1310/1550nm and 850/1300nm		
	10.1.11. **Arc Fusion Splicer** Automatic splice 7sec for fast mode; 12-15 sec auto mode Splice loss maximum 0.02dB for Single Mode Fiber Automatic/manual arc calibration Portable		
	10.1.12. **HDD Machine with Locator** Working distance up to 500 meters per one shoot Maximum Push and Pull Speed, 40m/min		
	10.1.13. **Fiber Blowing Machines** Can blow fiber up to 4km		

	Blowing speed up to 100m/min Blowing method either air or combination of air and water		

Bidder's Authorized Representative:

_____

Signature over Printed Name

_____

Principal Bidder/ Supplier