Security Video System Standards for Correctional Facilities

Washington State Department of Corrections
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Security Video System Standards

Washington State Department of Corrections
VERSION 1.0

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Executive Summary

Legislation

KMB design groups, inc., p.s. was tasked by the Washington State Department of Corrections (WSDOC) with addressing the requirements outlined in Section 6 of Engrossed Senate Bill 5907, passed by the 62nd Legislature and signed into law by the Governor. Section 6 of the Bill requires that a consultant make recommendations regarding statewide standards for positioning and use of video monitoring cameras in total confinement correctional facilities.

Specifically, the reporting is to

- Make recommendations for the use of video monitoring cameras by security level,
- Make recommendations for specific locations within a total confinement correctional facility which would benefit from the use of video monitoring cameras,
- Inform regarding the information technological and infrastructure requirements needed for effective use of video monitoring cameras,
- Make recommendations for how video monitoring cameras would best be deployed in current total confinement correctional facilities,
- Make recommendations about how video monitoring cameras should be incorporated into future prison construction, to ensure consistency in camera use statewide, and
- Develop the estimated cost of the video monitoring cameras, supporting infrastructure needed, and staffing required.

Background

In its prison facilities today, WSDOC has widely varying levels of deployment of Security Video Systems. There is one prison without any cameras, while the recently constructed Coyote Ridge Corrections Center Medium Security Complex has over 700 cameras.

It is important to understand that few cameras are actively being viewed at any given time. There are no staff positions (posts) dedicated to watching video monitors. Instead, cameras are deployed strategically for operational purposes, and for activity or specialized monitoring on a periodic as-needed basis. Other cameras serve to provide overview monitoring of areas of the facility to help staff detect abnormal conditions warranting further attention, and some cameras may be linked to monitoring systems for surveillance of areas where an alarm is triggered.

Historically, prison facilities had cameras only for doors and gates that were controlled but not directly viewable by the control panel operator, and at a few areas where risks of incidents and/or introduction of contraband was high. Today, with an emphasis on highly efficient staffing models, and with advances in control panel technology local control booths may not have 24/7 staffing so their door and gate control operations are transferred to a remote control panel, necessitating more cameras for operational purposes. Also, in the new staffing models offenders do not always have fulltime direct supervision, creating a need for camera surveillance at areas previously not covered.

The Prison Rape Elimination Act (PREA) is adopted by WSDOC as a no-tolerance policy, and the Security Video System is integral to that policy as a deterrent, and for forensic use in investigation of allegations.

When events of any type occur (or are alleged to have occurred) in a prison they must be reviewed forensically post-event. Video records are critical for support of a criminal or quasi-judicial action, or for defense against civil litigation. The quality of the video archive must be high, and the data must be available, retrievable, and secure against

destruction or tampering.   The State Agency record retention standard applicable to security video recordings is for 30-day retention, or until matter resolution if the recording is involved in litigation.

Some prisons still operate with video-cassette recorders (VCR's) recording on looping magnetic tape. Those devices are obsolete, and require daily tape changes and a structured process for labeling, rotating, replacing tapes when worn, and the maintenance of a vast library of tapes in order to maintain records for any significant time period.

Other prisons have multiple small standalone video system "clusters" with based around recording on digital video recorders (DVR's) writing video data to hard drives, which may not have any redundancy and very limited capacity. The DVR's dispersed around a facility are usually not networked or synchronized with the other DVR's for date/time coordination, making data retrieval difficult, and with the potential for compromised evidentiary value.

In contrast, the few facilities recently built or which have had a major facilities expansion have a site-wide digital network video management systems (NVMS) with robust and efficient archival storage devices which can be centrally managed, similar to those found in modern IT data centers. Even those facilities, however, often have analog cameras, where the video signaling is converted to digital by separate hardware devices known as "encoders".

To meet its operational needs, older systems are being upgraded and/or expanded whenever funding can be obtained, often by the facility's maintenance staff without the benefit of a system Masterplan or any analysis of the appropriate technologies, or a well-reasoned vision of a sustainable and comprehensive long-term strategy. This has led to a "hodge-podge" of deployments. So, it is very appropriate that these "Standards for Security Video Systems" are developed, to complement and update the "Security System Design Guidelines" that were recently completed by KMB for WSDOC's use in conjunction with its projects.

Recommendations for Standards

The recommendations are organized to inform and establish the basis for the recommended Standards in the following topics:

- Purposes for deployment of Video System cameras (Part 3)
- Locations where Video System cameras should be deployed (Part 4)
- The basis for the Security Video System Resolution Standards (Part 5)
- Standards and requirements for the Security Video System Deployment (Part 6)
- How the Standards are to be applied to existing facilities, with estimated costs, strategies, and recommended priorities for implementation (Part 7)

The Standards, in comparison with the existing conditions, generally will:

- Require more areas of the prison facilities to have camera coverage,
- Require upgrading the acuity level of the imaging in areas of large expanses of coverage, to achieve better forensic value,
- Require IT infrastructure improvements for implementation of a Security Video System that operates on a reliable high-speed Ethernet network providing site-wide connectivity (a fully integrated system), and
- Require increased and expandable video archive storage capacity.

Cost Forecast

The cost for achieving the Security Video System Standards statewide is estimated to be in the range of **$49.94M** on a Total Project Cost basis, in 2011 dollars.

Implementation

The initial step toward achieving the Standards should be a Pre-Design effort at each facility, to include a detailed inventory and assessment of the existing video system assets, review of the available infrastructure, and assessment of the facility's site-specific needs for camera coverage and system improvements. A Security Video System Masterplan should then be developed as a "roadmap" for full-system or incremental expansion or upgrading.

In terms of priority, it is recommended that Level-3 (Medium Custody) and Level-4 (Close Custody) facilities be among the first to be addressed. Improvements in those facilities should be directed first to expanding the areas of coverage, achieving the more cost-effective fully networked centrally managed digital system configuration with adequate data storage, and then to achieving the higher acuity standards set forth in these Standards.

1.   Background

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Specifically, the reporting is to
- Make recommendations for the use of video monitoring cameras by security level,
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- Develop the estimated cost of the video monitoring cameras, supporting infrastructure needed, and staffing required.

KMB design groups, inc., p.s. is a Washington-based consultant having extensive background and experience in the design of secure facilities at all custody levels, and which provides consulting and design for the security systems that are their core. KMB is privileged to have provided consulting and design for WSDOC continuously since the early 1990's.

The Department of Corrections had previously tasked KMB with assisting it in the development of Security System Design Guidelines, to be used as a basis for design of Security Systems in its projects of any scale or scope. As Guidelines for design, they did not develop the requirements for Security Video Systems to the level necessary to respond to this Bill.

The Bill requires the drafting of Standards for deployment and use of Security Video Systems, which would be applied for future prison construction, and the development of estimates of cost for achieving the Standards in the existing prisons. The Standards will be annexed into the Security System Design Guidelines.

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2.   Introduction

A. <u>Department Mission</u>

The Mission Statement of the Washington State Department of Corrections (WSDOC) is straightforward: "To improve public safety." To carry out that mission the Department utilizes Security Video Systems as a component of its overall Security Systems, which provide for the safety and security of the public in the community, and the staff, contractors, visitors, and the offenders who are within its prison facilities.

The development of these Standards for Security Video Systems is expected to form the basis from which new facilities are designed, and from which a strategic plan for improving existing facilities to achieve the Standards is developed.

B. <u>What is a Security Video System?</u>

The term "Security Video System" will be used in this document in place of the acronym CCTV (standing for Closed-Circuit Television), which has been commonly used in the past to refer to video systems deployed for security purposes.

C. <u>What are the Purposes for Deploying a Security Video System?</u>

Cameras are deployed strategically for operational purposes, and for activity or specialized monitoring on a periodic, as-needed, basis. Other cameras serve to provide overview monitoring of larger interior and exterior areas of the facility to help detect abnormal conditions warranting further attention. Integration with other security systems allows for visual surveillance of areas where an alarm has originated.

Historically, prison facilities had cameras only for doors and gates that were electronically controlled, but not directly viewable by the control panel operator, and at a few areas of the facility where the risk of incidents and/or introduction of contraband was high. Surveillance cameras are thought to be both a deterrent of unwanted activities, and a means to provide the surveillance in combination with other custody staff activities.

Today, with an emphasis on highly efficient staffing models and with advances in control panel technology, local control booths may not have 24/7 staffing, and their door and gate control operations are transferred to a control panel located distant from the controlled doors or gates. That necessitates more cameras for operational purposes. Also, in the new staffing models offenders do not always have fulltime direct supervision, creating a need for camera surveillance at areas previously not covered.

The Prison Rape Elimination Act (PREA) is adopted by WSDOC as a no-tolerance policy. The Security Video System is integral to that policy, as a deterrent and for forensic use in the investigation of allegations.

It is important to understand that while they are installed and operating, few cameras are actively being viewed by prison staff at any given time. There are no staff positions (posts) designated solely for watching video monitors. When events of any type occur (or are alleged to have occurred) in a prison

they must be reviewed forensically post-event. For this reason all installed cameras should be continuously recorded, to allow investigators to re-construct events. Video records are critical both for support of a criminal or quasi-judicial disciplinary actions, and for defense of the State against civil litigation.

To support those needs, the quality of the video archive must be high, and the data must be available, readily retrievable, and be secure against its destruction or tampering.   The State Agency records retention standard applicable to security video recordings is for 30 day retention, or until matter resolution if involved in litigation.

D. Digital Technology Transition

Using "Security Video System" in this document, in lieu of CCTV, reflects today's "systems" approach to integrating all of the components that originate, manage, distribute, control, view, and store video data. Even the concept of video as "data" is rather new. The cameras, monitors, the cabling infrastructure, and the switching and recording technologies have evolved dramatically over the last ten or so years with the industry's transition from analog technology to digital.

Analog video systems are a hardware-based technology, where system capacity is dependent on the number of individual cables, ports, cards, channels and the limits of the recording media form the capacity of the system. Video signaling in an analog system is one-way, device to device, output-to-input. Usual modules for expansion are factors of four (4, 8, 16, 32 and so on). Analog cameras require separate wiring additional to the coaxial data cable, for camera power, which is derived from dedicated low-voltage power supplies. Monitors capable of displaying an analog signal were predominantly Cathode-Ray-Tube (CRT) type, which are now obsolete. Modern LCD monitors with compatible analog input connection capability are only available from a few manufacturers, and are expensive, compared to digital monitors.

Initially in the transition only the core of the system (recording only, then transport and recording) was done digitally, while the edge devices (cameras) remained analog, transmitting on coaxial cable. More recently, as demand has increased and the benefits were recognized, economies of scale and competition within the industry have allowed fully-digital systems (including digital "Internet Protocol", or IP, cameras at the system edge) to be economically viable.

Digital cameras signal on, and can receive power from, standard IT cabling (copper or fiber-optic) and switching equipment. A high-speed Ethernet backbone infrastructure allows a large number of devices to communicate over individual cables, and the communication need not be one-direction, dramatically reducing the cabling infrastructure needed to deploy a video system. The management of the video streams for switching and recording is accomplished in software by servers; the viewing is by PC's which obtain access to the video stream for display. Powerful software is available for video archive searching and forensic analysis. There is wide latitude in configuring digital systems, as there are no longer the constraints imposed by the one-way topology and physical device connection capacity of analog.

In recent years manufacturers have focused nearly all of their research and development on digital technology. No new features have been brought to market, and production of analog equipment has declined significantly. Industry forecasts are for an eventual discontinuance of manufacture and support for analog equipment.

Some of the benefits of the transition to digital video have included:

- Improvements in the ease of installation
- Video viewing software that is "user-friendly"
- Greater video resolution capability
- The ability to provide greater flexibility in distributing access to live and archived video
- The ability to use standard IT infrastructure
- The ability to view video using monitor hardware commonly associated with personal computers (PC's)
- More options for cost-effective video archival storage, making practical and affordable the ability to record many cameras.

E. <u>Variance in Existing Conditions</u>

<u>Number of Cameras</u>: In its prison facilities today, WSDOC has widely varying levels of deployment of Security Video Systems. There is one prison (Larch Corrections Center) without any cameras. The 2,258-bed Airway Heights Corrections Center complex opened in 1992 has 115 cameras, while the recently expanded Coyote Ridge Corrections Center (2,468 beds) has over 720 cameras.

<u>Recording Technology</u>: Some prisons still operate with video-cassette recorders (VCR's) recording on looping magnetic tape. Those devices are obsolete, have a maximum of four (4) recording channels, and require daily tape changes and the maintenance of a vast library of tapes in order to maintain records for any significant time period. Other prisons are recording on digital video recorders (DVR's) writing to hard drives, which may not have any redundancy, and very limited capacity. The DVR's are usually not networked, and not synchronized with the other DVR's for date/time coordination, making data retrieval difficult, and with the potential for compromised evidentiary value.

<u>Video Data Distribution</u>: Most prisons have multiple small standalone video system "clusters". The few facilities recently built or which have had a major facilities expansion, have a site-wide digital network video management systems (NVMS) with robust and efficient archival storage devices which can be centrally managed, similar to those found in modern IT data centers. (Even these, however, often have analog cameras, with the signaling converted to digital by separate hardware devices before transmission on the network.)

<u>The Need for Standards</u>: Technology evolves, as do expectations. To meet today's demands, older systems are being upgraded and/or expanded whenever funding can be obtained, often by facility maintenance staff or as part of a limited-scope project. The expansion or upgrade is done without a system Masterplan for the facility, or any analysis of the appropriate technologies and the vision of a sustainable and comprehensive long-term strategy.

The absence of a Statewide statement of guidelines and requirements can only lead to diverse solutions being implemented, based on local decision-making. WSDOC, as a large and growing agency, believes it can be most efficient with taxpayer money, and effective in its mission, when well-reasoned Standards are developed and implemented. So, it is very appropriate that these "Security Video Systems Standards" are developed at this time, to complement and update the "Security System Design Guidelines" that were recently completed by KMB for WSDOC's use in conjunction with its projects.

F. <u>Standards Development and Application</u>

The Standards address the intended uses, the locations in prison facilities where Security Video System cameras should be deployed, and how they should be monitored and recorded. Guidance is provided for the differing conditions imposed by facilities which house female offenders, and facilities of different custody levels.

While these are Standards, each deployment should consider the unique characteristics of the facility, both in its physical plant, and its operational requirements and objectives.

In determining a Standard to be applied, there must be an understanding of what needs to be accomplished, and the finding of an appropriate balance between what is technically possible, and what is reasonably affordable. The Standards should be un-clouded by marketing or an underlying commercial motivation. This document attempts to accomplish all of these things.

The Standards will not replicate information contained in other related documents. The "Quality and Performance Requirements for Security Video Systems", along with related other sections in Part V. of the Washington State Department of Corrections Security System Design Guidelines, latest adopted version, are incorporated by reference to provide guidance for the technical requirements. The Guidelines are available through WSDOC's Administrative Services Division, Capital Programs.

G. <u>Standards Document Organization</u>

The Standards document is organized to inform, and establish the basis for the recommended Standards in the following topic areas:
- Purposes for deployment of Security Video System cameras (Part 3)
- Locations where Security Video System cameras should be deployed (Part 4)
- The basis for the Security Video System Resolution Standards (Part 5)
- Standards and requirements for the Security Video System (Part 6)
- How the Standards are to be applied to existing facilities, with strategies and estimated costs for implementation (Part 7)

The Appendix (Part 8) provides:
- A reference to the abbreviations and acronyms used herein,
- The Facility Matrix for camera deployment, and
- Supporting data and diagrammatic illustrations of the Standards.

3. Purposes for Deployment of Security Video System Cameras

A. Camera Deployment Purposes

The recognized purposes for deployment of cameras in WSDOC's prison facilities are:
- Movement Control
- General Surveillance Monitoring
- Activity Monitoring
- Specialized Monitoring
- Alarm Association

Because it is essential that the cameras provide usable information for their intended purpose, the Video System attributes that are needed to support the purpose are described below. "Purpose Codes" (MC, GS and GS+, AM and AM+, SM and SM+, and AA) are associated for each purpose, to be used as a code in combination with the camera image acuity levels established in later Part 6.A.6) of these Standards.

1) **Movement Control (MC) Cameras**: At the perimeter of and within a facility there are physical barriers, in the form of walls or fences, which create Security Lines. The most important of those barriers have doors or gates with locks which are controlled remotely from an electronic control panel in a secure control booth. Every controlled door/gate in facilities of all custody levels should have cameras of a type and at a location on both sides of the opening, to provide for positive facial identification of the persons requesting movement. *(Note: Doors/gates which may have direct line-of-sight from a Control Point are generally not exempt from this requirement, unless it can be predicted with great certainty that control will never be transferred to another remote Control Point.)*

   Requirements:
   - Utilize fixed cameras configured and located to provide images presenting the subject's face
   - Cameras are integrated for automated association to Door/Gate Control, and are, by operating procedures, expected to viewed as a pre-requisite to unlocking or opening the door or gate
   - Cameras are selectable from the Human-Machine-Interface (HMI) of the control panels having control or needing for situational awareness of area where camera is located
   - Cameras are selectable from the Network Video Management System (NVMS) Graphical User Interface (GUI) on monitor(s) in the area of control
   - Cameras are selectable from the NVMS GUI at Master Control

2) **General Surveillance Monitoring (GS or GS+) Cameras**: Prison facilities are to be operated in a manner that provides for the safety of all persons (including the offenders) on the grounds, and to assure that the offenders have supervision of and accountability for their actions. The facilities cover large areas and are comprised of many buildings and functional areas. Offenders are generally expected to move between services and programs following specified routes, and to respect out-of-bounds or restricted area delineations. Staff numbers are limited so it is impossible to have staff presence at all areas within the perimeter to monitor compliance with expectations. The Security Video System can provide remote surveillance of areas where staff may not be present, or have clear lines of vision to all areas.

