Effective Strategies for Creating Safer Schools and Communities

Ensuring

Quality School Facilities and Security Technologies

THE GEORGE WASHINGTON UNIVERSITY
GRADUATE SCHOOL OF EDUCATION AND HUMAN DEVELOPMENT

NWREL
Northwest Regional Educational Laboratory

Hamilton Fish Institute

This publication contains pages that have been left intentionally blank for proper pagination when printing.

Ensuring Quality School Facilities and Security Technologies

Effective Strategies for Creating Safer Schools and Communities

Tod Schneider, Safe Schools Consultant

Revised September 2007

Published by:
The Hamilton Fish Institute on School and Community Violence &
Northwest Regional Educational Laboratory

With support from:
Office of Juvenile Justice and Delinquency Prevention
U.S. Department of Justice

Hamilton Fish Institute on School and Community Violence
The George Washington University
2121 K Street, NW, Suite 200, Washington, DC 20037-1830
Phone: (202) 496-2200
E-mail: hamfish@gwu.edu
Web: http://www.hamfish.org

Hamilton Fish Institute Director:
Dr. Beverly Caffee Glenn

Center for Classroom Teaching and Learning
Northwest Regional Educational Laboratory
101 SW Main St., Suite 500, Portland, OR 97204
Toll-free number: 1-800-547-6339, ext. 135
E-mail: cctl@nwrel.org
Web: http://www.nwrel.org/cctl

Center for Classroom Teaching and Learning Director:
Kit Peixotto

Author:
Tod Schneider

Editors:
Ira Pollack, Michael Garringer

Technical editor:
Eugenia Cooper Potter

Layout design:
Dennis Wakeland

Cover design:
Paula Surmann, Michael Heavener

This project was supported by the Hamilton Fish Institute on School and Community Violence through Award No. 2005-JL-FX-0157 awarded by the Office of Juvenile Justice and Delinquency Prevention, Office of Justice Programs, U.S. Department of Justice. Points of view or opinions in this document are those of the author and do not necessarily represent the official position or policies of the U.S. Department of Justice or the Hamilton Fish Institute.

About the Effective Strategies for Creating Safer Schools and Communities Series

School safety requires a broad-based effort by the entire community, including educators, students, parents, law enforcement agencies, businesses, and faith-based organizations, among others. By adopting a comprehensive approach to addressing school safety focusing on prevention, intervention, and response, schools can increase the safety and security of students.

To assist schools in their safety efforts, the Hamilton Fish Institute on School and Community Violence and the Northwest Regional Educational Laboratory (NWREL) have revised this series of five guidebooks intended to build a foundation of information that will assist schools and school districts in developing safe learning environments. The series identifies several components that, when effectively addressed, provide schools with the foundation and building blocks needed to create and maintain safe schools. Written in collaboration with leading national experts, these resources will provide local school districts with information and resources that support comprehensive safe school planning efforts.

Each guide provides administrators and classroom practitioners with a glimpse of how fellow educators are addressing issues, overcoming obstacles, and attaining success in key areas of school safety. They will assist educators in obtaining current, reliable, and useful information on topics that should be considered as they develop safe school strategies and positive learning environments. As emphasized in *Threat Assessment in Schools: A Guide to Managing Threatening Situations and to Creating Safe School Climates*, a joint publication of the U.S. Secret Service and the U.S. Department of Education, creating cultures and climates of safety is essential to the prevention of violence in school. Each guidebook retains this message as a fundamental concept.

Under No Child Left Behind, the education law signed in January 2002, violence prevention programs must meet specified principles of effectiveness and be grounded in scientifically based research that provides evidence that the program to be used will reduce violence and illegal drug use. Building on the concept in No Child Left Behind—that all children need a safe environment in which to learn and achieve—these guides explain the importance of selecting research-based programs and strategies. The guides also outline a sample of methods for addressing and solving safety issues schools may encounter.

Creating Schoolwide Prevention and Intervention Strategies, by Jeffrey Sprague, is intended to put the issue of schoolwide violence prevention in context for educators and outline an approach for choosing and creating effective prevention programs. The guide covers the following topics:

- Why schoolwide prevention strategies are critical
- Characteristics of a safe school
- Four sources of vulnerability to school violence
- How to plan for strategies that meet school safety needs
- Five effective response strategies
- Useful Web and print resources

School Policies and Legal Issues Supporting Safe Schools, by Thomas Hutton and Kirk Bailey, is a practical guide to the development and implementation of school district and school policies that support safe schools. Section 1 provides an overview of legal and practical considerations to keep in mind and to address with local legal counsel when developing policies at the district level to prevent violence. Section 2 addresses specific situations and issues that may arise and discusses how the framework set forth in Section 1 bears on these questions.

Ensuring Quality School Facilities and Security Technologies, by Tod Schneider, is intended to help educators and other members of the community understand the relationship between school safety and school facilities, including technology. The guide covers the following topics:

- Crime Prevention Through Environmental Design (CPTED)
- Planning To Address CPTED: Key Questions To Ask
- Security Technology: An Overview
- Safety Audits and Security Surveys

The Role of Mental Health Services in Promoting Safe and Secure Schools, by Krista Kutash and Albert Duchnowski, explores the role of mental health services in developing and maintaining safe schools. The guide provides an overview of research-based school mental health models and offers guidance for school personnel and others on implementing mental health–related services, including the role that federal, state, and district policies play and the need for community involvement.

Fostering School, Family, and Community Involvement, by Howard Adelman and Linda Taylor, provides an overview of the nature and scope of collaboration, explores barriers to effectively working together, and discusses the processes of establishing and sustaining the work. It also reviews the state of the art of collaboration around the country, the importance of data, and some issues related to sharing information.

The Hamilton Fish Institute on School and Community Violence and the Northwest Regional Educational Laboratory hope that the guides in this series assist your school and its partners in creating a safe, positive learning environment for the children you serve.

About the Author

Tod Schneider, a national consultant on violence, environmental design, ad hope building, has served as the senior Eugene (Oregon) Police Department crime prevention specialist for 15 years, and is the senior author of Safe School Design. He has taught confrontation management, violence prevention, and crime prevention through environmental design for a wide variety of audiences, including the Arizona Juvenile Justice Association, the Kansas Advisory Group, the Oregon Department of Education, state and federal government groups, the National Recreation and Parks Association, many social service groups, and the University of Oregon.

Contents

blank page

Introduction

Schools are generally safe environments. Yet, while chronic, lethal violence does pose an ongoing threat to school-age youth in many economically depressed urban centers, most of America's high-profile school shootings have occurred in locations that not only did not match that profile, but seemed like highly improbable targets. This would include not only the rash of shootings in the 1990s, but a rural Amish school in Pennsylvania in 2006, and the Red Lake (Minnesota) High School on the Chippewa Indian Reservation in 2005. This conundrum contributes to an understandably heightened level of anxiety: We cannot effectively predict where school violence might happen next.

The most important steps a school can take in preventing crime involve the affective rather than physical environment. These include promoting a positive school climate and culture, teaching and modeling prosocial behaviors, and providing effective intervention when antisocial behaviors occur, or when individual students demonstrate a propensity for violence. In addition, schoolwide prevention and intervention strategies can mitigate threats. Each of these considerations is addressed in other guidebooks in this series.

However, the physical environment obviously plays a critical role in keeping students safe. The school structure should provide an inviting environment in which children can be protected from threats and learning can take place. While researchers are continuing to study the role that a facility's physical environment plays in school safety, educators and parents agree on the importance of providing a safe school environment. Children who feel safe are both psychologically and physiologically more receptive to learning.

How do schools ensure a safe physical environment? Every school must consider different weaknesses and strengths. Of all school-related homicides reported for 1992–1994, only about one in three occurred inside a school building. The remaining two-thirds were equally divided between outdoor locations on campus, and locations off site (Kachur et al., 1996). However, the high-profile school shootings that have taken place in more recent years—including in Littleton, Colorado (1999); Springfield, Oregon (1998); Bailey, Colorado (2006); Cazenovia, Wisconsin (2006); and Lancaster, Pennsylvania (2006)—occurred inside school buildings.

It's important to remember that most schools will never experience a shooting, but they will very likely face other threats. Bullying, domestic violence, custody battles, drug dealing, gang activity, bike theft, and extreme weather are much more commonplace threats to school children. Littleton, Colorado's Public Schools Manager of Security and Emergency Preparedness estimates 25 outside threats for every one inside—including a dozen tornado watches and 3–4 thunderstorm warnings in a recent one-month period.

Decisions about whether to remodel or rebuild a school are complex, and must take into account a variety of logistic, economic, and political factors. In some cases, minor improvements are all that can be done to address safety concerns. In other cases, communities are willing to shoulder bond measures to build the best possible school, from the ground up.

In either case, and along the continuum of compromises in between, many improvements can be made to enhance school safety. New security-oriented design measures are often crisis driven. Highly visible, superficial "solutions" may fail to correspond to the problems that need to be addressed. A comprehensive examination of site weaknesses must occur before an effective "solution" can be put in place. That examination can draw on a number of approaches, including user surveys and safety audits, which can vary considerably in length and complexity. As long as the perspective is broad enough to encompass all aspects of the school, the results should be useful. By definition, such a broad examination falls under the field known as **Crime Prevention Through Environmental Design** (CPTED).

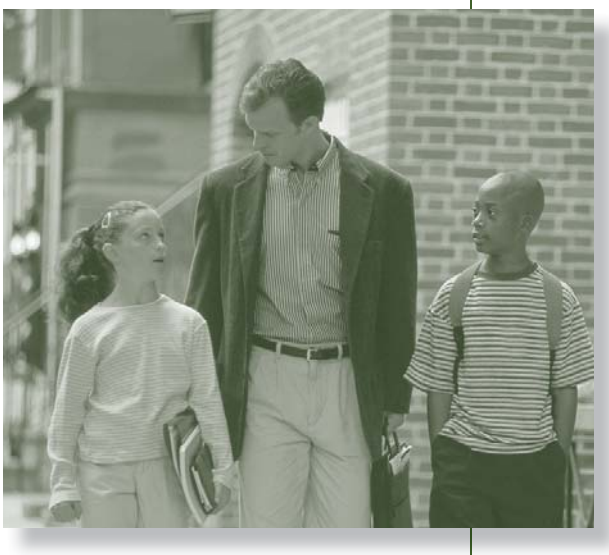
WHAT THIS GUIDEBOOK INCLUDES

This guidebook is intended to help educators and other members of the community understand the relationship between school safety and school facilities, including technology. It covers the following topics:

- Crime Prevention Through Environmental Design (CPTED)
- Planning To Apply CPTED: Key Questions To Ask
- Security Technology: An Overview
- Safety Audits and Security Surveys

Section 1.

Crime Prevention Through Environmental Design (CPTED)



Many American schools are falling apart—age has caught up with them and maintenance has often been deferred to a point of diminishing returns. Building deficiencies have become glaring over time, highlighted by concerns over lead paint, asbestos, frayed wiring, decrepit plumbing, ergonomics, inaccessibility, antiquated fire suppression systems, energy inefficiency, and technological obsolescence. A decade ago, the U.S. General Accounting Office reported that one-third of all U.S. schools needed extensive repairs and put the price tag to bring them into good condition at more than $112 billion (U.S. General Accounting Office, 1995). By May 2000, the National Education Association estimated the cost would be $322 billion, and construction costs since then have only continued to climb. Meanwhile, operations and maintenance budgets have dropped from 9.2 percent of school district budgets in 1994 to 7.7 percent in 2004 ("Building Blocks," 2005).

But public alarm over those problems can be dwarfed by the fear of school violence. The school shootings of recent years have underscored the extraordinary vulnerability inherent in the design of most schools.

Although schools come in many shapes and sizes, two types of school architecture are common: fortress and sprawl designs. Fortresses are usually solitary structures, a bit reminiscent of medieval castles. This model was particularly common in the first half of the 1900s. Sprawl designs became more common from the 1960s in one of two ways: by design, as communities found the campus-style approach, with a number of buildings spread over a site, to be aesthetically pleasing, or by default, as add-ons to existing schools often involved "temporary" buildings scattered on site wherever they could be conveniently placed.

Neither design was particularly concerned with security issues.

Fortresses are, at first glance, easier to secure. Students are either inside or outside, and once inside they theoretically can rely on the security of a controlled environment. Sprawling campuses are much more difficult to monitor, as students are constantly traveling between buildings, exposed to threats on the outside.

In fact, both designs fall short when it comes to safety: Containing students inside the school is no panacea: Up to one-third of school violence routinely occurs indoors. In addition, up to 70 percent of school-related violence occurs outside, half of that on campus and the rest elsewhere in the community. Neither design does a good job of taking these statistics into account.

