

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1      Programmable Logic Controllers.
- .2      Graphical User Interfaces
- .3      Network Equipment
- .4      System Software
- .5      Magnetic Door Switches
- .6      Terminal Cabinets and Block
- .7      End of Line Resistors
- .8      Local Alarm

**1.2                REFERENCES**

- .1      Canadian Standards Association (CSA)
  - .1      CSA C22.1-09, Canadian Electrical Code, Part 1 (21<sup>st</sup> edition) Safety Standard for Electrical Installations.
  - .2      CAN/CSA-C22.2 No. Nos. 14, 40 and 94, Non-hazardous enclosures
- .2      National Fire Protection Association (NFPA)
  - .1      NFPA 70 National Electric Code.
  - .2      NFPA 101 Life Safety Code.
- .3      Electronic Industries Association (EIA)
  - .1      EIA-310-C Electronic Industries
- .4      Underwriters Laboratories of Canada (ULC)
  - .1      ULC-S317 (1996) Installation and Classification of Closed Circuit Video Equipment (CCVC) Systems for Institutional and Commercial Security Systems.
  - .2      Underwriters' Laboratories (UL)
  - .3      UL 294 (1999) Standard for Safety for Access Control System Units.
  - .4      UL 1076 (1995) Standard for Safety for Proprietary Burglar Alarm Units and Systems.
- .5      Association Standard for Racks, Panels and Associated Equipment
- .6      Standards Video Display Unit Electronic Systems
- .7      PWGSC Specifications
  - .1      \*{to be determined}

- .8 Drawings
  - .1 T01-1
- .9 CSC Telecommunications Standards:
  - .1 ES/SOW-0101 – Procurement & Installation of Electronic Security Systems (Revision 3)
  - .2 ES/SOW-0102 – Quality Control for Procurement and Installations of Electronic Security Systems (Revision 5)
  - .3 ES/SPEC-0006 – Conduit, Space, and Power Requirements for Security Systems Use in Federal Correctional Institutions (Revision 2)
  - .4 ES/SPEC-0303 – Limited Call Intercom System for Use in Federal Correctional Institutions (Revision 2)
  - .5 ES/SOW-0404 Electronic System/Equipment Evaluation Criteria Guidelines
  - .6 ES/STD-0803 Electronics Engineering
  - .7 ES/SPEC-0900 – Door/Barrier/Gate Control System for Use in Federal Correctional Institutions (Revision 2)

### **1.3 SYSTEM DESCRIPTION**

- .1 System to consist of alarm control panel, motion detectors and intrusion switches located at door to be supervised.
- .2 System to interface to the CCTV and intercom systems to send messages to each one and allow for interactive audio and video information when processing door calls.
- .3 System to interface with fire hose cabinet solenoid valves for alarm monitoring.
- .4 System to have the capability to review and print the data archive.

### **1.4 WARRANTY**

- .1 Manufacturer's Warranty: Submit, for Consultant's acceptance, manufacturer's standard warranty document executed by authorized company official.
- .2 Provide one year warranty on defective parts and installation labour, commencing on the date of system acceptance by CSC.

### **1.5 PERFORMANCE REQUIREMENTS**

- .1 Security Clearance
  - .1 No employee of the Contractor will be permitted to enter or work in the Institution without a current valid security clearance issued by CSC.
- .2 Precedence of Institutional Operations
  - .1 While working on this project, it is essential that Contractors take every precaution to reduce any disturbance to normal institutional operations to a minimum. Onsite work may have to be performed at night or during other periods set by the Institution. The Contractor must recognize that it is essential that his

personnel working onsite cooperate fully with the security staff at the institution by conforming to operational security requirements.

- .3 All work shall be coordinated with the Technical Authority and the institutional staff.
- .4 Service Response Capability
  - .1 Contractor shall provide service response capability within 24 hours both during and after the system warranty period.

## **1.6 SUBMITTALS**

- .1 General: Submit two sets hardcopy (paper) plus one set softcopy (computer files) documentation at each submittal.
- .2 Preliminary Design Report (PDR): Provide documentation defined by ES/SOW-0101 Section 4.1
- .3 Final Design Report (FDR): Provide documentation defined by ES/SOW-0101 Section 4.3
- .4 Acceptance Testing Plan (ATP): Provide documentation defined by ES/SOW-0101 Sections 6.1 and 7.2. ATP shall also include test procedure and certificate for fibre optic communications channels.
- .5 Training Plan and Course Materials: Provide documentation defined by ES/SOW-0101 Section 8.2
- .6 Operator Manual: Provide generic manual for touch-screen operation, as well as system-specific information summarizing the operator-training course content.

## **1.7 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Consultant.
- .5 Fold up metal banding, flatten and place in designated area for recycling.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Equipment to be designed and manufactured in accordance with ISO-9001 1994 Quality System Standard.
- .2 Manufacturer's quality control program to be registered in accordance with the above noted standard.
- .3 Units of the same type of equipment shall be products of a single manufacturer. All material and equipment shall be new and currently in production. Each major component of equipment shall have the manufacturer's name and address, and the model and serial number in a conspicuous place. Material will conform to the applicable requirements of the Underwriters Laboratories and the National Standards Institute.
- .4 All system equipment and field devices to be held securely in place. Fastenings and supports shall be selected to provide a safety factor of three.
- .5 All systems equipment equipped with plug in power connectors to be connected to a dedicated receptacle. Do not use tap connectors for plugging in multiple plugs into a single receptacle.
- .6 Acceptable Manufacturer's
  - .1 PLC and software: Allen-Bradley (Rockwell Automation), 1201 South Second Street, Milwaukee WI 53204-2496 USA.
  - .2 PCs: Broadax Systems Inc., 17539 E. Rowland St, City of Industry CA 91748 USA.
  - .3 Touch Screen LCD Monitors: Elo TouchSystems Inc., 6500 Kaiser Drive, Fremont CA 94555 USA
  - .4 Computer Keyboard/Video/Mouse (KVM) Extenders: Dakota Computer Solutions LLC, 1579 Lexington Road, Green Oaks IL 60048 USA.
  - .5 Fiber-optic Hub: Cisco Systems Inc., 170 West Tasman Drive, San Jose CA 95134 USA.
  - .6 Operator Interface Software: Intellution Inc., 325 Foxborough Boulevard, Foxborough MA 02035 USA
  - .7 LAN Software: Microsoft Corporation, Redmond WA USA
  - .8 List of acceptable manufacturers is not exclusive but supplied alternates are subject to rejection by CSC's Technical Authority unless details have been submitted in advance and accepted by CSC's Technical Authority.

**2.2 PROGRAMMABLE LOGIC CONTROLLERS**

- .1 Enclosures:
  - .1 Employ existing cabinets.
  - .2 Allow for top and bottom entry of surface mount conduits.
- .2 Power Supplies:

- .1 Provide 110 VAC/24 VDC power supply for door position switch contact wetting.
- .3 Modular PLC equipment:
  - .1 Use Allen-Bradley SLC-500 family components and input/output (I/O) modules as required, compatible with existing PLC in Principal Entrance.
- .4 Field Wiring Terminations:
  - .1 Use Weidmuller ZTR2.5 disconnect test terminal blocks and ZSI2.5 fuse terminal blocks assembled on DIN rails with appropriate end plates and terminal markers.
  - .2 Use Panduit wire guide to contain incoming field wiring and panel wiring.
  - .3 Use heat-shrink wire markers on all cable and wire terminations.
- .5 Network interfaces:
  - .1 Use Allen-Bradley SLC-5/05 processors incorporating Ethernet communications interface.

### **2.3 GRAPHICAL USER INTERFACES**

- .1 Computers:
  - .1 Utilize existing computers.
- .2 Touch-screens:
  - .1 Utilize existing LCD touch screens.
- .3 Pointing Devices:
  - .1 Utilize existing pointing devices.