Requirements:
- Utilize fixed cameras for coverage
- Areas designated GS+ are supplemented by PTZ type cameras providing video acuity "HD" (provide software and hardware for PTZ control)
- Cameras are integrated for selective call-up for periodic live-viewing, but are primarily forensic (video is archived and reviewed as needed)
- Cameras are selectable from the NVMS GUI on monitor(s) in the area of control
- Cameras are selectable from the NVMS GUI at Master Control.

3) **Activity Monitoring (AM or AM+) Cameras**: Similar to General Surveillance, but more specific to areas where offender activities take place. This monitoring is supplemental to, or in some cases may be in lieu of, direct staff supervision, depending on the facility's assessment of risks.

   Requirements:
   - Utilize fixed cameras for coverage
   - Areas designated AM+ are supplemented by PTZ type cameras providing <u>video acuity "HD"</u> (provide software and hardware for PTZ control)
   - Cameras are integrated for selective call-up for live-viewing during activity, and may be monitored continuously or intermittently as determined by post procedures
   - Cameras are selectable from the NVMS GUI on monitor(s) in the area of control
   - Cameras are selectable from the NVMS GUI at Master Control.

4) **Specialized Monitoring (SM or SM+) Cameras**: Some areas within prison facilities require extensive monitoring, including frequent or constant staff supervision. The Security Video System can be a means to provide or support the requirements for visual supervision, and additionally to provide a video record of the observed activities. Examples: Short-term holding cells, medical isolation, mental health, self-harm risk or suicide watch, etc.

   - Utilize fixed cameras
   - Supplemental coverage at areas designated "SM+" are to be PTZ type cameras providing <u>video acuity "HD"</u> (provide software and hardware for PTZ control)
   - Cameras are integrated for selective call-up for live-viewing during active use of the cell or monitored space, and are to be intermittently or continuously monitored as determined by post procedures
   - Cameras are selectable from the NVMS GUI on monitor(s) in the area of control
   - Cameras are selectable from the NVMS GUI at Master Control.

5) **Alarm Association (AA)** Cameras: The Security Video System can be electronically integrated such that another electronic security sub-system, when it detects a specified event, triggers the Video System to perform an action, such as display pre-defined camera images on a monitor. The cameras described herein are also selectable from the NVMS GUI at Master Control, and other Control Points as designated.

- When integrated to the Perimeter Intrusion Detection system provides live-viewing of the associated detection zones upon an alarm event - utilizes fixed cameras providing <u>video acuity "OS"</u>
- When integrated to Staff Duress devices (fixed duress alarm buttons or portable transmitting devices monitored on a dedicated system) provide for live-viewing of the associated site or building area upon an alarm event - utilizes fixed cameras providing <u>video acuity "GS"</u>

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4.   Locations Where Security Video System Cameras Should be Deployed

A. Security Level Differences

1) **Facility Security Levels**: The Washington State Department of Corrections classifies its correctional facilities according to a security level system, as follows, in highest to lowest order:

Level-5   Maximum Custody (Intensive Management, Administrative Segregation, Protective Custody, and other specialized population high-management units)
Level-4   Close Custody
Level-3   Medium Custody
Level-2   Minimum Custody
Level-1   Community Based, Partial Confinement

This report, per the legislation, is directed to the total confinement facilities, which are Facility Levels 2 through 5.

2) **Offender Characteristics and Application of Security Video System**

- Level-5 offenders, the highest risk classification, have the most restricted movement – usually having very limited time out of their cell, and with restraints applied and two officers directly managing movements when the offender is not securely confined. In the Intensive Management and Segregation Units where these offenders are housed, programs and services are usually delivered on-unit, limiting the need for the offenders to move outside of the unit. Recreation is in small yards accessed directly from the unit core. The units will have local control booths. Staffing is a low ratio of offenders to custody staff.
    o   The Security Video System is primarily deployed for Movement Control, Activity Monitoring, and Specialized Monitoring.

- Level-4 offenders will have highly organized schedules and move in closely supervised and limited-size groups. Housing units are typically 64 to 100 beds per pod and have local control booths managing the cell and other interior doors. Programs and services are both on-unit and centralized, and recreation yard and gym access is scheduled to limit numbers and restrict mixing of participants. Staffing levels are only nominally above Level-3 unit custody staffing, with the increase primarily the staffing for the booth post(s).
    o   The Security Video System deployment is for the full range of purposes.

- Level-3 offenders will have structured schedules for activities, but greater freedom of movement and opportunities for interaction with other offenders. Housing modules are large (up to 128 beds per pod in modern units), and cell doors may be under offender control during some periods of the day. Movements can be in large groups, with most programs and services centralized. There is a high ratio of offenders to custody staff.
    o   The Security Video System deployment is for the full range of purposes.

- Level-1 and Level-2 offenders have the least restricted opportunities for movement and spend relatively little time in their housing unit. Work assignments, including work outside the prison grounds are common. There is a high ratio of offenders to custody staff.

     o   The Security Video System deployment is for the full range of purposes, although there tends to be fewer controlled doors and gates.

B. Facilities Housing Female Offenders

1) **PREA Considerations**: The Prison Rape Elimination Act of 2003 (PREA) is a federal law that prohibits and seeks to eliminate sexual assaults and sexual misconduct in correctional institutions and community corrections settings. The Washington State Department of Corrections is committed to providing a safe and healthy environment for staff and offenders in all of its prison facilities.

- WSDOC has zero tolerance for sexual assault or abuse of any person or sexual relationships between staff and offenders

- Offenders who have consensual sexual contact with another offender will be disciplined

- Offenders who have non–consensual sexual contact with another offender will be disciplined and referred to law enforcement

- Employees, contract staff, volunteers and vendors who engage in sexual contact or sexual misconduct with offenders will be terminated and referred for criminal prosecution when applicable

2) **Role of Security Video System for PREA**: The Security Video System is employed as a tool to prevent incidents, and assist in investigation of alleged incidents. Facilities housing female offenders typically have greater need for measures to enforce the zero tolerance standard. To that end, facilities housing female offenders will have Security Video System camera coverage requirements that are greater than all-male facilities. This is reflected in the Facility Matrix.

C. Facility Matrix for Deployment of Cameras

1) **Matrix Table**: Knowing from Part 3 the purposes for which cameras are to be deployed, it is possible to identify the areas of a prison facility where cameras are expected to be placed. The Matrix table provided at Part B of the Appendix represents a "model" or prototypical WSDOC prison facility, organized by programmatic function. The Matrix is intended to provide guidance as to the areas of a facility where WSDOC has determined Security Video System camera coverage is expected to be deployed, identify the purpose of the deployment, and establish the level of video acuity (resolution, as discussed in Part 5) expected in order to meet its security needs.

5. Security Video System Resolution Standard Basis

A. Understanding Video Resolution - Simply

1) **Video Resolution**: Video resolution is a complicated subject. In its simplest definition it is the ability to look at a video display and delineate detail in an image captured by a camera. Factors complicating understanding are the varying industry standards and measures, technical terminology, the very different technologies (analog/digital) still in use, and the need to consider performance of all components of the video system, not just the camera that is generating a video stream. As in a chain, the weakest link (lowest resolution device) in the system sets the maximum picture quality that is achievable.

B. Analog and Digital Cameras

1) **Methods of Defining Resolution**: Resolution in an analog or digital world is similar, but differently defined. In analog video an image consists of lines or TV-lines, since analog video technology is derived from the television industry. In a digital system an image is made up of square pixels, as in a grid.

   In North America and Japan, the NTSC (National Television System Committee) standard is the predominant analog video standard; other parts of the world use a different standard. NTSC has a resolution of 480 lines and uses a refresh rate of 60 interlaced fields per second (or 30 full frames per second).

2) **Analog Image Degradation Issues**: Analog systems suffer from image degradation both in the conversion to digital processing and due to signal fidelity losses in the cabling. Depending on the video system configuration, conversions can occur multiple times. Resolution of the image in analog systems is limited in native form, and when converted to digital. Resolution can never be improved in the process.

   When analog camera video is digitized (converted to digital) the maximum number of pixels that can be created is based on the number of TV lines available to be digitized. The maximum resolution a conventional analog camera can provide after the signal has been digitized is 720x480, corresponding to 414,720 total pixels (0.4 megapixels). As noted above, high-resolution analog cameras can provide resolutions up to 752x480.

   When shown on a computer screen, digitized analog video may show interlacing effects, such as tearing, and shapes may be distorted slightly, since the pixels generated may not conform to the square display pixels on the computer screen.

3) **Digital Image Resolution**: With digital cameras, images are digitized at the camera's sensor, and they stay digital with no unnecessary conversions. Because the image becomes data encapsulated and transmitted in packets on the network, there is no image degradation due to distance transported if the network quality is sufficient.

   Resolutions are derived from the computer industry, standardized worldwide. The VGA (Video Graphics Array) format, which is 640x480 pixels, produces square pixels that match with those on

a computer screen. Computer monitors can handle resolutions in VGA or multiples of VGA (such as SVGA 800x600, XVGA 1024x768, and 4xVGA 1280x960).

4) **Megapixel Resolution**: Megapixel digital resolutions are generated from a megapixel sensor delivering an image that contains one-million or more pixels. The more pixels the greater potential for capturing finer details and producing a higher quality image. A common megapixel format of 1280x1024 gives a 1.3 megapixel resolution. This is more than three times the resolution than can be provided by an analog camera.

For cost reasons many megapixel sensors (i.e. sensors containing a million or more pixels) are the same size or only slightly larger than VGA sensors providing a resolution of 640x480 pixels. This means the size of each pixel on a megapixel sensor is smaller, and consequently less light-sensitive. For comparison, the pixel size of a 1/3-inch VGA sensor is 7.5 microns; a 1/3-inch 2-megapixel sensor is 3 microns.

Megapixel resolution also provides a greater degree of flexibility in terms of being able to provide images with different aspect ratios (ratio of width of an image to its height). A conventional TV monitor displays images with an aspect ratio of 4:3. Modern widescreen computer monitors are 16:9 format, as are high-definition television (HDTV) screens. The HDTV standard is based on square pixels, similar to computer screens, so HDTV video from digital sources can be shown on either HDTV screens or computer monitors.

5) **Other Resources**: A vast number of White Papers have been written attempting to bring together all of the factors for reader understanding of the topic, and this document cannot be expected to distill all of that information. It will try to provide some basis for understanding the Standards being set forth.

C. <u>Legacy WSDOC Video Systems and Resolution Issues</u>

1) **Legacy Systems**: Existing Security Video Systems in WSDOC prison facilities are, with the exception of very recent installations or upgrades, analog camera based. Most (but not all) of the very old monochrome/black-and-white cameras have been replaced with color, which provides a more lifelike image, aiding the viewer in recognition. Many are directly connected by coaxial cable to viewing monitors (CRT or LCD type, perhaps with switching and/or multiplexing hardware intervening). Digital Video Recorders (DVR's) are used for archive storage. Most systems do not record all cameras due to a lack of resources. Only selected cameras are connected to the available DVR ports. Older DVR's, or even newer models purchased at the lower end of the cost range, have limited capabilities for recording frame rate (how often an image is captured to archive) per camera, and what quality the recorded image is (a compromise we often see is significantly reduced image quality settings, done in order to extend the recording time before overwriting of the data occurs).

2) **Viewable Resolution**: The live-viewed video is at the native resolution of the analog camera, typically having 480 scanned horizontal lines of resolution (a resolution of 704x480 pixels or less), but the effective resolution (as-viewed resolution) is reduced when images are multiplexed (multiple camera inputs made into a single monitor input, displayed in a grid of images) due to monitor resolution limits. Some of the available pixels are not displayed.

3) **Recorded Resolution and Frame Rate Drive Storage Requirements**: Everyone wants the best video image available and the least amount of missing information. Compromises must be made however, because financial resources are never unlimited. Systems now in place often have recorded resolution (video frame size), and frame rate settings that are lower than the camera's signal output and recording device capabilities, due storage capacity limits and the conflicting need to have an increasing number of days of video data stored.

Higher resolution frames creates more data per frame. More frequent recording of the frames multiplies the storage needed. How many video image "frames" per second are recorded is a compromise between seeing "smooth" motion on playback, or "jerky" motion with data gaps between the frame sequences. For slow movements the data gaps are of little consequence. For events that might involve rapid movements, the missing data can be critical.

The final factor affecting the storage capacity is the data format and compression technology employed. (If a loss-less technology is employed there is little impact on image quality.)

The data storage capacity of the DVR's presently in operation within WSDOC ranges from 250GB to 3TB. (There remain a few Video Cassette Recorders in service, but most have been replaced with DVR's.)

Even the fairly recent installations, utilizing high-resolution analog cameras digitized by encoding hardware for transport on an Ethernet network, are limited to a maximum resolution of 704x480 (0.4 megapixels), which is an image size known as 4CIF. In those systems we often see systems set for CIF or 2CIF recording, with the recorded frame rate at 5 or 7.5 images per second.

It is commonly agreed by WSDOC end users that a 4CIF image and 7.5 frames is acceptable, but not ideal for live-viewing and archive video review for forensic purposes.

> *What is not said in that statement is what is the level of detail that 4CIF image provides, since a greater distance from the camera to an object necessarily causes a reduction in the number of pixels that are available to provide discriminating information about the object to the viewer.*

4) **Understanding CIF**: CIF is the name given to the number of horizontal and vertical pixels (picture elements) in an image. Under the NTSC (National Television System Committee) standard, which has 480 horizontal lines from top to bottom, a CIF image is 352 pixels across by 240 down. 2CIF has double the information going across, i.e. 704x240, and this is useful because the human eye is more interested in left-right activity than up-down - so more information the better. 4CIF is as good as NTSC gets - a full 704x480 image.

5) **Image Size**: What we have described here are a number of different image sizes, exactly like computer monitors used to be IBM's 1987 VGA (640x480) or SVGA (800x600), right up to QXGA (2048x1536). Notice the word resolution is not used. But, you might ask, isn't VGA a resolution? No, it's an image size.

6) **Resolution Equals Pixels per Inch**: We can better define resolution as pixels per inch (ppi), just like printer resolutions are often measured in dots per inch (dpi). And it is through this tie-in to distances in the real world that the monitor's capabilities are of fundamental importance.

7) **Monitor Pixels**: If we had a monitor that displays exactly 704x480 and we put it into quad-view mode, then a CIF image in one-quarter of the screen will look identical to a 4CIF image right next to it in another corner. The only difference is that the 4CIF image consumes up to 4 times the bandwidth to carry the detail we cannot see until we digitally zoom in (typically on recorded video). So now imagine standing in front of a PC-based video management system, showing 16 cameras in a 4x4 image array. If the monitor is a modest 1024x768, and even if all the screen was used to show video (which is not usually the case), then each image has 256x192 pixels, which means you will not see any difference between CIF and 4CIF until you make one camera window much larger.

If you have a fixed-size camera viewing window, then as you increase your image size (CIF, 2CIF etc.) your resolution increases (there are more pixels per inch on the screen) and clarity increases, so there is clearly a close relationship. However, if you increase your image size (CIF, 2CIF etc.) and also increase the size of the camera view window, your resolution will not change, and the clarity stays exactly the same.

In a correctional setting it is common to have multiple images displayed on a monitor. Quad-view mode is often deployed for movement control and surveillance applications. Displays of nine (9) or sixteen (16) cameras are also in common use. On digital systems current software can allow for up to 40 images on a screen. As more images are displayed fewer monitor pixels are available for each image, reducing the *apparent* camera resolution.

8) **Megapixel Display Issues**: Resolution is influenced by image size, but not only by image size. They are related, but not the same thing. It is the same lack of understanding that causes people when scanning in 5x7 photos at extremely high resolutions (say 8MB per photo) to be confused as to why it looks identical on a computer monitor as a 100kB version of the same photo. It is because computer monitors are generally limited to resolutions of about 72-96 pixels per inch, so anything higher is simply not visible. Another good example is home digital cameras which are now commonly in the 8-12MP range, yet, unless you zoom in or print out at poster-size, the image actually looks identical on a PC monitor as a humble 3MP camera; some of the available data is not displayable. All you're doing is taking up more hard drive space unless you need to see the higher detail from the archived data.

D. <u>Setting Resolution or Acuity Standards</u>

1) **Determining Image Resolution (or Acuity) Standards**: In a video surveillance application, image quality must be of a level that meets the user's needs. There are many components to image quality, but resolution is probably foremost, and somewhat easier to define.

The traditional way of defining requirements for the resolution of an analog CCTV system has been by specifying what percentage of the full screen the object of interest occupies. Different surveillance objectives require different percentages, as derived from human perceptions. For example, detecting the *presence of a person* in a scene could only require that the person occupies 10% of the view. *Recognizing a known person*, however, could require that the person occupies 50%, and positively identifying that person could require 120% or more.

With today's wide range of available camera resolutions, it is practical to translate the percentage requirements to pixel resolution, in order to compare and specify requirements for viewing (based

on the standards for monitor quality and assuming a quad-view display configuration), and recording solutions.

2) **Security Industry Guidelines**: Industry standards for how many pixels are required do not exist, but there are guidelines available, and loose definitions of what those provide.

- General Surveillance – provides for viewing or recording general information such as activity or movement within a certain area, such as traffic flow or activities, or unauthorized entry.

  Recommendation: 20 to 30 pixels per horizontal foot of coverage

- Identification – the ability to recognize a person's face or read license plates.

  Recommendation: 40 to 50 pixels per horizontal foot of coverage

- High-Detail – the ability to identify every detail within the scene, usually required in gaming, banking and for forensic applications.

