STATE OF WYOMING

SCHOOL FACILITIES DEPARTMENT

Matthew H. Mead
Governor

William T. Panos
Director

DIRECTOR'S MEMO 2014-3

TO: District Superintendents, Select Committee on School Facilities, School Facilities Commission, Legislative Service Office, Governor's Office

FROM: William T. Panos, Director

DATE: November 19, 2014

RE: School Safety and Security Methodology

Under Enrolled Act No. 41, Section 027 of the Sixty-Second Wyoming Legislature, the Wyoming School Facilities Department was directed to study current school safety and security standards in the state and report on the anticipated costs to evaluate all schools and implement safety and security standards statewide.

In fulfilling this request, the department has collaborated with external security experts, the Wyoming Department of Education and the Wyoming Office of Homeland Security to develop the attached guidelines, methodology and recommendations for the further evaluation of schools. The report also includes a detailed timeline on when such a project would be completed.

If you have questions, please do not hesitate to contact me directly at 307-777-8675 or bill.panos@wyo.gov.

Thank you.

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SECURITY STANDARDS FOR THE WYOMING K-12 SCHOOLS

Prepared for:

Wyoming School Facilities Department

October 2, 2014

MOA ARCHITECTURE

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I. INTRODUCTION

In July of 2014, the team of MOA Architecture (MOA), RETA Security, Inc. (RETA), and Emergent Policy & Systems, Inc. (Emergent) was charged with helping to develop security standards, in conjunction with the Wyoming School Facilities Department (WSFD), for all of Wyoming's K-12 schools. The Team developed a collaborative approach which, over the course of 13 weeks, included meetings with the WSFD, presentations to the School Facilities Commission (SFC) and the Select Committee on School Facilities, and publication of work in progress to interested school districts. Following a kick-off meeting to better define the scope of the effort, the Team performed an exhaustive search and review of nationally recommended best practices for enhancing school security. This review helped in establishing the matrix of standards and guidelines which is included in this report. The ultimate goal of the effort is to lead up to a comprehensive assessment of all Wyoming school facilities with regard to security features, the results of which will ultimately be reflected in the AiM database and become the basis for prioritization of funding for security improvements in the schools. This assessment will be accomplished in a second phase of security work for the Wyoming schools. While the actual assessment work itself is outside of the scope of this project, developing the methodology for how and when it will occur is part of this scope, and is described in Section VIII below.

II. DISCUSSION OF PAST STUDIES / SURVEYS

At least since 2006, various studies and surveys have attempted to identify the current state of security in the Wyoming schools, highlighting strengths and areas of concern while proposing recommendations for improvement. A list of these various efforts is shown below:

- Wyoming DOE School Safety and Security Study (Dec. 1, 2006)
- 2012 Facilities Condition Assessment & Building Data Collection Project (Sept. 28, 2012)
- State of Wyoming School Safety and Security Task Force Report (Oct. 24, 2013)
- School Facilities Adequacy Standards Perceptions Survey (Spring 2014)

In addition to these, in mid-2014, the Wyoming SFD solicited funding requests from districts for security-related improvements. Developing recommendations for prioritizing these requests was done in parallel with the effort to develop the standards and guidelines that appear in this report. Capitalizing on the research that went into these past studies, one of the purposes of this report is to build on this previous work and document the most current philosophies regarding security in the Wyoming K-12 schools.

III. APPROACH / METHODOLOGY

Data Collection

Physical security is an arena virtually devoid of codes and standards. As such, it stands in sharp contrast to the related arena of life/health safety, where codes clearly specify fire prevention measures, ADA requirements, and construction/building standards. For example, there is no manual to guide a school administrator through the design of physical security systems. This report can help in that regard.

This 'grey area' in the arena of security makes it essential that any standards developed are based on widely accepted industry practices. To that end, a data collection effort reviewed State and Federal studies, industry associations, and trade publications, and was the first step taken in the process of standards development. A list of sources reviewed is included in Appendix A of this report. In addition, the project team included RETA Security's Paul Timm, a board-certified Physical Security Professional (PSP) through ASIS International, who also served as co-chairman of the School Safety & Security Council. His expertise helped make certain that the approach for WSFD followed industry best practices.

Philosophy of Approach

Physical security measures fall into four categories: deterrence, detection, delay and response. [Garcia, Mary Lynn. The Design and Evaluation of Physical Protection Systems, Butterworth-Heinemann, 2001]

Deterrence is the act of discouraging someone from taking an action. Forms of deterrence include marked personnel, exterior signs, bright exterior lighting, and fencing. Video cameras also deter criminals. The effectiveness of deterrence elements is very difficult to measure.

Detection is the ability to discover undeterred activities and incidents as they occur. Unlike deterrence, detection systems can be measured. Forms of detection include access control measures, communication systems, video surveillance systems, and intrusion detection systems.

Delay slows the movements of an adversary. Locked doors, windows, and other possible entry points delay intruders. Locked interior doors, gates and other forms of delay impede the progress of perpetrators. Other delaying tools include fences, vehicle barriers, and speed reducing features.

Security programs succeed or fail based on the quality of the response. School resource officers, security personnel, administrators, and any faculty and staff that happen to be in the building can positively affect various incidents. Response effectiveness is often determined by training, tools, and supplies. Of course, local emergency responders also factor into this category.

The elements that afford the most protection for students, staff, and visitors are access control and communications. Access control means that schools must be able to account for persons that are in the building and/or are no longer in the building at all times.

Communications means that persons in duress must have means to contact others when in need and must be able to be reached when an emergency announcement is made.

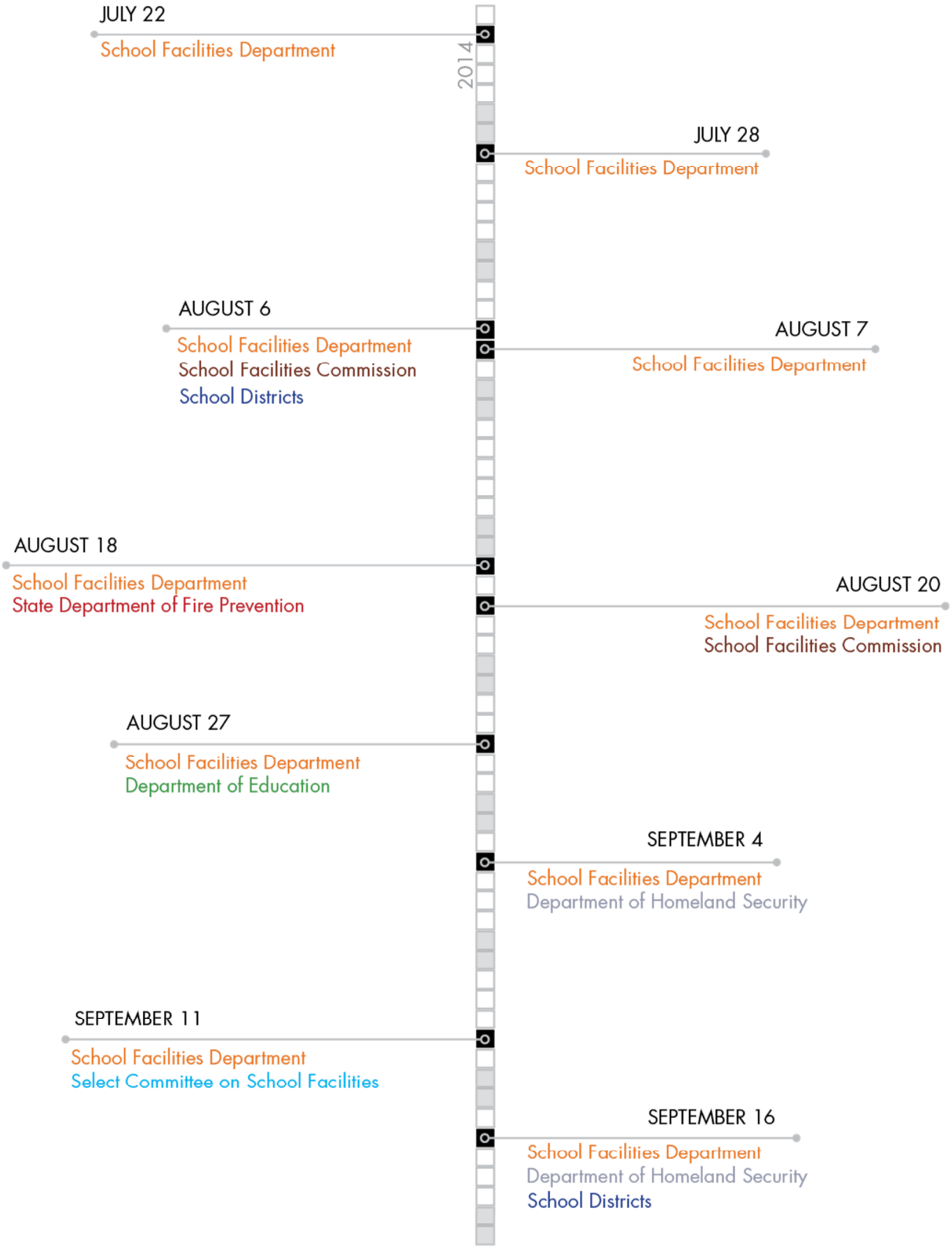
The project team followed this approach in developing the attached matrix of standards and guidelines, and this philosophy also informed the prioritization discussions that took place around all measures under consideration.

