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Schools: Lessons Learned from Site Assistance Visits

Schools Lessons Learned

Introduction

The Site Assistance Visit (SAV) is part of a suite of vulnerability identification and assessment tools developed by the U.S. Department of Homeland Security (DHS). The SAV is a risk based assessment that has been applied to facilities across all 17 critical infrastructures and key resources. In addition to collecting information on physical security characteristics and vulnerabilities at critical infrastructure facilities, two additional elements of the SAV methodology include enumerating commendable actions and options for consideration. The commendable actions represent the SAV team's observation of site-specific best protective measures in place while options for consideration represent potential strategies for enhancing the security posture of the facility.

This paper provides insights or lessons learned gained from an in-depth data mining effort of all SAV reports and from an evaluation of the commendable actions and options for consideration taken from SAVs conducted at schools between October 2004 and November 2005.

The sample of SAV Schools has the following general characteristics:
- 35 schools: five colleges/universities and 30 Kindergarten through 12th grade (K-12) schools
- Statistical analysis is limited to elementary and secondary schools due to the limited number of colleges and the diversity of the group
- 17 private and 13 public schools
- All of the private schools have a religious orientation
- 15 elementary (Kindergarten through 7th grade) and 15 secondary schools (grades 8-12)
- All but two of the schools are located within UASI districts
- Limited geographic dispersion
    - 23 schools are located in the South census region (MD, VA, and DC)
    - Four schools are located in the Northeast census region (NY and NJ)
    - Three schools are located in the West census region (CA and AK)

Protective Measures

The SAV information includes physical security characteristics as well as threat-specific factors of susceptibility. Schools use a variety of measures and practices intended to promote the safety of students and staff. The appropriate level of security and types of protective measures may vary widely depending upon a number of factors. Some of the factors that impact the security decisions at schools are listed below:
- Age and type of construction
- Layout of the buildings
- Local demographics
- Physical location – urban, suburban, rural
- State and local regulations
- Level of school – elementary, secondary, post-secondary
- Type of school – public, private; secular, non-secular
- Enrollment.

Key Statistics

The following are some of the key findings based on the SAV sample.[1]

- *Schools emphasize access control measures to maintain a safe environment for students.* Ninety percent of the schools in the SAV sample use one or more protective measures to limit access to school buildings. The following are some of the access control measures in place along with the percent of schools:
  - Visitor sign-in procedures (60%)
  - Student/staff ID badges (47%)
  - Monitored building entrances (33%)

  Visitor sign-in procedures may include protocols such as ID checks, visitor badging, and escort requirements. In addition, it was generally found that staff was required to wear badges while students were only required to carry their school-issued ID. Access control to school buildings is a top concern of school administrators with nearly 17% of the schools using all three measures.

- *Schools with higher enrollments are more likely than schools with lower enrollments to use access control measures.* Using student enrollment data in conjunction with the SAV sample data, it is possible to determine the number of students protected by in-place protective measures. In all cases, the percent of students protected by one of the access control measures exceeds the percent of schools reporting the use of those measures.

- *Relative to other protective measures, schools have not put an emphasis on vehicle control.* Twenty percent or less of the SAV schools employed measures to mitigate the vulnerability to or consequence from a VBIED as shown in Figure 2. Two types of VBIED threat were considered: parking an explosive-laden vehicle in close proximity to the target building and ramming into a congested building or area. Possible protective measures for these two VBIED threats include those that increase standoff distance, such as bollards, jersey barriers, planters, and parking restrictions and those that limit avenues of high-speed approach.

- *Schools generally rely on staff employees to provide a security presence*. Over 60 percent of schools in the SAV sample have a visible security presence provided by employees, contract guards, or stationed local law enforcement. The overwhelming majority of schools, nearly 80%, rely on staff employees for security. Only four of the schools in the SAV sample used both an employee guard force and a local law enforcement presence. Figure 3 shows the distribution of types of security personnel.