  Recommendation: 70 to 90 pixels per horizontal foot of coverage

The following graphic illustrates that at least 40 pixels per foot are required for facial recognition.
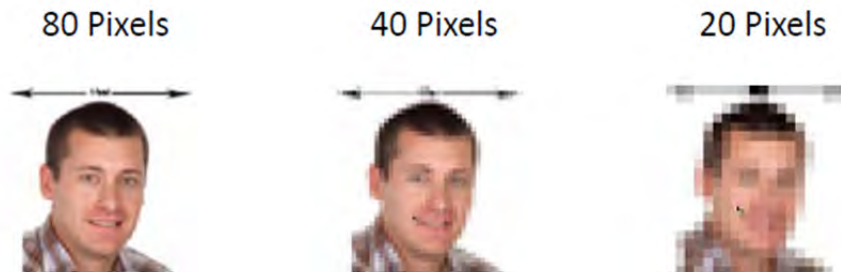
3) **Correctional Facility Standards**: Again, no set of standards exist that are in universal use for correctional facilities. KMB, which has extensive experience in the design of security systems for WSDOC, has always sought feedback from the facilities into which systems are deployed to verify that the project result is meeting the needs of the users. That feedback is the basis for a recommendation that an acceptable and practical level of acuity for general operational purposes can be achieved with fewer pixels per foot than the Security Industry Guidelines described above.

> Recommendation - ***Operational Surveillance***, *defined as "providing the general information needed to support correctional operations", is achieved at <u>10 to 20 pixels per horizontal foot of coverage</u>.*

Operational Surveillance will be the lowest level in these Standards for Camera Image Acuity (or Resolution) in a WSDOC facility. The Security Industry Guidelines at paragraph 2) above are recommended for the higher levels of acuity, where designated.

4) **Effect of Camera Lens Selection/Setting**: Appendix A translates the resolution Standards into graphic form, to illustrate how the horizontal angle of view of the camera lens selected (or its

setting if a variable-zoom type) is a factor that must be considered. A lens providing a wide-angle view will necessarily have a shorter scope of distance from the camera within which it will provide the requisite number of pixels.

Calculations will be necessary to determine the quantity and placement of cameras necessary to achieve the required acuity over the coverage area.

E. <u>Image Quality Factors</u>

1) **Image Quality Considerations**: Installing numerous high-resolution capable cameras will do little good if other factors that affect the quality of the images viewed and recorded are not addressed. The Security Video System design should address:

- Available illumination (particularly with megapixel cameras which have less sensitivity to low light levels)
- Shadows and glare
- Focus (lens selection, exact focus point, and the camera lens aperture setting will all have an effect on depth of field - the range of distance in front of and beyond the point of optimum focus where an object will still appear to be in focus.)
- Background
- Environmental conditions (wind, rain, snow, fog, etc)
- Camera mounting stability
- Maintenance (camera and housing cleanliness, mechanical and electronic function, connections)

6. Standards and Requirements for the Security Video System

A. Cameras

1) **Types**: Cameras are devices which originate one or more video data stream(s). Cameras used in a Security Video System may be of a fixed-view type, or pan-tilt-zoom (PTZ) type.

   - Fixed-view cameras are installed with their aim, view field, and focus set by the installer. Most cameras will have automatic adjustment for variations in illumination (auto-iris). When necessary, cameras with day-night capability or auxiliary infrared (IR) illumination may be appropriate to overcome low-light conditions and provide acceptable video output. Installation conditions where strong front or backlighting is anticipated, creating large differences between the darkest and brightest areas of the picture should utilize cameras with wide dynamic range compensation.

   - Pan-tilt-zoom (PTZ) cameras referenced in these Standards have motorized (mechanical) adjustability of their horizontal and vertical rotation around their respective axis, and the capability of adjusting the lens to zoom in and out, varying the apparent magnification (and field of view) of the coverage area. (Non-mechanical PTZ cameras are available in the marketplace, where panning, tilting and zooming is accomplished by digital manipulation of the viewed image, often with some distortion of the pixels produced. These are deemed unacceptable at this time for deployment in WSDOC's facilities.) Camera control is accomplished remotely through hardware (joystick/buttons) and/or software (mouse or touchscreen control). Since the camera will remain at its last position, which may not provide sufficient visual orientation to an operator, pan-tilt-zoom cameras should have a "home" position pre-programmed by the Security System Contractor which is to an easily recognized view.

2) **Surveillance and Identification Cameras**: The required Surveillance and Identification coverage under these Standards should be achieved using fixed-view cameras. Pan-tilt-zoom cameras are supplemental, not primary to meeting the requirements. Specifically, use of pan-tilt-zoom cameras for Perimeter alarm-associated coverage is not allowable due to the requirement for coverage of multiple adjacent perimeter zones simultaneously.

3) **Camera Environment**: Cameras should be of a type, and/or have housings and accessories, to ensure they are not easily physically damaged, and features (such as heaters) that they will not be damaged by and will reliably operate in the environmental conditions where they are deployed. Where artificial lighting is the source of illumination verify the existing or expected level, and select appropriate cameras.

   Construction of raceways for camera cabling must conform to applicable requirements of the WSDOC's Telecommunications Distribution Infrastructure Standards (TDIS), which is available on the Department's website.

4) **Camera Location**: Locate cameras

   - With consideration for sources of glare or extremes of light level

- Out of the reach of offenders, or if unavoidable, in suitable housings
- To preclude viewing (by camera position selection, view coverage adjustment, masking, or other approved method) specific areas where offender privacy is recognized
  - Showers and related dressing areas
  - Toilets

5) **Camera View Coverage**: At all locations where camera coverage is required, provide 100% coverage of the floor or ground area, and to a height of six (6) feet above that surface.

- Generally, for typical rectangular spaces, this will require at least two (2) cameras located at opposing upper corners of the space.
- Non-rectangular spaces and spaces having view obstructions (equipment, furnishings, etc) will require additional cameras to meet the requirements.
- Corridors, walkways, and other linear spaces will require a scheme of overlapping camera coverage to provide full end-to-end surveillance.

6) **Standards for Camera Image Acuity (or Resolution)**: Four (4) levels of camera image acuity (resolution) have been established for WSDOC Security Video Systems, per the following Table.

Because acuity is not absolute, and to give some flexibility for application of these Standards, camera deployment schemes may be approved as exceptions *where the horizontal field of view does not exceed 115% of the value in the Table below*.

Application / Criteria / Pixels per Ft	Camera Resolution – Pixels (H x V)	Horizontal Field of View – Feet (maximum)
Operational Surveillance (O) Provides general information needed for correctional operations; requires 10-20 pixels per foot	0.1 Megapixel (320 x 240)	32'
	0.3 Megapixel (640 x 480)	64'
	0.4 Megapixel (752 x 480)	76'
	1.3 Megapixel (1280 x 1024)	128'
	2 Megapixel (1600 x 1200)	160'
	3 Megapixel (2048 x 1536)	200'
	5 Megapixel (2560 x 1920)	250'
General Surveillance (S) Provides general information; face recognition not necessary; requires 20 to 30 pixels per foot	0.1 Megapixel (320 x 240)	16'
	0.3 Megapixel (640 x 480)	32'
	0.4 Megapixel (752 x 480)	38'
	1.3 Megapixel (1280 x 1024)	64'
	2 Megapixel (1600 x 1200)	80'
	3 Megapixel (2048 x 1536)	102'
	5 Megapixel (2560 x 1920)	128'
Identification (ID) Face recognition is possible; requires 40-50 pixels per foot	0.1 Megapixel (320 x 240)	8'
	0.3 Megapixel (640 x 480)	16'
	0.4 Megapixel (752 x 480)	19'
	1.3 Megapixel (1280 x 1024)	32'
	2 Megapixel (1600 x 1200)	40'
	3 Megapixel (2048 x 1536)	51'
	5 Megapixel (2560 x 1920)	64'

Application / Criteria / Pixels per Ft	Camera Resolution – Pixels (H x V)	Horizontal Field of View – Feet (maximum)
High-Detail (HD) Able to identify every detail, such as the denomination of currency; requires 70-90 pixels per foot	0.1 Megapixel (320 x 240)	3′
	0.3 Megapixel (640 x 480)	6′
	0.4 Megapixel (752 x 480)	6′
	1.3 Megapixel (1280 x 1024)	13′
	2 Megapixel (1600 x 1200)	15′
	3 Megapixel (2048 x 1536)	19′
	5 Megapixel (2560 x 1920)	26′

B. <u>Live Video Viewing (Monitoring)</u>

Few cameras in a prison facility are actively being viewed by staff at any given time. No staff positions (posts) are designated solely for watching video monitors. Staff at locations with video viewing monitors are multi-tasking, performing numerous functions necessary for prison operations.

Modern Security Video Systems operating with a NVMS are capable of displaying as many as 40 images on a single wide-screen LCD monitor. As a practical matter, studies have shown a competent individual with their attention focused is likely to be able to mentally process the information from a maximum of about 32 cameras. With 32 images, the level of visual-to-mental processing is intense, and if the individual's attention were equally divided, he or she is only to be able to discern a sense of the movement and activities in the monitored areas. In reality, an officer places increased attention on certain views that are important, and may reduce the number of images displayed in order to increase the detail of the video information.

Post orders prescribe the expectations of the staff position. The post activities and requirements will vary over the work shift, and are somewhat different on each shift, but the following are general expectations.

- <u>Movement Control</u> cameras are expected to be viewed in connection with operation of the controlled doors/gates. Doors and gates are provided with intercom stations having call buttons which indicate a request for access, precluding the need for continuous or periodic visual monitoring of the door/gate for approaching persons or vehicles.

- <u>General Surveillance</u> cameras are viewed periodically in accordance with the post orders or best practices, for surveillance of risk areas, detection of abnormal conditions, or for support and backup of floor or site staff. (Examples of abnormal conditions in a prison which could be detected are presence of an individual in a prohibited area; individuals running; and so on.)

- <u>Activity Monitoring</u> cameras are viewed periodically during periods when offender activities in the area are occurring, in accordance with post orders or best practices, for remote supervision or for support and backup of floor or site staff.

- <u>Specialized Monitoring</u> cameras are viewed in accordance with post orders or best practices associated with the specialized purpose, in support of the floor staff.

- <u>Alarm Association</u> cameras may be cameras that ordinarily serve in a role as General Surveillance, or may not normally be viewed, but they have been associated through electronic security system integration to be automatically selected and displayed in the event of a triggering alarm. They are expected to be viewed as an aid to the alarm response and dispatch.

Video monitors deployed for operational use should be high-quality, large, high-resolution widescreen LCD type. As a standard deployment, Security Video System equipment, integration, and capabilities should be provided at the following locations in a correctional facility, subject to applicability to the custody level:

1) <u>Master Control</u>: Master Control (the facility's highest level central Control Point) is to be able to live-view any camera operating on the facility's Security Video System.

2) <u>Other Control Points</u>: Other Control Points are to be able to live-view only the video originating from cameras located within their area-of-control (or related areas such as exterior approach ways and yards, as needed for situational awareness).

3) <u>Movement Control</u>: Control Points having Movement Control functionality will have all cameras represented on the touchscreen HMI with graphic icons which indicate the view direction and the camera ID number. Pan-tilt-zoom cameras should have icons indicating that capability. The Control Point should have video viewing monitors as follows:

- One quad-view (4 images) monitor, with
  - one or more quadrants used for automated movement door/gate call-up and alarm live-view video display
    - movement control is normally two cameras displayed minimum – both sides of the controlled door/gate
    - alarm association is minimum 3 cameras displayed for Perimeter, 1 or more displayed for Staff Duress
  - all quadrants also assignable for live-view surveillance (viewing assignments may be overwritten by the automated movement control selections) by selection
    - from the touchscreen HMI
    - from the NVMS GUI

- One user-configurable and assignable video viewing monitor
  - user may configure number and size of viewports from menu of available choices (typically up to 16 images, but newest systems support up to 40 images per monitor)
  - user may select cameras for live-viewing
    - from the touchscreen HMI
    - from the NVMS GUI

4) <u>Large Areas of Control</u>: Control Points having large areas of control, and specifically Major Control, should have additional video monitors to allow for greater live-view surveillance capabilities, with the control operator(s) able to set their viewing configuration and readily assign specific cameras to the viewports.

5) <u>Limited Control</u>: Limited-control Control Points will normally not have video viewing monitors.

6) <u>Specialized Monitoring Points</u>: Special facilities, such as prison hospitals, may have security stations where custody staff should have video system monitoring capability for areas where they have responsibility, but which may be remote or not easily viewed directly.
   - Provide one or more monitors and a means to control the display of cameras originating in the security station's area-of-responsibility.

7) <u>Perimeter Detection Alarms</u>: Perimeter alarms will, through integration, cause the display of live video coverage of the zone in-alarm and the two (2) adjacent zones on one or more video monitors dedicated for that purpose, located at Master Control adjacent to the perimeter alarm management PC.

   - If the alarms are integrated to the touchscreen control system those cameras will also be associated to display on the quad-view monitor upon alarm event selection. This is supplemental to the basic requirement stated above.

C. <u>Recording</u>

1) <u>Cameras to be Recorded</u>: All cameras connected to the Security Video System are to be recorded to a video archive which is securely maintained on the System, and which has been configured for resilience and component failure tolerance, as well as to permit expansion.

2) <u>Recording Parameters</u>: Recording of video data will be continuous 24/7/365 for all cameras deployed on the Security Video System, regardless of their purpose.

   - Recording should be at the full resolution of the installed camera, meeting the acuity standards set forth in this document
   - Record at not less than 7.5 frames per second (7.5fps); 10 video frames per second (10fps) is preferred
   - System features which mitigate the storage requirements, such as compression and motion-detection with "on-motion" buffer recording, where a reduced frame rate is used during no-motion periods, may be utilized so long as no gaps in the recording are created
   - The system shall be configured to self-monitor and alarm for loss of a video signal from the cameras
   - There shall be no interruption, or degradation of quality of the recording, due to any number of system users accessing the system's live or archived video
   - The "General Records Retention Schedule" adopted by the State of Washington, Disposition Authority Number GS 25003 specifies that Security Recordings of agency facilities and grounds be retained as an official copy for a period of 30-days
     - o A further requirement is that, as with all public records, security recordings must be retained until final resolution of the case if they are requested or used in litigation
     - o Video data with authentication may be exported from the system to provide support for civil litigation, prosecution or defense of criminal actions, or for other quasi-judicial actions
     - o System useable archive capacity shall be not less than 1.2 times the calculated requirement
     - o After 30 days have elapsed the archive data shall be overwritten by the system

D. <u>Archived Video Viewing</u>

1) <u>Viewing Workstations</u>: Video archive viewing-capable Security Video System workstations (PC's) with appropriate software (which can also live-view any camera in the facility's Security Video System) are to be deployed at the following locations:

- Shift Office
- Investigations and Intelligence offices
- Emergency Response Management room(s).

E. <u>Infrastructure Requirements</u>

1) <u>Security Video System Network</u>: WSDOC desires to create open architecture environments that are supportable and maintainable. These networks may be standalone in nature, or integrated into larger infrastructures. A diagram depicting the Security System LAN in its relationship to the other DOC Enterprise LAN's is included as an Exhibit in the Appendix.

2) <u>Systems Environment</u>: All network transport devices, servers, storage arrays, and other head-end components of electronic security systems should reside in Security Electronics Equipment Rooms, shared Telecommunications / Security Electronics rooms, or spaces specifically designed to support the equipment being located there. These rooms and/or spaces should be provisioned as defined in this document, and according to the applicable requirements of WSDOC's Telecommunications Distribution Infrastructure Standards (TDIS), current edition.

3) <u>Owner Furnished Services and Hardware</u>: Owner's Network Design Services: The design services provided by the Owner typically include physical design of the switching infrastructure including switches, routers, and firewalls.

4) <u>Hardware to be Furnished by Owner and Installed by Owner or Contractor</u>: DOC HQ IT has in place contracts for the procurement of certain computing and network hardware. At the time this document was prepared, DOC maintains purchasing agreements for Cisco LAN and WAN transport equipment, and has separate leasing agreements for PC workstations and servers. It is the preference of DOC to directly procure as much of the computing equipment related to these systems as possible, to maintain continuity throughout facilities, and to streamline the support processes.

7. Application to Existing Facilities

A. Existing Conditions / Needs / Capital Costs

There are an estimated 3,520 security video cameras currently deployed in WSDOC's prison facilities. Their distribution is uneven, as is their condition and availability of video data storage systems which can be re-used in a networked video system. The IT infrastructure, that would permit deployment of a video system with centralized management, storage, and access to video data, which is so necessary for operational purposes and cost efficiency, also varies from facility to facility.

