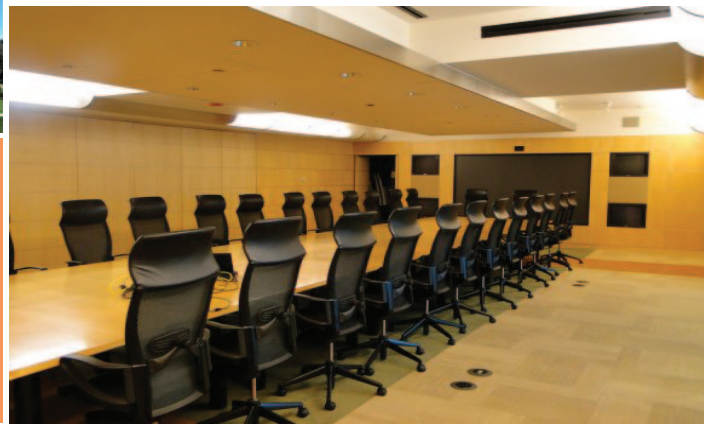


VA



U.S. Department  
of Veterans Affairs

Office of Construction &  
Facilities Management



# Physical Security Design Manual

JANUARY 2015

For VA **Life-Safety Protected Facilities**



**U.S. DEPARTMENT OF  
VETERANS AFFAIRS**

**PHYSICAL SECURITY  
DESIGN MANUAL**

**FOR**

**LIFE-SAFETY PROTECTED  
FACILITIES**

**JANUARY 2015**



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# 1 INTRODUCTION

## 1.0 Purpose

This Manual contains the *physical security* standards for improving the protection of life-safety protected facilities of the U.S. Department of Veterans Affairs (VA). Life-Safety Protected facilities are required to protect the life safety of the VA patients, staff, and visitors in case of an emergency. Although indispensable to the mission of VA, these facilities are not required to remain operational during a natural or manmade extreme event or a national emergency. Design and construction standards are provided for the physical security of new buildings, additions, and major *alterations*. In addition, standards are provided to improve the physical security for existing life-safety protected facilities.

The requirements of this manual are to be coordinated with all VA design and construction requirements for the *mitigation* of other hazards, such as *earthquake* and *hurricane*, in order to complete a multi-hazard approach to physical security planning, design, and construction. In addition, it is intended that the requirements of this manual be coordinated with the requirements of the Life Safety Code, NFPA 101.

## 1.1 Authority

It has long been the policy of the United States to assure the continuity and viability of *mission critical* infrastructure. Executive Order 12656, issued November 18, 1988, states, "The head of each Federal department and agency shall be prepared to respond adequately to all national security emergencies." Furthermore, the "head of each Federal department and agency shall ensure the continuity of essential functions in any national security emergency by providing for: succession to office and emergency delegation of authority in accordance with applicable law; safekeeping of essential resources, facilities, and records; and establishment of emergency operating capabilities." The Order also requires that the "head of each Federal department and agency shall: identify facilities and resources, both government and private, essential to the national defense and national welfare, and assess their vulnerabilities and develop strategies, plans, and programs to provide for the security of such facilities and resources, and to avoid or minimize disruptions of essential services during any national security emergency."

Public Law 107-188, Public Health Security and Bioterrorism Preparedness and Response Act of 2002 enacted June 12, 2002, requires actions to enhance the readiness of Department of Veterans Affairs medical centers to enable them to fulfill their obligations as part of the Federal response to public health emergencies. Under section 154 the law specifically requires that the "Secretary of Veterans Affairs shall take appropriate actions to enhance the readiness of Department of Veterans Affairs medical centers to protect the patients and staff of such centers from chemical or biological attack or otherwise to respond to such an attack

and so as to enable such centers to fulfill their obligations as part of the Federal response to public health emergencies.”

Public Law 107-287, Department of Veterans Affairs Emergency Preparedness Act of 2002 enacted November 7, 2002, requires that the “Secretary take appropriate actions to provide for the readiness of Department medical centers to protect the patients and staff of such centers from chemical or biological attack or otherwise to respond to such an attack so as to enable such centers to fulfill their obligations as part of the Federal response to public health emergencies” and that the “Secretary take appropriate actions to provide for the security of Department medical centers and research facilities, including staff and patients at such centers and facilities.” This Act also states that the “Secretary may furnish hospital care and medical services to individuals responding to, involved in, or otherwise affected by that disaster or emergency.”

38 USC Sec. 901 gives the Secretary the authority to prescribe regulations to provide for the maintenance of law and order and the protection of persons and property on VA property.

## **1.2 VA Facilities**

The Department of Veterans Affairs (VA) is composed of a Central Office (VACO) and three administrations, the Veterans Health Administration (VHA), the Veterans Benefits Administration (VBA), and the National Cemetery Administration (NCA). VHA manages one of the largest health care systems in the U.S. In addition to providing health care, VHA also has missions to provide training for health care professionals; to conduct medical research; to serve as a contingency backup to Department of Defense (DoD) medical services; during national emergencies, to support the National Disaster Medical System (NDMS); and provide hospital and medical services, as appropriate, to civilians during community-wide disasters. VBA provides benefits and services to Veterans including compensation and pension, education, loan guaranty, and insurance. NCA delivers burial benefits to Veterans and eligible dependents. In total, VA provides a mission critical medical and economic infrastructure to the government and population of the United States.

Life-safety protected facilities shall include all VA facilities designated as not mission critical. The status of each facility shall be determined by VACO prior to the programming phase of any project.

The facilities in the following table remain as published in the previous version of the Physical Security Design Manual dated July, 2007. VHA is currently planning to conduct a comprehensive review and analysis for the facilities and their physical security designations (i.e. mission critical or life-safety protected). Upon completion of the VHA review and analysis, the updated information will be incorporated into this Manual.

**Life-Safety Protected Facility  
Types**

Accessory Non-Building Structures	Laundry
Auditorium	Library/Museum
Biomedical Engineering (equipment and wheelchair repair)	Maintenance Facility (shops)
Canteen/Cafeteria	Maintenance Storage (equipment)
Canteen/Retail Store	Materials Management Storage
Cemetery Administration	Office
Cemetery Chapel	Plant Outbuilding
Cemetery Maintenance	Post Office
Child Care	Quarters (residential)
Clinical Services Administration Office	Recreational
Community-Based Outpatient Clinic (CBOC)	School
Community Living Centers (CLC) [with Mission Critical Level Utility/System Requirements <sup>1</sup> ]	Student Housing
Connecting Corridor Concourse (and bridge)	Temporary Buildings
General Administration Office	Toilets (outhouses)
Greenhouses	Training/Education
	Veterans Services
	Warehouse
	Waste Management (incinerator and recycling)
	Waste Storage

**Notes:**

Community Living Centers (CLC) are designated as “Life Safety Protected with Mission Critical Level Utility and System Redundancy/Capacity”. See Chapters 8 and 9 of the Physical Security Design Manual for Mission Critical Facilities. The default mission critical utility/system requirement is 4 days of full operation of the facility during or after an extreme event. It is acceptable to perform a risk assessment to determine if the level of the Mission Critical utility/system requirements can be reduced. VHA is the authority-having-jurisdiction enforcing this assessment. The minimum standby generator capacity shall not be less than the requirements of nursing homes in the state.

Buildings that are exempted from the building envelope standards and structural requirements (Chapters 6 & 7) set forth in the physical security design manuals include: open air structures (such as columbaria and committal shelters), lodges (non-residential meeting facilities), chapels, toilets (outhouses), greenhouses, maintenance storages, and waste storage.

National Cemeteries include facilities, both enclosed and open-air structures, and utilities. Physical security of NCA facilities and utilities is important, but their unique nature and function make many physical security requirements less likely to be applicable in cemeteries than in those facilities listed above. The following table indicates the applicable requirements for each NCA facility type. Exceptions will be handled in accordance with section 1.10.1.

<b>NCA Facility Type</b>	<b>Physical Security Design Manual Applicable Requirements</b>	<b>Notes</b>
Administration buildings - visitor information - public restrooms	Section 3.1 Standoff Distance Section 3.5.1.1 Parking Section 6.2.1.1 Glass Chapter 10 Security Systems Appx A Security Door Types Appx B Security System Application Matrix	Section 3.5.1.1 does not apply to NCA staff parking. Sufficient lighting shall be provided for the operation of security systems. Such lighting shall be mounted on the building exterior (not on poles or fences).
Lodges (residential)	Chapter 10 Security Systems Appx A Security Door Types Appx B Security System Application Matrix	None
Maintenance buildings - employee buildings - workshops - storage for vehicles and equipment	Chapter 10 Security Systems Appx A Security Door Types Appx B Security System Application Matrix	Provide security fencing to maintenance yard adjacent to maintenance buildings. Security fencing shall be six feet high, black, vinyl-coated chain link. Sufficient lighting shall be provided for the operation of security systems. Such lighting shall be mounted on the building exterior (not on poles or fences).
Columbarium - walls and courts - open-air structure	Chapter 10 Security Systems Appx B Security System Application Matrix	None
Committal shelter - roofed, open at sides - storage closet - open-air structure	Chapter 10 Security Systems Appx B Security System Application Matrix	None
Water supply - systems - pump stations - deep wells - reservoirs	Chapter 10 Security Systems Appx B Security System Application Matrix	Provide security fencing to control access. Security fencing shall be six feet high, black, vinyl-coated chain link.

<b>NCA Facility Type</b>	<b>Physical Security Design Manual Applicable Requirements</b>	<b>Notes</b>
Fuel supply - stations - tanks	Chapter 10 Security Systems Appx B Security System Application Matrix	Provide security fencing to control access. Security fencing shall be six feet high, black, vinyl-coated chain link.
Site		Where site conditions allow: perimeter or boundary fencing beyond the entrance area is preferred, but is a site-specific decision for NCA. The entire cemetery of hundreds of acres may not be fenced when it is first established but rather fenced incrementally as it is developed.

NOTE: All relevant requirements of Appendix A are listed in the National Cemetery Administration section of that appendix; relevant requirements of Appendix B are listed under Cemetery in that appendix.

### 1.2.1 VA Owned Facilities

Life-safety protected facilities that are owned and operated by VA shall follow the requirements of this document.

### 1.2.2 VA Medical-Related Leased Facilities

This section provides guidance in the determination of applicable physical security standards for VA medically-related leased facilities. Refer to section 1.10.1 Exceptions, as necessary.

**1.2.2.1 Leased built-to-suit facilities up to 150,000 net usable square feet** shall follow the requirements in the VA Physical Security Design Manual (PSDM) for Life-Safety Protected Facilities.

**1.2.2.2 Leased built-to-suit facilities greater than 150,000 net usable square feet** shall have a determination made by the local VAMC Director with concurrence by the Network Director, and approved by the Under Secretary for Health for Operations and Management or delegated approving official serving as the *authority having jurisdiction* (AHJ) as to whether the facility will be classified as mission critical or life-safety protected. This determination shall be identified and submitted in the original OMB-300 as part of the initial Capital Planning Process.

- When the facility is classified as mission critical, follow VA PSDM for Mission Critical Facilities, as allowable per local, city, and state building codes.
- When the facility is classified as life-safety protected, follow the VA PSDM for Life-Safety Protected Facilities.

### **1.2.3 Existing – VA Medical-Related Leased Facilities**

**1.2.3.1 Existing leased facilities up to 150,000 net usable square feet** shall comply with The Risk Management Process: An Interagency Security Committee (ISC) Standard dated August, 2013.

**1.2.3.2 Existing leased facilities greater than 150,000 net usable square feet** shall have a determination made by the local VAMC Director with concurrence by the Network Director, and approved by the Under Secretary for Health for Operations and Management or delegated approving official serving as the *authority having jurisdiction* (AHJ) as to whether the facility will be classified as mission critical or life-safety protected. This determination will be identified and submitted in the future OMB-300 as part of the Capital Planning Process.

- When the facility is classified as mission critical, follow VA PSDM for Mission Critical Facilities, as allowable per local, city, and state building codes.

When the facility is classified as life-safety protected, follow The Risk Management Process: An Interagency Security Committee (ISC) Standard dated August, 2013.

## **1.3 Introduction to Physical Security Concepts**

The Physical Security Design Manual for VA Facilities: Life-Safety Protected dated July 2007 is superseded by this physical security design manual. The VA *CD-54 Natural Disaster Non-Structural Resistive Design* (September 2002) is subsumed and superseded by this physical security design manual. The physical protection strategies used to develop this manual are documented in the *Physical Security Strategies Report* (January 10, 2006).

The Physical Security Design Manuals will be updated by interim amendments and revised every three to five years. All PSDM documents are posted and kept current on the CFM Technical Information Library (TIL) website at <http://www.cfm.va.gov/TIL/>.

VA is not adopting the 2010 Interagency Security Committee (ISC) requirements. The *ISC Security Design Criteria* is a controlled document and cannot be distributed to VA A/E consultants.

### **1.3.1 Concentric Levels of Control and Protection**

The physical security of facilities requires the use of concentric levels of control and protection to provide progressively enhanced levels of security to deter, prevent, detect, delay, and respond to *threats* in the protection of assets. The concept of concentric levels of control is to protect the central asset behind layers of security measures such that it is least exposed to the threats. Where a single line of defense might be easily breached, the concentric levels approach offers redundancy in lines of defense that is less likely to be breached.

**1.3.1.1 The first point of control**, or the outermost level, should be at the perimeter of the property consisting of fences and other barriers with one or two points of entry through gates controlled by police or other guard personnel. In certain urban sites,

the building perimeter may be on the property line. Increased levels of screening of persons and vehicles, as the Department of Homeland Security (DHS) threat levels are changed, must be accommodated at the perimeter without burdening surrounding roads with vehicles waiting to enter the site.

**1.3.1.2 The second point of control** should be at the building perimeter consisting of doors and other openings protected as appropriate to the level of protection needed with or without the first point of control. This includes access control hardware, intrusion detection, surveillance, and, at selected entrances at various times, personnel for control and screening.

**1.3.1.3 The third point of control** should be to segregate with barriers and hardware generally accessible public and patient areas from staff-only areas such as pharmacy preparation, food preparation, sterile corridors, research laboratories, and building operations and maintenance areas.

**1.3.1.4 The fourth point of control** should be to segregate authorized from unauthorized staff areas with barriers and access controls such as card reader-activated hardware. Unauthorized areas may include patient records, laboratories, vivariums, and cash-handling tellers.

**1.3.1.5 The fifth point of control**, at the innermost level, should be to restrict access to *restricted areas* to a minimum with card-reader access controls, *video assessment and surveillance system (VASS)* monitors, intrusion detection alarms, and forced-entry-resistant construction. Restricted access areas may include *select agent* storage, narcotics storage and pharmaceutical caches, and laboratories.

The more effective the *perimeter barrier* and screening are the less protection is needed within the site, such as between buildings, from patient and visitor parking and the building lobby, and from the site entrance to the other buildings on the site. In highly *urban areas* where the VA building may front on a city street with no *standoff* or separation, the building and its occupants can only be protected from hazards of breaking and entering, vandalism, and even explosive or armed attack by *hardening* the building itself to resist, which may lead to undesirable solutions such as façades with minimum openings and a fortress-like appearance.

### **1.3.2 Crime Prevention Through Environmental Design**

VA follows the principles of *Crime Prevention Through Environmental Design* (CPTED, see [www.cpted.net](http://www.cpted.net)). CPTED strategies include elements of natural surveillance, natural access control, and natural territorial reinforcement. CPTED promotes the principles that proper design and effective use of the built environment can discourage, reduce, or remove potential crime risks. CPTED should be used to evaluate VA site and building designs to create and enhance the concentric circles or layers of security protection.