There is no simple solution to school safety. Every campus has a unique mix of architecture, community characteristics, and funding to consider. Cost factors always loom large, and serious maintenance costs must be addressed as well. Simple fixes relying on gross security measures—ranging from metal detectors to armed guards—receive mixed reviews not only in terms of cost and effectiveness in promoting safety, but also in terms of their impact on school atmosphere. Crime Prevention Through Environmental Design (CPTED) takes a broader approach.

What Is CPTED?

CPTED is the broad study and design of environments to encourage desirable behavior, heighten functionality, and decrease antisocial behavior. Although the field is expanding to encompass affective, psychological and sociological environmental design—known as advanced or "second generation" CPTED—its traditional focus has emphasized physical design. This guide focuses on fundamental issues.

Historical Overview

CPTED has emerged as a field gradually over the past 50 years. Jane Jacobs' *The Death and Life of Great American Cities* (1960) was a giant early step in the direction of conscious environmental planning for public spaces. C. Ray Jeffery's book *Crime Prevention Through Environmental Design* was published in 1971. Oscar Newman's *Defensible Space*, followed in 1972. The "broken windows" theory put forth by James Q. Wilson and George L. Kelling in 1982 pointed out the impact that visible deterioration and neglect in neighborhoods have on human behavior. Many criminologists, sociologists, architects, and planners have developed the field further. Canadian academicians Pat and

Paul Brantingham, and consultants Greg Saville and Paul Wong made significant contributions from the 1980s on, while British criminologists Patricia Mayhew and Ronald Clark worked on "situational crime prevention." Criminologist Tim Crowe's 1991 book, *Crime Prevention Through Environmental Design: Applications of Architectural Design and Space Management Concepts*, became a standard textbook in the field. Stan and Sherry Carter have carried the CPTED banner in Florida, while Professors Gerda Wekerle and Carolyn Whitzman have furthered the cause in Toronto, notably applying it to both urban design and women's safety. Greg Saville went on to found the International CPTED Association (ICA) in 1996, which now serves over 400 practitioners in 35 countries around the world. Saville's work with the Center for Advanced Public Safety Research at the University of New Haven, Connecticut, along with Australia-based educator Gerard Cleveland, have expanded conventional CPTED to include a "second generation" CPTED approach incorporating affective issues.

Basic Concepts

Fundamental CPTED is built on three considerations: natural surveillance, natural access control, and territoriality.

Natural surveillance is the capacity to see what's occurring without having to take special measures to do so. Clear direct views, such as those provided by windows, provide natural surveillance. An adult presence does the same, with a notable impact on behavior. If responding to a call for help or a loud noise requires opening a solid door, or around a blind corner, natural surveillance is missing, and the response may be too little too late. We see the aftermath, but we don't know what initially occurred. If lighting is inadequate, we have even less hope of determining what happened.

Natural access control is the capacity to limit who can gain entry to a facility, and how. A school with dozens of unsecured exterior doors cannot hope to control comings and goings. Intruders have free rein, and schools must rely on other security measures. Without access control, a much greater emphasis must be placed on surveillance, territoriality, school climate, and security staffing in order to compensate.

Territoriality is the capacity to establish authority over an environment, making a statement about who is in charge, who belongs, and who is an outsider. Graffiti is one way gangs establish territoriality; schools can take it back with vigilant maintenance. Signs directing visitors to the office or spelling out rules reinforce territoriality and influence behavior. School uniforms make it easy to identify intruders at a glance.

blank page

Section 2.

CPTED Planning: Key Questions To Ask

KEY QUESTIONS

1. What risks and opportunities do students encounter between home and school?
2. What risks and opportunities are posed in areas directly adjoining school property?
3. Can office staff observe approaching visitors before they reach the school entry?
4. Do staff members have the physical ability to stop visitors from entering?
5. How well can people see what's going on inside the school?
6. Do staff members have immediate lockdown capability in classrooms and other locations?
7. Is the overall school climate prosocial?
8. Are there identifiable or predictable trouble spots or high-risk locations?

Although the fine details of safe school planning can become overwhelmingly complex, an excellent framework can be built from answers to the eight key questions listed to the right. Each question will be addressed in greater detail in the following pages, including suggested solutions.

1. What risks and opportunities do students encounter between home and school?

Regardless of school climate and architecture, if students encounter uncontrolled traffic, crime scenes, toxic exposure, or isolating territory in order to reach school, they are put at risk. In 2005, 6 percent of students surveyed feared being attacked while traveling to and from school (Dinkes, Cataldi, Kena, and Baum, 2006). Even when they reach relatively safe schools, high states of anxiety from the journey can compromise students' ability to learn.

If students walk to school, what is that experience like? Do they dread a daily shakedown at the hands of local bullies? Are they crossing gang territory? Do they risk being drawn into using alcohol or other drugs, or lured into prostitution? Do sex offenders live along the route to school? Are they able to ascertain when individual children are isolated and vulnerable?

What physical risk does the environment pose? Abandoned or derelict buildings, along with dark alleys, provide easy locations into which pedophiles and other criminals can lure children. Heavy traffic can pose a threat to pedestrians and bicyclists. Industrial facilities can expose children to toxic substances.

What messages are conveyed along this route? How are people portrayed in posters, billboards, graffiti, and advertisements? Do these messages contradict the worldview promoted at school? Are children likely to live by prosocial values only in specific settings, such as at home, in school, or even in a particular class?

Solutions:

Providing students with a safe route to school can reduce their fears considerably, having a tremendous impact on school attendance and performance, along with safety. Depending on staffing priorities, police officers may be able to focus on these routes during specified times. Not only does this improve route safety, but it also provides an opportunity for officers to establish positive relationships with children under nontraumatic circumstances, laying the groundwork for community policing programs. Emergency call buttons or standard pay phones should be accessible, at a height suitable for children or wheelchair users along the way. Organizing a neighborhood clean-up can reduce physical risks and build a support network at the same time. Graffiti can be painted over, and offensive advertising can be discouraged through organized social and political pressure. Neighbors along the route to school, equipped with cell phones or radios, can be recruited to serve as crossing guards or monitors. Drawing friendly neighbors onto the sidewalks makes the environment considerably safer—offenders prefer to approach their victims away from potential witnesses and allies.

Businesses and residents can work with the police in establishing safe havens along the route, into which children can retreat if they feel threatened, and where help is readily available. Programs like Block Home and Safe Place fill this role. Police background checks should be integrated into the program to build confidence and screen out unsafe participants.

"Walking school buses" can be organized, in which children and adults coordinate traveling in groups to and from school, providing security through numbers. Neighbors who step forward in the name of school safety may also be willing to participate in other school-supportive activities, such as voting for bond measures, attending school performances and athletic events, or volunteering their time as classroom aides or guest speakers. Businesses may serve as sites for community service projects or field trips, internships or after-school jobs.

2. What risks and opportunities are posed in areas directly adjoining school property?

The concerns posed in the areas directly adjacent to the school are at least as significant as those along the route to school. These are areas where students are commonly found engaged in behaviors forbidden on campus, making them doubly vulnerable to criminal enticements. An offender looking for child victims can predict accessibility at these locations.

Students can alienate neighbors by using their front yards as ashtrays, picking fights in front of their businesses, or monopolizing parking spaces. Inadequate parking on campus can lead to traffic jams and overload nearby streets. If residents cannot park at their own homes, and if customers cannot park at local businesses, this will probably lead to resentment, driving a wedge between the school and its neighbors.

Drug dealing or alcohol outlets anywhere near a school increase the likelihood of substance abuse–fueled antisocial behavior, either by students or against students. Industrial facilities may expose students to hazardous substances, which can have devastating effects on brain development, general health, and the corresponding ability to learn.

Solutions:

Most cities, backed by federal and state law, place restrictions on paroled sex offenders, drugs, weapons, and other illegal activities within a specific radius of school property. Schools should be good neighbors, attend to conflicts, and help involved parties design solutions. Ignoring a problem because it is technically off campus is not productive in the long run. If parking on campus is inadequate, make some changes. Restrict parking to residents with required stickers, or limit it to only two hours in commercial zones. Use playing fields at the school for overflow parking. Encourage student carpooling or mass transit use with incentives, such as assigned parking spots or discounted bus passes.

Changes in fencing and landscaping can open up areas that are hidden from view. For example, solid wood fencing can be replaced with wrought iron; overgrown hedges can be trimmed. School windows can be cleared of obstructions, allowing the staff to observe behavior on the street. Store windows can also be cleared of obstructions, allowing passersby to observe crimes in progress and respond appropriately,

such as by calling police. Students might be recruited to clean up problem areas, build fences, or paint over graffiti. This may discourage immediate problems while building long-term goodwill. This positive interaction can build a shared sense of belonging, leading to mutual assistance when either students or neighbors are in need of help.

Neighbors are positioned to serve as critical eyes and ears for a school, before and after hours. No security service can compete in terms of providing a continual presence, as well as in commitment to the neighborhood. Neighbors are more likely to spot vandals in the act than are police or private security. Enlisting these neighbors as allies is well worth it. Provide them with phone numbers for contacting the school administration. In some cases, it may be appropriate to entice them to help by providing binoculars, cell phones, or radios. Empower selected neighbors as quasi-official school caretakers or allies. Reward them for calling in crimes in progress, with recognition or other incentives. This is a cost-effective alternative to paid security.

“Neighbors are positioned to serve as critical eyes and ears for a school, before and after hours.”

Carefully assess the potential of neighboring facilities to serve as command posts and evacuation sites in emergencies. Make arrangements now, to ensure that sites are already in place should emergencies occur. Map out various routes between the school and these sites, based on the type and location of crises. Coordinate with police and emergency services personnel in choosing these locations. Staging sites will be needed for police, students, medics, and the media, as well as for family members responding to news coverage during a crisis.

If the evacuation route and site are predictable, these also must be examined for security weaknesses; plans should include a scouting party, immediately preceding a major evacuation, to check for suspicious packages or individuals along the evacuation route.

In addition, a number of communities have had excellent results with efforts to utilize law enforcement officers to target the neighborhoods around each school for intensive traffic enforcement and enforcement of life code sections. When added to other items mentioned above, this can result in dramatic improvement in the perceived and actual level of safety. Such efforts have been especially effective in areas of high drug and gang activity. State-mandated school safety zones can also assist officers in this regard. Similarly, enforcement of school safety zone statutes and ordinances relating to loitering in a school zone has shown marked results in reducing problems. Another useful practice is for school officials to enact and enforce policies that regulate student misconduct in these zones.

Some communities have had success in having law enforcement officers contact owners of rental property where criminal activity is being encountered near schools. Many landlords will evict tenants due to concern that their property will be seized if drug arrests are made. In other instances, parents who do not know that large numbers of children are gathering at their residence while they are at work will authorize officers to remove the problem element from their property. In extreme cases, a court-ordered eviction may be necessary.

3. Can office staff observe approaching visitors before they reach the school entry?

Main office staff and administrators are the most important players when it comes to school safety. The office is the screening tool for most schools, expected to evaluate and direct visitors, bar undesirables, placate the disgruntled, and generally solve problems.

Most offices are poorly sited to fill these roles. If offices are hidden deep within their respective schools, they are poorly positioned to guard against unwelcome visitors. Even if offices are located near exterior doorways, the school may have many alternative access points; intruders may be able to gain entry through secondary doors or even through windows. Fencing, landscaping, outbuildings, posters on windows, and poor lighting can also undermine surveillance from the office outward.

School layout and signage can actually exacerbate the problem. Frequently these signs lack maps, arrows, or other directions, and the office location is unclear. Visitors may be instructed to check in at the office, but with inadequate guidance this can be an invitation for a visitor to prowl the halls while ostensibly looking for a destination. Even if the office is located at the main entry, it may lack appropriately located windows, eliminating natural surveillance. The assumption that school staff can deal with a threat that suddenly appears at the front desk is unrealistic.

Solutions:

The office and window locations, reception desk and counter layout should be positioned to give the receptionist as wide a view of the entry area as possible, inside and outside. Security cameras can supplement the physical design, but a direct view is better. Assess school office location based on the following criteria, starting with the least desirable and progressively improving:

a. The least useful office location is hidden deep within the building. It is not adjacent to any exterior doorway, let alone the main entry, and there may be many alternative access points as well. Office staff members lack natural surveillance out of the office. They cannot see people approaching the building, nor can they see people the halls, and they cannot control access in any way.

b. Slightly better placement will bring the office to a location that can be easily found, with its doorway flush with a main hallway. It is still distant from the main entry, and provides no opportunity for natural surveillance outside the building. There may be a window facing into the hallway, providing a small opportunity to view people passing by, but staff are not in a position to anticipate or control them.

c. Design the office to protrude into the hall. This allows staff to look up and down the hallway, assuming window design and internal layout accommodate this.

d. Position the office somewhere along the perimeter of the school, allowing natural surveillance to the outside. On the inside, the office should protrude into a main hallway, allowing natural surveillance up and down at least the main hallway, and perhaps secondary hallways as well. This still establishes no access control over visitors.

e. Place the office directly adjacent to the main entry, protruding into the hallway and to the outside of the school. Visitors who approach the main entry are easily seen, and must pass close by to enter the school. Staff have good visibility outside the main entry area and down the main hallway. Unfortunately, secondary entrances still undermine the ability of the main office to observe or control unwanted visitors.

