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Compiled by



Tshoanelo Sam
Designer (Civil)
Substation Engineering

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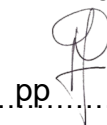
Reviewed by



Azhar Mayet
Senior Engineer (Civil)
Substation Engineering

Date: 22/04/2025

Authorised by


pp

Andile Maneli
Middle Manager (Civil)
Substation Engineering

Date: 30/04/2025

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1. INTRODUCTIONS

This project involves an adequate upgrade of the security systems and infrastructure at Theseus Substation. The aim of the project is to upgrade the Security Barrier Fence in compliance with OHS act and Eskom policies and standards. This substation formed part of National Security Project Phase 1 Build 2a and 2c under which the security systems are upgraded. The scope of work for this project was based on recent security threats and will cover the implementation of the following security measures:

- Upgrade of the non-lethal electric fence to a 24-strand galvanised wire with concrete plinth on either side for the prevention of vegetation grown/interference.
- Energisers that provide 8 Joules of energy (Energisers as per Eskom Specifications) and alarm detection. The non-lethal fence design to be in accordance with 240-136739222 and 240-78980848
- Upgrade the Perimeter Lighting along the fence; lights to be energy efficient and with day/night switch and sensors. Lighting to illuminate the prescribed area as set out in Standard 240-139282493.
- Upgrade the Access Gates; upgrade the current sliding gate at the entrance that provides the continuity of the electrified fence. Replace Inner gate to convert from swing gate to sliding gate.
- Refurbish the inner safety fence (making use of existing posts)"

2. REFERENCES

- [1] (240-55922824) - Substation Layout Design Guideline
- [2] (240-109644476) - Standard for Implementation of Substation Layouts for Transmission Substations
- [3] South African Grid Code
- [4] Occupational Health and Safety Act (OHS Act) 85 of 1993
- [5] (32-1205) - Eskom Maintenance Management Policy
- [6] (TST41-794) - Substation and Facility Maintenance
- [7] (32-727) - Eskom Safety, Health, Environment and Quality policy
- [8] (SANS 1200) – General Civil
- [9] (240-1001183119) - Standard for Fences in Eskom Transmission Stations
- [10] (240-108982466) - Standard for HV Yard Stone in Eskom Substations
- [11] (TST41-877) - Transmission Substations Design Earthing Standard
- [12] (240-139282493) – Security Lighting for Eskom applications

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[13] (240-75883230) – Refurbishment of Steel Power Lines Structures Standard

[14] (240-78980848) – Non-lethal Fence Specification

3. SCOPE OF WORK

Designs and construction are in accordance with [1] – [14]. All construction is to be carried out in accordance with Eskom's Safety, Health and Environmental Specification. Construction will be done in close proximity to other electrical equipment; therefore, all necessary safety procedures must be strictly adhered to.

The Civil Scope of Work involves the following design aspects:

3.1 NON-LETHAL FENCE

- The existing non-lethal fence, including the protection slab is to be removed and spoiled
- A new non-lethal fence in accordance with Eskom specifications 240-78980848 must be installed
- The new non-lethal fence is to be installed in the same position as the existing
- The layout of the new non-lethal fence is found on THE22P02-SE-E42
- The detailed drawings reflecting the specification can be found on 0.54-8282

3.2 INNER FENCE

- Remove the four strands of barbed wire on the single overhang and replace as specified on 0.54/5633 sht. 3 note 1.
- Remove the 2,4 m weld mesh and replace with new weld mesh according to 0.54/5633.
- All the posts, stays and overhang members must be painted.
- Surface preparation, coating application procedures and guarantees must be in accordance with Eskom specification 240-75883230 pages 12 to 16.
- The post and stay must be opened until the concrete is exposed
- Remove the rust stains with steel-wool. Care must be taken not to damage the galvanizing on the posts, stays and overhang.
- If part of the post or stay is found to be rusted to more than half the original thickness, it must be replaced as detailed in drawing 0.54/5633.
- After surface preparation clean member or fence with plascon metalcare galvanized iron cleaner.
- Apply one coat plascon metalcare galvanized iron primer.

