

DETAIL TECHNICAL SPECIFICATION

Decommissioning of obsolete Network Video Recorders (NVR), supply, installation, configuration, integration, training, maintenance, and commissioning of a new NVR and software for the CCTV surveillance system at Kilnerpark Corporate Office in Koedoespoort for a period of 12 months.

SECTION A – COMPLIANCE AND REQUIREMENTS

1. DEFINITIONS AND ABBREVIATIONS

- 1.1** "Owner" or "Client", means the TRANSNET FREIGHT RAIL, referred to as "CLIENT" or "the CLIENT" (all either fully, partially, or not at all in capitals).
- 1.2** "Bidder/Contractor" (all either fully, partially, or not at all in capitals), means and refers to the Contractor, who is appointed in terms of this contract, irrespective of whether the contract is a direct contract with the client or a sub-contract with a Principal Contractor.
- 1.3** "Engineer" means and refers to the person (professional Engineer registered at ECSA) or company (professional consulting engineering company, registered at CESA [formally SAACE]) appointed by the Client to represent the Client from an engineering perspective, should such an appointment be deemed necessary. In the absence of such an appointment, the Client will perform these functions internally.
- 1.4** "Original Equipment Manufacturer (OEM)" means the manufacturer of products or components that are purchased by a company and retailed under the purchasing company's brand name, thus may be also called third party component maker. OEM in terms of this Request For Service (RFS) refers to the company that originally manufactured the product that bidders will propose to the CLIENT. The CLIENT will accept any solution that meets or exceeds the technical specifications.
- 1.5** "With first delivery" means commissioning of the new NVR.
- 1.6** "Second delivery" means provision of maintenance services post commissioning of the NVR.
- 1.7** Network Video Recorder (NVR)
- 1.8** Network Video Management Software (NVMS)
- 1.9** Private Security Regulatory Industry Authority (PSIRA)
- 1.10** Original Equipment Manufacturer (OEM)
- 1.11** Closed-Circuit Television (CCTV)
- 1.12** High Definition (HD)
- 1.13** Internet Protocol (IP)
- 1.14** Terra Bytes (TB)
- 1.15** Megabits per second (Mb/s)

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- 1.16** Serial Advanced Technology Attachment (SATA)
- 1.17** Redundant Array of Independent Disks (RAID)
- 1.18** Pan Tilt Zoom (PTZ)
- 1.19** Software Development Kit (SDK)
- 1.20** Megapixels (MP)
- 1.21** Frames Per Second (FPS)

2 DISCRIPTION OF THE WORKS

- 2.1** The bidder shall decommission existing obsolete Network Video Recorders (NVRs), supply, install, configure, integrate, commission, provide training and maintenance services on new NVRs, equipment, and software for the Closed-Circuit Television (CCTV) surveillance system at Kilnerpark Corporate Office. The new installation shall function as a single integrated High Definition (HD) Internet Protocol (IP) CCTV surveillance system.
- 2.2** The bidder shall ensure that the new NVR and cameras are linked to the remote monitoring stations locally to enable remote management and control of the CCTV surveillance system.
- 2.3** The bidder shall ensure that all activities from all existing cameras are recorded on a new NVR.

SECTION B - TECHNICAL SPECIFICATIONS

3 MULTI-MEGAPIXEL NETWORK VIDEO RECORDER (NVR)

- 3.1** Multi-Megapixel NVR is to be provided in a space saving 2U 19" rack-mount chassis and is to be designed to achieve the highest performance for HD video recording and playback.
- 3.2** The NVR must be scalable to operate seamlessly in an environment with multiple NVRs, as a single solution.
- 3.3** The NVR must be preloaded with Multi-Megapixel Network Video Management Software (NVMS) and configured for maximum performance and reliability.
- 3.4** The NVR is to record up to 32 MB/s of image data running at 30 images per second. It is to be of enterprise-class reliability with a RAID-5 hot swappable hard drive (6 SATA) configuration, and the option for redundant power supplies.
- 3.5** The solution proposed must be clearly confirmed on the technical datasheet/specifications for both hardware and software.
- 3.6** Each NVR is to have 4 gigabit Ethernet ports and an effective 64 Tera Byte (TB) of on-board recording Capacity.

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- 3.7** The NVR must have a warranty of 5 years. The bidding company must submit a warranty letter from the OEM with the bid to proof the warranty of the product proposed.