4. Do staff members have the physical ability to stop visitors from entering?

Even if staff members can see intruders approaching, can they really do anything in response? Surveys in the 1990s found only half of all public schools even claimed to control access—whether they were successful was not evident (Kaufman et al., 1999). In the 2003–04 school year, 83 percent controlled access to buildings by locking or monitoring doors during school hours (Dinkes et al., 2006). But are the doors already locked as a matter of course once school starts? How quickly and easily can staff lock all entries? Once an intruder is inside the build-

ing and approaching or entering the main office, is the situation better or worse? Can staff protect themselves as well as the student body?

Solutions:

Options for improving natural surveillance can further be enhanced by improving the receptionist's ability to detect and stop potential intruders from entering the building, as follows:

a. By securing all secondary entries, effectively making them alarmed emergency exits, schools can force all visitors to use the main entry. Only at this level of secure design do staff members have adequate access control. Electronic controls governing the front door empower staff members to immediately lock doors against a potential threat. Communication devices should also make it possible to alert the entire school that a lockdown is in place, and that other doors should be kept locked until the situation is resolved.

b. At the highest level of security an entry vestibule is added, adjacent to the main office. Natural surveillance should be abundant in most directions. When visitors enter the entry vestibule they physically cannot proceed further until cleared by the staff, who control all adjacent doors electronically. In a high-security environment, this might include bullet-resistant glass and electronic screening for weapons. There might be a pass-through window for suspicious packages as well. Cameras can provide a remote viewing option, for screening from a distance. Only when staff members are satisfied do they press a release button, allowing the visitor to enter the facility.

5. How well can people see what's going on inside the school?

Blind corners, "dead walls," alcoves, and stairwells provide "cover," or hidden areas, for inappropriate behavior. These are predictable locations for misbehavior because they are out from under the eyes of the authorities. If 90 percent of the school design incorporates natural surveillance, the remaining 10 percent will be prime territory for drug use, bullying, harassment, and other illicit activities. Some areas are easily observed when empty, but become difficult to watch during times of peak use—the "transitional" times before and after classes, when most conflicts occur.

Solutions:

Provide direct, natural surveillance. Staff should be able to look up and see the source of a noise, or observe activity. If this is not the case,

the installation of windows or convex mirrors is the next-best option. Windows can provide natural surveillance, while mirrors provide a secondary view. Convex mirrors can be used to open up surveillance around all blind corners and dead walls. Mounted above head height, convex mirrors can make it possible to observe behavior in a crowded hallway. If neither of these is an option, surveillance cameras (discussed starting on page 31) or patrols by staff or volunteers are the remaining possibilities.

In many cases, natural surveillance is blocked by posters, notices, or artwork on windows. Removing these obstacles can make a difference. Transparent or mesh backpacks, open or screened lockers, and clothing restrictions are also options that can increase visibility. Clear bookbags are required in about 6 percent of schools overall, with a high of 13 percent when it comes to middle schools (Dinkes et al., 2006). Finally, crowds can act as a visual screen, hiding activity in an otherwise open area. Mirrors, cameras, or observation posts that provide a view over the heads of students can address this concern. Scheduling also can be planned with the goal of limiting crowds in the hallways or other gathering places.

6. Do staff members have immediate lockdown capability in classrooms and other locations?

Wherever staff and students are situated during a crisis, predictable questions arise: How do we call for help, make ourselves safe, protect students, and resolve the situation? Every location on campus may have to serve as a haven during a crisis. Unfortunately, most would be very difficult to lock down on a moment's notice, and only some have reliable intercoms, telephones, or other communication devices readily available.

Classrooms and many other areas will have outward opening doors, designed to meet fire and building code exit requirements. If the door is standing open during an emergency, a teacher will have to reach out into the hallway—which could be the scene of the crime—to pull the door closed. Even worse, she may have to insert a key on the outside in order to lock the door. That means she will have to step into the hallway, extract a key ring, find the correct key, and insert it into the lock. If she is in distress her physiology will go through changes, as her blood rushes to her major muscle groups, for fight or flight preparation. As a result, she will lose some or all of her fine motor skills, obviously

required to manipulate a key and insert it into a lock. If this is the only means of securing the door, there's a risk of failure. Alternately, entrapment is also a risk in any classroom or office. If an intruder blocks the classroom door, students will need a secondary escape route.

Solutions:

Every schoolroom should be considered as a potential safe haven. It should be possible to easily lock the door during a crisis without entering a danger zone. Building and fire codes require an outward-opening door if room capacity goes beyond a specified number of occupants. If the room serves a small group, it may be possible to install an inward opening door. This would be advantageous in circumstances where occupants want to close the door without first stepping into the hallway. In either case, the door should automatically lock, or locking should be a simple maneuver, such as pushing in a button. Teachers should be expected to keep the key on their person while on duty. One of the lessons to come out of Columbine was that many students were able to save themselves because doors were always kept in the locked position.

Each room should have a reliable communication device in it, usually an intercom or telephone. The system needs to have the capacity for conference calling, so that many classrooms can be on line with the office simultaneously during a crisis. The office should have the ability to tell everyone, immediately, to lock down, relocate, or evacuate. Many times, schools will have working equipment in some rooms, but not in others. Gymnasiums, playgrounds, parking lots, and bathrooms are frequently left disconnected from the public address system.

Ideally, if a 911 call is placed from a hard-wired classroom phone, an enhanced 911 system will identify the location. Unfortunately, when calls come from within multi-line systems, this is often not an option: the emergency dispatcher only knows that the call came from somewhere in the school. Alarm systems often have similar weaknesses, identifying only an address or a large zone. Most cell phone locations cannot be pinpointed through this system. Check with your local emergency services or alarm dispatcher to determine the limitations of your system.

Each room should be examined to determine where individuals can best take cover in the event of a serious incident. Generally, the thicker and denser the material, the better shield it provides. If walls are all paper thin, piled furniture may have to serve as a barricade. If planning new construction, thicker materials up to the six-foot mark should be used to provide shielding in walls. Windows can be reinforced with security

film, but this can be prohibitively expensive at $4 to $5 per square foot. Thicker glass is generally safer, but even bullet-resistant glass—at $100 per square foot—has its limits. Wire-mesh embedded in glass is not recommended. Students have suffered severe injuries when they have accidentally put hands through this type of glass, usually inset into a door.

Each location in the school will provide unique opportunities and challenges as safe havens. Hallways are sometimes too vulnerable to internal threats, in which case students will be better off retreating to a more enclosable space. Libraries can serve well only if securable, with thick furniture and piles of books offering protection. Gymnasiums rarely have communication devices in them or quick means by which to secure doors. Panic bars usually require the use of a hex key to secure them, and only one or two staff members typically have the key. Solutions include wider distribution of the key (and practice using it) or retrofitting the panic bars with conventional style keys on the inside. (Services such as Precision Hardware can do this type of conversion—http://www.precisionhardware.com).

> **"In the extreme, schools with high security but a negative affective climate resemble nothing more than a passable jail."**

Finally, escape routes also must be considered. Ideally an emergency exit door, or in some cases windows, should offer alternative means of escape in a crisis.

7. Is the overall school climate prosocial?

The dangers inherent in an anti-social school climate far outweigh the benefits of a prosocial physical environment. In the extreme, schools with high security but a negative affective climate resemble nothing more than a passable jail. Building the perfect facility will be of little value if even one disturbed student's anger is allowed to fester unchecked.

Solutions:

Establish an overall prosocial behavior management plan for the school, such as the Effective Behavior Support (EBS) or Positive Behavior Support (PBS) programs. Adopt a behavioral curriculum, such Seattle Committee for Children's Second Step program. Have a clear flow chart of preventive actions, crisis intervention, and remediation that staff can easily follow. If the same concepts are taught to all staff and students, they are more likely to be accepted and followed. If staff all know their responsibilities when misbehavior arises, problems are less likely to fall through the cracks or escalate into larger crises. Any reinforcers

for antisocial behavior, such as exclusive clubs, merit close attention. Negative graffiti, posters, or other messages should be removed. Other books in the Effective Strategies for Creating Safer Schools and Communities series can assist in improving the climate and mental health profile of a school site.

8. Are there identifiable or predictable trouble spots or high-risk locations?

In 2005, approximately 6 percent of students ages 12–18 reported that they were afraid of attack or harm at school, and 5 percent reported that they were afraid of attack or harm away from school. The same percentages reported avoiding school activities or one or more places in school because they thought someone might attack or harm them. There were no measurable differences by gender, but the fear level in urban schools is twice that of other schools—10 percent rather than 5 percent (Dinkes et al., 2006). This is an improvement over the data from the mid-1990s. At that time, 9 percent of all students, and up to 15 percent of minority urban students, reported "they avoided one or more places in school," and feared being attacked at school or on the way to and from home (Kaufman et al., 1999). One study placed 38 percent of on-campus homicides in parking lots or at school bus stops, 30 percent in stairwells or hallways, 23 percent elsewhere on the grounds, 21 percent in classrooms or offices, 11 percent in entry areas, 9 percent in breezeways or center courts, 6 percent in bathrooms, and 5 percent in cafeterias (Kachur et al., 1996). Places identified by students as being avoided have remained consistent over the past decade, including the entrance, any hallway or stairs, parts of the cafeteria, restrooms, and other places inside the school building (Dinkes et al., 2006). As such, each of these locations merits individual attention.

Parking Lots and Bus Stops

Unsupervised congestion and conflict commonly occur in parking lots and at bus stop areas, especially during peak times. Cars provide convenient, hidden areas in which students can engage in illicit behaviors undetected any time of day. Closed car doors muffle sound, and activity in one car can be hard to spot, hidden in a sea of other vehicles. Bus pick-up areas, particularly after school, pose some risks. Students anxious to escape after school jostle with each other for limited space. Normal traffic-related conflict among buses, cars, bicycles, and pedestrians compounds the potential for violence.

As the demand for parking exceeds available space, new parking areas will surface, officially or unofficially. Berkeley High School, for example, has extended parking onto the school tennis courts. When these kinds of expansion occur, the pedestrian flow may shift to a secondary entrance. If the administration ignores this new reality, the office can become dysfunctional as a gatekeeper. If, on the other hand, the secondary entrance remains locked and students are forced to walk a considerable distance to the main entrance, they may be at risk of victimization along the way.

Solutions:

Using traffic cones, gates, or other devices, restrict parking to a compact, easy-to-patrol area. Investigate any vehicles that circumvent this restriction. Require highly visible registration stickers for all students' vehicles, and keep records of license plate and vehicle descriptions, to make identification easier. Enclose parking lots with fencing, to restrict access by offenders. At the same time, leave escape routes for pedestrians, to avoid entrapment by predators.

Another possibility is to use assigned parking spots for students and staff when feasible. This makes a trespasser's vehicle stand out. CPTED principles call for avoiding the use of "dead" walls adjacent to parking lots and using windows to increase supervision. In addition, the direction in which cars are parked can be designed to enhance natural surveillance.

If parking shifts to a new location, converting a secondary entrance into a new "main" entrance by default, install a "front office" at that location. This can replace the original office, or augment it during peak hours. Another option is to place another type of service at that location, such as the library, using the librarian as a gatekeeper.

When all else fails, video surveillance and human patrolling can be added. For immense parking lots, emergency call buttons may be wise investments, too. School buses are not infrequently the site of conflicts. In those cases, video cameras in the buses and radios or cell phones for drivers would be important. Identifying numbers on bus rooftops will make them easier to identify from the air, in the unlikely event of a hijacking. After a Philadelphia-area bus driver absconded with a busload of students in January 2002, there was a surge of interest in global positioning system (GPS)–based bus-tracking devices, costing from $350 to $2500 per vehicle.

Hallways

Hallways suffer from a population explosion between every class. Within a small window of time, most of the student body is compet-

ing for space. Hallway locker doors and locker owners create obstacles for the pedestrian traffic flow, as does social interaction. Staff generally avoid hallways during these brief rush hours, and when they are present lack natural surveillance beyond the students closest at hand. A commotion at the far end of the hall is completely camouflaged by the chaos blocking the view. Overcrowding, combined with petty conflicts, can lead to violence.