### **1.3.3 Facilities in Floodplains**

Throughout this manual where it is mandatory that construction or equipment be in an area that is not subject to flooding refer to the FEMA flood map information available at <http://www.fema.gov/business/nfip/fmapinfo.shtm>. No new facility shall be constructed in the 100-year floodplain.

### **1.3.4 Security Operation Requirements**

Design decisions for the physical security of a mission critical facility should be based on the concentric levels of control and protection—both physical and operational—as described in section 1.3.1.

## **1.4 Objectives of VA Physical Security Design**

The primary objective of this manual is to provide the design team with the criteria and standards for the full range of strategies available for existing and new buildings to provide unobtrusive protection for VA facilities while safeguarding the Veterans, staff, visitors.

The physical security standards account for VA operations and policies and must be cost effective when implemented. An objective of this manual is to provide cost effective design criteria that will, when constructed and implemented, provide the appropriate level of physical security to VA's life-safety protected facilities.

## **1.5 Requirements for Physical Security Subject Matter Specialists**

In order to meet the physical security standards of this manual the design team must include a certified physical security specialist as well as a licensed professional structural engineer who has specialized training in blast design and analysis. These specialists shall become part of the design team during the concept phase of any project. This manual assumes the use of qualified physical security and blast experts.

### **1.5.1 Physical Security Specialist Requirements**

The security specialist shall have a minimum of five years' experience in physical security design and shall maintain current certification as Certified Protection Professional (CPP) or Physical Security Professional (PSP) from the American Society for Industrial Security (ASIS). The security specialist must have demonstrated knowledge and experience applying security strategies, such as the application of CPTED, ballistic and forced entry requirements, and electronic security system design as defined in Chapter 10. The résumé of the specialist must be submitted to the VA Project Manager (PM) for review and approval prior to the concept phase of the project. The qualifications of the firm for whom the specialist works must also be submitted with the résumé.

### **1.5.2 Blast Specialist Requirements**

At a minimum, the structural blast specialist shall have a bachelor's degree in structural engineering or a related field and have formal training in structural dynamics and demonstrated experience with the accepted design practices for blast resistant design. The specialist shall have a minimum of five years' experience in performing dynamic analysis in blast resistant design. The résumé of the specialist must be submitted to the VA PM for review and approval prior to the concept phase of the project. The résumé must include a



minimum of three projects during the previous two years with similar scope to the project being designed. The qualifications of the firm for whom the specialist works must also be submitted to the VA PM.

## **1.6 Budgeting and Programming for Physical Security**

When establishing a design and a budget for a life-safety protected project, the key point is that physical security is fully integrated into the program, rather than an added requirement. When physical security is seen as an add-on to an otherwise complete project, the costs for implementation will be higher and the results less satisfactory. As such, it is essential to establish the physical security goals within the capital investment project application phase of the project and to ensure that the budget is set to reflect the physical security requirements within the program goals.

## **1.7 Risk Assessment of VA Facilities**

*Risk* assessments of existing VA facilities showed that the primary threats faced by the Department continue to be routine criminal activity and violence in the workplace; however, the proximity of some VA facilities to high *vulnerability* targets and the role of VA medical centers as backup to DoD and communities in the public health system elevate VA's risks from both internal and external manmade threats.

It is not possible to eliminate all risk to a facility and every project will face resource limitations. Cost effective risk management is a requirement of every project. As part of the planning phase of a new life-safety protected facility or major alterations of an existing life-safety protected facility, a risk assessment must be performed, to determine project- or site-specific requirements or modifications to the physical security design requirements, taking into account the *Hazard Vulnerability Assessment (HVA)* and *Comprehensive Emergency Management Plan (CEMP)* for the facility. Cost effective strategies must be implemented to make the facility capable of life-safety protected operation.

The first task is to identify the assets and people that need to be protected. Next, a threat assessment is performed to identify and define the threats and hazards that could cause harm to a building and its occupants. Threats and hazards shall be measured against the overall facility and each (if any) mission critical function and system it contains or supports. After threats and assets are identified, a *vulnerability* assessment is performed to identify weaknesses. Next, the *consequences* to the mission that would result from a hazard event or a successfully executed threat are defined. Using the results of the asset, threat, vulnerability, and consequences assessment, risk can be determined.

Comprehensive protection against the full range of possible natural hazards and manmade threats to VA facilities would be cost prohibitive, but an appropriate level of protection obtained through the use of these standards can provide for continued operation of life-safety protected facilities at a reasonable cost.

## **1.8 Document Distribution, Use, and Control**

This manual is unclassified.

## **1.9 Administration and Enforcement**

The provisions of these standards shall apply to all VA life-safety protected construction projects for which design is begun on or after the effective date of this design manual.

These standards apply to new construction, whether free standing structures, additions, or major alterations. Application of these standards does not extend to other spaces within the existing building, except where directed by VA. Existing facilities not undergoing renovation may be required to meet certain physical security standards defined in this design manual as determined by VA, based on funding considerations, prioritization, and other mission driven requirements.

At any campus where a new life-safety protected facility is to be constructed, the entire site shall be upgraded to conform to these standards, except when limitation of the project scope or insufficient funding makes it infeasible to do so. Where the entire site cannot be upgraded, the project shall be designed to incorporate achievable physical security elements in a manner that will allow enhancement of those elements in the future. The specific elements to be incorporated or omitted shall be determined, using the risk assessment of both the site and facility, by the VA PM with the concurrence of the VA AHJ for overseeing implementation of physical security requirements for the facility.

Newly constructed roadways and alterations to existing roadways, building access, site access, and site circulation shall be designed in compliance with these standards.

## **1.10 Interpretations and Exceptions**

VA facilities that are not designated life-safety protected may be designated mission critical, which are required to remain operational in a natural or manmade extreme event or a national emergency. Physical security design requirements for mission critical facilities are covered in a separate manual.

Buildings of such occupancy type and floor area that would allow Type V construction as defined in the International Building Code are exempt from specific blast resistant design requirements for Building Envelope and Structural System. See Chapters 6 and 7 of this Design Manual for details.

Connecting corridor concourse and bridges, that are not the main entrance or required exit for the connected buildings, shall be exempt from the standoff distance requirements of Chapter 3 and the requirements of Chapters 6 and 7. Freestanding greenhouses shall be

exempt from the requirements of Chapters 3, 6, and 7. Physical security requirements for temporary buildings shall be determined on a case-by-case basis by the AHJ for overseeing implementation of physical security requirements for the facility.

### **1.10.1 Exceptions**

When a determination is made at the local level, that due to mission, function, location, or regional responsibility a facility should be down-graded from mission critical to life-safety protected (or vice versa), or when a waiver/deviation for the physical security requirements is sought, a request must be submitted and approved by the AHJ who is responsible for overseeing implementation of physical security requirements for facilities within his or her jurisdiction before the beginning of design.

### **1.10.2 Procedures for Waivers and Exceptions**

The local facility may initiate the waiver and exceptions process. The request shall be submitted to the AHJ for review and approval. For VHA, the AHJ is the Deputy Under Secretary for Operations and Management (DUSHOM) within 10N, and requests shall be submitted through the Network channels to 10N for review. For NCA, the AHJ is the Under Secretary for Memorial Affairs. For VBA, the AHJ is the Office of Administration, Emergency, Preparedness, and Facilities.

**1.10.2.1 Waiver or exception requests** shall include a narrative with justification for the request. To the extent applicable, include the following information:

- Building category
- Design criteria to be waived
- Physical limitations on implementation imposed by existing conditions
- Programmatic limitations imposed by implementation of standards
- Alternative method of achieving equivalent level of protection or a schedule for phased implementation of standard as part of risk mitigation strategy (VHA only)
- Cost of implementation of design standard with a comparison cost of the proposed equivalent protection
- Funding sources
- Impact of waiver on design schedule, construction schedule, and future operations
- Detailed effects on HVA and CEMP (VHA only)

**1.10.2.2 Review and approval procedures** for waiver or exceptions shall be as follows:

- Obtain concurrence from the AHJ for overseeing implementation of physical security requirements for the facility
- Forward a copy of the approved waiver/deviation request to the Office of Facilities Planning within the Office of Construction & Facilities Management in VA.

## **1.11 Master Planning**

As part of the master plan development, VA will conduct risk and vulnerability assessments for the facility or campus being planned. The findings of these assessments shall be incorporated into the master plan.

For facilities that have master plans, these plans shall include physical security design guidelines and parameters consistent with those included in, or referenced by, this document. At a minimum, master plans shall include standoff distances, provisions for perimeter security, site access control, applicable CPTED principles, site utility entrances and distribution, a mass evacuation plan, and a schedule for implementation of design guidelines and parameters or approved risk mitigation alternatives.

## 2 GLOSSARY & ACRONYMS

The following terms and definitions are related to the mitigation of manmade and natural hazards and do not include terms related to general facility design, construction, and operation.

**A/E:** Architect(s) and Engineer(s) consultants

**Alterations:** Major alterations or renovations define a project where the area of renovation, including any associated addition, is equal to or greater than 50 percent of the area in the building in which the work is to be performed. In cases where renovations involve changes to the building systems, site work, or other work that does not involve the building interior, the local facility, with concurrence by the region/network and approval by the AHJ shall determine if the work qualifies as a Major Renovation.

**Anti-ram:** Tested for resistance to a moving load impact at a given velocity and rated in terms of kinetic energy or “K” rating in tests for certification under Department of State programs or “M” rating in tests for certification under ASTM F2656.

**Authority Having Jurisdiction (AHJ):** The physical security decision-maker for the facility, such as the administration head, assistant secretary, other key official, or deputy assistant secretary, who is responsible for overseeing implementation of physical security requirements for facilities within his or her jurisdiction.

**Balanced Design:** Controlled failure of a system with an established hierarchy of component failures, where connections are designed for the maximum strength of the connecting components and members supporting other members are designed for the maximum strength of the supported members. For window systems, the glazing shall fail before all other components. (*ASCE/SEI 59-11 Blast Protection of Buildings*)

**Cache:** A storage facility requiring a high level of security, often referring to facilities storing pharmaceuticals or other supplies for use in emergencies.

**Charge Weight:** The amount of explosives in a device in trinitrotoluene (TNT) equivalent.

**Closed Circuit Television (CCTV):** A video system in which an analog or digital signal travels from a camera to video monitoring stations at a designated location. Historically, the term for a security video system was closed circuit television (CCTV), a closed analog video system. Very few video systems today are either closed or completely analog, making CCTV an antiquated term and leading the security industry to use various terms to describe a video system. Because security video serves two distinct purposes, assessment and surveillance, the term used here is video assessment and surveillance system or VASS. This provides a common term based on the functions the system serves, independent of technology.

## **Comprehensive Emergency Management Plan (CEMP)**

**Consequences:** Consequences assessment looks at the value of a building's critical assets, those that need to be protected, and the importance of the building's operations, within a wider network of public or private activities. (FEMA 452)

**Controlled Access Area or Controlled Area:** A room, office, building, or facility area which is clearly demarcated, access to which is monitored, limited, and controlled.

**Crime Prevention Through Environmental Design (CPTED):** Design philosophy that effective use of the natural environment coupled with proper design of the built environment can lead to a reduction in the fear and incidence of crime.

**Critical Assets:** People and those physical assets required to sustain or support the facility's ability to operate on an emergency basis.

**Critical Infrastructure, Critical Space:** Building area(s) required to sustain or support the facility's ability to operate on an emergency basis.

**Demarc:** The separation point between utility-owned and VA-owned equipment.

**Department of Agriculture (USDA)**

**Department of Defense (DoD)**

**Department of Health and Human Services (HHS)**

**Department of Homeland Security (DHS)**

**Detection and Screening System (DSS):** DSS are used for the pre-screening of persons, packages, and personal items for detection of contraband, such as, weapons, drugs, explosives, and other potential threatening items or materials prior to authorizing entry or delivery into the building. DSS includes X-ray machines, walk-through metal detectors (WTMD), hand-held metal detectors (HHMD), and desktop and hand-held trace/particle detectors (also referred to a "sniffers" and "itemizers").

**Duress Security Phone Intercom (DSPI):** DSPI systems are used to provide security intercommunications for access control, emergency assistance, and identification of personnel under duress requesting a security response.

**Earthquake Zones:** See seismic zones.

**Electronic Security System (ESS):** A sub-element of the physical security system, an electronic security system is comprised of *Physical Access Control System (PACS)*; *Intrusion Detection System (IDS)*; *Video Assessment and Surveillance System (VASS)*; *Duress, Security*

*Phones, and Intercom System (DSPI); and Detection and Screening System (DSS).* The ESS is commonly integrated to support correlation of security activity between subsystems.

**Essential Electrical System (EES):** A system comprised of alternate sources of power and all connected distribution systems, fuel systems, and ancillary equipment designed to ensure continuity of electrical power to designated areas and functions of a health care facility during disruption of normal power sources, and also to minimize disruption within the internal wiring system.

**Extraordinary Event or Incident:** Events or conditions that exceed locally accepted design practice.

**Federal Emergency Management Agency (FEMA)**

**Fire Command Center (FCC)**

**General Services Administration (GSA)**

**Hardening:** Reinforcement of the building structure, components, and systems against impact of a blast, a ballistic assault, or ramming.

**Hazard Vulnerability Assessment (Analysis) (HVA)**

**High Risk Area:** A location where a threat may be introduced.

**Hurricane Areas:** Hurricane preparedness requirements apply to VA facilities located within 16 kilometers (10 miles) of the Atlantic Ocean or 16 kilometers (10 miles) of the Gulf of Mexico. These requirements also apply to all inland VA facilities in Florida, Hawaii, and Puerto Rico. Similar requirements, for preparedness against tropical cyclones in the Pacific Ocean, apply to VA facilities located in Guam, American Samoa, and the Philippines. See also ASCE 7-10, section 26.2 Definitions, for Hurricane Prone Regions and Wind-Borne Debris Regions.

**ID Check:** Examination and verification of personal or vehicle identification visually or by other means.

**Illumination Engineering Society of North America (IESNA)**

**Interagency Security Committee (ISC)**

**Intrusion Detection System (IDS):** A system combining mechanical or electric components to perform the functions of sensing, controlling, and announcing unauthorized entry into areas covered by the system. The IDS is intended to sound alarms or alert response personnel of an actual or attempted intrusion into an area.

**Itemizer:** A trace particle detection device capable of identifying both explosives and narcotics.

**Life-Safety Protected Facilities:** VA facilities which are required to protect the life safety of the patients, staff, and visitors in case of an emergency; although indispensable to the mission of VA, are not required to remain operational in a natural or manmade extreme event or a national emergency.

**Local Alarm:** An alarm that is annunciated in the immediate vicinity of the protected premises.

**Magnetometer or Metal Detector:** A walk-through portal or hand-held device designed to detect changes in magnetic fields used to identify hidden metal objects.

**Mantrap or Sally-port:** A double-door booth or chamber that allows a person to enter at one end, undergo an access identification routine inside the booth, and when the routine is satisfied, the lock on the booth door at other end is released. A mantrap is used in high security environments where absolute access control is required.

**Mission Critical Facilities:** VA facilities that are required to continue operation during a natural or manmade extreme event or a national emergency.

**Mitigation:** Actions taken to reduce the exposure to and impact of a hazard.

**Pedestrian Barrier:** A fence, wall, or other structure designed to delay pedestrians from entering the site without using the gates provided for pedestrians where *personnel screening* may be performed. The pedestrian barrier may or may not be coincident with the vehicle barrier.

