



public works

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REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF PUBLIC WORKS

SECURITY

STANDARD TECHNICAL SPECIFICATION FOR A

DIGITAL INTERCOM AND PUBLIC ADDRESS SYSTEM FOR PRISONS

OCTOBER 2004

TECHNICAL SPECIFICATION FOR THE INTERCOM AND PUBLIC ADDRESS SYSTEM

1. INTERCOM AND PUBLIC ADDRESS SYSTEM	4
1.1 GENERAL	4
1.1.1 Cell and Passage Door Intercom Stations	6
1.2 GENERAL OVERVIEW	7
1.2.1 Central Control Room.....	7
1.2.2 Local Control Locations.....	7
1.3 SYSTEM OF OPERATION	8
1.3.1 General.....	8
1.3.2 Establishing a Call.....	9
1.3.3 Call & Event Logging.....	9
1.3.4 System Maintenance.....	10
1.3.5 Operator Handsets	10
1.3.6 Call Routing	10
1.3.7 Multiple or Simultaneous Calls	10
1.3.8 Public Address.....	11
1.3.9 Suppression of Call	11
1.3.10 Cell Monitoring.....	11
1.3.11 Future Expansion	11
1.4 INTERCOM STATIONS	12
1.5 DIGITAL AUDIO RECORDING SYSTEM	15
1.6 NON-CONTACT INTERCOMS	15
1.7 DOOR INTERCOM OPERATION	15
1.8 PUBLIC ADDRESS SYSTEM	16
1.9 CABLING	16
2. GRAPHICAL USER INTERFACE (GUI)	17
2.1 General Description and System Overview:	17
2.2 System Configuration:	17
2.3 System Performance:	18
2.3.1 Central & Movement Operator Workstations	18
2.3.2 Local Operator Workstations	18
2.4 Minimum Hardware Requirements:	19
2.4.1 Operator Workstations	19
2.4.2 Management Workstation.....	19
2.4.3 LAN Specification.....	19
2.5 Minimum Software Requirements:	20
2.6 OPERATOR STATIONS (VISUAL DISPLAY UNITS)	21
2.6.1 General.....	21
2.6.2 Monitors.....	21
2.6.3 Keyboards	21
2.6.4 Printer	21
2.6.5 Mouse.....	22
2.6.6 Networking.....	22
2.7 SOFTWARE	23
2.7.1 General.....	23
2.7.2 Operating System.....	23
2.7.3 System Access.....	23
2.7.4 System Reporting.....	23
2.8 SYSTEM STATUS	24
2.9 CURRENT ALARM WINDOW	25
2.10 GRAPHICAL DISPLAY	26
2.11 MANAGEMENT FUNCTIONS	27
2.11.1 Configuration.....	27
2.11.2 Global Function Operations:	27
2.11.3 Intercom Operations	29

IF 01	SCOPE OF WORK.....	31
IF 02	STANDARD SPECIFICATIONS, REGULATIONS AND CODES	32
IF 03	BRIEF DESCRIPTION OF THE SYSTEMS.....	34
IF 04	OPERATING AND MAINTENANCE MANUALS.....	34
IF 05	LOGGING AND RECORDING PROCEDURES	35
IF 06	MAINTENANCE TOOLS AND SPARES	35
IF 07	REPAIR WORK.....	37
IF 08	REPAIR WORK: MEASUREMENT AND PAYMENT.....	40
IF 09	ADDITIONAL MAINTENANCE WORK	55

1. INTERCOM AND PUBLIC ADDRESS SYSTEM

1.1 GENERAL

The system shall consist of a full duplex intercommunication system to provide digital voice communication, public address, voice recording and event logging facilities.

The following functional features shall be provided by the proposed system:

a. Noise immunity

The system shall provide clear undistorted speech and music transmission. The audio signal shall be digitally transmitted to each intercom station to provide immunity against electrical and earthing interference typically associated with analogue systems.

b. Bus structured Cabling

Intercom station cabling shall be installed in a BUS configuration to reduce system cabling and conduit requirements, and shall not require an independent pair of wires per station.

c. Multiple Audio Channels

The system shall be capable of transmitting a minimum of three digitized audio channels simultaneously, which shall enable intercom stations to independently select either a music channel, an education channel or to call and communicate with the system operator. The channel selection and current operation of one station shall have no effect on the channel selection and operation of any other station.

d. Interface to Telephone network

The system shall have the capability of interfacing to the prison telephone system (PABX), which will enable existing telephones situated in offices to call intercom stations and hold two-way conversations. The telephones shall also be used for paging over the public address system.

e. Tamper detection

Each intercom station shall provide tamper detection, which shall automatically notify the system operator of an intercom station, which has been opened or tampered with in any way.

f. PC based Operator console

A dedicated PC based operator console shall be provided at each local control room and at the Central control station. It shall be possible for any operator console to call any intercom station within the entire prison based upon authorized user levels. In the case of failure of any operator console it shall be possible to route incoming calls from intercom stations to any other operator console in the prison.

g. Event Recording and Reporting

The system shall be capable of recording and reporting the following events with an accompanying time and date stamp:

Intercom station call requests with station identification.
Operator response with operator/station identification and call duration.

h. Threshold Monitoring

The system shall be able to automatically detect raised voice levels in cells and passageways. It shall be possible to independently set the threshold (Trigger) level of each intercom station to suit the environment. Threshold alarms shall be transmitted to the system operator and treated as emergency calls.

i. Voice recording

Emergency calls shall be recorded onto a PC hard drive. System operators shall be able to replay the emergency call via a PC based control system, which shall indicate the associated intercom station and time and date of the call.

j. Two way conversations

The system operators shall be provided with handsets, which shall enable two-way (telephone type) conversations with any selected intercom station.

k. Volume level Adjustment

The system shall enable operators to independently set the speaker volume and microphone sensitivity levels for each intercom station in order to optimize the acoustic settings for each building or room.

l. VoIP Compatibility (Ethernet telephones)

The system shall be compatible with standard Voice over IP telephone systems, which will enable the expansion or replacement of equipment with products from a variety of competitors. The system shall be able to transmit multiple audio conversations between buildings via existing Ethernet networks.

System Description

Intercom stations shall be connected in a modular bus configuration in order to reduce cabling requirements. Point to point systems shall not be considered acceptable.

Analogue/digital hybrid systems making use of separate data and audio bus cabling shall not be accepted, and the tenderer shall provide sufficient technical literature to fully evaluate the data/audio protocol utilized by the system.

The system shall be compatible with standard voice over IP products (IP Telephony), which employ such protocols as SIP, and be capable of communicating both data and audio signals over standard TCP/IP and UDP Protocols. Where possible the system should make use of existing Large Area Networks for the transmission of control and Audio data.

The overall design of the system software and cabling shall be such that as far as practical, failure of one part (building) of the system does not affect normal operation of any other part of the system.

The system shall employ full duplex digital audio technology and provide clear undistorted speech communications, free from background noise and/or external interference.

Amplification shall be provided at each intercom or PA station in order to provide the option of piping music to groups or individual stations as required.

The system shall be capable of transmitting at least 32 simultaneous full duplex conversations via the TCP/IP network running between control areas, whilst being capable of transmitting two simultaneous full duplex conversations across any local intercom station

bus, in order to pipe music to all speakers, whilst simultaneously holding a conversation with any selected intercom station.

The intercom system shall be capable of being fully integrated with a PC based Graphical User Interface (GUI) via a bi-directional high level interface to allow remote monitoring of all intercom station calls by the GUI. All such interfacing of systems shall be configured such that if any one system fails to operate, the other systems shall continue to operate without any detrimental effect.

A dedicated GUI for the control, monitoring and logging of events shall be provided for the intercom system, and shall be installed at each control center.

1.1.1 Cell and Passage Door Intercom Stations

The contractor shall supply, install and commission a networked Cell and passage door Intercom System to the locations nominated in the accompanying drawings. Monitoring locations shall be provided in each local control room, with the primary central monitoring location to be installed in the Central Control room.

Calls originated from cell and passage door intercom stations shall be routed to the respective local control room GUI Operator terminal and Intercom GUI.

A Call diversion facility in the event of un-answered or unattended mode shall be provided, and shall be configured to the engineer's specification.

All **emergency** calls between Control stations and intercom stations shall be digitally recorded on the intercom digital recording system.

The Digital Recording System shall be expandable to cater for future system expansion.

1.2 GENERAL OVERVIEW

The systems major components shall be located as follows:

1.2.1 Central Control Room

19" rack mount Central Processor located within an equipment rack in the Central Control Room security equipment cupboard.

Rack mount Ethernet based Communication Controllers to interface to the local control racks situated in the Local control room equipment cupboards.

1x UPS suitable for the application. Surge protection and lightning protection have to be installed if electrical requirements pertaining to surges and spikes are not in accordance with SANS standards and should be part of the contract.

The consultant has to investigate and do tests to determine if this should be included in the BOQ and is needed on the project.

1x Operator GUI's (VDUs and keyboards) located in the nominated locations.

1x Operator communications handset with Keypad.

Digital Voice Recording System located within an equipment rack in the Central Control Room security equipment cupboards.

1.2.2 Local Control Locations

19" rack mount local controller.

Rack mount Ethernet based Communication controller to interface to the Central Control Room intercom rack.

Rack mount Communication Master controller cards to interface to intercom stations in a Bus configuration.

1x Operator GUI's (VDUs and keyboards) located in the nominated locations.

1x Operator communications handset with Keypad.

1.3 SYSTEM OF OPERATION

1.3.1 General

Within each nominated building, the contractor shall supply and install an integrated intercom system. The system shall be complete with cell and passage digital intercom stations, 19" rack mountable field controllers to provide voice communications to the local control room and/or the Central Control Room.

The system shall provide the following minimum system functions:

1.3.1.1 Normal calls

Calls initiated from Cell/Staff Intercom stations to system operators or vice versa

1.3.1.2 Alarm calls

Emergency calls initiated by officers or automatically triggered by system events such as audio level alarms (Threshold monitoring).

1.3.1.3 Tamper calls

Tamper calls initiated when an attempt is made to gain unauthorized access to intercom station electronics

1.3.1.4 Database for prisoner data

The system shall provide a database for prisoner and/or staff personal data. It shall be possible to import existing prisoner databases by means of an import tool. It shall be possible to display data from the central database on multiple operator workstations according to authorization levels. Editing of database entries shall be password protected.

1.3.1.5 System error messages and event logging

System errors and disturbances shall be displayed on appropriately configured operator workstations according to the type and location of the error or event. Disturbances such as raised voice levels in cells shall automatically generate alarms, which shall be documented in a log file and on a printer.

System functionality shall not be influenced in the event of failure of any one part of the system or operator station. Each operator workstation shall be configured as an autonomous system. In the event of an operator system failure, the functionality of that station shall be transferred to another operator workstation on the system according to a pre-configured set of rules.

1.3.1.6 Data Integrity

In the event of power failure, the actual status information in the system at the time of the failure shall not be lost. When the power is reconnected, all status information at the time of the power failure shall be retrievable and will be displayed on the relevant screens.

1.3.1.7 Listen-in

A "Listen-in" function shall be provided, and configured in accordance with the engineer's specification, to provide either overt or covert operation or to be disabled altogether. Overhearing (listening-in) from one cell to another via the cell station shall not be possible.

1.3.1.8 Public Address system

It shall be possible to announce messages in two ways:

- By initiating a group call to a selected group or all intercom stations.
- By initiating a group, or all PA stations which have been configured on the system.

Any operator workstation on the system shall be capable of being configured with PA functionality as required.

1.3.1.9 Audio level detection

Each intercom station shall be capable of automatically detecting excessive Audio Levels, and shall be configured remotely by means of the installation bus cabling. The system supervisor shall be capable of individually setting the audio alarm level sensitivity of each cell intercom station.

1.3.1.10 Call Monitor

A Call Monitor facility shall be provided, which shall provide the operator with station identification together with information of inmate(s) housed in appropriate cells. The call monitor shall display the calls and events from individual cell intercom stations in a priority based text listing.

The Call Monitor function shall be capable of displaying the following information.
Normal calls, Tamper calls, Alarm calls, Guard present, Intercom Station Error, Intercom Station Failure
It shall be possible to configure the call or event priority on the operator GUI.

1.3.2 Establishing a Call

At a minimum the system shall be capable of establishing calls in the following two ways:

1.3.2.1 Respond to Normal Calls

Call-ins shall be entered into Call-in queue on a first in – first out (FIFO) bases, and sorted by priority level. Priority levels shall be set for each intercom station on the system. On receiving a call-in the operator shall only need make a single keystroke to answer the highest priority call that has been in the queue for the longest period of time. It shall also be possible to select a specific call-in and initiate a call by making a single keystroke.