- *Public schools are more likely than private schools to have a visible security presence.* The results of the SAV sample indicate that security presence varies by type of school i.e., public vs. private. In the SAV sample 85% of the public schools were protected by a security force compared to 47% for private schools.

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[1] Findings are based on the 30 primary and secondary schools that participated in the SAV program and are not a representative sample of the population of primary and secondary schools.
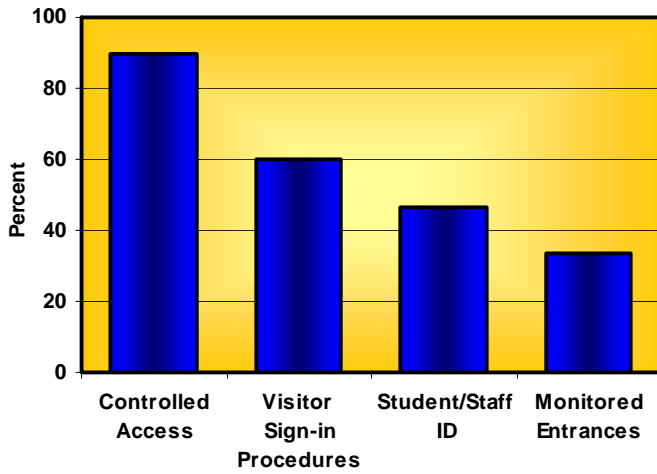
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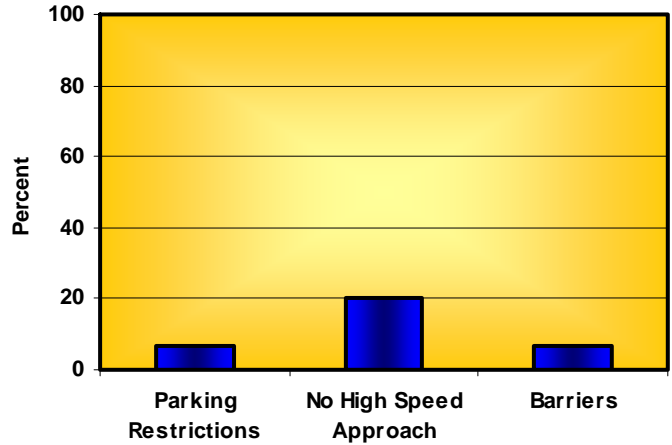Figure 1 Selected Interior Access Control Measures
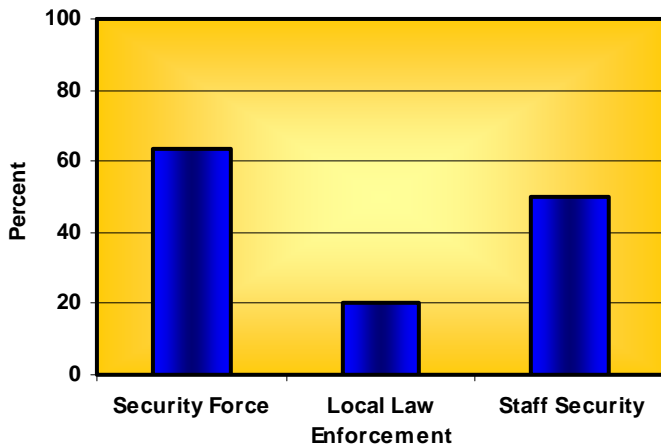