Solutions:

Wider spaces and otherwise unoccupied niches often act as social gathering spots. By selectively building these spaces out of the traffic flow, some of the congestion can be reduced. Lockers can be spread at a greater distance from each other, reducing conflict between neighboring locker users. Lockers can be moved to separate locker bays, but as with any isolated spot, if there is no natural surveillance over this area it is at risk of becoming a trouble spot. A compromise design effectively widens the hallway periodically, bringing the lockers out of the traffic flow without isolating them entirely from view. Where second stories exist, use them to provide natural surveillance for staff. Place staff break rooms at appropriate locations to at least give the impression of surveillance—mirrored windows can leave students guessing as to whether they can be seen. Convex mirrors placed high improve surveillance over crowds and around corners. Where the architecture fails to enhance surveillance, cameras or human patrolling may be additional options to consider.

School officials should try to avoid situations where line of sight is inadvertently blocked by vending machines or other large items. In many schools, classroom doors swing outward, due to fire code considerations. This can also block line of sight and thus natural surveillance by teachers. Classrooms are more secure if doors are kept locked and shut. While doors are open, some schools have had success by intructing teachers to open these doors flush to the wall so that doors don't block line of sight. In some cases, wall lockers may need to be removed to allow doors to open fully.

Stairwells

Stairwells, like hallways, may suffer from intermittent congestion, alternating with long periods of isolation. In either case, there is the added risk that comes with climbing and descending. Stairwells are often hidden from view; fire doors may seal them off entirely. In between rush hours, stairwells can provide hidden areas, and fire doors can muffle sound. Stairs may be "travel predictors," which offenders can rely on to place a victim in their path at a certain time.

Solutions:

The more open the stairway design, the better. Wherever solid walls are blocking surveillance, look for ways to install openings or windows. Exterior, isolated fire stairwells can be made safer by the extensive use of glass exterior walls. Short of these measures, mirrors, cameras and patrolling are additional options.

Grounds

Only 36 percent of U.S. public schools claim to control access to school grounds (Dinkes et al., 2006), a significant jump from 24 percent of schools reporting doing so in the late 1990s (Kaufman et al., 1999). Outdoor areas are extremely difficult to control, especially if designed for multipurpose use—territoriality is often vague and anyone who wants to can treat school grounds as open public space. Unfortunately, this can lead to visits from undesirables who put students at risk. If schools serve double duty as community centers and unofficial skateboard parks, nobody really knows who is in charge anymore. Landscaping and outbuildings can hide illicit activity; while outdoor shelters can become magnets for people with no better place to go. Playing field bathrooms are frequently problematic, serving as illicit meeting places or predictable locations for cornering victims.

Solutions:

Wrought-iron fencing is the territorial marker and access control device of choice. It provides strong access control, is extremely vandal resistant, and lacks enough surface space to attract much graffiti. Although it costs considerably more than mesh fencing, it is a good long-term investment that enhances school image and climate, and leaves natural surveillance intact, while defining and controlling official entry points.

The use of written warnings by law enforcement officials to ban certain people from school property has also been effective. Officers can ban known drug dealers or gang members, as well as students who have been suspended from school. Arrests of those who violate these warnings may deter potential troublemakers from loitering on campus.

Heighten area definition to enhance territoriality. Invite students, service clubs, and area residents to develop paths, swing sets, gardens, sandboxes, slides, wetlands, natural meadows, tennis courts, and amphitheaters, as well as traditional soccer or baseball fields. Student, neighbor, or service group participation can give community members a sense of ownership in the school. If they subsequently see problems occurring on the site, they will be more likely to call authorities.

Amenities should be factored into grounds development. Driveways and service roads will be needed, but can attract unwelcome users

if not controlled with gates, barricades, and/or speed bumps. Large crowds for soccer tournaments generate parking overflow, litter, and sanitation problems. They will need bathrooms, drinking water, and shelter. Benches or bleachers should also be considered. See-through bleachers can improve natural surveillance. Unfortunately, amenities can also serve as magnets for undesirable trespassers, and can be vulnerable to vandals. Boost natural surveillance of vulnerable amenities with nonglare lighting and clear sight lines for neighbors.

An in-residence caretaker is a good option to consider—trade mobile home housing for an overnight presence. Caretakers can be carefully screened with police background checks, and the usual school ground restrictions against alcohol, drugs, and weapons would apply. If vandalism is extensive, an on-site caretaker may be more economical than other options, such as paid security. Free or low-cost on-site housing may be attractive to new or retired teachers on tight budgets. Video cameras and paid security represent two further possibilities.

"Student, neighbor, or service group participation can give community members a sense of ownership in the school."

Entry Areas

Entry areas are travel predictors and gathering spots. Offenders targeting particular students know they can find them in entry areas at predictable times. If security measures focus on visitors only after they enter the building, violence is more likely to occur before visitors enter the school's locus of control. In this way, improved internal security can directly raise the external level of risk. Pedestrian traffic jams at a security checkpoint create a mass of unprotected potential victims, lingering outdoors. Student conflicts inside school may manage to contain themselves only until parties exit the front doors. Snipers and drive-by shooters can anticipate easy prey before or after school, when crowds provide easy targets outside the main doors.

Solutions:

As discussed earlier, schools should upgrade front office design to provide natural surveillance over the exterior entry area, as well as the interior foyer and hallway. Reconsider any security measures that create vulnerable gathering spots. If tight security at the entry point is required, consider staggering attendance times for each grade, thinning the crowd. Provide an adult presence wherever students congregate, and provide communication devices. Provide shelter for students waiting for rides, buses, or entry, with low walls or stanchions that can be used for protection. At the same time, take care to maintain natural lines of sight—don't build walls that eliminate natural surveillance. Install speed bumps or other traffic control devices to slow traffic near the main entry.

Breezeways

Sprawling campuses often connect buildings with breezeways for a variety of reasons. They're cheaper than enclosed hallways, avoid violating building code restrictions on building sizes, and in some cases are considered an aesthetic feature. Regardless of motive, breezeways are unprotected travel predictors. They may be underlit as well, and can lack natural surveillance. Even during rush hours, particularly in bad weather, staff members don't linger there. If surveillance cameras are used, bright daylight outside tunnel-like breezeways may backlight subjects, making useful pictures difficult to obtain.

Solutions:

Working in cooperation with building codes, look for ways to enclose breezeways and connect buildings, shifting from a sprawling campus to more of a fortress design. At the same time, keep natural surveillance as strong as possible by using windows rather than solid walls. Seal off all secondary entry points, such as breezeway entries, with fire doors. The doors should close and lock automatically. Staff should have keys or proximity cards, and doors can be staffed while open between classes.

Bathrooms

Bathrooms have a reputation as unsafe locations, where illicit activity and bullying are common. Many students avoid using school bathrooms altogether for this reason. Bathrooms are frequently located in isolated corners of buildings, away from natural surveillance. Occasionally they are also near secondary entries, providing opportunities for unobserved trespassers and easy exits. Double door entries muffle typical bathroom noises, but they also muffle cries for help, sounds of assaults, acts of destruction, and the drift of cigarette smoke. Toilet stalls provide even greater privacy, and are often covered with graffiti.

Solutions:

Bathrooms should be installed adjacent to supervised areas, within direct line of sight of school staff. Maze entries (with walls for privacy but no closing doors) should replace double-door entries, for a few reasons: Alarming sounds are more apt to be noticed from outside; escaping predators is much easier; offenders cannot count on the sound of the outer door opening to warn them when an authority figure is entering; cigarette smoke is no longer masked; and as an added benefit, fewer unsanitized hands have to share the same door knob or plate. Regular maintenance is essential. Take back ownership of toilet stalls by painting over graffiti, and even consider replacing it with prosocial mes-

sages. Anticipate the prosocial messages being vandalized regularly. Replace them relentlessly.

Many schools have had problems with several students gathering in one stall to smoke, or sell or use drugs. When officials approach the area, students typically flush any evidence. Using magnetic latches on stall doors can help prevent this type of problem by making it harder for students to delay entry by officials. In addition, some schools avoid the use of drop ceilings, which can be used to hide contraband. Vandalism-resistant materials can be used for stall partitions. Most important, adequate supervision of school bathrooms is always required, no matter how thoughtful the design.

If smoking in bathrooms is an overwhelming problem, consider installing high-sensitivity smoke or flame detectors. These devices can set off alarms or silently send messages to office staff.

Cafeterias

Cafeterias are predictable gathering spots. As a result, they can serve as easy destination points for intruders bent on destruction. This was the case with Springfield, Oregon's Thurston High School shootings in 1998. Combined weaknesses in that campus layout included "dead" walls blocking surveillance to the north, an unsupervised parking lot, access to a dark breezeway, and an insecure cafeteria entry. Images picked up on videotape, capturing Kip Kinkle walking across the parking lot, wearing a bulky trench coat, failed to convey any critical information, such as the suspended student's identity or what was under his coat. Victims were shot in the breezeway as well as in the cafeteria.

Another concern is intentional food contamination. There have been instances where students have contaminated food in accessible areas (such as poisoning a salsa bar.)

Solutions:

The greater the accessibility, the more vigilance is required. This applies to all locations, including cafeterias. Escape routes are critical, as are communication devices to call for help. If screening occurs at some distance from the cafeteria, there is less likelihood of an offender reaching this destination undetected. A locked or supervised breezeway might have deterred Kip Kinkle from his chosen route. Other group gathering spaces, including gymnasiums and theaters, have similar vulnerabilities.

To deter intentional food contamination, schools can position open food service areas and beverage dispensers near cash registers and

teachers' tables to increase natural surveillance. Security cameras in these areas can add additional deterrence.

School Size, Renovation, and Rebuilding

The larger the school, the more of a challenge it is to secure. Multiple entry points will require an equivalent number of guardians, or will compromise access control. A labyrinth of add-ons often incorporate numerous blind corners and niches, creating hidden areas attractive for delinquent behavior, and thus compromising natural surveillance. If the student body is quite large, staff and students alike may have trouble determining who belongs on campus and who doesn't, undermining territoriality.

Research makes a strong case for small schools in order to promote intimate learning communities, boost academic performance, improve the likelihood of personal connections and attention, reduce isolation and achievement gaps, build group cohesion, and make staff coordination easier, as well as to improve school safety. The research suggests a size limit of 300–400 students in elementary schools, no more than 600 in junior high schools, and between 600 and 900 students in high schools (Lackney, 2000; Duke and Trautvetter, 2001).

Many schools do not or cannot accommodate these limitations. In those cases, a number of options can be considered. Converting excess doors into alarmed emergency exits, sealing off under-utilized sections of the school with metal accordion-style grates, recruiting volunteer hall monitors, and installing surveillance cameras are some possibilities. Schedules can be staggered to reduce congestion and conflict in hallways. Larger schools can be divided into a number of smaller, specialized wings, houses, families, academies, or schools-within-schools, focusing on arts, sciences, language immersion, trades, career exploration or other subjects. From a CPTED perspective, any arrangement that makes it easier for staff and students to know each other and build bonds while enhancing staff surveillance and access control abilities is a step in the right direction.

Section 3.

Security Technology: An Overview

A school's physical structure should inherently provide adequate natural surveillance, natural access control, and territoriality to minimize the need for technological fixes. Unfortunately, this ideal structure rarely exists; improvements are usually necessary. These may take the form of short-term fixes, major architectural remodeling, extra staffing, and/or electronic technology.

Security technology provides many tools schools can point to as measures they have taken to enhance student safety. Unfortunately, such technology can inspire more enthusiasm than is warranted. Technology can fall short in a number of ways, including:

- Heavy-handed use of technology can generate resistance from individuals uncomfortable with a "big brother" or prisonlike atmosphere, which can undermine a positive school climate.
- The technology may fail to compensate for design weaknesses, providing only an illusion of substantially improved safety. For example, an electronically secured main entry is of little value if the back door remains uncontrolled. Cameras and monitors won't stop an intruder on their own.
- Equipment can be cumbersome, expensive, unsupportable, and counterproductive. New technology can quickly prove itself obsolete, or dependent upon unproven distributors for ongoing maintenance and repairs. If manufacturers close down, or vendors disappear, schools may be left with expensive, non-working security equipment that is difficult to repair or replace, with little or no resale value. After reasoned consideration, more than one school district has chosen more teachers and less security technology as the preferred investment strategy.