1.3.2.2 Response to Alarm Calls

The system shall be capable of automatically detecting raised audio levels at nominated intercom stations. It shall be possible to configure the system to automatically initiate calls to intercom stations that report audio level alarms.

1.3.3 Call & Event Logging

All calls and events shall be logged to a log file. Log files shall be named and stored by date.

The current or historical log files shall be displayed on the screen or printed out on request. The system shall maintain log files for a minimum of six months. The system shall provided the operator with a warning prompt indicating the files should be backed up if required for a longer duration.

1.3.4 System Maintenance

The system shall be provided with a system configuration tool whereby system parameters may be set for individual intercom stations. All system parameters shall be downloaded from a Central station, and shall not require the opening of intercom points in order to change system parameters.

The following maintenance parameters shall include but not be limited to:

1. System parameter initialization.
2. Intercom Station parameters configuration.
3. Line related parameters settings such as station type.
4. Station call number settings.
5. Group Call numbers setting for stations.
6. Emergency Call setting for stations
7. Call Restriction settings.
8. Transfer and Group Hunt settings.
9. Control desk group settings.
10. Configure Digital Switch parameters
11. Clear system tables
12. Save and retrieve data to/ from the database
13. Print pre-defined reports
14. Country specific characters settings for display stations
15. Testing of communication between PC and Digital Switch/s.

All setting changes shall be automatically updated in the work-files without saving. When loading the maintenance tool, the last entered data in the work-files shall be used.

1.3.5 Operator Handsets

It shall be possible to answer calls by means of lifting the operator handset from the cradle and selecting the appropriate station via the GUI.

Calls shall be cancelled by replacing the handset and selecting the appropriate station a second time via the GUI. When the call is connected, this event shall be recorded at the central controller processor including date, time, cell call station number and duration of the call.

A tone shall sound from the intercom whenever a call is answered.

1.3.6 Call Routing

If a call is not answered or cancelled locally within a user adjustable pre-determined time of 30-600 seconds the call shall be automatically switched to the Central Control station.

1.3.7 Multiple or Simultaneous Calls

Cell calls arriving at the local control panel or nominated Central Control Room operator's terminal shall be queued so that calls are listed and answered consecutively, in accordance with their priority and chronological arrival time.

Cell calls from Buildings, which are in attended mode and have been switched through to Central Control Room by default, shall have priority over calls from Buildings in unattended mode.

The system shall have programming capability for priority queuing so that inmates with medical or other problems can be assigned a higher precedence to pre-empt existing lower

Priority cells shall be highlighted on the Central Control Room operator's terminal.

1.3.8 Public Address

It shall be possible to initiate a public address call from any operator control station to a building or group of cells utilising the cell intercom units within their area of responsibility.

The system shall also have the capability to provide control of general public address speakers to nominated areas.

1.3.9 Suppression of Call

An operator shall be able to suppress calls from an individual cell or group of cells. This shall be initiated in the event of nuisance calls from cells. The suppression of the call function shall only be available when enabled via a high-level password control allocated to a supervisor.

Once a cell has been isolated calls initiated from the cell shall not register at the operator stations.

After a pre-determined time period a (5-30 minutes) a message shall be generated and displayed at the local control station or the Central Control station to remind the operator that the cell is in the isolated state. The operator shall either:

1. Acknowledge the message only. In this case the cell intercom shall remain isolated for a further period, and so on, until the "cell isolate" is reset.
2. Reset the cell intercom. In this case the cell intercom shall operate as previously described.

All activity including suppression of intercom unit(s), acknowledgment of reminder message and reset of intercom unit shall be recorded on the CPU events log and system printer.

The ability to implement the call suppression feature shall only be able to be activated and deactivated from a restricted access menu.

1.3.10 Cell Monitoring

The System shall have the capability of individually setting the Audio level Alarm set point for each intercom station.

Raised voices in cells shall automatically trigger an alarm condition once the set point has been reached. The alarm condition shall be reported to the local control station as an alarm call-in.

The Audio level set point for each station shall be configured over the data network, and shall not require the station to be removed.

1.3.11 Future Expansion

The Cell Intercom system shall be capable of being expanded for extended use within the total complex for future extensions. All upgrades to provide this service shall not affect the existing service as specified in this document or render the equipment, as specified, redundant in any form.

All system upgrades shall be configured using similar equipment and operate in the same manner in all respects. Any upgrades should cause minimal disturbance to the existing service.

1.4 INTERCOM STATIONS

Intercom stations shall be mounted in flush wall boxes as detailed on drawings. The accommodating wall boxes complete with acoustic material, conduits and draw wires for cabling access and cabling are to be supplied and installed as part of this project.

Intercom stations shall consist of a vandal resistant, momentary action, call switch, speaker and microphone mounted into a flush mounted stainless steel plate.

1.4.1 Cell Intercom units

The tendered rate shall include full compensation for the supply and installation of a cell speaker, microphone, pushbutton mounted on a flush mounted vandal proof stainless steel faceplate, two piece back-box and associated fixing equipment cable ferrules etc.

Cell Intercom units shall be designed/constructed/installed as follows:

- Front plate to be stainless steel 3 mm thick with 2.5 mm radius corners.
- The Speaker grille will be a grid pattern of diagonal slots.
- A 2 mm thick baffle plate with a corresponding 3 mm offset grid pattern.
- Mylar speaker with 5 watt power rating.
- The microphone is to be an Electret type with a minimum 36 DB dynamic range.
- An exterior, which does not facilitate the concealment of contraband.
- A tamper alarm separate to the call alarm to notify the respective operator station of an intercom unit's removal.
- The call button is to be a robust, vandal resistant push button manufactured of stainless steel.
- The call button shall activate a micro switch and bear against a solid shoulder, which resists knock through. An internal neoprene gland seals the button to IP65.
- Build in 1-Watt amplifier with software adjustable gain.
- Cabling shall be a Cat5, bus feed, fully digital transmission of speech and data.
- Adjustable microphone sensitivity

A 130mm circular hole shall be cored through each Cell wall between the passage and the cell at the position of the existing intercom station. A purpose made back-box as detailed in the accompanying drawing shall be installed within the 130mm core and secured to the wall from the inside to accommodate the intercom faceplate. The faceplate shall attach to the back-box on the cell side by means of welded studs on the faceplate, which shall be secured to the back-box with four nuts from the inside.

The cell station shall consist of a loud speaker, microphone and vandal proof push button mounted on a 140mm diameter circular, 3mm thick, brushed stainless steel plate. Threaded studs shall be welded to the rear of the grill plate to facilitate flush security from the rear.

A wall blank cavity cover plate of the same dimensions and material shall be mounted with recessed Torx type security screws to the passage side of the back-box.

The loudspeaker shall be a water resistant unit with a plastic cone. The loudspeaker shall be mounted such that tampering and water damage is eliminated.

The system cabling shall be routed through the existing conduiting. A cable ferrule shall be provided for each existing conduit end, to eliminate damage to cabling when entering and leaving the new back-box.

The finish of the speaker enclosure shall be of high quality, neatly finished and shall not require any paint or protective covering. The opening in the cover shall be situated in a manner that the speaker cannot be damaged from the outside by protruding obstacles through the sound cavities.

The intercom stations shall provide for a minimum of four (4) additional isolated inputs, and two (2) potentially free outputs for future expansion and connection to peripheral equipment such as panic buttons, lighting control etc

Intercom station electronic circuitry shall be optically isolated from the incoming data/audio bus.

1.4.2 Warden Intercom units

The tendered rate shall include full compensation for the supply and installation of a warden intercom station with speaker, microphone and magnetic contact mounted on a flush mounted vandal proof stainless steel faceplate, two piece back-box and associated fixing equipment cable ferrules etc.

Warden Intercom units shall be designed/constructed/installed as follows:

- Front plate to be stainless steel 3 mm thick with 2.5 mm radius corners.
- The Speaker grille will be a grid pattern of diagonal slots.
- A 2 mm thick baffle plate with a corresponding 3 mm offset grid pattern.
- Mylar speaker with 5 watt power rating.
- The microphone is to be an Electret type with a minimum 36 DB dynamic range.
- An exterior, which does not facilitate the concealment of contraband.
- A tamper alarm separate to the call alarm to notify the respective operator station of an intercom unit's removal.
- Calls to be activated via wardens magnets.
- Build in 1-Watt amplifier with software adjustable gain.
- Cabling shall be a Cat5, bus feed, fully digital transmission of speech and data.
- Adjustable microphone sensitivity

A 130mm circular hole shall be cored 150mm deep into the passage walls at the required or existing station positions. A purpose made back-box as detailed in the accompanying drawing shall be installed within the 130mm core and secured to the wall from the inside to accommodate the intercom faceplate. The faceplate shall attach to the back-box with 4x Torx type security screws.

The Warden station shall consist of a loud speaker, microphone and vandal proof push button mounted on a 140mm diameter circular, 3mm thick, brushed stainless steel plate.

The loudspeaker shall be a water resistant unit with a plastic cone. The loudspeaker shall be mounted such that tampering and water damage is eliminated.

The system cabling shall be routed through the existing conduiting. A cable ferrule shall be provided for each existing conduit end, to eliminate damage to cabling when entering and leaving the new back-box.

The finish of the speaker enclosure shall be of high quality, neatly finished and shall not require any paint or protective covering. The opening in the cover shall be situated in a manner that the speaker cannot be damaged from the outside by protruding obstacles through the sound cavities.

The intercom stations shall provide for a minimum of four (4) additional isolated inputs, and two (2) potentially free outputs for future expansion and connection to peripheral equipment such as panic buttons, lighting control etc

Intercom station electronic circuitry shall be optically isolated from the incoming data/audio bus.

1.4.3 Visitor Speaker Units

The tendered rate shall include full compensation for the supply and installation of a Visitor station set, with speakers, microphones, and a vandal proof push button on the Inmate side. The back-boxes shall consist of 45 deg surface mounted stainless steel boxes with associated fixing equipment cable, ferrules etc.

Visitor Intercom units shall be designed/constructed/installed as follows:

- Front plate to be stainless steel 3 mm thick with 2.5 mm radius corners.
- The Speaker grille will be a grid pattern of diagonal slots.
- A 2 mm thick baffle plate with a corresponding 3 mm offset grid pattern.
- Mylar speaker with 5 watt power rating.
- The microphone is to be an Electret type with a minimum 36 DB dynamic range.
- An exterior, which does not facilitate the concealment of contraband.
- A tamper alarm separate to the call alarm to notify the respective operator station of an intercom unit's removal.
- Build in 1-Watt amplifier with software adjustable gain.
- Cabling shall be a Cat5, bus feed, fully digital transmission of speech and data.
- Adjustable microphone sensitivity

1.4.4 Public Address Speaker Units

The tendered rate shall include full compensation for the supply and installation of a Public Address station, with 2x speakers, microphones, and a built in 10W amplifier. The back-box shall consist of a 45 deg surface mounted stainless steel boxes with associated fixing equipment cable, ferrules etc.

Public Address Intercom units shall be designed/constructed/installed as follows:

- Front plate to be stainless steel 3 mm thick with 2.5 mm radius corners.
- The Speaker grille will be a grid pattern of diagonal slots.
- A 2 mm thick baffle plate with a corresponding 3 mm offset grid pattern.
- Mylar speaker with 5 watt power rating.
- The microphone is to be an Electret type with a minimum 36 DB dynamic range.
- An exterior, which does not facilitate the concealment of contraband.
- A tamper alarm separate to the call alarm to notify the respective operator station of an intercom unit's removal.
- Build in 10-Watt amplifier with software adjustable gain.
- Cabling shall be a Cat5, bus feed, fully digital transmission of speech and data.
- Adjustable microphone sensitivity

1.5 DIGITAL AUDIO RECORDING SYSTEM

A digital voice recording and playback system shall be supplied and installed as part of the Works.

The central processor and associated peripherals shall support digital recording for a minimum of 32 channels without the requirement for additional central processors installed in each local area.

The system shall support up to 32 channels of voice data information per central processor.

Time and date stamping shall be automatically logged to all audio channels.

The voice recording system central processor shall provide immediate access to, and recording of, voice inputs via an onboard storage medium to a minimum capacity of 1200 hours of on-line data.

A CD-drive shall be installed as part of the central processor configuration for the archival of data.

The audio recording system shall provide the following alarm conditions:

- Recording medium capacity consumed by 80%
- Audio recording system non-operational due to power failure or failure of unit to record.

