FUNCTIONAL SPECIFICATIONS OF THE CLOSED-CIRCUIT TELEVISION (CCTV) SURVEILLANCE SYSTEM AT TRANSNET ENGINEERING (TE) PLANT IN KOEDOESPOORT

Document Revision History

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INTRODUCTION		
1	**Subject**	Functional Specifications
2	**Purpose**	The CCTV surveillance system at the Transnet Engineering plant in Koedoespoort has reached the end of lifespan and needs to be decommissioned.
3	**Main Point**	The document contains the cope of works and anticipated functionalities of the CCTV Surveillance system at Transnet Engineering plant in Koedoespoort
4	**Significance**	The suppliers must have a clear appreciation of the functional requirements of CCTV Surveillance prior to implementation thereof.
5	**Document summary**	Content of the report is centered on a variety of risks confronted and how to mitigate them with a CCTV Surveillance system
6	**Keywords**	CCTV Surveillance, camera, Network Video Recorder (NVR), footage, and software.
7	**Date of Issue**	09 July 2023

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ABREVIATIONS

CCTV	Closed Circuit Television
NVR	Network Video Recorder
TE	Transnet Engineering
CCTV	Closed Circuit Television
AI	Artificial Intelligence
SRA	Security Risk Assessment
SO	Systems Operator
SCR	Security Control Room
IR	Infra-Red
IP	Internet Protocol
LPR	License Plate Recognition
POE	Power Over Ethernet
M	Meter
Mm	Millimeter
PTZ	Pan, Tilt, Zoom
SDK	Software Development Kit
NVMS	Network Video Management Software
RMWS	Remote Monitoring Workstation
HD	High Definition

3.1 New High Definition (HD) Camera (Outdoor, indoor, PTZ)

3.1.1 The camera must stream video from its location over a network to allow management and viewing from the Security Control Room (SCR).

3.1.2 The camera shall operate in a systems-controlled centre environment with support for automatic discovery and connection of cameras and NVRs in the same network.

3.1.3 The cameras shall support user configuration of camera parameters including camera name, location, and logical ID.

3.1.4 The camera shall support a mode that automatically removes the Infra-Red (IR) filter and enters a monochrome mode when the available light drops below a set threshold.

3.1.5 The camera must support user configuration of an unlimited number of independent motion detection zones within the camera field of view.

3.1.6 The camera shall support user configuration of up to 3 privacy zones within the camera field of view.

3.1.7 The camera shall support remote zoom and focus control of the lens and performing automatic focus.

3.1.8 The camera shall have input/output terminal for connecting alarm inputs and alarm outputs.

3.1.9 The camera shall support audio input for connecting external microphones.

3.1.10 The camera shall support video output for connecting external monitors.

3.1.11 The camera shall allow for remote-software/firmware upgrade-over an Internet Protocol (IP) network for feature enhancements and investment protection.

3.1.12 The camera shall have temper resistant screws.

3.1.13 All perimeter and externally mounted cameras are to be protected against power surges with suitable inline 100 BaseT single Power Over Ethernet (POE) protection devices.

3.1.14 PTZ cameras shall pan, tilt and zoom smoothly (without delayed movement) in real time, controlled by software or joystick. They shall support auto tracking and pre-set tours. These functions can be activated when required.

3.1.15 The outdoor camera (in high-risk areas with low or poor lighting) shall have an integrated IR illuminator with a 60m range.

3.1.16 The camera shall have an impact resistant construction. Outdoor cameras shall be mounted in purpose made weatherproof housings to protect camera from dust, rain, and strong winds.

3.1.17 The camera shall have a pendant mount bracket.

3.1.18 Indoor camera shall have a ceiling mount bracket. Where no false ceiling is available, the camera will be mounted against wall.

3.1.19 The camera shall support user configuration of compression quality and image rate per individual camera.

3.1.20 The Camera shall support user selectable image dimensions, or windowing, to enable lower bandwidth and/or higher refresh rates for the image or portion of the image being monitored.

