THE UNITED REPUBLIC OF TANZANIA

PRESIDENT'S OFFICE, PUBLIC SERVICE MANAGEMENT AND GOOD GOVERNANCE

e-GOVERNMENT AUTHORITY

Document Title

Standards and Guidelines for ICT Readiness in Government Owned Infrastructure.

Document Number

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APPROVAL	Name	Job Title/ Role	Signature	Date
Approved by	Dr. Mussa M. Kissaka	Board Chairperson	Mkissaka	01/07/22

PREFACE

Government Infrastructures are widely implemented as the country's economy increases rapidly. Each public institution has been implementing infrastructures without considering the need of use of ICT leading to improper ICT implementation.

In that regard, it was apparent for enactment of the e-Government Act No. 10 of 2019 and its Regulations, 2020, which provide guidance on proper approach for implementing e-Government and establishment of e-Government Authority with mandate of coordinating, promoting and overseeing e-Government implementations as well as enforcing compliance with laws, regulations, standards and guidelines related to e-Government implementations in Public Institutions.

In this context, Section 23 (2) of the e-Government Act requires and empowers the e-Government Authority to provide guidance on the construction of any Government owned infrastructures such as roads, railways, buildings and any other infrastructure for the purpose of ensuring cost effectiveness and ICT readiness. Pursuant to these provisions, the Authority has prepared this document to provide guide on Government Infrastructure Implementation.

Dr. Mussa M. Kissaka
BOARD CHAIRPERSON

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1. INTRODUCTION

1.1. Overview

e-Government Authority also known as "e-GA" is a Government institution which was established in September 2019 under the e-Government Act No. 10 of 2019. The Authority is mandated to coordinate, oversee and promote e-Government initiatives and enforce e-Government related policies, laws, regulations, standards and guidelines in Public Institutions.

This document establishes standards and guidelines to the implementation of any Government owned infrastructure such as roads, railways, buildings and such other infrastructure as pursuant to Section 23 (2) of the e-Government Act, 2019.

1.2. Rationale

ICT infrastructure enables real time data, connectivity, increased productivity of employees, reduces errors in contracts documents, enhanced marketability and machine to machine communications. Furthermore, helping public institutions to bridge the gap between remote sites, improving management efficiency and reducing the time it takes to make important business decisions. As a result, making it easy in doing complex tasks. Thus, ICT is one of the critical technological pillars for the construction of any government owned infrastructure

1.3. Purpose

The purpose of this document is to establish standards, technical guidelines, proper elements and commitments to be in place in ensuring cost effectiveness and ICT readiness in construction of any government owned infrastructure.

1.4. Scope

This Standards and Guidelines for ICT Readiness in Government Owned Infrastructure document is applicable to government owned infrastructure such as Buildings, Roads/Bridges and Railways that are to be implemented by public institutions.

2. STANDARDS AND GUIDELINES FOR ICT READINESS IN GOVERNMENT OWNED INFRASTRUCTURE.

2.1. STANDARDS

1.1.1 Buildings Construction

1.1.1.1 ICT cabinet room should have minimum dimensions of 2mx2m (4m2).

1.1.1.2 Server room should have minimum dimensions of 4mx4m (16m2).

1.1.1.3 Control room should have minimum dimensions of 3mx3m (9m2).

1.1.1.4 Ducts material to be used should be Polyvinyl Chloride (PVC) or other material approved by the Tanzania Building Agency (TBA).

1.1.1.5 A hand hole should have the following dimensions;

i. Minimum length of 1690mm;
ii. Minimum width of 1120mm;
iii. Minimum depth of 1650mm; and
iv. Cover size with minimum diameter of 600mm (for round cover).

1.1.1.6 The hand hole must have a galvanized rods ladder.

1.1.1.7 Hand hole's top cover material to be used shall be reinforced fiber glass rid or any other heavy duty reinforced materials not made of metals capable of carrying a load of not less than 5 tones. The rid shall be labelled with network provider's name.

1.1.1.8 Location of the data points sockets should be 45cm above the floor finishing

1.1.2 Roads and Bridges

1.1.2.1 For each 500m along the Trunk Road there is a provision of a duct across the road for underground utilities with maker posts having World Geodetic System 1984 (WGS84) Coordinates.

1.1.2.2 For each 500m along the regional road there is a provision of a duct across the road for underground utilities with maker posts having World Geodetic System 1984 (WGS84) Coordinates.