Some highlights of the findings with regard to each facility and its existing Security Video System assets, the estimated need for cameras to meet the Standards, and the estimated Total Project Capital Cost in 2011 dollars, by institution, are:

1) Airway Heights Corrections Center (AHCC)

- Location, Date Opened: Airway Heights – opened 1992
- Sub-Units: Main Institution, MSU
- Classification: Medium, Long-term Minimum
- Approximate square footage (SF) of institution facilities: 718,000
- Operating Capacity: 2,258
- Estimated / reported number of existing cameras: 115
  - Cameras per offender = 0.0509 / Offenders per camera = 19.64
  - SF per camera = 6,244
- Estimated required cameras to achieve the Standards / deficiency: 993 / 878
- Network connectivity and infrastructure: Optical fiber backbone to most buildings and areas. Facility is served primarily with 62.5 micron Multimode optical fiber. Some locations are highly allocated with little or no spare capacity.
- Storage and Video Management System: DVR–based storage, most cameras are recorded
- Estimated Total Project Capital Cost: **$7,113,000**

2) Clallam Bay Corrections Center (CBCC)

- Location, Date Opened: Clallam Bay – opened 1985
- Sub-Units: Main Institution/IMU, MSC
- Classification: Medium, Close, Maximum
- Approximate square footage of institution facilities: 392,000
- Operating Capacity: 858
- Estimated / reported number of existing cameras: 297
  - Cameras per offender = 0.3462 / Offenders per camera = 2.89
  - SF per camera = 1,320
- Estimated required cameras to achieve the Standards / deficiency: 581 / 284
- Network connectivity and infrastructure: Limited optical fiber backbone to most buildings and areas. Facility is served primarily with 62.5 micron Multimode optical fiber that is highly utilized with very little or no spare capacity. Facility is slated for a complete telecommunications

infrastructure replacement which has been designed but not funded in the 2011–2013 budget cycle.
- Storage and Video Management System: 1 VCR, remainder is DVR-based storage, most cameras are recorded
- Comments: Approximately 50% of the cameras do not meet current standards
- Estimated Total Project Capital Cost: **$3,809,000**

3) Cedar Creek Corrections Center (CCCC)

- Location, Date Opened: Littlerock – opened 1954
- Classification: Minimum
- Approximate square footage of institution facilities: 158,000
- Operating Capacity: 480
- Estimated / reported number of existing cameras: 7
  - Cameras per offender = 0.0146 / Offenders per camera = 68.57
  - SF per camera = 22,571
- Estimated required cameras to achieve the Standards / deficiency: 40 /33
- Network connectivity and infrastructure: Optical fiber backbone to most buildings and areas. Facility is served primarily with 62.5 micron Multimode optical fiber. Some locations are highly allocated with minimal spare capacity.
- Storage and Video Management System: Unknown
- Estimated Total Project Capital Cost: **$314,000**

4) Coyote Ridge Corrections Center (CRCC)

- Location, Date Opened: Connell – opened 1992 (minimum), 2009 (medium)
- Sub-Units: MSC, MSU
- Classification: Minimum, Long-term Minimum, Medium
- Approximate square footage of institution facilities: 701,000
- Operating Capacity: 2,468
- Estimated / reported number of existing cameras: 727
  - Cameras per offender = 0.2946 / Offenders per camera = 3.40
  - SF per camera = 980
- Estimated required cameras to achieve the Standards / deficiency: 964 / 237
- Network connectivity and infrastructure: Optical fiber backbone to most buildings and areas. Medium security facility is served with 62.5 micron Multimode optical fiber and Singlemode optical fiber with available capacity in most areas. Minimum security campus is served with 62.5 multimode optical fiber with available connectivity in most areas.
- Storage and Video Management System: All cameras are network video recorded for 30 days, with failover storage
- Estimated Total Project Capital Cost: **$2,025,000**

5) Larch Corrections Center (LCC)

- Location, Date Opened: Yacolt – opened 1956
- Classification: Minimum
- Approximate square footage of institution facilities: 152,000

- Operating Capacity: 480
- Estimated / reported number of existing cameras: 0
  - Cameras per offender = 0 / Offenders per camera = infinite
  - SF per camera = n/a
- Estimated required cameras to achieve the Standards / deficiency: 38 / 38
- Network connectivity and infrastructure: Optical fiber backbone to most buildings and areas. Facility is served primarily with 62.5 micron Multimode optical fiber with available capacity in most areas.
- Storage and Video Management System: None
- Estimated Total Project Capital Cost: **$314,000**

6) Monroe Correctional Complex (MCC)

- Location, Date Opened: Monroe – opened 1910
- Sub-Units: WSRU, TRU, IMU, SOU, MSU
- Classification: Minimum, Medium, Close, Maximum
- Approximate square footage of institution facilities: 1,552,000
- Operating Capacity: 2,400
- Estimated / reported number of existing cameras: 446
  - Cameras per offender = 0.1858 / Offenders per camera = 5.38
  - SF per camera = 3,480
- Estimated required cameras to achieve the Standards / deficiency: 2,252 / 1,806
- Network connectivity and infrastructure: Optical fiber backbone to most buildings and areas. Optical fiber consists primarily of 62.5 micron Multimode fiber and limited quantities of Singlemode fiber to specific areas with limited available capacity in most areas.
- Storage and Video Management System: The majority of cameras are recorded; a variety of systems exist within the four different Units.
- Estimated Total Project Capital Cost: **$12,370,000**

7) Mission Creek Corrections Center for Women (MCCCW)

- Location, Date Opened: Belfair – opened 2005
- Classification: Minimum
- Approximate square footage of institution facilities: 90,000
- Operating Capacity: 305
- Estimated / reported number of existing cameras: 64
  - Cameras per offender = 0.2098 / Offenders per camera = 4.77
  - SF per camera = 1,406
- Estimated required cameras to achieve the Standards / deficiency: 90 / 26
- Network connectivity and infrastructure: Optical fiber backbone to most buildings and areas. Optical fiber consists primarily of 62.5 micron Multimode fiber and limited quantities of Singlemode fiber to specific areas with limited available capacity in most areas.
- Storage and Video Management System:
- Estimated Total Project Capital Cost: **$261,000**

8) Olympic Corrections Center (OCC)

- Location, Date Opened: Forks – opened 1968
- Classification: Minimum
- Approximate square footage of institution facilities: 160,000
- Operating Capacity: 378
- Estimated / reported number of existing cameras: 19
  o Cameras per offender = 0.0503 / Offenders per camera = 19.89
  o SF per camera = 8,421
- Estimated required cameras to achieve the Standards / deficiency: 40 / 21
- Network connectivity and infrastructure: Optical fiber backbone to most buildings and areas. Optical fiber consists of 62.5 micron Multimode fiber and Singlemode fiber to specific areas with available capacity in most areas.
- Storage and Video Management System:
- Estimated Total Project Capital Cost: **$248,000**

9) Stafford Creek Corrections Center (SCCC)

- Location, Date Opened: Aberdeen – opened 2000
- Classification: Minimum, Medium, Maximum
- Approximate square footage of institution facilities: 663,000
- Operating Capacity: 1,936
- Estimated / reported number of existing cameras: 245
  o Cameras per offender = 0.1265 / Offenders per camera = 7.90
  o SF per camera = 2,706
- Estimated required cameras to achieve the Standards / deficiency: 982 / 737
- Network connectivity and infrastructure: Optical fiber backbone to most buildings and areas. Optical fiber consists of 62.5 micron Multimode fiber and Singlemode fiber. Most network infrastructure is utilizing Singlemode optical fiber. There is available Multimode optical fiber to most locations. The Singlemode optical fiber is highly utilized with limited capacity in some areas.
- Storage and Video Management System: Most cameras are recorded on DVRs. Recent project at new furniture factory provided new, enterprise-level VMS platform with expansion capability to manage cameras and video data for entire institution (18 cameras on new system currently).
- Estimated Total Project Capital Cost: **$4,468,000**

10) Washington Corrections Center (WCC)

- Location, Date Opened: Shelton – opened 1964
- Sub-Units: Reception Center, IMU
- Classification: Medium, Close, Maximum
- Approximate square footage of institution facilities: 683,000
- Operating Capacity: 1,268 (Note: typical population is ~1,650)
- Estimated / reported number of existing cameras: 224
  o Cameras per offender = 0.1767 (0.1358 based on typical population) / Offenders per camera = 7.37 (based on typical population)

- o SF per camera = 3,049
- Estimated required cameras to achieve the Standards / deficiency: 1,011 / 787
- Network connectivity and infrastructure: Optical fiber backbone to most buildings and areas. Optical fiber consists primarily of 62.5 micron Multimode fiber with limited available capacity in most areas.
- Storage and Video Management System: Video data archiving information unavailable.
- Estimated Total Project Capital Cost: **$7,242,000**

11) <u>Washington Corrections Center for Women (WCCW)</u>

- Location, Date Opened: Gig Harbor – opened 1971
- Classification: Minimum, Medium, Close
- Approximate square footage of institution facilities: 365,000
- Operating Capacity: 738
- Estimated / reported number of existing cameras: 137
  - o Cameras per offender = 0.1856 / Offenders per camera = 5.39
  - o SF per camera = 2,664
- Estimated required cameras to achieve the Standards / deficiency: 494 / 357
- Network connectivity and infrastructure: Optical fiber backbone to most buildings and areas. Optical fiber consists primarily of 62.5 micron Multimode fiber and limited quantities of Singlemode fiber to specific areas with limited available capacity in most areas.
- Storage and Video Management System: 90% of the cameras are recorded, primarily on VCRs. A recent project (2010) at the Close Custody Unit replaced an existing analog CCTV system and VCR storage with IP cameras and NVR storage.
- Estimated Total Project Capital Cost: **$3,422,000**

12) <u>Washington State Penitentiary (WSP)</u>

- Location, Date Opened: Walla Walla – opened 1886
- Sub-Units: West Complex/IMU, East Complex, MSU
- Classification: Minimum, Medium, Close, Maximum
- Approximate square footage of institution facilities: 1,396,000
- Operating Capacity: 1,968
- Estimated / reported number of existing cameras: 1,239
  - o Cameras per offender = 0.6296 / Offenders per camera = 1.59
  - o SF per camera = 1,127
- Estimated required cameras to achieve the Standards / deficiency: 1,897 / 658
- Network connectivity and infrastructure: Optical fiber backbone to most buildings and areas. Optical fiber in the West complex consists primarily of 62.5 micron Multimode fiber and Singlemode optical fiber. The East complex is served primarily with 62.5 Multimode optical fiber that is highly allocated with little spare capacity.
- Storage and Video Management System: Data on how many cameras are recorded is unavailable. Video data storage is on a combination of DVRs and NVRs.
- Estimated Total Project Capital Cost: **$8,354,000**

B. <u>Strategies to Achieve the Standards</u>

1) <u>Masterplans</u>: The first step should be to engage one or more professional security system designers knowledgeable and experienced with regard to modern Security Video System planning and design for prisons, and these Standards, to develop a Security Video System Masterplan for each prison facility.

   Regardless of whether system expansions and upgrades are to be accomplished with facility maintenance staff or through capital project(s), or a combination thereof, having a Security Video System Masterplan that is site-specific, that reflects the Standards and goals established herein, and which establishes the overall system architecture and best methods to leverage existing assets at that site, will avoid missteps and waste.

   The Masterplan should identify specific deficiencies that may exist in the IT infrastructure and develop strategies and methods to overcome those deficiencies, so the professional team should include expertise in that area for proper evaluation and strategic planning.

   The Masterplan should provide a detailed budget assessment, and suggest any logical phasing or sequencing of work at the facility.

2) <u>Priorities</u>: It is recommended that Level-3 (Medium Custody) and Level-4 (Close Custody) facilities be among the first to be addressed.

   - The most deficient in terms of existing cameras per square foot of facility or per offender is Airway Heights Corrections Center (AHCC). It has about 1/3 the number of cameras that other facilities of that custody level presently have.

   - The Monroe Correctional Complex (MCC), with its vast size of over 1.5M square feet, is next most deficient in terms of number of cameras providing video coverage.

   - Stafford Creek Corrections Center (SCCC), Washington Corrections Center (WCC), and Washington Corrections Center for Women (WCCW) are similarly deficient with respect to cameras per facility square foot or per offender, and should jointly be third in priority.

   As a budget-reducing implementation strategy it is recommended that expanding the areas of coverage be prioritized on a risk-based scheme, and that achieving the more cost-effective fully networked system, and increasing the video archive storage capacity, be prioritized ahead of retrofitting existing areas having coverage to achieve the higher acuity standards.

C. <u>Understanding the Cost Estimating</u>

1) <u>Capital Costs</u>: The cost for implementing the statewide Security Video System Standards at all 12 of the existing operating total confinement prisons is estimated to have a combined construction cost (Maximum Allowable Construction Cost, or MACC, basis) of **$33,293,000**, which implies a **Total Project Cost of $49,940,000**. Estimates are based on 2011 costs, and will need to be escalated for future years.

The methodology used to derive this estimate was based from the Office of Financial Management's Facility Information System square footage information for WSDOC's prison facilities, and the application of information and analytic data derived from research and experience.

Square footage of outlying facilities at the prisons was disregarded, to determine the core facility gross square feet (GSF) where Security Video System camera coverage would be expected under the Standards.

A study of the expected outcome from application of the Standards, verified by comparative analysis of existing recent installations and designs, derived useable average GSF per camera for different facility types and custody level characteristics. Division of the GSF by the area per camera arrived at the probable quantity of cameras needed at a facility.

The average cost per camera was next determined by analysis of the various components making up the video system. For a new installation of a camera into an existing facility there are many variables – for examples: Wall, ceiling, or pole mounting? Distance of run? Requiring rigid steel conduit? (most expensive), in thinwall tube conduit above an accessible ceiling? or easily run cable hung on j-hooks?

There are just as many variables and questions regarding video transmission equipment and storage.

At this level of analysis it was determined that **$4,645** per camera represented a best-estimate of the construction cost at the subcontract level for each new camera, inclusive of the transmission, video viewing, and storage system contributions to cost.

The gross cost for an all new video system comprised of the calculated number of cameras at the above per-camera cost was determined. From that an adjustment was taken based from the consultant's best estimate of value available from the existing assets, and costs needed to improve the IT infrastructure.

2) <u>Non-Capital Costs and Savings</u>: It is expected that there will be no change in the number of correctional officers as a result of these Standards.

It is difficult to assess the direct cost savings and indirect cost avoidance that is likely to result from having better and more easily obtainable video evidence related to incidents and alleged incidents.

The expansion of the Security Video System can be expected to place additional demands on the prison facilities, for maintenance and sustainment of the system.

Ongoing costs, using 2011 dollars as the basis, are estimated to be:

- Vendor service agreements for support and system maintenance, estimated at 1.5% of the equipment portion of the construction cost: Approximately $240,000 per year for the full statewide deployment, escalating in future years

- Equipment replacement and renewal (assuming average 7-year life cycle): Estimated at $975,000 per year for the full statewide deployment, escalating in future years.

- Facility maintenance staff: Estimated additional staffing *over current levels* for the full statewide deployment equates to approximately 11.0 FTE $56,892/year x 1.32 = $826,000 per year, escalating in future years.

8.   Appendices

A. Abbreviations and Acronyms Used

Within these Standards the following abbreviations and acronyms were used:

CCTV   Closed-Circuit-Television; a legacy generic description for a security video system, usually analog operating on coaxial cable

CIF   Common Interchange Format (or Common Intermediate Format); a format used to standardize the horizontal and vertical resolutions in pixels, where 1CIF is a video sequence with a resolution of 352x240, 2CIF is 207x240, and 4CIF is 704x480

DVR   Digital Video Recorder; a device capable of digitally recording inputs from analog cameras on internal storage (hard drives)

GUI   Graphical User Interface; a graphical depiction used for visual interaction between a machine and an operator

HDTV   High-Definition Television; a series of standards defined by the Society of Motion Picture and Television Engineers

HMI   Human-Machine Interface; the means for interaction with a machine or technology device by an operator

HVR   Hybrid Video Recorder; a device capable of digitally recording inputs from analog and digital cameras on internal storage (hard drives)

IT   Information Technology

IP   Internet Protocol - the most commonly used set of rules for dispatching data across a large computer network

LAN   Local Area Network

NTSC   National Television System Committee; a video standards setting body

NVMS   Network Video Management System; a software based system which manages the digital video streams originated by cameras for switching and archiving, operating on an Ethernet LAN

PC   Personal Computer

PTZ   Pan-tilt-zoom; the capability of a video camera to be rotated horizontally or vertically, or have the view field and magnification changed by remote control

TDIS   Telecommunications Distribution Infrastructure Standards of the Washington State Department of Corrections (the most recent version)

VCR   Video Cassette Recorder; a device capable of recording one or more channels of analog video onto magnetic tape media which is wound on reels as parts of a removable cassette – for security video recording usage the tape is usually continuously wound, providing 24-27 hours of recording per cassette before data over-writing occurs

WSDOC   Washington State Department of Corrections

B. <u>Facility Matrix for Deployment of Cameras</u>

1) **Intent of Matrix**: The Matrix table following this page represents a "model" or prototypical WSDOC prison facility, organized by programmatic function. Facilities vary, depending on their size, mission, configuration, and site constraints, so this Matrix may not be directly applicable to any planned new facility, or any existing facilities. The site's custody staff and management should perform a risk assessment to identify any necessary deviations from the Matrix to address the unique circumstances of the facility.

2) **Application**: The Matrix is intended to provide guidance to facility staff and system designers as to the areas of a prison facility where WSDOC has determined Security Video System camera coverage is expected to be deployed, the intended purpose of the deployment, and the level of video acuity expected for that purpose.