### **National Disaster Medical System (NDMS)**

**National Terrorism Advisory System (NTAS):** formerly the Homeland Security Alert System (HSAS).

**Perimeter Barrier:** A physical barrier used on the outside of a protected area to prevent, deter, or delay unauthorized entry.

### **Personal Identification Number (PIN)**

### **Personal Identity Verification (PIV)**

**Personnel Screening:** Examining persons and their possessions for contraband such as weapons, explosives, and chemical or biological agents using magnetometer, x-ray, search, or other device.



**Physical Access Control System (PACS):** A system combining mechanical or electrical components, such as card readers, keypads, biometrics, and electromagnetic locks and strikes, for the purpose of controlling access and monitoring building entrances, sensitive areas, mission critical asset areas, and alarm conditions.

**Physical Security:** That part of security concerned with physical measures designed to safeguard people, to prevent unauthorized access to equipment, facilities, material, and documents, and to safeguard against damage and loss.

**Police Operations Unit:** An area designed to facilitate the functions of the police and security services, which include the protection of patients, visitors, and employees; the protection of property; and the maintenance of law and order on property under the charge and control of the Department.

**Protected Area:** An area continuously protected by physical security safeguards and access controls.

**Protection Level:** The degree to which resources are used to defeat a threat.

**Restricted Area:** A room, office, building, or facility area to which access is strictly and tightly controlled. Admittance to this area is limited to personnel assigned to the area and persons who have been specifically authorized access to the area.

**Risk:** The potential for a loss of or damage to an asset.

**Screened Vehicle:** Motor vehicle that has been examined systematically to determine whether or not a security threat that needs to be mitigated is present.

**Screening Vestibule:** Designated space or area located for access control between the public building entrance and the lobby which shall be of sufficient space and be provided with power, telecommunications, and data connections for installation of access control and screening equipment that may be used should the need arise.

**Secured Door Opening (SDO):** A door opening that requires security hardware such as electric strike, door contact, card reader, forced entry rating, or similar feature.

**Security Control Center (SCC):** A location for security personnel to monitor VASS, alarms, and other security systems and devices. This may be in a separate space or, for small facilities, combined with a guard or reception desk at the entrance.

**Seismic Zones:** See VA H-18-8: VA Earthquake Design Requirements.

**Select Agent:** Select agents shall be as defined in Title 42, CFR, Part 73, including pathogens and toxins regulated by both HHS and USDA and non-overlap select agents of HHS.

**Standby Electrical System:** Generators, switchgear, fuel storage, and distribution equipment necessary to provide standby electrical power to the mission critical facility.

**Standoff:** Horizontal distance from event to target.

**Terrorism:** An action that is intended to cause death or serious bodily harm to civilians or noncombatants, when the purpose of such an act, by its nature or context, is to intimidate a population or to compel a government or an international organization to do or to abstain from doing any act.

**Threat:** The National Infrastructure Protection Plan (NIPP) defines threat as any “natural or manmade occurrence, individual, entity, or action that has or indicates the potential to harm life, information, operations, the environment, and/or property.” [http://www.dhs.gov/xlibrary/assets/NIPP\\_Plan.pdf](http://www.dhs.gov/xlibrary/assets/NIPP_Plan.pdf)

### **Underwriters Laboratory (UL)**

**Uninterruptible Power Supply (UPS):** A device to provide battery power via an inverter to critical equipment during loss of utility power, or until the essential electrical system (EES) or standby generators are online.

**Urban Area:** A geographic area with a population of more than 50,000 or a population density of at least 1,000 people per square mile (386 per square kilometer) and surrounding census blocks that have an overall density of at least 500 people per square mile (193 per square kilometer).

**Vehicle Arrest:** Means of stopping a vehicle from breaching a defensive zone (perimeter).

**Vehicle Barrier:** A passive or active physical barrier consisting of natural or manmade features designed to keep a vehicle carrying explosives at the required standoff distance. This may or may not be coincident with a pedestrian barrier.

**Vehicle Inspection:** Examining vehicles for contraband such as explosives using physical search, K-9 searches, trace element sampling, x-ray, or other means.

**Video Assessment and Surveillance System (VASS):** Security video serves two distinct purposes, assessment and surveillance. The term video assessment and surveillance system or VASS is used here. This provides a common term based on the functions the system serves, independent of technology. Formerly referred to as Closed Circuit Television (CCTV).

**Vulnerability:** Susceptibility to physical injury to persons or damage to systems or functions. Vulnerability refers to the expected outcome in terms of damage, casualties, and business disruption if a threat is carried out or a hazard occurs. Vulnerability is measured by assessing

features that would enhance or diminish building performance during a crime, terrorist attack, or a hazard event. (FEMA 452)

**X-ray Screening System:** A device or system that inspects the contents of a package or container for concealed explosives or contraband.

## 3 SITE CONSIDERATIONS

### 3.0 Scope, Purpose, and Goals

This chapter focuses on security design concepts, elements, and site planning strategies that influence the protection of the built and natural environments.

VA follows the principles of Crime Prevention Through Environmental Design (see [www.cpted.net](http://www.cpted.net)) in order to reduce or remove potential crime risks. CPTED principles should be incorporated into the site design to create and enhance the concentric circles or layers of security protection.

For guidance on construction requirements for site security, such as perimeter fences and other barriers, refer to the Uniform Facilities Criteria (UFC) UFC 4-022-02 and UFC 4-022-01 available on the Whole Building Design Guide (WBDG) (see <http://www.wbdg.org>).

### 3.1 Standoff Distance

No vehicle shall be parked closer than 25 feet (7.6 m) to any side of a life-safety protected VA facility, regardless of the building height.

No unscreened vehicle shall be permitted to travel closer than 25 feet (7.6 m) and no *screened vehicle* shall be permitted to travel within 5 feet (1.5 m) of any life-safety protected VA facility. These minimum standoff distances are to be provided to the edge of the curb line demarcating the internal roadways and parking within a VA campus. For facilities not located within a campus with internal roadways or parking, the minimum 25 feet (7.6 m) standoff is to be provided to site perimeter fence.

#### 3.1.1 Existing Facility – Standoff Distance

Requirements for standoff distance at existing facilities shall be the same as in section 3.1.

### 3.2 Perimeter Fences

Perimeter barriers shall consist of fences, walls, a combination of these, and gates as needed for access. The perimeter barrier shall be contiguous around the entire facility or the campus within which the facility is located. The barrier shall be designed to resist forced or surreptitious entry using hand tools, such as by spreading bars of a fence to provide a passable opening. Fences shall have sufficient lateral support to resist overturning by manual force. The perimeter barrier, or *pedestrian barrier*, does not have to be *anti-ram* rated unless the barrier serves to mitigate a determined risk. Access gates shall be located to direct

pedestrians and vehicles in ways that enhance the operational environment of the security force.

### **3.2.1 Location**

The perimeter barrier shall be located as close as possible to (or along) the property line of the site on which the facility is located such that the standoff distance to the barrier is maximized and satisfies the minimum standoff distance requirements.

### **3.2.2 Height**

The perimeter barrier shall have at least 8 feet (2.4 m) between potential horizontal footholds or designed with other anti-climb measures.

### **3.2.3 Material**

Fences shall be metal and of heavy industrial-grade construction with bar spacing at a maximum of 5 inches (127 mm) on center. Chain link fences and gates shall not be used. Walls shall be of reinforced masonry or concrete construction.

### **3.2.4 Gates**

Gates shall be of the same or similar design and materials as the adjacent fences. Location of the gates shall have standoff from public streets to provide the security force with early warning of approaching pedestrians or vehicles. Gates shall be located away from known criminal adjacencies (such as prisons and high crime areas). The site adjacent to the gates shall provide transitional, non-silhouette lighting, and traffic calming features. Gates shall be access card operated from the outside or as prescribed by the AHJ.

**3.2.4.1 Pedestrian gates:** Pedestrian and bicycle gates shall swing in the outward direction and shall be fully accessible to persons with disabilities in width and operation.

**3.2.4.2 Vehicular gates:** Vehicular security gates shall be sliding or cantilevered (no tracks) and only wide enough to accommodate one vehicle lane. The vehicular gates shall be capable of being locked, but do not have to be anti-ram rated.

### **3.2.5 Existing Facility – Perimeter Fences**

Requirements for perimeter fences at existing facilities shall be the same as in section 3.2.

## **3.3 Vehicle and Pedestrian Screening**

No additional physical security requirements.

## **3.4 Anti-ram Rated Vehicle Barriers**

Vehicle barriers shall be selected on the appropriateness of the architecture of the facility and the specifics of the site and natural environment.

### 3.4.1 Active Barriers

No additional physical security requirements.

### 3.4.2 Stationary (Passive) Barriers

Anti-ram rated natural or manmade stationary barriers may be used. Landscaping examples include berms, gullies, boulders, trees, and other terrain. Hardscaping examples include benches and planters. Structural examples include walls, bollards, and cables.

**3.4.2.1 Locations:** Adjacent to *high risk* perimeter fences, protection for site utility equipment, at building entrances, at vehicle or ambulance drop-offs, at cafeterias, gathering areas, and other areas requiring additional protection from vehicles. High risk perimeter fences are portions of the fence at which there is a perpendicular vehicular roadway length equal to or greater than 200 feet (61 m), on which a vehicle can achieve a high approach speed.

**3.4.2.2 Structure:** See Chapter 7, section 7.4 Anti-ram Resistance, for structural requirements of passive barriers.

**3.4.2.3 Accessibility for persons with disabilities:** Coordinate locations of passive barriers, such as bollards, with accessibility requirements when placed adjacent to or across a path of pedestrian travel.

### 3.4.3 Existing Facility – Anti-ram Rated Vehicle Barriers

Requirements for vehicle barriers at existing facilities shall be the same as in section 3.4.2, or as determined by the facility risk assessment

## 3.5 Parking

### 3.5.1 Location

No new facilities shall be built with parking in or under the facility.

**3.5.1.1 Surface parking:** Vehicles shall not be parked or permitted to travel closer than 25 feet (7.6 m) to any life-safety protected VA facility.

**3.5.1.2 Parking structures:** No parking structure, whether on- or offsite, and whether above or below grade, shall be constructed closer than 25 feet (7.6 m) to any VA life-safety protected facility. Parking in or under a VA facility shall be restricted. No unscreened vehicles shall be permitted to be parked within or under any VA facility.

### 3.5.2 Access

**3.5.2.1 From vehicle entrance:** Access roads for all vehicles shall allow for separate driveways to the building entrance, service yard, or parking.

- Separate entrances to the site shall be provided for patients and visitors, employees and staff, emergency, and service and delivery vehicles.

- Access roads from entrances to parking for each vehicle type shall be separated, but may be connected for maintenance and emergency vehicles through gates controlled by access cards.
- Access roads shall be configured to prevent vehicles from attaining speeds in excess of 25 mph (40 kph).
- Straight-line vehicular approaches to a facility shall be avoided.

**3.5.2.2 From parking to facility:** See Chapter 4 for information on building entrances.

### **3.5.3 User Type**

In addition to the requirements of sections 3.5.1 and 3.5.2, the following are parking and access requirements for physical security according to specific users.

**3.5.3.1 Patients and visitors:** Parking and access for patients, visitors, and the persons transporting them to and from the VA facility shall be as convenient as possible to the main entrance, subject to the requirements of section 3.5.1.1. Parking and facility access shall comply with accessibility requirements for persons with disabilities.

- Where vehicles are unscreened, make site provisions to accommodate a shuttle service for persons needing assistance.
- Accessible shuttle stops or shelters in parking areas.
- Shuttle parking at building entrance.

**3.5.3.2 Emergency:** Emergency entrance shall be provided with a small parking area for emergency patients and space for ambulances as convenient as possible to the emergency entrance, subject to the requirements of section 3.5.1.1. Ambulances shall be permitted to approach the building directly and not be subjected to the distance requirements of this chapter.

**3.5.3.3 Childcare parents and staff:** All requirements for maintaining standoff distance between vehicles and the building shall apply. Child drop-off and pick-up shall be visible from the office of the childcare/development center and shall be monitored by VASS. All vehicular areas, onsite and adjacent offsite, including parking and access roads, shall be separated from playground areas by fences designed to prevent children from entering the vehicular areas and vehicles from entering the playground.

**3.5.3.4 Vendors:** The standoff distance and screening requirements of sections 3.1 and 3.3 apply. Vendors shall use the delivery vehicle entrance and service yard at the loading dock. Parking shall be provided for vendors in the service yard.

**3.5.3.5 Employees:** Where employees share access with patients and visitors, the entrance to the employee parking shall be controlled by a card-actuated gate. Employee parking areas shall be monitored by VASS. Emergency alert systems, such as blue phones, shall be provided at the discretion of the VA Police.

### **3.5.4 Existing Facility – Parking**

When separation of types of traffic is not feasible, card-controlled access gates and other traffic separation measures shall be used.

**3.5.4.1 Surface parking:** Passenger vehicles shall not be parked closer than 25 feet (7.6 m) to any life-safety protected VA facility. Existing parking within this standoff distance shall be eliminated, where possible. Where surface parking must remain within the 25 feet (7.6 m) standoff distance, the VA life-safety protected facility must be hardened to achieve the performance requirements for the corresponding increase in blast loads. See Chapters 6 and 7 for additional information on the façade and structural hardening requirements.

**3.5.4.2 Parking structures:** Where parking structure, whether on- or offsite, and whether above or below grade, must remain within the 25 feet (7.6 m) standoff distance, the VA life-safety protected facility must be hardened to achieve the performance requirements for the corresponding increase in blast loads. See Chapters 6 and 7 for additional information on the façade and structural hardening requirements.

## **3.6 Site Lighting**

### **3.6.1 General Requirements**

Provide minimum maintained illumination levels for pedestrian pathways, bicycle and vehicle routes, parking structures, parking lots, wayfinding, signage, pedestrian entrances, and building services which will provide safety and security for personnel, buildings, and site. Refer to the VA Electrical Design Manual for illumination requirements. Lighting shall provide for safety and security without compromising the quality of the site, the environment (including neighboring properties), or the architectural character of the buildings.

**3.6.1.1 Aesthetic:** The site lighting shall provide desired illumination and enhancement of trees, landscaping, and buildings without providing dark shadowy areas compromising safety and security.

**3.6.1.2 VASS:** Site lighting shall provide VASS and other surveillance support with illumination levels and color that assists in proper identification. Lighting shall be coordinated with VASS cameras to enhance surveillance and prevent interference. Avoid blinding VASS cameras in the placement and selection of fixtures and their cutoff angles.

**3.6.1.3 Luminance levels:** Illumination levels shall be in compliance with the Illumination Engineering Society of North America (IESNA), VA Electrical Design Guide, and local and state governing agencies.

**3.6.1.4 Signage and wayfinding:** Shall be enhanced by site lighting, including providing improved security by assisting pedestrians and vehicles to locate their destinations expeditiously. Refer to the latest edition of the VA Signage Design Guide.

**3.6.1.5 Environmental:** Minimize light pollution and spill into neighboring properties by selection of fixtures' cutoff angles to minimize their nuisance visibility from adjacent areas on and off VA property.



### **3.6.2 Lighting Locations**

Comply with all requirements for site lighting as set forth in VA publications. In addition, the following areas require additional attention in lighting design to support security and safety needs.

**3.6.2.1 Site entrances:** Lighting shall be provided at all site entrances at illumination levels that assist in after dark performance of security duties.

- To assist guards with visual personal identification into vehicles to see the driver's compartment and view ID.
- To assist guards with visual screening of box trucks, cargo areas, trunks, and trailers.
- To provide illumination of wayfinding and other signage.