3.1.22 The outdoor camera proposed shall be IP65 rated.

3.1.23 Camera shall support web application.

3.1.24 The Camera shall support user configuration of network parameters including, Static IP address; Subnet Mask; Gateway; and Control Port for control communications.

3.1.25 The IP-based Surveillance cameras supplied shall be fully controlled, managed, operated, configured, and administered by with the Network Video Management Software (NVMS) to provide a complete solution (for client and server applications) that delivers full situation awareness and indisputable detail, leading to faster response times, reduced investigation times, compliance validation and superior overall protection.

3.1.26 All cameras must be able to adequately cope with variable lighting conditions and in scenes where simultaneous low and high light exist concurrently. This will ensure facial identification in all scenes where cameras are to be installed.

3.1.27 The cameras shall be selected for suitability for internal and external surveillance.

3.1.28 The cameras must alert Security of any unusual activity.

3.1.29 The cameras must provide facial identification of all objects in camera field of view within a radius of at most 40m for indoor cameras, at most 60m for cameras the outdoor cameras and at most 300m for PTZ cameras.

3.2 License Plate Recognition (LPR) Camera

3.2.1 The LPR camera shall read and process license plates on vehicles travelling up to 100km/h and 15m away from the camera when installed in in the recommended position and mounting height.

3.2.2 The LPR camera shall read and process license plates in all lighting conditions including a minimum illumination of 0 lux.

3.2.3 The LPR camera shall read and process license plates within one vehicle road lane or approximately 3m.

3.2.4 The LPR camera shall be at least 99% accurate.

3.2.5 The LPR camera shall store vehicle license plate read and processed for up to 180 days.

3.3 New Camera Mounting Pole

3.3.1 The masts for dome and stand-alone static outdoor cameras shall be 9m Hollow spun concrete and shall be planted in 32Mpa concrete basis of 1.2 x 1.2 x 1.2m.

3.3.2 A 1,5m x 15mm steel rod with molecularly bonded copper cladding shall be mounted to the apex of the mast. This shall serve as the air termination of a lightning conduction system which will further consist of a 50mm² stranded bare copper down conductor running inside the mast to four 1,5m copper clad earth rods driven into the ground at the extremities of the excavation for the base of the mast before the concrete is cast.

3.3.3 The tops of the earth rods will be interconnected with the continuous 50mm² down conductor.

3.3.4 All connections in this down conduction path shall be hard soldered or fusion Welded.

3.4 Power Over Ethernet Network Switches (POE) (for new installation)

3.4.1 To provide adequate support for bandwidth intensive applications, such as multi-megapixel IP cameras as intended to be used here, the contractor shall provide managed gigabit speed, Power-Over-Ethernet (POE) network switches with fibre uplink ports, together will all patch-cables, cabinets, mounting

brackets and accessories to ensure a full and complete installation.

3.5 Video Surveillance Monitor

3.5.1 The contractor shall provide high-definition video Surveillance monitors together will all cabling, mounting brackets and accessories to ensure a full and complete installation,

3.6 Remote Monitoring Workstation (RMWS)

3.6.1 The Control and Observation Centres require professional high performance RMWS specifically designed to achieve the highest performance for a client control station within a multi-megapixel High-Definition Surveillance System.

3.6.2 The Remote Viewing stations with four high resolution monitors require professional high RMWS specifically designed to achieve the highest performance for viewing within a multi-megapixel HD Surveillance System.

3.6.3 High specification workstation, supplied in a desktop form factor, must have the capacity to support up to four high resolution monitors displaying a total 144 channels of concurrent video. The RMWSs are to be pre-loaded with Control Centre Client Software and supplied with a keyboard and mouse.

3.7 Video Surveillance System

3.7.1 All cameras mounted within and on the facility, buildings will be linked to and powered on the current network topology distributed network of POE switches with fibre uplinks to the Central Control Room.

3.7.2 An Observation Control Room with mirrored recording is essential for a completely fail-safe solution.

3.7.3 Remote Viewing Stations will be provided for the Management of localized cameras within the various sectors of the site. Perimeter cameras will be installed on a fibre ring. All fibre links are to have dual redundancy.