### **2.4 NETWORK EQUIPMENT**

- .1 Fiber-optic Satellite Hub
  - .1 Utilize and/or expand existing hub as required.

### **2.5 SYSTEM SOFTWARE**

- .1 Employ and modify existing software.
- .2 Software licenses
  - .1 Issue software licenses to CSC authorizing the use of all supplied system software at RPC Saskatoon in perpetuity and defining the terms and conditions of post-warranty software support, including provision of software upgrades if offered.

### **2.6 DOOR HARDWARE**

- .1 Connect to door hardware provided by other Divisions.

### **2.7 TERMINAL CABINETS AND BLOCKS**

- .1 Terminal cabinets: Type T. In accordance with Section 26 05 31 - Splitters, Junction, Pull Boxes and Cabinets.

- .2 Terminal Blocks: In accordance with Section 27 11 19 - Communications Termination Blocks and Patch Panels.

## **2.8 END-OF-LINE RESISTORS**

- .1 Mount end-of-line resistors to control supervisory current in each circuit, in control panel.

## **2.9 LOCAL ALARM**

- .1 Buzzer for local alarm at each door location and mount in single gang box as indicated.

## **2.10 EQUIPMENT ENCLOSURE**

- .1 Provide space for the rack mounted PC for the Door Control System in the Intercom and Public Address, Inmate Cell Call, or CCTV rack. Provide clear labeling and partitioning in the rack.

## **Part 3 Execution**

### **3.1 INSTALLATION**

- .1 Installation Methods
  - .1 Install equipment so that manufacturers', ULC and CSA labels are visible and legible.
  - .2 All system components and appurtenances shall be installed in accordance with the manufacturer's instructions and as specified and shown. Units to be mounted outside or subject to inclement conditions shall be weatherproof or be mounted in weatherproof enclosures.
  - .3 Provide for and ensure that all equipment and systems will operate under the radio frequency interference at the site. Any remedial action will be at the Contractors cost.
  - .4 All wall mounted devices will be housed in steel blocks wherever there is a concrete block wall.
  - .5 Electrical Contractor (Division 26) will be responsible for installation of all control cabling, low voltage wires (cabling and wires supplied by Section 27 51 23, 28 13 27, 28 13 29 and 28 23 00 Contractor) and pneumatic tubing (supplied by Section 11 19 20 DEC Contractor) in conduit and wire trays provided by Electrical Contractor (Division 26).
  - .6 Coordinate control cabling, low voltage wires and pneumatic tubing in conduit, raceways and cable trays with Section 11 19 20 DEC Contractor and Electrical Contractor (Division 26).
  - .7 All serviceable devices such as locks and door position indicators shall have connection terminated with AMP or MOLEX type connectors provided by the hardware supplier. All connections on the controls side of the lock pigtail shall be secure and shall be terminated by Section 27 51 23, 28 13 27, 28 13 29 and 28 23 00 Contractor.

### **3.2 DETAILED DESIGN DEVELOPMENT**

- .1 Upon Contract Award, prepare and submit PDR to CSC Design Authority
- .2 Upon CSC acceptance of PDR, prepare and submit FDR to CSC Design Authority
- .3 Upon CSC acceptance of FDR, proceed with procurement, manufacture and staging of products compliant with FDR. Prepare subsystem configurations using licensed software. Prepare and submit ATP, training course outlines and materials and operating manual to CSC Design Authority.
- .4 Conduct off-site Factory Acceptance Test (FAT) witnessed by CSC Design Authority, to demonstrate compliant subsystem operation, subsystem non-interference, system-wide control transfer and redundancy performance.

### **3.3 SYSTEM DESCRIPTION**

- .1 The primary purpose of the Door Control System (DCS) is to provide control and status monitoring of all secure doors in the facility.
- .2 On a failure of the primary PLC the operator must be notified by an alarm that indicates the failure and what action is required. The system shall switch over to the secondary PLC and continue to operate. The system shall remain operational on the backup unit even if the primary comes back on-line. Switching back to the primary shall only occur if the secondary fails or by manual command from the maintenance terminal
- .3 Systems shall have audible tones to alert the operator as follows:
  - .1 Audible signals shall be clearly heard at any position within a Control Post.
  - .2 Audible tones shall be user selectable.
  - .3 Tones will be different and distinct for each system event.
  - .4 The volume of the tone signal shall be adjustable.
  - .5 Provide a disable function so that audible alarms can be eliminated on maintenance terminals and adjustable at each console position individually.
  - .6 Audible tone for all changes from inactive to active state, i.e. communication failure, door forced open, server failure.
- .4 The DCS shall be connected to the other components of the BSCS system to provide fully integrated operation as described in this specification.
- .5 The DCS shall be powered from UPS power and shall operate for a minimum of 30 minutes on UPS.
- .6 The system shall provide for redundant file servers.
- .7 The communications network between the PLC and the Field I/O shall be via the Ethernet network.
- .8 The DCS shall provide data entry screens for addition, deletion or modification of all input and output points and their operating characteristics. Data entry shall be customized and allow system administrators to modify points without having to understand or use traditional PLC programming techniques such as ladder logic.

- .9 The DCS shall provide data entry screens for the creation and modification of logical points. This would include the defining of doors where a door is the logical association of multiple and different low level points. Programming functions shall be from Microsoft Windows style dialog boxes, Microsoft design principles shall be applied for the creation of all data entry screens. For each door the system shall allow the definition of:
  - .1 Input point for the door monitor switch.
  - .2 Input point for the lock status switch.
  - .3 Output point that activates the lock.
  - .4 Intercom stations on either side of the door.
  - .5 CCTV cameras on either side of the door.
  - .6 Amount of time the door lock is activated for
  - .7 Amount of time the alarm switches are bypassed or shunted when the door is commanded to open.
  - .8 Membership in a door interlock group.
  - .9 The above items are intended to present a general intent and is not a complete listing of required functions. Submit with graphic screen presentation samples of all data entry screens for all system functions specified herein. These items are to be considered a shop drawing submittal.
- .10 The system shall have a master disable icon on primary workstations. Activation of this icon shall cause the system to suspend all functions at all operator consoles in the room. The workstations will be reset in the BSCS equipment room via the maintenance screen.
- .11 Install an Unman Switch in the vestibule outside the LCP that is connected to the system in such a manner that activating it will disable all monitoring and control functions in the LCP. This can be done by disabling the AC power or through software features. Enabling the system will be done in the BSCS room.
- .12 A device icon (door) selected at a workstation shall only be controllable (lock/unlock) from that same workstation while it is selected. Other workstations that display that same icon shall indicate that the device has been selected but shall not be controllable until the first location has unselected or completed the operation.
- .13 Following a power failure the door control system shall resume normal operation without human intervention and shall display the real time status of all the doors. Operators will be required to login on restoration of the system. Power failure is defined as any action or activity that causes a loss of electricity to the system motherboard.
- .14 The system shall provide for an orderly shutdown. Orderly shutdowns shall close all files and protect data such that no data is lost during the shutdown process.
- .15 Any number of cell doors, up to the maximum installed complement shall be capable of group operation without a system overload.
- .16 The unlocking of doors shall executable at any time regardless of whether there is an intercom connection to the door or not. The audio switcher intercom channels will remain active when changing screens.

- .17 The DCS shall log all events and activities to a database. Include a flexible reporting module that allows retrieval of all information or subsets of information.