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- Apply two coats plascon metalcare silvershine aluminium
- Allow for 1900 m mesh replacement
- Allow for 255 strain posts
- Allow for 255 struts

3.3 ACCESS GATES

- The access gates must be removed completely and spoiled
- A total of new access gates to be provided and installed according to 0.54/10230 sht 1-6

3.4 LIGHTING

- Refer to drawings THE22P02-SE-E43 sheet 1-2
- Remove all existing security lighting poles, luminaires, Distribution boards and cables.
- Supply and install new supply cable from the Control building to the Security lighting distribution boards, SLDB.
- Supply and install two new SLDB's including electrical equipment, next to fence position shown on drawing. See drawing 0.54/8812
- Supply and install 4m high Security lighting pole along inner barrier fence at 15m intervals including luminaire on top of pole.
- Supply and install 10mm dia. copper earth rod around the entire barrier fence between the non lethal fence and the inner barrier fence. The earth rod shall be installed at 1m depth.
- Connect each security lighting pole to the copper earth rod with a 10mm dia. Earth rod.
- Supply and install cable from SLDB to the security lighting poles including a 4mm² earth cable for electrical earth.
- Supply and install control cable from SLDB's to the Access Control Building.
- Test and commission

3.5 ACCESS CONTROL BUILDING

- The existing guardhouse must be upgraded and refurbished to drawings THE22P02-SE-E47 sheets 1-8 to conform to the latest standard for guardhouses.

Access Control Building Electrical and Air conditioning.

- For the electrical and air conditioning upgrade refer to drawing THE22P02-SE-E43 sht 3.
- Remove all existing electrical equipment, Plugs, light switches, luminaires and the equipment in the existing Distribution boards.
- Supply and install new plugs, light switches, luminaires and equipment in the Distribution boards as shown on the drawing.

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- Supply and install new split type wall mounted air conditioners one in each room, according to the drawing provided.

3.6 FIBRE OPTIC SLEEVE ROUTE

- Install a fibre optic sleeve pipe with draw boxes in accordance with 0.53-2129
- The layout is shown on THE22P02-SE-E42
- Yard stone to be removed 2m on either side of excavation and replaced after backfilling and compaction to a thickness of 100 mm and free from soil

3.7 EARTHING

- Earth to the 10 mm diameter copper wire that will be constructed with the lighting.

4. DOCUMENT LIST

The following documents are applicable to this enquiry:

Drawing number	Document name
THE22P02-SE-E42	Barrier Fence Layout and Details
THE22P02-E43 shts 1 to 3	Security Lighting
THE22P02-SE-E47 shts 1 to 8	Guardhouse
0.54-5633 shts 1 to 4	Security Inner Fence and overhang
0.54-8282	Non-lethal Fence details
0.54-10230 shts 1 to 6	Access Gate Drawings
0.53-2129	FIBRE OPTIC SLEEVE
0.54-393 SHT. C1 TO C9	EARTHING STANDARDS
0.54-7515 SHT.1A TO 9	ACCESS CONTROL BUILDING
240-75883230	Steel Refurbishment Specification
240-78980848	NON-LETHAL FENCE SPECIFICATION
240-76368574	High risk fence specifications
240-170000109	Transmission Substation Qualitative Technical Evaluation Criteria
0.54-10230 shts 1 to 6	Access Gate Drawings
0.54-390 sht 43	Sleeve under road
0.54-390-67	Gate ramp detail
0.54-393-C32	Typical section of fences with Stone verge

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0.00/1286	Cable route marker
0.54/8805	Security lighting pole
0.00/1310	Cable code
0.00/5007	Labelling requirements
0.54/8812	Security lighting DB - SLDB
0.00/1290	Cable number tag details

5. AUTHORISATION

This document has been seen and accepted by:

Name	Designation
Andile Maneli	Middle Manager – Civil
Azhar Mayet	Engineer – Civil

6. REVISIONS

Date	Rev.	Compiler/s	Remarks
23-01-2023	1	Tshoanelo Sam	First Issue
08-10-2024	2	Tshoanelo Sam	Outer fence scope omitted
22-04-2025	3	Tshoanelo Sam	NTCSA logo added

7. DEVELOPMENTAL TEAM

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

- Dawie Naude
- Anton Naude
- Tshoanelo Sam

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