**3.6.2.2 Perimeter fence:** Lighting sufficient to support perimeter VASS surveillance shall be provided without objectionable spill onto neighboring properties or rights-of-way. Where a perimeter road has been provided for patrols or other functions, the lighting may be combined with roadway lighting.

**3.6.2.3 Building entrances and exits:** Lighting at building entrances shall support VASS surveillance and ID functions while providing illumination of surfaces and features for safety.

**3.6.2.4 Parking areas:** All parking areas covered and open shall be lighted in support of VASS and other surveillance without objectionable spill into adjacent areas on or off site.

**3.6.2.5 Pathways:** Pedestrian and bicycle pathways and walks, including bike racks, gates, and other features shall be illuminated in support of VASS and other surveillance, while providing for safety without objectionable spill onto adjacent areas on and off site.

**3.6.2.6 Signage:** All signage shall be adequately illuminated to provide safe wayfinding and identification. Wayfinding maps and texts shall be individually illuminated.

**3.6.2.7 Enclosures:** Liquid oxygen tanks and other enclosures, such as water tanks/towers and refueling stations, shall be illuminated in support of VASS and visual surveillance without spillage into other areas on- or off site.

**3.6.2.8 Trash collection areas:** Collection areas shall be illuminated in service yards as a part of the yard illumination. Individual trash bins may not require illumination.

**3.6.2.9 Loading docks and associated yards:** Loading areas shall be fully illuminated for operations and in support of VASS and other surveillance and identification needs.

### **3.6.3 Existing Facility – Site Lighting**

Site lighting for existing facilities shall meet the requirements in section 3.6.

## **4 BUILDING ENTRANCES & EXITS**

### **4.0 Scope, Purpose, and Goals**

This section provides requirements for public entrances, entrance lobbies, patient drop-offs, and staff entrances. Reduce the number of public entrances to the minimum number required. Entrance requirements for specific functional areas, such as emergency department, loading dock, and other service entrances for life-safety protected facilities, are covered in Chapter 5. Specific requirements for security devices and their locations can be found in Appendix A, Security Door Openings, and Appendix B, Security System Application Matrix.

### **4.1 Public Entrances and Lobbies**

Public access to the facility should be restricted to a single or limited number of entrances.

#### **4.1.1 Entrances**

**4.1.1.1 Public entrances:** The primary public entrance is to the main lobby of the life-safety protected facility. Other public entrances shall be kept to a minimum.

**4.1.1.2 Staff entrances:** Staff entrances shall be located independently of main entrance lobbies and be convenient to staff parking. Provide staff entrances with access control, visual monitoring devices, and intrusion detection system.

#### **4.1.2 Screening Vestibules**

The screening vestibule shall have sufficient space and be provided with power, telecommunications, and data connections for installation of access control and screening equipment that may be used should the need arise. Configure access from the drop-off to the lobby through the screening vestibule to prevent circumvention of screening process. Arrange path of travel to prevent vehicular access beyond the standoff distance to the building perimeter. Provide sufficient size to accommodate several people with mobility aids.

The screening vestibule may be one of two types: independent of the main building or part of the main building near the entrance doors. The standoff distance for vehicles may be measured to the main building façade whether the entry vestibule is within the building or an independent structure.

**4.1.2.1 Screening vestibules as a separate lobby** that is independent of the main building. The preference is for the screening vestibule to be located outside of the VA life-safety protected facility footprint as a stand-alone structure or structurally isolated from the protected building, such that any damage to the vestibule will not impact the integrity of the VA life-safety protected facility. When the screening vestibule is a stand-alone or independent structure, the standoff requirements of Chapter 3, the façade requirements of Chapter 6, and the structural requirements of Chapter 7 are

not applicable to the vestibule. However, laminated glass is to be used for all of the screening vestibule's exterior glazing.

**4.1.2.2 Screening vestibule as a part of the main building lobby** near the entrance doors. When the screening vestibule shares an internal wall or slab with the VA life-safety protected facility, the internal wall or slab is to be designed as an exterior wall or slab per the requirements of Chapter 6 and Chapter 7. The blast hardening requirements of Chapter 6 and Chapter 7 apply to the exterior wall(s) of the main building lobby.

### **4.1.3 Primary Public Entrances and Lobbies**

**4.1.3.1 Location:** Vehicles may not approach within 25 feet (7.6 m) of the entrance.

**4.1.3.2 Doors:** Entrance doors to the lobby shall be visible to or monitored by the security personnel.

**4.1.3.3 Access within the facility:** Access from the lobby to elevators, stairways, and corridors shall be controlled through the use of electronic access control or mechanical locking devices, limiting access to specific floors and areas that house functions requiring restricted access.

- Install card readers or other electronic access control devices at the entrances to restricted areas. Devices shall be located at entrances to suites and individual rooms from public corridors.
- Install elevator call buttons requiring use of key cards or other electronic access control when they are located in restricted areas.

### **4.1.4 Access for Emergency Responders**

When provided, the Fire Command Center (FCC) and secure house key box for emergency responders shall be located near an entrance door at a location approved by the VA PM, security personnel, and emergency responders. The door associated with the FCC shall be monitored by VASS and controlled by security personnel.

### **4.1.5 Planning, Construction Details, and Materials**

**4.1.5.1 Structural:** Building entrances shall be constructed to fail in a way that minimizes hazard to persons inside. (See Chapter 6, Building Envelope and Chapter 7, Structural System, for additional requirements.)

- Protection of entrances and lobbies from vehicle ramming shall be accomplished outside and in front of the entrance. (See Chapter 3, section 3.4 Vehicle Barriers.)
- Where a covered drop-off area is provided, its supporting structure shall be independent of the main building and protected from intentional and unintentional damage by vehicles. Protect supporting columns with anti-ram rated barriers and from explosive devices with architectural or structural finishes that prevent detonation within 6 inches.
- Drop-off areas are not permitted beneath the VA life-safety protected facility footprint.

**4.1.5.2 Façade:** All glazing (both interior and exterior) in the lobby area shall be laminated glass.

**4.1.5.3 Doors and hardware:** Exterior doors shall be in size, operation, and other characteristics in compliance with applicable regulatory requirements. Where doors are lockable, they shall comply with emergency egress requirements. Refer to Program Guide (PG-18-14) Room Finishes, Door, and Hardware Schedule, and Appendix A, Security Door Openings, for additional requirements.

- Glass for entrance and egress doors shall be laminated.
- Entrance doors shall be capable of being remotely locked and unlocked from the reception desk in the main lobby, the *security control center (SCC)*, or other designated position.
- Public entrance doors may be manually or power operated and may be swinging doors, horizontal sliding doors (power operated only), or revolving doors.
- Staff entrance doors shall prevent unauthorized access.
- Residential facilities requiring 24-hour access shall be provided with electronic or mechanical locks on exterior doors as well as visual monitoring and voice communication with connection to information desk or security office.
- Staff entrance door hardware shall include either mechanical or electronic locks.
- Means of egress doors that do not also function as entrances shall be provided with delayed action and alarmed emergency egress hardware.

**4.1.5.4 Receptacles:** Letter boxes and receptacles for trash and smoking paraphernalia shall not be located within 5 feet (1.5 m) of load-bearing elements. Those within 25 feet (7.6 m) of the building shall be designed to prevent depositing of explosive charges or to contain explosions with a *W0 charge weight* (defined in the Physical Security Design Standards Data Definitions) as directed by the VA PM and coordinated with the structural engineer.

#### **4.1.6 HVAC**

Maintain positive pressure in lobbies and entrance areas.

- Refer to Chapter 9, Building Systems, for requirements regarding relationship of air intakes to drop-off areas.

#### **4.1.7 Security**

All public entrances require security monitoring. At public entrances provide the means to restrict public access to those areas where screening is available when screening is required.

**4.1.7.1 Security guard stations:** No additional physical security requirements.

**4.1.7.2 Screening devices:** At all public entrances provide the required connections for temporary installation of *metal detectors* and package screening equipment and sufficient space for their installation and operation.

- Locate screening equipment in a manner that will prevent passage into the building or facility without passing through the devices.
- When screening devices are not permanently installed, provide secure storage in close proximity to their installation location.
- Locate screening equipment so as not to restrict emergency egress.

- Screening devices shall accommodate persons with disabilities.

**4.1.7.3 Security devices:** VASS cameras shall be provided to monitor activities in the vestibules and lobbies and shall be located to provide views of approaching pedestrian and vehicular traffic, drop-off areas, building entrances, and departing pedestrian and vehicular traffic.

#### **4.1.8 Existing Facility – Public Entrances and Lobbies**

**4.1.8.1 Covered drop-off:** Protect columns with anti-ram barriers such as bollards and from explosive devices by installation of architectural or structural finishes that prevent detonation within 6 inches (152 mm).

**4.1.8.2 Vestibules:** Where space permits, provide an entrance vestibule of sufficient size to accommodate several people with mobility aids. Configure access from the drop-off to the lobby through the screening vestibule to prevent circumvention of screening process. Arrange path of travel to prevent vehicular access beyond the standoff distance to the building perimeter.

**4.1.8.3 Glazing:** All glazing (both interior and exterior) in the lobby area shall be laminated glass or fitted with attached anti-fragmentation film.

**4.1.8.4 Access within the facility:** Modify existing elevator call buttons to require electronic access control to register calls when elevators open directly into restricted areas. Alternatively, construct secure vestibules at elevator lobbies on floors with restricted access.

**4.1.8.5 Security devices:** VASS cameras shall be required and located in accordance with section 4.1.7.3.

**4.1.8.6 Receptacles:** Locate as per section 4.1.5.4.

## **4.2 Patient Drop-offs**

Patient drop-offs shall be located at primary building entrances or other locations that will provide convenient access to services without hindering the flow of traffic. Patient drop-off areas shall not be located under occupiable portions of the building or near staff-only entrances.

### **4.2.1 Vehicular Access**

Drop-offs and staging areas for vehicles, including public transportation vehicles, shall be separated from the protected building structure by at least 25 feet (7.6 m).

### **4.2.2 Parking**

Parking shall not be permitted in patient drop-off areas. This should be designated by pavement markings and signage.

### **4.2.3 Security**

Provide VASS cameras for general surveillance of the area.

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**4.2.4 Existing Facility – Patient Drop-offs**

Patient drop-offs for existing facilities shall meet the requirements of 4.2.

### **4.3 Building Exits and Life Safety Considerations**

Means of egress shall not be obstructed by installation of security devices such as guard stations, screening equipment, or other security devices. Delayed egress and alarmed exits shall comply with applicable codes and regulations.

#### **4.3.1 Site Requirements**

Provide an unobstructed and adequately lighted path from each means of egress to a safe location outside the building.

- Where the means of egress is accessible to persons with disabilities, provide an accessible route to a safe location outside the building.
- Where means of egress lead to loading docks or other service areas, direct users away from hazardous and pathological waste storage, mailrooms, and other areas that may be the source of injury or contamination.
- Plan and locate egress paths so that they are not obstructed by the anti-ram barriers or other similar devices.

#### **4.3.2 Planning, Construction Details, and Materials**

Construction of building entrances and exits shall be consistent with the requirements for adjacent building envelope elements.

- See Chapter 6 for blast requirements for the building envelope.
- Means of egress doors shall be of construction that makes unauthorized entry from the exterior difficult. Provide hardware that minimizes the opportunity for unauthorized entry by using components such as continuous hinges and astragals.

#### **4.3.3 Security Monitoring**

Where means of egress do not also function as access points for the building, provide card reader for authorized users and delayed action, alarmed egress hardware to indicate unauthorized use.

- Provide VASS cameras at locations with alarmed exits, at loading docks, and other areas subject to pilferage.
- Install door status monitors at doors intended to be used only for emergency egress.

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**4.3.4 Existing Facility – Building Exits and Life Safety Considerations**

Existing facilities shall meet the requirements of section 4.3.

## **5 FUNCTIONAL AREAS**

### **5.0 Scope, Purpose, and Goals**

The following functional areas require enhanced protection when included in mission critical or life-safety protected buildings. Refer to the *Physical Security Design Manual for Mission Critical Facilities* for design requirements for these functional areas. Specifically, all requirements of the VA Fire Protection Design Manual (which covers all VA construction) and the OIT Design Guide (which covers all spaces under OIT's purview) remain in effect.

#### **5.1 Agent Cashier**

#### **5.2 Cache**

#### **5.3 Childcare/Development Center**

#### **5.4 Main Computer Room**

#### **5.5 Emergency Department**

#### **5.6 Emergency and/or Standby Generator Room**

#### **5.7 Energy Center/Boiler Plant**

#### **5.8 Fire Command Center**

#### **5.9 Incident Command Center**

#### **5.10 Loading Dock and Service Entrances**

#### **5.11 Mailroom**

#### **5.12 Pharmacy**

#### **5.13 Police Operations Room and Holding Room**

#### **5.14 Records Storage and Archives**

#### **5.15 Research Laboratory and Vivarium**

#### **5.16 Security Control Center**

## **6 BUILDING ENVELOPE**

### **6.0 Scope, Purpose, and Goals**

This section provides requirements for exterior walls other than load bearing walls; glazed façade fenestration and glazed atria; for roof structures, including skylights; and air intakes and exhausts servicing critical equipment but does not pertain to stacks and wall openings for non-critical equipment. These requirements are in addition to the requirements for conventional façade design, including the provisions for hurricane, earthquake, and any other extreme loading condition required by code. The magnitudes of W0, W1, and GP1 are defined in the Physical Security Design Standards Data Definitions, a document separate from this Manual. It is provided on a need-to-know basis to the blast/structural engineers performing analysis and design of VA projects. Authorized users can contact the Office of Construction and Facilities Management (CFM) in VA to request the document. [Note: The W and GP values in the Physical Security Design Standards Data Definitions were updated along with this Manual. Users shall use the updated values.]

Connecting corridor concourse and bridges, that are not the main entrance or required exit for the connected buildings, and freestanding greenhouses shall be exempt from the requirements of Chapters 6 and 7. When the connecting corridor or bridge includes the main entrance for the connected buildings, it shall not be exempt. When the internal wall is shared with a VA mission critical facility, the internal wall is to be designed as an exterior wall per the requirements of Chapter 6 and Chapter 7. Physical security requirements for temporary buildings shall be determined on a case by case basis by the AHJ.

Buildings of such occupancy type and floor area that would allow Type V construction as defined in the International Building Code are exempt from the building envelope blast resistant design requirements in Chapter 6. However, laminated glass shall be used for fenestration and atria. For insulated glazing units, the interior light of glass is to be laminated. For existing facilities, a daylight application of 7 mil anti-shatter film shall be applied to existing windows.

In order to meet the physical security standards of this chapter, the design team must include a security specialist and a structural blast specialist. The qualifications requirements for these specialists are included in section 1.5.

### **6.1 Walls**

#### **6.1.1 Non-load Bearing Walls**

Non-load bearing walls shall be designed such that they have some permanent deformation but are generally repairable in response to the calculated peak pressures and impulses resulting from the design level vehicle threat (W1) located at the minimum standoff distance of 25 feet (7.6 m), but no greater than GP1. Standoff provided in excess of the 25 feet (7.6 m)



or increased distances over the height of the building may not be accounted for in the calculation of the blast loading environment. Although negative phase loading should not be considered, the effects of rebound shall be included in the design of blast resistant façade. Deformations shall be as defined by the B3 response limits per the Protective Design Center document PDC-TR 06-08, *Single Degree of Freedom Structural Response Limits for Antiterrorism Design*.