4 NETWORK VIDEO MANAGEMENT SOFTWARE (NVMS)

- 4.1** The NVMS provided is to be a licenced Enterprise Edition and is to run seamlessly on the NVRs provided. It is to function in conjunction with the cameras installed to provide a complete solution that delivers full situation awareness and indisputable detail, leading to faster response times, reduced investigation times, compliance validation and superior overall protection.
- 4.2** 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, and encoders from leading manufacturers.
- 4.3** 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.
- 4.4** As it is a requirement to integrate the NVMS into both Access Control and Intercom Control systems the NVMS is to be an open-source platform with access to the Control Centre SDK source code and technical support from the software developer.
- 4.5** The NVMS shall 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.
- 4.6** The NVMS shall be pre-loaded on turn-key servers running the latest version of Microsoft Windows with configurable storage.
- 4.7** 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.
- 4.8** The NVMS shall include the Server Software Applications (Control Centre Server, Control Centre Admin Tool), Client Software Applications (Control Centre Client, Control Centre Web, Client Control Centre Player, Control Centre Camera Installation Tool).
- 4.9** The NVMS shall permit server and client software applications to be installed and run on both the same computer and on separate computers.
- 4.10** The NVMS shall support High-Definition Stream Management (HDSM) architecture which includes support for industry standard JPEG2000, MJPEG, MPEG-4, and H.264 compression formats.
- 4.11** Support for reducing the required client bandwidth and processing power by only
- 4.12** transmitting what is necessary to view the video stream at full quality (e.g., if a user is viewing a 5MP camera in a 1MP window then a 1MP representation of the 5MP image shall be transmitted).

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- 4.13** The NVMS shall support recording and monitoring video and audio streams from sources with bandwidth up to 90 Mbit/sec, frame rate up to 60 fps, and video resolution up to 16MP (4872x3248).
- 4.14** The NVMS shall require no proprietary recording hardware, no hardware multiplexer or time-division technology for video and audio recording or monitoring.
- 4.15** The NVMS shall not limit the storage capacity and shall allow for upgrades of recording capacity.
- 4.16** The NVMS shall digitally sign recorded video and audio using 256-bit encryption or higher so video can be authenticated for evidentiary purposes.
- 4.17** The NVMS shall securely transmit all command-and-control data via TCP/IP using cryptographic keys based on SSL to prevent eavesdropping or tampering.
- 4.18** The NVMS shall be capable of being upgraded from one version to another without having to uninstall the previous version.
- 4.19** 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.
- 4.20** 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.
- 4.21** 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.
- 4.22** The NVMS shall provide a search functionality to discover Control Centre Server instances running on computers connected on a different network segment than the Control Centre Client by using IP addresses or hostnames.
- 4.23** The NVMS shall provide the ability to connect a video or audio source to multiple NVRs to achieve redundant recording.
- 4.24** The NVMS shall provide the ability to create a failover connection for a video or audio source. If the NVR that the video or audio source is connected to goes offline, then the failover NVR will take over the connection.
- 4.25** The NVMS shall provide administration of all system connections from a single window.
- 4.26** The NVMS shall support receiving Simple Network Management Protocol (SNMP) messages from servers and alert the user.
- 4.27** The NVMS shall provide the capability to rename all video and audio sources and NVRs.
- 4.28** The NVMS shall record video and audio streams based on a recording schedule that can be defined individually for each video source. The schedule shall be created with the parameters (Recording Mode, Continuous, Motion, Digital Inputs, Alarms, License Plates, Time, and Date Settings, Daily, Weekly, and Monthly).
- 4.29** The NVMS shall provide the ability to manually trigger recording.
- 4.30** The NVMS shall provide a pre-event and post-event recording option.