Figure 2 Selected Exterior Control Measures

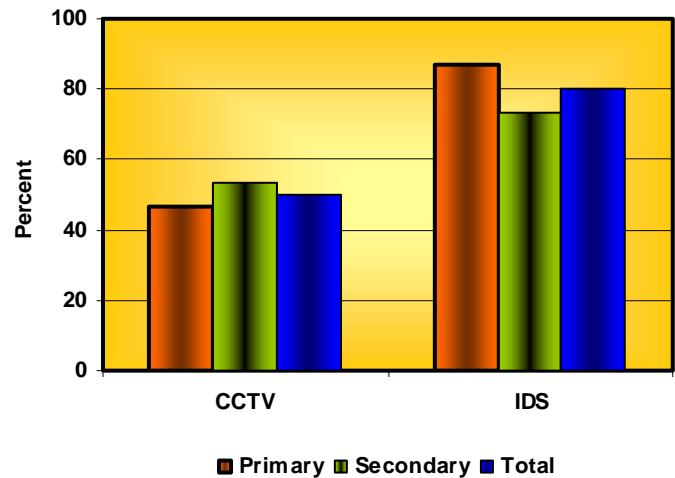Figure 3 Security Force Presence and Composition

Figure 4 Surveillance Protective Measures

- *Secondary schools are more likely than primary schools to use security or closed-circuit TV (CCTV) cameras.* Fifty-three percent of the secondary schools had CCTVs in place compared to 46 percent for primary schools (see Figure 4). Common placement of CCTV cameras includes parking lots, hallways, libraries, gymnasiums, cafeterias, entrances, and potential trouble spots. CCTV systems at schools typically are not monitored and are primarily used for after-incident review rather than for prevention/response.

- *Schools use alarm and intrusion detection systems to provide perimeter and interior protection.* Eighty percent of the SAV schools use alarm or intrusion detection systems to detect unauthorized entries (see Figure 4). These systems typically are used to monitor buildings after hours. Alarm / intrusion detection systems were found in more of the primary schools than secondary schools in the SAV sample. However, when taking into consideration enrollment, the

percentage of secondary school students protected by alarm / intrusion detection systems is more than double that of primary school students, 68 percent compared to 32 percent, respectively.

Lessons Learned: Commendable Actions

Commendable actions represent the good protective measures that are in place at a facility at the time of the SAV. The following have been condensed from the site-specific actions provided in the individual SAV reports to general commendable actions. The good security practices listed below are designed to provide information and assistance to school administrators in planning a security strategy. No two schools are alike and, therefore, each school must determine the appropriate combination of protective measures based on its security risks taking into consideration threat, assets to be protected, and school characteristics.

Access Control Measures
- School is not open to the public and is not rented out for after-school functions
- Monitoring of pick-up and drop-off zones and main entrances
- Exterior doors have controlled access (key pad/electronic/key)
- Visitor sign-in procedures
- ID badges for student/staff
- Signage posted declaring no public access policy
- Steel roll-down gates to limit access in hallways
- Deliveries controlled (scheduled/off-site)
- Limited number of external access points
- Individual classrooms and critical areas can be locked
- Classroom intercom systems/panic buttons
- Inspection of mass gathering areas prior to special events
- Maintenance Staff have recognizable uniforms

Vehicle Access Control
- Limited access to parking lots such as, strict enforcement of parking policy, vehicle gates, or vehicle stickers for staff and students
- Vehicles are not allowed close to buildings
- Parking lots have set-off distance from populated areas
- Vehicle barriers at school entrances

Perimeter Protection
- Perimeter fence is in good repair and clear of vegetation
- Locked gates after school hours
- Fresh air intakes not accessible
- Anti-blast film on exterior windows
- Metal grates on first-floor windows
- Solid steel exterior doors
- Trash receptacles are located away from buildings
- Bag inspection procedures and appropriate signage in place

Surveillance
- Closed-Circuit Television (CCTV) installed at critical areas such as, parking lots, student pick-up/drop-off zones, entrances, cafeterias, gymnasiums, and hallways

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- Monitoring of CCTV system
- External lighting for critical areas
- Intrusion detection devices (IDS) installed
- Guard patrols of school property

Security Force
- Uniformed security guards on-site
- Police Officers on-site or conduct regular patrols of school grounds
- Guards carry radios/communication/transceivers
- Additional security staff added for special events
- Direct telephone line to LLE

Interdependencies
- Dual boilers provide redundancy
- Backup generators or redundant supply
- UPS backup of critical IT systems
- UPS for security access systems
- Redundant communications devices (e.g., radios/cell phones)
- Fire suppression system is separated from main potable water system

