Eskom	Report	Group Technology

Title: **Scope of Work for Non-Lethal Energized Perimeter Detection System (NLEPDS)**

Document Identifier: **240-170000192**

Alternative Reference Number: N/A

Area of Applicability: **Eskom Holdings SOC Ltd**

Functional Area: **Engineering**

Revision: **3**

Total Pages: **13**

Next Review Date: **N/A**

Disclosure Classification: **Controlled Disclosure**

Compiled by	Functional Responsibility	Authorized by
Donald Moshoeshoe	**Cornelius Naidoo**	**Judith Malinga**
Senior Engineer- PTM&C	**Middle Manager - Telecoms T&S CoE Manager**	**Senior Manager – PTM&C**
Date: 02/08/2023	Date: 2/8/2023	Date: 08/08/2023

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1. Introduction

Due to the constant changes in the risk profiles of Eskom assets and installations, the review of physical security measures is necessary to ensure that current threats are appropriately mitigated, through the implementation of suitable site specific protection measures, systems and procedures. This document provides an overview of Eskom's requirements for the design, supply, installation and commissioning of a Non-Lethal Energized Perimeter Detection System (NLEPDS).

Note: The terms Non-lethal Electrified Fence and Non-Lethal Energized Perimeter Detection System (NLEPDS) are used interchangeably in this document and shall refer to the same system.

2. Supporting Clauses

2.1 Scope

2.1.1 Purpose

The document serves as a technical guideline for the enquiry for a Non-Lethal Energized Perimeter Detection System (NLEPDS) Project and stipulates technical scope and deliverables for the project.

Note: Annex B shall be populated to capture site specific project details.

2.1.2 Applicability

This document shall apply to Transmission sites.

2.1.3 Effective date

The authorisation date.

2.2 Normative/Informative References

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

[1] ISO 9001 Quality Management Systems

[2] 240-78980848 Specification for Non-Lethal Energized Perimeter Detection System (NLEPDS) for protection of Eskom installations and its subsidiaries

[3] 240-60725641, Specification for Standard (19 Inch) Equipment Cabinets

[4] 240-83684419 PTM&C Technology Development

[5] 0.52/30122 Manufacturing detail for two way Energizer Kiosk

[6] 0.52/30123 Manufacturing detail for four way Energizer Kiosk

[7] 0.52/30124 Manufacturing detail electric fence controller kiosk

[8] 0.52/30125 Manufacturing detail electric fence guard house kiosk

[9] 240-171000171 Commissioning guideline for secondary plant physical security systems

2.2.2 Informative

Not Application

2.3 Definitions

Definition	Description
Tender	A tender refers to an open or closed competitive request for quotations / prices against a clearly defined scope / specification.

2.3.1 Disclosure Classification

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.4 Abbreviations

Abbreviation	Explanation
NLEPDS	Non-Lethal Energized Perimeter Detection System

2.5 Roles and Responsibilities

As per PTM&C technology development standard (240-83684419)

2.6 Process for Monitoring

Not applicable

2.7 Related/Supporting Documents

2.7.1 Reference drawings

[1] 0.54/8282 Non-lethal fence plan, sections and details

[2] 0.54/7470 Access Area Gates layout

2.8 Technical returnables

The tenderer shall submit the following deliverables for technical evaluation:

a) PSIRA registration certificate (mandatory).

b) A completed technical Schedule A/B indicating compliance to NLEPDS requirements (mandatory) from Eskom standard (240-78980848).

c) Supporting information including deviation schedules in response to AB Schedule for NLEPDS from Eskom standard (240-78980848) to be evaluated on technical basis.

d) The tenderer's past experience in delivering projects of a similar nature and scale (provide references).

e) A company overview detailing the company background, available local expertise and international technical support capabilities.

f) CVs of company personnel

g) OEM signed confirmation letter/s confirming that warrantees to the end user shall be honoured by the OEM.

h) Functional design specification and system design report (refer to Annex A).

i) Detailed design specification (refer to Annex A).

3. Project scope

3.1 General scope

The contractor shall design, manufacture, supply, develop user documentation, perform testing at works, deliver, install, and commission the Non-Lethal Energized Perimeter Detection System (NLEPDS) according to the associated technical specifications. The proposed design and costing shall be based on the associated site as outlined in sections below. Generic site layouts in Annex C shall be used for typical site zoning.

Note: This PTM&C scope excludes the civils and mechanical scope including casting of anti-tunnelling and vegetation slab, fence earthing and installation of fence posts. The civils and mechanical scope is covered by others.