### **3.4 SCOPE OF WORK**

- .1 Detail-design, supply, install, configure, program and commission new DCS subsystem in accordance with CSC's ES/SPEC-0900 and as shown on the Drawings.
- .2 Operator shall be provided with the capability to identify the occupant of each cell with a 4-character mnemonic or abbreviation configurable from the touch-screen GUI.
- .3 Detail-design, supply, install, configure, program and commission two new operator interfaces in accordance with CSC's ES/SPEC-0900 and as shown on the Drawings. Operator Interface shall be associated with alternate control of any networked DCS subsystem.
- .4 Detail-design, configure, program and commission a local area network (LAN) as shown on the Drawings.
- .5 Interface the door control system and the electrical systems for the control of lighting throughout the Unit. All lighting zones are to be controlled from the touch screens in the Local Control Post. In the cells individual controls for the room light, night light and cell receptacle are to be provided. Install a separate PLC in the electrical room along with the necessary interface input / output modules and terminal blocks to control these functions.
- .6 Provide functionality and indicate interlock doors on screen.
- .7 System design will include monitoring of Fire Hose Cabinets.
- .8 All exterior door locks to be equipped with heaters.
- .9 Integrate DCS subsystems and LAN into one complete DCS employing control transfer and redundant operation as shown on the Drawings.
- .10 Provide all documentation, reports, plans, schedules, and manuals as defined within ES/SOW-0101.
- .11 Provide all specified spare parts and service manuals for maintenance of the Security Door Supervision system. Provide complete listing of provided parts including quantity, manufacturer, model number, and unit price.

### **3.5 DESCRIPTION OF EXISTING FACILITIES [if required]**

- .1 Main Communications and Control Post (MCCP) [if required]
- .2 Unit Six Common Equipment Room (CER) [if required]

### **3.6 GOVERNMENT FURNISHED EQUIPMENT [if required]**

### **3.7 SCHEDULE**

- .1 The general contractor will be responsible for establishing and coordinating the project schedule.
- .2 Documentation pre-requisites
  - .1 Installation shall not commence until Preliminary and Final Design Reports (PDR/FDR) defined by document ES/SOW-0101 have been submitted by Contractor and reviewed/accepted by CSC Technical Authority.
  - .2 Acceptance testing shall not commence until project-specific Acceptance Testing Procedures (ATP) defined by document ES/SOW-0101 have been submitted by Contractor and reviewed/accepted by CSC Technical Authority.
  - .3 Operator and Maintenance Technician Training shall not commence until project-specific Training course outlines and trainee handouts defined by document ES/SOW-0101 have been submitted by Contractor and reviewed/accepted by CSC Technical Authority.
  - .4 System substantial performance and commencement of the warranty period shall not commence until acceptable ATPs have been completed and signed off by both Contractor and CSC Technical Authority, and Operator training is complete. Substantial performance may nevertheless be granted in the presence of noted deficiencies at the discretion of the Crown.
  - .5 Final completion will not be granted until system is in full operation, all noted deficiencies have been cleared and all documentation deliverables have been received by the Crown in the quantities specified.

### **3.8 CO-ORDINATION WITH INSTITUTIONAL OPERATIONS**

- .1 Security Clearance
  - .1 No employee of the Contractor will be permitted to enter or work in the Institution without a current valid security clearance issued by CSC.
- .2 Precedence of Institutional Operations
  - .1 While working on this project, it is essential that Contractors take every precaution to reduce any disturbance to normal institutional operations to a minimum. On-site work may have to be performed at night or during other periods set by the Institution. The Contractor must recognize that it is essential that his personnel working on-site co-operate fully with the security staff at the institution by conforming to operational security requirements.

### **3.9 SEQUENCES OF OPERATION**

- .1 System operation: when supervised door is opened, zone indicating lamp flashes and operates audible alarm at control panel. When "acknowledge" button is operated, audible signal is silenced and flashing light changes to steady glow.
- .2 System restored to normal when door is closed and "reset" key switch on control panel operated.

- .3 Buzzer located at each door to give pulsating signal when door opened. Upon acknowledgment from control panel signal to change to continuous note. Buzzer at door location to be silenced only after door reclosed and "reset" key switch operated. Closing of door alone not to affect signal once it has started to sound.
- .4 When deactivating switch is operated, supervised door on that zone opened without causing alarm. Zone trouble lamp illuminated when zone is deactivated but audible trouble signal not to sound.
- .5 Fault in wiring of one zone to cause audible signal to sound even if zone in deactivated position.

### **3.10 GRAPHIC SCREENS**

- .1 Modify existing graphic screens that provide the new functionality shown indicated in the drawings.
- .2 Contractors shall submit three drafts and one final version of the screens prior to installing the screens on the system. Users shall provide feedback and this feedback will be incorporated in to the next submission. Complete all screen submissions and install on the system for the FAT.
- .3 These sample screens are to convey the general intent and do not include all details. Contractor is to confirm final operating characteristics with CSC. Costs for this consultation and the subsequent changes are to be included in the total contact price.
- .4 Ensure that interlocked doors are included in the "Screen Layouts", "Control 'System Operation", and "Logging and Reporting" sections.

### **3.11 SITE TESTS**

- .1 Perform tests in accordance with Canadian Electrical Code.
- .2 Test system components in presence of [Engineer] [Consultant] to ensure correct operation of system. On completion of tests, submit to [Engineer] [Consultant] certificate listing components tested.

### **3.12 FINAL ADJUSTMENTS, TESTING AND COMMISSIONING**

- .1 Upon completion of the work and during interim periods as required under the Contract, perform all final adjustments of levels, timing, equalization, limits, and operational sequences.
- .2 Conduct detailed testing of all systems and equipment. Submit certified test results to the Consultant for review.
- .3 Conduct commissioning procedures as required under the Contract. Submit report of results together with all required statements and certificates.

**END OF SECTION**

**1.0 General**

**1.1 SECTION INCLUDES**

- .1 Security Cabling
- .2 Connectors
- .3 Termination

**1.2 REFERENCE DOCUMENTS**

- .1 American National Standards Institute (ANSI)/ Telecommunications Industry Association (TIA):
  - .1 ANSI/TIA-568-C.0 Generic Telecommunications Cabling For Customer Premises
  - .2 ANSI/TIA-568-C.1 Commercial Building Telecommunications Cabling Standards
  - .3 ANSI/TIA-568-C.2 Balanced Twisted-Pair Telecommunications Cabling And Components Standards
  - .4 ANSI/TIA-568-C.3 Optical Fiber Cabling Components Standard
  - .5 ANSI/TIA-568-C.4 Broadband Coaxial Cabling And Components Standard
  - .6 ANSI/TIA-569-C Commercial Building Standard for Telecommunications Pathways and Spaces
  - .7 ANSI/TIA-942-A Telecommunications Infrastructure Standard for Data Centers
- .2 Canadian Standards Association (CSA):
  - .1 CAN/CSA-ISO/IEC 11801-04 Generic Cabling for Customer Premises (Adopted ISO/IEC 11802:2002)

### **1.3 ABBREVIATIONS**

- |    |          |   |
|----|----------|---|
| .1 | ETL      | Electronic Testing Laboratories         |
| .2 | IDC      | Insulation Displacement Connectors      |
| .3 | UTP      | Unshielded Twisted Pair                 |
| .4 | NEXT     | Near End Crosstalk                      |
| .5 | ELFEXT   | Equal Level Far End Crosstalk           |
| .6 | PSNEXT   | Power Sum Near End Crosstalk            |
| .7 | PSELFEXT | Power Sum Equal Level Far End Crosstalk |

### **1.4 INSTALLER QUALIFICATIONS**

- .1 Personnel installing communications cabling shall be trained and conversant with communications cabling practices required for this project.

### **1.5 SCOPE**

- .1 System to be complete with all data and voice outlets, patch panels, racks, patch cords, wire and cable required to form a complete system.
- .2 Supply and install cable in raceway in exposed locations or where concealed in inaccessible walls and ceilings.
- .3 Supply and install data outlets, racks, patch panels, patch cords, network (PoE) switches, routers, wire and cable to provide an isolated and fully functional security system network.

