



**Republic of Ghana**

**Ministry of Communications and Digitalisation**

GDAP Project

**Terms of Reference**

**For**

**Engagement of Consulting firms to conduct a Nationwide Fiber Audit in Ghana**

**January, 2024**

## **1. Background**

The Ministry of Communications and Digitalisation (MoCD) has the core responsibility for initiating and developing national policies aimed at achieving cost effective information communications infrastructure and services for the enhancement and promotion of economic competitiveness in line with the policy guidelines of Coordinated Programme of Economic and Social Development Policies (2017-2024). The purpose is to enable government to develop policies that will help integrate information technologies into activities of the society and harness the full potential for effective development.

MoCD believes that all the needed basic building blocks to digitalize Ghana's economy fully are in place. Ghana as a result is moving into the next phase of its digitalization efforts to consolidate the gains that have been realized from our past initiatives. There will be more focus on integrating the ecosystem to eliminate siloed systems and promote data sharing and reuse. The Ministry will also focus on initiatives and systems that bring governance and public services closer to the average citizen and promote inclusion thereby bridging the digital divide.

MoCD as a result has followed through with Policies and Programs to actualize its mandate and the vision of the government to digitize all aspects of the economy fully and to ensure that no citizen is left behind.

The Government has therefore secured funding from the World Bank for its Ghana Digital Accelerated Project which aims to expand access to broadband, enhance the efficiency and experience of selected digital public services, and strengthen the digital innovation ecosystem. To achieve this objective, the project will consist of three interlinked technical components, in addition to the Project Management and Coordination Component, and a Contingent Emergency Response Component (CERC) to address the key binding constraints for the development and attainment of a digital economy.

## **2. Sector General Overview**

With mobile internet growing strongly and the government committed to extensive ICT development, Ghana's IT sector is gaining momentum. Demand for tech services and products is rising from private, and public sector bodies, Secondary and Tertiary Institutions as well as individuals, and the rollout of new in-country cable networks and nascent 4G is boosting connectivity. These factors, as well as Ghana's competitive advantages as a business destination, are stimulating the start-up scene.

The liberalization of the telecommunications sector in Ghana allowed many private operators to invest, own, and run telecommunication infrastructure to deliver communication services to its consumers. The commercial deployment of optical fiber infrastructure in Ghana began in late 2000. This development saw fiber deployment replacing most of the existing radio wave transmission system. The fiber cable deployment has received attention 10 years later, where tertiary, secondary, individuals, private and public institutions have access to the distributed fiber optics infrastructure.

## **2.1 Inland Fiber Optic Deployment**

All the four MNOs (MTN, Glo, Vodafone, and AirtelTigo) licensed to provide telecom services in Ghana have deployed fiber optics cable either as a backbone redundancy to the already existing microwave transmission infrastructure and/or metro fiber network to provide the necessary data capacity and voice traffic to the end-user. Voltacom, a subsidiary of Volta River Authority, installed the first backbone fiber optics network in Ghana. Taken advantage of the already existing pylons, Vodafone deployed an aerial fiber optic cable, which runs on the pylons. The fiber optic cable is installed on the southern and mid-portion of the national power grid.

In its quest to enhance data and voice traffic, MTN has deployed optical fiber networks across the country using underground deployment strategy to connect all the 16 regions in Ghana. Beside the backbone interconnections, MTN and Vodafone Ghana have deployed underground fiber metro networks (FTTx) in about 38 cities and towns. AirtelTigo, and Glo have all buried fiber cable underground to provide adequate capacity on the backbone route and providing redundancy route for the existing microwave links.

## **2.2 Fiber Deployment Challenges**

Fiber deployment comes with processes and procedures which, when not strictly adhered to could be a potential for threat to the entire project. The project involves multifunctional units and hence requires more comprehensive consultation.