- Some equipment only reaches its full potential if specialists are available to operate, monitor, or respond to it. Facilities can lock themselves into a plan that requires security staff at critical locations. If funding sources for staffing decreases or disappears the entire security plan can become dysfunctional.
- Hastily chosen technology may not even come close to addressing the problem. For example, passive electronic surveillance can provide evidence against bullies, and that can be an effective deterrent, but such an approach would be ineffective against suicidal armed intruders.

Ultimately, if considering security technology, schools need to methodically analyze their needs and whether technological fixes are the best tools for addressing a problem. Security cameras, ID cards, burglar alarms, and most weapon and drug detectors would have had no bearing on the outcome of the highly publicized school shootings over the past decade. Solid access control and improved emergency communication, on the other hand, might have made a difference. Schools with chronic violence and small budgets won't be served well by the same approaches taken in schools where violence is rare and budgets are large. Always bring the discussion back to the original problem being addressed, and see if the technology is a good match.

There are many situations where technology can be immensely helpful. The key to identifying which specific make, model, or system to use requires very up-to-date research. Technology is evolving at such a rapid pace that almost any specific equipment seen on a site visit that was installed more than a year or two ago, is unlikely to be state of the art, and could even be obsolete. The same applies to recommendations published in hard-copy documents, including this one. Installers and system integrators who can provide solid references, and who are currently active in the field, may be the best source of up-to-date information on state-of-the-art equipment.

Communication devices

Telephones, radios, cell phones, intercoms, public address systems, and pagers are the least controversial, and possibly the most sensible, technological fixes that can be employed. Trouble can occur anywhere on or near campus. If staff can immediately call for help, damage can be minimized. Using staff to patrol the grounds will be of limited value if they have no communication devices; more than likely they are simply being set up as the first victims. Leaving them isolated in classrooms can have a similar effect. The ideal hand-held, voice-based communi-

cation device will combine cell phone and radio or walkie-talkie functions in a single unit—a standard feature in Nextel phones. Users can reach an individual or predetermined group with one push of a button. Additional features continue to expand on cell phones, and can include email, Internet, and GPS features. Prices vary considerably depending on the number of cameras purchased and services subscribed to. Radio bandwidths may involve FCC-approved licenses that can come with hefty annual fees.

Ham radio groups, working with local disaster response groups and the Red Cross, can be a resource, especially useful when power sources for other means of communication fail. One such group is the Irvine, California Disaster Emergency Communications volunteer group. They place portable stations at designated emergency shelters at area high schools, containing battery power, a printer, a laptop computer, and a radio. Volunteers attend various trainings in the area. In June 2007, a nationwide simulated emergency operation involved amateur radio operators in 50 states and Canada. Voice, Morse code, radio-teletype, satellite, and other digital-text modes were used without using any commercial power. Temporary antennae were improvised. When standard cell phone, telephone or Internet technologies fail, ham radios may be the best alternative. Commonly, such groups work cooperatively with area Emergency Management groups.

Wireless technology is the wave of the immediate future, but without cell towers or routers acting as boosters, most wireless technologies will be of little or no use. Sparsely populated areas may not contain enough customers to justify the expense to a private company of constructing towers. Installing wireless routers throughout a campus or community may be an essential component of a wireless communication plan.

Annunciators are lights or buzzers indicating an open door. Wired into new construction, they can alert staff at a central console when a secondary or emergency door has been opened. Augmented with cameras, they allow staff to observe behavior at all entry points, inside and out, and to respond in a timely fashion.

Alarms triggered by smoke or flame, or set off by hand, are required by fire code. More sophisticated systems can also send messages to a central receiving station, pinpointing the location of a problem. Panic button alarms can be built into intercom systems; identification alarms can be worn as pendants. Combination identification/location alarms identify, locate and track people using them. "Smart" cameras (discussed shortly) can recognize specific shapes or movements, such as a person falling down, and trigger alarms. Depending on the sophis-

tication and reach of equipment, costs can range from a few hundred dollars for an in-house wiring job to $100,000 or more for a 40-acre campus-wide system.

Emergency Notification products are quickly becoming commonplace. A number of companies offer mass communication services and technology for schools and communities—a service that has drawn considerable attention after the Virginia Tech tragedy. Virginia Tech recently selected a product from 3n (National Notification Network), a California-based mass notification systems provider. It is designed to communicate via cell phone text messages, online instant messages, phone calls, and e-mails (http://www.3nonline.com). Comparable products and manufacturers include Intelligent Wireless Solutions (http://www.inwireless.com), The MIR3 inCampusAlert™ Intelligent Notification™ system (http://www.mir3.com) and Wide Area Rapid Notification (WARN) (http://www.warncalling.com).

A number of districts have recently signed on with ParentLink (http://www.parentlink.net), including Sunnyside, Arizona; Broward County, Florida; New Haven, Connecticut, and Eugene, Oregon schools. New Haven anticipates reaching 21,000 parents in less than a minute with the ParentLink system. The Priority Alert Software System (PASS) (http://www.vasonatech.com) is another model schools might consider. The PASS model's strength is in the area of graphics and text messaging. It sends text messages within seconds to a wide variety of wireless and wired devices, including desktop computers, cell phones, and public displays. Alerts can include emergency guidelines, photos, diagrams, evacuation maps, voice directives, and updates. The system has been around for a few years, and is just being installed in its first public schools in Fort Lupton, Colorado. These are just a handful of examples. Costs can be high, but as new products come on the market, the costs may come down. Major considerations should include:

- References for successful installations elsewhere
- Range of devices and means of delivery
- Speed of delivery
- Volume capacity
- Ease of use
- Start-up costs
- Ongoing costs

Personal Digital Assistants (PDAs) can be used for tracking data, sending messages, and in some cases pulling up live video images from cameras linked to a school network or an Internet protocol (IP) address.

Littleton, Colorado, schools may have been the first to adopt the use of pocket PCs, which initially were widely distributed at that location. They proved prone to damage, and the distribution now has been scaled back primarily to supervisors.

Access control technology

The access control field has been evolving at a breakneck pace during the past decade, and shows no sign of letting up. Reliance on conventional keys is likely to fade—but by no means disappear—as more sophisticated options become more affordable. Conventional keys can be lost, copied, or stolen, at which point there is no access control. They will still be needed for emergency use in the foreseeable future, but are likely to become back-up devices rather than primary access methods. Electronic devices such as swipe cards, proximity cards, coded entries, fingerprint scanners, or facial recognition technology offer far better control. In conjunction with readers that send messages through an Access Control Unit (ACU) to a central computer, electronic access control devices can track who used which door at what time. With a few keystrokes, any individual can be barred from entry at a moment's notice. Contractors can be given access cards that expire in a predetermined number of days; school staff may have access only during certain hours, or to certain buildings. Cards cannot be copied, and can be immediately nullified. Schools are reluctant to change keys and locks every time someone retires, but changing the codes on access control devices is relatively easy and voiding one card is almost effortless. Littleton, Colorado, schools now have 5–10 proximity card readers in every school and partition large schools to further control access for after-hours events. Vanderbilt University, in Nashville, Tennessee, is considering using facial recognition technology.

Integrating electronic technology at the design stage is almost always more cost-effective than introducing it after the building has been built. In 2007, retrofitting one set of doors could cost $2,000 in parts alone. For campus-wide installations, wireless technology is now providing some money-saving options over hard-wired installations, not the least of which is the elimination of the need to run additional cable. As with all other technology, reliability of vendors for ongoing maintenance, repairs, parts, and supplies is a critical factor that must not be overlooked.

Weapons detectors

Metal detectors, wands, portals, and X-ray machines have drawn some media attention as potential solutions, particularly for high-crime schools. Unfortunately, they come with considerable expenses beyond the initial equipment cost of $30,000 or more, not the least of which is the cost of staffing the equipment. This, along with the fact that most schools have never had shootings, may be why metal detectors are only used in perhaps 1 percent of U.S. schools on a daily basis (Kaufman et al.,1999; Guerard, 2002; Dinkes et al., 2006).

"While incidents of gun violence are of concern, they make up only a tiny fraction of school-related ssaults."

Schools with tight budgets quickly find that labor-intensive security stations can be beyond their ability. Consider an airport security station: it requires an X-ray machine costing anywhere from $250,000 to $1 million, a portal to walk through costing at least $2,000–4,000, and individual wands at $150–200 for closer inspection (2007 prices). At least one person must staff the portal; another must watch the X-rays; and a third must operate the hand wand. If anything suspicious is found, a fourth staff person will be needed to take the suspect into custody or isolate him from the rest of the passengers. School settings require similar staffing: one NIJ report recommends eight security staff to operate an entry for a school of 2,000 students, and notes that one New York city school employs nine security staff for two hours each morning, adding up to 100 work hours weekly (Green, 1999).

With airplanes, once you're in flight nobody new is going to gain entry. With schools, visitors may be able to slip in at any time, while windows and secondary entry points may allow students to slip in contraband even while a security station is in high gear. As discussed earlier, security stations also oblige students to form a crowd or a queue, waiting for their turn passing through. This leaves them highly vulnerable, stuck in a holding pattern outside the front entry.

While entry point screening can be costly and time-consuming, and requires significant staffing, it is not the only option for weapons screening. A number of schools have had excellent results with random screening of classrooms, entry points, and school buses. Random screening can be accomplished with a low investment in both equipment and personnel.

Security vestibules are expensive options, costing $80–120,000, including installation. These self-contained units control access effectively, only allowing one individual to pass through at a time. Once inside the vestibule, the first door closes and an adjustable scanner checks for weapons. A camera transmits an image to a controller, who can ask the visitor, via intercom, to open packages or coats, and

can then reject them, give them instructions, or allow them to pass through the second, electronically controlled door. Exits also involve double-door vestibules, making unauthorized entry through exits impossible. The volume of traffic moving through a large school makes this option questionable on a pragmatic level, and may interfere with emergency exit requirements. It may make sense for a very limited number of high security facilities, but this option is not likely to be applicable to most schools. While incidents of gun violence are of concern, they make up only a tiny fraction of school-related assaults.

Surveillance technology

Surveillance camera technology has evolved over the past few years, with the biggest change being a shift from analog to networked high definition cameras.

Analog cameras set the standard well into the 21st century, but are now rapidly losing ground to digital technology. Most analog cameras feed images into recording devices which in turn yield basic evidence, such as which of two students started a fight, or what time a car was stolen. This may be adequate for many schools as even a weak picture of a student may be enough to help identify him if administrators know their student body. But if a quality picture is needed, analog cameras usually fall short.

High definition (HD) cameras now set the standard for the highest quality. They generate vastly superior "forensic quality" digital images which can be enlarged without losing definition—up to a twelve-fold increase over traditional analog recordings in resolution quality and detail, and that level of detail continues to be improved upon. Unfortunately, HD cameras can cost a few thousand dollars, compared to a few hundred for an analog camera. As with all other technologies, those prices should drop in the years to come.

HD cameras need to be linked to recording devices with significant memory capacity. Digital video recorders (DVRs) have larger memory capacity than is found with video recorders, but have limitations on the number of cameras they can service. Greater capacity comes with Network Video Recorders (NVR). NVRs, have been generally available since 2005 and are installed on the edge of a Local Area Network (LAN). They usually include their own independent storage capacity, and can use large network storage hardware as well. This is a more cost-effective method and has greater capacity. There is no limit on the number of cameras that can be plugged into an NVR, and there is considerable flexibility in the distribution of cameras anywhere that presently has

access to the LAN. In institutional settings, NVRs are likely to displace DVRs over the next decade.

With NVRs, camera images can be accessed throughout the LAN by any user who has the access code. Images can also be accessed anywhere through internet access via an assigned Internet protocol (IP) address. (Analog cameras can be configured to allow this as well, using adaptors.) This allows district administrators, or anyone issued the code, to view live security camera images from virtually anywhere—a powerful and useful tool during a crisis.

A further improvement in surveillance technology is "smart camera" or "intelligent video" software that uses algorithms to spot predetermined shapes or movements, such as someone entering through an exit, falling down, spray-painting, climbing a fence, or parking in a no-parking zone. These movements can automatically trigger alerts, prompting staff to attend to an activated monitor. Refinements over the next decade will likely make it possible for cameras to recognize specified individuals, based on facial geometry, or to spot a gun. Vandal resistant cameras can now be set to trigger alarms if the lens is obscured or painted over (Pohle, 2007).

As with all technological fixes, cameras and recording devices come with strings attached: Maintenance costs and parts replacement must be built into the budget. Without emergency access to repair persons and supplies, equipment usefulness can be severely limited. Costs may be mitigated in a number of ways: joint projects with local municipalities or corporations may help share the load. In addition, one pan-tilt-zoom (p-t-z) high definition (HD) camera can cover an area that once required 10 conventional cameras. Even fixed lens high definition cameras often cover a considerably wider view than was available with analog cameras. Some locations currently using high definition p-t-z cameras include Grossmont Union High School district in El Cajon, California, the city of San Mateo, California, and the city of New Orleans, Louisiana.