Communication with Stakeholders

As part of the effort to make the process of standards development as transparent and collaborative as possible, a series of opportunities were scheduled where the various stakeholders in the process could provide input. All these organizations have interests in the successful implementation of security standards into the Wyoming Schools, and came to the table with different perspectives and levels of involvement.

- School Facilities Department: The WSFD was the primary provider of input to the MOA/RETA team during the process of standards development. In addition to the regular project meetings, RETA Security's contact at the public relations firm TCPR corresponded with Tony Hughes at WSFD regarding the development of strategic press releases on the project.
- School Facilities Commission (SFC): The WSFD, along with the MOA/RETA team, was part of the SFC's meeting agendas and provided updates to the SFC throughout the process.
- Select Committee on School Facilities: The WSFD took responsibility for keeping the Select Committee abreast on the development of the security standards.
- State of Wyoming Department of Fire Prevention: Deputy Director Mark Young attended one of the project meetings and was engaged as the project moved forward.
- Wyoming Department of Education: The MOA/RETA team communicated with the Department at critical stages during standards development, and the Department was copied on the first and second drafts of this report. The WDE's primary point of contact for the MOA/RETA team was Kevin Lewis.
- Department of Homeland Security: The Department of Homeland Security was a valued partner in the process. Bill Morse, Emergency Preparedness Specialist, attended meetings and provided input.

The diagram on the next page provides a graphical representation of when the interfaces between the members of the standards development team and the various stakeholders took place. All meetings were attended by at least one representative of the MOA/RETA team.


2014
JULY 22
School Facilities Department
JULY 28
School Facilities Department
AUGUST 6
School Facilities Department
School Facilities Commission
School Districts
AUGUST 7
School Facilities Department
AUGUST 18
School Facilities Department
State Department of Fire Prevention
AUGUST 20
School Facilities Department
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AUGUST 27
School Facilities Department
Department of Education
SEPTEMBER 4
School Facilities Department
Department of Homeland Security
SEPTEMBER 11
School Facilities Department
Select Committee on School Facilities
SEPTEMBER 16
School Facilities Department
Department of Homeland Security
School Districts

Focus of the Work

The focus of this project has been on physical security, in other words, those items that touch the design or construction of a school building or other district facility. Physical security elements address the loss prevention, or proactive, side of security. The reactive side of security, known as emergency response policies and practices, was being addressed by the Department of Education, in conjunction with the Department of Homeland Security, as of the date of this writing. The MOA/RETA team communicated with both of these groups during development of the physical security standards, so that any coordination that might exist between the two scopes of work could happen.

The scope of this study also did not include emergency preparedness measures, such as drills for fire, severe weather, active shooter, or other security scenarios; predator prevention strategies; or emergency supply management. The study also did not address security of information technology hardware or software.

Definitions of Standards and Guidelines

In the matrix that follows later in this report, each of the various security features is categorized either as a 'standard' or a 'guideline'. Furthermore, those that are classified as standards are more specifically defined as either an 'existing building standard' or a 'new building standard'. Definitions of these classifications are as follows:

Existing Building Standard – A criteria set for existing schools. It requires universal compliance. These are best practices that have general acceptance throughout the industry and were felt to be realistically implementable by all School Districts.

New Building Standard – A criteria set for new schools to be designed, or for those schools that are early enough in the design process to allow implementation, as determined by the WSFD. It requires universal compliance. These are best practices that have general acceptance throughout the industry for new construction.

Guideline – A recommendation given to schools. It is not binding; that is, there is no requirement to carry it out. While these are also best practices in the literature and will certainly enhance a school's security presence, there is an understanding that either budgetary constraints or the philosophies of a particular school district may keep these from being universally implementable. *All measures in the matrix that are not marked as either existing building standards or new building standards are considered guidelines.*

The development team and WSFD determined it necessary to make these distinctions, given the breadth and diversity of schools and communities across Wyoming. A 'one-size-fits-all' approach is neither appropriate nor realistic when it comes to physical security measures.

Applicability of the Standards and Guidelines

One the right side of the matrix are columns for 'Modulars', 'Administration Buildings', 'Transportation Buildings', and 'Special Program Facilities'. School Districts often have one or more of these building types in their property portfolios, and the standards development effort includes consideration of how the security measures under consideration might apply to these facilities. The column labeled 'Modulars' refers specifically to modular classrooms that are part of a larger school building/facility. Modular classrooms that are stand-alone on a site are treated simply as school buildings with regard to the matrix and its applicability.

A dot under a particular building type indicates that that measure is applicable, as either a standard or guideline, to that category of building. During the assessment phase, buildings will only be assessed for the measures that are specifically applicable to them. Since the great majority of buildings under consideration through this effort are school buildings, the term 'school' and other language related to schools are used throughout the matrix and the remainder of this report. It bears stressing that this usage is for convenience only, and the measures are equally applicable to other building types as indicated in the matrix.

Prioritization Methodology

Various factors determine levels of risk. For example, a high school, due to age of students and typical population size, presents a higher level of risk than a middle school. For the same reasons, a middle school presents a higher level of risk than an elementary school. Factors such as population density and socio-economic conditions also dictate that schools in urban settings tend to face higher levels of risk than schools located in suburban or rural settings. Schools located in remote areas may also face higher risk levels simply because of the length of time it takes for emergency responders to arrive on the scene of an incident.

This methodology, along with knowledge of industry best practices, helped inform the overall levels of prioritization within the matrix. The standards and guidelines included in the matrix are divided into seven (7) broad categories – these overall categories are *generally* ordered from highest to lowest priority, although individual items may have higher or lower priority within the total list. This, in turn, informed the selection and ordering of existing security funding requests which came into WSFD during 2014, which needed to be considered in parallel with the standards development process, but prior to the completion of this final report.

Additionally, prioritization by factors as mentioned above will be used after the assessment phase is complete and individual schools are being considered for security upgrades. A top-to-bottom prioritization of all standards and guidelines developed here was determined to be inappropriate and potentially misleading. Factors present at individual schools and individual communities may, in many cases, override any pre-assigned priority, and these factors are only understandable once a complete and thorough assessment of all schools is underway.

Risk Assessment Methodology

An accepted method of risk assessment involves use of a Threat Assessment Matrix. A threat assessment considers the full spectrum of threats (i.e., environmental, criminal, medical, etc.) for a given school. The assessment considers the potential impact of loss (severity) from an incident as well as the likelihood that it will occur. A key component of the assessment is properly defining the ratings for likelihood and severity. These definitions are often subjective and can vary greatly from facility to facility.

		Severity		
		Minor	Moderate	Major
Likelihood	Unlikely			
	Possible			
	Likely			

The actual risk assessment matrix should be completed by schools/districts or by those conducting site visits in the next phase of this project.

IV. MATRIX OF STANDARDS AND GUIDELINES

The matrix of standards and guidelines for Wyoming Schools appears on the following pages. As mentioned previously, the overall categories are *generally* ordered from highest to lowest priority. In an effort to reference this work back to previous studies, a relative 'Level of Need' has been assigned based on results of the State of Wyoming Safety and Security Task Force Survey in 2013 (along with the associated question numbers from the survey in parentheses). Also, an indication has been given as to whether the measure was included in the WSFD Design Guidelines as of the date of this report. Ultimately, the design guidelines will be updated to reflect the recommendations contained herein.

Standards listed in the matrix (both for existing buildings and new) are required to be implemented and so are essentially considered equal in their level of importance, and are the highest priority of all the measures. In order to give some idea of priority among the guidelines, a 'Level of Importance' has been assigned to each: either 'high', 'medium', or 'low'.

Items that are considered good security practices, but that are already required by applicable building codes, are purposely excluded from this matrix. This includes items such as visible and accessible fire hydrants, easily accessible fire extinguishers, and the presence of such systems as fire alarm, emergency lighting, and smoke evacuation.