100 - Gate House

		Camera Purpose / Acuity Standard			
		Purpose		**Acuity / Resolution**	
		MC = Movement Control GS = General Surveillance AM = Activity Monitoring SM = Specialized Monitoring AA = Alarm Association		O = 10-20 pixels per horizontal foot S = 20-30 pixels per horizontal foot ID = 40-50 pixels per horizontal foot HD = 70-90 pixels per horizontal foot	
Space ID	Space Use	Both Level-2	Male L-3/4/5	Female L-3/4/5	Footnotes
110.00	**Facility Control (Outside Perimeter)**				
110.01	Main Vehicle Sallyport	N/A	AM / S	AM / S	100% coverage to include both sides of each constructed lane, assuming occupancy by a large semi-trailer truck. Coverage must include full sides and ends of vehicle. Movement Control ID is provided thru Sallyport officer.
110.02	Officers' Station w/Toilet	---	---	---	
110.03	Staff Sallyport	---	MC / ID	MC / ID	
110.04	Staff Metal Detector	---	---	---	
110.05	Minor Control Room	---	---	---	
110.06	Staff Toilet	---	---	---	
110.07	Security Electronics Room	---	---	---	
110.08	Chain Bus Sallyport	N/A	AM / S	AM / S	100% coverage to include both sides of any vehicle occupying a bay. Movement Control ID is by radio communication.
	Chain Bus Maneuvering Area (outside of Intake Vehicle Sallyport enclosures)	N/A	GS / O	GS / O	
110.09	Group Holding Cell	N/A	AM / S	AM / S	
110.10	Individual Holding Cell	N/A	AM / S	AM / S	
110.11	Locksmith Work Area	---	---	---	
110.12	Emergency Key Storage	---	---	---	
110.13	Visitor Sallyport	---	MC / ID	MC / ID	
120.00	**Master Control**				
120.01	Monitor Workstations	---	---	---	
120.02	Service Counter	---	---	---	
120.03	Support Area	---	---	---	
120.04	Control Room Sallyport/Stairs	N/A	MC / ID	MC / ID	
120.05	Lavatory/Toilet	---	---	---	
120.06	Sallyport for Roof Access	N/A	MC / ID	MC / ID	
130.00	**Special Teams**				
130.01	Sallyport	N/A	MC / ID	MC / ID	
130.02	Armory	---	---	---	
130.03	ERT Readiness Room	---	---	---	
130.04	SERT Readiness Room	---	---	---	
130.05	CNT Situation Room	---	---	---	Video Viewing Workstation
140.00	**Staff Support**				
140.01	Staff Entry Vestibule	---	---	---	
140.02	Break Room	---	---	---	

100 - Gate House

			Camera Purpose / Acuity Standard		
			Purpose		**Acuity / Resolution**
			MC = Movement Control		O = 10-20 pixels per horizontal foot
			GS = General Surveillance		S = 20-30 pixels per horizontal foot
			AM = Activity Monitoring		ID = 40-50 pixels per horizontal foot
			SM = Specialized Monitoring		HD = 70-90 pixels per horizontal foot
			AA = Alarm Association		
Space ID	Space Use	Both Level-2	Male L-3/4/5	Female L-3/4/5	Footnotes
140.03	Muster / Break Room	---	---	---	
140.04	Table Storage	---	---	---	
140.05	Staff Lockers - Male	---	---	---	
140.06	Staff Restrooms/Showers - Male	---	---	---	
140.07	Staff Lockers - Female	---	---	---	
140.08	Staff Restrooms/Showers - Female	---	---	---	
140.09	Staff Mail Boxes	---	---	---	
150.00	**Public Access**				
150.01	Vestibule	N/A	AM / S	AM / S	
150.02	Lobby	N/A	AM / S	AM / S	
150.03	Visitor's Lockers	---	---	---	
150.04	Public Restrooms	---	---	---	
150.05	Visitor Processing	AM / S	AM / S	AM / S	
150.06	Metal Detector	AM / S	AM / S	AM / S	
150.07	Search Room	---	---	---	
150.08	Visitor Waiting	AM / S	AM / S	AM / S	

200 - Outside Administration

		Camera Purpose / Acuity Standard			
		Purpose			**Acuity / Resolution**
		MC = Movement Control GS = General Surveillance AM = Activity Monitoring SM = Specialized Monitoring AA = Alarm Association			O = 10-20 pixels per horizontal foot S = 20-30 pixels per horizontal foot ID = 40-50 pixels per horizontal foot HD = 70-90 pixels per horizontal foot
Space ID	Space	Both Level-2	Male L-3/4/5	Female L-3/4/5	Footnotes
210.00	**Administration**				
210.01	Vestibule	---	GS / S	GS / S	
210.02	Waiting Area	---	GS / S	GS / S	
210.03	Administration Receptionist	---	---	---	
210.04	Visitor Toilet	---	---	---	
210.05	Superintendent	---	---	---	Video Viewing Workstation
210.06	Secretary Administrator	---	---	---	
210.07	Secretary	---	---	---	
210.08	Administrative Support Clerk	---	---	---	
210.09	Conference Room	---	---	---	Video Viewing Workstation
210.10	Equipment Storage	---	---	---	
210.11	General Files	---	---	---	
220.00	**Business Office**				
220.01	Local Business Advisor	---	---	---	
	Offender Banking				
220.02	Fiscal Tech	---	---	---	
	Local Funds				
220.03	Financial Analyst 2	---	---	---	
220.04	Fiscal Tech	---	---	---	
	Payroll/Timekeeping				
220.05	Fiscal Tech	---	---	---	
	General Accounting				
220.06	Financial Analyst 4	---	---	---	
220.07	Fiscal Tech	---	---	---	
	Accounts Payable				
220.08	Fiscal Tech	---	---	---	
220.09	Secure File Room	---	---	---	
230.00	**Human Resources**				
230.01	Human Recourses Manager	---	---	---	
230.02	Human Recourses Professional	---	---	---	
230.03	Human Resources Technician	---	---	---	
230.04	Human Resource Assistant	---	---	---	
230.05	Personnel File Room	---	---	---	
	Interview/Testing Room	---	---	---	
240.00	**Intelligence and Investigation**				
240.01	Investigations Manager	---	---	---	
240.02	Investigations Officer	---	---	---	
240.03	Workroom/Files	---	---	---	Video Viewing Workstation
250.00	**Records Office**				
250.01	Records Manager	---	---	---	
250.02	Records Specialist	---	---	---	
250.03	Records Clerk	---	---	---	
250.04	Records/File Storage	---	---	---	

200 - Outside Administration

		Camera Purpose / Acuity Standard			
		Purpose			**Acuity / Resolution**
		MC = Movement Control GS = General Surveillance AM = Activity Monitoring SM = Specialized Monitoring AA = Alarm Association			O = 10-20 pixels per horizontal foot S = 20-30 pixels per horizontal foot ID = 40-50 pixels per horizontal foot HD = 70-90 pixels per horizontal foot
Space ID	Space	Both Level-2	Male L-3/4/5	Female L-3/4/5	Footnotes
250.05	Records Review	---	---	---	
250.06	Scanner Workstations	---	---	---	
250.07	Supply/Work Area	---	---	---	
260.00	**Support Area**				
260.01	Copier/Fax/Supplies	---	---	---	
260.02	Conference Room	---	---	---	
260.03	Interview Room	---	---	---	
260.04	Office Equipment/Storage	---	---	---	
260.05	Staff Restrooms	---	---	---	
260.06	Janitor's Closet	---	---	---	
260.07	Staff Mail Boxes	---	---	---	
260.08	Telecommunications Room	---	---	---	
270.00	**Information and Computer Services-Main**				
270.01	IT Supervisor	---	---	---	
270.02	IT Support Analyst	---	---	---	
270.03	Computer Equipment Room	---	---	---	
270.04	Computer Repair/Storage Lab	---	---	---	
270.05	Mechanical/Fire Protection	---	---	---	
270.06	Staging Area and Storage	---	---	---	
270.07	Janitor's Closet	---	---	---	
270.08	Staff Toilet	---	---	---	
270.09	Service Area	---	---	---	
270.10	Electrical Closet	---	---	---	
270.11	Vestibule	---	---	---	
270.12	UPS	---	---	---	

300 - Housing

	Camera Purpose / Acuity Standard	
	Purpose	**Acuity / Resolution**
	MC = Movement Control GS = General Surveillance AM = Activity Monitoring SM = Specialized Monitoring AA = Alarm Association	O = 10-20 pixels per horizontal foot S = 20-30 pixels per horizontal foot ID = 40-50 pixels per horizontal foot HD = 70-90 pixels per horizontal foot

Space ID	Space	Both Level-2	Male L-3/4/5	Female L-3/4/5	Footnotes
310.00	**Level-3 Medium / Level-4 Close Custody**				
	Unit Management				
310.01	Housing Unit Vestibule	N/A	MC / ID	MC / ID	
	Corridors	N/A	AM / S	AM / S	
310.02	Unit Sergeant Office	N/A	---	---	
310.03	C.U.S. Office	N/A	---	---	
310.04	Clerk's Office	N/A	---	---	
310.05	General Storage	N/A	AM / S	AM / S	If offender workers access
310.06	Telecommunications Room	N/A	---	---	
310.07	Multi-Purpose Room	N/A	AM / S	AM / S	
310.08	Housing Unit Control Booth	N/A	---	---	
310.09	Toilet Room	N/A	---	---	
310.10	Security Electronics Room	N/A	---	---	
310.11	Staff Toilet	N/A	---	---	
310.12	Janitor's Closet	N/A	---	---	
310.13	Offender Property Storage	N/A	---	---	
310.14	Storage Room	N/A	AM / S	AM / S	If offender workers access
310.15	Mechanical Room	N/A	---	---	
310.16	Electrical Room	N/A	---	---	
310.17	Cart Staging Alcove	N/A	GS / S	GS / S	
310.18	Holding Cells	N/A	---	AM / S	
	Housing Unit				
310.19	Double Occupancy Cells	N/A	---	---	
310.20	ADA Double Occupancy Cell	N/A	---	---	
310.21	Dayroom	N/A	GS / S	GS / S	
	Circulation into/out of Dayrooms	N/A	MC / ID	MC / ID	
310.22	Multipurpose Room	N/A	AM / S	AM / S	
310.23	Open Officer's Station	N/A	GS / S	GS / S	
310.24	Counselor's Offices	N/A	---	---	
310.25	Beverage Station	N/A	GS / S	GS / S	
310.26	Laundry	N/A	GS / S	GS / S	
310.27	Showers	N/A	---	---	
310.28	Accessible Shower	N/A	---	---	
310.29	Janitor's Closet	N/A	---	---	
310.30	Canteen/Laundry Distribution	N/A	GS / S	GS / S	
310.31	Offender Communications	N/A	GS / S	GS / S	
310.32	Attorney Phone Booth	N/A	---	---	
310.33	Storage	N/A	AM / S	AM / S	If offender workers access
	Service Corridor	N/A	GS / S	GS / S	
320.00	**Level-5 Segregation Housing**				
	Unit Control				
320.01	Housing Unit Vestibule (Sallyport)	N/A	MC / ID	MC / ID	
	Sallyport Movement Areas	N/A	MC / ID	MC / ID	
320.02	Unit Sergeant Office	N/A	---	---	

300 - Housing

	Camera Purpose / Acuity Standard		
	Purpose		**Acuity / Resolution**
	MC = Movement Control		O = 10-20 pixels per horizontal foot
	GS = General Surveillance		S = 20-30 pixels per horizontal foot
	AM = Activity Monitoring		ID = 40-50 pixels per horizontal foot
	SM = Specialized Monitoring		HD = 70-90 pixels per horizontal foot
	AA = Alarm Association		

Space ID	Space	Both Level-2	Male L-3/4/5	Female L-3/4/5	Footnotes
320.03	C.U.S. Office	N/A	---	---	
320.04	Clerk's Office	N/A	---	---	
320.05	Counselor's Office	N/A	---	---	
320.06	General Storage	N/A	---	---	
320.07	QRT Ready Room	N/A	---	---	
320.08	Telecommunications Room	N/A	---	---	
320.09	Multi-Purpose Room	N/A	AM / S	AM / S	
320.10	Housing Unit Control Room	N/A	---	---	
320.11	Security Electronics Room	N/A	---	---	
320.12	Staff Toilet	N/A	---	---	
320.13	Offender Property Storage	N/A	---	---	
320.14	Storage Room	N/A	---	---	
320.15	Janitor's Closet	N/A	---	---	
320.16	Mechanical Room	N/A	---	---	
320.17	Holding Cell	N/A	AM / S	AM / S	
320.18	Holding Cell	N/A	AM / S	AM / S	
320.19	Non-Contact Visitation	N/A	---	---	
320.20	Cart Staging Alcove	N/A	GS / S	GS / S	
	Corridors	N/A	AM / S	AM / S	
	Housing Unit				
320.21	Single Cells	N/A	---	---	
320.22	Accessible Cells	N/A	---	---	
320.23	Dayroom	N/A	AM / S	AM / S	
	Corridors	N/A	GS / S	GS / S	
320.24	Offender Showers	N/A	---	---	
320.25	Exercise Area	N/A	AM / S	AM / S	
330.00	**Level-2 Housing**				
	Unit Control				
330.01	Weather Vestibule	GS / S	N/A	N/A	
	Entry Corridor	GS / S	N/A	N/A	
330.02	Unit Sergeant Office	---	N/A	N/A	
330.03	C.U.S. Office	---	N/A	N/A	
330.04	Clerk's Office	---	N/A	N/A	
330.05	General Storage	AM / S	N/A	N/A	If offender workers access
330.06	Telecommunications Room	---	N/A	N/A	
330.07	Multi-Purpose Room	AM / S	N/A	N/A	
330.08	Security Electronics Room	---	N/A	N/A	
330.09	Staff Toilet	---	N/A	N/A	
330.10	Janitor's Closet	---	N/A	N/A	
330.11	Offender Property Storage	---	N/A	N/A	
330.12	Storage Room	AM / S	N/A	N/A	If offender workers access
330.13	Mechanical Room	---	N/A	N/A	
330.14	Electrical Room	---	N/A	N/A	
330.15	Cart Staging Alcove	GS / S	N/A	N/A	

300 - Housing

		Camera Purpose / Acuity Standard			
		Purpose			**Acuity / Resolution**
		MC = Movement Control GS = General Surveillance AM = Activity Monitoring SM = Specialized Monitoring AA = Alarm Association			O = 10-20 pixels per horizontal foot S = 20-30 pixels per horizontal foot ID = 40-50 pixels per horizontal foot HD = 70-90 pixels per horizontal foot
Space ID	Space	Both Level-2	Male L-3/4/5	Female L-3/4/5	Footnotes
	Corridor to/from Cart Staging	GS / S	N/A	N/A	
330.16	Holding Cells	---	N/A	N/A	
	Housing Unit				
330.17	Four-Person Rooms	---	N/A	N/A	
330.18	Two-Person Rooms	---	N/A	N/A	
330.19	Dormitory	GS / S	N/A	N/A	Common areas
330.20	Dayroom	GS / S	N/A	N/A	
330.21	Circulation into/out of Dayrooms	GS / S	N/A	N/A	
330.22	Multipurpose Room	GS / S	N/A	N/A	
330.23	Open Officer's Station	GS / S	N/A	N/A	
330.24	Counselor's Offices	---	N/A	N/A	
330.25	Beverage Station	GS / S	N/A	N/A	
330.26	Laundry	GS / S	N/A	N/A	
330.27	Offender Toilets	---	N/A	N/A	
330.28	Showers	---	N/A	N/A	
330.29	Accessible Shower	---	N/A	N/A	
330.30	Janitor's Closet	---	N/A	N/A	
330.31	Canteen/Laundry Distribution	GS / S	N/A	N/A	
330.32	Offender Communications	GS / S	N/A	N/A	
330.33	Attorney Phone Booth	---	N/A	N/A	
330.34	Exercise Area(s) (Outside)	GS / S	N/A	N/A	
330.35	Storage	AM / S	N/A	N/A	If offender workers access

400 - Offender Services

		Camera Purpose / Acuity Standard			
		Purpose		Acuity / Resolution	
		MC = Movement Control		O = 10-20 pixels per horizontal foot	
		GS = General Surveillance		S = 20-30 pixels per horizontal foot	
		AM = Activity Monitoring		ID = 40-50 pixels per horizontal foot	
		SM = Specialized Monitoring		HD = 70-90 pixels per horizontal foot	
		AA = Alarm Association			
Space ID	Space	Both Level-2	Male L-3/4/5	Female L-3/4/5	Footnotes
410.00	**Health Care**				
411.00	**Health Care Administration**				
411.01	Health Care Manager	---	---	---	
411.02	Medical Director	---	---	---	
411.03	Director of Nursing	---	---	---	
411.04	Director of Mental Health	---	---	---	
411.05	CQI - RN	---	---	---	
411.06	Multiple Staff Work Room	---	---	---	
411.07	Reception/Waiting/Secretary	---	---	---	
411.08	Copier/Storage	---	---	---	
411.09	Library/Conference Room	---	---	---	
411.10	Staff Break/Conference/Training	---	---	---	
411.11	Staff Toilet	---	---	---	
411.12	Staff Shower	---	---	---	
411.13	Unisex Staff Locker Room	---	---	---	
411.14	Telecommunications Room	---	---	---	
412.00	**Outpatient Clinic/Dental/Pharmacy**				
412.01	Open Offender Waiting Area	AM / S	AM / S	AM / S	
412.02	Holding Cell	---	---	---	
412.03	Officer Station	AM / S	AM / S	AM / S	
412.04	Reception Desk	AM / S	AM / S	AM / S	
	Health Records				
412.05	Health Records Storage	---	---	---	
412.06	Health Records Administrator	---	---	---	
412.07	Health Records Clerical/Transcription	---	---	---	
412.08	Health Records Work Area/Supply	---	---	---	
	Clinic				
	Corridors	AM / S	AM / S	AM / S	
412.09	Trauma - Minor Surgery	---	---	---	
412.10	Exam Room/Provider Office	---	---	---	
412.11	Exam Consulting Office	---	---	---	
412.12	Ortho/Casting Exam Room	---	---	---	
412.13	Optometry/ENT Room	---	---	---	
412.14	Physical Therapy	---	---	---	
412.15	Infection Control - RN	---	---	---	
412.16	Interview Room	---	---	---	
412.17	Lab	---	---	---	
412.18	Offender Toilet	---	---	---	
412.19	Phlebotomy Alcove	AM / S	AM / S	AM / S	
412.20	Pharmacy Workroom	---	---	---	
412.21	Medical Distribution	MC / ID	MC / ID	MC / ID	
412.22	Nursing Alcoves	MC / ID	MC / ID	MC / ID	
412.23	Nurses' Charting/Work Area	---	---	---	
412.24	Central Supply	---	---	---	