If you are likely to use other types of technology as well as security cameras, (such as electronic locks or alarms), and if your district maintains a Local Area Network (LAN), the overview of Integrated Security Management Systems, beginning on page 34, is essential reading. If you are interested in installing a simple, stand-alone surveillance camera system, consider the following pointers:

- Test cameras in actual lighting conditions, in conjunction with monitors and recorders, with successful performance a contingency of purchase.

- Be prepared for vandals targeting cameras, especially outdoors. Secondary, hidden cameras should cover primary cameras to document any wrongdoing. Protective cages or cases are also essential.

- Dependable, high-quality recorders are critical. Many a taped crime has yielded pictures of such poor quality that they were useless.

- From a cost-effective point of view, videotapes (analog technology) are still more economical, but their quality varies to extremes, and the technology is rapidly becoming obsolete. Digital technology is now well established, and prices have dropped. DVR (Digital Video Recording) systems often can self-diagnose, send warnings, or self-repair. Digital images generally offer better image quality, and, if high definition technology is used, enable users to zoom in without losing details. Search parameters can simplify the process of reviewing recordings after an incident. Compare costs and technology before buying, and make sure all parts of the system are compatible.

- Essential storage of digital images requires hard drive space or back-up equipment and compression software. Determine what it will take to maintain digital recordings for at least 24–48 hours, in addition to any archived suspicious activity.

- Going out for bid on video technology must be done with great care. Payment should be contingent upon installation and a guarantee of successful operation. Specify required results in your Request for Proposal, such as: "must be able to distinguish between two different faces of unmasked individuals anywhere on the basketball court at 3 a.m. despite darkness and inclement weather" or "images printed on the included printer should clearly identify an individual in the north stairwell under normal lighting conditions."

- If equipment is going to fail, the first few months are the most likely time, so test diligently during this period. Vendors should be easily reached for timely maintenance and repair services for the life of the equipment. If the service representatives cannot be there the same day, with replacement parts, that's a major concern. A year after installing their system, one out of four of Berkeley High School's cameras reportedly still didn't work. Nevertheless, their campus officer speaks highly of their cameras today (see case study on page 41).

Integrated security management systems (ISMS)

Over the past five years exponential growth in the complexity and options for security technology has occurred. Those schools that invested in cameras, alarms, and other devices, have served well as testing grounds, learning valuable lessons. Take advantage of their wealth of information about what has worked and what has not. Before investing in new gear, carefully diagnose your school's concerns, including (1) what are the common problems needing to be addressed, (i.e., bullying or snowstorms) and (2) what are uncommon problems that you want to preemptively address (i.e., school shootings or levees breaking). For all:

a. Brainstorm solutions. These could be structural or technological, or could involve staffing or behavioral changes.

b. Research what others have done to alleviate concerns.

c. Always reevaluate how proposed solutions would mitigate the specific problems on your list.

Examples of brainstormed solutions are illustrated on the following two pages.

Concerns and Objectives	Possible Solutions
Intruders have been a problem. How can we control entry into the school?	• Upgrade door locks. • Proximity Cards or Biometric capture devices. • Check IDs. • Require all visitors to wear school-issued ID badges. • Lock all doors. • Supervise entry points. • Install emergency lockdown buttons under reception desk. • Install emergency lockdown icon on selected computers.
Computer equipment has been stolen. How can we increase security for our computer equipment?	• Alarm the computer room doors. • Install surveillance cameras. • Require proximity cards for entry. • Record serial numbers. • Lock computers in place. • Increase staff supervision. • Move equipment to another location easier to monitor. • Install tracking devices on computers. • Install alarms on computers.
There have been many incidents of bullying in the bathroom. How can we address this problem?	• Remove bathroom doors. • Provide motivators for staff to randomly patrol bathrooms. • Recruit parent volunteers to patrol. • Provide a tip line. • Require students to check out a key to the bathroom.
There have been a number of fights in the cafeteria. How can we address this problem?	• Reduce congestion at doors; mark as entrances or exits. • Improve ambience of cafeteria. Use tablecloths and lower lighting levels. Hang curtains to absorb sound. Play calming, classical music. • Establish a culinary institute, run partly by students. Let them run one part of the cafeteria like a restaurant, accessible only to students who behave. • Serve meals at tables, rather than having students competing for space in line. • Provide secondary dining locations, which can create smaller groups eating together. • Assign students to seating areas. • Have staff eat with students in small groups. • Have conflicting groups eat at separate times. • Install surveillance cameras. • Post and enforce rules. • Increase supervision.

(continued next page)

Concerns and Objectives	Possible Solutions
Vandals have been spray painting the wall outside the gym. What can we do about this problem?	• Recruit neighbors with good natural surveillance of the gym wall to watch for culprits. • Install surveillance cameras. • Install cameras with smart technology that responds to painting or tampering. • Move a caretaker trailer on site. • Offer a reward. • Ask stores to require ID before selling spray paint. • Coat the wall with a graffiti-incompatible coating that's easy to clean.
Tornadoes wreaked havoc in a neighboring district last year. How can we prepare for extreme weather events?	• Prepare to serve as an emergency shelter. • Attach shelves to walls in all rooms. • Build shutters for windows facing fields. • Mark emergency shelter locations. • Practice emergency evacuation. • Clear out basement so it can be used for shelter in an emergency. • Install back-up generator and lights. • Store emergency supplies. • Prepare emergency communication system.
After a serious car wreck last year, we weren't able to alert students, staff, parents, or the media as rapidly as we would have liked. How can we rapidly communicate emergency messages to staff, students, parents, media, police, or district administration?	• Repair the existing PA system. • Install intercoms in rooms. • Install phones in rooms. • Provide PDAs for all staff. • Provide cell phones for all staff. • Provide radios for all staff. • Provide electronic displays at key locations. • Automate media releases. • Program fax machine for mass distribution. • Investigate emergency mass transmission software and services. • Install wireless routers throughout campus. • Create group email and text message lists. • Create pre-recorded emergency messages, triggered by alarms. • Identify zones in school and community where electronic communications won't work.

Two points worth noting:

1. Technology isn't always the most appropriate, the best, or the only solution.

2. Every problem addressed generates a different list of solutions. One size does not fit all.

Sometimes, problems can be addressed piecemeal. If a school is unlikely to install anything beyond a basic four camera security system, that's relatively simple and can be installed as a stand-alone device. But frequently problems result when the solutions accumulate in a patchwork manner over time—especially technological solutions.

There comes a point when a school is much better off integrating a variety of technological solutions into a cohesive system. For example, if your school wants to install smoke detector alarms, open-door annunciators (lights or sounds that tell you a particular door has been left ajar), video surveillance over multiple locations, emergency lockdown buttons at the reception desk, proximity card access control devices on particular doors and emergency call boxes in the parking lot, then an integrated system will serve you best. Competently installed, the components will work together, maximizing efficiency and reliability. Integration ensures software and hardware compatibility for all the involved technology, and lowers maintenance costs. This has become particularly relevant as video technology has leaped forward. Ten years ago, VCRs were standard recording devices; five years ago basic digital video recorders (DVR) took over; most recently, high capacity network video recorder (NVR) and digital storage devices (such as the CoVi Distributed Media Manager™ [DMM]) have set the standard. The latter devices are integrated into the edge of a facility's network, making it possible to lock doors, check ID, or retrieve data and images from almost anywhere in the intranet system, or via Internet protocol (IP) address wherever Internet access is available. (Some examples of major NVR software makers are Lenel, Onssi, Milestone, and Sony.)

One obstacle to creating a good, integrated system is confusion about where to begin. Examples of the biggest errors are:

1. Starting with a solution (e.g., "let's get some cameras") before the problem has clearly been identified (i.e., bullying in the bathroom, where cameras would be inappropriate).

2. Emphasizing low bids (e.g., "great price on these cameras!") rather than performance standards (e.g., quality of the pictures, competence of the installers, compatibility with other equipment, or access to ongoing maintenance, especially in emergencies.)

3. Being unclear about what hardware and software to use. A bid that requires a specific camera "or equivalent" risks ending up with something far from adequate.

4. Providing substandard equipment for all schools, rather than quality equipment at fewer schools, with additional equipment installed over the passage of time. In the long run, substandard equipment will be less reliable, harder to maintain, and ultimately more expensive than the higher quality alternative.

These errors can lead to fiascos, in which limited funds are spent on equipment that doesn't address the problem or which doesn't perform adequately.

If a school or district is ready to invest in an Integrated Security Management System (ISMS) it is critical that the school or district receives competent guidance from the start. Here is one set of guidelines that may help:

1. **Form a team.** A team can be composed of school or district personnel, such as an administrator, an information technology expert, an in-house electrician, a school resource officer, and maintenance staff. If multiple technologies are likely to be involved and in-house expertise is limited, bring in an outside expert to help refine objectives. An expert is someone who has installed an integrated system before, who has local references, a verifiable track record, and who can show you other facilities where similar equipment has been installed. High-technology corporations, casinos, major airports, and universities are more likely than public schools to have integrated security systems already in place. These facilities may have experts on staff, or be familiar with local professionals who can help the planning team.

2. **Make an initial plan.** Comprehensively identify all your initial technology objectives and possible solutions. When possible, the plan should be as specific as possible about what devices are used, including make, model, and capabilities. Articulate performance needs (see discussion of cameras). Examples of general objectives and solutions you might identify include:

    - "We will develop a fully integrated network of access control devices, burglary detection devices, surveillance cameras, alarms, and communication systems."

    - "We have indentified which doors are locked, where cameras are located, etc."

    - "Devices should be connected to our local area network (LAN), with access from (for example) five selected computer stations.

The system should have an easy-to-use Graphic User Interface (GUI)—which means when you look at your monitor the layout makes sense."

- "Software and hardware should be upgradeable and easily expandable."
- "Don't skimp! The system installed at the first schools should be continually upgraded, and should serve as templates for additional schools in the future. Using the same technology at all schools will make maintenance easier than if choices are site-based."

3. **Identify qualified integrators** to bid on the project. Ask institutions in your area if they have had success with a particular company. (One example of a good Security Technology Integration company would be Selectron [http://www.selectron.com].) Qualifications could include:
   - References for similar installations and ongoing maintenance for the past three to five years within the same region of the country
   - A company profile demonstrating reliability and continuity (for reassurance that they know what they are doing, and that they will still be around in a few years)
   - Key personnel résumés or profiles, including relevant certifications
   - Demonstrated technical know-how
4. **Provide Requests for Proposal** (RFPs) to these integrators. Invite the selected integrators to tour the facility (if already built), review the draft plan, and propose a system.
5. **Require a demonstration.** Specification sheets and product descriptions will not provide the same level of assurance that the equipment works. The Integrator should be required to set up the actual components, including hardware and software, on a smaller scale, to demonstrate functionality. The school information technology director should attend the demonstration.
6. **Rate the submitted proposals** according to the following (or similar) standards:
   a. System Installation References (25 points)
   b. Service References (25 points)
   c. Key personnel qualifications (25 points)

d. Exceptions/ Deviations (20 points). Bidder may propose different equipment.

e. Technical Proposal (50 points). This should include a floor plan drawing and photos of bidder-installed panels from other sites.

f. Conceptual Presentation (50 points). This can include schematics, explanations of operations, construction plans and product demonstrations.

g. Bidder premises visit (35 points). Verify adequate resources, including repair vehicles and qualified staff.

h. Reference site visit (40 points). Visit a site where the bidder has installed a system.

i. Pricing (50 points). The low bid receives 50 points. Higher bids receive incrementally fewer points, such as 7 points for every additional 5 percent in cost.

The case studies on the opposite page illustrate how many of the considerations and technology options discussed in this section play out in actual school-site planning and implementation.

SURVEILLANCE CAMERA CASE STUDIES

Berkeley, California High School, which serves 3,000 students, 150 full-time teachers, and 80 classified staff members, provides one good example of effective surveillance technology. With limited options for access control (although they are closing 11 of the 14 entries onto the campus) or territoriality, (their inner-city, 17-acre site serves as a neighborhood cultural center almost 24 hours a day) school surveillance capacity was critical. They installed 80 motion-activated cameras in 2001. The cameras covered hallways, bathroom doors, and fire alarms, as well as other locations. Images are sent to a security office containing five monitors, each of which is split into 16 screens. They have found the cameras useful for evidence gathering, and as a deterrent. The cameras helped identify arsonists, and made it much easier to ascertain the facts when conflicts occurred. The latter has been particularly helpful when trying to determine whether two students contributed equally to a fight, or whether one was clearly the victim of an assault. The cameras had a deterrent effect as well: Vandalism, fire alarms, theft, and fights dropped dramatically. Despite the fact that the camera technology being used may not be the most up-to-date, the school resource officer assigned in 2006–07 reports that the cameras have been "invaluable" tools for identifying many offenders. The freshmen, notably, are not too savvy about the cameras. Others, however, do cover their faces while committing crimes.