When the hard disk reaches full capacity the system shall automatically over write the oldest dated data file. Access to the voice recording system shall be controlled by password authorization. A minimum of three levels of access rights shall be provided.

The Intercom system supplied and installed, as part of these works shall be interfaced to the voice recording system.

All voice communications shall be automatically recorded on a digital recording medium with time and date being encoded on the same channel as each conversation.

1.6 NON-CONTACT INTERCOMS

Provide individual audio monitoring and recording of the non-contact visiting booths in the nominated locations.

Provide visitation intercom stations to the same specification to that of the cell and passage intercom stations, however without the call button.

All voice communications shall be automatically recorded on a digital recording medium with time and date being encoded on the same channel as each conversation.

1.7 DOOR INTERCOM OPERATION

The door intercom system shall be configured to provide the functionality as follows:

In general, when a door intercom point is activated the intercom shall be answered from the relevant GUI operator station or Intercom GUI via a dedicated handset.

The GUI terminal shall include a graphical display to connect and cancel intercom calls as elected.

In the event of a door intercom point not being answered within the default time period of 30 seconds or the relevant GUI operator terminal being off-line the call shall automatically divert to the Central Control Station.

1.8 PUBLIC ADDRESS SYSTEM.

The public address system shall be provided as an integral part of Intercom system.

The system shall include internal public address to nominated buildings via ceiling or wall mounted speakers and externally mounted speakers for non-building areas such as exercise yards and external association areas at the locations indicated on the drawings.

PA stations shall be provided with a built-in 10W audio amplifier, and shall be capable of providing a continuous music channel if required.

1.9 CABLING

Bus Cabling between individual intercom and PA stations shall consist of the following:

- 1.) 1x 3 Core 1,5mm Power Cable
- 2.) Cat5 Data/Digital Audio Cable.

All intercom circuit cabling shall be terminated to the relevant Master Controllers situated in the local control racks.

2. GRAPHICAL USER INTERFACE (GUI)

2.1 General Description and System Overview:

The tenderer shall supply, install and commission a fully integrated multi-station Graphical User Interface to facilitate the control and monitoring of all the intercom and future security sub-system components by means of a mouse activated operator workstation.

Operator consoles shall be located within each local control room as well as the Central control room within the facility.

The tenderer shall provide all materials, labour and supervision required to install, commission and document the complete system as required by this specification.

The GUI shall have demonstrated proven operation in a correctional environment, and a list of reference sites shall be provided as part of the tender response.

The Digital Intercom and Public Address sub-system hardware shall be integrated with the GUI via a high level Interface (HLI). The full functionality of the system shall be integrated with the GUI to provide enhanced features including but not limited to:

- Station Call-In
- Station Fault Analysis
- Call In Divert
- Call Answer
- Call Cancel
- Call-In Queuing
- Tamper Alarm monitoring
- Threshold Monitoring (Disturbance detection)
- Individual station Speaker and Microphone sensitivity adjustment

The Intercom and Public Address system shall enable the selection of any individual or group of intercom stations by any operator workstation within the facility.

2.2 System Configuration:

The Interactive GUI shall consist of multiple Operator Workstations, situated in the local, movement and central control rooms, and shall be networked by means of a Fiber Optic Large Area Network (LAN).

The network interface between control rooms shall be by means of a Fiber Optic medium, and shall form a star configuration from the Central Control room to each local control room to ensure local system autonomy.

The Operator workstations shall serve as the graphic based operator interfaces between the corrections officers and the intercom system hardware as specified herein.

All operator functions shall be controlled by means of a mouse, and shall require the minimum movement and actions in order to complete a required task.

The audio sub-system components within each control room shall form an integral part of the control console, and shall not require the use of external control equipment such as PTT buttons, Operator Keyboards etc.

Alarm processing, alarm logging, alarm response data entry, graphical and text based user interface, data entry, and other system management functions shall be performed by the GUI operator workstations. The operator workstations shall be located in the Central Control Room and other nominated locations.

The GUI shall be fully programmable to allow:

- Response instructions to be displayed for all alarms types.
- Use dynamic (real time) graphics to display device status.
- Initiate operator commands via system tailored icons.
- Display building layouts in a graphical representation.
- Easy to follow menus with single key select options, to assist in the daily routine operations of each facility.
- Allocate alarm priorities.
- Set Alarm response properties.
- Set lock/unlock and access/secure operating schedules.
- Generate User defined reports.

The contractor shall allow adequate time to liaise with the Engineer in order to detail any user specific requirements necessary for the operation of each building, system, alarm type, and alarm response configuration within the system. This shall include the configuration of maps, report formats, access schedules, alarm response instructions and the like, to suit each operator workstation.

The system shall be modular in design to allow for future system expansion (i.e. in excess 200 % of specified capacity) with minimum cost and disruption to the existing operational system.

Tenderers are to specify the systems total capacity for future expansions. Such upgrades shall not render a redundancy in field hardware, the Central Processing Units or any major component of software, firmware or operating systems.

2.3 System Performance:

2.3.1 Central & Movement Operator Workstations

The interaction delay between activating a control icon on any given operator workstation and the controlled point activation, (i.e., the cell station), shall be no greater than one second (1 sec)..

The interaction delay between controlled point activation and any given operator workstation response either by activation of an audible alarm and/or the associate icon changing state (color) shall be no greater than one second (1 sec).

The interaction delay between recalling any floor plan at any given operator workstation shall be no greater than one quarter of one second (0.25) second.

2.3.2 Local Operator Workstations

The interaction delay between activating a control icon on any given operator workstation and the controlled point activation, (i.e., the cell station), shall be no greater than one half of one second (0.5 sec).

The interaction delay between controlled point activation and any given operator workstation response either by activation of an audible alarm and/or the associate icon changing state (color) shall be no greater than one half of one second (0.5 sec).

2.4 Minimum Hardware Requirements:

2.4.1 Operator Workstations

Each Operator workstation shall consist of the following:

- a. 4U Industrial mount 19" PC workstation with a minimum of an Intel Pentium IV 1.8 GHz processor with 256Mb Ram with internal parity checking, loaded with Win 2000 operating system.
- b. One 1.44M Byte three and one half inch (3.5") disc drive, one removable 20 G Byte hard drive, and one 52 x CD Rom shall be fitted with the proper controller/s for all associated drives.
- c. A 21" video system Cathode Ray Type and video driver card that shall be SVGA compatible and shall have a resolution of 1600 x 1200, with 32-bit colour.
- d. All necessary daughter boards for integration to local area network, mouse, sound card, speakers, etc., shall be provided.
- e. A vandal resistant Biometric Fingerprint verification reader shall be provided at each workstation for automatic operator identification and logon.

2.4.2 Management Workstation

A single Management Workstation shall be provided, and shall consist of the following:

- a. 4U Industrial mount 19" PC workstation with a minimum of an Intel Pentium IV 1.8 GHz processor with 256Mb Ram with internal parity checking, loaded with Win 2000 Operating System.
- b. One 1.44M Byte three and one half inch (3.5") disc drive, one 20 G Byte hard drive, and one 52 x CD Rom shall be fitted with the proper controller/s for all associated drives.
- c. A 19" video system Cathode Ray Type and video driver card that shall be SVGA compatible and shall have a resolution of 1600 x 1200, with 32-bit colour.
- d. A vandal resistant Biometric Fingerprint verification reader shall be provided for automatic operator identification and logon.

2.4.3 LAN Specification

Media

- a. Distance <100m: Ethernet Category 5 – UTP
- b. Distance >100m: Fiber Optics – 100Base-FX, 850nm Multimode
- c. Conversion Mod: TX/FX Single Mode/Plus-SC

Central Switch Hardware

The central control room switch stack shall be capable of supporting 10 Mbps and 10/100 Mbps traffic. The switch shall be capable of cascading for expansion purposes.

The unit shall provide support for a range of backbone options including Fast Ethernet over fiber, Gigabit Ethernet, Layer 3 switching and ATM via a high speed module.

2.5 Minimum Software Requirements:

2.5.1 The GUI shall have a proven track record in the security industry, and shall be an Off-the-shelf package available through a distributor network. The off-the-shelf software shall be programmed and tailored to the specified functions and features described herein and as indicated on the accompanying drawings.

2.5.2 The software shall convey an accurate floor plan of all areas that require display on the VDU. The software shall utilize the maximum resolution and colours of the SVGA monitor to enhance and simplify the displayed control and status information. Fast orientation and ergonomics will be the goal of the graphic displays.

2.5.3 The software shall provide integrated Biometric (Fingerprint) log-on security functionality with security level protection for all Mouse driven operator workstations. The Biometric (Finger print) logon facility shall be capable of providing a one to many search algorithm to confirm operator credentials, without the need for entering user details or the swiping of a personal identification card.

There shall be a minimum of sixteen (99) levels of access, and shall be expandable.

The software shall provide a user database within the Management workstation. The database shall support a minimum of two thousand (2000) users.

2.5.4 The software shall provide on-line utilities accessed through the Management workstation menu structure. These utilities shall provide the system supervisor with the ability to edit and update required data bases, system operating variables, report configuration and generation, alarm tags and point descriptions, etc. These utilities shall be protected by security levels and Biometric Access.

2.5.5 All software licenses shall be transferred to the Owner at completion of the project. This shall include but not be limited to all original installation disks, software manuals, equipment manuals, etc. All project specific applications software shall be transferred at the end of warranty period.

2.6 OPERATOR STATIONS (VISUAL DISPLAY UNITS)

2.6.1 General

The GUI system offered shall be capable of providing a multiple operator workstation environment, which may be configured for full or selective operational & functional monitoring and control of select areas and functions.

Operator workstations shall be located as indicated in the tender drawings issued.

The operator workstations shall operate in both text and graphics based display. Any operator workstation enabled via the Biometric logon system shall be capable of controlling any area within the facility providing the respective operator is authorized to do so.

The operator workstation shall also be capable of implementing changes to the system configuration and parameters, provided the operator has the necessary administration rights.

Entries, deletions or modifications to the configuration shall be possible via the operator workstation VDU/Keyboard without loss of, or degradation to, any other system functionality.

2.6.2 Monitors

All operator workstations shall be of robust construction, ergonomically designed to minimise operator fatigue and conform to the following minimum requirements:

- Screen: An effective viewing screen size of 21".
- Character set: ASCII with near letter quality fonts with crisp, fully formed characters.
- Contrast: Sufficient brightness and contrast to be easily readable by an operator with average vision, but not to cause burn-in of fixed display on screen. Screen saver functionality shall be provided to prevent burn-in.
- Power: 230 VAC 50 Hz.

2.6.3 Keyboards

Keyboards shall be supplied with all workstations, however shall only be used for commissioning and maintenance purposes. All operator functions shall be performed by means of an optical mouse, with system screens being designed so as to require the minimum operator action. Functions such as audio system Push to talk, volume up and down control etc shall be possible by means of function keys on the GUI workstation.

2.6.4 Printer

A high quality Inkjet printer shall be supplied, installed and commissioned as part of this contract, for use with the management workstation in order to generate user defined management reports.

The following shall be included:

- Paper feed: Page feed capable of accepting paper at least up to 242 mm (A4) wide. Single page paper shall be used to allow users to print out historical events and system activity.
- Character set: ASCII & Graphics.
- Print speed: Minimum of 150 characters per second at 10 cpi.
- Print type: Ink jet type using continuous A4 fan fold paper handling.
- Ink Storage: Ink cartridge, including 2 spare cartridges/printer.
- Print direction: Bi-directional in text mode.
- Pitch: User selectable (i.e. 10, 12 or 15).
- Print colour: Black on white paper.

The printer shall incorporate a visible control panel with LED indication for power on, paper out and ready.

The printer shall be installed and configured into the Management workstation to be installed within the Central Control Room..

The printer shall be supplied with both power and data cables of suitable length to suit the location. In addition, the printer shall be set up complete with one full box of paper and two spare ink cartridges each.

2.6.5 Mouse

All mouse devices shall be optical of robust construction and suitably secured by an interconnecting cable.

2.6.6 Networking

Each GUI workstation installed on the security LAN shall be capable of monitoring and reporting the current status of all workstations on the network.

Should communications between workstations or control equipment be disrupted, an alarm shall be generated at the Central Control Room Operator workstations to alert the operators of the failure within the communications network.

Alarms generated shall be displayed at the operator stations, while updating the system database with the Time, Date and relevant workstation detail.

Failure of any operator workstation shall not prevent communication between any other workstation or Distributed control modules and their associated devices.