Preparedness, Planning and Training
- Written emergency action plan
- Vulnerability assessments conducted
- School Crises Handbook available in classrooms or hallways
- Emergency evacuation drills practiced
- Participate in table top exercises with first responders
- Emergency assembly areas are well-dispersed with multiple assembly points
- Utility disruption plan and agreements with utility service providers
- Security and/or terrorist awareness training for staff, students, and security personnel
- Staff trained in emergency medical procedures such as, CPR
- Limited publicly available information on school layout and activities
- Neighborhood watch coordinated with school (e.g., report suspicious behavior)
- Criminal background checks for employees/staff (Often a state or local requirement)
- Communication coordinated with other local schools or centralized school district incident command center
- Religious affiliation not displayed prominently

Response and Recovery Measures
- MOA with LLE
- MOA with mass transit for evacuation/relocation
- Security information sharing with external agencies
- Continuity Plan (e.g., relocation)
- MOA with local facilities for shelter in place/relocation/evacuation

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Lessons Learned: Common Security Enhancements

Central to the SAV methodology are the options for consideration that the team provides to the facility owner/operators. Listed below are the most frequently cited options for consideration (greater than 30%) followed by an analysis of the costs and benefits associated with each. The information designed to assist school administrators in making decisions on protective measures. Each school's security staff must determine the appropriate combination of protective measures based on its own assessment of risks taking into consideration threat, assets to be protected, and school characteristics.

Access Control
- Conduct random searches: person and bag checks at entrance points
- Visitor sign-in procedures: check ID and issue badges

Vehicle Access Control
- Install vehicle barriers (e.g. concrete planters, cement benches, bollards) with a stand-off distance around building
- Install vehicle gates and control access onto school grounds (guard shack)

Perimeter Protection
- Install blast resistant film on all exterior windows
- Install/improve perimeter fencing (10 feet high) and use screening

Surveillance/CCTV/Intrusion Detection
- Install CCTV coverage of critical areas with a dedicated post for monitoring
- Alarm all points of entry including windows (IDS) and monitor

Security Force
- Increase visible police/security presence, especially at entrances

Interdependencies
- Install steel barrier or other protection around utility assets (e.g., electric transformer, exposed gas lines, fuel tanks, etc.)

Preparedness, Planning and Training
- Provide additional security and terrorist awareness training for staff including table-top exercises

Costs and Benefits

Order of magnitude cost estimates were developed for the common security enhancements. The cost estimates include two separate cost components: equipment/installation costs and maintenance/operations costs. The equipment cost component takes into account purchase, installation, and implementation of the measure. Annual operations cost factors in elements, such as labor, maintenance, operability testing, and repair. In addition to the cost estimates, Table 1 also provides a list of benefits associated with each of the recommended measures.

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Table 1 Cost and Benefits of Common Security Measures		
Physical Protective Measures	**Initial Cost ($K)**	**Annual Operations Cost ($K)**
Provide additional security and terrorist awareness training for staff including table-top exercises *Benefits* • Allows facility personnel to quickly respond to emergency situations • Allows facility and facility security personnel to interact with local responders and know their capabilities • Gives facility personnel the ability to ID potential indicators of emergency situations possibly mitigating consequences or improving response	1	1
Install steel barrier or other protection around utility assets. *Benefits* • Protects electric transformers, gas lines, fuel tanks, etc. from accidental and intentional damage • Reduces risk of utility outage and possible school closure or safety concerns	40[1]	0
Install blast resistant film on all exterior windows *Benefits* • Increases building impact and blast resistance • Reduces threat of injury due to flying glass	50[2]	0
Conduct random searches: person and bag checks at entrance points. *Benefits* • Acts as a deterrent to entry of unauthorized items into the facility (e.g., guns, knives, IEDs)	0	100[3]
Visitor sign-in procedures: check ID and issue badges, inspect packages. *Benefits* • Prevents unauthorized persons from entering the facility • Prevents entry of unauthorized items into the facility (e.g., guns, knives, IEDs)	2[4]	100[3]
Increase visible police/security presence, especially at entrances. *Benefits* • Acts as a deterrent to entry of unauthorized items into the facility (e.g., guns, knives, IEDs) • Prevents entry of unauthorized persons into the facility • Improves response time to emergency situations possibly mitigating consequences or improving response	0	150[5]
Vehicle access control: install vehicle gates and control access onto school grounds (guard shack). *Benefits* • Prevents VBIED parking and detonation near populated areas or buildings	80[6]	110[3,7]

