



ACT Crime Prevention & Urban Design

R E S O U R C E M A N U A L



AUSTRALIAN CAPITAL TERRITORY GOVERNMENT



Australian Capital Territory
**CRIME PREVENTION
AND URBAN DESIGN
RESOURCE MANUAL**

Prepared by Sarkissian Associates Planners
in collaboration with ACT Planning and Land Management

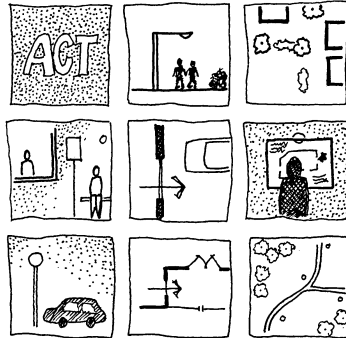


ACT Department of Urban Services ■ Planning and Land Management

16 Challis Street, Dickson ■ GPO Box 1908, Canberra, ACT 2601

Telephone: (02) 6207 1706 ■ Facsimile: (02) 6207 1925

2000



PREFACE

The *Crime Prevention and Urban Design Resource Manual* is an advisory document to assist in incorporating crime prevention through environmental design principles into planning and development activities in the Australian Capital Territory (ACT). It builds on previous research in the ACT on the role of urban design in crime prevention and community safety.

It outlines the type of safety issues and possible design or management responses that need to be addressed in the planning and development of public places. While its focus is on public places, the principles of crime prevention through environmental design outlined also can be applied to residential, commercial and community developments. This is particularly so with large scale developments or where there are potential safety issues.

The manual is intended as a resource guide to assist planners, developers, city managers and community groups in applying the principles of crime prevention through environmental design in the ACT. While the design strategies outlined in this manual are not intended to be rigid standards, the underpinning principles will be incorporated in the Territory Plan.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1	The Role of Urban Design in Crime Prevention	1
1.2	Overview of this Resource Manual	2
1.3	Status of this Manual	2
1.4	Objectives	3
1.5	The Approach Undertaken	3
1.6	The Stakeholders' Workshop	3
1.7	How to use this Manual	4
1.8	Using Care in Applying the Design Responses	4
1.9	A Question of Standards	4
1.10	General Considerations	5
1.11	Crime Prevention and Sustainability	5

CHAPTER 2

A RISK ASSESSMENT PROCESS: AN ESSENTIAL FIRST STEP

2.1	Overview	7
2.2	Key Design Elements Identified in the Risk Assessment	8

CHAPTER 3

GENERAL ISSUES

3.1	Introduction	11
3.2	Lighting	12
3.3	Natural Surveillance and Sightlines	14
3.4	Signage	16
3.5	Building Design	17
3.6	Land Use Mix	18
3.7	Landscaping	19
3.8	Spaces Safe from Entrapment	20
3.9	Management and Maintenance	22

CHAPTER 4

SAFETY IN SPECIFIC PLACES IN CANBERRA

4.1	Introduction	25
4.2	Civic and the Town Centres	26
4.3	Public Open Space and Parks	27
4.4	Community Facilities	29
4.5	Recreation Areas for Children and Young People	30
4.6	Car Parks	31
4.7	Relationship to Residential Areas	34
4.8	Bicycle Paths	35
4.9	Pedestrian Underpasses and Overpasses	36
4.10	Bus Stops and Taxi Ranks	37
4.11	Pedestrian Routes, Lanes and Alleys	39
4.12	Public Toilets	41
4.13	Shopping Centres	42

APPENDICES

	Appendix A: Recent Developments in Crime Prevention	45
	Appendix B: Design Issues for People With Disabilities	46
	Appendix C: Criteria for Signs for Older People and People with Disabilities	48
	Appendix D: Possible Conflicts between CPTED and ESD	49
	Appendix E: Lighting Levels Tables	50
	Appendix F: Safety Audits	52

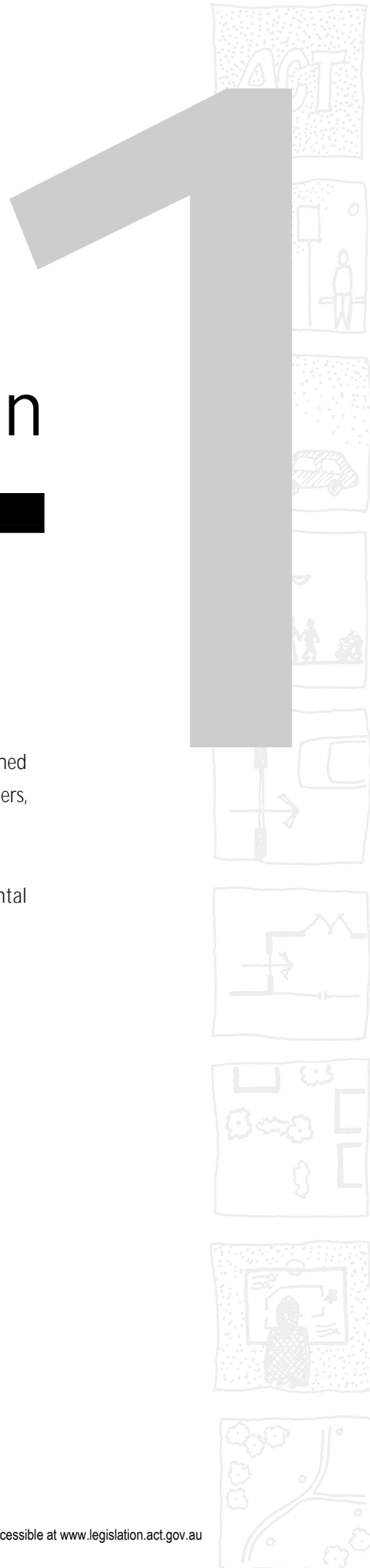
	REFERENCES	53
--	------------	----

Introduction

1.1

THE ROLE OF URBAN DESIGN IN CRIME PREVENTION

There has been increased awareness in Australia in recent years about the role of urban design and planning in addressing crime. This manual is designed to assist policymakers, developers, planners, designers, administrators, community groups and those evaluating proposals. It does so by outlining the principles of crime prevention through environmental design (CPTED) and some of the ways that these principles might be applied in an ACT context.



CPTED is based on a “situational approach” to crime prevention. It aims to reduce the opportunities for crime by increasing the effort and risks for offenders, as well as reducing the rewards. CPTED recognises that any design strategy needs to be part of a holistic approach to crime prevention, incorporating social, environment and community development strategies (see Appendix A).

Current research has already shown that CPTED is an effective tool in reducing opportunities for crime, fear of crime and nuisance problems. It does require crime prevention principles being incorporated into planning and development on a consistent basis and at all levels, not just as a checklist within building codes. It is also important to provide for a **risk assessment** process to systematically evaluate the strengths and weaknesses of each development.¹ Rather than a prescriptive approach, it is necessary to experiment and explore, embracing a range of approaches which lead to an understanding of how the built environment creates opportunities for crime and how criminal choices are made.

As crime and fear of crime are situational in nature, each approach has to be tailor-made at the local level to meet the needs and priorities of the community. This requires flexibility to meet these local needs. This is why involving the local community can be critical to ensuring

the success of proposed design strategies.

Successful community safety projects include participatory processes that bring together different users and which consider local needs, community development, the social environment and management issues, as well as design strategies.

1.2

OVERVIEW OF THIS RESOURCE MANUAL

This manual builds on research conducted in 1994-95 into the role of urban design in crime prevention and community safety. The outcome of the research was a report entitled, *The Role of Urban Design in Crime Prevention and Community Safety* (Bell, Woodroffe and Gaston, 1995), a joint initiative of the (then) ACT Planning Authority and the Attorney General's Department. The Department of Urban Services, the Australian Federal Police and the Australian Institute of Criminology also provided assistance. That report drew on international and Australian research documenting relationships between crime prevention and physical design, management and planning of facilities and urban areas. The report recommended that planning and development processes in the ACT needed to have a much stronger focus on safety and crime prevention.

1.3

STATUS OF THIS MANUAL

This manual is intended as a tool to assist practitioners in achieving the objectives for safety that are contained in the Territory Plan. It aims to be a comprehensive document that promotes an understanding of the principles of CPTED and outlines the types of *possible* design approaches.

As design and planning issues need to be considered along with social, regulatory and activity relationships, this manual is not intended to provide generic solutions to crime prevention. Rather, it should be used as part of a holistic approach to crime prevention. It aims to assist in ensuring that urban design, planning and development are consistent with community safety principles - one of the key priorities of the *ACT Community Safety Strategy*. It is intended to support broader crime prevention strategies in the ACT and the principles which underpin the *ACT Community Safety Strategy*.²

The research for this manual reinforced what is well known in CPTED research: a comprehensive CPTED strategy must be implemented on a case-by-case basis with attention to the unique, situational nature of crime. It must be emphasised that no one generic approach will work every time. A more site-specific approach is required.

¹ A risk assessment process is outlined in Chapter 2.

² ACT Crime Prevention Committee 1995, *ACT Community Safety Strategy*, Canberra, Australian Capital Territory.

1.4

OBJECTIVES

The objectives of this manual are to:

- ensure that issues of community safety are adequately addressed in decision making for land use and development activities in the ACT; and
- provide possible approaches to address community safety issues through planning and urban design.

It is designed to complement guidelines already provided for public spaces in the ACT, and existing policies for landscaping, lighting, signage and urban design. While the focus of this manual is on public places, CPTED principles also apply to residential development and have been incorporated into ACTCODE (ACT Code for Residential Design).

This manual is designed to complement:

- the Territory Plan;
- the National Capital Plan;
- the Urban Design Strategy for Civic;
- the ACT Landscaping Plan;
- the Civic Lighting and Pedestrian Signage Strategy Plan;
- Location Guidelines for Community and Recreation Facilities; and
- Canberra Landscape Guidelines.

1.5

THE APPROACH UNDERTAKEN

This manual was prepared by:

- reviewing the literature on crime prevention, CPTED and community safety;
- updating the relevant research and theoretical literature review, including searching catalogues and databases;
- consulting widely with ACT stakeholders through a stakeholder workshop, and the widespread dissemination of drafts to special interest groups, and through a final public consultation process in September/October 1999;
- accommodating the advice of stakeholders on both the format and content of the resource manual; and
- collaborating with specialists in Australia and North America to ensure that the document was based on current research and best practice for crime prevention through environmental design.

1.6

THE STAKEHOLDERS' WORKSHOP

A stakeholders' workshop in 1998 identified the key crime prevention concerns. The strongest message was that people want a diversity of uses and legitimate activities in any given public area. Further, that increased activity levels at all times would increase opportunities for natural surveillance (seen to be a very effective method of crime prevention).³ It was recognised that a

mixture of uses can sometimes cause conflict, but this sentiment seemed to be overridden by the call for diversity and tolerance. Relocation of activities seen as undesirable was not acceptable unless a suitable alternative space could be found. A key strategy of CPTED is to place "less safe" activities in safe areas. These should take precedence over "very safe" activities which may be relegated to slightly less safe areas.

Perception of crime was another area of great debate. Stakeholders' perceptions of the threat of crime were seen by some to be as important as actual crime statistics. It was recognised, however, that increased perception of safety could increase opportunities for people to put themselves at risk. In general, a greater use of public space is likely to result in higher levels of informal community surveillance.

Significant concern was expressed about access and transport. This focused on the safety of public transport and the need for safe movement corridors, especially at night.

Participants also expressed concern that no single set of guidelines could guide development because of the diversity of land use in any one area. People's perceptions of crime and levels of fear vary greatly within the community.

Maintenance also was seen as a key component of any successful strategy.

Finally, many participants noted that the issue of young people in public

³ Natural surveillance may not be a powerful crime deterrent in all circumstances. However, formal surveillance by employees has been found to be particularly effective in deterring potential offenders. Authorised by the ACT Parliamentary Counsel—also accessible at www.legislation.act.gov.au

places is important. It was noted that while groups of young people may appear threatening to other groups, statistics showed that young people were more likely to be victims of crime than perpetrators of crime. The stakeholder workshop recommended alleviating fear surrounding young people using urban space and providing appropriate, well-located spaces for youth activities.

1.7

HOW TO USE THIS MANUAL

The intention is that this manual be used to gain an understanding of the type of community safety issues and possible strategies for different sites. For example, for developing a new park, the site-specific chapter would be consulted—in this case Chapter 4.3 (*Public open space and parks*), as well as related chapters such as 4.5 (*Recreation areas for children and youth*), 4.8 (*Bicycle paths*), 4.11 (*Pedestrian routes, lanes and alleyways*). These site-specific guidelines provide an overview of the specific community safety issues related to that site type. *Chapter 3: General Issues* would then be referred to for advice on generic issues which can relate to any setting in an urban design context. In the case of a park, these could include *lighting, surveillance, signage, landscaping, spaces safe from entrapment and management and maintenance*.

This manual could be used for a number of other purposes. For example:

- as part of a functional brief or program for a new development or a redevelopment;
- to inform assessment criteria for a post-occupancy evaluation or to review work-in-progress;
- by community groups when assessing the appropriateness of a proposal or plan; and
- to highlight the role of community safety in urban design in staff development and professional education programs.

1.8

USING CARE IN APPLYING THE DESIGN RESPONSES

While much of the emphasis of CPTED is on situational crime prevention, that is, targeting strategies for particular local situations, increasingly a need emerges for more “generic” guidelines to aid practitioners and decision-makers. Research in Australia and overseas has shown that checklists ignore the unique “situational” nature of crime. No one generic approach will work every time as every location is different. For example, although lighting may be an effective deterrent to crime in commercial areas, it may lead people to use shortcuts through well lit (but isolated) walkways late at night and may place them at unnecessary risk.

It matters little that a walkway has lighting if it is isolated from view. Instead of the “checklist” approach, a CPTED perspective has been evolving towards a more holistic approach by concentrating on what is needed to apply these principles and identifying key design elements that can be assessed for specific sites.

1.9

A QUESTION OF STANDARDS

There has been a great deal of debate in recent years about the appropriateness of guidelines in planning and design. Some specialists argue that prescriptive guidelines will lead to minimalist approaches and/or over-dependence on prescriptive inflexible design solutions. Thus, this manual provides technical advice where it is available, bearing in mind that a site-specific, targeted situational crime prevention approach is the most appropriate way to implement crime prevention strategies for a particular area.

This manual concentrates on site planning, with minimal emphasis on building design and hardware. It also addresses some wider urban design issues, such as public transport and community facilities. It does not include design and construction except for selected references to Australian Standard 1428 (*Design for access and mobility*) Australian Standard 1158.1 (*Road lighting*) and Australian Standard 1680 (*Interior*

lighting). As much as possible, it avoids quantification in favour of thoughtful interpretation.

Minimum standards must always be treated with caution as standards applied without careful thought often provide for sub-optimal outcomes. For example, Chapter 4.8 (*Car parks*) specifies lighting above the minimum standard because lighting standards in existing Australian codes do not reflect the latest research in lighting and crime prevention.

1.10

GENERAL CONSIDERATIONS

Chapters 3 and 4 of this manual present “core principles” that address the issues most likely to cause safety problems, such as: poor lighting, inappropriate landscaping, lack of natural surveillance opportunities, access for pedestrians located in dangerous locations, and so forth. Although these principles will help in the design or evaluation of public spaces in the ACT, they may need to be modified to fit specific local conditions. It cannot be emphasised too often that, just as there is no single crime prevention policy, there can be no single set of guidelines for all situations. Rather, effective crime prevention activities must be tailored to a better understanding of the dynamics of criminal activity and the responses of people and communities to crime.

As this document provides general advice, it is important to note that the particular security needs of groups such as older people, women, children and people with disabilities may require additional information.

1.11

CRIME PREVENTION AND SUSTAINABILITY

Safety and perceptions of safety are important factors contributing to sustainability of our city. However, while safety is an important element of good urban design of public spaces, it is only one aspect. It is important that strategies for crime prevention contribute to the vitality, accessibility and diversity of uses of public places and take into account other factors, such as environmental and social issues. Where possible, this manual highlights other design aspects that need to be considered along with safety issues: for example, issues of accessible design are outlined in Appendix B.

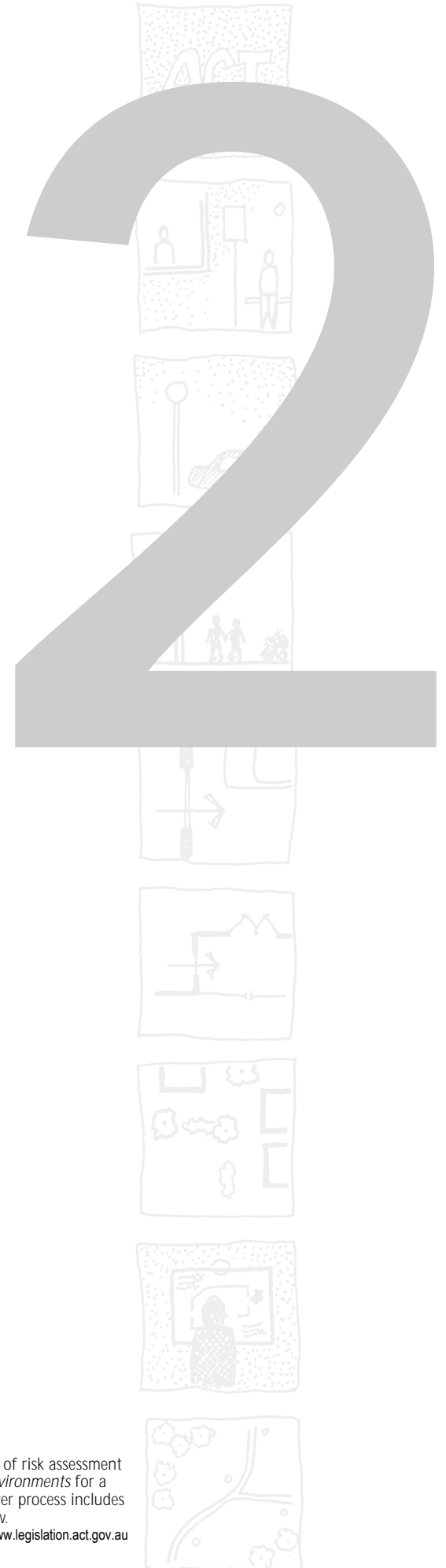
Possible conflicts between CPTED principles and ecological sustainable design or development (ESD) also need to be explored in implementing any CPTED strategy. Some possible conflicts in relation to lighting, landscaping, materials and maintenance are outlined in Appendix D.