2.7 SOFTWARE

2.7.1 General

Software shall be fully proven prior to being supplied, installed, tested and commissioned.

A list of reference sites at which the system software has been installed and operational at the date of the closing of this tender shall be provided.

The operator interface software shall incorporate English language descriptions and messages using both text based menus and graphical/icon displays. All configuration (e.g. entering of alarm response properties, adjusting time schedules, user data, etc) shall be performed on-line without effecting the operation of the overall system.

Selective access to different operator functions shall be configured based on an operator's user level. User levels shall be determined from the Biometric verification each time an operator logs on to a workstation.

After any predefined period, if no operator activity has occurred at the operator workstations, that station shall automatically request Biometric verification failing which the station shall log off.

The time period before automatic logging off of workstations shall be user configurable, and shall be determined during commissioning of the system, in liaison with the Engineer.

2.7.2 Operating System

The operating system shall be a recognised and widely accepted standard operating system that shall suit the requirements of the system to be installed. The operating system shall be a real time multi-user/multi-tasking system such as NT, W2000, Unix or QNX.

The operating system shall have proven and demonstrated reliable operation in the security environment.

Facilities shall be provided to store all programs on site and include all equipment necessary to backup and reload all system programs, including the operating system with all user specific system parameters.

2.7.3 System Access

Operators shall be required to "log on" to operator workstations using the finger print reader provided at each operator station before being able to access the system or user information, reset alarms or access any other system functions.

Access to all workstations shall be limited through allocation of access levels.

A minimum of 2000 users and 99 User levels shall be available. Only users allocated with a user level of 99 shall be capable of the assignment and changing of passwords to all levels.

Each operator shall be allowed to access different operator commands and functions, and view certain individually assigned events, menus and functions based on their assigned user level.

2.7.4 System Reporting

The GUI shall be capable of performing SQL queries to the current or archived databases on the server workstations, format the data into customised reports which shall allow for the following:

- Display of all relevant information on any individual alarm point including alarm point identification by device number and alarm point status.
- Display all alarm points in the system in alarm or normal condition, as a single log.
- Display all emergency procedures applicable to any alarm type with corresponding alarm response actions and locations, per alarm device.

Reporting details shall include:

- Alarm point status
- Alarm count per device.
- Alarm activity over a time period, selected by time and date.
- Display of selected alarm transactions based on alarm type and a calendar / time period.
- Display system operators login/out history
- Display all operator commands entered by any or all operators based on time/calendar interval.

2.8 SYSTEM STATUS

The GUI shall provide a menu option which, when selected, allows the system to display or print a list of current alarms, faults and conditions including the current fault conditions relating to GUI workstations and Intercom system hardware.

In graphical display mode the system shall display maps of each building complete with all internal levels and shall indicate all systems equipment status (i.e. Intercom on, off, tamper, Threshold, isolated etc).

2.9 CURRENT ALARM WINDOW

The system shall provide an efficient and reliable alarm handling procedure and shall include both audio and visual annunciation, logging to the database and recording of the history file the device description, point description, location, time and date the alarm occurred.

The system software shall have the ability to route only selected alarms to specific operator workstations, allowing different locations or applications to be segregated on a building or system basis.

All systems activity shall be presented to ensure proper actions have been taken and that no alarm is left unattended for any lengthy period. Alarms, which have been acknowledged, and not cleared/reset shall be clearly distinguishable.

Upon occurrence of an alarm(s) a user configurable audible tone shall sound at the operator workstation(s) and display an indication of the incoming alarm together with its priority.

If there are additional alarms to acknowledge the operator's station shall continue to sound the appropriate alarm tone and identify the highest priority alarm.

The first alarm displayed shall be the highest priority alarm followed by the next highest priority alarm, etc.

All alarms are required to be separately acknowledged by the operator, by means of the mouse provided to acknowledge and reset each alarm separately.

Each time new alarms are created the system shall restack the alarms so the operator sees them in order of priority.

The system shall also have an alarm/event status display available to the operator at all times on the operator's station.

The display shall be a real-time dynamic display of alarms in the active state, or system component failures.

An audit trail shall be used to log the actions taken by all system operators in response to an alarm. The audit trail shall note:

- When the alarm was activated.
- When the alarm was acknowledged.
- Who acknowledged the alarm.
- When the alarm was restored.

The system shall record every user command, acknowledgment and log every operator login.

These transactions shall be routed to the history database.

Any alarm point, which has been suppressed/inhibited by the operator shall on expiry of the time zone, or when unsuppressed by the operator, generate an alarm if the alarm point is in the "active" state. The report to the operator terminal shall be the same as described above.

Each alarm point shall have the facility for a description of the alarm occurring. A comprehensive outline for operator instructions, detailing all response actions shall be provided for all alarms.

2.10 GRAPHICAL DISPLAY

The GUI shall support a minimum of 150 colour maps for the purpose of displaying the location and real time status of any GUI input or output.

Graphical maps to be included within the initial configuration are to show in detail the following areas:

- Site plan showing all buildings and locations of all alarm points and operator workstations.
- A plan of each accommodation unit and building.
- All buildings intercoms and accessory devices/status/alarms and the like.
- All building tamper, communications, power and the like devices/status/alarms and the like.
- Other maps as required to clearly display all alarm input within buildings, or an external equipment cubicle locations.

Each site map shall be provided with a site plan key, which shall be common to all maps and situated in the same position. The key shall provide a means for the operator to quickly navigate through the entire facility without the need to use standard navigation buttons or the main site map.

All device location and statuses shall be detailed on each map and coloured accordingly for ease of recognition of both the device type and real time status.

Text messaging identifying the device type, designation and alarm status shall be available in a "mouse over" or "windows hint" structure to minimise text on individual maps.

All text descriptions shall be approved by the Engineer prior to final acceptance. Liaise all requirements through the Engineer when programming these maps and other alarm/response descriptions.

Function key descriptions shall also be displayed as mouse over or windows hints.

Graphical map displays shall be of high resolution to enable accurate images to be represented. The configuration software shall provide a complete graphical design environment in order to design/edit building and site maps. A standard icon library shall be available to the designer in a window environment to enable efficient editing of existing maps by means of dragging and dropping equipment icons onto maps.

The system shall allow maps to be linked by means of navigation buttons to allow operators to "zoom" in or out to display either additional detail or an overall map.

Point status and locations shall be clearly displayed using colour-coded icons. All icons shall display real time status of each point with continuous updates being provided to any dynamic screen display.

Updates shall occur every 1 second or less. Icons shall be easily duplicated from a library of standard symbols at the configuration stage of developing the graphics.

2.11 MANAGEMENT FUNCTIONS

2.11.1 Configuration

The GUI shall consist of a multiple screen representation of the entire facility, which shall contain all of the necessary icons to control the intercom and Public Address equipment and future devices such as CCTV images, door control devices situated throughout the prison. All icons shall be activated with the use of a mouse. All icons and status indicators shall be a minimum of 5mm in diameter. All symbols shall provide status by color and/or associated text.

2.11.2 Global Function Operations:

Global function icons shall be located at the bottom of each graphic screen in the form of a footer window, which shall be common to all area maps. These icons, if active, shall control the global functions for the entire facility.

2.11.2.1 System Control

Activating this icon shall cause the system to switch to the system control screen. The System Control screen shall provide a complete system diagnostic window for all sub-system components and communication systems within the entire facility.

Where applicable all alarm conditions shall allow for operator acknowledgement and automatic selection of the alarmed zone layout screen.

2.11.2.2 Site Plan

The site plan shall consist of an interactive miniature layout of the entire facility, and shall be situated on the bottom Right hand side of each operator screen.

The site plan shall provide the operator with a quick method to access an individual area to monitor and / or control.

2.11.2.3 Volume Up

Activating and maintaining this icon shall result in an increase in the operator console speaker volume. The icon shall change status to RED to indicate activation of this function.

2.11.2.4 Volume Down

Activating and maintaining this icon shall result in a decrease in the operator console speaker volume. The icon shall change status to RED to indicate activation of this function.

2.11.2.5 Select

Activating this icon shall result in either the first audio call-in or the currently selected audio call-in in the Audio Call-in Queue to be answered. Upon answering the call, the call shall be removed from the Audio Call In queue on all workstations.

2.11.2.6 Reset

Activating this icon shall result in either the first audio call in or the currently selected audio call-in in the Audio Call-in Queue to be reset. Upon resetting the call, the call shall be removed from the Audio Call In queue on all workstations.

2.11.2.7 Push To Talk

Activating and maintaining this icon shall result in the PTT function being activated within the audio control hardware. Releasing the icon resets the PTT function

2.11.2.8 All Page

Activating the ALL PAGE icon on the footer window shall activate all Public Address stations within the immediate area of control, and in the case of a Central Operator shall activate all stations within the facility. The PTT function shall be enabled and remain enabled until the ALL PAGE icon is selected again in which case the stations are de-activated and the PTT released.

The ALL PAGE icon shall change colour when active to clearly indicate the current status.

2.11.2.9 Call Central

Each local operator workstation's footer window shall contain a "Call Central" icon. When selected the GUI shall generate a high priority call-in at the Central operator workstation. Central control room operators shall respond to these call-ins in the same manner as with a normal intercom station call request.

2.11.2.10 Audio Call In Queue

The GUI footer window shall contain an Audio Call-in queue facility into which audio call requests are entered on a first in first out (FIFO) basis.

Upon receipt of an audio call-in from any intercom station in the facility, the call-in detail listing the control area, equipment designation and the specific location of the calling intercom station shall be entered into a FIFO queue.

The call-in priority of each Intercom station within the facility shall be individually configurable within the GUI, and station priority shall take preference over the FIFO queue. Intercom station call requests of higher priority e.g. Control room call-in requests shall be entered into the top of the queue.

The following methods of answering calls-ins shall be possible:

- a. Highlighting the desired call-in in the Audio queue and clicking on the "Select" icon in the footer window.
- b. Clicking repeatedly on the "Select" icon in the footer window, which shall automatically answer the oldest entry in the Audio queue.
- c. Double clicking on any entry in the Audio queue.

Any of the above-mentioned methods of answering a call-in shall reset the currently selected intercom station and enable the selected station as well as simultaneously removing the entry from the Audio queue on all workstations.

When the local operator workstations are logged on, call-ins from the relevant local area shall be directed to the local workstation. In the event that the call is not answered within thirty seconds, the call shall be forwarded to the Central Control room workstations. Call-ins from local areas in which a local operator is not logged in, shall be forwarded immediately to the Central Control room operators.

2.11.2.11 Fault Queue

The GUI footer window shall contain a Fault queue facility into which all security sub-system or control system faults are entered in order of priority.

Upon receipt of any security sub-system or control system fault, the relevant fault detail including the control area, equipment designation and the specific location of the fault shall be entered into the Fault queue.

The Fault queue is intended to provide a quick reference to the system operator of current alarms, and is intended to replace functionality of the Current Alarm window described in section 2.12 of the specification.

Faults may be dealt with in the following ways:

- a. By right clicking on a specific fault in the queue, the operator shall be presented with an "Acknowledge" option. Clicking on the Acknowledge option shall enter the acknowledgement into the event recording system and remove the fault from the queue.
- b. By double clicking on a specific fault in the queue, the appropriate area map shall be displayed with the faulty equipment control icon clearly visible. The equipment icon shall display the fault detail in a mouse-over or "hint" fashion. Right clicking on relevant equipment icon shall present the operator with an "Acknowledge" option. Clicking on the Acknowledge option shall enter the acknowledgement into the event recording system and remove the fault from the queue.

Local operator workstations shall display alarms and faults related to the immediate area of control only. Central operator workstations shall display all current alarms within the entire facility.

2.11.2.12 Synchronized Clock System

All operator workstations footer windows shall contain a synchronized digital clock, which indicates the Date and Time in 24 Hour mode. The accuracy of the synchronized digital clock system shall be within +- one (1) minute within a thirty (30) day period, and shall be synchronized with the management workstation within the central control room each hour on the hour.

2.11.2.13 Operator Logon Details

The GUI footer window shall contain the detail of the currently logged on operator including full name and authorized user level.

2.11.3 Intercom Operations

2.11.3.1 Audio Control – Staff/Cell Intercom Icon:

The GUI shall provide a control icon with visual status indication for each intercom station within the entire facility.

The icons shall be used to initiate or terminate an audio channel between the relevant control room operator's audio console and the selected intercom station.

Each Intercom station icon shall provide mouse over or "hint" fashion detail of fault conditions relating to the station as well as indicating the equipment designation.