### **1.6 REFERENCE STANDARDS**

- .1 Comply with the following standards:
- |    |                  |
|----|------------------|
| .1 | ANSI/TIA 568-C   |
| .2 | ANSI/TIA 569-C   |
| .3 | ANSI/TIA 942-A   |
| .4 | CAN/CSA 11801-04 |
| .5 | BICSI            |

## **2.0 Products**

### **2.1 HORIZONTAL CABLING TO WORKSTATION AND DEVICES**

- .1 UTP: to CAN/CSA 11801-04 and TIA 568 – C.1, C.2, Category 6.
  - .1 Physical Characteristics:
    - .1 Conductors: four-pair, 22-24 AWG, thermoplastic insulated, solid copper wire.
    - .2 Twists: pairs variably twisted relative to one another. Minimum 29 twists/m per pair.
    - .3 Cable Size: maximum OD 6.4 mm.
    - .4 Breaking strength: 40.8 kg at temperature of  $-20^{\circ}\text{C} \pm 1^{\circ}\text{C}$  without jacket or insulation cracking.
    - .5 Colour coding of pairs: tracer coloured white paired with each of blue, orange, green and brown.
    - .6 Fire Rating: plenum-rated overall jacket, CSA FT-4 compliant.
    - .7 Data (Blue) - General Cable GenSpeed6 7131800 Plenum or equivalent.
    - .8 Security (Purple) – General Cable GenSpeed6 71318509 Plenum or equivalent.
  - .2 Transmission Characteristics: to ANSI/TIA-568-C.1 & C.2.
    - .1 DC resistance: less than 94 ohms/km, with an unbalance between conductors in a pair of 5% maximum.
    - .2 Mutual Capacitance of any one pair: maximum of 17 nF/305 m @ 1 MHz.
    - .3 Characteristic Impedance 1-100 MHz: 100 ohms  $\pm 15\%$ .

.4 Maximum values for attenuation, loss and crosstalk, worst pair at 20°C:

Frequency (MHz)	Attenuation dB/ 1000ft	NEXT Loss Pr-pr dB	PS NEXT Loss dB	ELFEXT pr-pr dB	PSELFEXT dB
1	2.5	76.0	53.0	57.4	54.4
4	4.5	53.6	50.6	45.3	42.2
8	6.3	50.0	45.6	39.3	36.3
10	7.0	47.0	44.0	37.4	34.4
16	9.2	43.6	40.6	33.3	30.3
20	10.3	42.0	39.0	31.4	27.4
25	11.4	40.4	37.4	29.4	26.4
31.25	12.8	38.7	35.5	27.5	24.5
62.5	18.5	33.6	30.6	21.5	18.5
100	24.0	30.1	27.1	17.4	14.4

## 2.2 RISER CABLING

.1 UTP Riser:

.1 UTP: to ANSI-TIA-568-C.0 & C.1, Category-3.

.1 Conductors: 25 pairs, 24 AWG, thermoplastic insulated, solid copper wire.

.2 Quantity: install 25 pair UTP riser cables as shown on drawing.

.2 Fiber Optic Cable Riser:

.1 Fiber Optic Cable: to ANSI-TIA-568-C.3.

.1 Physical Description:

.1 Conductors: 12 strand, 9/125 micron core/cladding diameter, single-mode.

.2 Continuous operating temperature: -20°C to +85°C.

.3 Strength member: Aramid.

.4 Minimum bend radius for installation:

.1 12 strand - 305 mm.

.5 Minimum bend radius for long term:

.1 12 strand - 178 mm.

.6 Fire Rating: plenum-rated overall jacket, CSA FT-4 compliant.

.7 Jacket colour: Yellow.

- .2 Transmission Characteristics:
  - .1 Operational wavelengths and testing: 1310 nm and 1550 nm.
  - .2 Maximum attenuation:
    - .1 1.5 dB/km @ 1310 nm.
    - .2 1.0 dB/km @ 1550 nm.
- .2 Additional requirements for underground conduit fibre optic cable:
  - .1 Direct buried slotted cored design with encapsulated in thermoplastic cushion layer moisture barrier and PE jacket.
  - .2 Bundles of aramid yarn laid over PE and covered with PVC bedding.
  - .3 HD-Polyethylene sheath.
  - .4 2000N/cm crush resistance.
  - .5 -15°C to +50°C installation.
  - .6 -30°C to +85°C operation.
- .3 Quantity: install fibre optic riser cables as shown on drawings.

## **2.3 COMMUNICATIONS OUTLET ASSEMBLIES**

- .1 Communications Outlet - Boxes:
  - .1 One (1) gang recessed box, 63 mm minimum depth with 19 mm deep one device adapter ring, 1.6 mm 16 AWG thickness.
  - .2 Supply and install 27 mm EMT from box to communication tray or communication system backboard.
- .2 Communications Outlet - Housings:
  - .1 Formed Outlet Plate.
    - .1 Maximum dimensions: 150 mm x 150 mm x 38 mm deep.
    - .2 Rear and side entry of cable. Strain relief provisions for side entry of cable.
    - .3 Routing guide for terminated fiber optic cables to maintain adequate bend radius.
    - .4 Flat plate: minimum thickness 3.9 mm.
  - .2 Accepts minimum of two (2) (for one (1) gang) or six (6) (for two (2) gang) snap-in or slide-in outlet inserts.
  - .3 Mounts to standard one (1) gang opening or mounting ring.
  - .4 Constructed of high-impact fire-retardant thermoplastic.

- .3 Communication Outlet - Jacks:
  - .1 Copper-Based Inserts: to TIA/EIA 568-C.1, C.2, C.3 Category 6 standards, worst pair:
    - .1 Termination via fixed or removable IDC, AT&T 110, Krone LSA-Plus, or NT BIX IDC's with hinged or separate stuffer cap.
    - .2 If removable IDC type is used, they must meet the following physical specifications:
      - .1 Connection of removable IDC's via 8-position edge connectors plated with minimum 40 microns of nickel. Capable of minimum 250 insertion and withdrawal cycles.
      - .2 Connection of removable IDC's via 8-pin header connector. Maximum 8.9 N engagement force and minimum 2.25 N disengagement force. Pins minimum 1.4 mm square.
  - .2 Modular Outlet - UTP:
    - .1 Eight (8) position unkeyed jack for voice and data compatible with 4-pair 100 ohm unshielded twisted pair.
    - .2 Capable of minimum of 200 insertion and withdrawal cycles.
    - .3 Copper-based contacts with 50 to 100 microns of nickel overlay uniformly coated with minimum 50 microns of gold overlay.
    - .4 Minimum contact force 1.1 N per contact. Minimum plug retention force 76 N.
    - .5 Conductors separated and aligned internally by comb structure.
    - .6 Electrical Specification:
      - .1 Contacts:
        - .1 Dielectric strength: 1000 V rms @ 60 Hz.
        - .2 Insulation resistance: 10 megohms, minimum.
        - .3 Contact resistance: 0.02 ohms, maximum.
        - .4 Current rating: 1.5 amps, maximum.
      - .2 Insulation Displacement Connectors:
        - .1 Voltage Rating: 250 VAC.
        - .2 Current Rating: 5 amps.
        - .3 Resistance: 0.02 ohms maximum.
        - .4 Dielectric Withstanding: 2000 VAC for 60 sec.
        - .5 Insulation Resistance: 500 megohms minimum.
    - .7 Rated for data transmission up to 1000 MHz.
    - .8 Wire configuration to T568A pair assignment.

- .3 Fiber-Based Inserts:
  - .1 Contains two fiber optic outlets.
  - .2 LC or SC-style connector.
  - .3 Accept single-mode 9/125-micron fiber cable.
  - .4 Dual-fiber cable attached using compatible breakout kit.
  - .5 Provide dust caps with both outlets.
  - .6 Transmission Properties:
    - .1 Insertion loss, maximum: 0.4 dB.
    - .2 Return loss, minimum: 26 dB.