A Risk Assessment Process: an Essential First Step

2.1

OVERVIEW

A risk assessment process is recommended prior to developing design strategies and using some of the possible responses suggested in this manual. It is the most systematic way to determine which design strategies apply, based on the context of each specific site.⁴ There are four elements to the risk assessment. The extent of this review process depends on the scale of the development. However, on medium and large projects, a risk assessment should include a four-stage process:



⁴ See Saville, Gregory 1995, "TCR: the Diagnosis Before the Prescription" for an explanation of risk assessment and City of Vancouver (nd), *Planning Information Bulletin # 4: Designing Safer Urban Environments* for a description of that city's comprehensive step-by-step CPTED Review process. The Vancouver process includes the following: site review, crime review, user review, use review and neighbourhood review.

1. **Site visit**, including interviews or surveys with local residents and other relevant persons. Graphic or photo surveys of the site and the surrounding area by day and night are sometimes conducted. Safety audits can also be used (see Appendix F).
2. **Preliminary review**, including meetings with police officers, residents, planners, shopkeepers etc. This process can take the form of planning meetings, focus groups or community meetings.
3. A **crime assessment**, including crime analysis of available statistics, local demographics, mobility patterns, and any available forecasts. On complicated or large projects, specialists use geographic information system simulations, "hotspot"⁵ analysis and other technical techniques, such as computerised forecasts.
4. **Design reviews** are conducted, including architectural design workshops and a review of existing plans using the CPTED principles. Detailed landscaping plans and photometric surveys can be used to examine sightlines, entrapment areas and natural surveillance locations.

How sophisticated the risk assessment is will depend on the project. The important issue, no matter how small the project, is to look at the local environment, preferably involving people who use it or will use it, and consider the particular activities,

crime patterns and safety issues for that location. The benefit of the risk assessment is that it allows the strategies to be responsive to the specific site and avoids costly measures which may not be effective.

2.2 KEY DESIGN ELEMENTS IDENTIFIED IN THE RISK ASSESSMENT

During this risk assessment, specific types of problems can be identified. Once identified, crime prevention through environmental design principles and supporting strategies can be applied to reduce the impact of these problems.

Types of issues that are considered in a risk assessment are:

1. Activity generators

Activity generators are features that tend to create local activity, such as playgrounds, benches, picnic areas and kiosks. Crime opportunities can be high in such areas if CPTED is not applied. In some circumstances, activity generators can be used to reduce opportunities for crime.

2. Edge effects

Edge effects are generated around the actual, or perceived, physical borders of different land uses, such as the edge of a park, the border of a commercial strip or around a shopping mall. Research

points to high crime rates in these types of areas. CPTED aims to identify, soften or eliminate as many of these effects as possible.

3. Movement predictors

Movement predictors are predictable or unchangeable routes or paths that offer few choices to pedestrians. Pedestrian bridges, enclosed pathways, and staircases are examples. Often alternate routes are unavailable to pedestrians and this becomes a problem, especially if the route contains entrapment areas or is not lit at night.

4. Conflicting user groups

Users of certain facilities or spaces, such as teens at an amusement arcade, may present a perceived concern for users of other nearby facilities, such as older people. While these conflicting uses do not necessarily generate crime, the perception of conflict or an unsafe environment can lead to some people not using spaces. This can reduce the effectiveness of crime prevention strategies, such as surveillance and community cooperation. Also different groups using spaces for different reasons can often cause conflicts, for instance when pathways are used both by cyclists and walkers. Attention must be given to the relationship between different uses, the likely users of an area or facility and how they access it, and the location of activities to avoid creating or

⁵ Hotspots are existing high-crime locations that can impact on a nearby development. Authorised by the ACT Parliamentary Counsel—also accessible at www.legislation.act.gov.au

exacerbating conflicts between user groups.

5. Hotspots

Hotspots are existing high-crime locations that can impact on a nearby development. These can include areas of high car theft such as certain underground parking lots; sites of pick-pocketing such as bus terminals; or specific pubs experiencing fights at closing time. Consideration must be given to the proximity of such locations and how to provide for public safety at the proposed development.

6. Displacement

The “displacement phenomenon” occurs when crime is moved away or drawn into new developments. Many aspects of a problem or crime can be displaced, including its place, the timing, the kind of offence, the target and the method. Research has shown that displacement is not always negative. It can be controlled, and even used positively, if proper CPTED planning principles are incorporated.

7. Building elements

The assessment also needs to consider whether building elements may contribute to safety problems. Potential problems include blank walls, service areas, alleyways, gaps or indentations in fences and walls, bushes, planter boxes, large signs (for example, pylon signs) and remotely located toilets.

General Issues

3.1

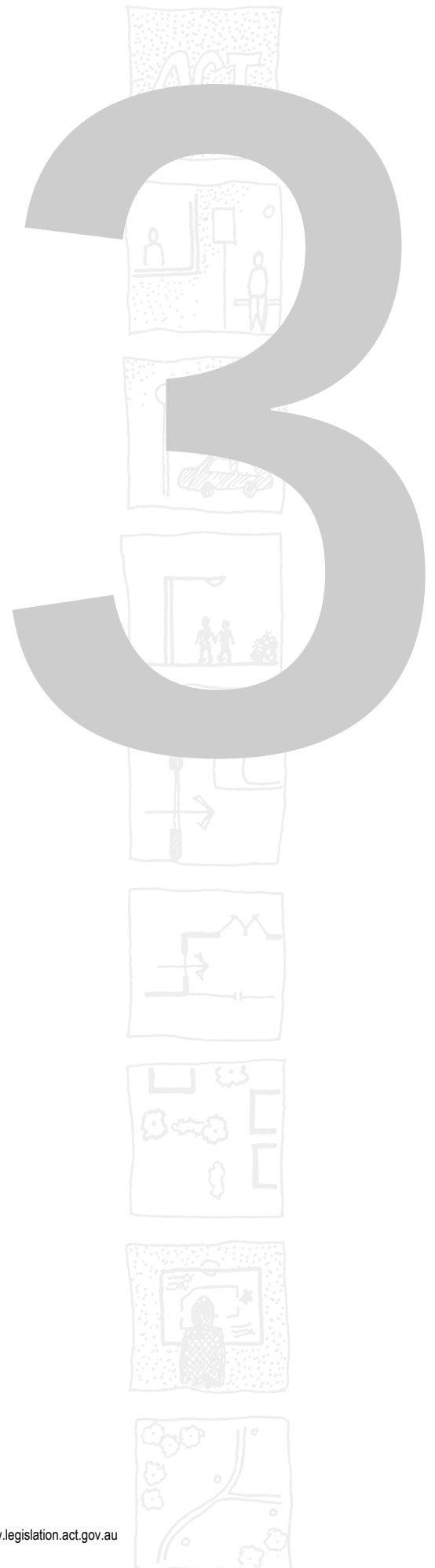
INTRODUCTION

Chapter 3 addresses generic issues which can relate to any setting in an urban design context:

- lighting;
- natural surveillance and sightlines;
- signage;
- building design;
- land use mix;
- landscaping;
- spaces safe from entrapment; and
- management and maintenance.

Employing these principles in the design or redesign of a public space can contribute to the safety of that space as part of a comprehensive crime prevention strategy. These principles also can be applied to multi-unit residential sites, retirement village complexes and clusters of independent living units.

No specific response can provide the full answer to a site-planning or design problem. This section should be read in conjunction with Chapter 4.



3.2

LIGHTING

OBJECTIVES

- To promote legitimate activity by users of public spaces after dark.
- To encourage the use of appropriate types of lighting fixtures.
- To ensure the appropriate placement of lighting to avoid shadows and glare which might put pedestrians at risk.

Lighting is an important aspect of community safety and crime prevention, impacting on both actual crime and fear of crime. While these are different issues, they are connected. A poorly lit street with a low level of illumination and low usage will appear to the user to have the potential to hide attackers, thus increasing fear of crime. Such a street also lowers the possibility of detection, recognition and apprehension for a person considering a criminal act, thus increasing the likelihood of actual crime.

The perceived and actual risks for people using public open space increase at night. Poorly designed and badly lit areas provide greater opportunities for crime and provide an unwelcoming environment for users of the space. Improved lighting encourages people to use spaces. This increases informal surveillance,

thereby contributing to actual and perceived levels of safety. Similarly, lights from buildings can reduce opportunities for crime. Lighting at an entrance removes the cover of darkness for intruders, although it is important that lighting should not affect the vision of observers. For example, in a public building, lights need to illuminate the building (that which you want to observe) but also should allow an observer **in** the building to see out—lights in this case should point away towards access routes or approaching people.

On average, 40 per cent of night-time street crime occurs when lighting levels are at five lux or below (a lux is a measure of lighting: a typical side street has a level of about two lux at night and about 18,000 lux on a bright day). Only three per cent of crime at night occurs when the lighting level is above 20 lux.⁶

Lighting levels

The level of lighting in public spaces must be adequate for a person to be able to have a good look at another person when he or she is still a reasonable distance away. If there are high levels of illumination in high risk areas, offenders are more likely to be seen and thus discouraged from antisocial activities. Where higher lighting levels are required, it is important not to create intense floodlighting, which may create an oppressive effect and deter pedestrians.

Lighting for older people needs to be designed with care. About twice as

much actual brightness is required to create the same degree of perceived brightness for a 60-year-old as for a 20-year-old, and the ratio increases even more for people in their seventies.

Lighting for car activity is different to that for pedestrians, hence the need for lighting on a pedestrian scale. Recognising this, Australian standards for road lighting have been revised to take into account pedestrian lighting and the effect on crime against the person. *Australian Standard 1158.1.3 Pedestrian Lighting* outlines minimum requirements for pedestrian lighting, considering factors such as level of activity and perceived safety (see Appendix E for an overview of lighting requirements in *AS1158.1.3 Pedestrian Lighting*). The British Standard for maintained lighting levels for public areas (*BS 5489 Code of Practice for Road Lighting, 1992*) specifies higher lighting levels than the Australian Standards in some areas and is included as an additional reference at Appendix E.

Location and consistency of lighting

As well as the level of lighting, the location and consistency of lighting is important. That is, lighting should be even or consistent, except when it is necessary to highlight a specific area or feature. The selection of lighting will depend on the assessment of risk in each location. For example, bright glaring light may have the effect of making it difficult to see an approaching person. Therefore, the

⁶ Stollard, Paul, ed, 1991, *Crime Prevention through Housing Design*, London, Chapman and Hall, p 49. Authorised by the ACT Parliamentary Counsel—also accessible at www.legislation.act.gov.au

location of the light and its relation to pathways will depend on each circumstance. The same problem may arise with people stepping in and out of shadows.

It should not be assumed that improved lighting alone will make an area safe. Therefore, care must be taken to ensure that improvements to lighting do not lead to a false sense of security and confidence about a location. Further, people may perceive an area where lighting has been improved as now being safe, when surrounding areas through which they must pass are still not safe. Overlighting and inappropriate use of lighting also can be a problem. It may create a false perception of safety or may create surrounding dark areas where a person could hide.

Types of lighting

Sodium lighting gives a softer but more penetrating light than halide light, it reduces shadowing and is energy-efficient. However, it has poor colour rendition and may hamper the ability to identify a person at a distance. By contrast, metal halide lamps provide good colour rendition. The best overall colour rendition is provided by deluxe cool white fluorescent lamps.

Current government policy is for white light (mercury vapour) in shopping areas and residential streets, and high pressure sodium in main roads.

Energy-efficient lighting

When specifying lighting it is important to consider both the life

and efficiency of lamp types. For example, metal halide lamps are highly efficient whereas incandescent lamps are the least efficient and have the lowest life. The relatively long life of white mercury lamps is offset by their lower efficiency rating. Incandescent can be expensive compared to high-pressure sodium lighting.

ISSUES TO CONSIDER

Situational factors

- Treat lighting in a comprehensive manner. This requires selecting an approach that is appropriate for local conditions and crime problems. The useful ground coverage of an elevated light fixture is roughly twice its height.
- For areas intended to be used at night, ensure that lighting supports visibility. Where lighting is at a lower height to support visibility for pedestrians, ensure it is vandal-resistant.
- Light heavily used spaces such as car parks, major pedestrian routes, entries to buildings and entries to public toilets with the power of 50 to 100 lux (Lumens). This is a higher level of lighting that may be needed where potential safety risks are identified.
- Ensure inset spaces, access/egress routes and signage are well lit.
- Ensure security lighting is consistent with *AS4282 (1997) The Control of the Obtrusive Effects of Outdoor Lighting*.

- Consider the light pollution effects and energy use of any lighting strategy.

Consistency of lighting

- Ensure that lighting is consistent to reduce the contrast between shadows and illuminated areas.
- Use multiple lights rather than single fittings to provide a consistent level of illumination.

Placement of lighting

- In areas used by pedestrians, ensure that lighting shines on pedestrian pathways and possible entrapment spaces.
- Place lighting to take into account vegetation, in both its current and mature form, as well as any other element which may have the potential for blocking light.
- Where possible, avoid lighting of areas not intended for night-time use—this avoids giving a false impression of use or safety. If danger spots are usually vacant at night, it may be better to avoid lighting them and close them off to pedestrians.
- Locate bright lights in heavily used spaces but ensure that they do not create a “wall of darkness” beyond them or create discomfort for pedestrians or drivers.
- Select and light “safe routes” so that these become the focus of legitimate pedestrian activity after dark.
- Provide adequate illumination for directional signage and maps in locations used at night.

- Avoid glare by not placing unshielded lighting at eye level (that is, 1.5 m to 3 m above ground level).
- Ensure that awning lighting, especially spotlights fixed to awnings, does not cast shadows which could hide intruders.
- Avoid locating lighting columns and electrical equipment alongside walls or low buildings, as they can provide climbing opportunities and other equipment may be reached for further vandalism or criminal acts. High, out-of-reach lighting can reduce the number of targets for attack and improve the level of general lighting.

Types of lighting

- Select vandal-resistant, high mounted light fixtures which are less susceptible to damage.
- Protect light fixtures from casual vandalism by using wired glass or a lantern style holder.
- Where period or traditional lighting is used, it may be necessary to increase the number of lights used to ensure adequate levels of light.
- Provide fixtures which deflect light downwards.
- Use photoelectric cells which are cheaper and easier to maintain and more reliable than time switches and when they fail they tend to fail in an "on" position.
- Avoid time-switched lamps as they can be inoperative for days if there is not frequent maintenance.
- Do not depend on bollards as the only light source. While they are

visually attractive, they do not illuminate to a sufficient height for an oncoming person to be fully seen.

- Wherever possible, combine lighting along footpaths with fittings associated with entrances.

Maintenance

- Ensure that light fixtures are maintained in a clean condition and promptly replaced if burnt out or broken.
- Consider providing public notices which state who to contact to report burnt-out or damaged lighting.
- Ensure that lease arrangements state who is responsible for lighting.
- Select and locate fittings for ease of bulb replacement.

Site planning and design

- Ensure that plans for new or redeveloped public space consider spaces likely to be used at night and provide information on the position, quantity and type of lighting. This information can be in the form of photometric maps of the proposed site.
- In areas to be used by older people, design lighting with particular care, as higher levels of brightness will be necessary.

RELATED TOPICS

- Management and maintenance Chapter 3.9
- Public open space and parks Chapter 4.3
- Car parks Chapter 4.6

- Bicycle paths Chapter 4.8
- Bus stops and taxi ranks Chapter 4.10
- Pedestrian routes, lanes and alleys Chapter 4.11

3.3

NATURAL SURVEILLANCE AND SIGHTLINES

OBJECTIVES

- To provide unimpeded sightlines, particularly along pedestrian pathways.
- To encourage natural surveillance from surrounding buildings and land uses.
- To improve natural surveillance through increased legitimate use of spaces.

While formal surveillance is undertaken by police, caretakers and security guards, natural surveillance involves the casual observation of people and public spaces as people go about their daily lives. It can be facilitated by windows overlooking public spaces and gardens, the location and design of pathways, the quality of lighting and landscaping, and the encouragement of legitimate activity in an area.