1.1.2.3 For each 500m along the District Road there is a provision of a duct across the road for underground utilities where applicable with maker posts having World Geodetic System 1984 (WGS84) Coordinates.

1.1.2.4 At each junction along District Roads there shall be a provision of duct across for underground utilities where applicable with maker posts having World Geodetic System 1984 (WGS84) Coordinates.

1.1.2.5 Flyovers/Interchanges is installed with CCTV as per CCTV technical Guideline by the e-Government Authority (e-GA).

1.1.3 Railways

1.1.3.1 The acceptable Railway Signaling System minimum level should be ERTMS Level 2 (ETCS -2 with Wireless GSM-R)

1.1.3.2 The GSM-R system should use the double layer coverage architecture in order to ensure sufficient coverage along the whole line and also provide redundancy.

1.1.3.3 There should be a minimum of two Robust Axle counters (SIL4 certified) per each block section to be used for Train control under train Dispatching System

1.1.3.4 Specifications of Optic Fiber Cables shall be as prescribed in Optic Fiber Cable infrastructure guideline document by the Ministry of Information, Communication and Information Technology.

1.1.3.5 There shall be at least Two (2) Optic Fiber cables Single mode. One installed underground in a duct at minimum depth of 1.5 m below the ground level and the other on Catenaries pole along the same side of the track as back up. An additional underground cable shall be installed in the spare duct to be used for future commercial.

1.1.3.6 Optic Fiber Network along the railway line shall be of ring connection basis.

2.2. GUIDELINES

2.2.1. General Guidelines

A public institution intending to implement any Government owned infrastructure shall ensure that:

2.2.1.1. ICT infrastructure requirements are included as part of the project design

2.2.1.2. ICT infrastructure is implemented by a qualified ICT expert with close supervision or collaboration with the internal ICT Department/Unit.

2.2.1.3. A scalable network design is implemented and shall have capabilities to connect to other networks when required.

2.2.1.4. ICT infrastructure are properly grounded where applicable and routine measurement of earth ground values for preventive maintenance purposes as well as safety assurance is done.

2.2.1.5. ICT cables are installed separately from electrical cables.

2.2.1.6. Proper cable management practices are followed such as using cable trays cable labelling and quality termination.

2.2.1.7. Vendor lock-in is avoided by using equipment from different manufactures whenever possible.

2.2.1.8. Accurate and latest ICT drawings and technical documentations are maintained.

2.2.1.9. ICT infrastructure shall have a main power supply and a backup power source.

2.2.1.10. ICT infrastructure implemented shall not compromise the environment, natural habitats and are safe to users.

2.2.1.11. All documents such as User manual, technical manual/Drawings, Maintenance manual and Software license manual are be provided.

2.2.1.12. ICT design documents are shared to the Authority.

2.2.2. Buildings Construction

2.2.2.1. For areas where buildings are to be constructed, a master plan layout shall be available that will guide the laying of ICT ducts/cable along or across the road as per manual for control utilities within the road reserves established by ministry of works and transport.

2.2.2.2. A building has conduit ducts through which ICT cables will run through.

2.2.2.3. For storey buildings a dedicated ICT cabinet room in each floor with specified dimensions is in place.

2.2.2.4. A building is provided with completely sealed (no windows) server room with specified dimensions and a secured door.

2.2.2.5. For a multi-storey building, the server room is placed at the middle of the building near the center of the floor.

2.2.2.6. The server room is equipped with at least two (2) alternating Air conditioners, dry powder fire extinguisher and must be free from running water pipes and wet areas.

2.2.2.7. A building is equipped with ICT security infrastructure.

2.2.2.8. A building has a control room for CCTV and Access Control Systems.

2.2.2.9. A dedicated power (clean power) infrastructure is provided to serve ICT equipment in a building.

2.2.2.10. A building is provided with ICT duct aligned to the ICT cabinet room and server room with hand hole near the main entrance of the ICT duct.

2.2.2.11. For underground cabling along or across the road when connecting two or more buildings the laying of cable/duct is per manual for control utilities within the road reserves established by Ministry of Works and Transport.

2.2.2.12. Installation of overhead cables when connecting two or more buildings has to be as per the manual for control utilities within the road reserves established by Ministry of Works and Transport.

2.2.2.13. ICT ducts/conduits are separated from other ducts/conduits.

2.2.3. Roads and bridges

2.2.3.1. The reserved utility corridor along the roads and bridges are to be ducted.

2.2.3.2. The roads and bridges are to be built with underground utility duct for data cables.

2.2.3.3. For existing roads with non-ducted underground utilities, the permitted owners/investors are mandated to build sharable duct to other investors while conforming to the prescribed specifications from the Optic Fiber infrastructure guideline document by the Ministry of Information, Communication and Information Technology.