**6.1.1.2 Supporting structure:** Walls shall span from slab to slab and shall not be attached directly to gravity load bearing elements (such as columns and shear walls) unless an advanced analysis of the load bearing element demonstrates it can accept the maximum blast forces transferred by the members framing into it without compromising its load bearing capacity.

**6.1.1.3 Loads:** Walls shall be able to accept the tributary loads transferred from glazed fenestration in addition to the design level blast pressures applied directly to their surface.

### **6.1.2 Existing Facility – Walls**

For building upgrades in which the façade is being completely replaced, the existing facility shall comply with the requirements defined in Section 6.1.1.

## **6.2 Fenestration and Doors**

### **6.2.1 Façade Fenestration**

All façade fenestration shall be designed to crack but fragments shall enter the occupied space and land on the floor no further than 10 feet (3 m) from the façade in response to the calculated peak pressures and impulses resulting from the design level threat (W1) located at the minimum standoff of 25 feet (7.6 m), but no greater than GP1. Although negative phase loading should not be considered, the effects of rebound shall be included in the design of blast resistant glazing. All blast resistant design requirements are in addition to the requirements of the VA Window Specifications. The use of operable windows for blast resistant design is discouraged; however, where operable windows are required, their performance must be demonstrated with acceptable explosive (or shock tube) test data while in the open position.

**6.2.1.1 Glass:** All new exterior glazing is to use laminated glass. For insulated glazing units (IGUs) the laminated glass is required only for the inner lite.

**6.2.1.2 Glazing:** The glass shall be restrained within the mullions with a minimum ½" bite and a continuous bead of structural silicone adhesive attaching the inner lite of glass to the frame to allow it to develop its post-damage capacity.

**6.2.1.3 Mullions:** The mullions are to be of aluminum and/or steel construction and shall be designed to accept a blast load equal to the maximum capacity of the weakest lite of supported glass (i.e., *balanced design*), but no less than the design level pressures while sustaining deformations no greater than L/30. For windows with glazing lay-up governed by non-blast requirements (hurricane, forced entry, fabrication, handling, and ballistic), mullions are to be designed for the capacity of the glazing that would be required to meet the blast requirements only.

**6.2.1.4 Curtainwall:** Curtainwall framing members shall span from slab to slab and shall not be attached directly to gravity load bearing elements (such as columns and shear walls) unless an advanced analysis of the load bearing element demonstrates it can accept the maximum blast forces transferred by the members framing into it without compromising its load bearing capacity.

### **6.2.2 Existing Facility – Fenestration**

For upgrades in which the façade is not replaced, a mechanically anchored or wet glazed attached 7-mil thick anti-shatter film may be used to satisfy the requirements of this section. Glass replacement upgrades, window replacement upgrades, and “storm-window” upgrades interior to existing historic facade shall use laminated glass and structural silicone sealant. For insulated glazing units (IGUs) the laminated glass is required only for the inner lite. No upgrades to the frames or mullions are required for glass replacement projects. For upgrades in which the façade is being completely replaced, the existing facility shall comply with the requirements defined in Section 6.2.1.

### **6.2.3 Doors**

All doors shall be designed using debris mitigating materials such as laminated glass and heavy gauge metal (14-gauge minimum), shall open towards the detonation, and the heavy duty frames and anchorages shall be capable of resisting the collected blast loads. Frame rotations shall be limited to L/30.

All roll down doors shall be constructed of 14-gauge metal, and the anchorage to the overhead support shall be designed to resist the collected blast loads.

## **6.3 Atria**

### **6.3.1 Atria**

All vertical, horizontal, and sloped glass surfaces shall be designed to crack but fragments shall enter the occupied space and land on the floor no further than 10 feet (3 m) from the façade in response to the calculated peak pressures and impulses resulting from the design level vehicle threat (W1) located at the standoff distance, but no greater than GP1. Although negative phase loading should not be considered, the effects of rebound shall be included in the design of blast resistant façade. All blast resistant design requirements are in addition to the requirements of the VA Window Specifications.

**6.3.1.1 Skylights:** See section 6.4.2.

**6.3.1.2 Glass:** See Section 6.2.1.1.

**6.3.1.3 Glazing:** See Section 6.2.1.2.

**6.3.1.4 Mullions:** See Section 6.2.1.3.

**6.3.1.5 Framing:** Atria framing members shall be designed to continue carrying gravity loads while sustaining deformations no greater than L/30 in response to the collected blast loads.

### **6.3.2 Existing Facility – Atria**

Upgrades involving the replacement of the atria framing shall meet the requirements of section 6.3.1.5.

## **6.4 Roofs**

### **6.4.1 Roof Structure**

Roof structure (including metal deck, composite deck, concrete slabs, beams, joists, and girders) shall be designed to withstand the design level vehicle threat (W1) located at the minimum standoff distance of 25 feet (7.6 m). Note that the GP1 peak pressure and impulse limit should not be used in the design of the roof structure. Standoff provided in excess of the 25 feet (7.6 m) may not be accounted for in the calculation of the blast loading environment. Although negative phase loading should not be considered, the effects of rebound shall be included in the design of blast resistant roof. Deformations shall be as defined by the B3 response limits per the Protective Design Center document PDC-TR 06-08, *Single Degree of Freedom Structural Response Limits for Antiterrorism Design*. The blast loading shall take into account the presence of parapets, the diffusion of blast waves, and the spatial extent of the roof surface.

### **6.4.2 Skylights**

Skylight glass shall be designed to crack but remain in its frame in response to the calculated peak pressures and impulses resulting from the design level vehicle threat (W1) located at the minimum standoff distance of 25 feet (7.6 m), but no greater than GP1. Standoff provided in excess of the 25 feet (7.6 m) may not be accounted for in the calculation of the blast loading environment.

**6.4.2.1 Glass:** All skylight glazing is to use laminated glass. For insulated glazing units (IGUs) the laminated glass is required only for the inner lite.

**6.4.2.2 Glazing:** Skylight glass shall be restrained within the mullions with a minimum ½" bite and a continuous bead of structural silicone adhesive attaching the inner lite of glass to the frame, to allow it to develop its post-damage capacity.

**6.4.2.3 Mullions:** The mullions are to be of aluminum and/or steel construction and shall be designed to accept a blast load equal to the maximum capacity of the weakest lite of supported glass (i.e., balance design), but no less than the design level pressures while sustaining deformations no greater than L/30.

### **6.4.3 Penthouses Enclosing Critical Equipment**

Penthouse enclosures shall be designed to resist the peak blast pressures and impulses resulting from the design level vehicle threat (W1) located at the minimum standoff distance of 25 feet (7.6 m), but no greater than GP1. Standoff provided in excess of the 25 feet (7.6 m) may not be accounted for in the calculation of the blast loading environment.

#### **6.4.4 Existing Facility – Roofs**

For upgrades in which the skylight is not replaced, a mechanically anchored or wet glazed 7-mil thick anti-shatter film may be used to satisfy the requirements of this section. Glass replacement upgrades shall use laminated glass and structural silicone sealant. For insulated glazing units (IGUs) the laminated glass is required only for the inner lite. No upgrades to the frames or mullions are required for glass replacement projects. For upgrades in which the skylight roof is being completely replaced, the existing facility shall comply with the requirements defined in Section 6.4.2. For upgrades in which the structural roof is being completely replaced the existing facility shall comply with the requirements defined in Section 6.4.1.

### **6.5 Air Intakes and Exhausts Servicing Critical Equipment**

#### **6.5.1 Intakes and Exhausts**

Air intakes and exhausts shall be designed to minimize the blast over pressure applied to critical mechanical equipment due to the design level vehicle threat (W1) located at the minimum standoff distance of 25 feet (7.6 m), up to a maximum peak pressure and corresponding impulse of GP1, by means of hardened plenums and internal or external structured baffles. Standoff provided in excess of the 25 feet (7.6 m) may not be accounted for in the calculation of the blast loading environment. Deformations of hardened plenums and structured baffles in response to the blast loading shall be as defined by the B3 response limits per the Protective Design Center document PDC-TR 06-08, *Single Degree of Freedom Structural Response Limits for Antiterrorism Design*. Anchorage of baffles shall be designed for the collected blast loads. Baffles shall provide an overlap that is equivalent to the space between the baffle and the surrounding wall. The design shall deny a direct line of sight from the design level vehicle threat (W1) located at the standoff distance to the critical infrastructure within. Where direct lines of sight cannot be denied, distributed redundancy may be required to provide continuous operations. Louvers in areas prone to hurricanes or wind hazards (in accordance with ASCE 7-10) shall be certified by the manufacturer to meet the following Florida Building Code tests: Uniform Static Air Pressure Test, Cyclic Wind Pressure Test, Large Missile Impact Test, and Wind Driven Rain Resistance Test.

#### **6.5.2 Existing Facility – Air Intakes and Exhausts Servicing Critical Equipment**

Air intakes and exhausts shall be upgraded to minimize the extent of debris that may enter *critical spaces* in response to the design level vehicle threat (W1) located at the minimum standoff distance of 25 feet (7.6 m), up to a maximum peak pressure and corresponding impulse of GP1. Standoff provided in excess of the 25 feet (7.6 m) may not be accounted for in the calculation of the blast loading environment. Hardened plenums and structured baffles, impact and wind driven rain resistant louvers, as described in section 6.5.1, shall be installed when a major interior renovation or major equipment replacement is performed.

## **6.6 Calculation Methods**

All blast design and analysis, whether for new or existing construction, shall be performed in accordance with accepted methods of structural dynamics. Explosive (or shock tube) testing is required wherever operable windows are used or where the behavior of energy absorbing or other complex façade systems cannot be characterized by analytical methods.

### **6.6.1 Design and Detailing**

The performance of façade in response to blast loading is highly dynamic and often inelastic. Design and detailing of protected façade shall therefore be based on analytical methods that accurately represent the loads and response. Explosive test data, developed by an experienced testing facility approved by the U.S. Government (USG), may be used to supplement the analytical methods where a direct analytical representation is not feasible.

### **6.6.2 Blast Loads**

Blast loads shall typically be developed using the semi-empirical relations of UFC 3-340-01, *Design and Analysis of Hardened Structures to Conventional Weapons Effects*, dated June 2002 (CONWEP).

### **6.6.3 Dynamic Response**

Dynamic structural response analyses shall be performed using either empirical data developed by an approved USG testing laboratory, simplified Single-Degree-of-Freedom (SDOF) analytical methods or advanced Finite Element Methods (FEM). Where simplified SDOF methods are used, the performance criteria shall be in accordance with this document. Where advanced FEM are used, the performance shall be demonstrated through interpretation of the calculated results. Dynamic glass response analyses shall be performed using window glazing analysis and design software developed by the USG, such as WINGARDPE, WINLAC, or HAZL, which are capable of predicting the glass, film, and laminate response when subjected to the blast loading environment.

## **7 STRUCTURAL SYSTEM**

### **7.0 Scope, Purpose, and Goals**

This chapter provides requirements for blast resistant structures and includes requirements for the prevention of progressive collapse and the hardening of critical columns and load bearing walls. All building components requiring blast resistance must be designed using established methods and approaches for determining dynamic loads, structural detailing, and dynamic structural response. Alternative analysis and mitigation methods are permitted, provided that the performance level is attained.

While structural hardening makes the structure resistant to a specific threat, design to resist progressive collapse increases the robustness of the structure to an undefined event. This threat independent approach provides redundant load paths, ductility, and continuity. Designers may apply static and/or dynamic methods of analysis to demonstrate compliance with this requirement.

These requirements are in addition to the requirements for conventional structural design, including the provisions for hurricane, earthquake, and any other extreme loading condition required by code. The magnitudes of W0 and W1 are defined in the Physical Security Design Standards Data Definitions, a document separate from this Manual. It is provided on a need-to-know basis to the blast/structural engineers performing analysis and design of VA projects. Authorized users can contact the Office of Construction and Facilities Management (CFM) in VA to request the document. [Note: The W and GP values in the Physical Security Design Standards Data Definitions were updated along with this Manual. Users shall use the updated values.]

The minimum physical requirements for the construction of active and passive vehicle barriers are also included in this chapter.

Connecting corridor concourse and bridges, that are not the main entrance or required exit for the connected buildings, and freestanding greenhouses shall be exempt from the requirements of Chapters 6 and 7. When the internal wall is shared with a VA mission critical facility, the internal wall is to be designed as an exterior wall per the requirements of Chapter 6 and Chapter 7. Physical security requirements for temporary buildings shall be determined on a case-by-case basis by the VA PM with concurrence of the AHJ.

Buildings of such occupancy type and floor area that would allow Type V construction as defined in the International Building Code are exempt from the blast resistance and progressive collapse prevention requirements of Chapter 7, sections 7.1 through 7.3. However, connections of primary structural members shall be designed to develop the flexural capacity of the members. Members shall develop their full plastic capacities before they may detach due to connection failure. Balanced design approach as defined in ASCE 59-11 shall be used to prevent brittle modes of failure.

In order to meet the physical security standards of this manual the design team must include a security specialist and a structural blast specialist. The qualifications for these specialists are included in section 1.5.

## 7.1 Blast Resistance

Structures shall be constructed to withstand the actual pressures and corresponding impulses produced by the design level vehicle threat (W1) located at the standoff distance and the design level satchel threat (W0) that may be delivered to loading docks, mailrooms, and lobbies. The design shall provide a level of protection for which progressive collapse will not occur, the building damage will be economically repairable, and the space in and around damaged area can be used and will be fully functional after cleanup and repairs. Standoff distances provided in excess of 25 feet (7.6 m) may not be accounted for in the calculation of the blast loading environment.

### 7.1.1 Priority for Protection

The priority for blast resistance shall be given to critical elements that are essential to mitigating progressive collapse. Designs of secondary structural elements, primary nonstructural elements, and secondary non-structural elements shall minimize injury and damage. The priority depends on the relative importance of structural or non-structural elements in the following order.

All flexural elements and their connections shall be designed and detailed such that no brittle failure mode limits the capacity of the section. Unless the element is designed to remain elastic in response to blast loading, ductile failure modes shall be the governing failure mode for flexural elements and their connections and splices. When the elements are designed to resist the blast loads elastically, the design of non-ductile modes shall include a 1.5 factor of safety on the calculated forces.

**7.1.1.1 Primary structure:** Primary structural elements are the essential parts of the building's resistance to catastrophic failure, including columns, girders, roof beams, and the main lateral resistance system. Deformations shall be as defined by the B2 response limits per the Protective Design Center document PDC-TR 06-08, *Single Degree of Freedom Structural Response Limits for Antiterrorism Design*.

**7.1.1.2 Secondary structure:** Secondary structural elements are all other load bearing members, such as floor beams and slabs. Deformations shall be as defined by the B3 response limits per the Protective Design Center document PDC-TR 06-08, *Single Degree of Freedom Structural Response Limits for Antiterrorism Design*.

**7.1.1.3 Primary non-structural (non-façade elements):** Primary non-structural elements and their attachments that are essential for life-safety systems or elements that can cause substantial injury if failure occurs, including overhead or heavy suspended mechanical units or fixtures weighing more than 31 lbs. Anchor these elements (excluding distributed systems such as suspended ceilings or piping networks) with lateral ties capable of resisting lateral motions associated with the

building's calculated blast induced base shear. This requirement does not preclude the need to design the mountings for forces required by other criteria such as seismic standards.

**7.1.1.4 Secondary non-structural:** Secondary non-structural elements are all elements not covered in primary non-structural elements, such as partitions, furniture, and light fixtures. Provide a positive means of attachment of these elements to the building structure and to designing arrangements that will minimize debris following in-structure shock motions.

### **7.1.2 Existing Facility – Blast Resistance**

See section 7.3.1.