Natural surveillance is thought to be an ideal form for crime deterrence, not only because residents may see an

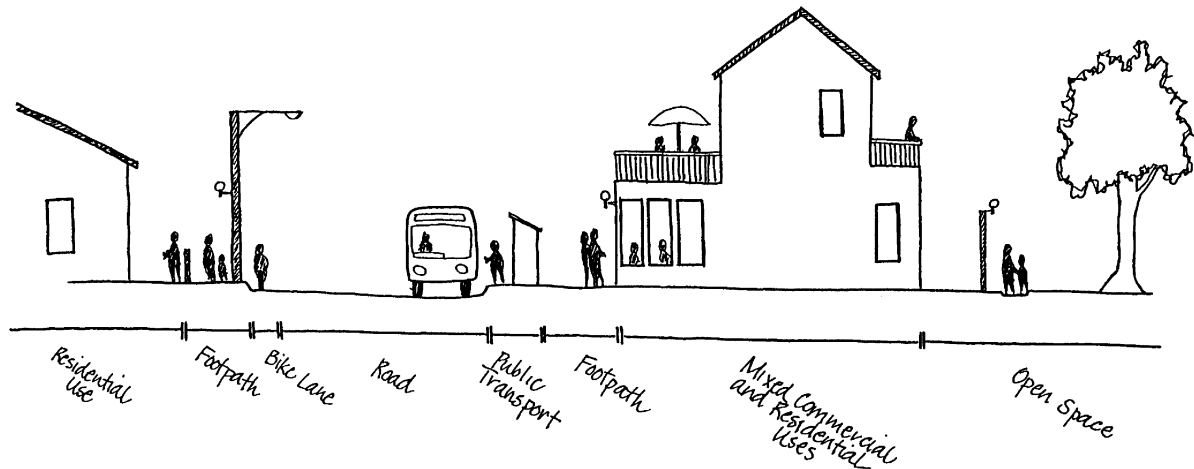


FIGURE 1: LAND USE MIX: FACILITATING CASUAL SURVEILLANCE

offender, but more importantly because offenders think they will be seen.

Natural surveillance can be achieved by designing landscapes to allow unobstructed views into parking areas, windows and doorways. Lighting, transparent building materials and reflective ground cover also can improve visibility.

It is also important that planning and design enable police to readily observe premises, especially from a police vehicle. Police need to have surveillance of rooflines and areas of potential crime (near doors and alleyways).

Care must be taken that in providing for natural surveillance privacy is not violated.

ISSUES TO CONSIDER

Problem areas

- Avoid sharp “blind” corners, especially on pathways, stairs or corridors.
- Avoid or ameliorate sudden changes of grade on pathways which may reduce sightlines.

- Take particular care for visibility in areas where risk to personal safety is perceived to be high or where crime reports indicate there are problems, such as stairwells, entrances, corridors, toilets etc.
- Ensure that pedestrians can see what is in and at the end of tunnels and underpasses.

Improving sightlines

- Where sightlines are impeded, determine whether they could be improved through the use of hardware such as flat vandal-resistant security mirrors. A safety mirror with a larger radius may be required. Avoid convex mirrors as they distort the image.
- Ensure that you can see through barriers along paths, where possible.

Future sightline impediments

- Avoid use of landscaping materials which could, when mature, serve as screens or barriers to unimpeded views of pathways.

Informal surveillance

- Ensure that windows of activity rooms (for example, kitchen windows not bathroom windows)

rather than blank facades overlook pedestrian areas.

- Ensure that, where possible, windows of surrounding buildings overlook routes to and from problem areas such as car parks.
- Establish community focal points (for example, common mail pick-up locations within town house complexes) where they facilitate social interaction and therefore enhance informal surveillance.
- Collocate pedestrian, cycle and vehicular movements systems to encourage maximum surveillance of public areas.
- Ensure that bus shelters do not impede natural surveillance from windows of adjoining buildings.

Land uses

- Encourage mixed use developments to facilitate day and night use of public spaces, taking into account compatible uses and avoiding potentially conflicting uses.

RELATED TOPICS

- Lighting Chapter 3.2
- Land use mix Chapter 3.6

- Landscaping
Chapter 3.7
- Car parks
Chapter 4.6
- Bicycle paths
Chapter 4.8
- Pedestrian underpasses and overpasses
Chapter 4.9
- Bus stops and taxi ranks
Chapter 4.10
- Pedestrian routes, lanes and alleys
Chapter 4.11

3.4

SIGNAGE

OBJECTIVES

- To provide adequate, easily legible signage to assist pedestrians, particularly older people and people with disabilities, to find their way safely.
- To provide signage which indicates safe places and routes.

A signs system should:

- identify a place and indicate whether or not it is accessible to everyone;
- indicate warnings where necessary; and
- give routing information.

Signs should be developed as a system with a consistent pattern, based on a hierarchy of most important to least important messages and be accessible to people with visual impairments (see Appendix C for further information

on the design and location of signs for older people and people with disabilities). This makes it easier to identify signs and reduces clutter.

All signage should be consistent with the requirements of *AS1742.10 (1991) Manual of Uniform Traffic Control Devices—Pedestrian Control and Protection* and *AS1428.1 (1998) Design for Access and Mobility—General requirements for access*.

A signage strategy also contributes to legibility—the ability of the environment to communicate a sense of place—and reinforces messages of orientation and direction. As well as signs and graphics, legible environments can be created through building and site layouts, colour and texture coding, and maps.

ISSUES TO CONSIDER

Design and provision of signage

- Prepare a signage plan focussing on the “safe routes” and indicating destinations, facilities and amenities en route.
- Ensure that signage is easily legible. Use strong colours, clear contrasts, standard symbols and simple graphics on signage so that they can be easily understood by all (*AS1428.1 (1998) Design for Access and Mobility* applies). Ideally, specify signs of high contrast, with light lettering on dark backgrounds with non-reflective surfaces.
- Locate signs strategically at entrances and near activity nodes.

- Provide signage which indicates where to go for assistance, the location of telephones, taxis, bus stops and the nearest “safe” place.
- Provide clear and regular signposting to main pedestrian routes.
- Locate signs at every crossroad or junction in the city.
- Clearly indicate closing hours at entrances to public areas which are closed off at night.
- Provide clear signage at bus stops, taxi ranks and public facilities.
- Clearly name streets, courtyards and other identifiable common areas and encourage labelling of street numbers and names for businesses.
- Illuminate signs which are essential for night use.
- Inlay street and place names into pavement at corners through the city centre area.
- Incorporate Braille street names and numbering as an important aspect of the signage strategy.
- Locate signs so that they are not likely to be obscured by growing vegetation.

Entrapment and hiding spaces

- Ensure that the size and/or location of signs do not create entrapment spaces or hiding places (for example, signs outside buildings and pylon signs).

Maintenance

- Consider including how to report maintenance or vandalism on signs.

Location maps

- Provide maps in large public open spaces, such as parks, and ensure that information is in plain words in the languages of various user groups. Orientate maps to be consistent with the viewer's direction.

RELATED TOPICS

- Spaces safe from entrapment Chapter 3.8
- Public open space and parks Chapter 4.3
- Bicycle paths Chapter 4.8
- Pedestrian routes, lanes and alleys Chapter 4.11
- Public toilets Chapter 4.12

3.5

BUILDING DESIGN

OBJECTIVES

- To integrate public buildings into the wider public realm.
- To use buildings to support natural surveillance of adjacent open space.
- To construct sturdy, attractive buildings to reduce temptations to vandalism and graffiti.
- To reduce the risk of public buildings contributing to crime or safety problems.

The design of buildings can contribute to community safety by reducing

opportunities for entrapment and fostering natural surveillance. Providing an opportunity for users of buildings to see inside the building before they enter and to survey the surrounding open space before they exit a building, especially at night or after hours, increases their safety and sense of safety.

It is recommended that the lowest risk activities are placed in the highest risk areas. For example, after hours or weekend activities could be strategically positioned to provide employee supervision near entries, overlooking pathways or adjacent to loading docks. It may be possible to lease ground-floor building space to businesses that can provide around-the-clock activity (for example, a taxi control centre⁷). Locating activities such as late hour operating retail outlets or cafes, and providing windows which overlook public areas are other ways to facilitate surveillance and promote safety.

Where public buildings have perimeter fencing, it should be visually permeable. Light colours reflect light toward the observer and provide good privacy, but dark colours facilitate better surveillance from the street.

Buildings can create problems if they are not properly designed and maintained. Poor sightlines from the building and inadequate lighting at entries are some examples of potential problems. It is especially important that care be taken in the design of public buildings in locations where a mix of uses cannot be

encouraged and where spaces are likely to be "dead" (without significant pedestrian traffic) at night and on weekends.

Hidden areas and blind corners provide excellent hiding places for potential criminals. Where these cannot be removed, provide mirrors, windows and improved lighting (preferably vandal-resistant).

Encouraging a clear hierarchy of space from the public street to the semi-private areas of buildings can increase the territoriality of the building and make it uncomfortable for offenders to loiter in entrances.

ISSUES TO CONSIDER

Building entrances

- Ensure that entrances to buildings are clearly defined, secure, well lit and face the street.
- Design the front entries of public buildings so that they do not create entrapment spots or places where intruders may loiter.
- Design lobbies to be visible from the exterior.
- Avoid locating ramped and elevator entrances in isolated areas.
- Secure non-pedestrian entrances against illicit entry.
- Locate lifts within secure entrances, and incorporate graffiti and vandal-resistant measures. For example, in parking lots, provide window glazing on doors of lifts or, where possible, create a fully glazed and enclosed vestibule area for passengers when they exit the lift.

⁷ See Crowe, Timothy 1991, *Crime Prevention through Environmental Design: Applications of architectural design and space management concepts*, Boston, Butterworths/Heinean.
Authorised by the ACT Parliamentary Counsel—also accessible at www.legislation.act.gov.au

The vestibule should allow passengers to look out into the surrounding area from a space where they feel safe.

- If staff entrances must be separated from the main entrance, ensure that they are well lit and maximise opportunities for natural surveillance and for sightlines.

Building design

- Consider crime reduction measures in the early design stages of public buildings and ensure that measures are compatible with other design criteria. For example, provide windows overlooking public areas, avoid locating toilets, service areas and ramps in isolated areas and avoid designing features that create entrapment spaces.

Materials and fixtures

- Avoid use of materials and fixtures on the exterior of buildings which might encourage crime, such as poor strength cladding or protruding pipes.
- Use transparent, unbreakable materials in parts of doors and walls at major entry points.

Storage areas

- Locate delivery hatches and bins so that they do not assist an intruder to gain access to windows and doors.
- Ensure that loading and storage areas are either well lit or can be locked after hours.⁸

Retail/commercial frontages

- Consider providing retail and other after hours uses in public buildings

fronting onto public spaces where there is otherwise unlikely to be much pedestrian activity outside standard office hours and on weekends.

Sightlines

- Provide clear sightlines from the building foyer so that occupants can see outside before leaving the building.

Lighting

- Illuminate entries so that occupants can see out some distance from the entry before leaving the building. Ensure that lighting at entries does not create a blinding effect through glare and/or shadows, thus making it difficult for eyes to adjust to different light levels. Exterior lighting needs to be very effective to facilitate good interior-to-exterior surveillance through windows.

Employee car parking

- Reserve some parking spaces near the building entry for employees working after hours.
- Ensure that enclosed or underground car parks can only be accessed from inside the building, not by outside pedestrians.
- Place building windows to overlook car parks and reduce theft from street-level car parks.

Landscaping

- Select only low groundcover or high-canopied trees, clear-trunked to a height of 2 metres.

- Avoid large planter boxes or planting that may create hiding places.

Building security

- Secure all windows, particularly those at street level, but ensure that security devices do not create a “fortress-like” appearance (avoid solid roller shutters).

RELATED TOPICS

- Lighting
Chapter 3.2
- Management and maintenance
Chapter 3.9
- See also: Location Guidelines for Community and Recreation Facilities

3.6

LAND USE MIX

OBJECTIVES

- To promote natural surveillance, a wide range of legitimate activities, community ownership and increased use of public spaces.
- To create a mix of uses (such as restaurants, businesses and shops which open at night and after hours) which promote round-the-clock surveillance and are compatible with neighbouring uses such as residential areas.

As one of the primary means of creating a safe public realm is

⁸ Lights work only as a deterrent when there is a strong chance that someone will see any illicit activity. If this is not likely, lighting can actually make crime easier to commit.

legitimate activity, it is important to vary land uses so that a range of activities is supported. This may help overcome one of the major criticisms of public areas in cities, which is that they are “dead” in the evenings, at night and on weekends.

A public space has little vitality when all surrounding uses are office buildings which are closed at night and on weekends. It is essential that the mix of uses is capable of providing safe havens, as well as legitimate activity—especially pedestrian activity. One way to encourage greater use and “ownership” of public spaces is to encourage land use mixes which enhance opportunities for cultural or recreational activities.

One facility which is often open at night is the licensed club/premise. It is sometimes considered that pubs can be sources of natural surveillance, however, research shows that pubs are generally crime generators. While they do promote pedestrian activity, it is often not of the type which could offer support to a potential crime victim. Thus, they cannot always be relied upon to provide the benefits of natural surveillance. A risk assessment process would be necessary to determine whether a specific licensed premise in a specific location would be a source of natural surveillance and therefore a contributor to safety, rather than a contributor to crime in an area.

Generally, while there are merits in promoting a range of uses in an area,

it is preferable to use a risk analysis to determine whether a mix of land uses is compatible or whether there may be potential conflicts.

ISSUES TO CONSIDER

Compatible and complementary uses

- Encourage land use mixes that promote activity, informal surveillance and contact between people during the day and at night.
- Avoid strict separation of land uses which may result in some facilities being isolated.
- Encourage land use mixes which are compatible in scale and consistent with neighbouring uses, especially in isolated areas.
- Balance activities which may be crime generators, such as pubs, with other night-time uses, such as restaurants and entertainment.
- Avoid placing too many pubs and liquor serving establishments close to each other. It is possible to establish distance requirements between pubs, and restrictions on the size of pubs in order to achieve this. Generally one small-sized pub (less than 100 seats) for two city blocks is desirable.

RELATED TOPICS

- Community facilities
Chapter 4.4
- Relationship to residential areas
Chapter 4.7

3.7

LANDSCAPING

OBJECTIVES

- To create a friendly and pleasant environment, at the same time as protecting users.
- To support ease of maintenance by not creating fragile landscaped areas.
- To support and reinforce security principles such as natural surveillance and sightlines, by the selection and placement of appropriate landscaping.

Landscaping plays an essential part in making an area environment friendly and pleasant. It can provide an appropriate balance between aesthetics and safety—an attractive area is more likely to be used. In general, studies have found that the landscaping design and maintenance of a whole site correlates with user satisfaction and safety. However, where planted areas are poorly maintained and vandalised, this may increase the risk of crime.

In terms of crime prevention through environmental design, landscaping can contribute to the safety of the area by promoting opportunities for natural surveillance; by allowing good sightlines through an area; by not creating potential entrapment spots; and by providing for easy maintenance.

Landscaping should not detract from pedestrians' visibility nor should it create secluded areas. Care should be taken in the selection of all plants, bearing in mind their shape and size as they mature. Planting programs that involve the local community in species selection and planting programs can assist in promoting ownership of an area and in ensuring the plants' survival.

Landscaping can also be used to direct pedestrian movement. This can be done in many ways, especially by means of densely planted landscaping features. It is important to balance the advantages of thorny shrubs as access deterrents against the disadvantages of litter trapped in shrubbery. Railings set into low walls can reduce the chance of litter getting trapped in vegetation. It also is important that walls and fencing used to deter movement enhance the landscape and are not obtrusive. It may be worthwhile to delay the installation of some landscape features until regular movement lines across a new site have been confirmed.

ISSUES TO CONSIDER

Footpath planting

- Ensure that shrubbery and low-level planting associated with footpaths does not exceed 1 m in height where abutting pavements.

Wall planting

- Grade planting, with taller plants next to walls.

Planting at entrances

- Avoid placing taller growing plants and trees in areas that screen doorways, entrances and windows.

Non-concealing trees

- Select trees for critical locations which do not have branches below 1.5 m (for the trees' protection, it is better if they do not have branches below 2.4 m).

Graffiti reduction

- Carefully locate climbing plants to prevent graffiti.

Sturdy plants

- Specify high-quality plants to increase their chance of survival.
- In high-crime areas, rather than planting saplings, consider planting heavy standard (120-140 mm girth), extra heavy standard (140-160 mm girth) or semi-mature trees (200-720 mm) to make it more difficult to snap main growing stems.

"Keep-off" planting

- Carefully specify location of planting. For example, use shrubs such as prickly thorns (grevillea and juniper) to prevent shortcuts across beds. It is essential that thorny plants are not noxious weeds (see *ACT Weeds Strategy*) or located where they can be dangerous to children or cyclists.

Protection of delicate foliage

- Use plantings of sharp-edged foliage to protect plantings with more delicate foliage.

Hard landscaping

- Use hard landscaping details such as low fencing and walls to deter pedestrian or vehicle movement.

Path construction

- If deterrent surfaces are constructed using cobbles or large pebbles, make sure that they are embedded for two-thirds of their

own depth. Avoid using gravel paths and borders as these provide loose material which can be used as missiles and may cause difficulties for people with mobility problems. Be especially careful about loose stone for groundcover near buildings with windows.

RELATED TOPICS

- Lighting Chapter 3.2
- Natural surveillance and sightlines Chapter 3.3
- Spaces safe from entrapment Chapter 3.8
- Management and maintenance Chapter 3.9
- Pedestrian routes, lanes and alley Chapter 4.11

See also: *Canberra Landscape Guidelines*

3.8

SPACES SAFE FROM ENTRAPMENT

OBJECTIVES

- To reduce the risk of attack by hidden persons.
- To eliminate possible entrapment spaces and reduce the danger of people being attacked where they have no direct means of escape.
- To ensure that the location and design of facilities such as automatic teller machines do not create entrapment spaces.

Entrapment spots are small, confined areas that are adjacent to or near a well-travelled route and are shielded on three sides by some barrier.

Barriers may include lifts; storerooms; fire stairs; dark, recessed entrances that may be locked at night; gaps in tall shrubbery; curved or grade-separated driveways; or loading docks off a pedestrian route.