	NOTE: THOSE ITEMS NOT MARKED AS EITHER 'EXISTING BUILDING STANDARD' OR 'NEW BUILDING STANDARD' ARE CONSIDERED 'GUIDELINES'.	Existing Building Standard	New Building Standard	Level of Need per State of Wyoming Task Force Report	Inclusion in WSFC Design Guidelines	Level of Importance (high, medium, low) for Guidelines	Applicability				
							Modulars	Admin Bldgs	Transportation Bldgs	Special Program Facilities	
1	**Locking Systems / Hardware**										
1.1	Classroom doors can be locked.	●	●	High (Q3)			●	●	●	●	1.1
1.2	Classroom doors can be locked from inside, without after-market devices.		●	High (Q3)			●	●	●	●	1.2
1.3	Exterior doors are lockable.	●	●	High (Q10)	Included		●	●	●	●	1.3
1.4	Exterior windows are lockable.	●	●		Included		●	●	●	●	1.4
1.5	Rekeying utilizing patented key systems.					Medium	●	●	●	●	1.5
1.6	Door position switches for awareness of 'propped' doors.			High (Q9,Q13)	Partial	Medium		●		●	1.6
1.7	Window position switches.				Partial	Low		●		●	1.7
1.8	Key lock box for law enforcement access.					Medium		●		●	1.8
1.9	Exterior doors with hardware capable of a full perimeter lockdown.			Medium (Q4)	Included	Medium	●	●		●	1.9
1.10	Exterior doors have non-removable hinge pins.					High		●		●	1.10
2	**Access Control**										
2.1	Single visitor point of entry.	●	●				●	●	●	●	2.1
2.2	Secured vestibule at main entry.		●	High (Q8)	Included						2.2
2.3	Positive entry control systems at main entry point:			Very High (Q11)							2.3
2.3a	- Entry control credential				Included	High		●		●	2.3a
2.3b	- Electronic keypad					Medium		●		●	2.3b
2.3c	- Video intercom					Medium		●		●	2.3c
2.3d	- Interaction with personnel	●	●					●		●	2.3d
2.4	Visitor management at main entry (registry; colored breakaway lanyards).	●	●								2.4
2.5	Visitor management software.					Medium					2.5
2.6	Entry control credential at select exterior doors (other school access points).				Partial	High					2.6
2.7	Visibility from main office to main entry.		●	Very High (Q11)	Included						2.7
2.8	Visibility from main office to corridors and stairwells.					Medium					2.8
2.9	High counter that is difficult to breach at main office.		●								2.9
2.10	Bullet resistant glass at potential points of entry:										2.10
2.10a	- At visitor/reception interface.					Medium					2.10a
2.10b	- At classroom interior windows or door lites.					High		●		●	2.10b
2.11	Interior doors or gates that restrict access.				Partial	Medium		●		●	2.11
2.12	Exterior features cannot be used to access roof or upper levels.				Included	High	●	●	●	●	2.12
2.13	Modulars are surrounded by fencing requiring use of school's main entry.					High	●				2.13
2.14	Second floor windows are inaccessible.					Medium		●		●	2.14
2.15	Basement windows are protected from unauthorized entry.	●	●					●		●	2.15
2.16	Interior access doors to roofs or mechanical penthouses are secured and locked.	●	●					●	●	●	2.16
2.17	Elevator(s) with restricted access.					Medium		●		●	2.17
3	**Communication Systems**										
3.1	Two-way communication systems:										3.1
3.1a	- Telephone and/or intercom at main entry or secured vestibule, with connection to main office.	●	●								3.1a
3.1b	- Telephones and/or intercoms in classrooms, with connection to main office.	●	●	Low (Q16)	Included		●				3.1b
3.1c	- Telephones and/or intercoms in all other rooms, with connection to main office.			Medium (Q16)		High		●		●	3.1c
3.1d	- Telephones have an all-call feature (as applicable).			Medium (Q17)		High	●	●		●	3.1d
3.1e	- Use of two-way radios by staff that monitor student movement.					High		●		●	3.1e
3.1f	- Two-way radio coverage comprehensive, aided by repeater (as applicable).					Medium		●		●	3.1f

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							Modulars	Admin Bldgs	Transpor-tation Bldgs	Special Program Facilities	
3.1g	- Cell phone signal booster (as applicable).					Medium		●		●	3.1g
3.2	Mass notification systems:										3.2
3.2a	- One-way public address system to all parts of building, including exterior.	●	●	Low (Q17)			●	●	●	●	3.2a
3.2b	- Intrusion detection system, including panic buttons.			High (Q9,Q13,Q17)	Partial	Medium	●	●		●	3.2b
3.2c	- External signaling device (bell, siren, etc.).					Low					3.2c
3.3	Signs directing visitors to access points.	●	●		Partial			●		●	3.3
3.4	Main office and school nurse office are clearly signed.	●	●								3.4
3.5	Interior doors and stairwells are labeled/numbered.	●	●					●		●	3.5
3.6	Exterior doors are numbered on the outside and inside.	●	●					●		●	3.6
3.7	Exterior windows are numbered on the outside.	●	●					●		●	3.7
3.8	All modulars are numbered/labeled.	●	●				●				3.8
3.9	School-based law enforcement office with view of entrance/hallways.			Medium (Q15)		Medium					3.9
3.10	Law enforcement sub-station in school with separate exterior entry.			Medium (Q14,Q15)		Low					3.10
3.11	Elevators have alarm and/or communication features.		●					●		●	3.11
4	**Site and Perimeter**										
4.1	Landscaping that permits natural surveillance.				Included	High	●	●	●	●	4.1
4.2	Barricades to prevent vehicles from being driven into building entries and pedestrian areas.				Included	Medium	●	●	●	●	4.2
4.3	Buffer around building to help protect openings from blast and arms fire.					Low		●	●	●	4.3
4.4	Fencing with gates along perimeter of school.				Included	Medium		●	●	●	4.4
4.5	Perimeter features aid in surveillance and prevent concealment.					High	●	●	●	●	4.5
4.6	Dedicated parking spaces at front of school for law enforcement.			High (Q5)		Low		●	●	●	4.6
4.7	Loading, unloading, drop-off zones, and fire zones are clearly marked.	●	●		Partial						4.7
4.8	Security signage.	●	●					●	●	●	4.8
4.9	Avoid jogs and niches in footprints of buildings.				Included	Low		●		●	4.9
4.10	Parking, entrances and walkways are well lit to aid in surveillance.				Partial	High	●	●	●	●	4.10
5	**Video Surveillance**										
5.1	Video surveillance of main entry, with both front and back views of approach.	●	●	Medium (Q7,Q11)	Included			●	●	●	5.1
5.2	Video surveillance of other key exterior areas (playgrounds, athletic fields, parking lot).				Included	Medium	●		●		5.2
5.3	Video surveillance of other key interior areas (alternate entries, hallways, cafeterias, gymnasiums).				Partial	Medium		●		●	5.3
5.4	If no natural surveillance, place cameras in enclosed stairwells.				Partial	Low		●		●	5.4
5.5	Video surveillance recording capability in place.	●	●				●	●	●	●	5.5
5.6	Active monitoring of video systems during school hours or specific time periods.			High (Q19)		Low	●	●	●	●	5.6
6	**Building Systems**										
6.1	Access to critical utility systems from exterior is restricted.	●	●		Included			●	●	●	6.1
6.2	Master ventilation shut-off in principal's office or designated area.					Low		●		●	6.2
6.3	Master shut-offs for water, gas, and electricity easily accessible.		●		Partial			●		●	6.3
6.4	Protection of water well systems.					Low		●	●	●	6.4
6.5	Occupancy sensors for interior lighting.				Included	Low		●		●	6.5
6.6	Battery back-up in place for key security systems:										6.6
6.6a	- Door hardware overrides					Medium	●	●		●	6.6a
6.6b	- Intrusion detection system					Medium	●	●		●	6.6b
6.6c	- Two-way communication systems	●	●			High	●	●		●	6.6c

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							Modulars	Admin Bldgs	Transpor-tation Bldgs	Special Program Facilities	
6.6d	- One-way public address system	●	●		Included	High	●	●		●	6.6d
6.6e	- Video surveillance	●	●			Medium	●	●		●	6.6e
6.7	Fresh air intakes enclosed by metal mesh sloped at least 45 degrees.					Low		●		●	6.7
6.8	Fresh air intakes on roof or at least 12 feet off ground.					Low		●		●	6.8
6.9	Exhaust air outlets separated from air intakes by maximum distance possible.					Low		●		●	6.9
6.10	Smoke detectors have vandal-resistant features.					Low	●	●		●	6.10
7	**Egress and Refuge**										
7.1	Classroom doors are constructed of durable material.	●	●							●	7.1
7.2	Interior rooms or areas used for lockdown. (Design standard for these spaces?)			High (Q18)	Partial	High	●	●		●	7.2
7.3	Classroom interior windows, or lites in doors, can be covered during a lockdown.					Medium	●				7.3
7.4	Doors equipped with push bar exit devices are resistant to chaining.					Medium		●		●	7.4
7.5	Retractable partitions fully recess into locking niches.					Low		●		●	7.5
7.6	Windows are designed to serve as secondary means of egress.					Medium		●		●	7.6
7.7	Provide shatterproof mirrors in classrooms and restrooms.				Included	Low				●	7.7
7.8	Avoid creating blind spots in interior of school.				Included	Low		●		●	7.8
7.9	Interior lighting does not produce shadowy spaces.				Partial	Low		●		●	7.9

V. FURTHER DISCUSSION OF STANDARDS AND GUIDELINES

The purpose of this section is to provide a brief discussion of each standard and guideline included in the matrix. This is not intended to be an exhaustive justification of each item's status as a best practice in the industry – for that, we refer the reader to Appendix A, in which more thorough backgrounds on any of these items may be found in government publications, industry research, and trade journals.