## 2.4 **RACK HARDWARE**

- .1 Provide all components of a particular type of the same manufacture. All rack components shall be of common manufacture.
- .2 Rack: Provided by Others.
- .3 UTP Patch Panels: supply all hardware from the same manufacturer.
  - .1 Ports: same type as corresponding outlets Ports/Panel: maximum quantity 48.
  - .2 Physical, Electrical, Transmission Properties: not less than specified for outlets, Category 6, worst pair.
  - .3 Horizontal cable management minimum 90 mm high.
  - .4 Grounding lug hardware kit.
  - .5 Panel:
    - .1 Width 483 mm.
    - .2 Multiple of EIA-301-E standard module height of 44.45 mm (1U).
    - .3 EIA mounting hole spacing.
  - .6 Panel Height: 178 mm maximum.
  - .7 Material: metal of the following minimum thickness:
    - .1 3 mm flat anodized aluminum.
    - .2 1.65 mm formed aluminum.
    - .3 1.9 mm flat steel.
    - .4 1.5 mm formed steel.

- .4 Fibre Optic Cable Patch Panels
  - .1 Fibre interconnect center rack mounted, low profile, modular design.
  - .2 Ports: 12.
  - .3 Connectors: feed through type LC.
  - .4 Cable management and slack storage designed to accommodate fibre optic cable bend radius.
  - .5 Lockable doors or covers for cable termination and patch compartments.
  - .6 Anchor points for strain relief of fiber cable entry.
  - .7 Grounding provisions.

## 2.5 PATCH CABLES

- .1 UTP Type:
  - .1 Patch Cables to match installed cable's transmission and electrical specifications.
  - .2 Fire Rating: plenum rated overall jacket, CSA FT-4 compliant.
  - .3 Modular Connectors:
    - .1 Matching types and minimum specifications as for outlet components.
    - .2 Long body type.
    - .3 Suitable for solid or stranded conductor and wire gauge used.
    - .4 Tool-stuffed or plier-stuffed with IDC contacts and plier-latched cap.
    - .5 Factory manufactured.
  - .4 Quantity: Provide one (1) 1 m and one (1) 3 m UTP patch cord for each new cable outlet.
- .2 Optical fiber patch cords:
  - .1 Fiber Core and Cladding: identical to installed cable.
  - .2 Transmission Properties: match installed cable's transmission and electrical specifications.
  - .3 Configuration:
    - .1 Dual strand, single jacket, with breakout assemblies separate LC connectors each end.
    - .2 Single fiber dual cable, separate LC connectors each end.
  - .4 Factory manufactured.
  - .5 Quantity – Provide one (1) 2m patch cord for each patch panel outlet.

## 2.6 SECURITY SYSTEM CABLES

- .1 Card Access Single Reader Door Cable (Composite Style)
  - .1 One Card Reader 3 pair, 22 AWG, shielded
  - .2 One Lock power 4C, 18 AWG
  - .3 One Door Contact 2C, 22 AWG
  - .4 One Request Exit/Spare 4C, 22 AWG
  - .5 \_ or equivalent.
- .2 Card Access In and Out Card Reader (Composite Style)
  - .1 One Card Reader 3-pair, 22 AWG, shielded
  - .2 One Lock Power 4C, 18 AWG
  - .3 One Door Contact 2C, 22 AWG
  - .4 One Request Exit/Spare 4C, 22 AWG
  - .5 One Card Reader (Out) 3 pair, 22 AWG, shielded
  - .6 \_ or equivalent.
- .3 Security Device Cable
  - .1 One device 4C, 18 AWG
  - .2 Belden 6302UE or equivalent.

## 2.7 CABLE TRAYS, WIREWAYS AND SURFACE RACEWAYS:

- .1 Provide slotted PVC raceway on rack sides.
- .2 Provide cable tray as indicated on drawings.

## 2.8 IDENTIFICATION MATERIALS

- .1 Lamicoid Nameplates: 3 mm thick plastic engraving sheet, black face, white core, mechanically attached, sizes as follows:
  - .1 Size 1: 12 mm high with 5 mm high letters.
- .2 Wire Identification Materials: Use one of the following:
  - .1 Heat shrink sleeves, pre-marked with identification information.

### **3.0 Execution**

#### **3.1 INSTALLATION**

- .1 Minimum conduit size 27 mm.
- .2 Cable Installation:
  - .1 Generally install FT4 rated data cable and voice cable without using raceway except where noted otherwise on drawings or as follows.
    - .1 Install data and voice cable in conduit where:
      - .1 Concealed in inaccessible walls or ceilings.
      - .2 Exposed to mechanical damage.
      - .3 Cable runs require fire rating (for example in riser shafts).
    - .2 Support cable runs independently of ceiling suspension system.
    - .3 Swab raceway system before installing wiring.
    - .4 Do not exceed manufacturer's maximum pulling force.
    - .5 Maintain not less than minimum bending radius for fiber and copper conductors.
    - .6 Install cable along or at right angles to building lines unless impractical to do so. Verify specific cases of deviation in advance.
    - .7 Maintain open copper-conductor cable at maximum practical distance from fluorescent ballasts and other EMF - or discharge-generating equipment.
    - .8 Ensure that cable is not flattened, squeezed, or crimped at any point along entire run. No splices or intermediate terminations in cable runs except by special permission in advance, with documentation detailing locations and nature of splices.
    - .9 Install cables in PVC raceway in equipment room and fan individual cables to applicable patch panels in neat, logical fashion.
    - .10 Tie wrap cables neatly into logical bundles.
    - .11 Minimum 3 m of slack cable per run.

.3 Connectors:

- .1 Use tooling specific to connector types in use.
- .2 Use connectors suitable for nature of conductor in cable, e.g. stranded vs. solid copper.
- .3 Ensure that connectors' strain relief provisions are used. Strip jackets only amount required.
- .4 Maintain pair twists within 13 mm of termination.
- .5 UTP Connection Configuration in accordance with ANIS/TIA-568-C.1 assignment T568A.

<u>Pair</u>	<u>Colour</u>	<u>RJ-45 Pins</u>
1	Blue	4
	White/Blue	5
2	White/Orange	3
	Orange	6
3	White/Green	1
	Green	2
4	White/Brown	7
	Brown	8

.4 Outlets, Boxes and Fittings:

- .1 Ensure in advance that outlet box/data outlet installation methods yield vertically-mounted data outlets.
- .2 Install all outlets flush with finished surfaces unless indicated otherwise on the drawings.

.5 Cabinets, Enclosures, Racks, Backboards:

- .1 Install at locations and heights indicated on drawings.
- .2 Use green insulated 6 AWG ground conductors for grounding racks. Use grounding bushing, solderless lug, clamp, or cup washer and screw.
- .3 Protect ground conductors from mechanical injury.
- .4 Install ground conductors such that neither ground conductors nor data cables interfere with one another in regards to future servicing of patch panel rear connections.
- .5 Anchor or stabilize racks as recommended by manufacturer.
- .6 Ground as required by system.
- .7 Mount panels to racks with as many screws as there are mounting holes or slots in panels.
- .8 Provide and install necessary strain reliefs and cable support brackets, plus trays for fibre cable loop behind panel and install cables utilizing such devices.

### **3.2 COMMUNICATIONS CABLE AND EQUIPMENT LABELLING**

- .1 Label communication outlets, panels and ports with size 1 Lamicoid nameplates.
- .2 Label each of cables with other end's address using Wire Identification Materials.
- .3 Label outlets with labels vertically aligned in each row.
- .4 Position panel labels in the same position on each panel.

### **3.3 METHOD OF WORK**

- .1 Each category of Work to be performed by fully competent and certified tradesmen and technicians in a thorough manner.
- .2 All workmanship to be of the highest quality and meet recognized industry standards of craftsmanship.
- .3 Installation deemed not acceptable by the Owner to be redone at the Contractor's expense.

### **3.4 WARRANTY**

- .1 All equipment furnished under this contract shall be warranted for a period of twelve (12) months from the date of final Owner acceptance of the system.
  - .1 Respond to service requests on-site, if required.
  - .2 Replace or repair defective components as required.