3.2 Pre-installation development scope

The appointed contractor(s) shall be responsible for the following pre-installation development scope of work:

a) System development including manufacturing of conductors. This includes any additional development work required to fully comply with the technical requirements.

b) Compiling site specific detailed designs including the following:

i. All equipment required to comply with the specification and its configuration;

ii. Cable layout and routing drawings;

iii. Interfacing to the SCADA system for security alarms to the security monitoring centre.

iv. Interface drawings to the site security lighting.

c) Ensure that the design complies with all relevant standards in order for a Certification of Compliance (COC) to be issued.

d) Model system testing scheme for required functionality including energy, voltage tests and energizers synchronisation tests at the tenderer's workshop/premises.

e) Factory testing of the complete system (FAT).

f) Development of product training material and delivery of system related courses.

g) Produce site acceptance testing procedure for Eskom's acceptance.

h) Produce a functional design specification (refer 240-83684419 and Appendix A of this document).

i) Produce a detailed design specification (refer to 240-83684419 and Appendix A of this document).

3.3 Equipment for decommissioning and disposal

i. The existing non-lethal electrified fence and associated equipment shall be decommissioned, removed and stored to a designated scrap area on site (where applicable).

Note: Decommissioning shall be done is close consultation with the responsible Eskom representative for guidance on decommissioned equipment that will be reserved for spares.

3.4 Equipment for manufacturing, supplying, installing and commissioning

The appointed contractor shall manufacture, supply, install and commission all the equipment in the following sections:

3.4.1 Entrance area

a) Install an automatic sliding gate as per Eskom drawings (0.54/7470). The gate shall be installed together with all the associated equipment i.e. electric motors with suitable enclosure and mechanical disengage mechanism, status detector mechanisms, obstruction detector mechanisms, conductor wires and anti-theft brackets.

b) Install a 25 Pair communication cable from the guard house to the sliding gate motors.

c) Install infra-red (IR) units to prevent the gate from closing on vehicles. The IR units shall be installed together with the associated mounting posts with concrete foundations, blanking plates and cover plates.

d) Install goose necks for mounting of biometric and card readers.

3.4.2 Access control building (ACB) equipment & Kiosks

Note: The equipment installed shall meet the functional requirements as specified in the technical specification, 240-78980848. The appointed contractor shall provide the specific system design, configuration and equipment for the requirements of the site.

a) Install the control unit used to configure the electric fence system.

b) Install the graphical user interface/display unit to display the configured zones of the fence including alarms.

c) Install the alarm relay cards (where applicable) to configure the system alarms as well as interfacing the Non-Lethal Electrified Fence with other security systems deployed at site. i.e.

i. Security lights;

ii. CCTV cameras (PTZ cameras to zoom to fence alarmed zones);

iii. Security alarm system.

d) Install the energizers including synchronisation mechanism.

e) All the equipment shall be installed in their appropriate kiosks as per the drawings below:

i. 0.52/30122 Manufacturing detail for two way Energizer Kiosk
ii. 0.52/30123 Manufacturing detail for four way Energizer Kiosk
iii. 0.52/30124 Manufacturing detail electric fence controller kiosk
iv. 0.52/30125 Manufacturing detail electric fence guard house kiosk

Note: The terms guard house and access control building are used in generic terms and shall refer to any buildings that are used for similar purposes.

3.4.3 Site Perimeter

a) Install HT cables, fence conductors (2.24 mm galvanised steel) and associated insulators.

b) Install warning and zoning signs around the site perimeter.

c) Install a 25 Pair communication cable from the guard house to the control room to interface the fence alarms to the SCADA system for routing of alarms to the remote monitoring centre. A trench has to be dug from the guard house to the closest trench in the HV yard.

Note: For coastal sites Eskom might decide to install aluminium fence conductors, clarity should be obtained from Eskom representative for the site for preferred fence conductor.

3.5 Testing and commissioning

a) Site Acceptance testing shall be performed to ensure that the entire Non-Lethal Fence is fully functional and all alarms are commissioned to the remote monitoring centre (zero control).
b) Issue the Certificate of Compliance (CoC) for the site.
   i. Every user or lessor of an electric fence, as the case may be, shall have an original valid electric fence system certificate of compliance. Meaning that the original CoC shall be handed over to Eskom.
   ii. The electric fence system certificate of compliance shall be accompanied by a test report.
   iii. An electric fence certificate of compliance shall be in accordance with the Electrical Machinery Regulations, 2011 as contained in the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).
   iv. A map of the electric fence installation, clearly showing various aspects of the installation shall be attached to the test report.
   v. The customer shall receive training in the operation of the Non-Lethal Fence.
   vi. Official hand-over to the customer shall take place. The hand-over documentation shall consist of all marked-up drawings, test certificates / documents and the Certificate of Compliance.