1.1 Classroom doors can be locked – Classroom doors play a significant role in slowing adversarial movement. It is absolutely essential that, as a minimum, all classroom doors have locking mechanisms.

1.2 Classroom doors can be locked from inside, without after-market devices – All classroom doors should have locking mechanisms and, for the sake of consistency, they should all have the same kind of locking mechanisms. The majority of schools have classroom doors that lock from the outside. Almost all classroom doors swing open into the hallway. This combination of features presents risk to the teacher that has to step into the hallway to secure the classroom during an event that necessitates a lockdown. If the teacher cannot immediately locate the key to lock the door, the entire situation becomes even more complicated. There are several potential solutions to reduce this risk. To avoid expenditures, some schools have dealt with this issue by keeping classroom doors both locked and open. A manufacturer-designed hold open feature in the door closer is the best way to keep the door open. In the event of a lockdown, the teacher simply reaches for the door handle and pulls the door closed. Other schools have decided to keep doors closed and locked at all times. Obviously, this option can be disruptive to a teacher from an operational standpoint if students are frequently leaving and returning to the classroom. Schools may replace locking mechanisms that lock from the outside with locking mechanisms that lock from the inside with a thumb turn. The thumb turn lock aids in timeliness because it does not require a key to operate. This solution, however, presents an additional risk in that an unauthorized person can enter an unsecured room and lock out staff members. Schools may pursue an option that permits all classroom doors to be locked electronically with the push of a button. The best option, taking into account both budget and operations, involves replacing locking mechanisms that lock from the outside with locking mechanisms that lock from the inside with a key. In this scenario, teachers are required to keep that key on the staff ID lanyard so that it can be accessed and utilized as efficiently as possible.

1.3 Exterior doors are lockable – A facility cannot be secured without functional exterior door locks.

1.4 Exterior windows are lockable – Exterior windows with locking capabilities deter, delay, and/or prevent unauthorized building access.

1.5 Rekeying utilizing patented key systems – Because 'key control' policies are notoriously difficult to enforce, building keys inevitably fall into the hands of unauthorized individuals. Periodically rekeying the facility enables administrators to implement more effective key control procedures. The most effective way to rekey involves utilization of a patented key system. A patented key system prevents unauthorized individuals from duplicating keys – thereby reducing the risk of compromising key control practices.

1.6 Door position switches for awareness of 'propped' doors – Exterior doors can be equipped with door position switches. When a door remains open (i.e. due to propping) for a pre-determined amount of time, the door position switch sends an electronic signal to assigned personnel.

1.7 Window position switches – Window position switches afford the same detection features as door position switches.

1.8 Key lock box for law enforcement access – A key lock box enables emergency responders to access building keys in a storage container at a strategic location (i.e. main entry) so they can quickly enter the facility in an emergency. Most schools are already outfitted with a lock box for fire officials because it is required by Code. Schools should also have a lock box for police officers.

1.9 Exterior doors with hardware capable of a full perimeter lockdown – A full perimeter lockdown can be accomplished with the push of a button once a system that relies upon electrified exterior doors has been installed.

1.10 Exterior doors have non-removable hinge pins – Exterior doors should never have removable hinge pins on the outside of the doors. Acceptable and contemporary door hardware is designed to prevent tampering with the use of non-removable hinge pins.

2.1 Single visitor point of entry – Single point of entry supports a 'closed campus' practice. Closed campus can be defined as one where exterior doors are closed and secured. Access to the facility is restricted to a monitored entrance or, in rare cases, entrances. Architectural designs can make attaining a closed campus difficult, if not impossible. For schools that cannot implement a closed campus practice, it is important to move toward a 'close' campus. In other words, begin reducing the number of open exterior doors to as few as possible. For example, a school that currently operates with four points of unmonitored entry should strive for the ultimate goal of one monitored point of entry. If that scenario is presently unrealistic, the school should attempt to move from four points of entry to three, keeping the long-term goal of single point of entry in mind.

2.2 Secured vestibule at main entry – Many schools have changed their main entrances to enhance access control capabilities. They have added locked vestibules inside the main door. (The 'bones' of a vestibule such as this is often already included in building designs in

order to meet Energy Code). At the beginning of the school day when students arrive, the vestibule doors can be opened to allow free access while designated staff members monitor the arrival of students. Once the day begins, however, a custodian would lock the doors to the vestibule. When visitors arrive, they would pass through the outer entrance doors, allowing them to get out of the weather. To continue through the vestibule doors, visitors would have to discuss their business with security personnel or someone trained in visitor management practices in the main office. If possible, the vestibule might contain a counter with a pass-through window into the main office. If not, office and visitor could communicate with a video camera and an intercom. Security personnel or a designated staff member from the office would escort visitors cleared for admittance to the main office where they would be recorded in the visitor management system and receive a visitor badge attached to a colored, break-away lanyard. At the end of the school day, the vestibule doors would once again open, this time to allow students an unencumbered exit while designated staff members monitor the dismissal of students.

2.3 Positive entry control systems at main entry point – Electronic access control systems offer a number of advantages over conventional locks and keys. Cards, fobs, keypads, and sometimes biometric sensors unlock doors in such systems. Cards seem generally to be the key of choice in schools. Administrators, faculty, staff, and a few students with responsibilities requiring access after-hours might have card access to the building. A cardholder can swipe a card with a magnetic strip through a reader or present a proximity card to a reader. Information coded onto the magnetic strip or an integrated circuit inside the proximity card identifies the cardholder to the system, which looks for the name in a database. If that name has permission to enter that door, the system unlocks the door. This rendering of the process assumes that the individual identified by the card is the person using the card. Facilities that need higher levels of security might provide a keypad for the individual to enter a code by hand after swiping or presenting the card.

Electronic access control systems offer three advantages: easy re-keying, monitoring who visits after-hours, and limiting where those in the building can go after-hours. When someone loses a key or keys to a school building, facilities personnel must re-key all of the affected locks and make new keys for everyone that needs a key to those doors. It can be very expensive and time consuming. Furthermore, key control, a term that describes the methods utilized to ensure that specific keys are given to authorized individuals, is notoriously difficult. It is not uncommon for a school to find that several generations of family have keys to the building. When an electronic access control card goes missing, the system administrator simply disables the card and issues a new one. It is, by contrast, inexpensive and fast.

Electronic systems record who enters along with the time and date. The system administrator can monitor that log and look for anomalies. It is also possible to control where in the building those with access cards can go. Electronic systems can enable

cardholders to enter any door or just one door. Senior administrators, maintenance, and a limited number of others could receive access to all doors. Faculty members might be limited to doors leading into their department.

2.4 Visitor management at main entry – Effective visitor management systems require visitors to produce photographic ID. Designated school personnel visually verify the visitor's identity and record that person's pertinent information in a registry. Once authorized, the visitor is presented with a badge that hangs from the neck on a colored, break-away lanyard. To verify that a visitor has left, many schools require the return of the badge and lanyard to the office at the end of the visit. This verification can be particularly important to emergency responders as they attempt to account for persons in the school. To ensure that the return takes place, the designated personnel can keep the visitor's photographic ID until the visitor's credential is returned.

2.5 Visitor management software – Visitor management software systems automate the process of vetting visitors and printing visitor badges. When a visitor arrives in the office, office personnel ask for a driver's license or another government-issued identification credential. The visitor management system hardware can scan the ID and screen the visitor's identity by searching databases of registered sex offenders, restraining orders, and other problems. The system administrator can also manually enter information denying admission to certain visitors. Some systems can simultaneously notify designated personnel authorized to address such instances. Once the system has cleared the visitor, he or she would receive a visitor badge attached to a colored, break-away lanyard to wear at all times while at the school. If the system produces a sticker, we recommend leaving the backing on the sticker and placing it into a clear badge holder attached to a colored, break-away lanyard. Some brand names to consider are Raptor vSoft and LobbyGuard.