**END OF SECTION**

## **1.0 GENERAL**

### **1.1 Section Includes**

- .1 Cameras
  - .1 Fixed and PTZ cameras
- .2 Digital video management system
- .3 Network video user stations
- .4 Monitors
- .5 UPS
- .6 Cable

### **1.2 Reference Standards**

- .1 Canadian Standards Association, (CSA International)
  - .1 CSA C22.1-09, Canadian Electrical Code, Part 1 (21<sup>st</sup> edition) Safety Standard for Electrical Installations.
  - .2 CAN/CSA-C22.2 No. 182.4-M90 (R2006), Plugs, Receptacles, and Connectors for Communication Systems.
- .2 Electronic Industries Association (EIA)
  - .1 REC 12749, Power Supplies.
  - .2 ANSI/EIA/TIA-568 Commercial Building.
- .3 Underwriters Laboratories of Canada (ULC)
  - .1 ULC-S317 (1996) Installation and Classification of Closed Circuit Video Equipment (CCVC) Systems for Institutional and Commercial Security Systems.
  - .2 Underwriters' Laboratories (UL)
  - .3 UL 294 (1999) Standard for Safety for Access Control System Units.
  - .4 UL 1076 (1995) Standard for Safety for Proprietary Burglar Alarm Units and Systems.
- .4 CSC Standards:
  - .1 ES/SOW-0101 – Procurement & Installation of Electronic Security Systems (Revision 3)

- .2 ES/SOW-0102 – Quality Control for Procurement and Installations of Electronic Security Systems (Revision 5)
- .3 ES/SOW-0404 – Electronic System Proposal Evaluation Criteria (Revision 1)
- .4 ES/SPEC-0006 – Conduit, Space, and Power Requirements for Security Systems Use in Federal Correctional Institutions (Revision 2)
- .5 ES/STD-0204 – Fixed/Zoom Lens Closed Circuit Television (Revision 1)
- .6 ES/STD-0207 – High Security Enclosure Closed Circuit Television (Revision 1)
- .7 ES/STD-0221 – Fixed Network Colour Closed Circuit Television Camera (Revision 0)
- .8 ES/STD-0222 – Indoor Network Colour Dome Camera (with Pan/Tilt/Zoom) Closed Circuit Television (Revision 0)
- .9 ES/STD-0227 – LCD Colour Computer Monitor Closed Circuit Television (Revision 0)
- .10 ES/STD-0228 – Network Video User Station Closed Circuit Television (Revision 0)
- .11 ES/STD-0229 – Network Video Recorder Closed Circuit Television (Revision 0)
- .12 ES/STD-0230 – NTSC-IP Video Converter Closed Circuit Television (Revision 0)
- .13 ES/STD-0231 – IP-NTSC Video Converter Closed Circuit Television (Revision 0)
- .14 ES/STD-0803 – Video Display Unit Electronic Systems (Revision 2)

### 1.3 Definitions

- .1 AGC: Automatic Gain.
- .2 ATP: Acceptance Testing Procedure/Plan.
- .3 CCTV: Closed Circuit Television.
- .4 CCVC: Closed Circuit Video.
- .5 CCD: Charge Coupled Device.
- .6 CEC: Canadian Electrical Code.
- .7 CER: Common Equipment Room.
- .8 CSA: Canadian Standards Association.
- .9 CSC: Correctional Service of Canada.
- .10 EIA: Electronic Industries Association.

- .11 ES: Electronic Systems.
- .12 FAT: Factory Acceptance Test.
- .13 FDR: Final Design Report.
- .14 FOV: Field of View.
- .15 GFE: Government Furnished Equipment.
- .16 GUI: Graphical User Interface.
- .17 I/O: Input/Output.
- .18 KVM: Keyboard/Video/Mouse.
- .19 LAN: Local Area Network.
- .20 LCP: Local Control Post.
- .21 MTBF: Mean Time Before Failure.
- .22 NVRS: Network Video Recorder System.
- .23 OFC: Optical Fiber Cable.
- .24 PC: Personal Computer.
- .25 PDC: Power Distribution Centre.
- .26 PE: Principal Entrance.
- .27 PIU: PIDS Integration Unit.
- .28 PWC: Public Works Canada (PWGSC's predecessor).
- .29 PWGSC: Public Works and Government Services Canada.
- .30 RU: Rack Units.
- .31 SCP: Secure Control Post.
- .32 SOW: Statement of Work.
- .33 SPEC: Specifications.
- .34 STD: Standard.
- .35 T&E: Telecommunications and Electronics.
- .36 TES: Telecommunications Equipment Space.

- .37 UPS: Uninterruptible Power Supply.
- .38 V&C: Visits and Correspondence.
- .39 VAC Volts: Alternating Current.
- .40 VDC Volts: Direct Current.
- .41 VVMS: Virtual Video Matrix Switcher.

#### **1.4 Design Performance Requirements**

- .1 Support: Provide a CCTV System expansion for real time viewing and digital network recording with the highest possible clarity for post event investigations. Camera functions such as pan/tilt and zoom fully supported by CCTV system.
  - .1 Provide operator with ability to control all camera functions.
- .2 Alarm point monitoring: System capable, upon alarm recognition, of switching CCTV cameras associated with alarm point.
- .3 Switching:
  - .1 Provision to switch any camera in system to any monitor in system manually or automatically.
  - .2 Provision to switch system video recorders to selective monitor outputs in system.
- .4 Control: Provision for any camera equipped with pan, tilt, and/or motorized zoom lens:
  - .1 Manually control pan, tilt and lens functions.
  - .2 Set pan and tilt home position.
  - .3 Set and clear movement limits of pan and tilt mechanism.
  - .4 Adjust motorized zoom lens.
- .5 Enter and edit CCTV programs and save them for future use.
- .6 Set dwell time for viewing of any camera picture.
- .7 Define sequence for viewing cameras on each monitor.
- .8 Bypass cameras in system during sequencing to monitor.
- .9 Provide ability to display stored 'video image' of cardholder, and switch real-time camera to card reader location for specific card usage.
- .10 Overall control of CCTV provided through software control, which provides complete integration of security components.

- .11 Environment: Design video components and systems to operate with all specified requirements under following ambient temperatures:
  - .1 Indoor installations:
    - .1 Temperature: 0°C to 30°C.
    - .2 Humidity: 10 to 90%.
  - .2 Outdoor installations:
    - .1 Temperature: -40°C to 60°C.
    - .2 Humidity: 10 to 100%.

## 1.5 Submittals

- .1 Product Data: Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings: Submit in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Submit shop drawings to indicate project layout, camera locations, point-to-point diagrams, cable schematics, risers, mounting details and identification labelling scheme including:
    - .1 Functional description of equipment.
    - .2 Technical data sheets of all devices.
    - .3 Device location plans and cable lists.
    - .4 Video camera surveillance chart.
    - .5 Video interconnection detail drawings.
    - .6 Calculation of the recording period for video storage and RAID array.
- .3 Samples: Submit in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Submit one (1) sample of each camera selected complete with housing, brackets and mounting hardware.
  - .2 Camera will be returned for incorporation into work as appropriate.
- .4 Quality Assurance Submittals: Submit the following in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Test Reports: Submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.