After extensive research by their in-house IT specialist, the Berkshire Farm Center in Canaan, New York, installed a networked CoVi Crystal high-definition digital video surveillance system in 2006 that dramatically increased their ability to watch over their 17-building campus and the 200 at-risk students served in their residential treatment center. By June 2007 they expressed great enthusiasm for the system, and were planning on adding a few dozen to the 100 cameras already installed. The Power-over-ethernet (POE) feature made installation much easier, as they didn't need to run power to each camera.

Chesterfield County Public Schools, Virginia, awarded a contract in 2007 to install a video surveillance system in order to enhance security for 58,000 students in 59 schools. They now have a variety of analog and digital cameras, with a few high-definition models. Police are able to pull up networked cameras from their command center. The cameras have enabled school security staff to intervene with an unruly crowd in a timely manner, and to identify a suspect in a knife fight—who confessed once shown the video. They are discovering that maintenance of their large quantity of cameras (some schools have as many as 80 cameras installed on site) has become overly time-consuming, and are now contemplating establishing a maintenance agreement with an outside firm.

blank page

Section 4.

Safety Audits and Security Surveys

Approaches to School Safety Audits can range from basic, no cost, in-house overviews to extensive projects drawing on grants and consultants. To find CPTED specialists, contact the author (http://www.transcendingviolence.com). Local police and security agencies may be able to help as well. A variety of checklists and surveys are available nationally, many from sources listed at the end of this chapter. One of the most extensive surveys is available for free from the National Clearinghouse for Educational Facilities (http://www.edfacilities.org). The two surveys provided below attempt to cover the main points.

Because the variables are considerable, school comparisons can be difficult and subjective. Especially for political reasons, it can be tempting to spread funds thin, giving each school a token amount of money for improvements. From a CPTED perspective, this is like plugging half the holes in a sieve. The public may gain the illusion that all the schools are safer, when in fact all are still equally at risk.

Until the survey is conducted you cannot reasonably predict the costs of remodeling, so bear this in mind while seeking grant funding or crafting bond measures. A two-stage process would be most sensible. If that is not possible, assume that an inspection can cost $4,000 or more, while CPTED improvements can easily run $100,000 to $500,000 per school, not including electronic technology.

There are many approaches to site inspections. One that works well is to use a basic school layout map, as is typically given to school visitors. Mark locations on the map that need attention, identifying them with letters or numbers corresponding to your notes. Always attach a site map to your survey results. Depending on the setting, start from a few blocks out, then work your way onto the grounds and in through the main entrance. At each point along the way, consider the issues of natural surveillance, access control, and territoriality as discussed previously. Two sample surveys—one basic, one more detailed—are included here to serve as guides.

Basic School CPTED Survey

School name, address, contact information:

Addressing the key questions

1. What risks and opportunities do students encounter between home and school?

2. What risks and opportunities are posed in areas directly adjoining school property?

3. Can office staff observe approaching visitors before they reach the school entry?

4. Do staff members have the physical ability to stop visitors from entering?

5. How well can people see what's going on inside the school?

6. Does the staff have immediate lockdown capability in classrooms and other locations?

7. Is the overall school climate prosocial?

8. Are there identifiable or predictable trouble spots or high risk locations?

For each of the problems or locations identified above, determine:

1. How can we improve natural surveillance?

2. How can we improve access control?

3. How can we improve territoriality?

Annotated School CPTED Survey

School name, address, contact information:

History of problems:

Source of information: (police, school records, student interviews)

Anticipated problems:

Source of information: (police, school records, student interviews, news media, world events.)

1. What risks and opportunities do students encounter between home and school?

- Traffic related: Are crosswalks hazardous? How well protected are they? Can crossing guards be recruited?
- Crime related
- Weather or environment related
- Other hazards
- Opportunities: field trips, mentors, jobs, safe havens
- Alternative transportation options
- How can natural surveillance be improved?

(continued next page)

Annotated School CPTED Survey, p. 2 of 7

2. What risks and opportunities are posed in areas directly adjoining school property?

- Traffic related
- Crime related
- Other hazards
- Opportunities: field trips, mentors, jobs, safe havens.
- How can natural surveillance be improved?
- Is access to school property controlled by fencing, walls, or signs?
- Do solid walls, fences, or hedges block surveillance, or attract graffiti?
- Do students congregate at predictable locations off campus, and does this cause a problem?
- Where are possible evacuation sites? Do they have telephones, bathrooms, heat, and securable areas?

3. Can office staff observe approaching visitors before they reach the school entry?

- Is the office located adjacent to the main entry?
- Do windows allow natural surveillance of approaching visitors?
- Does anything block the view? (posters, sculpture, shrubbery, etc.)
- Does the office layout allow staff to see approaching visitors from normal working positions?
- If poorly located, can the office be moved?
- Can new locations for the office be identified?

4. Do staff members have the physical ability to stop visitors from entering?

- How difficult is it for staff members to lock entry doors in an emergency?
- Can they use an emergency electronic lock button?

Annotated School CPTED Survey, p. 3 of 7

- Do they have to use keys? Do they have to go outside in order to insert keys in locks?
- Are doors locked other than during rush hours?
- Is the front entry staffed with security personnel?
- Are office staff members provided with crisis intervention and response training?
- Is the front entry controlled with weapons scanners or other technology?
- Do counters or windows protect office staff?
- If threatened, can office staff retreat to safer locations, or are they trapped?
- Do staff members have panic button alarms?
- Can intruders gain access any other way than through the main entry?
- Can those secondary entries be locked, staffed, or otherwise controlled?
- How is access controlled after hours?
- Are keys controlled effectively?
- Is an alarm system in place? What triggers the alarm? What happens when the alarm is triggered?

5. How well can people see what's going on inside the school?

- How extensively can office staff and others see activity in immediately adjacent public areas, as well as up and down hallways? Can they see over the heads of crowds using mirrors, cameras, or raised areas?
- Do blind corners, niches, or unlocked and unattended rooms block surveillance?
- Where can illicit activity occur undetected?
- How can access to hidden areas be denied? Can those areas be locked off?
- Where would convex mirrors help?
- Can internal windows be uncovered, or blinds be opened, to improve surveillance?

6. Do staff members have immediate lockdown capability in classrooms and other locations?

- Which rooms can be used as "safe havens" in emergencies?

Annotated School CPTED Survey, p. 4 of 7

- How hard is it to lock each room, in an emergency? Does it require a key? Does a person have to step out into the hallway to lock the door?
- Will classroom doors lock automatically when closed? Are they kept closed during class?
- Is there a two-way intercom or telephone in each room?
- Do staff members carry communication devices?
- Do thin walls and windows weaken rooms as safe havens?
- Are there secondary emergency exits available from each room?

7. Is the overall school climate prosocial?

- Are behavioral expectations spelled out in positive terms?
- Are these reflected in student-created posters or other displays?
- Is there hostile graffiti? At whom are they directed? Are graffiti immediately painted over?
- Are there conflicts between groups?
- Are there students who are isolated?
- Does bullying occur?
- Do students feel safe?
- Do students turn to staff for help resolving problems?
- Are student mediators used?
- Is there a universal prosocial curriculum in place, teaching empathy, problem solving, anger management, and tolerance?
- Is there an overall behavioral plan for the school?
- Do all staff members participate in behavior management training? Does this include school officers, cafeteria workers, playground monitors, and bus drivers?
- Is there a targeted program in place for intervening with severely misbehaving individuals?

Annotated School CPTED Survey, p. 5 of 7

8. Are there identifiable or predictable trouble spots or high-risk locations?

(These locations may have already been addressed in #1–7. This serves as a fail-safe, to see if any locations have been missed, and require more specific recommendations)

- Neighboring streets
- Neighboring businesses
- Other neighboring locations
- School boundaries
- School grounds
- Parking lots
- Driveways
- Loading docks and dumpsters
- Main entry area
- Main office
- Hallways (specify which ones)
- Secondary entryways
- Classrooms
- Gymnasium
- Cafeteria
- Auditorium
- Bathrooms
- Locker rooms, locker bays, locker halls
- Art rooms
- Industrial and home economics
- Science labs
- Library
- Preschool or Head Start classrooms
- Courtyards
- Music rooms
- Special education rooms
- Computer/technology rooms
- Furnace and custodial storage
- Time-out rooms
- Meeting or conference rooms.
- Informal or formal gathering areas
- Roof
- Crawl spaces
- Portable buildings
- Key control
- Surveillance equipment closet
- Lighting problems indoors or out

Annotated School CPTED Survey, p. 6 of 7

Security Technology

- What access control devices are used?
- How well are keys controlled?
- Have keys been lost?
- Have locks been changed?
- Are electronic access control devices being used? If not should they be considered?
- Will repair parts be readily accessible over the next 10 years?
- Will repair services be readily available over the next 10 years?
- Do emergency workers have easy access when needed?
- Is an integrated security system in place?

What surveillance equipment is used?

- Is it protected from vandals?
- Are they well maintained?
- How well do they work?
- How long are tapes or images kept?
- Are the transmitted images of adequate quality for identifying individuals?
- Are the printed images of adequate quality for identifying individuals?
- Is footage retrievable from off site during a lockdown (i.e., via an IP address)?

Are weapons scanners used, and if so, how effectively?

- Is the system impractical?
- Are there traffic jams at scanning devices?
- Are they cost-justifiable?
- Are they well maintained?
- Are staff members trained in their use?
- Have they effectively kept weapons out?
- Have they had a positive or negative impact on school climate?

Annotated School CPTED Survey, p. 7 of 7

What communication devices are available?

- Do staff members have cell phones, radios, intercoms, and/or pagers? Do they operate throughout the school property, indoors and outside?
- Are there locations that lack communication devices?
- Are there emergency call stations or panic alarms? Who receives the distress signal when a panic button is used? Is the signal monitored 24 hours a day, 7 days a week, or just when office staff members are working?
- Do radios operate on channels coordinated with police and other emergency workers?
- Is there an unlisted number reserved for outgoing calls during a crisis?
- Can emergency personnel easily and directly reach a live adult—not voicemail, or a student volunteer—24 hours, 7 days a week?
- Does your local 911 dispatch center have the capacity for electronic mass calling with urgent messages—a Community Emergency Notification System (CENS)?
- Are all staff trained in emergency communications?

IN CONCLUSION...

Crime Prevention Through Environmental Design is a critical component of school safety planning. A site that is well protected with natural surveillance, access control, and territoriality will require less staff time and energy to maintain as a safe environment. This leaves instructors more time to focus on teaching, and students more time to focus on learning. Security technology can further enhance school safety. Areas where technology can be effectively applied include electronic surveillance, access control, and communication technology. Because this technology is experiencing dramatic improvements annually, keep a close eye on opportunities, as equipment improves and costs come down.

As important as these approaches are, they are only part of the bigger picture. CPTED is an approach that can help set the stage for a positive, safe learning experience. Many other factors will have a huge impact on a school's success or failure. School CPTED will only reach its full potential to promote school safety if linked to other essential components of a comprehensive school safety plan, as discussed in the accompanying guides in this series.

References

Building blocks: The fine art of school facilities management [Special report]. (2005). *American School Board Journal, 192*(6), 28–41.

Carter, S.P. (2001). *Surrounded by safety: A Crime Prevention Through Environmental Design (CPTED) handbook for youth*. Miami, FL: Youth Crime Watch of America.

Crowe, T.D. (2000). *Crime Prevention Through Environmental Design: Applications of architectural design and space management concepts* (2nd ed.). Boston, MA: Butterworth-Heinemann.

Dinkes, R., Cataldi, E.F., Kena, G., & Baum, K. (2006). *Indicators of school crime and safety: 2006*. (NCES Pub. No. 2007-003, NCJ Pub. No. 214262). Washington, DC: U.S. Department of Education & U.S. Department of Justice.

Duke, D.L., & Trautvetter, S. (2001). *Reducing the negative effects of large schools*. Washington, DC: National Clearinghouse for Educational Facilities.

Green, M.W. (1999). *The appropriate and effective use of security technologies in U.S. schools: A guide for schools and law enforcement agencies*. Washington, DC: U.S. Department of Justice, Office of Justice Programs.

Guerard, E.B. (2002, January 30). *High school tests high-tech weapon scanner*. Bethesda, MD: eSchool News.