3.8 Network Video Recorder (NVR)

3.8.1 The upgraded storage will maintain its original storage capacity and retention duration or exceed it. The security requirement is that recorded footage for all cameras be kept for 60 days.

3.8.2 The NVRs in the Central Control Room must incorporate an expansion card for connection to an external expansion unit, also configured in Raid-5.

3.8.3 Each storage device must be configured for maximum performance and reliability.

3.8.4 The NVR is to record up to 35 Frames Per Second if required. It is to be of enterprise-class reliability Both the hard drives and the power supplies are to be hot-swappable for online repairs.

3.8.5 Each NVR is to have 4 gigabit Ethernet ports and storage capacity to hold Footage for up to 60 days.

3.9 Network Video Management Software (NVMS)

3.9.1 The NVMS provided is to be an Enterprise Edition and is to run seamlessly on the NVRs and other systems components it manages.

3.9.2 It must provide complete control of all the camera surveillance devices, Sub systems and the network for client and server-based operations, management, administration, and configuration for use by operators, systems administrators and management.

3.9.3 The NVMS is to be a secure distributed-network platform with enterprise class reliability for capturing, managing, and storing high-definition multi-megapixel Surveillance video while efficiently managing bandwidth and storage.

3.9.4 The NVMS is to have the capability to manage both audio and video from a broad range of multi-megapixel IP cameras. In addition, the system must have the capability to accommodate conventional and PTZ analogue cameras and both audio and video from a broad range of 3rd party IP cameras.

3.9.5 The NVMS is to be powerful, yet intuitive, with an easy-to-use interface that allows operators to efficiently evaluate and respond to events with minimal training.

3.9.6 Support for third-party integration (for vehicle barrier system, and scanners) And for future integration with existing access control systems within Transnet.

3.9.7 The NVMS is to have all video and integration licenses provided as a once-off fee with unlimited client connections to all NVRs at no charge. Recurring annual license fees are not acceptable.

3.9.8 The NVMS shall be pre-loaded on turn-key servers running Microsoft Windows 10 Enterprise with configurable storage.

3.9.9 The NVMS shall be an enterprise level software solution that shall be scalable from one client, server, and camera to hundreds of clients, servers, and cameras.

3.9.10 The NVMS shall consist of server software applications and client software applications.

3.9.11 The NVMS shall be available in English.

3.9.12 The NVMS shall include the Server Software Applications, Control Center Server, Control Center Admin Tool, Client Software Applications, Control Center Client, Control Center Web Client, Control Center Player, and Control Center Camera Installation Tools.

3.9.13 The NVMS shall have functionalities to monitor and manage the entire CCTV Surveillance system and all its capabilities.

3.9.14 Support for edge-based storage which can be activated when required.

3.9.15 Support for high-definition video streaming using industry standard video compression formats and bandwidth control.

3.9.16 The NVMS shall digitally sign recorded video and audio using 256-bit encryption so video can be authenticated for evidentiary purposes.

3.9.17 The NVMS shall be capable of being upgraded from one version to another without having to uninstall the previous version.

3.9.18 The NVMS shall automatically detect if video or audio source firmware is out of date with respect to the current installed software and upgrade it.

3.9.19 The NVMS shall automatically detect if client application software is out of date with respect to the current installed server software and upgrade it.

3.9.20 The NVMS shall run as a service configured to automatically start when the server or workstation is powered on and automatically recover from failure or attempted tampering.

3.9.21 The NVMS shall allow system administration, and live and recorded video and audio monitoring all from a single client application that can be located anywhere on the network.

3.9.22 The NVMS shall automatically discover all Control Center Server instances running on computers connected to the same network as the Control Center Client.

3.9.23 The NVMS shall provide a search functionality to discover Control Center Server instances running on computers connected on a different network segment than the Control Center Client by using IP addresses or hostnames.

3.9.24 The NVMS shall automatically discover video and audio sources that are connected to the same network as the Control Center Server.

3.9.25 The NVMS shall provide a search functionality to discover video and audio sources that are connected on a different network segment than the Control Center Server.

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