2.6 Entry control credential at select exterior doors (other school access points) – This measure is the same as described in item 2.3 above except at doors other than the main entry. For operational reasons, schools may have a need for staff access at doors other than the main entry. If this is the case, these doors should be equipped with access control devices. For schools that choose to do this, it is typically three to four doors that are outfitted.

2.7 Visibility from main office to main entry – Clear lines of site from the main office to the main entry support the Crime Prevention Through Environmental Design (CPTED) principle of 'natural surveillance'. Natural surveillance enables administrators and support personnel to detect (potential) incidents as soon as possible. Early detection aids in prevention and intervention efforts.

2.8 Visibility from main office to corridors and stairwells – Again, natural surveillance helps reduce the risk of and/or prevent unauthorized actions.

2.9 High counter that is difficult to breach at main office – A high counter at the main desk discourages and/or delays the advance of an intruder, thereby providing protection to designated personnel.

2.10 Bullet resistant glass at potential points of entry – Bullet-resistant glass hardens view panels against the use of force. Whether through the use of laminated glass or the strengthening of tempered glass with a laminate film, schools can install this kind of glazing at main entry windows (2.10a) or classroom windows or door lites (2.10b).

2.11 Interior doors or gates that restrict access – Complementary access control measures, such as hallway gates and interior doors, can prevent access to other areas of the school (i.e. academic wings) during extracurricular activities. Often these are included in the design of schools for operational reasons, or can be added exclusively as a security measure.

2.12 Exterior features cannot be used to access roof or upper levels – Single story school buildings are especially vulnerable to unauthorized roof access. Obvious solutions include removing tree branches that overhang the building, storing ladders in secured areas, and installing slats in chain link fences. In other cases, solutions may require expert assistance or even trial-and-error initiatives.

2.13 Modulars are surrounded by fencing requiring use of school's main entry – Fencing around modular units provides good border definition and can deter/delay unauthorized persons from accessing these areas.

2.14 Second floor windows are inaccessible – For the same reasons stated above, schools should attempt to restrict access to second floor windows.

2.15 Basement windows are protected from unauthorized entry – For the same reasons stated above, schools should attempt to restrict access to basement windows.

2.16 Interior access doors to roofs or mechanical penthouses are secured and locked – Interior roof or penthouse access points can also present an area of vulnerability. Once these access points are breached, an intruder may have uninterrupted time to compromise the building's ventilation system because these areas are often not covered by natural or video surveillance. Restrict access to these rooms/areas and ensure that roof hatches are secured.

2.17 Elevator(s) with restricted access – To prevent unmonitored activities, schools should restrict access to elevators through the use of mechanical or electronic key access.

3.1a Telephone and/or intercom at main entry or secured vestibule, with connection to main office – Two-way communication systems are a critical component of a school's security system, and can be in the form of telephones or intercom systems. Traditional intercom systems are really just PA systems that have a two-way capability. In other words,

announcements can be made from the main office to all areas, but rooms that have call buttons can also contact the main office. These systems can provide audio or audio/video communication between visitors at the main (single point) entry and designated personnel in the main office.

3.1b Telephones and/or intercoms in classrooms, with connection to main office – Telephones (or intercoms) must be present, as a minimum, in all classrooms. Audit telephones to ensure that every one is functional. Label every telephone with emergency dialing instructions. For example, specify how someone would dial 911 and the main office.

3.1c Telephones and/or intercoms in all other rooms, with connection to main office – This is the same as item 3.1b above, except for the outfitting of gyms, libraries, or other support spaces.

3.1d Telephones have an all-call feature – If telephones are provided, this measure recommends that the system include an all-call feature, which is a mass notification feature that can be used in the event of an emergency.

3.1e Use of two-way radios by staff that monitor student movement – Two-way radios are one of the most effective means of on-site communications. They provide one-button, instant communications with an entire group of individuals across a campus. All administrators, facilities personnel, and staff members that monitor student movement (i.e. during period changes, recess, P.E., gym classes, etc.) should be required to carry two-way radios.

3.1f Two-way radio coverage comprehensive, aided by repeater – Schools can be tested to determine if the two-way radios used by school staff or law enforcement have adequate signal strength. For areas that lack adequate signal strength, repeaters and/or boosters can significantly improve two-way radio coverage.

3.1g Cell phone signal booster – Similar to item 3.1f above, boosters can be used for cell phone coverage on a campus.

3.2a One-way public address system to all parts of building, including exterior – Public address (PA) systems afford one-way communication so that emergency announcements made from the main office can reach all areas of the building. Ensure that coverage is comprehensive inside the building, outside the building, and to modular classrooms.

3.2b Intrusion detection system, including panic buttons – An intrusion detection or security alarm system seeks to detect unauthorized entry into a school building. Standard systems consist of door contacts and motion sensors. Systems should be monitored at a central station. In instances where staff members have the ability to arm and disarm the system, schools should issue individual codes for audit trail purposes. Intrusion detection systems can be optimized by installing panic buttons in key areas such as the main office.

3.2c External signaling device (bell, siren, etc.) – An additional mass notification device that might be especially useful for rural schools is an external signaling device on the exterior of the school. For areas that are subject to long response times from law enforcement, a bell or siren could serve to notify local townspeople ahead of an organized response. Controls for this feature would best be placed in the main office.

3.3 Signs directing visitors to access points – These signs direct visitors to approved entry points from outside of the facility. This is part of the 'territoriality' tenet of the Crime Prevention Through Environmental Design (CPTED) philosophy, a movement developed and furthered over the last four decades by criminologists, sociologists, architects and planners to encourage good behavior and discourage criminal activity. The idea is that a strong presence of 'ownership' on school grounds discourages bad activity from outsiders.

3.4 Main office and school nurse office are clearly signed – These signs direct visitors to key areas, such as the main office of nurse's office, from inside the facility.

3.5 Interior doors and stairwells are labeled/numbered – Interior door labels support efficient operations and assist emergency responders in identifying key areas during an emergency.

3.6 Exterior doors are numbered on the outside and inside – Exterior door numbers assist staff members and emergency responders in identifying key areas during an emergency.

3.7 Exterior windows are numbered on the outside – Exterior window numbers assist staff members and emergency responders in identifying key areas during an emergency.

3.8 All modulars are numbered/labeled – Modular labels assist staff members and emergency responders in identifying key areas during an emergency.

3.9 School-based law enforcement office with view of entrance/hallways – Whether or not a school provides a resource officer or outside security is out of the scope of this study. However, if a dedicated office is provided, natural surveillance helps reduce the risk of and/or prevent unauthorized actions.

3.10 Law enforcement sub-station in school with separate exterior entry – The operational presence of law enforcement officers deters crime, aids in the detection of unauthorized activities, and dramatically reduces response time. Their presence in a school is outside the scope of this study, however, if one is provided, a separate exterior entry is crucial from an operational standpoint.

3.11 Elevators have alarm or communication features – Elevators should be equipped with systems that alert response personnel in emergency situations.

4.1 Landscaping that permits natural surveillance – Clear lines of sight and a high degree of visibility on school grounds are cited by law enforcement as good contributors to campus safety. It is also included as one of the basic tenets of Crime Prevention Through Environmental Design (CPTED). Implementation involves using low growing vegetation and placement on the site to allow surveillance by staff, neighbors, pedestrians, and patrol cars. Where vegetation already obstructs vision, tree branches may be removed below 7 feet and bushes trimmed to less than 3 feet.

4.2 Barricades to prevent vehicles from being driven into building entries and pedestrian areas – Vehicle barriers can protect students, staff, and visitors on athletic fields, in playground areas, near building entries, and at other pedestrian areas. Bollards, short vertical posts that are sunk into the ground, generally provide the best kind of vehicle barriers. Alternative barrier types vary in effectiveness. For example, while cement planters provide sturdy obstruction, they also can send projectiles flying if targeted with improvised explosive devices (IEDs). Other options, such as traffic barricades, offer more value in visually deterring vehicle access than in actually stopping vehicles. In order to permit snowplows to push snow from parking areas and walkways onto athletic fields, some vendors are now carrying various kinds of removable bollards. The challenge for the architect or site designer is to implement this in such a way as to keep the school's outward appearance open and inviting.

4.3 Buffer around building to help protect openings from blast and arms fire – The 'stand-off distance' is the distance between the face of a building and the nearest point an explosive device can approach from any side. Maximizing this distance is one of the more cost-effective ways to mitigate potential damage from an outside explosion, if that is determined to be an area of risk. An added benefit of maximizing this distance is that it gives more response time against a person or persons approaching a school building from a parking area, if they are determined by surveillance to be a threat.