4. Acceptance

This document has been seen and accepted by:

Name	Designation
Mario Petersen	Middle Manager (acting) – PTM&C Planning and Project Support

5. Revisions

Date	Rev.	Compiler	Remarks
August 2023	3	R Moshoeshoe	Added project details annexure
September 2021	2	R Moshoeshoe	Included reference to kiosk drawings
July 2020	1	R Moshoeshoe	First Issue

6. Development Team

The following people were involved in the development of this document:

- Joe Verissimo
- Victor Lehobo
- Chris Van Reenen

7. Acknowledgements

Not applicable

Annex A: Functional and Detailed Design specifications requirements

1. Functional design specification (basic design)

The tenderer is required to produce and submit a Functional Design specification and a System Design Report. The Functional Specification details Eskom's functional requirements in the context of the product that is offered by the Tenderer. The System Design Report documents the design that has been developed in order to meet the requirements as specified in the Functional Specification (240-78980848). At minimum the functional design specification and System design report shall cover the functional and interconnection details of system components listed below:

a) Electric fence conductors

b) Power supply

c) Control unit

d) Graphical user interface / Display unit

e) Synchronising equipment/mechanism

f) Relay cards (where applicable)

g) Communication infrastructure

h) Energizer(s)

Note: The Functional Specification and the System Design Report can be combined as one document.

2. Detailed Design Specification

The tenderer is required to produce a Detailed Design Specification for both hardware and software components of the system and Acceptance Testing Procedures. At minimum the detailed design specification shall cover details listed in the following index.

a) Overview of functional specification
b) Scope of work
c) High Level Integration
   i. Local vs remote monitoring and control capabilities
   ii. Software and network config files.
   iii. Cause and effect matrices (e.g. if alarm on fence, lights are switched on)
d) System Architecture (to include logical and physical design)
e) Lifespan of System and product software versions (include 10 year life span support)
f) Recommended Maintenance (Procedures, Spares and FMECA- Failure mode effects and criticality analysis, tools and test equipment, training requirements-engineering and field operations)
g) System commission and acceptance testing procedure (commissioning results to be provided prior to system handover.
h) Appendix A – Drawings
   - Site layout
   - Site Security Zoning
   - System Configuration

- Security LAN and communication Reticulation
- Cable and trench layout
- Power reticulation
- Electric fence and energiser
- kiosks

i) Appendix B – Equipment Specification

- Energisers
- Electric fence conductors
- Power supply
- Control unit
- Graphical User interface / Display unit
- Synchronising equipment/mechanism
- Relay cards (where applicable)
- Communication infrastructure
- kiosks

j) Appendix C – Datasheets

- Energisers
- Electric fence conductors
- Power supply
- Control unit
- Graphical user interface / Display unit
- Synchronising equipment/mechanism
- Relay cards
- Communication infrastructure
- kiosks

k) Appendix D- Bill of Materials

Annex B: NLEPDS Project details

Lead Engineer:		**Tel:**	
Lead Engineer's Department:			
Project name:			
Project No/WBS.:			
Region /Grid			
Substation/ET site:			
Offsite Security Control Centre:			

	Name	**Designation**	**Signature**	**Date**
Project Scope verified by:				
Project Scope Approved by:				