400 - Offender Services

		Camera Purpose / Acuity Standard			
		Purpose			**Acuity / Resolution**
		MC = Movement Control			O = 10-20 pixels per horizontal foot
		GS = General Surveillance			S = 20-30 pixels per horizontal foot
		AM = Activity Monitoring			ID = 40-50 pixels per horizontal foot
		SM = Specialized Monitoring			HD = 70-90 pixels per horizontal foot
		AA = Alarm Association			
Space ID	Space	Both Level-2	Male L-3/4/5	Female L-3/4/5	Footnotes
412.25	Clean Utility	---	---	---	
412.26	Dirty Utility	---	---	---	
412.27	General Storage	---	---	---	
412.28	Janitor's Closet	---	---	---	
412.29	Staff Toilet	---	---	---	
	Radiology				
412.30	Machine Space	---	---	---	
412.31	Control Alcove	---	---	---	
412.32	Office/Workstation	---	---	---	
412.33	Dressing Alcove	---	---	---	
	Dental				
412.34	Chief Dentist Office	---	---	---	
412.35	Dental Staff Admin. Workstation	---	---	---	
412.36	Dental Operatories	N/A	AM / S	AM / S	
412.37	Dental X-ray (Panarex) Alcove	N/A	AM / S	AM / S	
412.38	Dental Prosthetic Lab	---	---	---	
412.39	Dental Work/Sterilization	---	---	---	
412.40	Dental Storage/Air/Vacuum	---	---	---	
413.00	**Mental Health**				
413.01	Psychiatrist Consultant Office/Tx	---	---	---	
413.02	Psychologists Office/Tx	---	---	---	
413.03	Social Work Office/Tx	---	---	---	
413.04	Clerical Support	---	---	---	
413.05	Group Therapy	---	---	---	
413.06	Suicide Observation Rooms	N/A	SM / HD	SM / HD	
413.07	Offender Shower	---	---	---	
413.08	Custody Staff Station/Vestibule	N/A	AM / S	AM / S	
420.00	**Food Service**				
421.00	**Food Preparation Area**				
421.01	Tool Storage	---	---	---	
421.02	Vegetable Preparation				
421.03	Food Preparation				
421.04	Linen Storage				
422.00	**Offender Dining**				
422.01	Entry Vestibules	AM / GS	AM / S	AM / S	
422.02	Offender Dining Room	AM+ / S	AM+ / S	AM+ / S	100% coverage; minimum (4) cameras each space; also provide (2) PTZ cameras at each space
422.03	Beverage Station	AM+ / S	AM+ / S	AM+ / S	Part of Dining Room

400 - Offender Services

		Camera Purpose / Acuity Standard			
		Purpose		**Acuity / Resolution**	
		MC = Movement Control GS = General Surveillance AM = Activity Monitoring SM = Specialized Monitoring AA = Alarm Association		O = 10-20 pixels per horizontal foot S = 20-30 pixels per horizontal foot ID = 40-50 pixels per horizontal foot HD = 70-90 pixels per horizontal foot	
Space ID	Space	Both Level-2	Male L-3/4/5	Female L-3/4/5	Footnotes
	Food Prep Circulation Areas	AM / S	AM / S	AM / S	100% coverage; take into account tall equipment in locating cameras
423.00	**Staff Dining**				
423.01	Staff Entry Vestibule	---	---	---	
423.02	Staff Dining	---	---	---	
423.03	Staff Toilets	---	---	---	
424.00	**Offices**				
424.01	Office - Food Service Manager	---	---	---	
424.02	General Office/Work Area	---	---	---	
425.00	**Storage**				
425.01	Receiving/Holding Sallyport	N/A	MC / ID	MC / ID	
425.02	Trash Room	AM / S	AM / S	AM / S	
425.03	Dry Storage	AM / S	AM / S	AM / S	
425.04	Ready Cooler	---	---	---	
425.05	Cooks Cooler	---	---	---	
425.06	Freezer	---	---	---	
425.07	Produce Cooler	---	---	---	
425.08	Dairy Cooler	---	---	---	
	Circulation	AM / S	AM / S	AM / S	
426.00	**Dishwashing/Cart Wash/Pot Wash**				
426.01	Tray Wash	AM / S	AM / S	AM / S	
426.02	Detergent Storage	---	---	---	
426.03	Cart Wash	AM / S	AM / S	AM / S	
426.04	Clean Storage	AM / S	AM / S	AM / S	
426.05	Janitor Closet	---	---	---	
427.00	**Support**				
427.01	Mechanical	---	---	---	
427.02	Electrical	---	---	---	
427.03	Offender Toilet	---	---	---	
427.04	Offender Check-In	AM / S	AM / S	AM / S	
427.05	Janitor Closet	---	---	---	
427.06	Recycling/Trash Staging	AM / S	AM / S	AM / S	

500 - Institutional Operations

		Camera Purpose / Acuity Standard			
		Purpose			**Acuity / Resolution**
		MC = Movement Control GS = General Surveillance AM = Activity Monitoring SM = Specialized Monitoring AA = Alarm Association			O = 10-20 pixels per horizontal foot S = 20-30 pixels per horizontal foot ID = 40-50 pixels per horizontal foot HD = 70-90 pixels per horizontal foot
Space ID	Space	Both Level-2	Male L-3/4/5	Female L-3/4/5	Footnotes
510.00	**Intake/Discharge and Property Storage**				
510.01	Sergeant's Office	---	---	---	
510.02	Officer Work Area	---	---	---	
510.03	Open Waiting Area	AM / S	AM / S	AM / S	
510.04	Search/Changing Area	---	---	---	
510.05	Individual Holding Cells	---	---	---	
	Corridors	AM / S	AM / S	AM / S	
	Clothing/Property Storage				
510.06	Property Officer	---	---	---	
510.07	Property Storage	---	---	---	
510.08	State Issue	---	---	---	
510.09	Property Vestibule	---	---	---	
510.10	Identification/Photo	---	---	---	
510.11	Interview Room	---	---	---	
510.12	Janitor's Closet	---	---	---	
510.13	Offender Toilet	---	---	---	
510.14	Accessible Offender Toilet	---	---	---	
510.15	Staff Toilet	---	---	---	
520.00	**Inside Administration**				
520.01	Associate Superintendent	---	---	---	
520.02	Correctional Program Mgr.(CPM)	---	---	---	
520.03	Administrative Assistant	---	---	---	
520.04	Secretary	---	---	---	
520.05	Captain	---	---	---	
520.06	Shift Lieutenant	---	---	---	Video Viewing Workstation
520.07	Shift Sergeant	---	---	---	
520.08	Clerical	---	---	---	
520.09	Administrative Files	---	---	---	
520.10	Multi-Purpose Room	---	---	---	
520.11	Copier Room	---	---	---	
520.12	Janitor's Closet	---	---	---	
520.13	Safety Coordinator	---	---	---	
520.14	Staff Toilets	---	---	---	
520.15	Open Work Area	---	---	---	
530.00	**Visiting**				
530.01	Visitor Entry Vestibule	---	---	---	
530.02	Multi-Purpose / Contact Visiting Room	AM+ / S	AM+ / S	AM+ / S	100% coverage; minimum (6) cameras; minimum (3) PTZ cameras located at 1/3 points in the center of the ceiling
530.03	Non-Contact Visitation Room	---	---	---	
530.04	QRT Ready Room	---	---	---	
530.05	Interview Rooms	---	---	---	
530.06	Vending Machine Alcove	AM+ / S	AM+ / S	AM+ / S	Part of Contact Visiting

500 - Institutional Operations

		Camera Purpose / Acuity Standard			
		Purpose			**Acuity / Resolution**
		MC = Movement Control GS = General Surveillance AM = Activity Monitoring SM = Specialized Monitoring AA = Alarm Association			O = 10-20 pixels per horizontal foot S = 20-30 pixels per horizontal foot ID = 40-50 pixels per horizontal foot HD = 70-90 pixels per horizontal foot
Space ID	Space	Both Level-2	Male L-3/4/5	Female L-3/4/5	Footnotes
530.07	Offender Shakedown Room	AM / S	AM / S	AM / S	
530.08	Offender Holding Cells	---	---	---	
	Corridors	AM / S	AM / S	AM / S	
530.09	Visitation Sergeant	---	---	---	
530.10	Visitor Restrooms	---	---	---	
530.11	Staff Restroom	---	---	---	
530.12	Janitor's Closet	---	---	---	
530.13	Offender Entry Vestibule	---	MC / ID	MC / ID	
530.14	Telecommunications Room	---	---	---	
530.15	Storage Room	---	---	---	
540.00	**Hearings Court**				
540.01	Hearings Room	AM / S	AM / S	AM / S	
540.02	Hearing Lieutenant	---	---	---	
540.03	Hearing Officers	---	---	---	
540.04	Hearings Clerk	---	---	---	
540.05	Waiting Area	AM / S	AM / S	AM / S	
540.06	Court Storage	---	---	---	

600 - Offender Programs

		Camera Purpose / Acuity Standard			
		Purpose			**Acuity / Resolution**
		MC = Movement Control GS = General Surveillance AM = Activity Monitoring SM = Specialized Monitoring AA = Alarm Association			O = 10-20 pixels per horizontal foot S = 20-30 pixels per horizontal foot ID = 40-50 pixels per horizontal foot HD = 70-90 pixels per horizontal foot
Space ID	Space	Both Level-2	Male L-3/4/5	Female L-3/4/5	Footnotes
610.00	**Academic Education and Treatment**				
610.01	Multi-Purpose Rooms	---	---	---	
610.02	Multi-Purpose Rooms	---	---	---	
610.03	ESL Classrooms	---	---	---	
610.04	Computer Training Classrooms	---	---	---	
610.05	Group Counseling Room	---	---	---	
610.06	Individual Interview Rooms	---	---	---	
610.07	Skills Development Classrooms	---	---	---	
610.08	Officer Station	AM / S	AM / S	AM / S	
	Corridors	AM / S	AM / S	AM / S	
611.00	**Education Administration**				
611.01	Education Director	---	---	---	
611.02	Secretaries	---	---	---	
611.03	Teachers Workstations	---	---	---	
611.04	Copy Rooms	---	---	---	
611.05	Educational Supplies	---	---	---	
611.06	Treatment Director	---	---	---	
611.07	Treatment Secretary	---	---	---	
611.08	Treatment Counselor's Wkstn.	---	---	---	
611.09	Treatment Storage	---	---	---	
611.10	Coffee Alcove	---	---	---	
611.11	Main Staff Toilets	---	---	---	
611.12	Satellite Staff Toilets	---	---	---	
611.13	Offender Toilet Rooms	---	---	---	
611.14	Janitor's Closet	---	---	---	
611.15	Telecommunications Rooms	---	---	---	
611.16	CUS Grievance Officers	---	---	---	
620.00	**Religious Programs**				
620.01	Chaplain's Offices	---	---	---	
620.02	Work Area	---	---	---	
620.03	Religious Programs Storage	---	---	---	
620.04	Large Multi-Purpose Gathering Room	AM / S	AM / S	AM / S	
620.05	Multi-Purpose Gathering Room	AM / S	AM / S	AM / S	
620.06	Janitor's Closet	---	---	---	
620.07	Earth-Based Outside Religious Activity Area	AM+/ GS	AM+/ GS	AM+/ GS	
620.08	Storage Room	---	---	---	
	Corridors	AM / S	AM / S	AM / S	
630.00	**Library**				
630.01	State Library	AM / S	AM / S	AM / S	
630.02	Librarian's Office	---	---	---	
630.03	Library Work Room/Storage	AM / S	AM / S	AM / S	

600 - Offender Programs

Space ID	Space	Both Level-2	Male L-3/4/5	Female L-3/4/5	Footnotes
		Camera Purpose / Acuity Standard			
		Purpose		**Acuity / Resolution**	
		MC = Movement Control		O = 10-20 pixels per horizontal foot	
		GS = General Surveillance		S = 20-30 pixels per horizontal foot	
		AM = Activity Monitoring		ID = 40-50 pixels per horizontal foot	
		SM = Specialized Monitoring		HD = 70-90 pixels per horizontal foot	
		AA = Alarm Association			
630.04	Counter	AM / S	AM / S	AM / S	
630.05	Law Library	AM / S	AM / S	AM / S	
	Corridors	AM / S	AM / S	AM / S	
640.00	**Wellness/Fitness/Gymnasium**				
640.01	Gymnasium	AM / S	AM / S	AM / S	
640.02	Recreation Equipment Storage	AM / S	AM / S	AM / S	
640.03	Exercise Machine Alcove	AM / S	AM / S	AM / S	
640.04	Exercise Room	AM / S	AM / S	AM / S	
640.05	Offender Restroom	---	---	---	
640.06	Recreation Supervisor Workstation	---	---	---	
640.07	Recreation Specialists Workarea	---	---	---	
640.08	Office Work Area/Files/Supplies	---	---	---	
640.09	Staff Restroom	---	---	---	
640.10	Hair Care Center	AM / S	AM / S	AM / S	
640.11	Arts/Crafts/Hobby Room	AM / S	AM / S	AM / S	
640.12	Arts/Crafts Storage/Office	AM / S	AM / S	AM / S	
640.13	Music Room	AM / S	AM / S	AM / S	
640.14	Practice Rooms	---	---	AM / S	
640.15	Recording Area	AM / S	AM / S	AM / S	
640.16	Janitor's Closet	---	---	---	
640.17	Metal Detectors	AM / S	AM / S	AM / S	
640.18	Multi-Purpose Room	AM / S	AM / S	AM / S	
640.19	Weight Deck	AM / S	AM / S	AM / S	
640.20	Handball	AM / S	AM / S	AM / S	
640.21	Toilets - Outdoor Exercise Yards	---	---	---	
640.22	Soccer Field	AM+/ S	AM+/ S	AM+/ S	
640.23	Baseball Field	AM+/ S	AM+/ S	AM+/ S	
640.24	Telecommunications	---	---	---	
640.25	Offender Entry Vestibule	AM / S	AM / S	AM / S	
	Corridors	AM / S	AM / S	AM / S	

700 - Maintenance / Vocational Ed		Camera Purpose / Acuity Standard			
		Purpose		**Acuity / Resolution**	
		MC = Movement Control GS = General Surveillance AM = Activity Monitoring SM = Specialized Monitoring AA = Alarm Association			O = 10-20 pixels per horizontal foot S = 20-30 pixels per horizontal foot ID = 40-50 pixels per horizontal foot HD = 70-90 pixels per horizontal foot
Space ID	Space	Both Level-2	Male L-3/4/5	Female L-3/4/5	Footnotes
710.00	**Maintenance**				
	Offices				
710.01	Plant Manager 3	---	---	---	
710.02	Plant Manager 2	---	---	---	
710.03	Office Assistant Senior/Files	---	---	---	
710.04	Files Area	---	---	---	
710.05	CADD/Plan Room	---	---	---	
710.06	Meeting Room	---	---	---	
710.07	Staff Toilet	---	---	---	
710.08	Staff Break Area	---	---	---	
	Shops				
710.09	Plumbing & Plant Mechanics Shop	---	---	---	
710.10	Plumbing Supervisor, Plant Mechanics & Electrician's Office	---	---	---	
710.11	Carpentry Shop	---	---	---	
710.12	Paint Shop	---	---	---	
710.13	Painting and Construction & Maintenance Supervisors	---	---	---	
710.14	Electronics Shop	---	---	---	
710.15	Electrical Shop	---	---	---	
710.16	Custodial Services	---	---	---	
710.17	Offender Staging Area	AM / S	AM / S	AM / S	
	Corridors	AM / S	AM / S	AM / S	
710.18	Tool Control Sergeant	---	---	---	
710.19	Tool Storage	---	---	---	
710.20	Storage	---	---	---	
710.21	Offender Toilet	---	---	---	
710.22	Janitors Closet	---	---	---	
710.23	Telecommunications Room	---	---	---	
710.24	Compressor Room	---	---	---	
720.00	**Vocational Education**				
720.01	Welding Lab	N/A	AM / S	AM / S	
720.02	Welding Office	---	---	---	
720.03	Welding Tanks	---	---	---	
720.04	HVAC Lab	N/A	AM / S	AM / S	
720.05	Building Maintenance Lab	N/A	AM / S	AM / S	
720.06	Shared Offices	---	---	---	
720.07	Materials Storage	N/A	AM / S	AM / S	
720.08	Breakout Classrooms	N/A	AM / S	AM / S	
720.09	Staff Toilet	---	---	---	
720.10	Janitor's Closet	---	---	---	
720.80	Corridors	N/A	AM / S	AM / S	
730.00	**Clean Room**				
730.01	Vestibules	N/A	MC / ID	MC / ID	

700 - Maintenance / Vocational Ed

		Camera Purpose / Acuity Standard			
		Purpose		Acuity / Resolution	
		MC = Movement Control		O = 10-20 pixels per horizontal foot	
		GS = General Surveillance		S = 20-30 pixels per horizontal foot	
		AM = Activity Monitoring		ID = 40-50 pixels per horizontal foot	
		SM = Specialized Monitoring		HD = 70-90 pixels per horizontal foot	
		AA = Alarm Association			
Space ID	Space	Both Level-2	Male L-3/4/5	Female L-3/4/5	Footnotes
730.02	Locker/Change Rooms	N/A	MC / ID	MC / ID	
730.03	Offender Toilet	---	---	---	
730.04	Staff Toilet	---	---	---	
730.05	Hold/Search Room	---	---	---	
730.06	Cart Staging	---	---	---	
730.07	Janitor's Closet	---	---	---	
730.08	Officer Station	---	---	---	

800 - Correctional Industries

		Camera Purpose / Acuity Standard			
		Purpose			**Acuity / Resolution**
		MC = Movement Control			O = 10-20 pixels per horizontal foot
		GS = General Surveillance			S = 20-30 pixels per horizontal foot
		AM = Activity Monitoring			ID = 40-50 pixels per horizontal foot
		SM = Specialized Monitoring			HD = 70-90 pixels per horizontal foot
		AA = Alarm Association			
Space ID	Space	Both Level-2	Male L-3/4/5	Female L-3/4/5	Footnotes
810.00	**Correctional Industries**				
810.01	Industries Production Spaces	AM / GS	AM / S	AM / S	
810.02	Industries Program Spaces	AM / GS	AM / S	AM / S	
810.03	Offender Lunch / Break Room	AM / GS	AM / S	AM / S	
	Corridors	AM / GS	AM / S	AM / S	