## **7.2 Progressive Collapse**

Single story structures are exempt from progressive collapse requirements. All structures with two stories or more shall be designed to minimize the potential for progressive collapse using the Tie Force Method, in which the structure shall develop peripheral, internal, and vertical tie forces by providing continuous reinforcement and ductile detailing. The requirements of the Tie Force Method for demonstrating a structure's resistance to progressive collapse shall conform to U.S. Government (USG) guidelines, specifically, Design of Buildings to Resist Progressive Collapse, UFC 4-023-03 dated 27 January 2010.

### **7.2.1 Existing Facility – Progressive Collapse**

No additional physical security requirements.

## **7.3 Column Protection**

Columns and load bearing walls exposed to blast loading shall be hardened or isolated to resist the effects of the design level vehicle threat (W1) located at the provided standoff distance and the design level satchel threat (W0) that may be delivered to loading docks, mailrooms, and lobbies. The design shall provide a level of protection for which progressive collapse will not occur, the building damage will be economically repairable, and the space in and around damaged area can be used and will be fully functional after cleanup and repairs. Deformation limits shall be as defined by the B2 response limits per the Protective Design Center document PDC-TR 06-08, *Single Degree of Freedom Structural Response Limits for Antiterrorism Design*.

### **7.3.1 Existing Facility – Column Protection**

Protect columns in spaces the public can access prior to screening from explosive devices by installation of architectural or structural finishes that prevent detonation within 6 inches (152 mm).



## 7.4 Wall Protection

Non-load bearing interior walls separating high risk interior spaces (loading docks, mailrooms, and lobbies) shall be hardened to resist the effects of the design level satchel threat (W0) that may be delivered to these spaces. Walls shall be of reinforced masonry or concrete construction. Deformation limits shall be as defined by the B3 response limits per the Protective Design Center document PDC-TR 06-08, *Single Degree of Freedom Structural Response Limits for Antiterrorism Design*. Doors within these walls are to be of heavy gauge steel or laminated glass construction and are to open into the high risk space.

### 7.4.1 Screen Walls

Non-load bearing screen walls that enclose critical equipment and the structure providing lateral resistance shall be hardened to withstand the actual pressures and corresponding impulses produced by the design level vehicle threat (W1) located at the minimum standoff distance of 25 feet (7.6 m). Walls shall be of reinforced masonry or concrete construction. Deformation limits shall be as defined by the B3 response limits per the Protective Design Center document PDC-TR 06-08, *Single Degree of Freedom Structural Response Limits for Antiterrorism Design*. Doors within these walls are to be of heavy gauge steel and are to open outwards.

## 7.5 Anti-ram Resistance

### 7.5.1 Vehicle Barriers

Both active and passive barriers shall be tested and certified to be capable of stopping a 4,000 pound (1,800 Kg) vehicle at a speed of 30 miles per hour (48 Km/hr) with a maximum penetration distance of 3.3 feet (1m). (See also Chapter 3, Section 3.4 Vehicle Barriers.)

**7.5.1.1 Certification/Testing:** Performance of anti-ram element shall be demonstrated by means of impact testing or detailed finite element analysis of the vehicle impact. Testing is to be performed using either ASTM 2656-07 or DOS SD-STD-02.01, Revision A.

**7.5.1.2 Active barriers:** Active barriers shall be electric or hydraulic wedges, bollards, beams, drop arms, or sliding gates.

**7.5.1.3 Passive barriers:** Passive barriers shall be walls, stationary bollards, cables, or combination of landscape and hardscape that achieves the required anti-ram resistance.

### 7.5.2 Existing Facility – Anti-ram Resistance

The requirements of section 7.5.1 shall apply.

## 7.6 Calculation Methods

All blast design and analysis, whether for new or existing construction, shall be performed in accordance with accepted methods of structural dynamics.

### **7.6.1 Design and Detailing**

The performance of structures in response to blast loading is highly dynamic and often inelastic. Design and detailing of these structures shall therefore be based on analytical methods that accurately represent the loads and response. Explosive test data, developed by an experienced testing facility approved by the USG, may be used to supplement the analytical methods where a direct analytical representation is not feasible.

### **7.6.2 Blast Loading**

Blast loads shall typically be developed using the semi-empirical relations of UFC 3-340-01 (CONWEP); however, where near contact detonations are considered, Computational Fluid Dynamics (CFD) methods may be required.

### **7.6.3 Dynamic Response**

Dynamic structural response analyses shall be performed using either empirical data developed by an approved USG testing laboratory, simplified Single-Degree-of-Freedom (SDOF) analytical methods, or advanced Finite Element Methods (FEM). Where simplified SDOF methods are used, the performance criteria shall be in accordance with this section. Where advanced FEM are used, the performance shall be demonstrated through interpretation of the calculated results.

## **8 UTILITIES & BUILDING SERVICES**

### **8.0 Scope, Purpose, and Goals**

This chapter describes criteria for site utility entrances (services), onsite utility distribution, and building services. Utility systems include but are not limited to, potable and industrial water, fire protection water, sanitary sewer, fuels, steam, chilled water, electrical power, and telecommunications. Site utility entrances may include utility-owned service and metering equipment. Utility services shall be designed in accordance with VA Design Manuals including the Electrical, HVAC, Plumbing, Fire Protection, Outside Steam Distribution, and Sanitary Design Manuals.

### **8.1 Utility Entrances**

#### **8.1.1 Mechanical**

No additional physical security requirements.

#### **8.1.2 Electrical**

No additional physical security requirements.

#### **8.1.3 Telecommunications**

No additional physical security requirements.

#### **8.1.4 Existing Facility – Utility Entrances**

No additional physical security requirements.

### **8.2 Site Distribution**

#### **8.2.1 Mechanical**

No additional physical security requirements.

#### **8.2.2 Electrical**

No additional physical security requirements.

#### **8.2.3 Telecommunications**

No additional physical security requirements.

#### **8.2.4 Existing Facility – Site Distribution**

No additional physical security requirements.

## **8.3 Energy Center**

### **8.3.1 Requirements**

No additional physical security requirements.

### **8.3.2 Sustained Service**

No additional physical security requirements.

### **8.3.3 Separation from Other Buildings**

No additional physical security requirements.

### **8.3.4 Standby Electrical System**

No additional physical security requirements.

### **8.3.5 Long-replacement-time Equipment**

No additional physical security requirements.

### **8.3.6 Existing Facility – Energy Center**

No additional physical security requirements.

## **8.4 Water and Fuel Storage**

### **8.4.1 Requirements**

No additional physical security requirements.

### **8.4.2 Storage Volume Criteria**

No additional physical security requirements unless the Life Safety Protected facility is on a campus with Mission Critical facilities and the Life Safety Protected facility establishes the greatest fire protection demand. See section 8.4.2.1.3 in the Physical Security Design Manual for Mission Critical Facilities.

### **8.4.3 Water Storage Emergency Connection**

No additional physical security requirements.

### **8.4.4 Water Treatment**

No additional physical security requirements.

### **8.4.5 Onsite Water Well**

No additional physical security requirements.

### **8.4.6 Protection of Equipment**

No additional physical security requirements.

**8.4.7 Electrical Power**

No additional physical security requirements.

**8.4.8 Existing Facility – Water and Fuel Storage**

No additional physical security requirements.

## 9 BUILDING SYSTEMS

### 9.0 Scope, Purpose, and Goals

This chapter describes criteria for building mechanical building systems (fuels, steam, and chilled water), building plumbing systems (potable water, fire protection water, sanitary sewer, and medical and laboratory gases and vacuum systems), building water storage systems (potable and industrial water storage tanks, water wells, pumps, and water purification systems), building electrical power distribution systems, standby electrical systems, UPS systems, and building telecommunications systems (demarc room, main computer room, telecommunications rooms, WLAN system, portable radio system, satellite radiotelephone system, public address system, distributed antenna system, and VSAT data terminal system). The building systems shall be designed in accordance with the VA Design Manuals including the Electrical, HVAC, Plumbing, Fire Protection, and Sanitary Design Manuals; specifically, all requirements of the VA Fire Protection Design Manual (which covers all VA construction) and the OIT Design Guide (which covers all spaces under OIT's purview) remain in effect.

#### 9.0.1 Modularity

No additional physical security requirements.

#### 9.0.2 Security Considerations

No additional physical security requirements.

### 9.1 HVAC systems

#### 9.1.1 Requirements

**9.1.1.1 Equipment location:** Major mechanical equipment shall not be located in high risk areas.

**9.1.1.2 Emergency connections:** No additional physical security requirements.

**9.1.1.3 Security control center (SCC):** No additional physical security requirements.

**9.1.1.4 Entrances and lobbies:** Maintain positive pressure in lobbies and entrance areas.

#### 9.1.2 Intakes and Exhausts

**9.1.2.1 Outdoor air intakes:** All air intakes shall be located so that they are protected from external sources of contamination. Locate the intakes away from publicly accessible areas, minimize obstructions near the intakes that might conceal a device, and use intrusion alarm sensors to monitor the intake areas.

- Locate all outdoor air intakes a minimum of 50 feet (15 m) from areas where vehicles may be stopped with their engines running.

- Locate all outdoor air intakes a minimum of 30 feet (9 m) above finish grade or on roof away from the roof line.

**9.1.2.2 Air intakes and exhausts:** Design to minimize the blast over pressure admitted into critical spaces and to deny a direct line of sight from a vehicle threat located at the standoff distance to the critical infrastructure within. Refer to Chapter 6.

**9.1.2.3 Hurricane areas:** Louvers in areas prone to hurricanes or wind-debris hazards (in accordance with ASCE 7-10) shall be certified by the manufacturer to meet the following Florida Building Code tests: Uniform Static Air Pressure Test, Cyclic Wind Pressure Test, Large Missile Impact Test, and Wind Driven Rain Resistance Test.

**9.1.3 Existing Facility – HVAC Systems**

No additional physical security requirements.

## **9.2 Electrical Systems**

Major electrical equipment shall not be located in high risk areas.

### **9.2.1 Standby Electrical System**

Major standby power system equipment shall not be located in high risk areas.

### **9.2.2 Uninterruptible Power Supply (UPS)**

Provide UPS equipment for telecommunications equipment that is required for proper operation of calls to 911.

**9.2.3 Existing Facility – Electrical Systems**

Existing facilities shall meet the requirements of section 9.2.2.

## **9.3 Telecommunications Systems**

Refer to Chapter 5 for functional area requirements.

### **9.3.1 Demarcation Room**

Demarcation rooms (demarc) shall not be located in high risk areas.

### **9.3.2 Main Computer Room**

Main computer rooms shall not be located in high risk areas.

### **9.3.3 Telecommunications Rooms**

Telecommunications rooms shall not be located in high risk areas.

### **9.3.4 Wireless Local Area Network System**

No additional physical security requirements.

### **9.3.5 Portable Radio System**

No additional physical security requirements.

### **9.3.6 Satellite Radiotelephone System**

No additional physical security requirements.

### **9.3.7 Public Address System**

No additional physical security requirements.

### **9.3.8 Distributed Antenna System**

No additional physical security requirements.

### **9.3.9 Very Small Aperture Terminal Satellite Data Terminal**

No additional physical security requirements.

### **9.3.10 Existing Facility – Telecommunications Systems**

No additional physical security requirements.

## **9.4 Plumbing Systems**

### **9.4.1 Medical Gases, Vacuum, and Oxygen Systems**

No additional physical security requirements.

### **9.4.2 Existing Facility – Plumbing Systems**

No additional physical security requirements.

## **9.5 Fire Protection Systems**

### **9.5.1 Fire Department Hose Connections**

Fire department hose connections located on the exterior of a building shall be protected in such a manner as to limit access only to authorized personnel. Protection devices shall be approved by the Authority having Jurisdiction (AHJ) and local Fire Officials.

### **9.5.2 Existing Facility – Fire Protection Systems**

Existing facilities shall meet the requirements of section 9.5.



## **10 SECURITY SYSTEMS**

### **10.0 Scope, Purpose, and Goals**

The requirements of Chapter 10 shall apply to all life-safety protected facilities, both new and existing. Existing facilities shall be required to meet the same requirements as new facilities. There are some life-safety protected facilities that have mission critical operations or functions; these functions shall have mission critical level protection.

This chapter addresses physical security standards associated with the selection, application, and performance of electronic security systems (ESS). The ESS includes the *Physical Access Control System (PACS)*; *Intrusion Detection System (IDS)*; *Video Assessment and Surveillance Systems (VASS)*; *Duress, Security Phones, and Intercom System (DSPI)*, commonly referred to as intercommunications system; and the *Detection and Screening System (DSS)*. The integration and monitoring of the ESS, system operation, and space requirements associated with the ESS subsystems are discussed in this section.

Life-safety protected facilities may or may not include a *Security Control Center (SCC)*. Where an SCC and *Security Equipment Room (SER)* are required in a life-safety protected facility, the functional requirements provided in Chapter 5, section 16, of the *Physical Security Design Manual for Mission Critical Facilities* shall apply. Where an SCC is not required in a life-safety protected facility, a centralized monitoring function shall be provided in order to accommodate security system monitoring requirements (see section 5.16 for further guidance). Operational and system requirements for the SCC are found within this chapter.

The ESS subsystems shall be designed and engineered by a qualified security specialist complying with the requirements in section 1.5.

#### **10.0.1 Guidance on use of this Section and Appendices A and B**

The requirements provided within this chapter and Appendices A and B shall be used collectively to provide an acceptable level of security for the subject facility and/or site.

#### **10.0.2 Designers Resources**

The security consultant shall comply with VA's latest construction specifications for electronic security systems, found on the VA TIL, and augmented by VA Policies and Directives. Additional sections shall be prepared by the designer as necessary to suit the project requirements.

### **10.1 Electronic Security Systems**

Life-safety protected facilities shall report up to a regional monitoring center for primary monitoring functionality. All PACS are required to be networked for identity verification as required by Homeland Security Presidential Directive 12 (HSPD-12) and Federal Information Processing Standards 201 (FIPS-201) compliance. Each life-safety protected facility shall have

its own dedicated connection to the Federal bridge and PACS server. All PACS shall comply with HSPD-12 and NIST 800-16 requirements. These requirements are established in the Master Construction Specifications.

Integrate all ESS into a common graphic user interface (GUI) to provide comprehensive situational awareness. This includes correlating alarm events with automated video call-up of associated video for remote assessment. Linkages between systems shall be logical in lieu of complex hardwired systems using inputs and outputs.

Regional systems shall consider the use of physical security information management (PSIM) systems to combine large complex subsystems. PSIM systems also provide the ability to monitor multiple security subsystems from multiple manufacturers. Regional monitoring systems are a VA goal and are encouraged. See *Physical Security: Electronic Security Systems Manual, Final Draft 2008* concerning regional monitoring systems.

A central interface shall be provided for monitoring, reporting, and configuration of all electronic security subsystems. It shall provide correlated event monitoring and controls. The ESS shall allow the configuration of alarm monitoring, administrative, asset management, digital video management, intrusion detection, visitor enrollment, remote access level management, and integrated security workstations.

The ESS shall have the ability to compose, file, maintain, update, and print reports for either individuals or the system. Examples of systems reports include:

- Individual reports consisting of an employee's name, office location, phone number or direct extension, and normal hours of operation and shall provide a detail listing of the employee's daily events in relation to accessing points within a facility.
- System reports producing information on a daily/weekly/monthly basis for all events, alarms, and any other activity associated with a system user.

All ESS with system clocks shall be connected to a time synchronization clock to provide a coordinated time stamp. The time synchronization system shall be based on an internal VA utilized time clock or atomic sync.