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- 4.31** The NVMS shall provide a reference frame recording option in the absence of events.
- 4.32** The NVMS shall perform motion detection on each individual video source with adjustable sensitivity, threshold, and detection zones.
- 4.33** The NVMS shall provide the ability to reduce the image rate of recorded video over time as a means of increasing record time. The image rate shall be able to be reduced to one half or one quarter of the original image rate. This setting can be configured separately for each video source.
- 4.34** The NVMS shall provide the ability to set a maximum recorded video retention time for each video source.
- 8.35** The NVMS shall authenticate users before granting access to the system. Access rights for each user shall be able to be defined individually for each user, and shall include, viewing live images, viewing recorded images, Connect and disconnect cameras, Setup cameras, Setup servers, and Access to individual video and audio sources.
- 4.36** The NVMS shall provide the ability to import Windows users and use Windows credentials to authenticate users.
- 4.37** The NVMS shall provide the ability to create alarms.
- 4.38** The NVMS shall provide the ability to schedule backups of recorded video with associated events to a local folder or mapped network drive.
- 4.39** The NVMS shall provide the ability to email users and system administrators when an event or system health error occurs.
- 4.40** The NVMS shall have the capability to execute user notification actions (Display on-screen message, play a sound), monitoring actions (Start live streaming video), device actions (Reboot camera, trigger digital output), PTZ Actions (Go to pre-set, run a pattern, set auxiliary, clear auxiliary), alarm actions (Trigger an alarm, acknowledge an alarm) in response to any of the events listed above.
- 4.41** The NVMS shall provide a maintenance log and audit trail of all system errors and events.
- 4.42** The NVMS shall provide the ability to define a region of an image where license plate detection is performed. Detected license plates shall be stored along with the video data.
- 4.43** The NVMS shall provide the ability to create a Watch-list that will be used to create events when any license plate on the watch-list is detected in the images being analysed.
- 4.44** The NVMS shall provide the ability to enable and configure PTZ control on the RS-485 interface of a video source.
- 4.45** The NVMS shall support a wide range of PTZ camera protocols.
- 4.46** The NVMS shall provide the ability to change the network settings for a video and audio source.
- 4.47** The NVMS shall provide the ability to change image quality and image rate parameters for a video source without affecting the settings on the other video sources.
- 4.48** The NVMS shall provide the ability to enable a secondary stream for live viewing.

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- 4.49** The NVMS shall provide the ability to change the exposure, iris, IR filter, backlight compensation, gain, priority, sharpening, saturation, focus, and white balance settings for a video source.
- 4.50** The NVMS shall provide the ability to change the image dimensions for a video source.
- 4.51** The NVMS shall provide the ability to add Privacy zones to a video source to block unwanted areas in the image field of view.
- 4.52** The NVMS shall provide the ability to save and restore the window layout.
- 4.53** The NVMS shall provide the ability to control the system using a PC keyboard or joystick.
- 4.54** The NVMS shall provide the ability to import and export client settings such as maps, views, and web pages.
- 4.55** The NVMS shall support live or recorded video monitoring of 1 to 36 video streams simultaneously on a single monitor with an unlimited array of user-defined layouts.
- 4.56** The NVMS shall support the ability to display the following list of image overlays (Camera Name, Camera Location, Timestamp, Record Indicator, PTZ Controls, Motion Activity and License Plate).
- 4.57** The NVMS shall support an unlimited number of monitors for monitoring video and audio streams.
- 4.58** The NVMS shall support monitoring live and recorded video and audio streams simultaneously on the same monitor.
- 4.59** The NVMS shall support viewing the same live or recorded video stream at different zoom levels.
- 4.60** The NVMS shall support the ability to cycle through views (guard tour) based on a specified interval.
- 4.61** The NVMS shall support the ability to drag and drop a video source from a tree of video sources into a window for live or recorded video and audio monitoring.
- 4.62** The NVMS shall support the ability to create a map that represents the physical location of cameras and other devices throughout the Surveillance system. Maps shall be created from images stored in JPEG, BMP, PNG, or GIF image formats. Maps shall have the ability to contain links to create a hierarchy of interlinked maps.
- 4.63** The NVMS shall highlight a camera on a map when an alarm linked to the camera is triggered.
- 4.64** The NVMS shall support digital zooming and panning on live and recorded video streams.
- 4.65** The NVMS shall support forward and reverse playback of recorded video and audio at variable speeds.
- 4.66** The NVMS shall support navigation of recorded video and audio via calendar, timeline, or events.
- 4.67** The NVMS shall support the ability to export recorded audio in WAV format.
- 4.68** The NVMS shall support the ability to snapshot a live or recorded image and export it from the system.
- 4.69** The NVMS shall support the ability to export a live stream of images in the various formats (JPEG, PNG, TIFF)

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- 4.70** The NVMS shall support the ability to export video from multiple camera streams in Native format.
- 4.71** The NVMS shall support reviewing video and audio that was exported in the Native format.
- 4.72** The NVMS shall support authenticating video that was exported in the Native format to validate that it was not tampered with.
- 4.73** The NVMS shall support converting video that was exported in the Native format to an industry standard format.
- 4.74** The NVMS shall support reviewing video and audio stored in a backup.
- 4.75** The NVMS shall super users who will be able to create users, allocate user levels, edit user details, and delete users off the system