The alarm detail displayed by the "hint" function shall include:

- Intercom station Tamper alarm
- Intercom station Threshold alarm

- Intercom station I/O alarm
- Intercom station Communications alarm

All alarm conditions shall be presented to the operator within the Fault queue as described in Section 2.14.2.11 of the specification.

A right mouse click over any icon shall provide the operator with an option to acknowledge an alarm condition, to inhibit an intercom station, or to view the engineering properties of the element provided the necessary user level is active. Inhibiting an intercom station shall change the icon colour to blue.

a. Intercom Station Call Up:

Activating a staff or inmate station icon shall open a talk path between the operator and the associated intercom station. The associated status icon shall illuminate yellow to indicate an active channel.

Activating the staff station icon a second time shall close the talk path and the status icon shall extinguish.

b. Staff Station Call-In:

Upon activation of a Staff or Cell station call-in button located on the intercom station faceplate, the associated status icon shall illuminate and flash between yellow and gray with an audible tone. Activating the associated intercom station icon shall open a talk path between the operator and the staff station. The status icon shall illuminate yellow and the audible tone shall silence. Once complete, activating of the staff station icon a second time shall close the talk path and the associated status icon shall extinguish.

c. Automatic termination of an audio channel:

Should multiple audio call in's be received by the local operator, the operator shall only be required to select each audio icon once. The second icon selected shall initiate an audio channel to the appropriate intercom station and initiate an automatic de-select command to the previous channel.

d. Delayed Call-In:

Upon activation of a Staff or Cell station call-in button on an intercom station which falls under the control of a local control workstation, provided the particular operator is logged in, the call shall at first be routed to the local operator. If the local operator fails to respond to a call in within 60 seconds, the call is automatically routed to central control. This event is to be logged to the event recording system.

d. Audio Queue:

An Audio Call-in queue facility shall be provided as an integrated function of the GUI system. Refer to Section 2.14.2.10 for the functional requirement of this facility.

IF 01 SCOPE OF WORK

IF 01.01 This specification comprises all aspects regarding the repair/replacement and maintenance of the intercom systems. The intercom systems comprises the:

- Cell Intercom stations
- Wardens Intercom stations
- Visitors system
- Public Address System
- Alarm System
- Administrative System

For detail scope refer to IF 08.03

IF 01.02 All the associated equipment, components, wiring, draw boxes, conduit, cover plates, labels, cabinets, etc. also form part of the installation even though they are not specifically mentioned.

IF 01.03 **INVENTORY OF THE INSTALLATION**

The intercom systems consist of the items detailed below. Please note that the items and components mentioned below are for information only and to determine the extent of the systems. The lists are not intended to be complete in every detail.

- Main Control Room
 - Equipment rack
 - PC based Operator workstation
 - Music control console
 - Copper/Fiber Cable network
- Reticulation network
 - Cabling between main control room and sub control room equipment racks (Primary network)
 - Cabling between sub control room equipment racks and field equipment (Secondary network)
- Field equipment
 - Cell intercom stations
 - Warden intercom stations
 - Public address stations
- Visitation system
 - Visitor station (Hands free operation)
 - Inmate station (Push to talk operation)
 - Station selectable listen-in console
- Administrative system
 - PABX Interface to Intercom System.
 - Telephone extensions in offices.
- Residential installation comprising off:
 - Flats
 - Single quarters

IF 02 STANDARD SPECIFICATIONS, REGULATIONS AND CODES

IF 02.01 The latest edition, including all amendments up to date of the following specifications, publication and codes of practice shall be read in conjunction with the specification and shall be deemed to form part thereof.

IF 02.02 SABS SPECIFICATIONS

- SABS 0400 The application of the National Building Regulations
- SABS 0142 The wiring of premises
- ELEK 165 A lightning protection guide for electronic installations
- NRS 042 Guide for the protection of electronic equipment against damaging transients (SABS 1996).
- SABS IEC 1024-1 Protection of structures against lightning :
- IEC 1993 Part 1: General principles
- SABS IEC 1312-1 Protection against LEMP: Part 1 General principles (IEC 1994).
- Regulations of Telkom

IF 02.03 DEPARTMENT OF PUBLIC WORKS SPECIFICATIONS

Standard specification for intercom systems in prisons (Rev July 2003).

IF 02.04 Occupational Health and Safety Act of 1993 (OHS-Act)

IF 02.05 Manufacturer's specifications and maintenance instructions

IF 02.06 ADDITIONAL REQUIREMENTS

Only new materials of first-class quality shall be used and all materials shall be subject to the approval of the Department. Departmental specifications for various materials to be used on this contract are attached to and form part of this specification.

Wherever applicable the material is to comply with the relevant South African Bureau of Standards specifications, or the British Specifications, where no SABS specifications exist.

Material wherever possible, must be of South African manufacture.

IF 02.06.01 Enclosures

It is a specific requirement of this tender document that all enclosures containing cable joints, loudspeakers, microphones, and intercommunication stations, situated in areas to which prisoners can normally obtain access, must be vandal proof. Such enclosures must be splash proof; flush mounted and secured using Torx type security screws. The enclosures must have no external holes, hollows, or grilles in which prisoners may conceal contraband. Samples of each respective type of enclosure as described in section 09.10 herein are to be submitted to the Engineer prior to proceeding with bulk manufacture.

IF 02.06.02 Repair Of Damage And Making Good

The contractor will be held responsible for all damages to services, buildings, surfaces, other services, lawns or any areas caused by him or his workmen during the repair and maintenance of this installation.

The contractor will also be held responsible to keep the work site clean and tidy at all times during the contract period and he shall remove all rubble from site on a regular basis.

IF 02.06.03 Environmental Conditions

All materials shall be suitable for use at altitudes of between 0 and 1 800 meter above sea level and in ambient temperatures of between -5°C and 45°C at a humidity of up to 100%, with extreme lightning conditions.

IF 02.06.04 Lightning And Surge Protection

The contractor must comply with the latest recommendations for the protection of electronic installations, i.e.:

- a) CSIR publication ELEK 165 - A LIGHTNING PROTECTION GUIDE FOR ELECTRONIC INSTALLATIONS.
- b) NRS 042 - Guide for the protection of electronic equipment against damaging transients (SABS 1996).
- c) SABS IEC 1024-1 - Protection of structures against lightning: Part 1: General principles (IEC 1993).
- d) SABS IEC 1312-1 Protection against LEMP: Part 1 General principles (IEC 1994).

The contractor must ensure that the intercommunication installation is adequately protected against lightning and power surges in the power system, as well as the intercommunication wiring.

IF 02.06.05 Type Of Cable

Except for connections to power supplies, microphones and loudspeakers, all communications wiring must consist of Category 5 type unarmored multi-core cable installed in conduit or wiring ducts. Suitably terminated and/or screened cables to ensure a minimum cross talk shall be utilised.

Fiber Optic cable shall be installed in sleeves between the various buildings. Conversion from Fiber Optic to copper cabling shall be provided within each sub control room equipment cabinet. All cables shall have sufficient cores to allow for at least two spare fibers or 20% of the total number of pares.

IF 02.06.06 Joint Boxes

Since all electronics and switching equipment with the exception of the digital intercom modules installed within each intercom station, must be installed in the control room, only cable terminations in the draw-boxes along the wiring routes will be allowed.

IF 02.06.07 Wire and cable coding

All wiring must be colour or number coded according to the schematic diagrams and equipment layout drawings to be submitted by the contractor upon completion of the repair phase. Terminals in cable junction boxes must be clearly numbered in accordance with the shop drawings provided by the contractor. The wiring system must be designed to facilitate easy fault finding and maintenance.

All cables in the main wiring routes must be suitably marked, wherever accessible, to identify their respective function and the specific areas which they serve.

IF 03 BRIEF DESCRIPTION OF THE SYSTEMS

For detail refer to IF 08

Cell Intercom System: This system is completely controlled from the main and/or local control desks and is exclusively for communication with prisoners. The system consists of cell stations (combination loudspeaker, microphone and necessary electronic components) flush mounted in the prisoner's cells within a custom made back-box as per drawings provided, with a service plate secured to the back-box on the passage side of the station.

Cell stations shall comply in full with Clause 1.4.1 of the General Specification for Intercom systems.

Warden system: This system is completely controlled from the main control desk and is exclusively for communication with wardens. The system consists of warden stations (combination loudspeaker, microphone and necessary electronic components) flush mounted in the passageways at strategic positions within custom-made back-boxes. and secured with security screws.

Warden stations shall comply in full with Clause 1.4.2 of the General Specification for Intercom systems.

Visitation system: A completely independent vandal proof intercom system for the visitor's facility, with the ability to listen in to conversations from the main control desk.

Visitor stations shall comply in full with Clause 1.4.3 of the General Specification for Intercom systems.

Public Address System: The P.A. Systems are controlled from the main control desk separately or in groups to provide the required functions detailed below. The P.A. Systems may service indoor and outdoor areas.

Public Address stations shall comply in full with Clause 1.4.4 of the General Specification for Intercom systems.

Alarm System: Call points in rooms with under desk-mounted units without cancellation buttons. A common cancellation "RESET" button shall be provided on the local indicator control console.

IF 04 OPERATING AND MAINTENANCE MANUALS

IF 04.01 It shall be assumed that no current "as built" information on the installation is available. Civil site plans will be available for information only.

The Contractor shall be responsible for the compilation of an inventory list and Operating and Instruction Manuals. The Contractor shall be responsible for the verification of the correctness of all such information.

This shall be done in accordance with the Additional Specification SB-Operating and Maintenance manuals.

IF 04.02 Over and above what is specified in the Additional Specification - SB Operating and Maintenance manuals, the Operating and Maintenance Manual to be compiled shall be structured and shall at least include the following:

Schematic diagrams

Schematic diagrams shall show at least:

- Location and size of all equipment in each control room.
- One cell station unit (excluding enclosure installed by others), one cell push-button unit, one warden station unit, one P.A. Loudspeaker and one P.A. Microphone unit.
- All amplifiers.
- At least one circuit showing typical controls of all the systems.

Commissioning Data

- Complete commissioning, test and inspection data of all the systems.

This shall be done for each system individually. The commissioning data shall comprise the results of all the specified tests.

- Equipment layout drawings - Hard copies and IT format (DXF File)
- Termination schedules indicating cable numbers and colour coding
- Schedule of sound level measurements in each room
- List of personnel that underwent formal training

IF 05 LOGGING AND RECORDING PROCEDURES

IF 05.01 The Contractor shall as part of this Contract institute a fault recording system as part of his Maintenance Control Plan as defined in the Additional Specification SA - General Maintenance. This shall consist of a Record book, which shall be utilised to log and record all faults, system checks, services, overhauls, breakdowns, maintenance visits, inspections, etc.

IF 05.02 The logbook shall be stored in a safe place inside the prison maintenance supervisor's office and shall only be utilised by the Contractor and Engineer. The Contractor shall submit a copy of the entries and recordings into this logbook together with his report to the Engineer.

IF 06 MAINTENANCE TOOLS AND SPARES

IF 06.01 SPARE PARTS CABINET

If a parts cabinet does not exist then the contractor shall supply and install a double door floor-standing steel lockable cabinet in the control-room to store parts and manuals in. The cabinet shall consist of horizontal and vertical compartments. Each type of part shall be stored in its own compartment, labeled with the shelf-number, part and quantity. A complete list with the number, quantity and type of part shall be attached permanently to the inside of the door behind protective material. A diary shall be supplied with a complete list of spare equipment, with at least the following columns:

Part description, quantity, date taken, by whom it was taken, date returned and signature of the responsible officer.

IF 06.02 SPARE PARTS

The following equipment shall be supplied at completion of the repair phase as part of this contract:

- Two complete cell-stations, without back boxes.
- Two complete warden stations, without back boxes.
- One complete pair of visitor inter-communication stations.
- One handset for remote usage.
- One complete set (one of each type) of printed circuit boards for the inter-communication system.
- Ten off warden station activation magnets.

IF 06.03 QUALITY ASSURANCE SYSTEM

IF 06.03.01 Following formal approval of his Quality Assurance system by the Engineer, the Contractor shall implement the approved Quality Assurance system.

IF 06.03.02 Records of this Quality Assurance system shall be kept throughout the duration of the contract and shall be submitted to the Engineer as required by the Department.

IF 06.04 RE-COMMISSIONING OF INSTALLATION

IF 06.04.01 On practical completion of the repair work, the contractor shall re-check and put all systems into operation.

IF 06.04.02 All commissioning shall be performed by the Contractor, to the satisfaction of the Engineer. The Contractor shall confirm in writing that all systems have been replaced according to specification and are fully operational.