Annex C: Typical site layout

The generic site layouts below shall be used for a typical site zoning

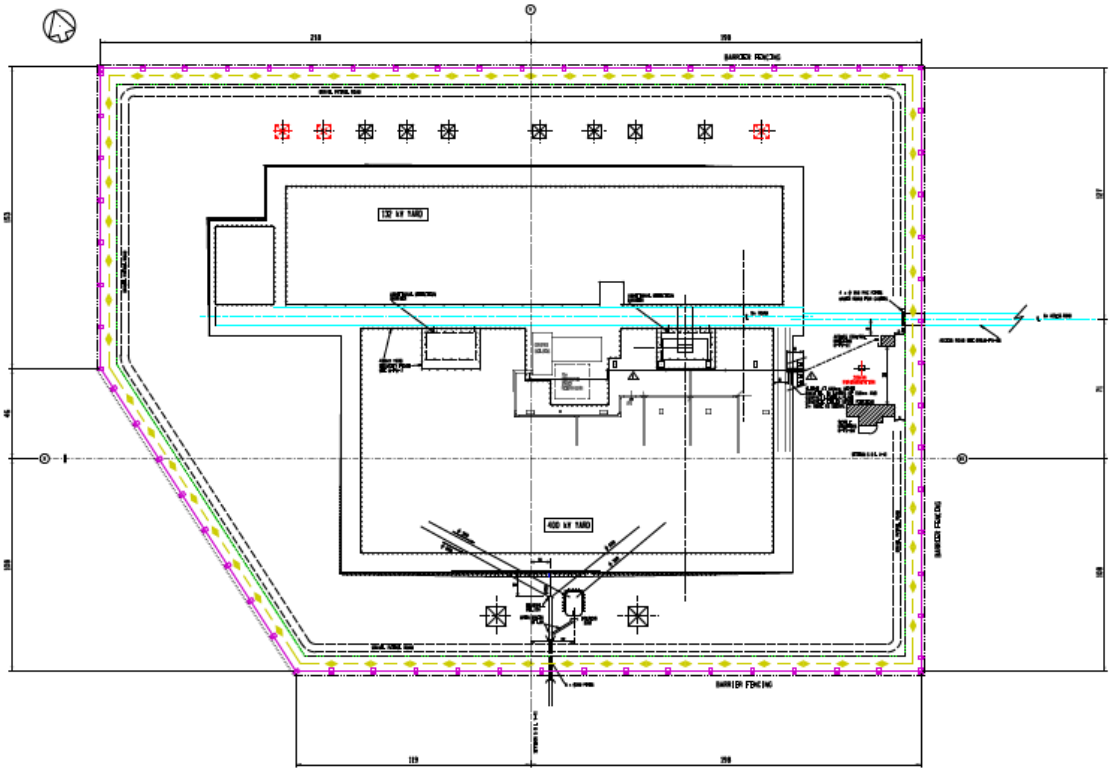

Figure C1: Typical Tx Substation site layout (refer to drawing THE22P02-SE-42)

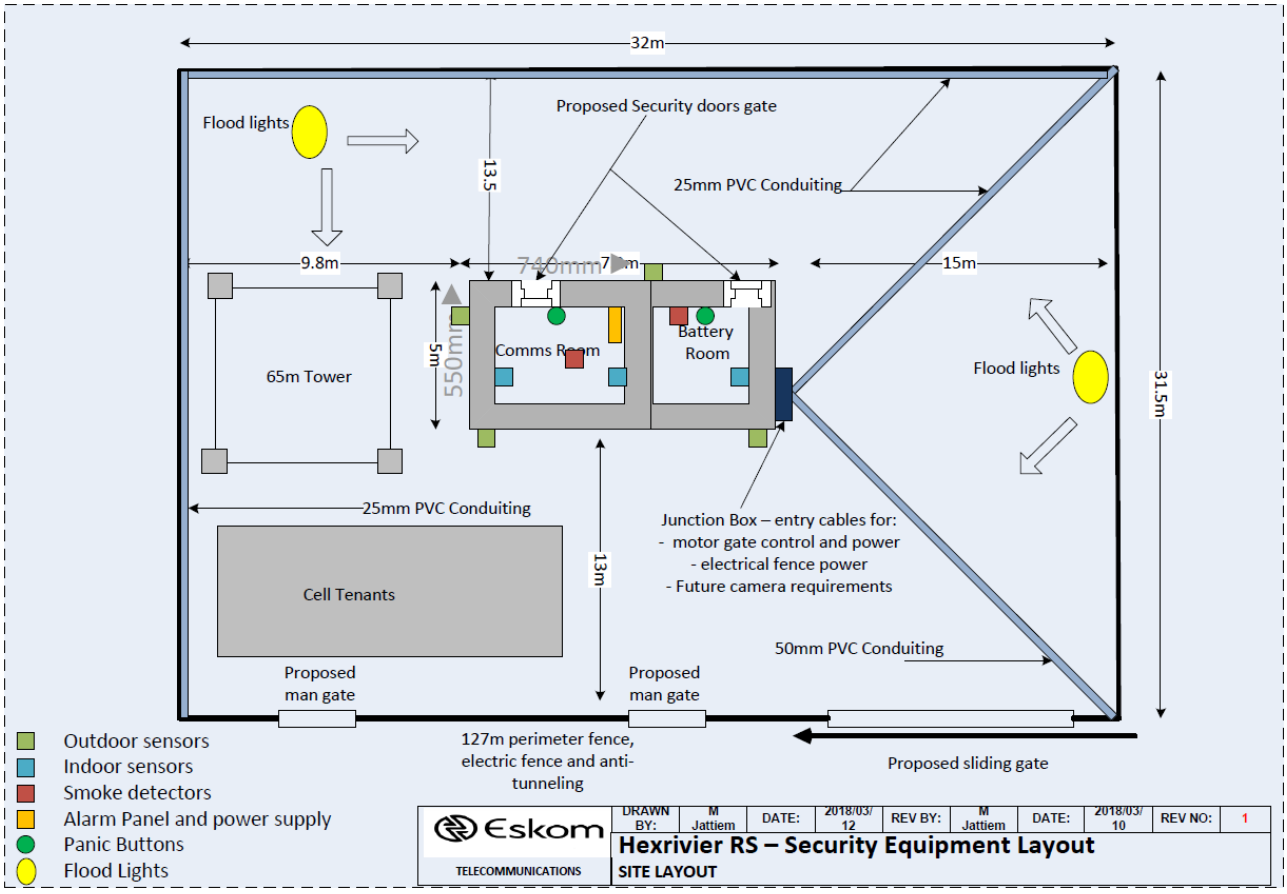

Figure C2: Typical layout for ET Site