- .2 Instructions: Submit manufacturer's installation instructions.
- .3 Manufacturer's Field Services: Submit copies of manufacturer's field reports.
- .5 Maintenance Data: Submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals. Include following:
  - .1 System configuration and equipment physical layout.
  - .2 Functional description of equipment.
  - .3 Instructions on operation, adjustment and cleaning.
  - .4 Illustrations and diagrams to supplement procedures.
  - .5 Manufacturer's operation instructions
- .6 Document Requirements:
  - .1 General: Submit three (3) copies of each hard and computer disk copies of all documents in accordance with ES/SOW-0101.
  - .2 Submit three (3) copies of operational manuals in accordance with ES/SOW-0101.
  - .3 Preliminary Design Report (PDR): Provide documentation defined by ES/SOW-0101 Section 4.1.
  - .4 Final Design Report (FDR): Provide documentation defined by ES/SOW-0101 Section 4.3.
  - .5 Acceptance Testing Plan (ATP): Provide documentation defined by ES/SOW-0101 Sections 6.1 and 7.2. ATP shall also include test procedure and certificate for fiber optic communications channels.
  - .6 Training Plan and Course Materials: Provide documentation defined by ES/SOW-0101 Section 8.2 .3 Operator and Maintenance Technician Training shall not commence until project-specific Training course outlines and trainee handouts defined by document ES/SOW-0101 have been submitted by Contractor and reviewed/accepted by CSC Technical Authority.
  - .7 Operator Manual(s): All CCTV related components and provide generic manual for touch-screen operation, CCTV interface, as well as system specific information summarizing the operator training course content.
  - .8 Maintenance Manual: Provide documentation defined by ES/SOW-0101 Section.

## **1.6 Waste Management and Disposal**

- .1 Deposit packaging materials in appropriate container on site for recycling or reuse.
- .2 Avoid using landfill waste disposal procedures when recycling facilities are available.

- .3 Collect and separate plastic, paper packaging and corrugated cardboard.
- .4 Dispose of corrugated cardboard, polystyrene and plastic packaging material in appropriate on-site bin.

### **1.7 Warranty**

- .1 **Manufacturer's Warranty:** Submit, for Consultant's acceptance, manufacturer's standard warranty document executed by authorized company official.
- .2 Provide one (1) year warranty on defective parts and installation labour, commencing on the date of system acceptance by CSC.

### **1.8 Performance Requirements**

- .1 **Security Clearance**
  - .1 No employee of the Contractor will be permitted to enter or work in the Institution without a current valid security clearance issued by CSC.
- .2 **Precedence of Institutional Operations**
  - .1 While working on this project, it is essential that Contractors take every precaution to reduce any disturbance to normal institutional operations to a minimum. Onsite work may have to be performed at night or during other periods set by the Institution. The Contractor must recognize that it is essential that his personnel working onsite cooperate fully with the security staff at the institution by conforming to operational security requirements.
- .3 **Contractor Experience**
  - .1 The contractor shall provide evidence of five (5) years' experience in the detail design, supply and installation of Closed Circuit Television Systems in Federal Correctional Facilities. Due to the complex IP virtual matrix design, contractor to provide evidence of team member IT technology and PC Network competency (MCSE or equal).
  - .2 Contractor shall demonstrate full compliance with the mandatory requirements set out in ES/SPEC-0404, including corporate capability; qualifications and experience of personnel assigned to the project; a full understanding, and capability to fulfil warranty obligations; ability to obtain the necessary level of security clearance for its onsite personnel to the installation locations; and the ability to execute the Contract in the language designated at the installation site.
- .4 **Service Response Capability**
  - .1 Contractor shall provide service response capability within twenty-four (24) hours both during and after the system warranty period.

### **1.9 Description of Existing Facilities**

- .1 Main Communications and Control Post (MCCP)

- .1 An existing IP based video surveillance system exists within the facility with monitoring capabilities at the MCCP. Viewing of new unit cameras at the MCCP to be via existing equipment.

#### **1.10 Government Furnished Equipment**

- .1 [to be determined]

#### **1.11 Scope of Work**

- .1 Provide a high resolution CCTV system expansion utilizing state of art IP technology for real time viewing and digital network recording with the highest possible clarity for post event investigations.
- .2 System shall utilize existing camera storage.
- .3 Cameras with high quality colour (auto switching to black and white at low light) pictures, with all necessary components, programming, commissioning, patch cables, and interface devices as required and regardless of mention to provide a complete functioning system.
- .4 Provide all required phase lock, common ground reference filters, ground loop transformers, synchronization and any other equipment required to ensure proper video transmission with zero picture roll or tearing.
- .5 Utilize existing CCTV Monitors and keyboards and all necessary devices to call any camera to any monitor or quad monitor view position
- .6 Provide all devices in accordance to the following CSC's ES/STD-0207, ES/STD-0221, ES/STD-0204, ES/STD-0231, ES/STD-0203, ES/STD-0222, ES/STD-0214 specifications.
- .7 Connect, terminate and focus all cameras to IP streaming devices as located on the drawings with virtual matrix IP control system with 'group salvo' macro commands for area by area camera call-up, integrate camera programming and PTZ commands, video display IP decoders and monitors, and network video recorders and storage devices.
- .8 Integrate the CCTV Subsystem with the Door Control system.
- .9 Provide all documentation, reports, plans, schedules, and manuals as defined within ES/SOW-0101.
- .10 All cables shall be installed in conduit provided by Division 26, coordinate with Division 26 and ensure all conduits as laid out are adequate. If any conduit is inadequate then identify the discrepancy prior to the close of tenders.
- .11 Use CAT 6 cable from all cameras to the network switches located in the [BSCS] [T & E] room. Where the use of IP based cameras is not possible i.e. for zoom pan tilt cameras then locate the digital streamer box as close as possible to the camera location. Use CAT6 cable for Low Voltage power to all cameras for Camera Power. Use 16 Gauge wire for Heater and Blower power and 16 Gauge wire for Dome Zoom Pan and Tilt power.
- .12 Provide terminal servers, communication and closed CCTV network 10/100Mb/1Gig switches etc as required.

- .13 Provide all specified spare parts and service manuals for maintenance of the Video Surveillance system. Provide complete listing of provided parts including quantity, manufacturer, model number, and unit price.

## **2.0 PRODUCTS**

### **2.1 Materials**

- .1 All system hardware and software components to be designed and manufactured in accordance with ISO-9001 Quality System Standard.
- .2 Manufacturer's quality control program to be registered in accordance with the above noted standard.
- .3 Units of the same type of equipment shall be products of a single manufacturer. All material and equipment shall be new and currently in production. Each major component of equipment shall have the manufacturer's name and address, and the model and serial number in a conspicuous place. Material will conform to the applicable requirements of the Underwriters Laboratories and the National Standards Institute. Each major component of equipment shall have the manufacturer's name and address, and the model and serial number in a conspicuous place.
- .4 All system equipment and field devices to be held securely in place. Fastenings and supports shall be selected to provide a safety factor of three.
- .5 All systems equipment equipped with plug in power connectors to be connected to a dedicated receptacle. Do not use tap connectors for plugging in multiple plugs into a single receptacle.
- .6 Acceptable Manufacturers
  - .1 Fixed CCTV Camera AXIS 211.
  - .2 Pan and Tilt Dome Camera AXIS 213.
  - .3 Lenses to be of high quality and compatible with the specified camera.
  - .4 Housings – Pelco, Videoalarm
  - .5 NVR Servers to be Dell, HP or IBM.
  - .6 Network Data Switches to be Cisco.
  - .7 Computer Keyboard/Video/Mouse (KVM) Extenders: ATen.
- .7 Video Camera Characteristics:
  - .1 Fixed cameras shall be Axis 211 or approved equal.
  - .2 Cameras shall be powered over the Ethernet cable.
  - .3 Pan/Tilt/Zoom cameras shall be Axis 213 or approved equal.

.8 Lenses

.1 2.5 LENS – 1/3 INCH 2.8 – 12MM, AUTO IRIS

- .1 The vari-focal lens shall be compatible with the AXIS 211 camera.
- .2 The lens shall include a spot filter.
- .3 The unit shall have an aspherical lens element
- .4 Specifications:
  - .1 Focal length 2.8 to 11mm
  - .2 Iris auto iris, direct drive
  - .3 Focus manual
  - .4 Zoom manual
  - .5 Aperture Range – f1.4 – 360 c/w ND spot Filter
  - .6 Lens must be IR corrected to 950 Nm spectrum.