900 - Support Services

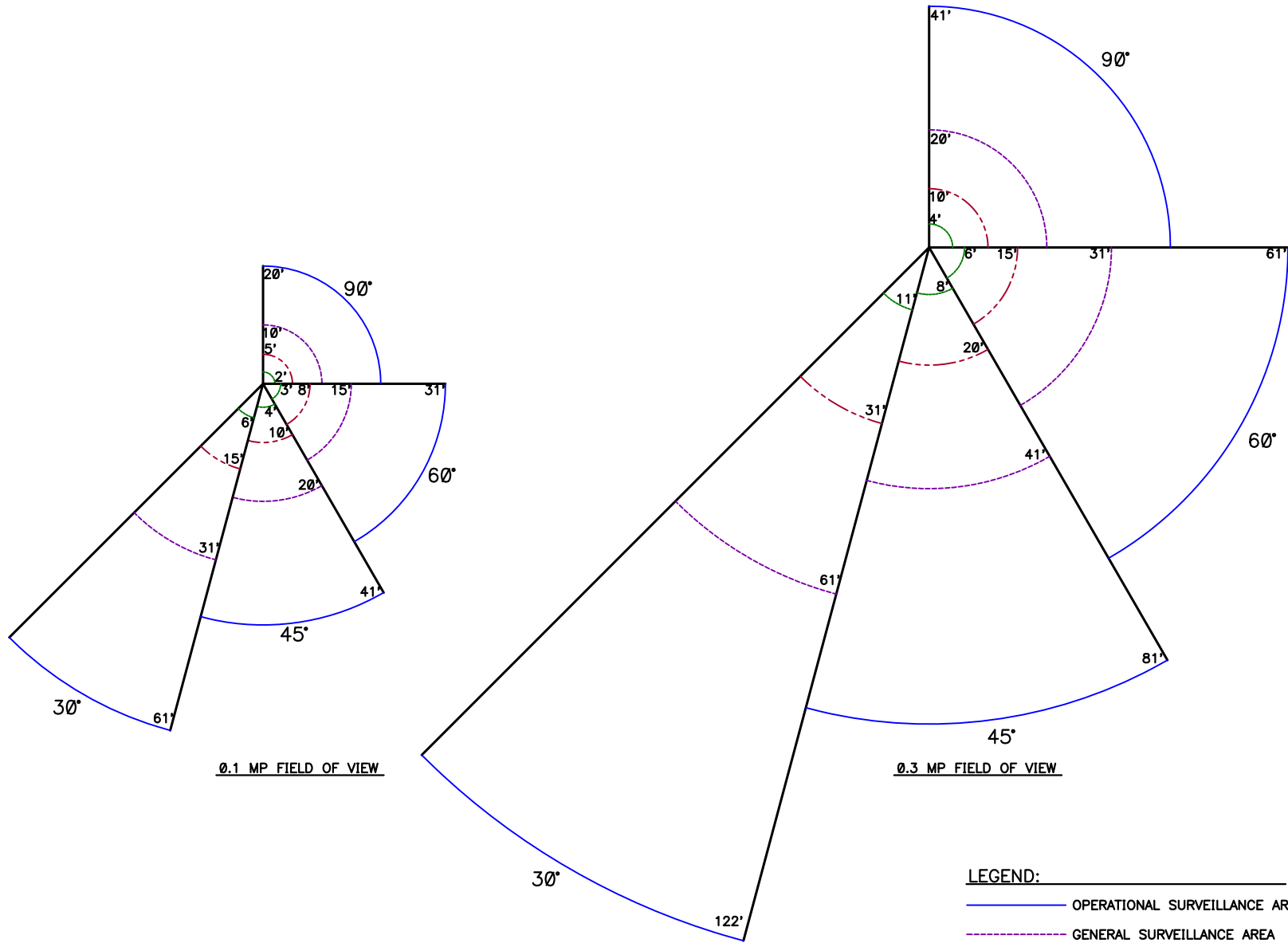|		Camera Purpose / Acuity Standard			
		Purpose			**Acuity / Resolution**
		MC = Movement Control GS = General Surveillance AM = Activity Monitoring SM = Specialized Monitoring AA = Alarm Association			O = 10-20 pixels per horizontal foot S = 20-30 pixels per horizontal foot ID = 40-50 pixels per horizontal foot HD = 70-90 pixels per horizontal foot
Space ID	Space	Both Level-2	Male L-3/4/5	Female L-3/4/5	Footnotes
910.00	**Warehousing/Support**				
	Staff Offices				
910.01	Warehouse Supervisor 2	---	---	---	
910.02	Warehouse Supervisor 1	---	---	---	
910.03	Warehouse Worker 2	---	---	---	
910.04	Supply Control Tech	---	---	---	
910.05	Fiscal Tech	---	---	---	
910.06	Files	---	---	---	
910.07	Copier/Printer/Fax Room	---	---	---	
910.08	Staff Work/Break Area	---	---	---	
910.09	Staging Area	---	---	---	
910.10	Central Storage	---	---	---	
910.11	Dry Food Storage	---	---	---	
910.12	Freezer	---	---	---	
910.13	Cooler	---	---	---	
910.14	Short-Term Storage	---	---	---	
910.15	Medical Storage	---	---	---	
910.16	Forklift Charging Area	---	---	---	
910.17	Refuse/Recycle	---	---	---	
910.18	Staff Toilet	---	---	---	
910.19	Offender Toilet	---	---	---	
910.20	Janitor's Closet	---	---	---	
910.21	Eye Wash Station	---	---	---	
	Mail/UPS Room				
910.22	Mail Service Center	---	---	---	
910.23	Mail Room	---	---	---	
910.24	Telecommunications Room	---	---	---	
910.25	Radio Room	---	---	---	
910.26	Bio-Refuse Space	---	---	---	
910.27	Paint and Volatile Storage / Groundskeeping Storage	---	---	---	
910.28	Switchgear/Water Softening Equipment	---	---	---	

1000 - Site

		Camera Purpose / Acuity Standard			
		Purpose			**Acuity / Resolution**
		MC = Movement Control GS = General Surveillance AM = Activity Monitoring SM = Specialized Monitoring AA = Alarm Association			O = 10-20 pixels per horizontal foot S = 20-30 pixels per horizontal foot ID = 40-50 pixels per horizontal foot HD = 70-90 pixels per horizontal foot
Space ID	Space	Both Level-2	Male L-3/4/5	Female L-3/4/5	Footnotes
	Site				
S1	General Parking	GS+ / O	GS+ / O	GS+ / O	PTZ coverage; minimum (3) cameras arranged for 100% coverage
S2	Industries Service Area	N/A	GS+ / O	GS+ / O	Fixed + PTZ coverage of vehicle loading, parking and maneuvering areas
S3	IT Bldg	N/A	GS+ / O	GS+ / O	Fixed + PTZ coverage of vehicle loading, parking and maneuvering areas
S4	Warehouse Bldg	N/A	GS+ / O	GS+ / O	Fixed + PTZ coverage of vehicle loading, parking and maneuvering areas
S5	Service Court	N/A	GS+ / O	GS+ / O	Fixed + PTZ coverage of vehicle loading, parking and maneuvering areas
S6	Staff, Visitor & Offender Services & Programs Movement Ways and Open Space Yards	GS / O	GS / O	GS / O	100% Fixed Camera Coverage
S7	Recreation Yards	GS+ / O	GS+ / O	GS+ / O	
S8	Out-of-Bounds / Service Areas	GS+ / O	GS+ / O	GS+ / O	
S9	Perimeter Intrusion Detection Zones	N/A	AA / O	AA / O	

0.1 MP FIELD OF VIEW

90°

60°

45°

30°

20'
10'
5'
2'
3' 8' 15' 31'
4'
6'
10'
.15'
20'
31'
41'
61'

0.3 MP FIELD OF VIEW

90°

60°

45°

30°

41'
20'
10'
4'
6' 15' 31' 61'
8'
11'
20'
31'
41'
61'
81'
122'

LEGEND:

—————————— OPERATIONAL SURVEILLANCE AREA

- - - - - - - - GENERAL SURVEILLANCE AREA

–·–·–·–·– IDENTIFICATION AREA

—————————— HIGH–DETAIL AREA

CAMERA VIEWING DISTANCES

DOC VIDEO STANDARDS
CAMERA FIELDS OF VIEW

0.4 MP FIELD OF VIEW

1.3 MP FIELD OF VIEW

LEGEND:

— OPERATIONAL SURVEILLANCE AREA

----- GENERAL SURVEILLANCE AREA

—·—·— IDENTIFICATION AREA
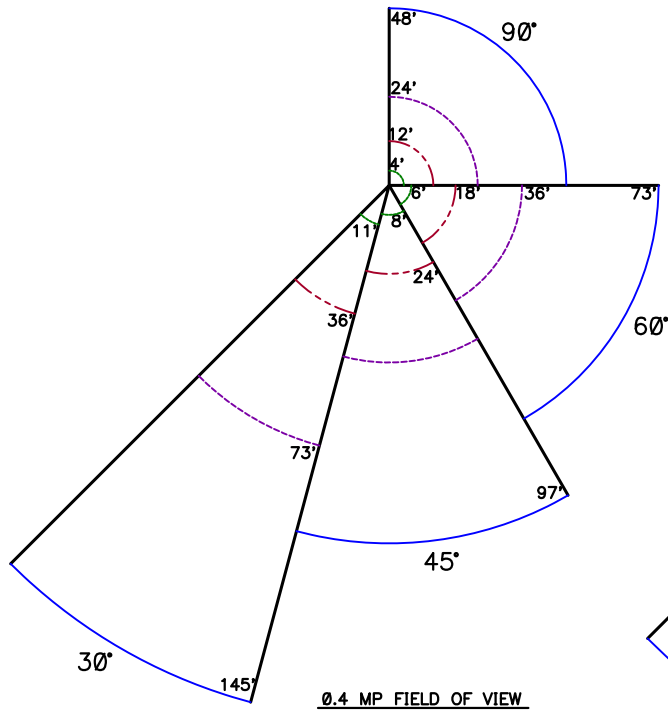
——— HIGH-DETAIL AREA

CAMERA VIEWING DISTANCES

DOC VIDEO STANDARDS
CAMERA FIELDS OF VIEW

Revision
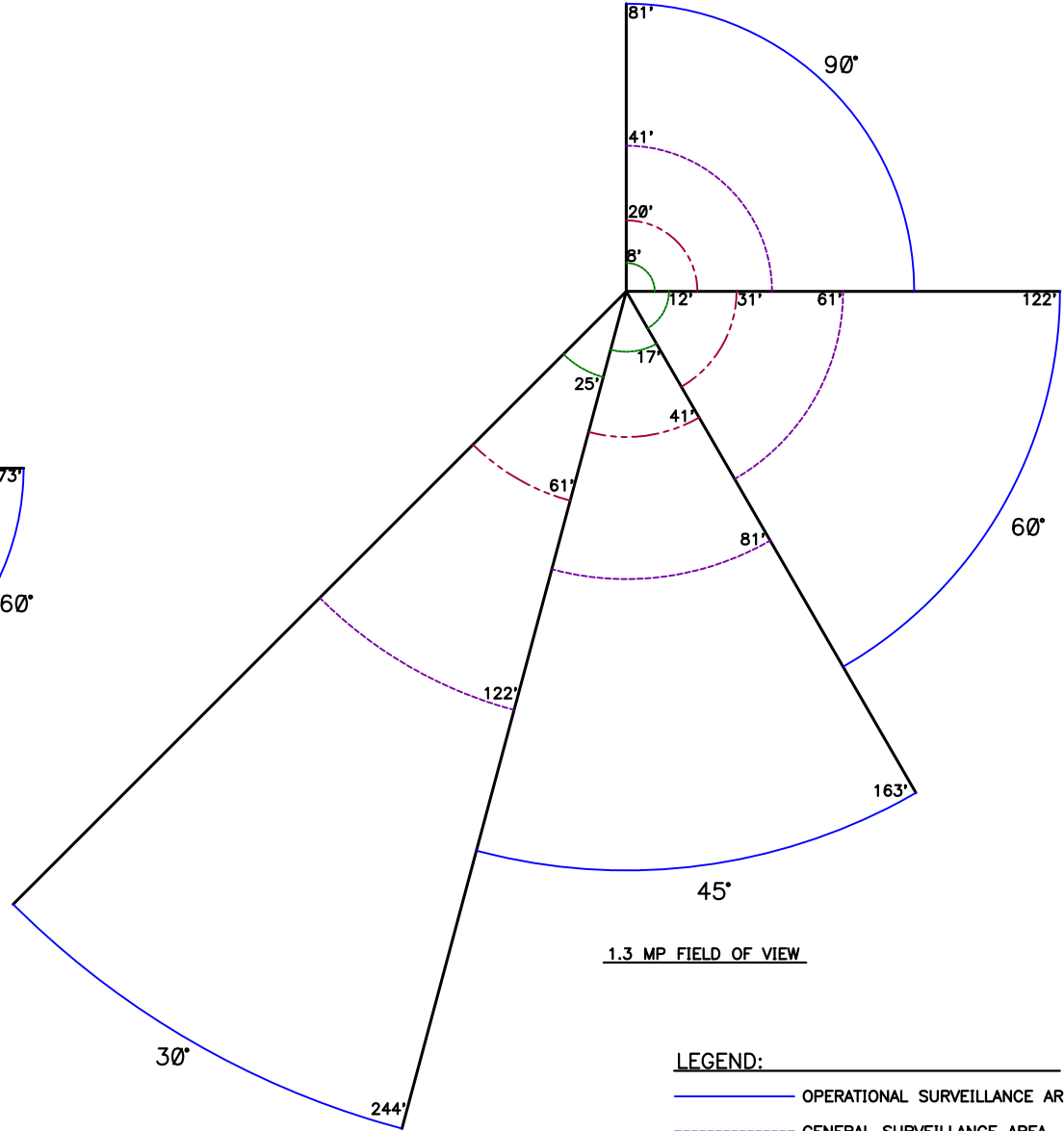
Purpose: Date:

Designed By: BNH
Drawn By: BNH
Date: 09/29/11
Approved by: SHH
Project No.   430111

Sheet Number:

SE1.1

2 MP FIELD OF VIEW

3 MP FIELD OF VIEW

102'
51'
25'
10'
90°
14' 38' 76' 153'
19'
29'
51'
76'
102'
153'
60°
45°
30°
306'

127'
65'
32'
12'
90°
18' 49' 97' 191'
24'
36'
65'
97'
130'
195'
60°
255'
45°
30°
382'

LEGEND:

—————— OPERATIONAL SURVEILLANCE AREA

– – – – – GENERAL SURVEILLANCE AREA

–·–·–·– IDENTIFICATION AREA

————— HIGH–DETAIL AREA

CAMERA VIEWING DISTANCES

DOC VIDEO STANDARDS
CAMERA FIELDS OF VIEW

159'

90°

81'

41'

17'

25' 61' 122' 239'

33'

50'

81'

122'

163'

60°

244'

318'

45°

5 MP FIELD OF VIEW

30°

477'

LEGEND:

———————— OPERATIONAL SURVEILLANCE AREA

·············· GENERAL SURVEILLANCE AREA

–··–··–··– IDENTIFICATION AREA

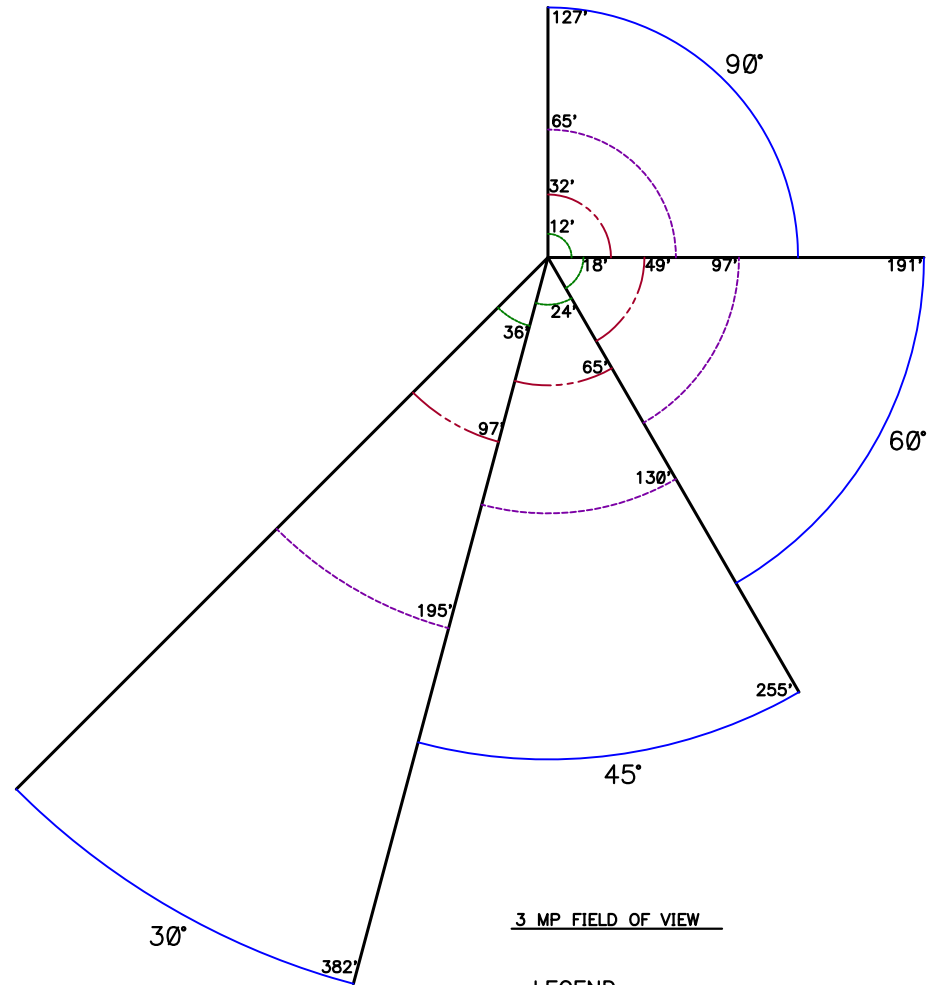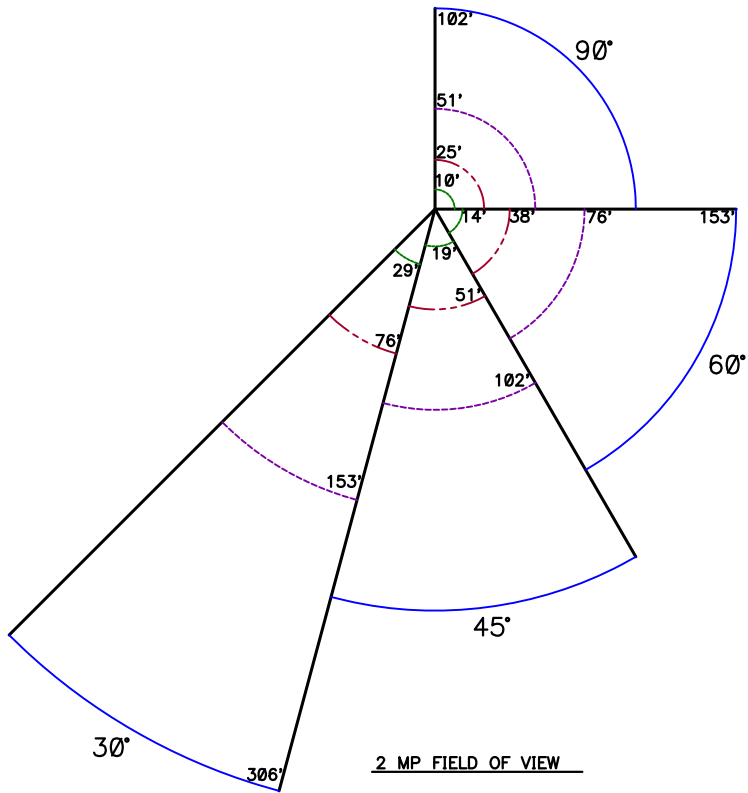———————— HIGH–DETAIL AREA
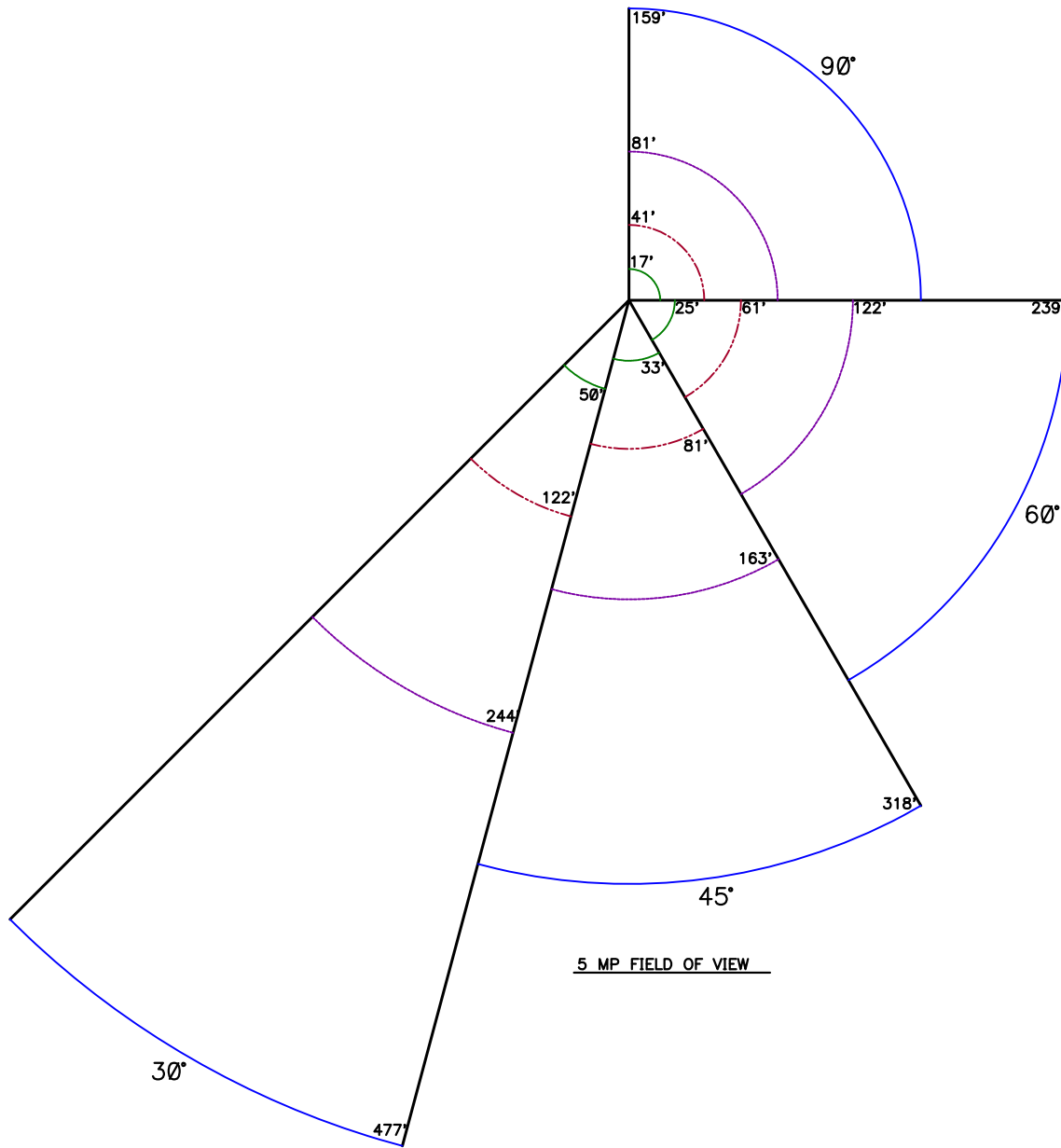
CAMERA VIEWING DISTANCES

DOC VIDEO STANDARDS
CAMERA FIELDS OF VIEW

Revision

Purpose: Date:

Designed By: BNH
Drawn By: BNH
Date: 09/29/11
Approved by: SHH
Project No.   430111

Sheet Number:

SE1.3

Security Electronics Network
Site X

(Design is replicated at each DOC Prison Location)

Internet

Core Router

MPLS Backbone

HQ Data Center

WAN Links Vary
T1 – 10 MB

Site X Router

DOC Admin LAN

Phone System VLAN

Lighting VLAN

Radio VLAN

BAS (HVAC) VLAN

BAS (HVAC) User VLAN

Key Control VLAN

Video User VLAN

All Other DOC VLANs

Firewall

Security Electronics LAN

Door Control VLAN

Perimeter VLAN

Intercom & Paging VLAN

Video VLAN

Switch Mgmt VLAN

Access Control VLAN

UPS Mgmt VLAN
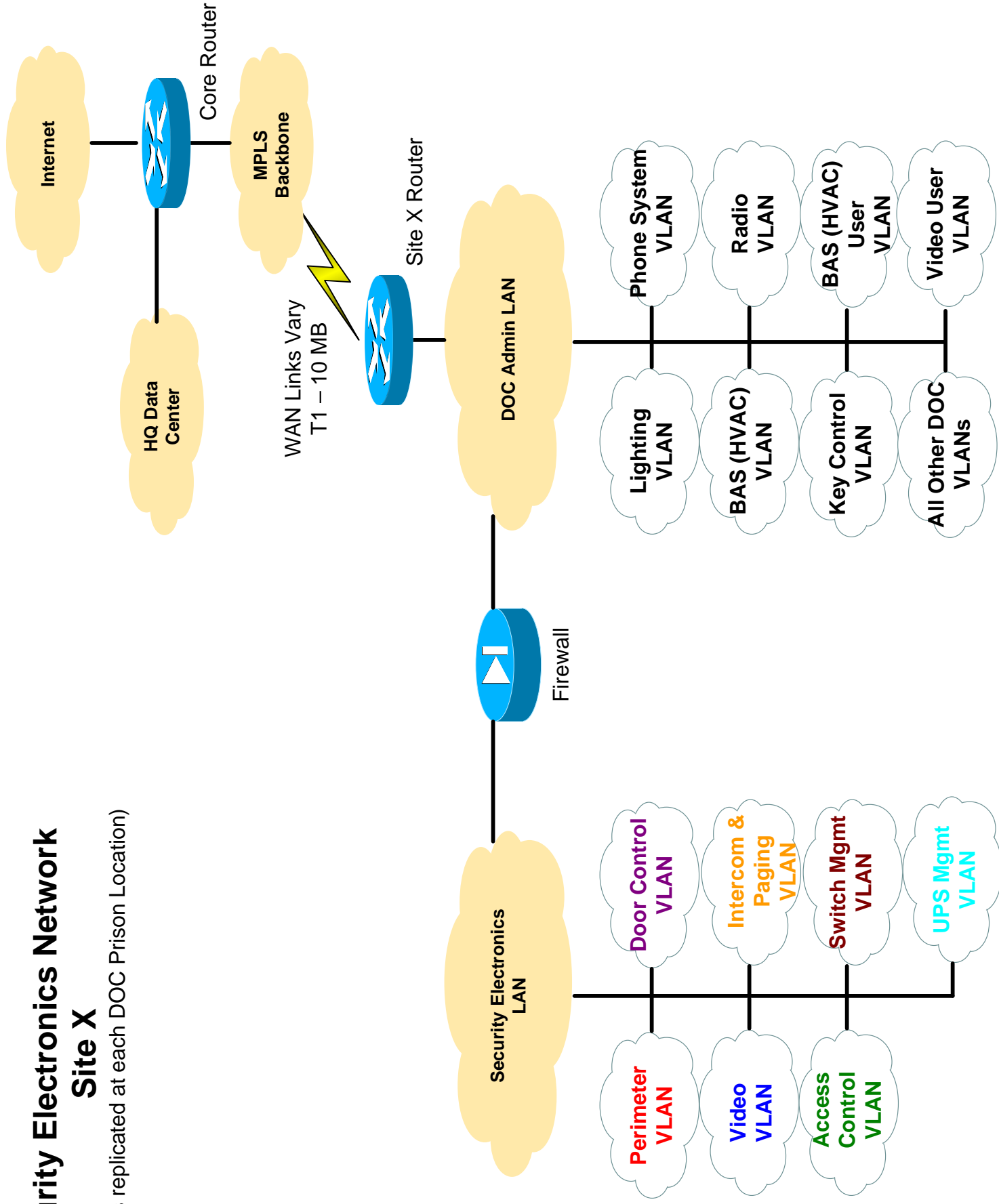
Washington State Department of Corrections

Project No. 2011-330A - Security Video System Standards for Correctional Facilities

ESTIMATE OF CAPITAL COSTS FOR STANDARDS IMPLEMENTATION STATEWIDE - updated 6/2014

INSTITUTION Unit(s)	GSF by Unit*	Estim. Cameras Req'd GSF per Camera	Cameras Req'd	Cost per Camera w/ Storage	UNADJUSTED SUBTOTAL COST	Credit Existing SVS Assets %	ADJUSTED SUBTOTAL COST	Cost per Bldg. SF for SVS OSP Impr.**	IT Infra Improves Cost	ADJUSTED SUBTOTAL COST	Estimating Contingency 10%	Construction GC's + OH&P 22%	Const. Cost SUB-TOTALS by Unit	Const. Cost TOTAL (MACC) by Institution	TOTAL PROJECT COST by Institution
AHCC															
Main Institution	571,987	550	1040	$ 4,800	$ 4,992,000	0%	$ 4,992,000	$ 1.75	$ 1,000,977	$ 5,992,977	$ 599,298	$ 1,450,301	$ 8,042,600	$ 9,277,000	$ 13,916,000
MSU	145,954	1,000	146	$ 4,800	$ 700,800	0%	$ 700,800	$ 1.50	$ 218,931	$ 919,731	$ 91,973	$ 222,575	$ 1,234,300		
CBCC															
Main Institution	391,894	475	825	$ 4,800	$ 3,960,000	0%	$ 3,960,000	$ 1.75	$ 685,815	$ 4,645,815	$ 464,582	$ 1,124,287	$ 6,234,700	$ 6,235,000	$ 9,353,000
MSC	included above														
CCCC															
Camp	158,358	1,500	106	$ 4,800	$ 508,800	0%	$ 508,800	$ 1.50	$ 237,537	$ 746,337	$ 74,634	$ 180,614	$ 1,001,600	$ 1,002,000	$ 1,503,000
CRCC															
MSC	547,064	675	810	$ 4,800	$ 3,888,000	30%	$ 2,721,600	$ 0.35	$ 191,472	$ 2,913,072	$ 291,307	$ 704,963	$ 3,909,300	$ 5,160,000	$ 7,740,000
MSU	154,207	1,000	154	$ 4,800	$ 739,200	0%	$ 739,200	$ 1.25	$ 192,759	$ 931,959	$ 93,196	$ 225,534	$ 1,250,700		
LCC															
Camp	152,070	1,500	101	$ 4,800	$ 484,800	0%	$ 484,800	$ 1.00	$ 152,070	$ 636,870	$ 63,687	$ 154,123	$ 854,700	$ 855,000	$ 1,283,000
MCC															
WSRU	697,117	475	1468	$ 4,800	$ 7,046,400	10%	$ 6,341,760	$ 2.00	$ 1,394,234	$ 7,735,994	$ 773,599	$ 1,872,110	$ 10,381,700	$ 27,568,000	$ 41,352,000
TRU	323,907	325	997	$ 4,800	$ 4,785,600	0%	$ 4,785,600	$ 1.75	$ 566,837	$ 5,352,437	$ 535,244	$ 1,295,290	$ 7,183,000		
IMU	183,275	650	282	$ 4,800	$ 1,353,600	5%	$ 1,285,920	$ 1.00	$ 183,275	$ 1,469,195	$ 146,920	$ 355,545	$ 1,971,700		
SOU	245,474	250	982	$ 4,800	$ 4,713,600	5%	$ 4,477,920	$ 1.50	$ 368,211	$ 4,846,131	$ 484,613	$ 1,172,764	$ 6,503,500		
MSU	102,500	450	228	$ 4,800	$ 1,094,400	10%	$ 984,960	$ 1.50	$ 153,750	$ 1,138,710	$ 113,871	$ 275,568	$ 1,528,100		
MCCCW															
Main Institution	90,280	600	150	$ 4,800	$ 720,000	0%	$ 720,000	$ 1.75	$ 157,990	$ 877,990	$ 87,799	$ 212,474	$ 1,178,300	$ 1,178,000	$ 1,767,000
OCC															
Camp	159,648	1,500	106	$ 4,800	$ 508,800	0%	$ 508,800	$ 2.00	$ 319,296	$ 828,096	$ 82,810	$ 200,399	$ 1,111,300	$ 1,111,000	$ 1,667,000
SCCC															
Main Institution	663,107	475	1396	$ 4,800	$ 6,700,800	10%	$ 6,030,720	$ 0.75	$ 497,330	$ 6,528,050	$ 652,805	$ 1,579,788	$ 8,760,600	$ 8,761,000	$ 13,142,000
WCC															
Reception Ctr	682,501	425	1606	$ 4,800	$ 7,708,800	0%	$ 7,708,800	$ 1.75	$ 1,194,377	$ 8,903,177	$ 890,318	$ 2,154,569	$ 11,948,100	$ 11,948,000	$ 17,922,000
IMU	included above														
WCCW															
Main Institution	268,820	475	566	$ 4,800	$ 2,716,800	5%	$ 2,580,960	$ 1.75	$ 470,435	$ 3,051,395	$ 305,140	$ 738,438	$ 4,095,000	$ 5,352,000	$ 8,028,000
MSU	95,671	550	174	$ 4,800	$ 835,200	5%	$ 793,440	$ 1.50	$ 143,507	$ 936,947	$ 93,695	$ 226,741	$ 1,257,400		
WSP															
West Complex	1,264,642	425	2976	$ 4,800	$ 14,284,800	50%	$ 7,142,400	$ 0.35	$ 442,625	$ 7,585,025	$ 758,503	$ 1,835,576	$ 10,179,100	$ 10,412,000	$ 15,618,000
East Complex	included above														
MSU	22,665	650	35	$ 4,800	$ 168,000	10%	$ 151,200	$ 1.00	$ 22,665	$ 173,865	$ 17,387	$ 42,075	$ 233,300		
SUB-TOTALS	**6,921,141**	---	**14,148**	---	**$ 67,910,400**	---	**$ 57,619,680**	---	**$ 8,594,093**	**$ 66,213,773**	**$ 6,621,381**	**$ 16,023,734**	**$ 88,859,000**		

TOTAL PRELIMINARY R.O.M. CONSTRUCTION COST ESTIMATE: $ 88,859,000

PROJECT COSTS MULTIPLIER @ 150% of CONSTRUCTION COST ESTIMATE: $ 133,291,000

* GSF is based on OFM Document: DOC Facilities Owned (2011)

** OSP improvements are ROM for work to support only the Security Video System

KMB design groups, inc., p.s.