Jacobs, J. (1961). *The death and life of great American cities*. New York, NY: Random House.

Jeffery, C.R. (1971). *Crime prevention through environmental design*. Beverly Hills, CA: SAGE.

Kachur, S.P., Stennies, G.M., Powell, K.E., Modzeleski, W., Stephens, R., Murphy, R., et al. (1996). School associated violent deaths in the United States, 1992–94. *Journal of the American Medical Association, 275*(22), 1729–1733.

Kaufman, P., Chen, X., Choy, S.P., Ruddy, S.A., Miller, A.K., Fleury, J.K., et al. (1999). *Indicators of school crime and safety, 1999* (NCES Pub. No. 1999-057, NCJ Pub. No. 178906). Washington, DC: U.S. Department of Education & U.S. Department of Justice.

Lackney, J.A. (2000). *Thirty-three educational design principles*. Washington, DC: National Clearinghouse for Educational Facilities.

NY school deploys HD CCTV surveillance system [Electronic version]. (2007, June 12). *T.H.E. Journal*. Retrieved November 1, 2007, from www.thejournal.com/articles/20799

Pohle, L. (2007, June). An education market primer [Electronic version]. *SDM Magazine*. Retrieved November 1, 2007, from http://www.sdmmag.com/CDA/Archives/BNP_GUID_9-5-2006_A_100000000000000115399

Schneider, T., Walker, H., & Sprague, J. (2000). *Safe school design: A handbook for educational leaders. Applying the principles of Crime Prevention Through Environmental Design*. Eugene, OR: University of Oregon, ERIC Clearinghouse on Educational Management.

U.S. General Accounting Office. (1995). *School facilities: Conditions of America's schools*. Washington, DC: Author.

Virginia school district taps GVI for video security project [Electronic version]. (2007, June 12). *T.H.E. Journal*. Retrieved November 1, 2007, from www.thejournal.com/articles/20800

Additional Resources

Northwest Regional Educational Laboratory
101 SW Main St., Suite 500, Portland, Oregon 97204-3213
Tel. 1-800-547-6339; 503-275-9500
http://www.nwrel.org

NWREL provides research-based products, technical assistance, and training to improve educational systems and learning. NWREL works directly with educators in the field to develop and test research-based publications and strategies that improve learners' results.

Hamilton Fish Institute on School and Community Violence
2121 K Street NW, Suite 200, Washington, DC 20037, Tel. (202) 496-2200
http://www.hamfish.org

The Hamilton Fish Institute on School and Community Violence provides information, research, and support to make schools safer for high achievement.

Transcending Violence
894 W. 4th Ave., Eugene, Or 97402, Tel. 541-343-6813
http://www.transcendingviolence.com

Transcending Violence is a school safety consulting firm, specializing in Crime Prevention Through Environmental Design (CPTED) and Safe, Healthy and Positive Environmental Design (SHAPED).

American Society for Industrial Security (ASIS)
1625 Prince St., Alexandria, VA 22314, Tel. 703-522-5800
http://www.asisonline.org

ASIS International is a training and support organization geared toward security professionals. It disseminates information and educational materials to enhance security knowledge, practice, and performance.

Center for the Prevention of School Violence
1801 Mail Service Center, Raleigh, NC 27699-1801, Tel. 1-800-299-6054
http://www.ncdjjdp.org/cpsv/

The North Carolina Department of Juvenile Justice and Delinquency Prevention—Center for the Prevention of School Violence serves as a resource center and "think tank" for efforts that promote safer schools and foster positive youth development. The Center's efforts in support of safer schools are directed at understanding the problems of school violence and developing solutions to them. The Center focuses on ensuring that schools function so that every student who attends does so in environments that are safe and secure, free of fear, and conducive to learning. Positive youth development efforts are emphasized as the Center focuses beyond the school into the community and works in support of youth-serving programs and agencies that target the development of attitudes, behaviors, and conditions that enable youth to grow and become productive members of their communities.

DesignShare
http://www.designshare.com
Designshare is a Web-based service dedicated to collectively designing innovative learning environments that will support 21st century schools. Their Web site is a rich source of ideas for designing schools.

Institute on Violence and Destructive Behavior (IVDB) College of Education, University of Oregon
1265 University of Oregon, Eugene, OR 97403-1265, Tel. 541-346-3591
http://www.uoregon.edu/~ivdb/

The mission of the Institute on Violence and Destructive Behavior (IVDB) is to empower schools and social service agencies to address violence and destructive behavior, at the point of school entry and beyond, in order to ensure safety and to facilitate the academic achievement and healthy social development of children and youth. IVDB personnel study the conditions, developmental processes, and risk-protective factors that are related to the prevention of violence, school failure, delinquency, and other destructive outcomes among at-risk children and adolescents. Additional IVDB activities include program evaluation, outreach, training, and technical support.

International Association of Campus Law Enforcement Administrators
638 Prospect Ave., Hartford, CT 06105-4298, Tel. 860-586-7517.
http://www.iaclea.org

The IACLEA is a clearinghouse for information and issues shared by campus public safety directors across the country. IACLEA membership represents more than 1,000 colleges and universities in 20 countries.

National Criminal Justice Reference Service (NCJRS)
P.O. Box 6000, Rockville, MD 20849-6000, Tel. 800-851-4320.
http://www.ncjrs.org

NCJRS is a federally funded resource offering justice and substance abuse information to support research, policy, and program development worldwide.

National Clearinghouse for Educational Facilities
1090 Vermont Ave., NW Suite 700, Washington, D.C. 20005, Tel. 888-552-0624
http://www.edfacilities.org

Created in 1997 by the U.S. Department of Education, the National Clearinghouse for Educational Facilities (NCEF) provides information on planning, designing, funding, building, improving, and maintaining safe, healthy, high-performance schools. Their Web site provides access to a massive compilation of related documents.

National School Safety Center (NSSC)
4165 Thousand Oaks Blvd., Suite 290, Westlake Village, CA 91362, Tel. 805-373-9977
http://www.nssc1.org

The National School Safety Center serves as an advocate for safe, secure, and peaceful

schools worldwide and as a catalyst for the prevention of school crime and violence.

The Office of Safe and Drug-Free Schools Program, U.S. Dept. of Education
600 Independence Ave., N.W. Washington, DC 20202, Tel. 202-260-3954
http://www.ed.gov/offices/OESE/SDFS

The Office of Safe and Drug-Free Schools (OSDFS) administers, coordinates, and recommends policy for improving quality and excellence of programs and activities that are designed to provide financial assistance for drug and violence prevention activities and activities that promote the health and well-being of students in our schools.

Additional Readings

Brenner, B., & Schneider, T. (2006). *Safe school facilities checklist*. Washington, DC: National Clearinghouse for Educational Facilities.

Brooks, K., Schiraldi, V., & Ziedenberg, J. (2000). *School house hype: Two years later*. Washington, DC: Justice Policy Institute, & Covington, KY: Children's Law Center.

Crowe, T.D. (1990, Fall). Designing safer schools. *School Safety*, pp. 9–13. Encino, CA: National School Safety Center.

DeVoe, J.F., Peter, K., Noonan, M., Snyder, T.D., & Baum, K. (2005). *Indicators of school crime and safety: 2005* (NCES Pub. No. 2006-001, NCJ Pub. No. 210697). Washington, DC: U.S. Department of Education & U.S. Department of Justice.

Gaustad, J. (1999). *Fundamentals of school security* [ERIC digest]. Eugene, OR: University of Oregon, ERIC Clearinghouse on Educational Management. (ERIC Document Retrieval No. ED436814)

Gottfredson, D.C. (1997). School-based crime prevention. In L.W. Sherman, D.C. Gottfredson, D.L. Mackenzie, J. Eck, P. Reuter, & S.D. Bushway (Eds.), *Preventing crime: What works, what doesn't, what's promising; A report to the United States Congress* (Chap. 5). Washington, DC: U.S. Department of Justice, National Institute of Justice. Retrieved November 1, 2007, from www.ncjrs.gov/works/chapter5.htm

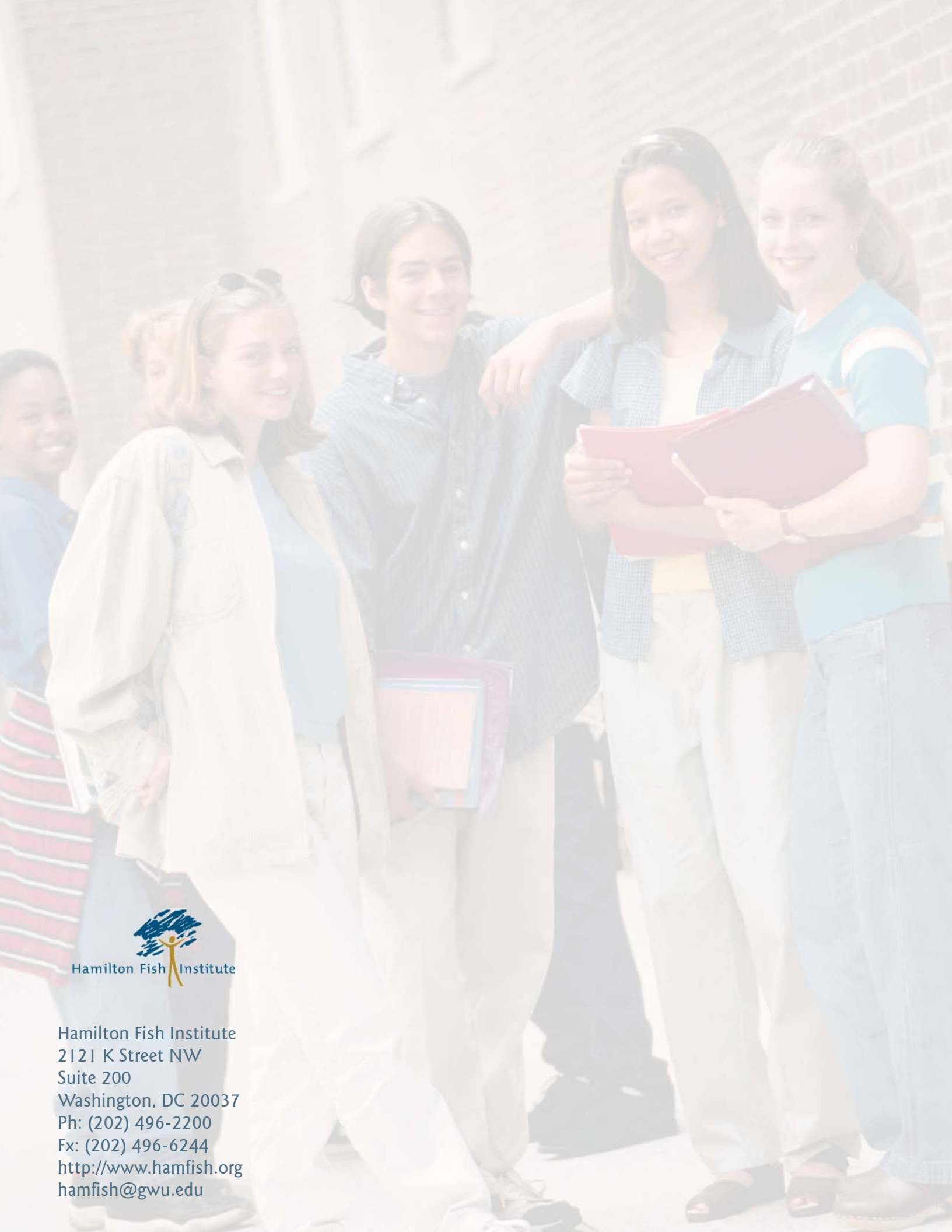
Heaviside, S., Rowland, C., Williams, C., Farris, E., Burns, S., & McArthur, E. (1998). *Violence and discipline problems in U.S. public schools: 1996–1997*. Washington DC: U.S. Department of Education, Office of Educational Research and Improvement.

Kaufman, P., Chen, X., Choy, S.P., Ruddy, S.A., Miller, A.K., Fleury, J.K., et al. (2001). *Indicators of school crime and safety, 2001* (NCES Pub. No. 2002-113, NCJ Pub. No. 190075). Washington, DC: U.S. Department of Education & U.S. Department of Justice.

Norris, C., & Armstrong, G. (1999). *The maximum surveillance society: The rise of CCTV*. New York, NY: Berg.

Stephens, R.D. (1990). *School safety check book*. Malibu, CA: Pepperdine University, National School Safety Center.

Reader Notes:



Hamilton Fish Institute

Hamilton Fish Institute
2121 K Street NW
Suite 200
Washington, DC 20037
Ph: (202) 496-2200
Fx: (202) 496-6244
http://www.hamfish.org
hamfish@gwu.edu