2.2.3.4. All systems to be used in roads and bridges for monitoring shall be interfaced.

2.2.3.5. All systems to be used in roads and bridges for monitoring shall be configured to generate accurate data and reports based on the needs to enable easy analysis and decision making.

2.2.3.6. ICT related components are to be leveraged in design of roads and bridges.

2.2.4. Railways

2.2.4.1. The signaling system avoids (where possible) the use of track side equipment because of vandalism and theft of materials such as copper wire, solar panels and scrapped metals.

2.2.4.2. All Signaling, Telecommunication and data communication system equipment are compatible, and do not adversely affect any other equipment installed in the same location or along the other existing railway lines to ensure smooth operation.

2.2.4.3. Provision of Time distribution and Synchronization systems (Master clock) along the line has been and integrated with any existing SGR master clock

2.2.4.4. A remote Supervision Center (Network Operation Center) at one location and a backup in other location for remote control and supervision of all Signaling, telecommunication and IT systems for the whole railway lines are established.

2.2.4.5. Centralized Traffic Control ((CTC) -Train Dispatching Command Centre) at one location and a backup in another location with a wall mounted big screen/video wall showing all stations along the entire line signal layout, real time display status and train tracing are in place.

2.2.4.6. Provision of Shunting Signals together with its control cabin and GSM-R Handheld plus Base station radio for Marshalling yard operations has been considered.

2.2.4.7. Provision of defect detectors such as Hot Box detector, Hot Wheel detector, Dragging Detector and Wheel Impact load detectors has been considered.

2.2.4.8. Provision of connectivity manholes and ducts at the suitable locations to connect the new SGR fiber cable with the existing Meter Gauge Railway (MGR) stations along the line has been considered.

2.2.4.9. Provision of mail services system integration for all signaling and Telecom NMS has been considered.

2.2.4.10. A structured network connectivity is provided in every station, office, workshop, Marshaling yard and buildings.

2.2.4.11. GSM-R is compatible and integrated with the existing GSM-R Network covering the other SGR lines to ensure smooth operations.

2.2.4.12. Provision of underground ducts on railway is considered

3. IMPLEMENTATION, ENFORCEMENT AND REVIEW

This document shall be:

3.1. This document shall be effective upon being signed by the Board chairman on its first page.

3.2. Subjected to review at least once every three years or whenever necessary changes are needed.

3.3. In case of any exceptions to this document, its application must duly be authorized by Board chairman before documentation.

4. GLOSSARY AND ACRONYMS

4.1. Glossary

A server room: Is a centralized room used to store, power and operate server computers for non-critical applications and all other ICT equipment's.

Duct: A structure in form of channel, pipe, tube, or box culvert through which service infrastructure is placed or installed.

Intelligent Transport System: are the control and information systems that use integrated communications and data processing technologies for the purposes of:

i. improving the mobility of people and goods
ii. Increasing safety, reducing traffic congestion and managing incidents effectively
iii. Meeting transport policy goals and objectives – such as demand management or public transport priority measures

Centralized Traffic Control: Railway signaling technology equipment that conducts dispatching and command of the trains and shunting operations in the section under jurisdiction and achieves centralized control by signal equipment like interlocking, train control and section block

European Rail Traffic Management System: European signaling and speed control system that ensures interoperability of the national railway systems, reducing the purchasing and maintenance costs of the signaling systems as well as increasing the speed of trains, the capacity of infrastructure and the level of safety in rail transport.

European Train Control System: Signaling and control component of the European Rail Traffic Management System (ERTMS).

Global System for Mobile Communications – Railway: International wireless communications standard for railway communication and applications.

Network Management System: an application or set of applications that lets network administrators manage a network's independent components inside a bigger network management framework

Safety Integrity Level 4: Safety standard that set the optimal safety level for the probability (likelihood) of a safety-related system performing the required safety function under all the stated conditions within a stated period of time

Traction Power Station: Power station that produces only traction (electric) current used for railways

Marshalling Yard: Location along the railway line (railway yard) used to separate railways cars onto one of several tracks

Infrastructure: It is simply the basic physical and organizational structures and facilities (e.g. buildings, roads, power supplies) needed for the operation of a society or enterprise

ICT Infrastructure: Simply all the information and Communication Technology infrastructure and systems (including software, hardware, firmware, networks and the company websites) that are used in an organization

ICT Cabinet Room: Is a room smaller that a server room that contains racks cabinets used to hold ICT equipment such as switch, brushes, and patch panel.