5 SYSTEM CONFIGURATION, INSTALLATION, AND COMMISSIONING

- 5.1** The system shall be installed and commissioned in accordance with the OEM's recommended procedures as defined in the product's installation manual and commissioning documents.
- 5.2** The installation shall be comprehensibly commissioned and configured as individual and integrated systems as may be required by the configuration after the configuration, installation, and commissioning works are substantially complete.
- 5.3** The bidder shall provide adequate and competent personnel for commissioning and configuration of every installation and for the full duration of the commissioning process.
- 5.4** The commissioning and configuration shall include interaction between other services where interdependence of installations is encountered (Example, there might be a need to interact with the Transnet Telecommunications department who are responsible for networks and power provision for the CCTV surveillance system).
- 5.5** The commissioning and configuration process shall after all testing has been completed be the final proving ground of the systems and during this procedure the installations shall be subjected to all possible inputs and actions which may be encountered under operational conditions. The bidder shall prove the full operation, working and compliance of the installation in accordance with the specifications.
- 5.6** During the course of the inspection, the representative of the CLIENT will compile a list of items (if any) requiring further attention. A copy of this list will be provided to the bidder who will have a period of 7 days in which to rectify the offending items of the installation.
- 5.7** The bidder shall provide all tools and instruments (Electrician tool kit, drill machine, crimping tool with crimping bits for all required sizes, insulation Resistance Tester, Power Tools 110V, Aluminium step ladder, line tester, multi-meter, etc.) required for inspections, testing and commissioning of the works.

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- 5.8** The bidder acknowledges that the Client is as a material term of this procurement event, relying on its skills, expertise, and experience in the commissioning of similar systems to attain the required functionality. The bidder shall advise the Client of the appropriateness of the design thereof and with respect to suitable back-up power supply and making recommendations to the client to ensure the minimum disruption due to power surges, and/or power failures, and/or power disruptions and/or lightning, etc.
- 5.9** The bidder shall provide the Client with an electronic copy of all required documentation including without limitation the Software manual and hard copy thereof for each user of the Software at no additional cost to the client.
- 5.10** The bidder shall ensure that all existing cameras are linked to the new NVR and that they are recording the events.

6 INFORMATION TECHNOLOGY (IT) REQUIREMENTS – TFR Architecture standards

- 6.1** The TFR Architecture standards are currently as follows:
- 6.1.1** Microsoft Windows Enterprise and higher.
 - 6.1.2** Browser functionality must be compatible with Google Chrome and higher.
 - 6.1.3** The bidder should indicate to which extent it conforms to TFR's Architecture standards, and how problems encountered with architectural fit are proposed to be solved.

7 TRAINING

- 7.1** The bidder shall provide technical and operational training to that number of personnel as specified by Transnet, on the train-the trainer basis, in the use and operation of the solution proposed, including without limitation the ability to test hardware and software and to diagnose and identify all defects that may arise therein and rectify them.
- 7.2** To successfully deliver the solution TFR envisages extensive training to be undertaken by its employees. The accompanying RFP to the technical specifications includes training requirements and bidders must demonstrate the proposed training plan to implement the integrated solution.
- 7.3** Pre-requisite user qualifications and experience is to be defined by the solution provider.
- 7.4** Training material must cater for manual and e-learning material with assessment tools, criteria, and results management.
- 7.5** Training material will be developed by the Bidder.
- 7.6** The Bidder will be required to provide training on the following:
- 7.6.1** Role based training to end users to use and operate the solution.
 - 7.6.2** Training on how to interpret the output of the system capability

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and to use these results in decision-making.

7.7 The bidders should provide TFR with the following as part of tender submission:

7.7.1 The training methodology and strategy.

7.7.2 The training plan.

7.7.3 The proposed roles and role job requirements for training purposes for the solution.

7.7.4 The minimum skills requirements for each proposed role.

7.7.5 Software support of the solution.

7.8 Training shall be carried out by experienced and accredited personnel of the bidder who are proficient in the English language and have the requisite experience and expertise to provide training in all aspects and areas of the Site Security System to enable the relevant personnel to properly use and operate it.

7.9 The bidder shall provide all relevant documentation required for training of the designated number of employees. In this regard the bidder warrants that the training will be of such quality and standards as to ensure that the Client's personnel will have skills required to use and operate the system properly.

7.10 The amount payable for training shall be included as part of the Service to be provided by the bidder and no additional payment shall be made by the Client for any such training.

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