IF 07 REPAIR WORK

IF 07.01 GENERAL

This specification is for the comprehensive replacement and maintenance of the existing intercom system at the Xxxxx Prison.

The Contractor shall note that all components of the intercom system are part of a specialised and highly sensitive network and that no claims what so ever resulting from ignorance, lack of understanding or lack of expertise shall be entertained.

All equipment and material are subject to prior approval by the Engineer.

All material shall be subject to re-measurement.

The Contractor shall issue all notices and pay all the required fees in respect of the installation to the authorities, and shall exempt the employer, principal contractor and the Engineer from all such costs.

It shall be assumed that the Contractor is conversant with the above-mentioned requirements. Should any requirements, by laws or regulation, which contradicts the requirements of this Document, apply or become applicable during erection of the installation, such requirement, by-law or regulation shall overrule this Document and the Contractor shall immediately inform the Engineer of such a contradiction. Under no circumstances shall the Contractor carry out any variations to the installation in terms of such contradiction without obtaining the written permission to do so from the Engineer.

IF 07.02 SITE

Tenderers will note that access to the site can only be obtained between 07:00 and 15:30 on weekdays and is strictly subject to prior arrangement with the prison head. The Contractor shall be responsible to arrange access as well as adhere to any security requirements as called for by the managing body.

Site conditions:

Ambient Temperature: 40°C Maximum
-5°C Minimum
Altitude: ± 1500 m above sea level
Lighting: Severe
LV Supply: 400V 3 Phase 4 Wire with neutral earthed
Frequency: 50 Hz

IF 07.03 SCOPE OF WORK & EQUIPMENT SCHEDULE

The scope of this contract shall include and provide for:

1. The complete replacement of the existing main operator desk and associated equipment in all control rooms with a PC based operator consol and Graphical User Interface as described in Section 2 of the General specification for Intercom systems (Rev_July 2003). The PC based Operator workstation shall be capable of providing multiple software based mimics on a single 21" monitor.

The Current main control room equipment is comprised of:

- Main Mimic control panel
- Amplifier cabinet
- Music control cabinet

- Termination distribution board
- The administrative communication system (TOA System)
- 2. The replacement of all existing cabling between the control room and each building equipment cabinet as well as between each buildings equipment cabinet and the field equipment is included in this contract.
- 3. The removal of all existing intercom housings and the replacing of these housings with a flush mount vandal-proof faceplate and back box as specified.
- 4. The removal of all redundant cell, warden, visitor and public address stations and the replacing of these with new stations as specified.
- 5. The linking of all local control rooms to the main control room through an optical fiber network. All local control functions shall be duplicated in the main control room.
- 6. Testing and commissioning of the fully integrated system.
- 7. Provision of Cad equipment layout drawings as specified.
- 8. Provision of three sets of comprehensive maintenance and operational manuals as specified.
- 9. Adequate training of personnel as specified.

IF 07.03.01 Short abbreviation of system operation - Criteria for commissioning:

All Call

- Select the Push-to talk Icon and hold while talking.

Single extension or group communication:

- Select relevant station Icon on the screen with the pointing device.
- Select the Push-to-talk Icon while talking and release to listen.
- Deselect the relevant station Icon to cancel the call.

Cell Communication

- Calls from cells will cause a flashing Icon on the GUI.
- Select the relevant station icon with the pointing device or press "Select".
- Select the Push-to-talk Icon while talking and release to listen.
- Deselect the relevant station Icon to cancel the call.

Warder Communication

- A short ring tone (windows ring.wav) will sound and the warder station Icon shall flash, and at the same time be added to the top of the priority call queue on the GUI.
- Select the Push-to-talk Icon to talk and release to listen.
- Deselect the relevant station Icon to cancel the call.
- Warden stations shall receive priority over cell calls, and shall be reflected in the call in queue on the GUI.

Music Switching

- ❑ The systems shall have the ability to input a minimum of eight audio sources including education channels, music channels, radio, etc.
- ❑ Operators shall be able to assign any of the audio sources to intercom groups based on cable reticulation.
- ❑ Operators shall be able to enable audio channels to groups.
- ❑ Selecting a voice channel automatically overrides the music at the selected station and resumes music operation upon completion of the conversation.

Monitoring

- ❑ Select the "Listen-In" icon followed by the desired station icon. The icon shall change colour to blue indicating the monitoring mode is active. Conversations shall automatically be digitally recorded to hard drive. All recorded conversations shall be retrievable and played back by Time, Date and Station number.
- ❑ To cancel the recording, deselect the station icon.

Warden Stations

Press the warden magnet against the area indicated, wait for a response from the control room and speak normally.

Cell Stations

Press the call button. When the control answers the request, music shall be switched off and a normal conversation shall be held.

Visitation Stations

The unit shall consist of a vandal proof housing and faceplate. The Inmate unit shall provide a Push to talk button, which shall be depressed when the inmate speaks. Speech in both directions shall be activated by an automatic microphone gain monitoring circuit.

The gain monitoring and PTT functions are to be provided to minimise system feedback.

IF 08 REPAIR WORK: MEASUREMENT AND PAYMENT

IF 08.01 REPLACE CONTROL DESK WITH PC BASED CONSOLE

The unit of measurement shall be for the replacing of a redundant control desk and mimic panel as specified.

The Tendered rate shall include full compensation for:

- Ascertaining precise features of the existing unit and the current requirements
- Comprehensive design of the new PC based console
- Submission of the design to the Engineer for approval
- Assembling and manufacturing of the unit
- Conduction of factory inspections in the presence of the Engineer where all functions will be simulated
- Delivery to site of the unit
- Installation and connection
- Testing and commissioning of the unit
- Guarantee for 12 months of all workmanship, components and functions
- Complying in full with Section 2 of the standard intercom specification (Rev_July 2003)

The Contractor shall consider the actual dimensions of the control room to ensure easy access for maintenance and operational purposes.

Computer Monitor display

A single line graphical layout, not necessarily to scale, of the controlled section must be displayed on the screen. The display on the monitor in the main control room must display the entire prison. The local control monitors shall only display the area controlled.

A facility must be provided to change the display to show only the local section, on an enlarged scale, from where the call is received, if selected.

The display layout must be designed in such a manner that the entire section of prison is easily visible to the operator for quick identification of the exact position of a call from an outstation to the desk.

All cell, wardens and PA station points as well as each local control desk, shall be shown on the display.

Stations Call-ins shall be indicated by the appropriate flashing icon, as well as the call being entered into a FIFO (First in first out) queue at the bottom of the screen. The operator shall be able to select a calling station by either selecting the appropriate icon, or selecting the call from the text based queue at the bottom of the screen.

The graphics shall be of good, clear quality with an acceptable contrast between the various functions and status indications.

IF 08.01.02 Construction of the worktop

IF 08.01.02.01 The worktop for the PC based operator console shall be wall mounted with an 800mm deep post-form surface, large enough to allow the seated operator to control the system and to accommodate a 19" 700mm equipment rack. The equipment rack positioning must allow for enough legroom under the worktop.

**General Specification
Intercom and Public Address System**

IF 08.01.02.02 The worktop shall be manufactured from standard granite finish post-form material. The horizontal writing surface must be 800mm deep measured from front to back.

IF 08.01.02.03 The desk must have a solid angle or square tubing metal framework bolted securely to the wall.

IF08.01.02.04 All additional controls such as the music centre must be installed in an appropriate position on the worktop. The controls must be sensibly grouped according to their respective function and very clearly labeled.

IF 08.01.02.05 A colour computer monitor must be installed in the control desk in order to display the actual layout and position of each intercom station in a graphical representation of the prison.

Each intercom station shall be represented on the screen with an individual icon which shall be capable of displaying the current status of the station such as Active, Inactive, Call In, Music, Listen in and record modes. The icon when clicked upon shall control the station by either selecting, deselecting, directing music to the unit or placing the unit in listen in or recording modes.

The main control room equipment desk shall be equipped with a 21" VGA monitor, and the local desks with a 19" VGA monitor.

IF 08.01.02.06 Unless absolutely essential, no electronic equipment must be housed in the control desk. All electronic equipment must be housed in a freestanding equipment panel with 500mm (19 inch. DIN.) racks installed adjacent to the control desk or in any other suitable position within the control room.

IF 08.01.02 EQUIPMENT ON THE WORKTOP

General

All functions required to operate the system shall be an integrated function of the Graphical user interface as per the requirements of the standard specification for Intercom Systems (Rev_July 2003). Equipment to be mounted on the worktop shall be limited to the following:

- a) One 21" (19" for local control rooms) SVGA monitor.
- b) One loudspeaker and one microphone for audio system.
- c) One PC compatible loudspeaker set for GUI tones.

The mimic display shall be designed in a logical order in cell, block, floor and public area configuration for easy operation, and the screens shall be orientated according to the operators seating position.

Item

Unit

IF 08.02 REPLACE AMPLIFIER CABINETS WITH DIGITAL AUDIO SWITCH

The unit of measurement shall be for the replacing of a redundant amplifier cabinet as specified.

For tender purposes the contractor shall allow to provide a panel suitable to control:

- 400 Cell Stations
- 100 Warden Stations
- 60 PA Stations

The Tendered rate shall include full compensation for:

- Ascertaining precise features of the existing unit and requirements
- Comprehensive design of the new control cabinet
- Submission of the design to the Engineer for approval
- Assembling and manufacturing of the unit
- Conduction of factory inspections in the presence of the Engineer where all functions will be simulated
- Delivery to site of the unit
- Installation, cable terminations, connections and labeling
- Testing and commissioning of the unit
- Guarantee for 12 months of all workmanship, components and functions

The replacement system shall be a fully digitized audio switch with Voice over IP (VoIP) compatibility, and shall comply in full with Section1 of the standard specification for Intercom system (Rev_July 203). As a minimum the following functional features shall be available:

- Noise immunity

The system shall provide clear undistorted speech and music transmission. The audio signal shall be digitally transmitted to each intercom station to provide immunity against electrical and earthing interference.

- Bus structured Cabling

Intercom station cabling shall be installed in a BUS configuration to reduce system cabling and conduit requirements, and shall not require an independent pair of wires per station.

- Multiple Audio Channels

The system shall be capable of transmitting a minimum of three digitized audio channels simultaneously, which shall enable intercom stations to independently select either a music channel, an education channel or to call and communicate with the system operator. The channel selection and current operation of one station shall have no effect on the channel selection and operation of any other station.

- Interface to Telephone network

The system shall have the capability of interfacing to the prison telephone system (PABX), which will enable existing telephones situated in offices to call intercom stations and hold two-way conversations. The telephones shall also be used for paging over the public address system.

- Tamper detection

Each intercom station shall provide tamper detection, which shall automatically notify the system operator of an intercom station, which has been opened or tampered with in any way.

- PC based Operator console

A dedicated PC based operator console shall be provided at each local control room and at the Central control station. It shall be possible for any operator console to call any intercom station within the entire prison based upon authorized user levels. In the case of failure of any operator console it shall be

possible to route incoming calls from intercom stations to any other operator console in the prison.

Event Recording and Reporting

The system shall be capable of recording and reporting the following events with an accompanying time and date stamp:

Intercom station call requests with station identification.
Operator response with operator/station identification and call duration.

Threshold Monitoring

The system shall be able to automatically detect raised voice levels in cells and passageways. It shall be possible to independently set the threshold (Trigger) level of each intercom station to suit the environment. Threshold alarms shall be transmitted to the system operator and treated as emergency calls.

Voice recording

Emergency calls shall be recorded onto a PC hard drive. System operators shall be able to replay the emergency call via a PC based control system, which shall indicate the associated intercom station and time and date of the call.

Two way conversations

The system operators shall be provided with handsets, which shall enable two-way (telephone type) conversations with any selected intercom station.

Volume level Adjustment

The system shall enable operators to independently set the speaker volume and microphone sensitivity levels for each intercom station in order to optimize the acoustic settings for each building or room.

VoIP Compatibility (Ethernet telephones)

The system shall be compatible with standard Voice over IP telephone systems, which will enable the expansion or replacement of equipment with products from a variety of competitors. The system shall be able to transmit multiple audio conversations between buildings via existing Ethernet networks.

Mounting

All electronic components shall be mounted in 19" format, clearly coded or numbered 19" cards mounted in standard 19" equipment chassis.

The electronic equipment contained in the system must be provided in standard 19" rack mountable printed circuit cards in such a manner to maximise the interchangeability of identical types of cards. Each standard type of card must be allocated to an identification code.

The position of each 19" card in the equipment rack must be clearly labeled. The label must describe the function of the card in the system and also the code of the card to be installed in that position.