4.4 Fencing with gates along perimeter of school – A physical barrier around a school's property is regarded the 'first layer of defense' by the Department of Homeland Security. Perimeter fencing provides good border definition and can deter/delay unauthorized persons from accessing the property. This strategy may only be considered for medium or high risk sites, and is most effective when combined with an entry control point. It is somewhat less effective, however, if the potential perpetrator is an individual known to the school who has been granted access. Individual schools / districts will need to determine if this approach is appropriate given the desire to promote welcoming, community-oriented campuses. Depending on operations, implementation of access procedures across a secured perimeter can vary greatly.

4.5 Perimeter features aid in surveillance and prevent concealment – This is closely related to item 4.1 and also a tenet of CPTED. Man-made obstacles should be situated to not create hiding spaces, and fencing, if used, should not be solid for the same reason.

4.6 Dedicated parking spaces at front of school for law enforcement – Not only does this provide the obvious benefit of making accommodation for responding officers, but it also offers the perception of a more secure campus with the associated signage that would be installed. However, this is considered one of the less important items in the matrix since emergency personnel will park to give themselves the best building access whether or not it is normally accommodated.

4.7 Loading, unloading, drop-off zones, and fire zones are clearly marked – Marking of fire zones is already required by Code, and marking of the other areas is already considered best practice by site designers. Having organized areas for bus- and car-oriented activities limits potential negative behavior and makes for easier site surveillance.

4.8 Security signage – Security signage not only provides rules under which a property should be accessed, but also helps establish the territoriality of a school as recommended by CPTED. Examples of verbiage that might be included on such signage are: "No trespassing"; "Premises monitored by…"; "Vehicles are subject to search"; and "School grounds hours:…"; with the first two being the most common.

4.9 Avoid jogs and niches in footprints of buildings – The intent of this item is to avoid creating places along the outside of a building where a perpetrator can hide from either visual or electronic surveillance. In practice however, the complex programs of school buildings and the desire to create engaging and interesting school designs make this difficult to effectively accomplish.

4.10 Parking, entrances and walkways are well lit to aid in surveillance – Almost universally, law enforcement agencies agree that the benefits of well-lit sites far outweigh any advantages that dark sites might offer, at least from a security standpoint. To avoid introducing too much unwanted light, especially in rural areas, motion-activated lights to meet the intent of this measure are acceptable.

5.1 Video surveillance of main entry, with both front and back views of approach – Video surveillance systems provide value in several areas: deterrence, surveillance, assessment, and forensics. As mentioned earlier, the deterrence element is difficult to measure. We do know, however, that those who engage in criminal behavior sometimes escape being identified by vandalizing cameras or concealing their identity by wearing things such as masks or hoodies. Surveillance of the main entry must provide both front and back views of the person as they approach and enter the building. This can be accomplished in a number of ways: 1) One fixed camera at the interior and one fixed camera at the exterior, both focused on the main entry; 2) One 360 degree camera at the exterior; 3) One 360 degree camera at the interior. Installation of cameras in the interior can be advantageous in limiting vandalism opportunities and eliminating accommodations for weather

protection/calibration. Care should be taken to determine that the installation location will give the views desired and not create any 'dead zones'.

The surveillance aspect of video surveillance occurs when a security officer or designated staff member watches a monitor in the hopes of detecting an event happening in real time. Unfortunately, tests have shown that the likelihood of being successful in this endeavor is very low. It is worth noting that success rates increase as monitoring time spans decrease. In other words, the person tasked with monitoring during a five-minute passing period will be more successful than the person monitoring a three-hour, afterschool event.

The assessment aspect of video surveillance takes place when a security officer or designated staff member receives notification about a potential incident. For example, a lunch monitor may see unusual activity across the cafeteria and communicate that information to someone that has access to the monitor. That person can, in turn, look at a specific camera view to assess more accurately the situation before deciding how to respond appropriately. The advent of video analytics has significantly improved the value of the assessment aspect. Video analytics employ software and algorithms that automatically detect certain kinds of motion occurring in a fixed-background scene. When those predetermined movements take place, the system sends notification to security personnel or a designated staff member.

The forensics aspect of video surveillance accounts for all of the recorded information. This aspect also represents the chief value of a school's video surveillance system. School administrators, security personnel, and local first responders all depend heavily on recorded information.

Since people are the highest priority asset category, video surveillance systems should be designed from the inside out. The school that installs exterior cameras first has inadvertently determined that the things category of asset prioritization is more important than the people category. A basic video surveillance system should begin with the installation of cameras at main entries. These cameras ensure that all persons entering and leaving the building will be recorded with a time and date stamp. Next, install cameras in interior areas that are difficult to monitor or have experienced discipline incidents. After addressing the important interior areas, pursue strategic placement of exterior cameras. All cameras should be added based on need and collaborative input. Standard recording systems range from DVRs to network video recorders (NVRs). NVRs generally get paired with centralized Internet protocol cameras.

5.2 Video surveillance of other key exterior areas – See discussion in item 5.1 above. As much coverage as possible of exterior portions of the school s desired, however practical considerations and particular geometries of school grounds will make implementation different for each school.

5.3 Video surveillance of other key interior areas – See discussion in item 5.1 above. There are no agreed upon metrics for how much video coverage of the interior of a school is appropriate – the agreed-upon solution will vary widely depending on the plan of the school and particularities of the community.

5.4 If no natural surveillance, place cameras in enclosed stairwells – Stairwells are often the scene of undesirable activity, given their inherent concealed nature in many school designs. If cameras are not desired, some schools have found that convex mirrors offer additional visibility into otherwise unmonitored areas for very little expense.

5.5 Video surveillance recording capability in place - For liability reasons, fake cameras should never be used. Someone that experiences victimization in the field of view of a fake camera may come to the school with the hope of ultimately receiving justice based on accessing recorded video. When the victimized person discovers that the system is not functional, a lawsuit may potentially be filed against the school because the fake camera conveyed an expectation of security. For the same reason, functional cameras must also have recording capabilities. The need to review recorded video for evidentiary purposes depends on it. Schools that utilize a single camera at the main entry but lack recording capabilities should add a recording device immediately. Consider nothing less than a digital video recorder (DVR). The amount of archiving capacity to build into the system varies but schools average out at approximately 30 days' worth of documentation.

5.6 Active monitoring of video systems during school hours or specific time periods – This keeps video surveillance from being strictly a forensic measure, but active monitoring is often out of reach due to the labor cost involved. This can be lessened by monitoring only specific portions of each day, such as passing periods, lunch, athletic events, and so on.

6.1 Access to critical utility systems from exterior is restricted – The means by which a perpetrator could shut off power, telephones, or other system feeds to a school building, putting the inhabitants at a great disadvantage, must be restricted. This could include having the systems not exposed above grade, or having a locked enclosure around the utility in question.

6.2 Master ventilation shut-off in principal's office or designated area – In the event of an attack on a school involving the release of a toxic gas, the school's ventilation system can spread the gas and endanger the occupants. A master shut-off switch can limit the potential damage in such a scenario.

6.3 Master shut-offs for water, gas, and electricity easily accessible – Similar to item 6.2 above, the ability to limit the damage from compromises to other building systems is a benefit.

6.4 Protection of water well systems – For many rural schools, the school's water supply comes from a well. This creates a unique need to protect these systems as much as the systems fed from municipal grids.

6.5 Occupancy sensors for interior lighting – If an intruder does manage to gain access to the inside of a building after hours and at night, occupancy sensors could help alert responding authorities or other passers-by as to the intruder's location in the building. Fixtures affected would be above and beyond those that are already designated as emergency fixtures by Code. If fixtures with ambient light sensors are already in place as part of a building's sustainability strategy, the system would need to be programmed to allow the occupancy sensors to control after the conclusion of the school day.

6.6 Battery back-up in place for key security systems – While it is standard practice as one aspect of school design to designate certain loads in the building to have a back-up power source, the effort here is to discuss whether certain security functions should be required to be one of those loads based on their importance. Some systems, such as fire alarm and smoke evacuation systems, which might be considered part of an overall security strategy but which are already required by the Code to be on back-up power, are not included here.

6.6a Door hardware overrides – The capability for the office to perform a lockdown of all exterior doors is often included in school security guidelines (see item 1.9 above). If power has been cut to a school during an emergency situation, having this connectivity on back-up power allows the lock-down to proceed regardless. This is not required with some of the newer generation access control systems, which have battery back-up built into the access control device on the door.

6.6b Intrusion detection system – Inclusion of an intrusion detection system as a guideline is discussed in item 3.2b above. On its own, loss of power may be enough of an indication that an emergency situation is in progress, however, the ability to detect the location of an intrusion and to be able to use panic buttons connected to local law enforcement may be considered highly important.