Other entrapment spots can include car parks, fencing along irregular shaped pathways, petrol stations and car yards, especially if they are adjacent to pedestrian routes. Hidden areas adjacent to school buildings or isolated school grounds may also be entrapment spots, especially at night. Below-grade and above-grade walkways may create places that are isolated or invisible from the street.

It is important to eliminate potential hiding places. The design of public spaces should ensure that users, particularly women, older people and people with disabilities, can see a safe route and not be liable to attack in unsurveyed spaces. Not only will unsurveyed spaces become unsafe (and perhaps develop a reputation for danger), but they are also unlikely to be used. This will limit the amount of legitimate activity in the space and a further cycle of danger and non-use can occur.

ISSUES TO CONSIDER

Entrapment spots adjacent to pedestrian routes

- Avoid creating entrapment spots adjacent to a main pedestrian

route, a predictable/unchangeable path or a private dead-end alleyway (for example, a storage area or a hidden area below or above grade).

- Consider adding activities, such as food kiosks or vendors, to make the space safer.
- Provide deadlocks for storage areas off pedestrian routes.
- Avoid creating entrapment spaces through indentation in fencing.

Limiting access

- Specify appropriate heavy-duty hardware, such as dead-bolt locks, for storage areas off pedestrian routes.
- Limit access to loading docks and other restricted areas by measures such as lockable doors or gates. Where possible, close or lock potential entrapment spots after hours.
- Avoid gaps in the street such as entrances to interior courtyards which may create an environment that is isolated after dark.

Lighting and sightlines

- Use full-length polished aluminium mirrors (not convex mirrors) and other aids to sightlines to provide views around corners.
- Keep trimmed any low-level vegetation in surrounding areas.
- Where possible, use and maintain high-branching vegetation.
- Where entrapment areas cannot be removed (especially in highly used or problem areas), specify appropriate, high-intensity lighting and aids to visibility such as mirrors.

- Arrange for regular police and security patrols to pay particular attention to possible entrapment spots such as isolated stairwells and storage areas in problem locations.

Location, design and use of facilities

- Reduce entrapment risks at Automatic Teller Machines (ATMs) by providing card access only, clear sightlines and not locating them in out-of-the-way places or adjacent to licensed premises.
- Locate entrances to ATMs and other facilities, such as public telephones, within direct view of pedestrian paths so that they can be overlooked from vantage points. Ideally, enclose the ATM in a window-glazed vestibule with good sightlines, rather than place it outside on a public street. Though the vestibule is an enclosed area, it provides a safer area for users, as long as there are good sightlines and lighting.
- Locate car parking away from potential entrapment spaces to reduce opportunities for abduction.
- Ensure signs outside building entrances and near alcoves, rubbish hoppers and enclosures do not create entrapment spots.

RELATED TOPICS

- Lighting
Chapter 3.2
- Natural surveillance and sightlines
Chapter 3.3
- Signage
Chapter 3.4

- Landscaping
Chapter 3.7
- Civic and town centres
Chapter 4.2

3.9

MANAGEMENT AND MAINTENANCE

OBJECTIVES

- To ensure prompt maintenance and repairs.
- To facilitate prompt reporting of any damage or repair needs.
- To promote a perception that an area is well maintained and is well cared for by its local community.
- To discourage graffiti and vandalism.
- To install equipment and fixtures that are vandal-resistant and can be easily cleaned, repaired or replaced, without creating an “institutional” appearance.

Management and maintenance are important issues for crime prevention as a run-down or vandalised appearance can contribute to the perception that an area is unsafe. Whether deliberate or not, damage which is not repaired is a cue to further misuse of the environment—thus minor faults and repairs can develop and encourage wilful damage. Therefore, timely feedback on the

deterioration of equipment is essential.

A planned maintenance cycle involving full electrical, mechanical and structural inspection is needed to assess the extent of wilful and accidental damage and natural deterioration.

Other common approaches are to protect equipment by improved construction or the use of more vandal-resistant materials. A balance between vandal-proof materials and management responses can reduce the chances of places and equipment becoming targets for vandalism and graffiti.

It may also be worthwhile to coordinate security planning with neighbouring developments, government departments, local commercial enterprises and other relevant parties, including groups such as Neighbourhood Watch in residential areas.

Management and maintenance issues also apply to open space as run-down areas discourage use and increase risk of crime.

ISSUES TO CONSIDER

Maintenance

- Place signage indicating contact details for emergency maintenance in a prominent location.
- Promptly repair damage to public spaces to ensure safety for all users and to reduce the risk of crime. Use imaginative solutions to overcome vandalism problems, such as wall

murals painted by local street artists and formalising informal pathways subject to vandalism.

- In construction situations, delay installing equipment until the site is ready and require removal of rubbish, as it can provide ammunition.
- Develop a planned system of “preventative” maintenance.
- In designing a new building or facility, prepare a maintenance manual to facilitate speedy repairs.

Graffiti protection

- Use graffiti-resistant paints and finishes, where appropriate.
- Remove graffiti, especially offensive graffiti, promptly.
- Avoid long expanses of light coloured walls, except in areas where the intent is to increase the luminance of lighting, such as parking lots. Where this is the case, it may be advisable to encourage natural surveillance and a program of graffiti removal rather than reduce the lighting.

Robust materials

- Specify materials that can withstand normal hard use and can be easily replaced.
- Use standard-sized panels, panes and fittings to facilitate replacement.
- Avoid the use of highly vulnerable materials such as flimsy panelling, fragile light fittings and external fixtures which can be easily removed.

- Avoid extensive use of problem materials such as heavy-duty mesh, cyclone fencing and grilles, which may encourage wilful damage.

Protective coatings

- Employ protective coatings able to withstand normal wear and tear and graffiti, scratching and peeling.

Hardware

- Use sturdy, non-corrosive catches, bolts and locks.
- Use flush-mounted meter boxes or service points within a secure building/enclosure for protection.

Lighting

- Protect all light bulbs with a suitable lantern bowl.

Security education and coordination

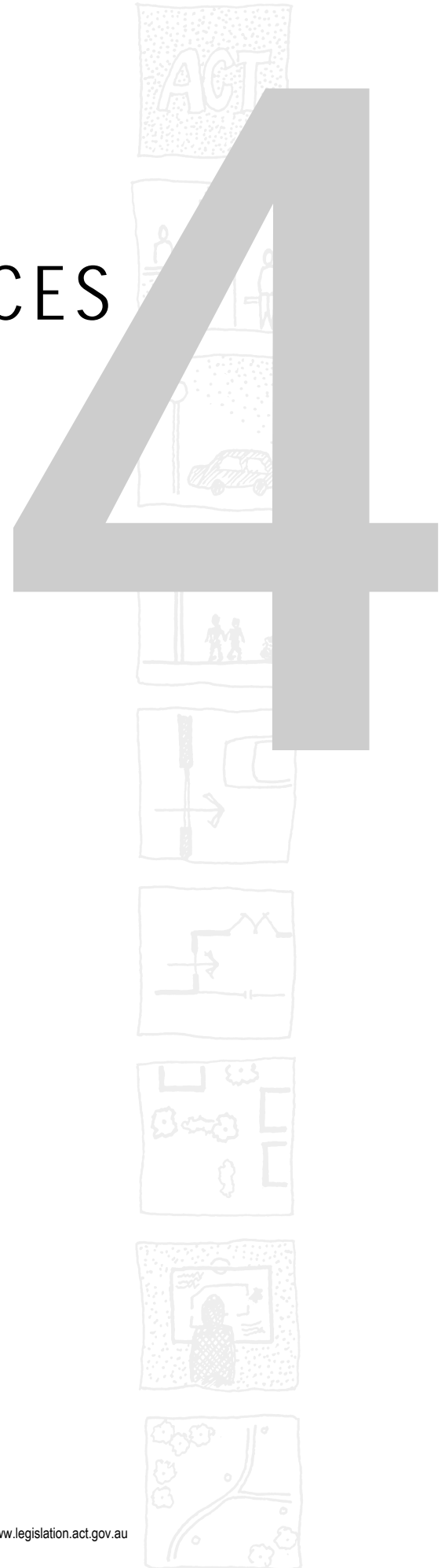
- Consider instituting security education programs in conjunction with local police.
- Coordinate all security efforts with tenants and management of surrounding buildings.
- Ask police and other security experts to inspect development plans and completed developments for possible security problems.
- Develop a comprehensive crime reporting system, encourage reporting of all crimes and keep accurate statistics.

SAFETY IN SPECIFIC PLACES IN THE ACT

4.1

INTRODUCTION

This chapter provides generic advice to address safety in specific places and spaces in the ACT, covering all parts of the urban realm where crime is likely to be a concern.



Building on the principles in Chapter 3, this chapter provides further information on specific settings. For example, the design of safe bicycle paths would examine issues about lighting, landscaping and natural surveillance, using the material in Chapter 3, as well as the site-specific issues identified in Chapter 4.8 Bicycle paths. The settings covered are:

- Civic and town centres;
- public open space and parks;
- community facilities;
- children's and youth recreation areas;
- car parks;
- relationship to residential areas;
- bicycle paths;
- pedestrian underpasses and overpasses;
- bus stops and taxi ranks;
- pedestrian routes, lanes and alleys;
- public toilets; and
- shopping centres.

4.2

CIVIC AND THE TOWN CENTRES

OBJECTIVES

- To ensure safe and easy movement between uses.
- To balance the mixing of land uses with selective concentration of night-time uses in safe, easily accessible locations.
- To encourage increased use of Civic and the town centres, particularly at night.

Civic and the town centres such as Woden, Tuggeranong and Belconnen can play an important role in bringing activity to an area. Because they contribute to vitality and legitimate activity, the design and mix of uses in these centres are very important contributors to community safety. When retail establishments are not open, safety is a particular issue for all users of these centres.

In the ACT, as in other places, commercial centres have “two lives”—a day life and a night life. After closing times, retail areas are frequently deserted. This can lead to feelings of fear and vulnerability for users after hours. However, initiatives which bring people into these areas in the evening and on weekends can increase the safety of the centres. Restaurants, window shopping and housing are some examples. Active frontages, such as cafes which face the street and are open after hours, can have a positive impact on safety. In promoting a range of activities, it is important to maintain safe access through areas for all users. For example, there needs to be adequate space between pedestrian areas and outdoor cafes.

Public safety in Civic has been a particular focus of attention with significant work already undertaken in City Walk and Garema Place to provide a safe and pleasant environment for all users.

The question of access routes between residential areas and Civic and the town centres raises some issues. For example, over half of alcohol-related

crimes occur in or within eyesight of licensed premises. As routes may already be established, it may be difficult to remove or redirect them. Thus, the design of pedestrian routes must be carefully considered at the planning stage.

A risk assessment may be necessary to determine whether it is better to group similar after hours' facilities together to reduce opportunities for crime (particularly in relation to parking and transport) or whether the CPTED strategy of mixing land uses is more effective for that area.

The design and location of automatic teller machines (ATMs) is a highly specialised field. While this manual highlights some of the issues (see *Chapter 3.8 Spaces safe from entrapment*), the technical nature of the design of ATMs requires specialist advice and a risk assessment to determine appropriate locations (often approaches will differ among financial institutions). For example, in some cases, wrap-around enclosures have been used to trap customers. While the problems with enclosures are so significant as to lead some specialists to recommend against them, well located and well lit ATMs with mirrored panels and adequate sightlines can reduce the risk of robbery. A risk assessment considers the context of each specific site. Suitable locations include ATMs with entrances directly on commercial streets or glazed vestibule-enclosures which can be card-locked and provide a measure of security.

ISSUES TO CONSIDER

Street-level activities

- Encourage commercial uses that are open late, such as restaurants, recreational activities and theatres, to open onto the street.
- Try to ensure that outdoor public areas and parks are at street level. Where this cannot be achieved, design buildings with balconies and alfresco dining areas to enable natural surveillance.

Entrapment spaces

- Ensure that alleys and loading docks are well lit, fenced and locked at night or when not in use.
- Where possible, ensure that buildings are built to a continuous setback line to eliminate dead spaces and entrapment spots adjacent to footpaths.

Balancing concentrated and mixed uses

- Ensure that pedestrian routes between areas of night-time activity are well lit and clearly identified.
- Encourage night-time use through a mix of commercial uses with different closing times.

Safe access routes

- Support night-time activity areas by designing safe access to public transport and car parking facilities.

Maintenance

- Ensure that streets, outdoor public areas and parks in the city centre are well maintained to demonstrate ownership, care and security.

Access to entertainment facilities

- Where possible, ensure that routes to and from clubs and entertainment facilities do not lead directly through housing areas, and use measures to reduce risk on any routes which are likely to be unsafe.

Well located facilities

- Locate public telephones, toilets and taxi ranks in obvious locations and ensure they are well signposted and/or located near or in restaurants or shops that have late opening hours.

Automatic Teller Machines

- Ensure that ATMs are visible from the street and are adequately lit.
- Avoid locating ATMs adjacent to bus stops (particularly in more isolated locations) to discourage loitering by potential offenders. ATMs in locations near busy bus stops and pedestrian routes may be less dangerous but require careful design.

Direct building access

- Where possible, provide direct pedestrian access from the street to the front of the building, rather than side or rear access or access via an indirect route.

Direct car park access

- Provide some close, directly accessible car parking from the main entrances of buildings.

RELATED TOPICS

- Signage
Chapter 3.4
- Land use mix
Chapter 3.6
- Spaces safe from entrapment
Chapter 3.8
- Bus stops and taxi ranks
Chapter 4.10
- Pedestrian routes, lanes and alleys
Chapter 4.11

4.3

PUBLIC OPEN SPACE AND PARKS

OBJECTIVES

- To encourage legitimate use of public open space by a wide range of users.
- To ensure that the design of public open space does not create unsafe environments such as “dead” areas or entrapment spaces.
- To ensure appropriate lighting and landscaping of public open spaces to reduce opportunities for crime.

The safety of public open space is directly related to the design of the spaces and its ability to provide natural surveillance, sightlines, legibility and protection from entrapment.

Potentially dangerous open spaces:

- provide places for intruders or assailants to conceal themselves;

- are difficult to see “at a glance”;
- have shrubbery, buildings or fences which block sightlines; and
- are surrounded by blank walls.

In designing new areas, it may be worthwhile to conduct a risk assessment process involving crime analysis, safety audit, site design review, interviews with nearby users and participatory design workshops. The lighting of public open space is an example where a risk assessment would help to determine whether there is likely to be people around who would see what is being lit. Lighting space at night invites use. In a high-risk area, the inviting of use should be avoided.

Where buildings can provide activity along the edge of a public space, this can create natural surveillance opportunities.

It also is important to design public open space to be interesting and inviting to attract legitimate users. Unused space often causes safety problems. Poorly maintained areas also lead to lack of use.

In Canberra, the lakeshore areas are important areas of open space for the community, as well as providing links between different parts of the town centres for pedestrians. The design of the lakeshore, and its relationship to surrounding areas, needs to consider safety issues for a range of users.

ISSUES TO CONSIDER

Design

- In considering the relationship between the public open space and surrounding public and private uses, conduct a proper risk assessment process as part of the design of new developments.
- Foster legibility in the design of public open space, so that people can easily identify entrances and exits, find their way around and find each other, and locate public amenities.
- Avoid creating unused or unusable “dead” spaces or isolated pockets.
- Design for easy maintenance of well used areas (see also Chapter 3.9 Management and Maintenance).
- Locate open space where it can be surrounded by a mix of land uses to generate activity throughout the day, as well as at night.
- Avoid open space which adjoins the rear of housing or use measures such as visibly permeable fencing so that the open space area can be observed from the dwellings.
- Locate children’s play areas so they are visible from adjoining properties. Use access-control measures, such as low, optically permeable fencing, to deter illegitimate users from children’s play areas.

Lighting

- Ensure that paths and areas intended for night use are lit to the same level as the street to indicate

that they are “safe routes” (see also Chapter 3.2 Lighting).

- Use lighting and landscaping to demarcate areas that are likely to be deserted at night and areas where legitimate activity is likely and should be encouraged. For example, it may be best not to light an isolated area at all.
- Select and maintain landscaping elements so that they do not block light onto pedestrian routes.
- Strategically locate trees and light standards so foliage does not block light.

Sightlines

- Design pathways with unimpeded sightlines, particularly if there are curves or changes in grade.
- Avoid below-grade pathways. From a crime prevention perspective, well planned street level crossings are safer than underpasses.
- Where possible, ensure that parks or play areas are visible from the street and that housing or commercial buildings with active frontages overlook parks or edges of larger parks.

Entrapment spots

- Ensure that any landscape border on a pathway is either low-lying or high branching vegetation. (Avoid trees or bushes which easily create entrapment spots and reduce sightlines.)
- Provide multiple entries/exits to all parks and playgrounds.

Signage

- Clearly indicate the location of telephones and toilets through the use of words, symbols and maps.
- Locate signage at entrances and intersection of major paths.
- Indicate on signage where to find help and where to report maintenance problems.

Location of activity generators

- Locate activity generators along the edge of parks or along pedestrian routes, for instance, coffee vendors, chess board tables, etc.

Maintenance

- Ensure that open space and associated amenities are well maintained, indicating that the area is well cared for by ground staff and local people—the greater the distance between park amenities and community control, the greater the risk of vandalism and graffiti.

Community involvement

- Promote community use and “ownership” of public open space through local events and activities, such as “adopt-a-park”, tree planting and bushland repair.

RELATED TOPICS

- Lighting Chapter 3.2
- Natural surveillance and sightlines Chapter 3.3
- Signage Chapter 3.4
- Landscaping Chapter 3.7
- Spaces safe from entrapment Chapter 3.8

4.4

COMMUNITY FACILITIES

OBJECTIVES

- To encourage use of community facilities during the day and at night.
- To support security measures by the use of planning and design principles.
- To create a pleasing milieu while ensuring the safety of staff and users of facilities.