All non-standard 19" cards must be identified by a code clearly indicating that the card is not interchangeable with any other.

All other equipment such as power supplies, transformers, circuit breakers etc that are not 19" rack mountable must also be coded and clearly labelled. This type of equipment must be installed on suitable mounting in the lower portion of the equipment rack.

The equipment must be free standing and self-supporting. All controls and racks must be accessible from the front.

All wiring shall be neatly bound and arranged. All cables shall either terminate in multi-pin plugs, on numbered terminal strips, or directly into the 19" rack mount cards and must be labelled at each end. Cables with suitable connectors can however, be attached directly to the equipment. Power connections to equipment must be made by means of power plugs, which connect to switched socket outlets, clearly labelled, mounted inside the rack.

The design and workmanship of the equipment rack, as well as the mounting and wiring of equipment within the rack must be carried out to a professional standard in compliance with general practice.

The design, quality of workmanship and mounting of equipment on printed circuit boards must be of a professional standard. The successful tenderer shall be required to submit sample printed circuit boards with the equipment mounted for approval prior to proceeding with the manufacture of the printed circuit cards.

This tender includes the supply of one spare 19" card of each type, fully equipped and ready for installation. Tenderers are requested to submit their price for the supply of these cards separately and not as part of a lump sum tender price.

Item

Unit

IF 08.03

REPLACE MUSIC MANAGEMENT UNIT

The unit of measurement shall be for the replacing of a redundant music management unit as specified

The Tendered rate shall include full compensation for:

- Ascertaining precise features of the existing unit and requirements
- Comprehensive design of the new music management unit
- Submission of the design to the Engineer for approval
- Assembling and manufacturing of the unit
- Conduction of factory inspections in the presence of the Engineer where all functions will be simulated
- Delivery to site of the unit
- Installation and connection
- Testing and commissioning of the unit
- Guarantee for 12 months of all workmanship, components and functions

The music management unit must be equipped with the following equipment:

- FM tuner
- Cassette recorder
- Speaker for audio channel monitor
- Volume control
- Power supply
- CD player as approved

The Contractor shall confirm that:

- The system can record any of the given sources of music
- The system can record from the FM tuner while playing record music to the inmates
- Recorded material is automatically transmitted through the monitor loudspeaker. The push button adjacent to the speaker shall allow monitoring of the transmitting audio channel

Music shall at all times be transmitted via all speakers and shall only be interrupted when:

- There is an incoming call from the control room
- The control room monitors a specific cell
- There is a group call or all-call
- A call is being made from a specific cell the music to that cell will be interrupted

The equipment must be free standing and self-supporting and finished to the same standard and colour as the control desk. All controls and racks must be accessible from the front.

The design and workmanship of the Music management unit, as well as the mounting and wiring of equipment within the rack must be carried out to a professional standard in compliance with general practice.

Item

Unit

IF 08.04 REPLACE VISITOR CONTROL PANEL

The unit of measurement shall be for the replacement of the visitor control panel.

The tendered rate shall included full compensation for the supply, installation and commissioning of the system comprising:

- Stainless steel desk mount housing
- Microphone and speaker
- Volume Control
- Push-to-talk button

The inmate PTT button shall switch the speech direction. Switching clicks must not be noticeable during normal speech. The speaker volume and microphone sensitivity shall be software adjustable.

The amplifiers for the intercom units shall be housed in the vandal-proof loudspeaker units. The output audio power of each amplifier shall be approximately 1 Watt.

Item

Unit

IF 08.05 ADMINISTRATIVE SYSTEM

The unit of measurement shall be for the replacement of the existing TOA administrative system with a standard PABX system with telephone extensions.

The system shall provide a four-extension interface to the Digital Intercom system described in paragraph IF 08.02, which will enable users of the administrative system to dial into the intercom system and connect to any intercom station with the necessary user level protection.

The tendered rate shall include full compensation for the replacement of the system, in strict relation to the supplier's requirements.

The number of extensions required shall equal the existing number of TOA units currently installed.

Item Unit

IF 08.06 SERVICE TERMINATION PANEL

The unit of measurement shall be the number of termination panels inspected and refurbished.

The tendered rate shall include full compensation for the cleaning and conformation of moisture, ingress and corrosion protection as well as for the testing of all associated terminals.

The contractor shall take cognisance of the fact that the majority of existing termination panels is partially occupied with telephone systems equipment. The contractor shall thus allow in his tender to liaise with the appropriate parties and ensure that the cabinets and associated sleeves are made vacant to install the required intercom cables and terminal blocks.

IF 08.07 WIREWAYS, CONDUITS AND ACCESSORIES

Item Unit

IF 08.07.01 Replace Conduit m

The units of measurement shall be the linear meter of conduit supplied and installed.

The tendered rate shall include full compensation for the supply and installation of hot dipped galvanized conduit surface mounted on raised saddles, and the PVC conduit installed within hollow walls.

Item Unit

IF 08.07.02 Supply and install draw boxes m

The unit of measurement shall be the number of draw-boxes supplied and installed.

The tendered rate shall include full compensation for the supply and installation of draw boxes complete with all accessories such as threaded couplings, lock nuts, brass bushes, cover plates etc.

The tenderer shall allow for:

- Removing of damaged draw box with hammer and chisel
- Opening up of suitable cavity
- Installation of new draw box
- Plastering of concrete slab as per initial status

The tendered rate shall include full compensation for the supply and installation of the specified type wiring channel with 6 x 60mm fasteners including the cover and all accessories such as splices, bends, tee's, reducers, offsets etc.

Item Unit

**General Specification
Intercom and Public Address System**

IF 08.07.03 Replace Wiring Channel m

The unit of measurement shall be the linear meter of wiring channel replaced.

The specified rate shall include full compensation for the supply and installation of the specified type wiring channel with fasteners including the cover and all accessories such as splices, bends, tee's, reducers, offsets etc.

Item Unit

IF 08.08 CABLES

Item Unit

IF 08.08.01 Replace cables m

The unit of measurement shall be the linear meter of cable supplied and installed.

The tendered rate shall include full compensation for the removal of the existing cables, the supply, handling, installation and the pulling into conduit wire ways of multi core cables as specified.

All cables shall comply with SAPO 271 regulations.

Cables to exterior public address speakers shall be either armored cables or installed in galvanized conduit.

The quantities and sizes of cable is provisional only and the Contractor shall be responsible to establish the final sizes and lengths on site plus allow for 20% spare capacity on all cables.

No joints or T-off type wiring will be accepted and a radial wiring system shall be implemented throughout.

The Contractor shall test and confirm that no 0.5mm² conductor exceeds an overall length of 400m or a resistance of 72 OHM.

Item Unit

IF 08.08.02 Terminate Cables No

The unit of measurement shall be the number of cables terminated as specified.

The tendered rate shall include full compensation for the final measurement, making off, termination and testing of cables forming part of the Intercom system.

All cables shall terminate onto multi-pin plugs, numbered terminal strips or directly into 19' rack control equipment as specified.

Item Unit

IF 08.08.03 Labeling of Cables Sum

The unit of measurement shall be for the suitable labeling of a cable termination.

The tendered rate shall include full compensation for the colour or number coding of each strand forming part of the Intercom system including

**General Specification
Intercom and Public Address System**

terminals in cable junction boxes. The labelling system shall correlate with the labelling schedules as compiled by the contractor and included in the maintenance manuals.

In addition all primary cables shall be marked with suitable "Grafoplast" or "Le Grant" type cable markers at both ends. The markers shall make mention of both sides of termination for instance (Int. Main cont./Block B).

	<u>Item</u>	<u>Unit</u>
IF 08.09	CABLE TRENCH AND ACCESSORIES	
IF 08.09.01	<u>EXCAVATIONS</u>	m ³
	The unit of measurement shall be the cubic meter of material excavated in trenches.	
	The tendered rate shall include full compensation for clearing and grubbing the trench areas, for excavating the trench, preparing the bottom of the trench, separating material unsuitable for backfill and dealing with any surface or subsurface water.	
	The tendered rate shall furthermore cover the cost of installing the sand bed and sand cover, backfilling, compacting and disposing of the surplus material.	
	All trenches shall have a minimum depth of 600 mm. For tender purposes it can be assumed that all excavations shall apply to pickable soil and that blasting shall not be required.	
	<u>Item</u>	<u>Unit</u>
IF 08.09.02	<u>Supply and install cable sleeves</u>	m
	The unit of measurement shall be the linear length in meter of the cable sleeves supplied and installed.	
	The tendered rate shall include full compensation for the supply, delivery, and installation of the specified sleeves including all required, couplings, steel draw wires and plugs.	
	<u>Item</u>	<u>Unit</u>
IF 08.09.03	<u>Cables installed in cable trenches</u>	m
	The unit of measurement shall be the linear meter of cables installed in cable trenches.	
	The tendered rate shall include full compensation for the laying of cable in PVC sleeve in a 600-mm deep trench.	
IF 08.10	SPEAKER UNITS	
	<u>Item</u>	<u>Unit</u>
IF 08.10.01	<u>Replace Cell Speaker Unit</u>	No

**General Specification
Intercom and Public Address System**

The unit of measurement shall be the number of cell speaker units supplied and installed.

The Cell speaker unit shall comply in full with paragraph 1.4.1 of the standard specification for Intercom systems (Rev_July 2003)

Refer to drawing INT/INST/DET/C/W001 for the installation detail.

The tendered rate shall include full compensation for the supply and installation of a cell speaker, microphone, pushbutton mounted on a flush mounted vandal proof stainless steel faceplate, two piece back-box and associated fixing equipment cable ferrules, cable termination, connection and labeling.

A 130mm circular hole shall be cored through each Cell wall between the passage and the cell at the position of the existing intercom station. A purpose made back-box as detailed in the accompanying drawing shall be installed within the 130mm core and secured to the wall from the inside to accommodate the intercom faceplate. The faceplate shall attach to the back-box on the cell side by means of welded studs on the faceplate, which shall be secured to the back-box with four nuts from the inside.

The cell station shall consist of a loudspeaker, microphone and vandal proof push button mounted on a 140mm diameter circular, 3mm thick-brushed stainless steel plate. Threaded studs shall be welded to the rear of the grill plate to facilitate flush security from the rear.

A wall blank cavity cover plate of the same dimensions and material shall be mounted with recessed Torx type security screws to the passage side of the back-box.

The loudspeaker shall be a water resistant unit with a plastic cone. The loudspeaker shall be mounted such that tampering and water damage is eliminated.

The system cabling shall be routed through the existing conduiting. A cable ferrule shall be provided for each existing conduit end, to eliminate damage to cabling when entering and leaving the new back-box.

The finish of the speaker enclosure shall be of high quality, neatly finished and shall not require any paint or protective covering. The opening in the cover shall be situated in a manner that the speaker cannot be damaged from the outside by protruding obstacles through the sound cavities.

The unit in general shall be ingress protected and tamper proof to the approval of the Engineer.

The speaker module and all fixing accessories shall be submitted for approval to the Engineer prior to installation commencement.

	<u>Item</u>	<u>Unit</u>
IF 08.10.02	<u>Replace Warden Speaker Unit</u>	No

The units of measurement shall be the number of warden units supplied and installed.

The Warden speaker unit shall comply in full with paragraph 1.4.2 of the standard specification for Intercom systems (Rev_July 2003)

Refer to drawing INT/INST/DET/C/W001 for the installation detail.

The tendered rate shall include full compensation for the supply and installation of a cell speaker, microphone, pushbutton mounted on a flush mounted vandal proof stainless steel faceplate, single sided back-box and associated fixing equipment cable ferrules cable termination, connection and labeling.

A 130mm circular hole shall be cored half way through the wall at the position of the existing warder station. A purpose made back-box as detailed in the accompanying drawing shall be installed within the 130mm core and secured to the wall from the inside to accommodate the intercom faceplate. The warder faceplate shall attach to the back-box by means of four recessed Torx type security screws.

The warder station shall consist of a loud speaker, microphone and vandal proof push button mounted on a 140mm diameter circular, 3mm thick brushed stainless steel plate.

The loudspeaker shall be a water resistant unit with a plastic cone. The loudspeaker shall be mounted such that tampering and water damage is eliminated.

The system cabling shall be routed through the existing conduiting. A cable ferrule shall be provided for each existing conduit end, to eliminate damage to cabling when entering and leaving the new back-box.

The Contractor shall only install such units where previously installed. The unit is a combined loudspeaker/microphone unit that also houses a pre amplifier and magnetically operated switches.

The pre amplifier is essential as the priority configuration will not function if not in place and will lead to cross talk between cable pairs.