6.6c Two-way communication systems – Justification for these systems are included in items 3.1b (classrooms) and 3.1c (other areas) above. During an emergency, communication between the main office and other occupants in the school building is considered critical, and so is, by extension, the ability to keep this communication link open even in the event of loss of building power.

6.6d One-way public communication systems – Similar to item 6.6c above, a public-address system (see item 3.2a above) or external signaling device (see item 3.2c above) that is operable under all circumstances is critical to maintaining effective communication with all school occupants or community members during an emergency.

6.6e Video surveillance – Operation of this equipment, covered under sub-heading 5 above, is most useful for identifying perpetrators after an incident has already taken place. Therefore, to have full confidence in the efficacy of these systems, consideration should be made for protecting their operation with back-up power.

6.7 Fresh air intakes enclosed by metal mesh sloped at least 45 degrees – This feature limits the ability for a perpetrator to release a toxic substance into the school's ventilation system.

6.8 Fresh air intakes on roof or at least 12 feet off ground – As with the item above, making access to the outside interfaces of a school's ventilation system more difficult will discourage any criminal behavior associated with it. This covers not only scenarios with criminal intent but also situations such as where an idling truck can inadvertently contaminate an air system.

6.9 Exhaust air outlets separated from air intakes by maximum distance possible – A minimum separation between these two ends of an HVAC system is already mandated by Code, but for security purposes they are encouraged to be as far from one another as possible.

6.10 Smoke detectors have vandal-resistant features – These features make it difficult for someone to interfere with the proper functioning of the system.

7.1 Classroom doors are constructed of durable material – Although this is good design practice for a school anyway, security needs only make this more important. Any measure that 'buys time', in the event of an intruder attempting to make his or her way into a classroom, is in the best interest of safety. Doors of any material other than those of hollow core construction would be considered to meet the intent of this standard.

7.2 Interior rooms or areas used for lockdown – In the event that an active shooter scenario in progress, it is considered important to have a place where students and staff can take refuge and prolong the incident to give law enforcement time to respond. This could be a windowless room directly accessible from a classroom, or a portion of each classroom with a solid wall where there is no visibility from an interior window or sidelight. Given the wide variety of existing and new schools in Wyoming, this may or may not be possible to implement in any given school, and if it is, may take different form depending on the school's unique plan.

7.3 Classroom interior windows, or lites in doors, can be covered during a lockdown – Having the ability to cover interior openings into a classroom may discourage an active shooter from attempting to access that room.

7.4 Doors equipped with push bar exit devices are resistant to chaining – Different types of exit or 'panic' devices are available on the market, including rim (including concealed or exposed vertical rod), push bar, and paddle types. The intent of this guideline is to select a

type that does not have exposed features which can be used to place a chain around and restrict the exiting of occupants, as has happened in past school incidents.

7.5 Retractable partitions fully recess into locking niches – If partitions are used to divide classrooms or other areas, this guideline suggests providing a recessed niche with a locked door, into which they may be retracted when not in use. This prevents the creation of potential hiding places for a perpetrator.

7.6 Windows are designed to serve as secondary means of egress – One of the strategies in building security is to limit the number of entry points into a facility. However, there may be scenarios in which the desire is to be able to get students and others out of the building as quickly as possible, rather than being in a lockdown situation. In this case, windows that are easily unlockable and large enough to exit through would be necessary.

7.7 Provide shatterproof mirrors in classrooms and restrooms – This prevents the shards from the breaking of mirrors from being used as weapons.

7.8 Avoid creating blind spots in interior of school – Visibility down corridors is a key part of an overall school security strategy, as mentioned in item 2.8 above. Avoiding niches as much as possible limits the creation of hiding spots for perpetrators, although in practice, this is often difficult to accomplish.

7.9 Interior lighting does not produce shadowy spaces – This is generally already accomplished by proper lighting design in new schools. However, in existing facilities, there may be benefit in reviewing lighting levels specifically with prevention of potential hiding spots in mind.

Additional Discussion on Emergency Supplies

A standard or guideline related to the provision of emergency supplies for schools is not strictly a physical security component and hence, has not been included in the matrix. However, since it is a low-cost and very important part of any school's preparedness for security (or other) events, the team wished to mention it in this report regardless. Adequate access to these supplies means having them not just in the nurse's office, but decentralized throughout the school as much as possible. Some of the items to be provided should include first aid supplies, blankets, and wind-up flashlights.

Additional Discussion on Modular Classrooms

Some schools have portable classrooms, referred to as modulars, on the property as a temporary solution to provide additional classroom space when facing capacity issues. This temporary solution often becomes a permanent problem. Portable classrooms present challenges to both access control and communications. Effective access control faces challenges when there is routine movement of students and personnel between the

building and the portable classroom. Maintaining effective communications becomes difficult when standard systems in the main building do not exist in the modular. While no administrator wants portable classrooms, crowded classrooms sometimes make them unavoidable. Attempt to address the problem of students walking outside without supervision to move from buildings to modular and back. Is there an affordable way to construct enclosed walkways? Two-way radios can solve the communications problem. Every school should keep a supply of two-way radios on hand for teachers supervising classes outside. If something happens, a two-way radio can provide instant communications with the security office or the principal. Teachers in modular classrooms should have the same capability.

VI. COORDINATION WITH DISTRICT EMERGENCY OPERATIONS PLANS

As stated earlier in this report, emergency operations plans (EOPs), which are created at the District level in Wyoming, are being reviewed under the auspices of a different study. For the most part, these physical security standards do not directly impact existing emergency operation plan standards.

There are a few exceptions. Classroom door locking mechanisms obviously impact lockdown procedures. Schools without locking capabilities cannot participate in lockdowns. As the Deputy State Fire Marshal (Mark Young) mentioned, his office needs to be involved if a school chooses to implement a lockdown system, to determine how the fire alarm system will interact with the lockdown system to avoid creating a situation hazardous to life safety. He also joins the standards development team in standing against the use of after-market devices designed to secure classroom doors as these devices tend to violate fire egress and ADA codes. Another potential exception is communication systems – applicable EOPs should be reviewed based on the particular communication system which may be selected as a result of this study.

VII. INTEGRATION WITH EXISTING WSFD DOCUMENTATION

Design Guidelines

Design guidelines will be amended by WSFD after the conclusion of this study. Design guidelines dealing with security will most likely be replaced in their entirety with relevant portions of this report.

Adequacy Standards

Adequacy standards will be amended by WSFD after the conclusion of this study. This effort goes hand-in-hand with the update of the design guidelines.

AiM Database

The AiM database will have a new section added for security upgrades. The information to be entered will come out of the facility assessment process, along with the cost bases of work developed during this study. The assessment phase of work is discussed in more depth in the section below.

VIII. FACILITY ASSESSMENT PROCESS

Process and Approach

The second phase of establishing a consistent and equitable approach to security within the Wyoming K-12 schools is the facility assessment process. All buildings in each district will be evaluated on the basis of each standard and guideline presented in this report's matrix. The methodology used will be similar to that used in preparation of the 2012 Facilities Condition Assessment & Building Data Collection Report by Facilities Engineering Associates. Exact details of the methodology development, training and calibration techniques, and the assessment process itself will be developed further in this second phase of work.

Cost Bases of Work

As part of this scope of work, the MOA/RETA team established cost bases for each of the standards and guidelines included in this report. Costs were based on data from the 3rd quarter of 2014 in the RS Means online system, which was the most current cost data available at the time of this report's publication. Unit costs were multiplied and totaled based on prototype plans of Wyoming elementary schools available in the AiM database, and then divided by the square footage of the particular school from which the takeoff was accomplished. If the standard or guideline was more 'generic' in nature, costs were estimated based upon a theoretical 60,000 sf school. Through this method, cost opinions were established which can scale up or down for different size schools. For very small schools, costs should be anticipated to be relatively higher since the economies of scale will not be available for smaller projects. Since costs have been developed on only minimally specific standards and guidelines, and due to the very preliminary nature of this work, appropriate contingencies and escalation percentages should be applied to the costs established herein.

A summary of the square footage cost bases for each of the standards and guidelines presented earlier is presented on the two pages that follow.