A safe and pleasant environment within and around community facilities is very important to encourage the most effective use of these facilities, particularly at night. Increased use of facilities will improve both real and perceived safety.

For information on suitable collocation opportunities for community facilities, as well as access to public transport and pedestrian access, refer to Planning and Land Management’s *Location Guidelines for Community and Recreation Facilities*.

While it is often wise to collocate facilities, a full crime risk assessment must be undertaken to ensure that collocation or multiple uses does not result in real or perceived dangers for any user group.

It is important to note that movement sensors can be effective in community facilities only if nearby residents know they are there and are encouraged to

respond when activated. Without this cooperation, the lights are not likely to be effective. Lights can be wired to fail in an “on” position if tampered with.

ISSUES TO CONSIDER

Location

- Locate community facilities near other activities to increase the level of legitimate activities in the area (also consider access to public transport and pedestrian access).

Car parks

- Consider arrangements which allow appropriate community facilities to share car parking.

Fencing

- Provide secure fencing around play equipment and select fencing options which clearly delineate the territory of the community facility, but do not conceal intruders. If back fences over 1800 mm are used, they should have a see-through quality.

Lighting

- Provide movement-sensors for lighting at front and back entrances.

Community participation

- Involve the community in the design and construction of community facilities, including outdoor community spaces, fencing, landscaping and play equipment to increase opportunities for public ownership and care.

RELATED TOPICS

- Lighting
Chapter 3.2
- Recreation areas for children and young people
Chapter 4.5
- Car parks
Chapter 4.6
- See also: *Location Guidelines for Community and Recreation Facilities*

4.5

RECREATION AREAS FOR CHILDREN AND YOUNG PEOPLE

OBJECTIVES

- To provide safe, challenging and inviting play areas for young people and children of all ages so that no age group dominates an area.
- To provide comfortable seating for all users, particularly supervising adults.
- To maximise natural surveillance and sightlines from neighbouring dwellings, schools and other activity areas.

The key issue in designing recreation environments is to find a balance between safety and recreation needs.

Young people often use public places as places of recreation. It is important to provide opportunities for teenagers to “hang out” in places where their

activities do not cause difficulties for others using open space and to neighbouring residents, but where they are not in isolated locations, particularly at night. Activities for young people need to be located in places that provide safe access to public transport. They also need to be designed and developed in conjunction with young people.

A safety issue which is relevant for public places and recreation areas is to ensure that no group, while undertaking its daily business on a site, will have to “run the gauntlet” through an area dominated by others that may represent a real or perceived threat to them. This may require the relocation of pedestrian routes or, in the planning stages, careful consideration of the relationship between different activities and collocation issues such as the location of leisure facilities adjacent to facilities or housing for older people. This matter is highly site-specific and is preferably dealt with through a risk assessment.

ISSUES TO CONSIDER

Conflicting uses

- Do not place potentially conflicting activities next to each other.

Equal recreation opportunities

- Provide adequate and appropriate equipment for all ages and both sexes so that one group does not dominate or damage recreation equipment intended for others.

Supervising adults

- Provide shaded seating areas with good sightlines to children's play areas for adults supervising children's play.

Youth recreation

- Provide informal gathering spaces for young people, based on detailed situational planning, risk assessments, and input from young people likely to use the space.
- Design places where teenagers can “hang out”, call their own and socialise among their peers. By means of a risk assessment procedure, locate these spaces where they will be convenient and safe for young people and others using the space.
- Involve young people and children in the process of designing and constructing recreation areas for their use, to maximise ownership and care of facilities.

Children's preferences

- Select play equipment which meets the developmental needs of children as well as maintenance needs.

Maintenance of recreation equipment

- Inspect and repair recreation equipment regularly.
- In areas where teenagers may hang out, allow plenty of standing, sitting and sprawling spaces on horizontal surfaces and low walls around benches and rubbish bins.
- Regularly inspect areas for signs of substance abuse to uncover

problems, such as hypodermic syringes, early.

Sturdy materials

- Ensure that children’s play equipment is constructed from sturdy, durable, vandal-resistant materials which can be easily repaired if damaged.

RELATED TOPICS

- Lighting Chapter 3.2
- Natural surveillance and sightlines Chapter 3.3
- Landscaping Chapter 3.7
- Community facilities Chapter 4.4
- Bicycle paths Chapter 4.8
- Pedestrian routes, lanes and alleys Chapter 4.11
- See also: *Canberra Landscape Guidelines (Playgrounds)*

4.6

CAR PARKS

OBJECTIVES

- To increase safety by fostering visibility and clear sightlines.
- To encourage informal surveillance of car parks from surrounding land uses.
- To encourage car park design which assists users to easily locate their vehicles.
- To provide safe access to and from car parks.

The planning and design of new car parks should take into account principles of natural surveillance and sightlines, as well as lighting and direct access by pedestrian paths to destinations.

Car parks are often a problem from a community safety perspective. They are regularly used by drivers who travel alone at night, making them targets for attack. Existing car parks often require modification to improve safety, particularly lighting and landscaping improvements.

While exterior and interior car parks require different approaches, lighting is a key factor in determining how safe people will feel. This can be achieved by measures other than simply lighting fixtures. For example, lighter colours on ceilings can increase levels of illumination.

While different approaches are needed for buildings and open car parks, some of the general principles relating to sightlines, lighting and access control can improve safety.

A critical consideration is how the design of the car park is experienced from the pedestrian’s perspective. For example, it is important that lighting enables a person to clearly identify vehicles, objects and approaching people. Lighting on a pedestrian scale is therefore a key issue for outdoor car parks. Parking spaces for people with disabilities require higher levels of illumination, generally more than twice the minimum average illuminance.

A significant body of new research and standards has been developed for car park lighting. In particular *AS1680.2.1 (1993) Interior Lighting* addresses these issues. Most facilities fall well short of minimum lighting standards.

Because of the complex and highly specific requirements for lighting car parks within buildings, this chapter focuses primarily on exterior or outdoor car parks.

ISSUES TO CONSIDER

Lighting

- For exterior car parks with low night-time activity, provide a minimum average illuminance of 14 lux and a minimum illuminance of at least four lux. For more detailed information, see Table 2.4 in *AS1158.3.1—Part 3.1 – Road Lighting – Pedestrian Area Lighting*; and for requirements for indoor car parks, see *AS1680.2.1 Interior Lighting*.
- For exterior car parks with high night time activity, provide a minimum average illuminance of 20 lux and a minimum illuminance of 10 lux. This exceeds the Australian Standards but is recommended for improving safety in these areas. For underground and multi-storey car parks, lighting throughout the car parks should conform to *AS2890.1 (1993) Parking Facilities—Off-street car parking* and *AS1680.2.1 Interior Lighting* as a minimum standard.

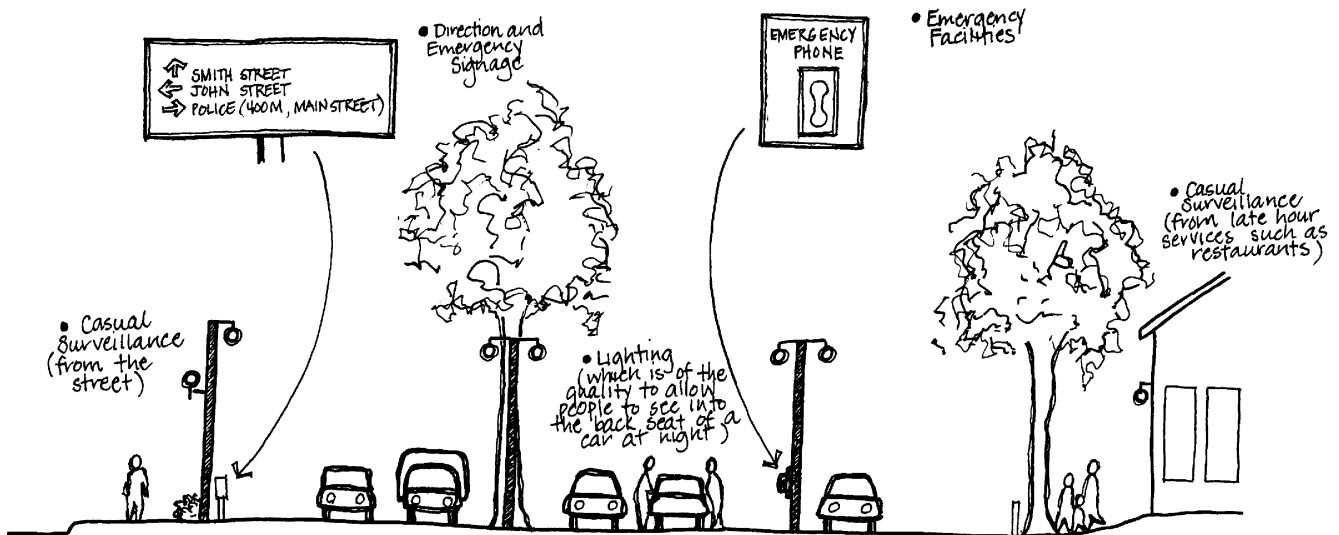


FIGURE 2: ASPECTS OF SAFE CAR PARK DESIGN

- Ensure that lighting is vandal-resistant and has a wide beam of illumination which reaches to the next light.
 - Provide minimum average illuminance of 50 lux for parking spaces in outdoor car parks for people with disabilities.
 - For car parks used at night, ensure that lighting is adequate so that a person can see the inside of a car's back seat before entering the car.
 - Provide consistent lighting which does not create shadows, and ensure that lighting levels are the same over parking bays as the rest of the car park.
 - Pay particular attention to lighting levels near exit points and pedestrian access points to reduce theft from vehicles (see *AS1680.2.1 Interior Lighting—Circulation Spaces*, pp. 11-17).
 - Ensure that entries and exits to the car park are well lit.
 - Provide lighting that illuminates both parking bays and circulation routes.
 - Use white paint or stain on vertical building surfaces as well as ceilings (over parking bays as well as lanes) to maximise light distribution.
 - Design lighting so that it can be on at all hours after dark while the car park is accessible or operated on a sensor system.
- Sightlines**
- Maximise sightlines within car parks through the removal of any dense bush or tree landscaping, solid fences, signage or unnecessary structures which block views.
 - In enclosed car parks, ensure that support pillars are as few and as slim as possible to minimise their use as hiding places. As a rule, rounded pillars are preferable to square ones. Also, if sheer walls are necessary, port-holed windows can be provided to allow sightlines through them.
 - Where possible, provide direct access at each level of the car park to the building it serves.
 - To maximise visibility, ensure that lift enclaves in enclosed car parks are not enclosed by concrete, but are surrounded by window glazing. Robax glass can be used in fire exit doors to facilitate supervision and natural surveillance.
 - Arrange parking spaces in straight rows to provide sightlines.
 - Design stairwells which are on the car park perimeter to be open or to be seen through to facilitate natural surveillance from external public areas. Use wire glass panels on stairwell doors.
 - Use convex security mirrors in stairwells, corners and corridors.
- Informal surveillance**
- Encourage informal surveillance of multi-storey or interior car parks through placement of windows of new buildings to overlook the car park and locate new car parks

where they can be overlooked by shops, offices or housing.

- Design exterior surface car parks to be overlooked from the street and occupied buildings.

Signage

- Provide signs in large car parks so people can easily locate their cars. Signage which outlines security measures in place will also act as a deterrent.
- Provide exit and direction signs which are clearly visible from within the car park.
- Provide signage to encourage people to lock their cars and conceal or remove any valuables.

Design

- Clearly identify pedestrian routes within car parks.
- Attempt to integrate as much complementary activity as possible near car parks. Where possible, integrate car parking with other site uses to prevent isolation.
- Where possible, avoid large expanses of car parking.
- Divide large car parks into sections or groups of cars, each visually distinguishable from the other (by different paving, landscaping, street furniture, etc) to help people locate their cars quickly. Where possible, these sections should be able to be opened and closed separately, thus enhancing supervision capacity and minimising opportunities for crime.

Car park size

- Car park design should be kept to as small a size as possible. More than

about 75 cars in one lot makes it difficult to see and travel safely to exits. If the lot design calls for larger lots, separate the lot into segments of about 75 cars or smaller, with separate entrances.

Landscaping

- Use landscaping of a type and size which provides the widest possible view from the street of pedestrian entry/exit areas.

Access

- Ensure that access to the liftwell, stairwell and directions to these points are clearly visible from every car parking space.
- Ensure that paths to and from car parks have appropriate landscaping, lighting, signage, sightlines, etc.
- Use vehicle-control measures, such as boom gates, to reduce opportunities for vehicle theft. These are much more effective if exits are supervised.
- Employ pedestrian-control measures, such as ensuring pedestrians pass through regulated entry and exit points. If these are supervised, they will reduce opportunities for theft from motor vehicles. Fire exits accessed from street level increase risk considerably. Limit the number of unauthorised entry/exit points into the car park.
- Locate entry and exit points at ground level to maximise opportunities for natural surveillance from active uses at ground level, such as shops or cafes, as well as from a car park operator.

- Where appropriate, encourage on-street public parking.

Safe pedestrian routes

- Consider marking "safe routes" for pedestrians as a walkway system throughout the facility. These can incorporate cues such as floor markings. Ceiling lights can similarly be used (by changing colour, appearance, spacing or lux levels) to create overhead route cues. Pedestrian controls such as bollards/chains, low planting, signage etc can be used to define the limits of the safe route. Safe routes help to make illegitimate users of space (car thieves, muggers etc) stand out.

Escort service

- Provide escort services for car parks at office buildings where staff regularly work late or where customers are likely to use them late at night.

Facilities

- Locate facilities such as telephones and bicycle storage in the most prominent and visible areas possible.
- If seating is installed, locate it where it reduces opportunities for loitering. Seating should not be located near toilets, but rather in highly visible locations near pedestrian entry and exit points.

Management

- Institute regular patrols by car park employees or security personnel.

Maintenance

- Replace inoperable lights on a regular basis.

RELATED TOPICS

- Lighting
Chapter 3.2
- Natural surveillance and sightlines
Chapter 3.3
- Signage
Chapter 3.4
- Landscaping
Chapter 3.7
- Spaces safe from entrapment
Chapter 3.8

4.7

RELATIONSHIP TO RESIDENTIAL AREAS

OBJECTIVES

- To link public open space with residential areas to encourage pedestrian movement.
- To reduce any conflict between uses in the public realm and residential areas.
- To provide opportunities for resident-generated activities in residential areas to confer safety benefits to public spaces and to encourage residents to move freely throughout the public realm.

It is generally unwise to close off a common landscaped area in a residential area entirely. However, subtle “filters” can be provided to

create entry points, such as gates, that are obvious to residents but less so to passers-by. When entering via a clear access point which differentiates a residential area from the wider public realm, outsiders are unlikely to mistake the interior space for a “neighbourhood park” or “public playground”.

The design of residential areas has implications for the safety of adjacent public open spaces. Equally, an unsafe public realm can cause safety problems for residents. For example, if gated or other residential developments turn their backs on the public realm or are enclosed by high fences, legitimate pedestrian activity is likely to be reduced because residents will access and move about the housing estate by car. Motorists alone cannot provide the level of safety which a lively pedestrian realm can confer on a public space.

Particularly in high-crime areas, paths through a residential development should be designed to allow pedestrians to scan the path before entering and should not include places for potential intruders to wait. At the same time, “visibility” does not necessarily mean an undifferentiated or uninteresting site.

Where public open space is adjacent to large-scale developments that may have reduced pedestrian activity, locate and design pedestrian routes with care. Pay particular attention to lighting and landscaping.

The concept of space hierarchy lies at the heart of the notion of territorial

reinforcement. The purpose is to clearly identify ownership and use of different spaces, which will buffer those spaces from each other so that intrusion into private or semi private spaces can not occur unintentionally.

It is important for designers to specify the designated purposes of any space. If the intended purpose of the space is not clear, then the risk of illegitimate use is likely to increase. Space with “confusing cues” legitimises loitering, facilitates anonymity and familiarity, and helps to rationalise illegitimate behaviour/s (and claims for the ownership of that space).

Specific guidelines are available on the planning and design of residential developments. For the ACT, these are outlined in the *ACT Code for Residential Development (ACTCODE)*.

ISSUES TO CONSIDER

Residential site-entry boundaries

- Avoid large “fortress” or gated residential developments where residents do not participate in the wider public realm.
- Employ real or symbolic barriers to help discourage intrusion by strangers into communal landscaped spaces intended for residents only.
- Treat the boundaries of residential developments with care to allow permeability without having outsiders intruding into private or semi-private residential areas.