.9 LCD Flat Screen Monitoring

.1 Provide 17” flat screen monitor(s) with the following minimum specifications:

- .1 600 TV Line Resolution minimum
- .2 Loop through composite BNC, S-video and RCA audio inputs
- .3 VGA input with 15 pin D-sub connector.
- .4 On-Screen set up display
- .5 TFT active matrix with 1024 x 768 pixels.
- .6 Panel size to be 390w x 70 D x 395 H mm maximum.
- .7 Supply with matching power supply with ULC or CSA safety approvals.
- .8 ABS plastic chassis, charcoal finish.

.10 CCTV Digital Decoders

- .1 Digital decoders shall be compatible with the Axis cameras specified and shall decode both live and archived video to 17” LCD NTSC monitors.

.11 Video Software System

- .1 Existing.
- .2 Provide additional licenses as required.

.12 Camera Housings

- .1 Housing shall be compatible with the specified cameras and the mounting location.
  - .2 All outdoor housings are to be provided with heaters and blowers that are compatible with the weather conditions expected in Saskatoon, SK.
  - .3 Enclosures shall be high security, constructed and designed for installation in detention facilities.
  - .4 All domes are to include smoked bubbles to hide where the camera is pointing.
  - .5 Tamper screws with no exposed cables or mounting hardware
  - .6 Heavy Duty 12.5 mm (1/2") thick clear Lexan window with impact resistance 140 lbs min.
  - .7 Powder coat polyester finished.
- .13 Transmission Methods: Coax, UTP, Fiber Optics, and control cabling as required by location and manufacturer.

## **2.2 Camera Power Supply**

- .1 Camera power shall be supplied from the Cisco switch. Provide power supplies for other devices as required.

## **2.3 Junction Box**

- .1 Metal, sized to handle all system conduit interconnections with appropriate expansion.

## **2.4 Radio Frequency Interference**

- .1 Ensure that all equipment and systems are capable of operating under RFI conditions at the site. All corrective action is to be at the Contractors cost.

## **2.5 Equipment Enclosure**

- .1 Employ existing equipment rack.

## **3.0 EXECUTION**

### **3.1 Manufacturer's Instructions**

- .1 Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and datasheet.
- .2 Manufacturers' directions shall be followed in all cases where the manufacturers of equipment or materials used in the Work furnish directions covering points not shown on the Drawings or Specifications.

### **3.2 Installation**

- .1 Installation shall not commence until Preliminary and Final Design Reports (PDR/FDR) defined by document ES/SOW-0101 have been submitted by Contractor and reviewed/accepted by CSC Technical Authority.
- .2 All work shall be coordinated with the Technical Authority and the Institutional staff.
- .3 Install video surveillance equipment and components in accordance with ULC-S317.
- .4 All wall mounted devices will be housed in steel blocks wherever there is a concrete block wall.
- .5 Install cable, boxes, mounting hardware, brackets, video cameras and system components in accordance with manufacturer's written installation instructions.
- .6 Install components secure, properly aligned and in locations shown on reviewed shop drawings.
- .7 Connect cameras to cabling in accordance with installation instructions.
- .8 Install equipment so that manufacturers', ULC and CSA labels are visible and legible. Install ULC labels where required.
- .9 Units to be mounted outside or subject to inclement conditions shall be weatherproof or be mounted in weatherproof enclosures.
- .10 Camera Mounting:
  - .1 Locate ceiling mounted cameras in tiles or in secure ceiling in locations.
  - .2 Ensure camera views are consistent for each dining area.
- .11 Viewing Station Installation:
  - .1 Provide wall mounting equipment, anchors, and bracing as required for a stable installation.
  - .2 Provide tilt adapters compatible with swivel arms for monitors to allow flexibility to adjust monitor angles.
  - .3 Account for screen glare when positioning monitors.
  - .4 Install the keyboard shelf for mouse controls at 900mm and monitors directly above at 1700mm AFF. Coordinate location with existing pipes to maximize corridor width and with site instructions regarding location within the Security Galleries.

### **3.3 FIELD QUALITY CONTROL**

- .1 Manufacturer's Services:

- .1 Have manufacturer of products, supplied under this Section, review Work involved in the handling, installation/application, protection and cleaning, of its products and submit written reports, in acceptable format, to verify compliance of Work with Contract.
- .2 Manufacturer's Field Services: Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
- .3 Schedule site visits, to review Work, at stages listed:
  - .1 After delivery and storage of products, and when preparatory Work, or other Work, on which the Work of this Section depends, is complete but before installation begins.
  - .2 Twice during progress of Work at 25% and 60% complete.
  - .3 Upon completion of the Work, after cleaning is carried out.

### **3.4 VERIFICATION**

- .1 Acceptance testing shall not commence until project Acceptance Testing Procedures (ATP) defined by document ES/SOW-0101 have been submitted by Contractor and reviewed/accepted by CSC Technical Authority.
- .2 System substantial performance and commencement of the warranty period shall not commence until acceptable ATPs have been completed and signed off by both Contractor and CSC Technical Authority, and Operator training is complete. Substantial performance may nevertheless be granted in the presence of noted deficiencies at the discretion of the Crown.
- .3 Conduct offsite Factory Acceptance Test (FAT) witnessed by CSC Design Authority, to demonstrate compliant subsystem operation, subsystem non-interference, system-wide control transfer and redundancy performance.
- .4 Obtain reports, within three (3) days of review, and submit, immediately, to Consultant. Upon completion of the work and during interim periods as required under the Contract, perform all final adjustments of levels, timing, equalisation, limits, and operational sequences.
- .5 Conduct detailed testing of all systems and equipment. Submit test results to the Consultant for review.
- .6 Conduct commissioning procedures as required under the Contract. Submit report of results together with all required statements and certificates.
- .7 Final completion will not be granted until system is in full operation, all noted deficiencies have been cleared and all documentation deliverables have been received by the Crown in the quantities specified.
- .8 Perform verification inspections and test in the presence of Consultant.
  - .1 Provide all necessary tools, ladders and equipment.

- .2 Ensure appropriate subcontractors, and manufacturer's representatives are present for verification.
- .9 Visual verification: Objective is to assess quality of installation and assembly and overall appearance to ensure compliance with Contract Documents. Visual inspection to include:
  - .1 Sturdiness of equipment fastening.
  - .2 Non-existence of installation related damages.
  - .3 Compliance of device locations with reviewed shop drawings.
  - .4 Compatibility of equipment installation with physical environment.
  - .5 Inclusion of all accessories.
  - .6 Device and cabling identification.
  - .7 Application and location of ULC approval decals.
- .10 Technical verification: Purpose to ensure that all systems and devices are properly installed and free of defects and damage. Technical verification includes:
  - .1 Measurements of tension and power.
  - .2 Connecting joints and equipment fastening.
  - .3 Measurements of signals (dB, lux, baud rate, etc).
  - .4 Compliance with manufacturer's specification, product literature and installation instructions.
- .11 Operational verification: Purpose to ensure that devices and systems' performance meet or exceed established functional requirements. Operational verification includes:
  - .1 Operation of each device individually and within its environment.
  - .2 Operation of each device in relation with programmable schedule and or/specific functions.
  - .3 Operation control of camera lens, pan, tilt and zoom.
  - .4 Switching of camera to any monitor.
  - .5 Switching of system video recorder to selective monitor.
  - .6 Set dwell times.
  - .7 Demonstrate:
    - .1 Sequence viewing of cameras on each monitor.

- .2 Bypass capability.
- .3 Display of stored image to cardholder.

### **3.5 Cleaning and Adjusting**

- .1 Remove protective coverings from cameras and components.
- .2 Adjust cameras for correct function.
- .3 Clean camera housing, system components and lens, free from marks, packing tape, and finger prints, in accordance with manufacturer's written cleaning recommendations.

**END OF SECTION**