The ESS shall be backed by the standby electrical system and UPS equipment. Refer to Chapter 9 for utility and building system requirements.

## **10.2 Physical Access Control System**

The physical access control system (PACS) consists of all equipment and information required to verify, identity, and grant or deny access to individuals in accordance with HSPD-12. Equipment ranges from card readers and locks to the servers and databases required for identity verification and all components and communication in between.

### 10.2.1 ESS Hardware

**10.2.1.1 Data gathering panels** shall be centrally located within a secure location that prevents panels from being damaged, tampered with, or accessed by unauthorized personnel. Field modules, such as reader modules, may be located on the secured side of a door in an enclosure that is locked or protected with a tamper switch.

**10.2.1.2 Entry control devices** include card readers and biometric verification stations. All entry control devices shall be FIPS 201 compliant and hardwired to the PACS data gathering panel. Biometric systems have limited application and shall only be utilized for secondary authentication into high security areas.

**10.2.1.3 Electrified locks**, such as, magnetic locks, strikes, and mortise locks, shall be selected based upon life-safety requirements, locking arrangements, and level of security. Utilize request-to-exit devices integrated in the electrified locksets in accordance with NFPA, IBC, and other applicable construction codes. Fail-safe-fail-secure, field selectable locks shall be used.

**10.2.1.4 Optical turnstiles**, where used in high-traffic access control points such as lobbies, require integrated barriers. Rotary turnstiles are discouraged due to life-safety concerns. Coordinate and accommodate life-safety when planning to use turnstiles.

**10.2.1.5 Credentials and enrollment interface:** with the development of the HSPD-12 based architecture, credentialing and badge issuance are separate from the PACS. Facility level enrollment station will be required; however, credentialing and badge issuance will be accommodated by a separate non-PACS system. The facility level enrollment station will allow the PIV badge holder to be programmed for facility level access permissions. Credential validations shall comply with OMD 11.11, FICAM, and NIST SP 800-116, and shall use PKI authentication method.

**10.2.1.6 Locations:** Refer to Appendix A, Security Door Openings, and Appendix B, Security System Application Matrix, for PACS system component locations.

## 10.3 Intrusion Detection System

The intrusion detection system (IDS) shall be used to provide an adequate level of protection for the life-safety protected facility. IDS consists of all equipment and information required to detect and annunciate potential unauthorized entry into a protected space through an accessible and man-passable opening. An accessible opening as defined by NFPA 730 *Guideline for Premise Security* is within 18 feet (4 m) of exterior ground surface or within 18 feet (4 m) directly or diagonally opposite a window, structure, fire escape, or roof. A man-passable opening as defined by NFPA 730 is a clear cross section area of 96 square inches (619 cm<sup>2</sup>) or more with the smallest dimension exceeding 6 inches (15.2 cm). IDS sensors include motion detection, glass break, door contacts, and other detection devices. All IDS shall meet UL 639 Intrusion Detection Standard. Terminate all IDS sensors on the PACS data gathering panel. Provide an arm/disarm panel in protected spaces. Pharmacies have additional requirements; refer to VA 0730, Appendix B for these requirements.

### **10.3.1 Planning and Selection Criteria**

IDS shall provide multiple levels or points of detection as far as possible from an asset to be protected. Determine the type of IDS sensor technology to use based upon the capability of the sensor and environmental factors.

Intrusion devices of different technologies (such as, motion detection, glass break, or magnetic contacts) shall be zoned separately. Intrusion devices of like technologies shall be wired together, not to exceed three devices, within the confines of clear physical barriers and not to exceed 50 feet (15 m). Devices in the same physical location providing the same purpose shall be programmed in alarm groups to support the intrusion zone concept.

### **10.3.2 Data Transmission System**

Sensors and arm/disarm devices shall be hardwired and directly connected to the data gathering panel whenever feasible. Wireless alarms may be used only where the surrounding building construction and environment will not degrade the effective range of the alarm signal. Where a wireless IDS system is used it shall meet Federal Communication Commission (FCC) wireless transmission standards and VA requirements, including coordination with proper approving authority within VA.

### **10.3.3 Interior Sensors**

**10.3.3.1 Balanced magnetic switches (BMS)** may be either recessed or surface mounted; the preferred method is to use a recess mounted switch to reduce the ability to defeat the system and improve aesthetics.

- When double doors or gates require protection, each door shall be fitted with a separate magnetic switch.
- Surface mounted switches shall be mounted on the protected side of the door.
- When protecting roll-up doors wider than 80 inches (2 m), BMS shall be mounted on both sides on the interior side of door.

**10.3.3.2 Glass break sensors:** Windows with security mesh screen do not require glass break sensors. Consider window construction to mitigate blast or ballistic hazards when selecting sensor technology. Laminated glass thicker than 0.25 inches (0.635 cm) does not require IDS. Glass break sensors shall not be used in the absence of PIRs or balanced magnetic switches.

**10.3.3.4 Passive infrared sensors:** Passive infrared sensor (PIR) shall meet the requirements of ANSI/SIA PIR-01, *Passive Infrared Motion Detector Standard - Features for Enhancing False Alarm Immunity*. A 360-degree field of view configuration shall be preferred for sensor monitoring purposes, but the final determination of configuration for field of view, which may be 360, 180, 90, 45 degrees or curtain, shall be determined from a field survey and mounting surface availability. Sensitivity of the sensor shall be adjustable to provide the necessary area of protection.

**10.3.3.5 Vibration sensors:** Boundary walls to be protected shall use vibration detection sensors mounted to the wall to assure detection of attempted penetration before the wall is breached. Vibration sensors shall be used in combination with BMS

for safes and vaults. Wall mounted shock/vibration sensors shall be provided with LEDs to indicate activation and shall be mounted to provide a clear view of the LED. Except for unusually small areas, smaller than 10 x 10 feet (3 x 3 meters), sensors zoned together shall not cover more than one wall.

**10.3.3.6 Video motion detection** does not provide sufficient probability of detection with reasonable nuisance alarm rates to be considered intrusion detection; however, video motion detection maybe used in areas where alternate sensor or more conventional detection methods are not appropriate. The nuisance alarm rate (NAR) shall be less than 5 percent.

### **10.3.4 Exterior Sensors**

Exterior intrusion detection systems shall be planned for remote VA utility infrastructure lacking physical guard or police force presence. These areas are commonly water towers and water treatment facilities outside the VA established perimeter but may include other assets. Exterior sensors shall only be used for perimeter protection when the area to be protected is bordered by a fence or physical barrier. Exterior perimeter detection capability shall be applied to fenced areas around a site or building, loading docks, and outside storage areas or enclosures, using volumetric sensors in addition to BMS on access gates. Facilities that use a fence to define boundaries shall address the use and necessity of fence mounted sensors, microwave sensors, or photoelectric beams.

**10.3.4.1 Microwave sensors**, where required for security, shall use a multiple-beam configuration and only be used when there is a clear line of sight between a transmitter and receiver and where the ground is within the sensor operational specifications. Microwave sensors shall not be used near outdoor fluorescent lights.

**10.3.4.2 Infrared Sensors**, where required for security, shall be used in a multi-beam arrangement to create an invisible fence or corral around the *protected area*. These systems are affected by fog, rain, and snow and shall not be installed where local climatic conditions would cause interference.

**10.3.4.4 Fence mounted sensors**, where required for security, shall include tension wire, capacitance, electric vibration, and shock sensors. When using fence mounted sensors a BMS shall be installed at the pedestrian and vehicle access point gates.

**10.3.4.5 Video motion detection** does not provide sufficient probability of detection with reasonable nuisance alarm rates to be considered intrusion detection; however, video motion detection maybe used in areas where alternate sensor or more conventional detection methods are not appropriate. The security consultant shall ensure that NAR is acceptable; an acceptable maximum shall be less than 5 percent.

### **10.3.5 Design and Installation**

To ensure proper operation, maximum detection capability, and minimize false alarms, IDS shall be installed in accordance with manufacture instructions, NFPA 731 *Standard for the Installation of Electronic Premises Security Systems* and UL 681 *Installation and Classification of Burglar and Holdup Alarm Systems*. All IDS shall be capable of continuous operation and monitoring through the use of UPS equipment and standby electrical system (see Chapter 9).

**10.3.5.1 Locations:** Protect all man-passable openings in a building perimeter with contacts. Protect all accessible openings as defined by NFPA 730 with appropriate sensors. Refer to Appendix A, Security Door Openings, and Appendix B, Security System Application Matrix, for IDS system component locations.

## 10.4 Video Assessment and Surveillance

This section addresses physical security standards for the two basic uses of a VASS: event assessment and general surveillance. This section describes the selection, application, and performance of the VASS, which includes cameras, monitors, controlling and recording equipment, and centralized management and operations of the system.

### 10.4.1 System Uses, Compatibility, and Integration

**10.4.1.1 System uses:** VASS shall be used to monitor building entrances, restricted areas, mission *critical asset* areas, and alarm conditions. VASS shall be used for surveillance and documentation of defined exterior areas, such as, site and roadway access points, parking lots, and building perimeter, and interior areas from a centralized SCC.

**10.4.1.2 System compatibility:** All components of the VASS shall be fully compatible and shall not require the addition of interface equipment or software upgrades to ensure a fully operational system.

**10.4.1.3 System integration:** The VASS shall be able to be fully integrated with other security subsystems.

### 10.4.2 Networked Versus Stand-alone

VASS shall be designed and engineered as either a networked or stand-alone system.

**10.4.2.1 Networked VASS** shall be utilized when multiple cameras, monitors, controllers, and recording devices are configured and makeup what is defined as a whole VASS. All components of the system shall be monitored and controlled in the SCC, using either a matrix switcher or a desktop computer. Alternate locations for monitoring cameras may be required in some circumstances.

**10.4.2.2 Stand-alone VASS** may be used for a single application and designated location use only and may compliment the PACS for a specific area. Fixed camera(s) shall be positioned in a manner to allow viewing of specific entry control point(s) through the use of a dedicated VASS monitor located in a common viewing area.

### 10.4.3 Cameras

The design, installation, and use of VASS cameras shall support the visual identification and surveillance of persons, vehicles, assets, incidents, and defined locations.

**10.4.3.1 General requirements:** All cameras shall meet the following requirements.

- Cameras shall conform to National Television System Committee (NTSC) formatting criteria.

- Cameras shall be color and auto-day/night feature to digitally switch from color to black and white at dusk and vice versa at dawn.
- Cameras shall be rated for continuous operation.
- Each camera function and activity shall be addressed within the system by a unique twenty character user defined name. The use of codes or mnemonics identifying the VASS action shall not be accepted.
- Cameras shall have built-in video motion detection that automatically monitors and processes activity information from each camera, based upon how the surveillance field-of-view is programmed.
- When the camera is used as part of a VASS computer network, a video encoder shall be used to convert the signal from the NTSC criteria to Moving Picture Experts Group (MPEG) format.
- All cameras shall be home run to a monitoring and recording device via controlling video equipment such as a matrix switcher or network server that is monitored from a designated SCC location. The use of wireless cameras are discourage for any long term application (more than 1 year period of use) and shall not be used for mission critical assets (see section 10.4.3.3 wireless camera use).

**10.4.3.2 Fixed versus pan/tilt/zoom:** VASS cameras may be either fixed or pan/tilt/zoom (P/T/Z).

- Fixed cameras shall be the primary means of surveillance to monitor designated access control and monitoring points.
- Fixed cameras shall be used to monitor interior building areas; P/T/Z cameras may be used to provide supplemental surveillance coverage of building interiors where necessary.
- P/T/Z cameras shall be used and deployed for all site perimeter and exterior building areas.

**10.4.3.3 Hardwired versus wireless:** VASS cameras classified as hardwired directly connect to a monitoring device using video signal imaging cable. A wireless VASS camera application is directly connected via a remote receiver that requires constant line-of-sight communications with the camera and the monitoring device.

- Hardwired or Internet protocol (IP) cameras shall be the preferred method of installation.
- Hardwired cameras shall be connected to the monitoring equipment with continuous wiring used as the media transmission system.
- Prior to selection of wireless cameras, consider the potential effects on the use of this technology, such as geographical area of coverage, environmental interference, effects on medical systems, and distance from the monitoring location.
- Wireless systems shall meet FCC requirements and be approved by VA wireless system approval authority during the design of the system.

**10.4.3.4 Color versus black and white:** All VASS cameras shall be color that allows for black and white applications.

- Cameras shall be able to switch between color and black and white through a programmable feature built into the camera (auto day/night feature).

- Color shall be the primary mode, automatically switching to black and white when light levels drop below normal specifications.

**10.4.3.5 Camera lenses** shall be used in a manner that provides maximum coverage of the area being monitored and shall meet the following requirements. Two types of lenses shall be used for both interior and exterior fixed cameras.

- Manual variable focus lenses shall be used in large areas monitored by the camera and shall allow for settings at any angle of field to maximize surveillance coverage.
- Auto iris fixed lenses shall be used in areas where a small specific point of reference is monitored.
- Specific lens size shall be determined using a field-of-view calculation provided by the manufacture.

**10.4.3.6 Camera enclosures:** All cameras and lenses shall be enclosed in tamper resistant housings.

- Both interior and exterior cameras shall be housed within a tamper-proof camera enclosure.
- Exterior camera enclosures shall be rated to protect against unique weather elements associated with the specific facility conditions and geographical area.

**10.4.3.7 Camera installation, mounts, poles, and bases:** All camera equipment shall be installed to ensure all components are fully compatible as a system. Adhere to guidance provided by the National Electrical Contractors Association Standard, NECA 303-2005, *Installing Closed-Circuit Television (CCTV) Systems*.

- Camera mounts shall be installed on approved mounting surfaces structured for weight, wind load, and extreme weather conditions.
- Camera mounts shall be installed in a manner that will not inhibit camera operation or field-of-view.
- Where a camera is mounted to a rooftop or within a parapet, ensure that the mount is designed and installed in a manner that the equipment can be swiveled inward for maintenance and upkeep purposes.
- All camera poles shall be constructed of metal with a concrete base and shall be installed and grounded in accordance with the NEC.
- Camera poles shall be weather resistant.
- Cameras and their mounts may share the same pole with lighting when the following conditions are met:
  - A hardened wire carrier system is installed inside the pole to separate the high voltage power cables for the lighting from the power and signal cables for the camera and mount.
  - The camera and mount are installed and positioned in a manner that the lighting will not deter from, cause blind spots or shadows, or interfere with the video picture and signal.
- All camera poles and mounts shall be installed in locations that will allow for optimum view of the area of coverage.

**10.4.3.8 Power source:** All VASS cameras and mounts shall be powered remotely by a UL listed power supply unit (PSU) as follows:



- The PSU shall have the ability to power at least four exterior cameras or eight interior cameras.
- A back-up with dedicated power feed from a security system power panel shall be provided to the camera and mount. A step down transformer shall also be installed at the camera location to ensure a proper operating voltage is provided to the camera and mount.
- The VASS shall be supported by UPS equipment and standby electrical system (see Chapter 9).

**10.4.3.9 Lightning and surge protection:** With the exception of fiber optic cables, all cables and conductors that act as control, communication, or signal lines shall include surge protection when extending beyond the building envelope.

**10.4.3.10 Site coordination:** Site and building exterior lighting shall be coordinated and installed in a manner that allows the VASS system to provide positive identification of a person, vehicle, incident, and location.