4.2. Acronyms

CCTV	Closed Circuit Television
e-GA	e-Government Authority
LAN	Local Area Network
ITS	Intelligent Transport System
CTC	Centralized Traffic Control
ERTMS	European Rail Traffic Management System
ETCS	European Train Control System
GSM-R	Global System for Mobile Communications – Railway
MGR	Meter Gauge Railway
NMS	Network Management System
SGR	Standard Gauge Railway
SIL4	Safety Integrity Level 4
TPS	Traction Power Station

5. RELATED DOCUMENTS

i. The e-Government Act, 2019

ii. e-Government General Regulations, 2020

iii. Data Centre standards for public institutions (eGA/EXT/IRA/003)

iv. Optic Fiber Installation infrastructure guideline document by the Ministry of Information, Communication and Information Technology

v. Manual for Control of Utilities Installation within Road Reserve

6. DOCUMENT CONTROL

Version	Name	Comment	Date
Ver. 1.0	e-GA	Creation of Document	July, 2022

APPENDIX

Appendix I: Checklist for ICT Readiness in Government Owned Infrastructure.

1. General Checklist					
	Question	**Yes**	**No**	**N/A**	**Remarks**
1.1.	Are the ICT design documents shared to the Authority?				
1.2.	Are ICT Infrastructure requirements included as part of the project design?				
1.3.	Is ICT Infrastructure design implemented by a qualified ICT expert with close supervision or collaboration with the internal ICT Department/Unit?				
1.4.	Is a scalable network design implemented having capabilities to connect to other networks when required?				
1.5.	Is ICT infrastructure properly grounded?				
1.6.	Is there a planned routine measurement of earth ground values for preventive maintenance purposes?				
1.7.	Are ICT cables installed separately from electrical cables?				

1.8.	Are Proper cable management practices followed such as; - using cable trays - cable labelling and - Quality termination.				
1.9.	Are accurate and latest ICT drawings and technical documentations maintained?				
1.10.	Is the ICT ducts design available?				
1.11.	Are ICT infrastructure having a main power supply and a backup power source?				
1.12.	Are ICT infrastructure implemented not to compromise the environment, natural habitats and are safe to users?				
1.13.	For acquired systems are all documents such as User manual, Technical manual/Drawings, Maintenance manual and Software license manual provided?				
2. Building Construction					
2.1.	Is there a master plan layout to guide laying of ICT ducts/cables outside the building?				

2.2.	Are conduit ducts in place to accommodate ICT cables?				
2.3.	Is there ICT cabinet room(s)? Has it met the standards?				
2.4.	Is a server room available? Has it met the standards?				
2.5.	Is a server room equipped with two alternating air conditioners, dry powder fire extinguisher and away from water pipes and wet areas?				
2.6.	Is the building equipped with ICT security infrastructure?				
2.7.	Is there a control room for CCTV and access control systems? Has it met the standards?				
2.8.	Is there dedicated clean power infrastructure to serve ICT equipment?				
2.9.	Is the ICT duct aligned to the ICT cabinet room and server room? Has the duct material met the required standards?				
2.10.	Is there a hand hole near the main entrance of the ICT duct? Has the hand hole specifications met the required standards?				
2.11.	Has the design of laying cable/duct outside the building abided to the requirements for control utilities within the road reserves?				

2.12.	For installation of overhead cables; are the requirements for control utilities within the road reserves considered?				
2.13.	Has the design separated ICT ducts/conduits from other ducts/conduits?				
3. Roads and Bridges					
3.1.	Is the reserved corridor for utility along the roads and bridges ducted?				
3.2.	Are the roads and bridges built with underground utility duct for data cables?				
3.3.	For existing roads with non-ducted underground utilities, have the permitted owners/investors built a sharable duct to other investors while conforming to the prescribed specifications from the Optic Fiber infrastructure guideline document by the Ministry of Information, Communication and Information Technology?				
3.4.	Are the monitoring systems used in roads and bridges interfaced?				
3.5.	Are monitoring systems used in roads and bridges configured to generate accurate data and reports?				
3.6.	Are the ICT related components such as Intelligent Transportation				