	NOTE: THOSE ITEMS NOT MARKED AS EITHER 'EXISTING BUILDING STANDARD' OR 'NEW BUILDING STANDARD' ARE CONSIDERED 'GUIDELINES'.	Existing Building Standard	New Building Standard	
1	**Locking Systems / Hardware**			Total Cost / sf
1.1	Classroom doors can be locked.	•	•	0.152
1.2	Classroom doors can be locked from inside, without after-market devices.		•	0.152
1.3	Exterior doors are lockable.	•	•	0.144
1.4	Exterior windows are lockable.	•	•	0.038
1.5	Rekeying utilizing patented key systems.			0.066
1.6	Door position switches for awareness of 'propped' doors.			0.040
1.7	Window position switches.			0.255
1.8	Key lock box for law enforcement access.			0.013
1.9	Exterior doors with hardware capable of a full perimeter lockdown.			0.272
1.10	Exterior doors have non-removable hinge pins.			0.002
2	**Access Control**			Total Cost / sf
2.1	Single visitor point of entry.	•	•	0.059
2.2	Secured vestibule at main entry.		•	0.667
2.3	Positive entry control systems at main entry point:			See Below
2.3a	- Entry control credential			0.025
2.3b	- Electronic keypad			0.015
2.3c	- Video intercom			0.038
2.3d	- Interaction with personnel	•	•	0.000
2.4	Visitor management at main entry (registry; colored breakaway lanyards).	•	•	0.000
2.5	Visitor management software.			0.153
2.6	Entry control credential at select exterior doors (other school access points).			0.099
2.7	Visibility from main office to main entry.		•	0.017
2.8	Visibility from main office to corridors and stairwells.			0.000
2.9	High counter that is difficult to breach at main office.		•	0.236
2.10	Bullet resistant glass at potential points of entry:			See Below
2.10a	- At visitor/reception interface.			0.019
2.10b	- At classroom interior windows or door lites.			0.159
2.11	Interior doors or gates that restrict access.			0.109
2.12	Exterior features cannot be used to access roof or upper levels.			0.000
2.13	Modulars are surrounded by fencing requiring use of school's main entry.			0.155
2.14	Second floor windows are inaccessible.			0.000
2.15	Basement windows are protected from unauthorized entry.	•	•	0.010
2.16	Interior access doors to roofs or mechanical penthouses are secured and locked.	•	•	0.008
2.17	Elevator(s) with restricted access.			0.308
3	**Communication Systems**			Total Cost / sf
3.1	Two-way communication systems:			See Below
3.1a	- Telephone and/or intercom at main entry or secured vestibule, with connection to main office.	•	•	0.049
3.1b	- Telephones and/or intercoms in classrooms, with connection to main office.	•	•	0.369
3.1c	- Telephones and/or intercoms in all other rooms, with connection to main office.			0.277
3.1d	- Telephones have an all-call feature (as applicable).			0.000
3.1e	- Use of two-way radios by staff that monitor student movement.			0.056
3.1f	- Two-way radio coverage comprehensive, aided by repeater (as applicable).			0.042
3.1g	- Cell phone signal booster (as applicable).			0.030
3.2	Mass notification systems:			See Below
3.2a	- One-way public address system to all parts of building, including exterior.	•	•	0.496
3.2b	- Intrusion detection system, including panic buttons.			0.538
3.2c	- External signaling device (bell, siren, etc.).			0.024
3.3	Signs directing visitors to access points.	•	•	0.012
3.4	Main office and school nurse office are clearly signed.	•	•	0.004
3.5	Interior doors and stairwells are labeled/numbered.	•	•	0.016
3.6	Exterior doors are numbered on the outside and inside.	•	•	0.003
3.7	Exterior windows are numbered on the outside.	•	•	0.017
3.8	All modulars are numbered/labeled.	•	•	0.001
3.9	School-based law enforcement office with view of entrance/hallways.			0.480
3.10	Law enforcement sub-station in school with separate exterior entry.			0.480
3.11	Elevators have alarm and/or communication features.		•	0.083

	NOTE: THOSE ITEMS NOT MARKED AS EITHER 'EXISTING BUILDING STANDARD' OR 'NEW BUILDING STANDARD' ARE CONSIDERED 'GUIDELINES'.	Existing Building Standard	New Building Standard	
4	**Site and Perimeter**			Total Cost / sf
4.1	Landscaping that permits natural surveillance.			0.000
4.2	Barricades to prevent vehicles from being driven into building entries and pedestrian areas.			0.159
4.3	Buffer around building to help protect openings from blast and arms fire.			0.000
4.4	Fencing with gates along perimeter of school.			1.178
4.5	Perimeter features aid in surveillance and prevent concealment.			0.000
4.6	Dedicated parking spaces at front of school for law enforcement.			0.018
4.7	Loading, unloading, drop-off zones, and fire zones are clearly marked.	•	•	0.021
4.8	Security signage.	•	•	0.012
4.9	Avoid jogs and niches in footprints of buildings.			0.000
4.10	Parking, entrances and walkways are well lit to aid in surveillance.			0.300
5	**Video Surveillance**			Total Cost / sf
5.1	Video surveillance of main entry, with both front and back views of approach.	•	•	0.021
5.2	Video surveillance of other key exterior areas (playgrounds, athletic fields, parking lot).			0.164
5.3	Video surveillance of other key interior areas (alternate entries, hallways, cafeterias, gymnasiums).			0.134
5.4	If no natural surveillance, place cameras in enclosed stairwells.			0.085
5.5	Video surveillance recording capability in place.	•	•	0.036
5.6	Active monitoring of video systems during school hours or specific time periods.			1.875
6	**Building Systems**			Total Cost / sf
6.1	Access to critical utility systems from exterior is restricted.	•	•	0.008
6.2	Master ventilation shut-off in principal's office or designated area.			0.025
6.3	Master shut-offs for water, gas, and electricity easily accessible.		•	0.075
6.4	Protection of water well systems.			0.017
6.5	Occupancy sensors for interior lighting.			0.167
6.6	Battery back-up in place for key security systems:			See Below
6.6a	- Door hardware overrides			0.042
6.6b	- Intrusion detection system			0.042
6.6c	- Two-way communication systems	•	•	0.042
6.6d	- One-way public address system	•	•	0.042
6.6e	- Video surveillance	•	•	0.042
6.7	Fresh air intakes enclosed by metal mesh sloped at least 45 degrees.			0.013
6.8	Fresh air intakes on roof or at least 12 feet off ground.			0.000
6.9	Exhaust air outlets separated from air intakes by maximum distance possible.			0.000
6.10	Smoke detectors have vandal-resistant features.			0.000
7	**Egress and Refuge**			Total Cost / sf
7.1	Classroom doors are constructed of durable material.	•	•	0.170
7.2	Interior rooms or areas used for lockdown. (Design standard for these spaces?)			0.000
7.3	Classroom interior windows, or lites in doors, can be covered during a lockdown.			0.013
7.4	Doors equipped with push bar exit devices are resistant to chaining.			0.237
7.5	Retractable partitions fully recess into locking niches.			0.269
7.6	Windows are designed to serve as secondary means of egress.			0.247
7.7	Provide shatterproof mirrors in classrooms and restrooms.			0.061
7.8	Avoid creating blind spots in interior of school.			0.000
7.9	Interior lighting does not produce shadowy spaces.			0.000

Timetable and Opinion of Cost

The MOA/RETA team investigated a potential approach to a follow-on assessment phase to the extent necessary to establish an opinion of cost and a timetable to complete the work. As stated earlier, this was based on the methodologies used during the 2012 Facilities Condition Assessment & Building Data Collection project conducted by Facilities Engineering Associates, in which MOA Architecture played a key role. A potential timetable for the effort that would allow completion of the assessment effort by June 2015 is as follows. This would allow the WSFD to have this data in time to support their efforts with the Select Committee in moving the work forward.

Project Start-up	2 weeks	Jan. 19, 2015 – Feb. 1, 2015
Assessment Process Development	3 weeks	Feb. 2, 2015 – Feb. 22, 2015
Assessment Training and Calibration	3 weeks	Feb. 23, 2015 – Mar. 15, 2015
Assessment Phase	8 weeks	Mar. 16, 2015 – May 10, 2015
Data Review and Adjustments	2 weeks	May 11, 2015 – May 24, 2015
AiM Integration	2 weeks	May 25, 2015 – June 7, 2015
Closing Phase / Final Report	2 weeks	June 8, 2015 – June 21, 2015

Based on this schedule, the number of meetings needed, and the number and size of assessment crews needed to cover all 400+ buildings in the WSFD inventory, an opinion of the overall cost to accomplish this effort is $1.6 to $1.8 million.

IX. CONCLUSION

The safety of children in the Wyoming K-12 schools is the number one priority for all those involved in the development of security standards for the districts' facilities. The number of design features related to physical security alone, not to mention procedural and operational interventions, can be overwhelming. Balancing the implementation of these various features with budgetary constraints and the desire to keep schools open and inviting environments is challenging. This study represents the most frequently cited measures for enhancing school security, based on a study of current literature, that were deemed appropriate for consideration for the Wyoming K-12 schools. Unfortunately, no strategy or set of strategies will ever be able to offer 100% protection against the kinds of school violence we have seen in recent years. However, the set of standards and guidelines presented in this report provide a balanced, thoughtful approach to school security that is based on recognized approaches in the industry.

X. APPENDIX A – LIST OF REFERENCE MATERIAL

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