- Lighting shall not provide bright illumination behind the main field of camera view.
- Cameras shall be installed in a manner that no lighting will point directly at the camera lens causing blind spots and black outs.
- Provide routine maintenance of lighting systems and replacement of lighting fixtures that are necessary for operational integrity of the VASS system.
- VASS cameras shall be installed so that landscaping will not deter from the intended field of view.
  - Cameras shall not be mounted in trees, bushes, or any other natural landscape that will in the long term degrade the view or operation of the VASS system.
  - Cameras shall not be installed behind, next to, or on any natural or manmade object that will restrict the field of view, cause signal loss, or prevent the camera from being fully operational.
  - Perform routine landscape maintenance that is necessary for operational integrity of the VASS system.

#### **10.4.4 Additional Components**

**10.4.4.1 Monitors** shall be color and able to display analog, digital, and other images in either NTSC or MPEG format associated with the operation of the security management system (SMS).

**10.4.4.2 Matrix switcher/network server (controlling equipment)** shall be used to call up, operate, and program all cameras associated VASS components. Controlling equipment shall have the ability to operate the cameras locally and remotely. A matrix switcher or a network server shall be used as the VASS controller. The controlling equipment shall allow the transmission of live video, data, and audio over an existing Ethernet network or a dedicated security system network, requiring an IP address or Internet Explorer 5.5 or higher. The controlling equipment shall be able to perform as an analog-to-Ethernet "bridge," allowing for the control of matrices, multiplexers, and P/T/Z cameras.

**10.4.4.3 Keyboards and joysticks** shall provide direct operator interface with the controlling equipment to allow for call-up, operation of cameras and mounts, and programming of controlling equipment as well as cameras and monitors. Where a matrix switcher is used, ensure the keyboard is outfitted with a joystick to provide direct interface with VASS camera controls.

### **10.4.5 Controlling and Recording Equipment**

All cameras on the VASS shall be recorded in real time using a digital video recorder (DVR), network video recorder (NVR), or a time lapse video recorder (VCR). The type of recording device shall be determined by the size and type of VASS designed and installed, as well as the extent to which the system is to be used. The following criteria shall be followed when choosing a VASS camera recording device.

**10.4.5.1 DVR** shall be used within the VASS for large or small VASS system set-ups. The DVR may be used in place of a time lapse VCR regardless of how the VASS is designed and installed. The DVR may be installed with the SMS or as part of a VASS network. The DVR shall be IP addressable. Programming, troubleshooting, and all general maintenance and upgrades to the DVR shall be done locally at the recording unit.

- The DVR shall have a built-in compact disc-recordable (CD-R) for downloading of the buffer to compact disc (CD) for back-up.
- The DVR buffer shall be cleared and all information transferred to CD when the buffer is at no greater than 60 percent of capacity.
- Compact disc-read only memory (CD-ROM) shall be stored in a dry, cool, central location that is secure. Recordings shall be stored in accordance with VA Police directives.

**10.4.5.2 NVR** shall be used within the VASS for large or small VASS system set-ups. The NVR shall be used when the VASS is configured as part of the SMS only. Input to the NVR shall be considered when designing and installing all cameras that will be connected to the NVR.

- Ensure the proper signal converter is used to interface non- PoE cameras over to a Category Five (CAT-V) cable.
- The NVR shall provide for either direct download of data to a computer storage device or CD-ROM. All storage media shall be stored in a dry, cool, central location that is secure, and storage media shall be held as directed by the VA Police.

### **10. 4.6 Video Motion Detection**

VASS cameras shall have built-in video motion detection capability that automatically monitors and processes information from each VASS camera. Cameras shall be programmed to automatically change viewing of an area of interest without human intervention and shall automatically record the activity until reset by the VASS operator.

**10.4.6.1 Timing:** This feature shall detect motion within the camera's field of view and provide the SCC monitors immediate automatic visual, remote alarms, and motion-artifacts as a result of detected motion.

**10.4.6.2 Interface with IDS:** The video motion detection shall be interfaced with the IDS to provide redundancy in the security alarm reporting system.

**10.4.6.3 Other system interface:** Cameras shall be designed to interface and respond to exterior and interior alarms, security phones/call-boxes, duress alarms, and intercoms upon activation.

### **10.4.7 Camera Locations**

Refer to Appendix A, Security Door Openings, and Appendix B, Security System Application Matrix, for VASS component locations.

## **10.5 Duress, Security Phones, and Intercom System**

The section addresses physical security criteria associated with the selection, application, and performance of the duress, security phones or emergency call-boxes, and intercom system (DSPI), also referred to as the intercommunications system.

### **10.5.1 System Elements and Features**

The DSPI system is used to provide security intercommunications for access control, emergency assistance, and identification of locations where persons under duress request a security response. Refer to Appendix B, Security System Application Matrix, for locations where DSPI devices shall be used.

**10.5.1.1 DSPI system compatibility:** All components of the DSPI shall be fully compatible and shall not require the addition of interface equipment or software upgrades to ensure a fully operational system.

**10.5.1.2 System integration:** DSPI shall be fully integrated with other security subsystems.

**10.5.1.3 Handicapped accessibility:** DSPI systems shall be accessible to persons with disabilities.

**10.5.1.4 Security intercoms:** The main components of this security subsystem are the hardwired master intercom and remote intercom stations. Intercom devices shall be integrated with the VASS upon initiation and activation of a two-way conversation. Where wireless systems are used, repeaters shall be required. Where a wireless intercom system is used; it shall meet FCC wireless transmission standards and VA requirements, including coordination with proper approving authority within VA. Typical locations for security intercoms shall include:

- Access controlled entry points to a site, parking, and perimeter building areas.
- Gated access and service road entry points.
- Loading docks and shipping/receiving areas.
- Interior building access control points to restricted areas.

**10.5.1.5 Intercom door release:** Security intercom with remote door release capability shall be used for functional areas that require PACS. The security intercom system shall be integrated with electronic or magnetic remote door release allowing for remote communication and unlocking of doors from a reception desk or SCC master intercom station. The security intercoms for these areas shall have both an

audio and built-in video capability. Video verification of person(s) requesting access at these points shall be required.

**10.5.1.6 Intercom master station** shall be capable of selectively calling and communicating with all intercom stations individually or system wide. Master stations shall have a “call in” switch to provide an audible and visual indication of incoming calls from remote stations. The master station shall include, but not be limited to, a handset, microphone/speaker, volume control, push-to-talk button, an incoming call/privacy indicator, and selectors to permit calling and communicating with each remote or other master stations.

**10.5.1.7 Intercom substation** shall be capable of calling into a pre-programmed single or group of master stations via the pressing of a button or voice activation. When a programmed master station is not available, the call shall automatically transfer to another master station.

**10.5.1.8 Multi-intercom station** shall have the ability to call or monitor multiple stations individually or as a public address system.

**10.5.1.9 Single intercom station** only calls or monitors one other intercom location or station at a time; intercoms are direct wired and do not require a master station.

**10.5.1.10 Push-to-Talk (PTT) two-way communications** is the typical type of intercom activation device, which requires a button be pressed in order to transmit conversation over the intercom.

**10.5.1.11 Voice operated intercom switching (VOX)** automatically switches audio direction based on the sound of a voice. The switch works when a sound is detected by the speaker/transmitter and no push-button is required to transmit a communication. These intercoms shall be used in interior or exterior areas; however, not in areas with high background noise, such as parking garages.

## **10.5.2 Security Phones or Emergency Call-Boxes**

An emergency call-box or telephone system shall be used instead of intercoms for a multi-facility environment, a stand-alone facility with a parking structure, or a site with a requirement to transmit call station communications to another site. Emergency call-boxes shall be used in areas such as parking garages/lots, sidewalks, pathways of large campuses, and in isolated areas.

**10.5.2.1 Push button hardwired:** Emergency call-box systems shall be hardwired to a master station located and monitored at a central location, preferably the SCC. Pushing and releasing the emergency call-box call button shall initiate a call-in to a pre-programmed master station. Once the button is pushed, hands free operation shall occur.

**10.5.2.2 Handset-telephone extension:** Emergency call-boxes shall have the capability of using the existing VA PBX telephone system lines. The PBX shall direct calls to a pre-programmed extension that may be located at a receptionist desk, the SCC, or both. Lifting the handset shall automatically dial a preprogrammed monitoring station. The caller’s location shall be defined in the PBX system. A minimum of two numbers shall be programmed into the system, so that if the first number is busy or unavailable the second number will be polled. VA facility telephone

systems and emergency call-boxes shall not use automatic voice dialers to 911 or the municipal police department.

**10.5.2.3 Speaker-handset stations:** Emergency call-box stations shall have the capability to automatically cut out the loudspeaker at the station when the phone handset is lifted, allowing conversations to occur through the handset rather than a speaker.

**10.5.2.4 Scream alert option:** Emergency call-boxes shall provide the option that a speaker phone becomes activated when a loud scream is heard. This system shall be limited to indoor applications, such as stairwells and elevators or pre-defined high-threat locations, where background noise will not cause false activation of these devices.

**10.5.2.5 Integration with VASS cameras:** Emergency call-boxes shall provide coverage with VASS when activated or have a built-in camera video surveillance capability that can be monitored from the SCC upon device activation. See section 10.4.

**10.5.2.6 Remote control and monitoring:** Emergency call-box master stations shall have the capability of monitoring and automatically polling each call-box, report incoming calls, identify locations, and keep records of all call events via software and integration with the SMS. The system shall provide auto-answer capability to allow VA Police to monitor and initiate calls. The master stations shall have the capability to remotely adjust speakerphone and microphone capabilities and reset the call-box activation from the central monitoring station.

**10.5.2.7 Signaling devices:** Emergency call-boxes shall provide visual recognition devices such as strobes or beacons, which will provide identification of the activated call-box.

**10.5.2.8 Outdoor vs. indoor locations:** All emergency call-boxes shall be installed on rigid structures, columns, walls, poles, and/or freestanding pedestals that are easily identifiable through unique markings, striping or paint, signage or lighting, and shall remain easily visible during low light conditions. VASS and call-boxes shall be integrated to provide automatic surveillance and priority monitoring of the caller's location.

- Emergency call-boxes in indoor locations shall be easily accessible to the public, clearly marked, and may be wall mounted.
- All emergency call-boxes shall be accessible to persons with disabilities.

### **10.5.3 Duress/Panic Alarms**

Duress/panic alarms shall be provided at locations where there is considerable public contact in isolated and pre-identified high-risk areas, such as the lobby reception desk, patient service areas, nursing stations, and isolated offices and buildings where VA personnel work. Upon activation, a silent alarm signal shall be sent to a centralized monitoring location that shall be capable of continuous operations. Other requirements associated with activated alarms shall include all of the following.

- Alarms shall be continuously monitored by the SCC.
- Activated alarms shall be integrated with VASS coverage of the area.

- Alarms shall be mounted in such a manner as not to be observable and shall prevent unintentional operation and false alarms.
- At strategic locations use PACS keypads that are capable of activation by a code known only to the user to notify the central monitoring station that the person entering an area is under duress.

**10.5.3.1 Switch/push button hardwired:** The duress/panic alarm system shall be hardwired to a monitoring site or the SCC. Upon activation of the alarm both a visual and audible alarm will be activated in the SCC. The system shall identify the location of the alarm by phone extension and area description.

**10.5.3.2 Wireless:** Before selection and installation of a wireless system a survey shall be conducted to determine if a wireless application is feasible. Wireless systems shall use ultrasonic, infrared, and radio frequency waves to link duress/panic devices with distributed transmitters and receivers. Receivers shall be mounted throughout an area or building, as needed, and hardwired to a central monitoring console. Repeaters shall be used to ensure full coverage. All wireless systems shall conform to FCC and VA standards for wireless communications systems. Authorization from the VA AHJ shall be required prior to specification of wireless devices.

**10.5.3.3 Switch/push button telephone extension:** This system shall use an existing telephone line and PBX to transmit a duress alarm. On activation the PBX shall direct the signal with the caller's location defined to a pre-programmed extension located at the SCC. VA facility telephone systems and emergency call-boxes shall not use automatic voice dialers to 911 or the municipal police department.

**10.5.3.4 Wireless-pendant devices:** Wireless duress/panic devices (also known as personal panic alarm, identification duress alarm, or man-down alarm) may be considered as an option. When the panic button is pushed a wireless alarm signal is sent to the closest installed wireless sensing unit, which sends the signal on to a designated alarm monitoring location. Only wireless alarms that provide both geographical location and identification of the individual and have been tested in the operational area, especially in isolated areas impacted by structures, topology and other influencing factors, shall be used. The use of these devices shall be limited to personnel identified as holding high-risk positions, work in isolated areas, or travel to/from parking areas and buildings that are isolated, especially during hours of darkness. Where a wireless pendant devices is used, it shall meet FCC wireless transmission standards and VA requirements, including coordination with proper approving authority within VA. The devices shall meet the following requirements.

- Be convertible and have the capability to be worn on a lanyard around the neck, belt clip, or wristband.
- Include low battery indicators that notify the user and monitoring station of their use.
- Be equipped with a pull chain that activates the device shall an attempt be made to forcibly remove it from the person carrying it.
- Only be operational while on VA facility property.

**10.5.3.5 Locators and repeaters:** The duress/panic alarm devices shall be integrated with SCC and SMS software to provide identification and location of the user. Locators

shall be required for wireless/pendant devices. Where a wireless locator and repeater systems are used, they shall meet FCC wireless transmission standards and VA requirements, including coordination with proper approving authority within VA. Requirements for locators and repeaters shall be as follows.

- Locators shall be placed in strategic locations such as hallways, gathering rooms, parking lots and garages, walking trails, or any place where the location of a person in duress is required.
- For large VA campuses and outside applications, repeaters shall be used that provide true line-of-sight range. The number of repeaters required will depend on the performance of a site survey, capabilities, and coverage distances.

**10.5.3.6 Automated dispatch:** Duress/panic alarm devices shall automatically announce or provide alarm notification signals to on-site pagers worn by VA Police and other designated personnel, hand held portable radios, cell phones, and landline telephones.

**10.5.3.7 Integration with VASS cameras and IDS:** Duress alarm areas shall be covered by VASS cameras. Once the duress alarm has been activated the VASS shall monitor and record all events associated with the alarm. The IDS will provide monitoring of duress alarm. Refer section 10.3.

#### **10.5.4 DSPI Locations**

Refer to Appendix B, Security System Application Matrix, for DSPI system component locations.

### **10.6 Detection and Screening Systems**

Used only where specific site conditions require this level of security, detection and screening systems (DSS) include: *X-ray screening* machines, walk-through metal detectors (WTMD), hand-held metal detectors (HHMD), and desktop and hand-held trace/particle detectors (also called sniffers and *itemizers*). The use of DSS equipment may be provided as an optional means for screening persons, items, and materials that may possess or contain weapons, contraband, or hazardous substances prior to authorizing entry or delivery into a facility. Use of DSS equipment may be considered during periods of elevated credible threat from the National Terrorism Advisory System (NTAS) (formerly the Homeland Security Alert System (HSAS)). Each facility shall be addressed on a case-by-case basis concerning the use of DSS.

At a minimum, provide power and communications rough-ins for future installation of DSS equipment in the screening vestibule.

#### **10.6.1 System Elements and Features**

DSS are used for the pre-screening of persons, packages, and personal items for detection of contraband, such as, weapons, drugs, explosives, and other potential threatening items or materials, prior to authorizing building entry or delivery. Refer to Appendix B, Security System Application Matrix, for optional locations where DSS may be utilized.

**10.6.1.1 DSS system compatibility:** All components of the DSS shall be fully compatible and shall not require the addition of either software or hardware interface equipment.

**10.6.1.2 System integration:** The DSS shall be fully integrated with other security subsystems.



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