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Table 1 Cost and Benefits of Common Security Measures		
Physical Protective Measures	**Initial Cost ($K)**	**Annual Operations Cost ($K)**
Install vehicle barriers (e.g. concrete planters, cement benches, bollards) with a stand-off distance around building. *Benefits* • Prevents VBIED from ramming into populated areas • Prevents VBIED parking and detonation near populated areas or buildings	200[8]	0
Install CCTV coverage of critical areas with a dedicated post for monitoring (assuming ten cameras [$1500 each], two monitors, switcher, and recorder and assuming one technician and one monitoring station officer). *Benefits* • Acts as a deterrent to unauthorized entry/activities • Allows facility security personnel to immediately ID unauthorized persons or activities • Allows facility personnel to quickly direct emergency response or facility security personnel to critical areas for deterrence or defense. • Allows ID of unauthorized persons or activities after the fact (forensic value)	17[9]	204[10]
Install/improve perimeter fencing (10 feet high) and use screening. *Benefits* • Prevents unauthorized entry to populated areas • Screening prevents outside surveillance of school activities, particularly targeting on outside play	250[11]	0
Alarm all points of entry including windows (IDS) and monitor. *Benefits* • Prevents unauthorized entry into buildings • Allows facility personnel to quickly direct emergency response or facility security personnel for deterrence or defense.	126[12]	1216[13]

[1] Chain link fencing with screening (800 ft) ($50/ft).

[2] For 500 windows ($100/window).

[3] Access Control Officer for 10 hr/school days.

[4] Write procedures, purchase badges.

[5] Police Officer 10 hr/school days.

[6] Four Railroad arm gate vehicle barriers ($20,000/barrier).

[7] Maintenance Technician.

[8] Concrete planter vehicle barriers for 2000 ft coverage ($100/ ft).

[9] Ten Ethernet ready cameras ($1500/camera), video switcher ($500), video recorder ($500), and two camera monitors ($1000).

[10] Alarm Technician (10 hrs/week) and Alarm Station Officer 10 hr/school days.

[11] Chain link perimeter fencing with screening (5,000 ft) ($50/ft).

[12] 40 door alarms ($150/alarm), 300 window alarms ($150/alarm), 100 volumetric alarms ($150/alarm), 4 ethernet ready field panels ($5000/panel), and Alarm reporting console ($40,000).

[13] Five Alarm Station Officers and five Alarm Assessment Officers - 24/7 staffing.

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Observations

- Increased terrorist awareness training for staff is a low cost high effectiveness option for increasing the overall security of schools.

- Establishing visitor sign-in procedures and increasing the security presence are high effectiveness measures that entail no initial outlay. The cost of establishing visitor sign-in procedures involves writing the procedure and an access control officer. The cost of increasing security presence is the cost of having a stationed security guard.

- The annual operations cost an alarm / intrusion detection system is estimated to be about 10 times the initial capital investment. The operations cost assumes two technicians and ten 24/7 officers to maintain and monitor the system.

- CCTV systems are relatively inexpensive to install, however, for response/interdiction capability, a commitment in resources for monitoring is required.