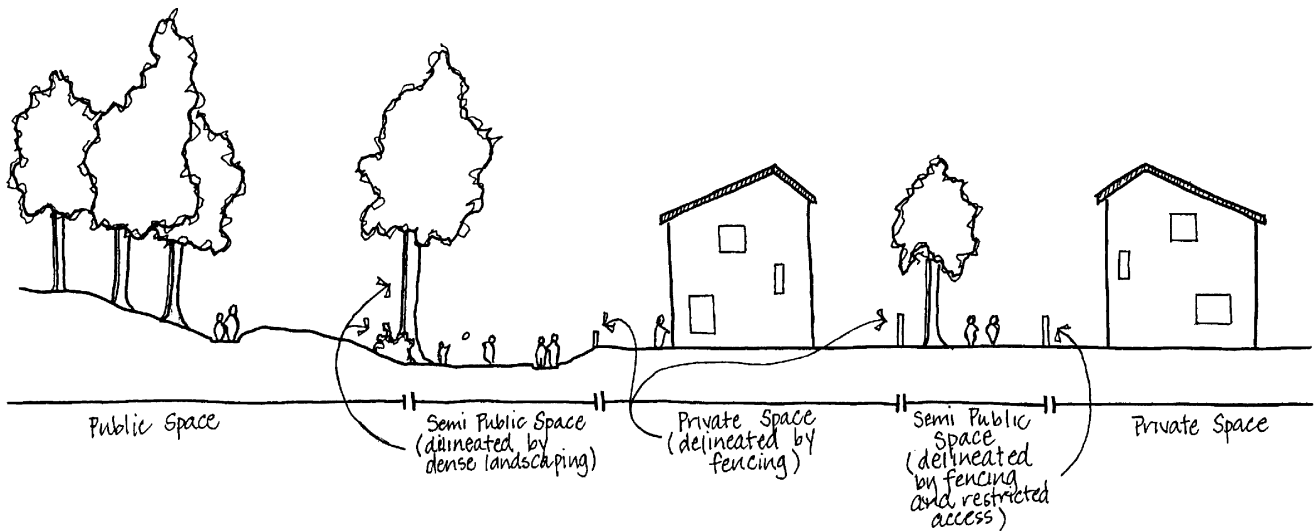


FIGURE 3: DELINEATION BETWEEN PUBLIC AND PRIVATE SPACE

- Eliminate opportunities for casual short-cutting through the site by the strategic location of fences or low planting within the site and at site-entry points. Low fences and walls also can define the site perimeter and serve to channel pedestrian movement.
- Where an existing street or established pedestrian route passes through a new residential site, ensure that it passes through relatively “neutral” portions of the site, buffered (by planting, level changes, mounding etc) from semi-private parts of the site. Buffers must be handled with great care. Nearly 60 per cent of all sexual assaults in public places occur on or within eyesight of movement predictors such as pathways and bus stops. Landscaping and other features which “buffer” these routes are common rape sites.

Space hierarchy

- In residential areas, clearly delineate the hierarchy of public open space,

community open space (shared areas) and private open space by means of fencing, landscaped buffers, level and material changes or the use of open space as a buffer.

- Divide large residential sites into visually identifiable and assignable “clusters” through use of appropriate fencing, planting and building placement so that open spaces become the “territories” of specific groups of dwellings.
- Where possible, provide at least a visual buffer between public and private spaces in residential areas.

Natural surveillance

- While maintaining opportunities to maximise resident surveillance (that is, from windows of the main activity rooms of dwellings adjacent to pedestrian paths), avoid paths passing directly by windows of dwellings so that pedestrians do not violate the privacy of residents.

RELATED TOPICS

- Land use mix Chapter 3.6
- Public open space and parks Chapter 4.3
- Pedestrian routes, lanes and alleys Chapter 4.11
- See also: ACT Code for Residential Development
- AMCORD Urban.

4.8

BICYCLE PATHS

OBJECTIVES

- To provide convenient and safe bicycle routes for transport and recreational cycling.
- To ensure adequate lighting, landscaping and signage along bicycle routes.
- To provide secure parking facilities for bicycles.

In order to maximise the use of cycle paths, it is essential that they provide a safe environment for cyclists of all ages, with adequate and safe facilities along the routes and at destinations. Bicycle routes should be selected both for convenience and security—that is, they should be routes with vehicle and pedestrian traffic during the day and evening, and with minimum empty spaces and underground crossings.

Some features which are potentially safe for cyclists can pose hazards for pedestrians. Pedestrian underpasses fall into this category.

Currently bicycle paths in areas such as approaches to shopping centres and underpasses are lit. The lighting of bicycle paths will depend on usage, location and safety priorities within available resources. As safe night-time routes will differ in each location because of the contextual nature of crime, it will be necessary to use risk assessment procedures to determine which specific routes need attention (see *Chapter 2: A Risk Assessment Process*).

Where bike paths join pedestrian or car routes, the use of “rumble strips” may assist in alerting cyclists to impending hazards.

ISSUES TO CONSIDER

Safe routes

- Ensure that routes are well lit and well maintained with clear signage. The recommended level of lighting for pedestrian and cycle activity is at least five lux (with seven lux recommended for high risk areas).

- Avoid tall bushes, dense shrubbery and dense clusters of trees immediately adjacent to routes and at predictable stopping points such as road crossings.
- The rule of thumb is low planting (maximum height 600 mm) and high-branching trees (two metres) to open sightlines, particularly within a distance of 15 m from bicycle stop signs or road junctions. Where bicycle paths travel through natural bush, clear approximately three metres either side of the pathway. The recommendation for sightline heights is then ignored.

Signage

- Clearly sign and light entrances to routes passing through relatively isolated areas, such as parks and industrial areas, and provide clearly signed alternative night-time routes.

Bicycle parking areas

- Ensure that bicycle parking areas are well lit and located where they can be seen from streets and buildings (for example, in front of shops).
- Provide bicycle parking and locking facilities in accordance with *AS2890.3 Parking Facilities—Bicycle Parking Facilities*.

RELATED TOPICS

- Lighting Chapter 3.2
- Natural surveillance and sightlines Chapter 3.3
- Signage Chapter 3.4
- Landscaping Chapter 3.7

- Spaces safe from entrapment Chapter 3.8

4.9

PEDESTRIAN UNDERPASSES AND OVERPASSES

OBJECTIVES

- To ensure the design of underpasses and overpasses reduces opportunities for crime through the provision of elements such as adequate lighting and signage.
- To avoid the use of underpasses and overpasses where alternatives are available.
- To balance the road safety needs of pedestrians and cyclists against community safety needs.

Overpasses and underpasses in many locations have contributed to road safety for pedestrians and cyclists. However, both can be subject to safety problems with underpasses generally regarded as **major** sources of risk of crime and/or fear for pedestrians.

Great care needs to be taken in designing underpasses, as they are likely to contribute to safety, as well as maintenance problems. This is particularly so where pedestrian routes have underpasses located away from occupied buildings.

If there is an alternative, it is preferable not to have underpasses

and overpasses. If a choice exists between an underpass or overpass, the preference is an overpass with good natural surveillance.⁹ Open, well lit underpasses are preferable to tunnels.

ISSUES TO CONSIDER

Alternative routes

- Avoid predictable or unchangeable routes that offer no choice for pedestrians.

Signage

- Provide signs at each end of an underpass indicating where it leads and an alternative route to use at night.

Night closure

- Where possible, lock underpasses which lead to places closed at night, and indicate at “decision points” with signage when the underpass is open and alternative routes.

Underpass design

- Make use of space in design to avoid claustrophobic feelings in underpasses and to allow for a quick turn around in case of emergencies.
- Ensure that underpasses are wide enough to accommodate both pedestrian and cycle traffic, in accordance with *AUSTROADS Guide to Traffic Engineering Practice Part 14—Bicycles*.
- Design overpasses which reduce opportunities to throw missiles at cars or pedestrians (any screening

should be open and provide for surveillance).

- Do not allow planting to extend close to the pathway.
- Ensure that the interior of the underpass is completely hard-surfaced and that walls are clean, light and easy to maintain.
- Provide gaps in the roof of dual roadway underpasses to allow natural light and ventilation.
- If possible, ensure that underpasses are straight and without recesses. Where an underpass must turn more than 60 degrees, provide a mirror so pedestrians can see around the corner.
- Where possible, provide stairs or paths to underpasses which are straight and are wide enough to allow more than one person to pass.
- If mirrors are located outside of underpasses/tunnels (and subject to daylight), lighting within the tunnel must be very bright (about 800 lux) to create a reflection on the mirror.
- Select mirrors with vandal resistance in mind.
- Ensure that the entrance and exit of underpasses are visible from shops, homes or other areas of frequent pedestrian traffic.

Lighting

- Ensure that underpasses are adequately lit by either natural or artificial sources.
- Ensure that lighting is vandal-proof and regularly checked, with a

phone number posted for reporting maintenance problems.

Maintenance

- Provide adequate drainage and access to water so that underpasses can be regularly hosed down.
- Inspect the cleanliness and maintenance of underpasses regularly.

RELATED TOPICS

- Lighting Chapter 3.2
- Natural surveillance and sightlines Chapter 3.3
- Spaces safe from entrapment Chapter 3.8
- Pedestrian routes, lanes and alleys Chapter 4.11
- *See also: AUSTROADS Guide to Traffic Engineering Practice Part 13—Pedestrians.*

4.10

BUS STOPS AND TAXI RANKS

OBJECTIVES

- To maximise the use of public transport by a wide range of people, especially after hours.
- To encourage users to feel safe in bus stops and taxi ranks by increasing safety provisions.
- To promote natural surveillance of bus stops and allow users to see around them.

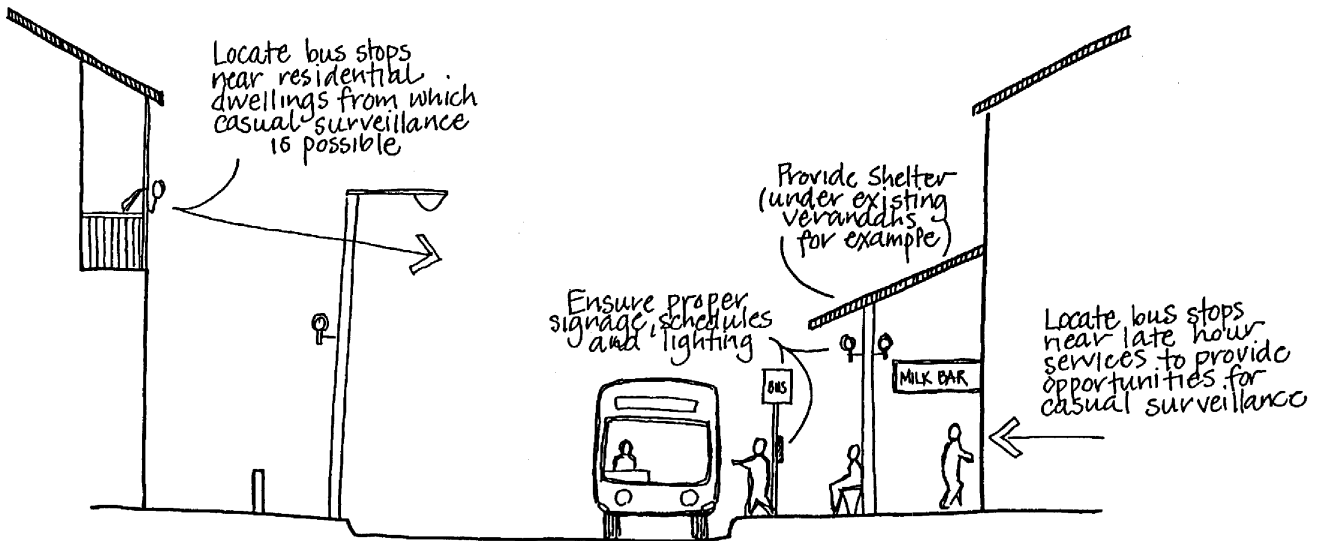


FIGURE 4: SOME OPTIONS FOR SAFER BUS STOP DESIGN

Safety at bus stops and bus interchanges has become an important issue for ACT residents in recent years. This has largely been a result of their location relative to surrounding uses such as shopping facilities.

The locations of bus interchanges and taxi ranks away from major activity areas such as shops reduce opportunities for natural surveillance. Some transport interchanges in the ACT have developed a deteriorated appearance and have become sites for graffiti.

Transport interchanges are used by different groups of people at different hours. Often it is not clear who is responsible for their management. They can be sources of fear, discomfort, confusion and crime, particularly for women and older people, and particularly at night. Often visibility is poor and sightlines can be obstructed.

Before new bus stop sites are selected a risk assessment may be necessary to identify the safety issues and whether design responses, such as additional lighting and surveillance, are required. Priorities for lighting and clearing sightlines also may be considered through this process. Where there are safety issues after hours, other strategies, such as alternative “safe” bus stops near main activity centres for use at night, may need to be considered.

While site-specific interventions require risk assessments, some basic principles can guide redesign and redevelopment of existing facilities and inform new planning and design.

It also is important that the needs of different travellers are taken into account. The siting of bus stops, as well as the design of seating, often is a cause of concern for older people. Seating which is too low and does not have arms or a back can make it difficult for people to stand up.

Additionally many older people have problems with the inadequacy of signage at bus stops.

Community ownership and involvement is an important principle of crime prevention through environmental design. In addition to the design of bus stops, a supporting strategy may be to encourage local residents and workers to report suspicious behaviour at or near bus stops.

ISSUES TO CONSIDER

Lighting

- Ensure that the areas adjacent to major bus stops and taxi ranks are well lit and protected from the weather.
- Ensure that lighting within bus shelters is not so bright as to affect the ability to see into darker surrounding areas.

Visibility

- Ensure that people waiting at bus stops and taxi ranks are clearly visible from the street and adjacent buildings, where possible.

Sightlines

- Remove or ameliorate any walls, landscaping, fences or other structures which block sightlines to bus stops.

Location

- Avoid locating bus stops and taxi ranks adjacent to vacant land, alleys, car parks and buildings set far back from the street or near possible entrapment spots.
- Provide short, safe routes to bus stops and taxi ranks from night-time venues such as cinemas, theatres, etc.
- Avoid locating interchanges at different levels from the main activity level, which creates an isolated and potentially unsafe environment for bus users.

Natural surveillance

- Based on a local risk assessment, consider relocating bus stops from isolated locations to spots where natural surveillance is possible. Take care to ensure that the location of the bus stop does not cause footpath congestion.

Entrapment

- Design bus shelters to reduce the possibility of entrapment and to improve sightlines.

Construction and maintenance

- Construct shelters of graffiti-resistant and vandal-resistant materials.
- Ensure that bus stops are well maintained and free of rubbish and graffiti.

Signage

- Provide adequate signage so that it is easy to find bus stops.
- Provide signage which indicates a number to call for maintenance.
- Provide vandal-proof signage with up-to-date passenger information such as routes and times to avoid long waits.

Telephones

- Where possible, ensure that public telephones are located near bus stops or taxi ranks.

Young people’s needs

- Provide public transport services to meet the needs of young people accessing venues at night.

RELATED TOPICS

- Lighting Chapter 3.2
- Natural surveillance and sightlines Chapter 3.3
- Spaces safe from entrapment Chapter 3.8
- Management and maintenance Chapter 3.9

4.11

PEDESTRIAN ROUTES, LANES AND ALLEYS

OBJECTIVES

- To maximise the safety of pedestrians, cyclists and business premises, especially at night.
- To encourage legitimate activity in public open space.

The design and use of lanes, alleys and pedestrian routes have a significant impact on public safety, both real and perceived. Poorly lit lanes, alleys and secluded or heavily vegetated pedestrian paths can provide potential hiding places and spaces for non-legitimate uses. While in many cases laneways should be lit to the same level as streets, all decisions about lighting laneways must take into account the local context. It is important to consider the lighting of laneways in terms of the safety issues of the area and also the impact on adjacent dwellings. Depending on the circumstances, lights may need to be located away from windows or the design of adjacent dwellings may need to consider shades which screen the dwellings’ windows from direct rays of street lights.

Risk assessment procedures could be used to address questions such as:

- What is the likely movement of pedestrians on the laneway?
- Who is likely to be in the laneway and at what times?
- What nearby land uses are likely to influence safety in the laneway?
- Who is likely to see what is being lit?
- Are there potential entrapment spaces or hiding points along the laneway due to its design, landscaping or services (for example, substations) etc?

The particular needs of older pedestrians and people with disabilities need to be considered in path design. Walking is a very popular activity, but mobility problems are frequent among older people. Strolling and stopping to rest or for a chat are popular activities among older people.

Walking and cycling also can provide access to other activities. While being safe and barrier-free, a walking circuit should be interesting with changing views and allow for casual social encounters en route. Symbolic barriers (as opposed to fences) can be a useful way of defining space—and making clear its designated purpose. This also applies to footpaths where design may be used to channel pedestrian traffic so that people, especially in the evening, are more likely to encounter other pedestrians. For details on the design of pedestrian paths for use by older people and people with disabilities, see Appendix B.

There is considerable evidence on dangerous places and the locations of sexual assaults in the public domain.

For example, the average external rape site is 10 m² and has two or more physical barriers (bushes, walls etc) which help to restrict victims both psychologically and physically. Although some existing features, such as hedged pathways, are ecologically important, they may be potentially dangerous. It is important to consider the maintenance of habitat links for indigenous fauna, while at the same time protecting humans from criminal behaviour.

Bicycle paths are addressed in Chapter 4.8.

ISSUES TO CONSIDER

Design of pedestrian routes

- Clearly define lanes, alleys and pedestrian routes.
- Where pedestrian routes are not easily recognisable and may be unclear to newcomers, consider using artwork, lighting or design elements to create a consistent and distinctive theme which can assist people to find their way at night and reduce their chances of becoming lost.
- Ensure that all pedestrian circulation patterns are compatible with and where possible enhance other security measures.
- Avoid dense shrubbery around pedestrian paths, set shrubs well back from paths, or use plant material with thorns or other repelling characteristics—providing that it can still be trimmed and ground cover cleaned and it provides no hazard to children or cyclists.

- Design circulation routes with options for length and difficulty of route to encourage casual strolling.

Location of pathways

- Locate pedestrian pathways to enhance other security measures.
- Design walkways and bicycle paths forming a collector system for meeting others.
- Locate paths for views of activity, as well as safety and security.

Design of alleyways

- Avoid providing alleyways and access paths in areas where little pedestrian traffic will be expected.