## **2.3 Technical Challenges in Fiber Deployment**

Deploying underground fiber in a developing country such as Ghana comes with several technical challenges. Underground fiber optics cable is mainly laid along highways and by city roads. However, in an environment where buildings come up without authorization, planning fiber route and adhering to the planned routes become difficult. Designing and implementing fiber as planned becomes difficult. Sharing existing right of way (ROW) by multiple MNOs comes with the challenges of frequent fiber cable cuts. The instance where another MNO requests to deploy its fiber optics cable by sharing ROW with an existing MNO, the fiber cable of the existing MNO has a high risk of cut during excavation. One of the major causes of fiber optics cable cuts is the shallow depth of cable burial, especially when sharing a congested ROW.

## **2.4 Right of Way**

ROW acquisition to lay optical cables along the highway is extremely exorbitant and time-consuming. The process involved for an MNO to acquire a license to lay fiber optics cable along the public street is difficult and can have direct consequences in the implementation timelines. ROW management is essential in the deployment of optical infrastructure. Several MNOs have noted that overly burdensome requests for information slowed implementations, permits acquisition, unreasonable charges to use ROWs, and undue remediation and maintenance requests.

## **2.5 Request to Evaluate All Fiber Optic Cable Installations in Ghana**

To help with the delivery of telecommunications services in Ghana, many fiber-optic cables have been deployed throughout the nation; nevertheless, due to lack of standards, this crucial infrastructure has been subject to frequent disruptions. Installations of fiber-optic cables in Ghana include:

- i. Nationwide Backbone Fiber Networks
- ii. Metro Fiber Networks
- iii. Last-mile connectivity (FTTH, FTTB, FTTC, etc.).

The terrestrial/metro fiber licensees, internet service providers, and mobile/fixed network operators are the owners of these fiber-optic cable systems. Despite the importance of terrestrial fiber installations, no national standards were followed when they were laid. There is also no complete map of the current fiber installations to direct building contractors and utility companies in their operations. It has become necessary to evaluate the current fiber optic cable network in order to collect information for the creation of a national standard for fiber optic cable infrastructure database and map to help streamline the operations of the sector.

The National Communication Authority (NCA) has received financial support from the Ghana Digital Acceleration Project (GDAP) to engage the services of a consulting firm to undertake a nationwide fiber audit.

### **3. Objectives of the assignment**

The objective of the project is to assess the state of terrestrial fibre laid in Ghana and to subsequently develop national standards for terrestrial fibre deployment in Ghana.

There are fundamental requirements or standards for installing fiber optic cables, particularly regarding the depth of the fiber and required cable protection. The audit would also help with the creation of a thorough national standard for fiber optic cable deployment.

A nationwide audit of the fiber infrastructure will help harmonize requirement for terrestrial fibre deployment and gain up to date information on existing terrestrial fibre infrastructure, which would aid government decision-making on digital inclusion and national security since terrestrial fibre is a critical national infrastructure.

#### **Scope of the assignment**

The scope of this assignment involves a physical audit of fiber optics cables deployed across the country. The nationwide fiber audit will be zoned into three, namely, middle, south and north zones and the consulting firms shall perform the following tasks:

- i. Audit terrestrial fiber assets and layout through the appropriate sampling approach and by relying on information provided by the terrestrial fibre infrastructure owners.

- ii. Develop a database of all installed fiber locations after the audit which will be used for the development of a geospatial map of terrestrial fibre in Ghana Database shall include geolocations of cable routes, type of fiber infrastructure,
- iii. Examine and identify all backup routes for redundancy.
- iv. Build the capacity of the relevant NCA staff to enable them to undertake the subsequent audits (training on methodology, reporting and tools used for audit).