Figure 5 shows the total cost of commonly recommended security enhancements taking into consideration both the initial and operations cost components.
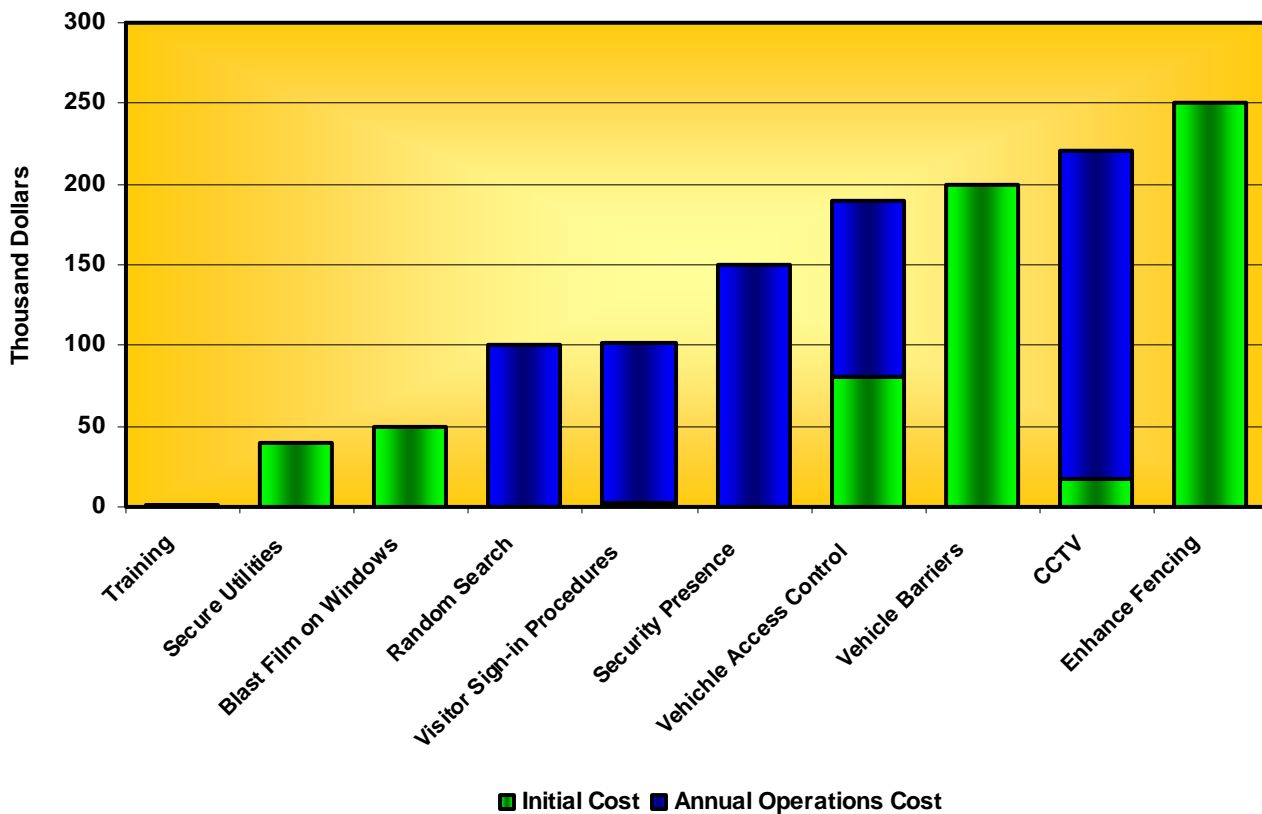

Figure 5 Initial and Annual Operations Cost of Common Security Enhancements

Conclusion

The SAV schools sample provides insights into security measures in place at primary and secondary schools. As indicated by the SAV teams, schools generally use protective measures such as, access control protocols, visible security presence, and intrusion detection systems to provide a safe school environment and protect school assets. However, because schools differ by type (private vs. public), student composition (primary/secondary), size, geographic location, and building characteristics, there is no single approach to security. The commendable actions and suggested security enhancements are tools that school administrators can use in developing an appropriate combination of protective measures given the threat environment and funding constraints.