Lighting

- Identify priorities for lighting, such as commonly used paths, and provide even lighting along paths.
- Focus lighting on laneways and away from dwellings so that it does not shine into dwelling windows.
- Align lighting along paths in residential areas to enable people to see their way and be seen by others in dwellings and those using paths. Lighting should fall directly on paths and not cast dark shadows, especially on steps.

Sightlines

- Align lighting and landscape footpaths so that it is possible to see a considerable distance ahead and therefore avoid the chance of attack by a hidden intruder.
- Make paths relatively straight for better visibility where that does not create a monotonous appearance. Where possible, ensure that

laneways have more than one entrance to avoid “dead-ends”.

- Design paths and planting so that the whole route between bus or parking areas and building entries can be clearly seen.

Short-cuts

- Avoid “short-cuts” through housing developments which encourage non-legitimate users to move through such areas en route to another location.

Conflicting uses

- Minimise the necessity of groups who are likely to be conflicting having to take the same route.

Dwelling privacy

- While facilitating natural surveillance of footpaths from dwellings, ensure pedestrian routes do not violate residents’ privacy.

Direct access

- Provide direct access routes to and from buildings from streets, car parks and public transport.

Escape routes

- Provide a visible exit point to an alternative route to enable a person to avoid a situation in which he or she might feel threatened. Signposts identifying exit routes can reduce feelings of isolation.

Barrier-free access

- Ensure that all major paths are accessible by ensuring the width, slope and type of surface are appropriate for people with a physical disability (see Appendix B for details).

- Provide clear edge definition between paths and planting. Where edging or paving does not meet at grade, falls can occur. On the other hand, if planted areas do not have edges, plant materials can fall onto paths, making them slippery, especially when wet.
- Select plant materials which will not be slippery if they fall on paths (large leaves are safer than small ones).
- Set back planter beds as far from paths as possible.

Maintenance

- Maintain laneways and fencing on laneway boundaries adequately.

RELATED TOPICS

- Lighting Chapter 3.2
- Natural surveillance and sightlines Chapter 3.3
- Landscaping Chapter 3.7
- Spaces safe from entrapment Chapter 3.8

4.12 PUBLIC TOILETS

OBJECTIVES

- To ensure safety for all people using public toilets.
- To ensure that facilities are well maintained and that repairs are made promptly.
- To locate facilities to take advantage of natural surveillance to discourage non-legitimate uses.

The design, siting and maintenance of public toilets play a significant role in ensuring safe and legitimate use of these facilities. These facilities should be designed and located to reduce possibilities of entrapment or inappropriate use.

ISSUES TO CONSIDER

Location

- Locate public toilets adjacent to high traffic areas rather than in isolated locations, but do not place seats and phones too near toilets as this legitimises loitering.

Secure access

- Ensure that external doors can be locked only by a legitimate key holder to reduce the danger of entrapment.

Visibility

- Design approaches and entrances to be highly visible so that people cannot loiter or enter without being seen.
- Make entrances to public toilets in playgrounds visible from the playground.

Maintenance

- Ensure that facilities are well maintained with vandalism repaired and graffiti promptly removed. This will encourage usage and promote a perception of safety as well as reduce the likelihood of further damage.

RELATED TOPICS

- Lighting Chapter 3.2

- Landscaping
Chapter 3.7
- Spaces safe from entrapment
Chapter 3.8

4.13

SHOPPING CENTRES

OBJECTIVES

- To provide a safe and welcoming environment for staff and users of shopping centres.
- To provide a range of uses suitable for all members of the community.
- To ensure safe and easy access to facilities in and around shopping centres.

The following guidelines refer to Group Centres in the ACT (for example, Dickson, Curtin, Kippax and Kaleen) which provide a main focus for the district for shopping, community, cultural, entertainment and recreational activities, as well as to local or neighbourhood centres.

Legitimate activity, including commercial activity, confers a sense of safety to the public realm. Active, vibrant community spaces associated with shopping centres can do much to enhance safety, as well as to reduce vandalism and graffiti.

Shopping malls generally do not provide for natural surveillance of surrounding public places. Enclosed malls which wrap around a common

public area have been used successfully so long as the property owner can control the entrances to the semi-public common area. However, this needs to be balanced against the lack of interaction, or active linkages, with surrounding land uses. In redeveloping or refurbishing centres, it may be possible to improve safety through encouraging a mix of uses and activities as well as promoting active frontages. As part of these planning and development processes for shopping centres, a risk assessment should be undertaken. It will help to identify the different uses and activity patterns as well as potential risks and provide a strategic basis for developing safety strategies.

ISSUES TO CONSIDER

Design

- Conduct a proper risk assessment as part of the design of new developments and refurbishment.
- Provide incentives to encourage footpath activities (such as coffee tables and seating) external to the development.
- Explore design solutions which do not require the shopping centre to “turn its back” on the surrounding streets but incorporate the streets in the design.

Car parking

- Design large car parks in shopping centres with good clear signage so shoppers can locate their cars quickly. It is preferable to separate car parks into smaller lots. Large car

parks are inherently unsafe and difficult to control. Good sightlines make little difference in very large car parks. (Compartmentalisation will fail to make much difference if the perceived risk (of being caught) to offenders is not increased—that is, if there is no real chance that a “capable guardian” will see them and intervene.)

- Provide signs to encourage shoppers to lock their cars.
- Ensure that car parking can be overlooked from shop windows.

Public transport

- Where possible, locate bus stops at the entrance of buildings rather than on the edge of car parks.

Activities

- Encourage activities which attract a diverse group of users at different times.
- Encourage centres to provide areas in which young people can congregate and consider developing facilities in consultation with young people and funded by the shopping centre to provide activities for young people.

Maintenance and improvement

- Remove obsolete and superfluous street furniture and replace with comfortable furniture.
- Redevelop unused spaces to encourage greater usage of poorly used centres.

Landscaping

- Consider using “green screens” in areas with high levels of graffiti.

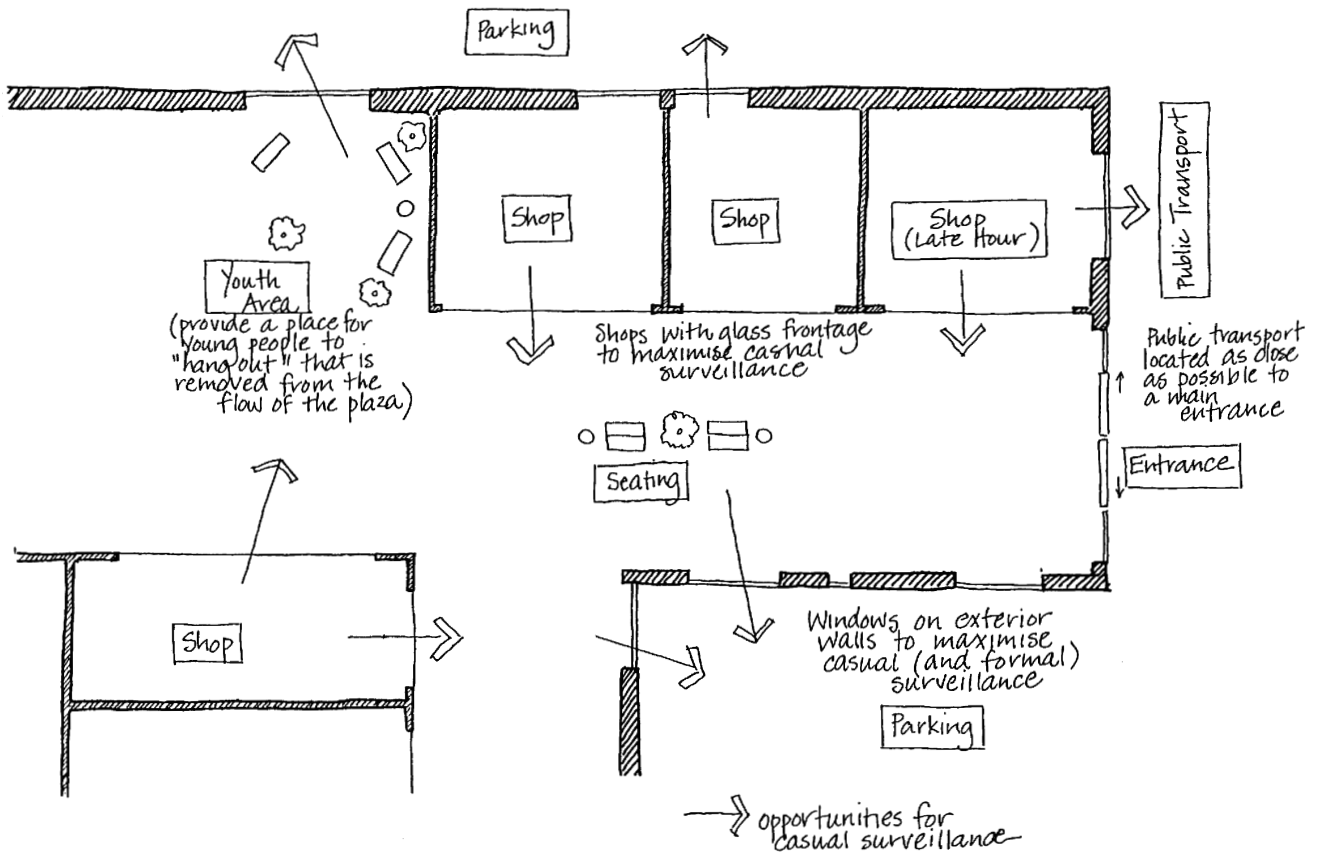


FIGURE 5: CASUAL SURVEILLANCE OF SHOPPING CENTRES

Creepers and wall vines provide a soft, natural surface, which defies graffiti. Other plants against wall surfaces can be useful (provided they do not create entrapment spaces).

- Design landscaping and select plants to ensure that hiding places and entrapment spots are not created, particularly in or near car parks.

Storage

- Provide secure storage areas for shop owners.

RELATED TOPICS

- Lighting
Chapter 3.2
- Natural surveillance and sightlines
Chapter 3.3
- Car parks
Chapter 4.6

APPENDIX A

RECENT DEVELOPMENTS IN CRIME PREVENTION

Crime Prevention Through Environmental Design (CPTED)

The term Crime Prevention through Environmental Design (CPTED) was first coined by criminologist C. Ray Jeffery in 1971 (see Jeffery 1971, 1997). However, it has origins in Jane Jacobs' work involving "eyes on the street" in her influential book, *The Death and Life of Great American Cities* (1961). CPTED is a tool which modifies the built environment to reduce opportunities for crime. Traditional tactics of CPTED include creating territoriality, natural surveillance and "eyes on the street", and focussing on access into and out of buildings and neighbourhoods. Early versions also involved vandal proofing vulnerable aspects of the public realm, also called target hardening. This discipline is based on where and when criminal behaviour occurs in the environment.

Later versions of this approach also include "second-generation" CPTED, developed by G. Saville and G. Cleveland in 1997 (see Cleveland and Saville 1997; Saville and Wright 1998; also Saville 1995). This approach is an attempt to expand the "design thrust" of CPTED to incorporate social crime prevention strategies for a more holistic approach to reducing crime. An example would be encouraging neighbourhood social

events after safety measures through design have been implemented.

Defensible space

This is a term coined by American architect Oscar Newman, in 1972 (see Newman 1992, 1995, 1996) and explored in several works based on studies of public housing in the United States. Defensible space (a basic element of CPTED) is based on principles which encourage community social control. These principles are:

- 1 **territoriality**: the capacity of the physical environment to create a feeling of neighbourhood and encourage residents to exercise surveillance over the area of defensible space;
- 2 **surveillance**: the capacity of physical design to enable residents to casually and continually survey a public area;
- 3 **image**: the capacity of design to improve building image and avoid stigma;
- 4 **environment**: the influence of a neighbourhood's geographical juxtaposition with safe or unsafe areas.¹⁰

It is based on the idea that those with criminal intent are deterred from places where they think they will be noticed and singled out. Residents or users of a space must not only feel it is their place, but also feel a

connection to those who share that space with them. Creating that social connection in specific places in order to deter crime is what defensible space is all about.

Situational crime prevention

This is a set of specific tactics documented by Ronald Clarke and Patricia Mayhew at the Home Office in London, UK, in the early 1980s (see Clarke and Mayhew, eds 1980; see also Brantingham and Brantingham 1990, 1991). It includes four sets of strategies: (1) reducing the rewards from committing crime; (2) increasing the effort needed to commit crime; (3) increasing the risks of getting caught; and (4) increasing the moral guilt for committing crime. These tactics incorporate the broader CPTED approaches of surveillance, access control, and hardening the target.

APPENDIX B

BARRIER-FREE ACCESS CRITERIA FOR THE DESIGN OF PEDESTRIAN PATHS

The following criteria are intended to assist in ensuring that paths, as well as being safe, also are accessible for all members of the community. It is important that, as a minimum, all major paths comply with *Australian Standard 1428 Design for Access and Mobility (AS1428)*, as amended.

1. Width of paths

Walkway widths vary according to the amount and type of traffic using them. They should be wide enough to accommodate two walking people side-by-side or a person in a wheelchair and a person using a walker (to give support or just for sociability). AS1428.2 states that a clear path width of 1800 mm is needed to allow two wheelchairs to pass comfortably; a clear path width of 1500 mm allows a wheelchair and a pram to pass; and a clear path width of 1200 mm is required by a person who uses a wheelchair. Space should be provided for wheelchairs to make a complete turning circle (1500 mm x 1500 mm).

AS1428.2 also states that where a path is less than 1800 mm, passing spaces at intervals of not more than six metres should be provided.

For moderate two-way pedestrian traffic, a path width of 1830 mm is preferable, while minor routes can be 1525 mm wide.

2. Slope of paths

Both slopes greater than three per cent (1 in 33) without frequent rest areas and slopes greater than five per cent (1 in 20)—with or without rest areas—are difficult to negotiate. Where walkways have gradients of 1 in 33, a landing (level and 1.2 m long) should be provided at least every 25 metres and at least every 14 metres for walkways with a gradient of 1 in 20 (AS1428.1).

Major on-site pedestrian access routes should not involve a slope of greater than 5 per cent (1:20). These are considered paths (or walkways); those with steeper gradients are considered ramps.

People with ambulatory difficulties may prefer indirect access routes that are level rather than shorter routes that have maximum grades. Options for safe, level access need to be considered as part of the overall planning process. The following features need to be considered:

- Major on-site paths at building entries should not exceed a 2.5 per cent slope (1 in 40).
- No ramps, steps or kerbs should be located in arrival court areas.
- If possible, gradients up to 3 per cent (1:33) are preferable.
- Frequent level rest areas with benches should be provided.

3. Paving and walking surfaces


Walking surfaces should be predictable, stable, firm, relatively smooth in texture and non-slip, as well as being made of non-glare substances. Smooth, non-porous surfaces provide inadequate traction for people in wheelchairs or users of canes and walkers. Generally, hard surface pedestrian paths meet most requirements.

Other factors to consider include:

- minimising use of expansion and contraction joints (less than 12.5 mm in width);
- avoiding soft or loose surface materials; and
- ensuring spaces between timber decking or planks are less than 12.5 mm.

Clear edge definition between paths and planting is critical. Where edging or paving does not meet at grade, falls can occur. On the other hand, if planted areas do not have edges, plant materials can fall onto paths, making them slippery, especially when wet. Use a combination of techniques to avoid this hazard:

- different coloured edging for paths to clearly mark edges;
- good lighting along paths;
- good path drainage;

- 
- plant materials which will not be slippery if they fall on paths (large leaves are safer than small ones);
 - planter beds set back as far from paths as possible;
 - use of high edging (such as garden walls) which can be used as seating to define edges of paths and planter beds; and
 - stained broom-finished concrete.

4. Paving materials to avoid

Many attractive looking paving materials are totally impractical.

Therefore, avoid:

- loose gravel, pebbles, raised cobblestones set in cement (exhausting to walk on);
- glazed brick and tiles, even quarry tiles (dangerously slippery when wet); and
- “crazy paving” which settles unevenly and may cause tripping or jamming of wheelchair wheels.

APPENDIX C

CRITERIA FOR SIGNS FOR OLDER PEOPLE AND PEOPLE WITH DISABILITIES

The following criteria should be read in conjunction with *Australian Standard 1428.1 (Section 14) and 1428.2 (Section 17) Design for Access and Mobility (AS1428)*, as amended. Use of international symbols is preferred as these are more easily identified by people with an intellectual disability and also by visitors or by people for whom English is a second language.

1. Visual problems and ageing

In older people or for people with visual impairment, the ability to discriminate fine visual detail may be seriously impaired. Reading printed information such as names on doors or directional signs in hallways of public buildings is a continual burden. Thus, a stronger and clearer signal is required. As many older people may be reticent about venturing into unfamiliar territory, a clearer signage system can greatly improve their use and enjoyment of the urban realm.

2. Signs for visually impaired people

To assist people with vision impairments, pay attention to sign design and location, for example:

- Minimum 25 mm high and raised with a high stroke width-to-height ratio for ease of reading by touch. AS1428.2 provides guidance on height of letters for varying viewing

distances—25 mm is suitable for viewing distances up to eight metres. Generally, the minimum height of letters (in mm) is three times the viewing distance (in metres).

- Recommended 1:6 to 1:10 with character-to-width ratio of 3:1 to 1:1, using only Arabic numerals and sans serif letters for example, Helvetica bold typeface.
- Minimum setback 457 mm and placed at height of 1220-1676 mm.
- Small raised letters (to be touched) are easier to read than larger letters.
- Braille strips along sign edges could be considered although raised letters are preferable to Braille which only a small proportion of the blind population can read.
- Avoid incised letters as they fill with dirt.