**4. Key Deliverables of this assignment**

The expected deliverable or output of the field fiber audit would be in the form of a technical report. The report should provide information such as the following:

1. Submission of Inception Report that includes implementation plan and methodology.
2. Submission of Draft Final Report containing the following:
  - o Coordinates of fiber routes
  - o Whether the fiber had been laid underground or aerial
  - o The depth of trenching if the cable is buried underground.
  - o Areas where there are markings of the fiber and trenches/ducts.
  - o The type of fiber deployed.
  - o Fiber termination points
  - o Active fiber at each termination point / Current and planned data capacity
  - o Identification and analysis of the back up routes for redundancy.
3. Submission of a database of all installed fiber locations based on the audit.
4. Submission of a geospatial map of terrestrial fibre in Ghana Database that shall include geolocations of cable routes, type of fiber infrastructure.
5. Deliver the training to NCA with objective to build its capacity to enable them to undertake the subsequent audits (training on methodology, reporting and tools used for audit).
6. Submission and approval of Final Report

**5. The expected Audit Report and Deliverables and payment terms**

The following deliverables are expected from the consulting firm with accompanying payment terms.

	Key Milestones	Timelines	Payment Schedule
1	Submission of Inception Report that includes implementation plan and methodology	One (1) month after the commencement of the assignment.	Twenty percent (20%)

2	Submission and approval of Draft Final Report containing all the deliverables	Seven (7) months after commencement of assignment.	Forty percent (40%)
3	Submission and approval of Final Report	Nine (9) months after the commencement of the assignment.	Forty percent (40%)

**6. Key personnel for the assignment**

**1. Team Leader.**

- The Team Leader must have at least Master’s degree in a related engineering field.
- The team lead must have at least 10 years’ experience in telecommunications sector with at least 6 years’ experience in fibre optic cable deployment.
- Must have at least 8 years’ experience in similar assignment either international/national
- Must have an in-depth understanding and hands-on experience of the Ghanaian communications environment.
- Must have project management expertise in managing similar and complex assignment.

**2. Subject Matter Experts (SMEs) – Four**

- The team must include **subject** matter experts (SMEs) who must be specialists in the respective fields of Telecommunications (Network planning), fiber ducts experts, Civil Works, GIS, Database and network performance etc.
- They must have at least 5 years of experience in similar assignment.
- Must have a minimum of a Bachelor’s Degree in Electrical/Electronic/Telecom Engineering or related field.

**3. Telecommunications Engineers – Two staff**

- Must have a minimum of a bachelor’s degree in Electrical/Electronic/Telecom Engineering.
- Engineers must have at least 5 years of experience in the telecommunications sector, with relevant experience in fiber optic cable deployment.
- Strong knowledge and understanding of International Standards for terrestrial fibre deployment.

## **7. Project Duration**

The entire project will span a period of nine (9) months.

## **8. Firm's Experience and Qualifications**

The following are the vendor qualification requirements required for the assignment:

- The Vendor should have successfully implemented and supported the proposed solution in at least two institutions within the last 5 years.
- The vendor must be an established firm with at least 10 years of experience in Information system implementation with demonstrable experience in Africa.
- The firm must obtain a data protection certificate from the Data Protection Commission of Ghana.
- The firm shall fully recognize that non-compliance or violation of any of the above requirements and standards during the contractor's engagement with the NCA may result a request for replacement of personnel or termination of the contract.

## **9. Environmental Safeguard Standards**

- i. The consultant shall abide by all the Environmental and Social Commitment Plan and the World Bank Environmental Safeguard regulations.
- ii. The consulting firm shall conform to the environmental Assessment Safeguard Standards of the country
- iii. The consulting firm shall put in place the mechanism to avoid Sexual Exploitation and Abuse (SEA), Sexual Harassment (SH) and Child Abuse and shall conform to country regulations on same.

## **10. Reporting and Coordination**

The consulting firm will report directly to the Deputy Director-General, Technical Operations, NCA and indirectly to the GDAP Coordinator and collaborate closely with relevant stakeholders throughout the project.

## **11. Confidentiality**

All data and information collected during the audit must be treated confidentially and used exclusively for the consultancy's purpose.

## **12. Intellectual Property**

Intellectual property rights for all reports and materials developed during this consultancy will belong to the MoCD.