	System (ITS) leveraged in design of roads and bridges?				
3.7.	For each 500m along the Trunk road, is there a provision of a duct across the road for underground utilities with maker posts having World Geodetic System 1984 (WGS84) Coordinates?				
3.8.	For each 500m along the District road, is there a provision of a duct across the road for underground utilities with maker posts having World Geodetic System 1984 (WGS84) Coordinates?				
3.9.	For each 500m along the Regional road, is there a provision of a duct across the road for underground utilities with maker posts having World Geodetic System 1984 (WGS84) Coordinates?				
3.10.	For a junction along the District Roads is there a provision of duct across for underground utilities?				
3.11.	For Flyovers/Interchanges is CCTV installed as per CCTV technical Guideline by the e-Government Authority (e-GA)?				
4. Railways					
4.1.	Is railway built with underground utility corridor for both data and				

	electric cables relocated in separate service ducts?				
4.2.	Are weighbridge systems accurately configured to all weighbridge stations and monitored?				
4.3.	Are monitoring systems interfaced and configured to generate accurate data and reports based on the needs to enable easy analysis and decision making?				
4.4.	Is the Railway Signaling System implemented with minimum ERTMS Level 2?				
4.5.	Is the GSM-R system used the double layer coverage architecture?				
4.6.	Is there at least two Robust Axle counters (SIL4 certified) per each block section for Train control under train Dispatching System?				
4.7.	Is the installed Optic Fiber Cables comply with the recommended specifications as per Optic Fiber Cable infrastructure guideline document by the Ministry of Information, Communication and Information Technology?				
4.8.	Are there Three (3) Optic Fiber cables Single mode type installed along the railway line?				
4.9.	Are there two underground Optic Fiber cables in ducts at minimum				

	depth of 1.5 m below the ground level, where one is the Core Backbone and the other as spare reserved for future use?				
4.10.	Is there One Optic Fiber cable deployed on Catenaries pole (Overhead) along the same side of the track as backup?				
4.11.	Is the Optic Fiber network installed along the railway line (Core backbone System) in Ring connection?				
4.12.	Is the signaling system use track side equipment?				
4.13.	Is Signaling system equipment compatible and does not adversely affect any other equipment installed in the same location or along the other existing railway lines?				
4.14.	Is Telecommunication system equipment compatible and does not adversely affect any other equipment installed in the same location or along the other existing railway lines?				
4.15.	Is data communication system equipment compatible and does not adversely affect any other equipment installed in the same location or along the other existing railway lines?				

4.16.	Is Time distribution and Synchronization systems (Master clock) provided?				
4.17.	Is Time distribution and Synchronization systems (Master clock) integrated with any existing SGR master clock?				
4.18.	Is the remote Supervision Center (Network Operation Center) established?				
4.19.	Is the established remote Supervision Center (Network Operation Center) has backup in other physical location?				
4.20.	Is the Centralized Traffic Control ((CTC) -Train Dispatching Command Centre) established?				
4.21.	Is the established Centralized Traffic Control ((CTC) -Train Dispatching Command Centre) has wall mounted big screen/video wall showing all stations along the entire line signal layout, real time display status, train tracing?				
4.22.	Is the established Centralized Traffic Control ((CTC) -Train Dispatching Command Centre) has a backup in another location?				
4.23.	Is the Shunting Signals together with its control cabin and GSM-R Handheld plus Base station radio				

	for Marshalling yard operations provided?				
4.24.	Is the Hot Box detector available?				
4.25.	Is the Hot Wheel detector available?				
4.26.	Is the Dragging Detector available?				
4.27.	Is the Wheel Impact Load detector available?				
4.28.	Are the connectivity manholes and service ducts provided?				
4.29.	Is the provided connectivity manholes and service ducts placed at suitable locations for linking new SGR fiber cable with the existing Meter Gauge Railway (MGR) stations?				
4.30.	Is mail services system provided?				
4.31.	Is mail services system integrated with all signaling and Telecom NMS?				
4.32.	Is structured network connectivity available in every station?				
4.33.	Is structured network connectivity available in every offices?				
4.34.	Is structured network connectivity available in every workshop?				
4.35.	Is structured network connectivity available in every Marshaling yard?				
4.36.	Is structured network connectivity available in every buildings?				

4.37.	Is GSM-R system compatible with the existing GSM-R Network covering the other SGR lines?				
4.38.	Is GSM-R system integrated with the existing GSM-R Network covering the other SGR lines?				
4.39.	Is GSM-R system provided with a Performance management tool and data storage capacity able to keep the GSM-R network performance data for at least two years?				
4.40.	Is the underground ducts on railway available?				