The finish of the speaker enclosure shall be of high quality, neatly finished and shall not require any paint or protective covering. The opening in the cover shall be situated in a manner that the speaker can not be damaged from the outside by protruding obstacles through the sound cavities.

The unit in general shall be ingress protected and tamper proof to the approval of the Engineer.

The speaker module and all fixing accessories shall be submitted for approval to the Engineer prior to installation commencement.

	<u>Item</u>	<u>Unit</u>
IF 08.10.03	<u>Replace Visitors Speaker Units</u>	No
	The unit of measurement shall be the number of visitor speaker/microphone combination supplied and installed.	
	The Visitors speaker unit shall comply in full with paragraph 1.4.3 of the standard specification for Intercom systems (Rev_July 2003)	
	The tendered rate shall include full compensation for the removal of redundant unit and the supply and installation of a new visitor speaker unit as specified including cable termination, connection and labeling.	
	The system is completely managed via the control desk and comprise of a combined loudspeaker/microphone unit with pre amplifier mounted in purpose made draw box (Refer detail drawing)	

**General Specification
Intercom and Public Address System**

The stainless steel draw box shall be manufactured from 3CR12 stainless steel and the speaker box from 3mm stainless steel. The cover shall be secured by means of Torx type security screws.

The finish of the speaker enclosure shall be of high quality, neatly finished and shall not require any part of protective covering. The opening in the cover shall be situated in a manner that the speaker cannot be damaged from the outside by protruding obstacles through the sound cavities.

The unit in general shall be ingress protected and tamper proof to the approval of the Engineer.

The speaker module and all fixing accessories shall be submitted for approval to the Engineer prior to installation commencement.

	<u>Item</u>	<u>Unit</u>
IF 08.10.04	<u>Replace Indoor Public Address Speaker</u>	No

The unit of measurement shall be the number of indoor Public Address speakers supplied and installed.

PA speaker unit shall comply in full with paragraph 1.4.4 of the standard specification for Intercom systems (Rev_July 2003)

The tendered rate shall include full compensation for the removal of the redundant speaker as well as the supply, installation, testing, adjustment and commissioning of a new indoor speaker, including cable termination, connection and labeling.

The speaker shall be either ceiling or wall mounted in the same position as that of the previous one.

The loudspeaker shall be of the plastic cone, moving coil type in suitably approved ingress protected and vandal proof enclosure.

	<u>Item</u>	<u>Unit</u>
IF 08.10.05	<u>Replace Outdoor Public Address Speaker</u>	No

The unit of measurement shall be the number of Outdoor Public Address speakers supplied and installed.

PA speaker unit shall comply in full with paragraph 1.4.4 of the standard specification for Intercom systems (Rev_July 2003)

The tendered rate shall include full compensation for the removal of the redundant speaker as well as the supply, installation, testing, adjustment and commissioning of a new Outdoor speaker, including cable termination, connection and labelling.

Speakers shall be of the weatherproof loudspeakers. Speakers shall be mounted by means of purpose made hot dipped galvanized brackets fixed to the walls with expanding type bolts of not less than 8mm diameter.

Speakers shall be fitted at a minimum height of 4m above finished floor level.

The Contractor shall ensure that the acoustic properties of the speaker is suitable for the area it is meant to cover.

**General Specification
Intercom and Public Address System**

	<u>Item</u>	<u>Unit</u>
IF 08.10.06	<u>Replace administrative desktop stations</u>	No
	The unit of measurement shall be the number of desktop stations supplied and installed.	
	The tendered rate shall include full compensation for replacing of defective stations.	
	<u>Item</u>	<u>Unit</u>
IF 08.10.07	<u>Replace microphone outlet points</u>	No
	The unit of measurement shall be the number of digital handheld telephone points supplied and installed.	
	<u>Item</u>	<u>Unit</u>
IF 08.10.08	<u>Supply and Install Interface to prison PABX System</u>	No
	The unit of measurement shall be the number of 4-Channel Interface cards supplied and installed to interface the existing prison PABX to the Digital Intercom System.	
	The Tendered rate shall include full compensation for the supply and installation of all necessary hardware, software and cabling required to link 4 extensions from the existing prison PABX to the Digital Intercom system.	
	The system installed shall enable any telephone connected to the existing PABX to dial into the intercom system to perform single or multiple station public address announcements. The system shall be coded for security reasons to allow only authorised users to make use of the facility.	
	<u>Item</u>	<u>Unit</u>
IF 08.10.09	<u>Supply and install Digital Audio Recording system</u>	No
	The unit of measurement shall be the number of Digital Audio recording systems supplied and installed.	
	The Tendered rate shall include full compensation for the supply and installation of all necessary hardware, software and cabling required to record 32 simultaneous conversations taking place on the digital intercom system in accordance with clause 1.5 of the specification document.	
	<u>Item</u>	<u>Unit</u>
IF 08.11	SUPPLY AND DELIVER WARDEN STATION ACTIVATION MAGNETS No	
	The unit of measurement shall be the number of warden magnets supplied.	
	The tendered rate shall include full compensation for the supply and signing over to the prison head of warden magnets.	
	The Tenderer shall allow to provide permanent magnets with 20mm steel rings as part of this contract. The magnet shall be manufactured from a suitable alloy with a life span of 20 years.	

Each magnet shall be fitted in a wear resistant, non-magnetic covering to prevent demagnetising.

Magnets shall be similar and technically equal to the "SAHE" make.

Item Unit

IF 08.12 SUPPLY OF TOOLS AND SPARES

The unit of measurement shall be the number of Tools and Spares supplied.

The tendered rate shall include full compensation for the supply and delivery of the Spares as specified in IF 06.02.

Item Unit

IF 08.13 DRAWINGS

The unit of measurement shall be the compilation of an equipment layout drawing on Cad format.

The tendered rate shall include full compensation for the obtaining of, or drawing up, of a floor plan of the buildings forming part of this contract and the indication in relation with an approved legend of all Intercom associated equipment and wiring.

An approved set shall be bound into each manual and one set on IT DXF format and Zipped if required, shall be handed to the Engineer on stiffer at first handover.

Item Unit

IF 08.14 OPERATING AND MAINTENANCE MANUALS

The units of measurement shall be the provision of three sets of prior approved manuals complete with contents list and in suitable hard cover binders.

The tendered rate shall include full compensation for the gathering and compilation of applicable information, drawing and schedules as called for in IF 04 and the binding and presenting thereof to the Engineer for approval.

Item Unit

IF 08.15 TRAINING OF PERSONNEL

The units of measurement shall be the provision of comprehensive training to personnel.

The tendered rate shall include full compensation for the obtaining, from the prison head, a list of dedicated personnel to undergo training, and the comprehensive training of twelve people for a period of two days.

The list shall be obtained in writing and each individual completing the training shall sign off this list, which will form part of the first delivery documentation and maintenance manuals.

Item Unit

IF 08.16 SOUND TESTS

The units of measurement shall be the conducting of sound tests in each office, room, cell or courtyard as specified.

The tendered rate shall include full compensation for the provision of adequate equipment and personnel to measure and tabulate sound levels in all areas (Equipment as specified in IF 05.01.02)

The price tendered shall also allow for final settings and adjustments to comply with the requirements as set out in IF 05.

The tabulated results shall be included and the contractor shall provide all required equipment to verify these results at first handover.

IF 09 ADDITIONAL MAINTENANCE WORK

The maintenance work shall be done in accordance with the manuals, Additional Specification SA and the requirements of the manufacturer of the equipment but shall at least include the following.

A component is any part of the systems like microphones, push buttons, lamps, cell stations, loudspeakers, amplifiers, cabinets, draw boxes, wiring, etc.

All maintenance work shall be scheduled prematurely in writing, to the Engineer, to the extend that any portion of the work can be witnessed or inspected by the Engineer and that he is dually aware of the intended scope at least 14 days prior to commencement.

The result of such maintenance work shall also be documented and presented to the Engineer within three days of completion.

IF 09.01 QUARTERLY

Verify the operation of all the systems.
Check for damage to any component.
Clean the cabinets and control equipment.
Clean filters if fitted.
Give informal training to the operators.
Check damage to labels.
Complete the logbook.
Do complete functionality test of the integrated system.

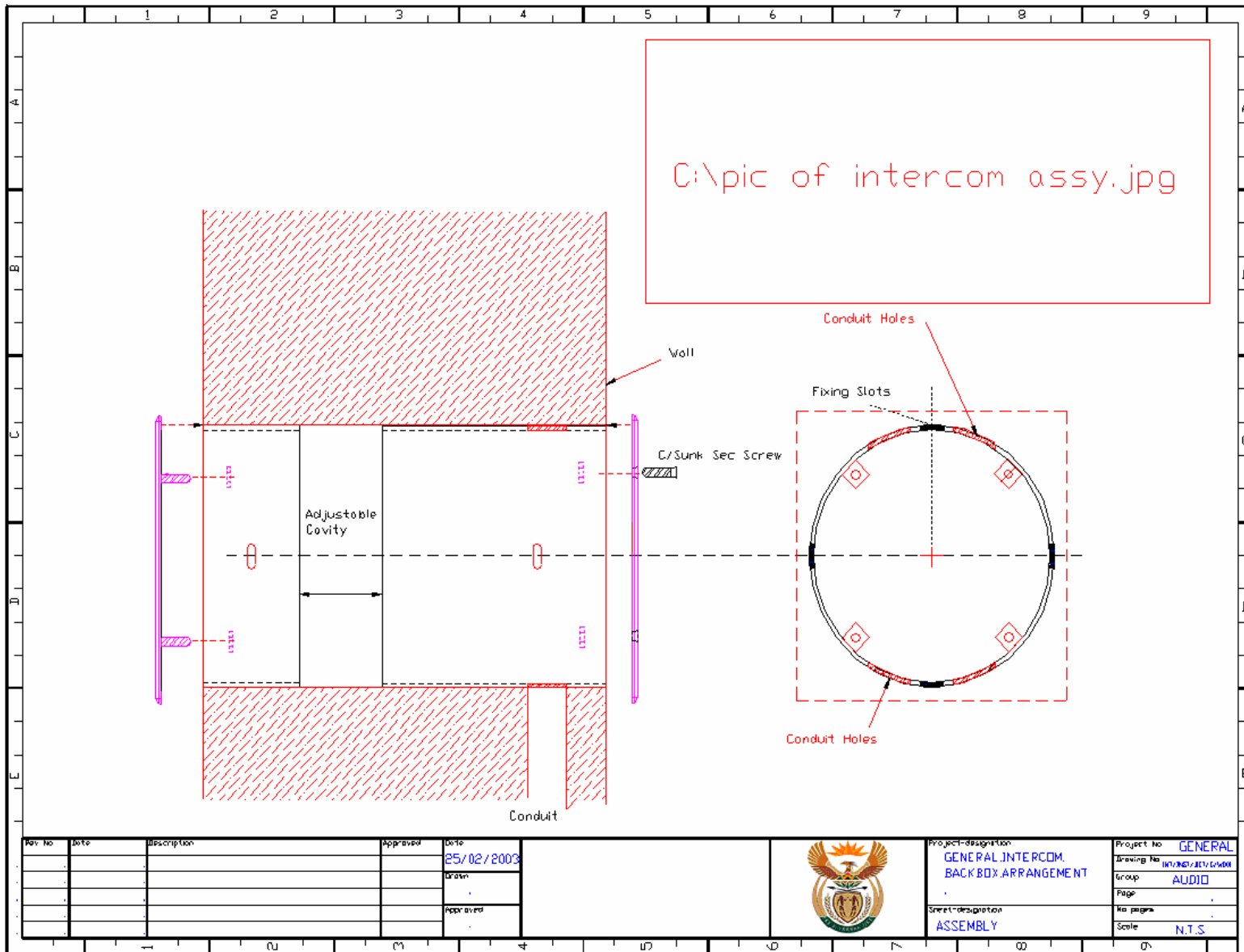
IF 09.02 ANNUALLY

Do the work specified under quarterly.
Check for loose connections and damaged wiring.
Check the function of each component by operating it.
Check all the indicator, alarm and initiator functions of the systems.
Clean all the units and blow out the cabinets and equipment.

IF 09.03 AT THE COMPLETION OF THE CONTRACT

Do all that is specified above.

**General Specification
Intercom and Public Address System**



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Project designation	GENERAL INTERCOM, BACK BOX ARRANGEMENT	Project No	GENERAL
Drawing No		Group	AUDIO
Sheet designation	ASSEMBLY	No. pages	
		Scale	N.T.S.