3. Sign design

- The figure-ground relationships of sign systems should employ a very high contrast ratio between the symbol and background. AS1428.2 requires that the luminance factor of the surface of the numbers, letters or symbols should not be less than 30 per cent different than their background.

- If dark letters are used they should be on a neutral grey background to reduce glare.
- Apply the principle of the maximum brightness difference between the symbol and the background.
- If colour is used, warmer colours are preferable. Blue and green colour combinations should be avoided as they are not easily distinguished.
- Closely or loosely spaced letters are difficult to read.
- Letters should be spaced similarly to spacing on typewritten material.
- Use matt finish, durable, non-reflective surfaces.
- Select bold lettering styles without serifs (*Helvetica* or *Futura* typefaces). Avoid extended or condensed styles.

4. Sign location

- Locate pedestrian signs to ensure easy identification without obstructing walkways.
- Locate signs for easy visibility by people in wheelchairs and so they do not present a hazard.
- Allow a clear space between 2000-2150 mm above grade to ensure safety for hanging signs.
- Locate signs at wheelchair height (980-1320 mm above ground level).

APPENDIX D

POSSIBLE CONFLICTS BETWEEN CPTED AND ESD

Safety is one element of design and needs to complement other criteria and objectives. The following list outlines some of the possible environmental impacts of safety strategies. It is not intended to be an exhaustive list but aims to provide a starting point for thinking about some of the broader issues that need to be considered.

Lighting

- Light pollution;
- use of non-renewable energy sources through lighting; and
- pollution and creation of Greenhouse gases from energy uses, especially for lighting.

Landscaping

- Creation of unnecessary heat islands in urban areas by trimming or elimination of vegetation;
- excessive paving, causing run-off and drainage problems and impeding percolation into soil;
- effect on drainage and soil stability of excessive pruning; and
- loss of the benefit of energy-efficiency features of deciduous trees if they are pruned to preserve sightlines.

Target hardening¹¹

- Energy and life-cycle costs of target hardening measures;
- the increased use of locks, bars, heavy doors, and other security devices greatly increases energy and material consumption, as well as waste and pollution; and
- high-energy consumption manufacture or resource extraction/refinement processes required to produce metal fences and gates.

Durability and maintenance

- Use of materials that weather well is important for reducing consumption, waste and pollution;
- low maintenance landscapes, which need no pesticides, fertilisers and as little water as possible have the least ecological impact; and
- a small consumption of materials and energy to repair immediately will help to reduce larger repair jobs in the future.

¹¹ Target hardening refers to the process of making it more difficult to vandalise vulnerable objects or break into vulnerable entry points. The aim is to reduce crime by increasing the effort required by an offender for example: steering locks, bandit screens, vandal-proofing, toughened glass, tamper-proof seals.

APPENDIX E

LIGHTING LEVELS TABLES

MAINTAINED LIGHTING LEVELS FOR PUBLIC AREAS (1999): RECOMMENDATIONS OF AS1158.1.3 – PEDESTRIAN AREA (CATEGORY P) LIGHTING

AS1158.1.3 uses different lighting categories, depending on factors such as pedestrian/cycle activity, vehicle activity, fear of crime and need to enhance prestige. For the purposes of this table, only the highest lighting level for each use has been included. This table is intended for indicative purposes only—refer to the Australian Standard for details.

C A T E G O R Y	Average luminance L_{ave} cd/m ²	Average illuminance E_{ave} lux	Minimum illuminance E_{min} lux
City or town centres Mixed vehicular and pedestrian Wholly pedestrian		20 20	10 10
Suburban shopping street Mixed vehicular and pedestrian Wholly pedestrian		20 20	10 10
Arcaded and canopied areas Open arcade		20	10
Subways and footbridges Open subways, including associated ramps on steps. Steps, ramps, footbridges, pedestrian ways.		35 *	25
Car parks Outdoor car parks, including rooftop Parking for people with disabilities		14 35	4 10
Traffic routes—roads in local areas Collector roads or arterial roads Local roads or streets Common areas, forecourts of cluster housing		7 7 7	3 3 3
Pathways Pedestrian or cycle orientated pathways Areas primarily for pedestrian use Transport terminals and interchanges, service areas		7 20 20	3 10 10

* Same as highest lighting level for connecting elements, but not less than 7 lux for pathways and roads.

Notes:

L_{ave} = Average luminance of vehicular and pedestrian surfaces

E_{ave} = Average illuminance of vehicular and pedestrian surfaces

E_{min} = Minimum illuminance of vehicular and pedestrian surfaces

MAINTAINED LIGHTING LEVELS FOR PUBLIC AREAS (1992): RECOMMENDATIONS OF BS 5489 – CODE OF PRACTICE FOR ROAD LIGHTING (UK)

C A T E G O R Y	Average luminance L_{ave} cd/m ²	Average illuminance E_{ave} lux	Minimum illuminance E_{min} lux
City or town centres Primary vehicular Mixed vehicular and pedestrian Wholly pedestrian	1.5	30 25	15 10
Suburban shopping street Primary vehicular Mixed vehicular and pedestrian Wholly pedestrian	1.5	25 15	10 5
Village centre Primary vehicular Mixed vehicular and pedestrian Wholly pedestrian	1.0	15 10	5 5
Arcaded and canopied areas Open arcade Totally enclosed (day) Totally enclosed (night)		50 250 150	5 150 100
Subways and footbridges Open subways Closed subways (day) Closed subways (night) Open footbridges Open stairways Enclosed stairways (day) Enclosed stairways (night)		150 350 150 50 50 350 150	100 150 100 15 15 150 100
Car parks Outdoor Enclosed—multi-storey		50 200	10 100
Traffic routes Category 1 Category 2 Category 3	1.5 1.0 0.5		
Residential areas Category 3/1 Category 3/2 Category 3/3		10 6 3.5	5 2.5 1

Notes:

L_{ave} = Average luminance of vehicular and pedestrian surfaces

E_{ave} = Average illuminance of vehicular and pedestrian surfaces

E_{min} = Minimum illuminance of vehicular and pedestrian surfaces

APPENDIX F

SAFETY AUDITS

The following example of a safety audit is taken from the report, *The Role of Urban Design in Crime Prevention and Community Safety*, which included a safety audit of Civic and selected residential areas in the ACT as part of the research. While this is only one approach, it provides an idea of the processes and type of issues involved in a safety audit.

1. Overview of safety audit process

- *Define key stakeholders*
In the case of this study, these varied between areas but ranged from representatives of user groups such as women, youth and older people to community organisations and business groups.
- *Safety Audit*
Safety audit kit prepared (this may involve piloting the kit). Teams conduct safety audits. Debriefing with safety audit teams, steering committee members and stakeholders.
- *Collation and analysis of results*

2. What is in the kit?

- Explanatory information (to describe the aims and practicalities of the audit).
- Key map (showing the audit area and the briefing and debriefing locations).

- Detail map of audit area (large scale maps showing the start, finish and possible audit route).
- Questionnaire to be completed during the audit.
- Sheet to list key problems.
- Questionnaire for information about team members.

3. Key steps in the safety audit:

- A briefing session is held to highlight aspects of an area that are associated with crime prevention. The safety audit process is explained and the safety audit kit is given to each auditor. The audit area is outlined and possible routes and times for the audit itself are suggested.
- The safety audit is undertaken, following the suggested routes wherever possible and recalling the important aspects of the setting highlighted in Step One. Using local knowledge and the questionnaire, each auditor inspects the defined audit area and builds a safety/security picture of it—where it feels safe, where it feels unsafe and why. Importantly, each auditor's fear of crime tells as much as the physical evidence of the crime.
- A debriefing workshop follows the audit to document, debate and clarify the audit findings. The "List Your Key Problems Form" at the

end of the audit kit is filled in by each auditor at this workshop. Suggestions for improvements will also be welcome at this stage.

- A follow up session is arranged for all interested auditors and parties to discuss and agree to the proposed draft safety guideline plan to ensure that it correctly represents people's opinions.

4. What should be looked out for during the safety audit?

Some of the features that are important to keep in mind while doing the audit include:

- feelings about safety;
- who's around;
- finding your way around;
- location of public telephones, public toilets and automatic teller machines (ATMs);
- location of public transport stations (bus and taxi);
- dense or high landscaping which can hide offenders or block views;
- safe and adequate car parking;
- adequate lighting for visibility;
- types of activities; and
- maintenance and upkeep of properties and public spaces.

SELECTED REFERENCES

PRIMARY REFERENCES

ACT Crime Prevention Committee 1995, *ACT Community Safety Strategy*, Canberra, Australian Capital Territory.

ACT Planning Authority and ACT Attorney General's Department 1995, *Role of Urban Design in Crime Prevention and Community Safety*, Canberra, Australian Capital Territory.

Department of Urban Services 1996, *ACT Weeds Strategy: A Ten Year Strategy for Implementing a Coordinated Program for Controlling Weeds in the ACT*, Canberra, Australian Capital Territory.

Department of Urban Services 1993, *Canberra Landscape Guidelines*, Canberra, Australian Capital Territory.

Fisher, A.J. 1997, "Outdoor Lighting – Lighting to deter fear and crime", *Lighting: Art and Science for International Designers*, 17(6), p32-37.

Planning and Land Management, "ACT Code for Residential Development", *Territory Plan*, Appendix III, Canberra, Australian Capital Territory.

Planning and Land Management 1998, *Location Guidelines for Community and Recreation Facilities*, Canberra, Australian Capital Territory.

Munns Sly Scott Bohanna Moss in association with MCC Joint Venture Architects 1997, *Civic Lighting and Pedestrian Signage: Strategic Plan*, Report to the Department of Urban Services.

Safe Women Project 1998, *Plan it Safe: A Guide for Making Public Places Safer for Women, Resource Kit*, Sydney, Safe Women Project.

Safe Women Project 1998, *Ask Any Women*, Sydney, Safe Women Project.

Safe Women Project 1998, *Women's Safety Audit Guide*, Sydney: Safe Women Project.

Saville, Gregory 1996, "The diagnosis before the prescription", *Problem-Solving Quarterly*, 9(1/2). Washington, DC, Police Executive Research Forum Publication, pp 10-11.

Standards Australia 1999, *AS 1158.3.1 Road Lighting: Part 3.1 Pedestrian area (Category P) lighting – Performance and installation and design requirements*.

Standards Australia 1999, *AUSTROADS, Guide to Traffic Engineering, Part 14: Bicycles*.

Standards Australia 1986, *AS1158.1 Road Lighting*.

Standards Australia 1998, *AS1428 Design for Access and Mobility*.

Standards Australia 1993, *AS1680.2.1 Interior Lighting—Circulation spaces and other general areas*.

Standards Australia 1990, *AS1742.10 Manual of Uniform Traffic Control Devices—Pedestrian Control and Protection*.

Standards Australia 1993 *AS2890.1 Parking Facilities—Off-street Car Parking*.

Standards Australia 1993, *AS2890.3 Parking Facilities—Bicycle Parking Facilities*.

Stollard, Paul ed 1991, *Crime Prevention Through Housing Design*, London, Chapman and Hall.

Wekerke, G. R. and Whitzman, Carolyn 1995, *Safe Cities: Guidelines for Planning, Design, and Management*. New York, Van Nostrand Press.

SECONDARY REFERENCES

Alexander, Christopher, Sara Ishikawa and Silverstein, Murray 1975, *A Pattern Language*, New York, Oxford University Press.

Anson, Brian 1986, "Removing Walkways is Not Nearly Enough", *Town and Country Planning*, 56 (3), pp 174-175.

Atkins, S., Husain, S. and Storey, A. 1991, *The Influence of Street Lighting on Crime and Fear of Crime*, Crime Prevention Unit Paper 28, London, Home Office.

Australian Institute of Urban Studies 1990, *Urban Crime: proceedings of a seminar held at Gosnells, Western Australia on 18 April by the Institute of Urban Studies, Insurance Council of Australia and the Western Australian Police Department*, October, Canberra, AIUS.

Barr, R. and Pease, K. 1990, "Crime Placement, Displacement and Deflection", in M. Tonry and N. Morris (eds) *Crime and Justice: A Review of Research*, Vol 12, Chicago. University of Chicago Press.

Baumer, T. L. and Hunter, A. 1978, *Street Traffic, Social Integration, and Fear of Crime*, Evanston, Ill, Northwestern University Center for Urban Affairs.

Beavon, Daniel J. 1984, *Crime and Environmental Opportunity Structure: The Influence of Street Networks on the Patterning of Property Offences*, unpublished M.A. thesis, Simon Fraser University, Burnaby, British Columbia.

Bell, J. A. M. 1983, "Lighting the Urban Environment" in A.B. Grove and R.W. Cresswell (eds), *City Landscape, A Contribution to the Council of Europe's European Campaign for Urban Renaissance*, London, Butterworths.

Bell Planning Associates and Graham Gaston 1995, *Crime, Safety and Urban Form*, Canberra, AGPS.

- Bell, Wendy and Sarkissian, Wendy, 1991, *Report on Urban Design and Crime Prevention in the Inner Adelaide Area, 1990-91*, report to the Attorney General's Department, South Australia.
- Bell, Wendy, Hazebroek, Angela and Sarkissian, Wendy 1992, "The Role of Urban Design in Crime Prevention", *Australian Planner*, August, pp 206-210.
- Bennett, Trevor and Wright, Richard 1984, *Burglars on Burglary: Prevention and the Offender*. Brookfield, VT: Gower.
- Bennett, Trevor, 1990, "Burglars' Choice of Targets", pp 176-192 in D. J. Evans and D. T. Herbert (eds), *The Geography of Crime*, London, Routledge.
- Bentley, Ian and Murrain, Paul (eds), 1985, *Responsive Environments: A Manual for Designers*, London, Architectural Press.
- Bernard-Butcher, Diane 1991, *Crime in the Third Dimension, A Study of Burglary Patterns in a High Density Residential Area*, unpublished MA Thesis, Simon Fraser University, Burnaby, British Columbia.
- Birenham, Rhonda 1983, "Crime Prevention Through Environmental Design", *Habitat*, 25(2), pp 2-8.
- Biron, Land Ladouceur, C. 1991, "The Boy Next Door: Local Teenage Burglars in Montreal", *Security Journal*, 2, pp 200-204.
- Brantingham, P. J., Brantingham, P.L. and Wong, P. S.(nd), "How Public Transit Feeds Private Crime", School of Criminology, Simon Fraser University, Burnaby, British Columbia, Canada.
- Brantingham, P. L. (nd) "Crime Prevention: The North American Experience", Chapter 16, pp 331-360.
- Brantingham, P. L and Brantingham, P. J. (nd), "Burglar Mobility and Crime Prevention Planning", *Coping with Burglary*, Chapter 6, pp 77-95.
- Brantingham, P. L. and Brantingham, P. J. 1988, "Situational Crime Prevention in British Columbia", *Journal of Security Administration*, 11(2), pp 17-27.
- Brantingham, P. L. and Brantingham, P. J. 1990, "Situational Crime Prevention in Practice", *Canadian Journal of Criminology*, January, pp 17-40.
- Brantingham, P. L. and Brantingham, P. J. (eds) 1981, *Environmental Criminology*, Beverly Hills, Sage Publications.
- Brantingham, P. L. and Brantingham, P. J. 1988, "Situational Crime prevention in British Columbia", *Journal of Security Administration*, 11 (2), pp 17-27.
- Brantingham, P. L. and Brantingham, P. J. 1990, "Situational Crime Prevention in Practice", *Canadian Journal of Criminology*, January, pp 17-40.
- Brantingham, P. L. and Brantingham, P. J. 1991, *Environmental Criminology* (2nd ed), Prospect Heights, IL, Waveland Press.
- Brantingham, Patricia L. 1989, "Planning, Development Designs and Crime", pp 35-45 in Susan Geason and Paul R. Wilson (eds) *Designing out Crime: Conference Proceedings*, Canberra, Australian Institute of Criminology.
- Brantingham, P. L. and Brantingham, P. J. 1977, "Housing Patterns and Burglary in a Medium-Sized American City", in J. Scott and S. Dinitz (eds), *Criminal Justice Planning*, New York: Praeger.
- Brantingham, P. L. and Brantingham, P. J. 1975, "Residential Burglary and Urban Form", *Urban Studies*, Vol 12.
- Brown, B. B. 1983, *Territoriality, Street Form and Residential Burglary: Social and Environmental Analyses*, Doctoral Dissertation, University of Utah.
- Brown, B. B. and Altman, I. 1981, "Territoriality and Residential Crime: A Conceptual Framework", in P. J. Brantingham and P. L. Brantingham (eds), *Urban Crime and Environmental Criminology*, Beverly Hills, Sage.
- Brown, B. B. and Altman, I. 1981, "Territoriality, Defensible Space and Residential Burglary: An Environmental Analysis", *Journal of Environmental Psychology*, 3, pp 203-20.
- Bynum, Timothy, and Purri, Dan 1984, "Crime and Architectural Style", in *Criminal Justice and Behavior*, 12 (2).
- Canada Mortgage and Housing Corporation 1989, *A Synthesis of International Literature on Urban Safety and Crime Prevention in Residential Environments: interim report and bibliography*, Ottawa, CMHC.
- Canada Mortgage and Housing Corporation 1989, *Overview of CMHC Activities Related to Urban Safety and Crime Prevention*, prepared for the European and North American Conference on Urban Safety and Crime Prevention, Ottawa, CMHC.
- Canada Mortgage and Housing Corporation 1996, *The Theory and Practice of Crime Prevention Through Environmental Design: A Literature Review*, Ottawa, CMHC.
- Canadian Criminal Justice Association 1989, "Safer Communities: A Social Strategy for Crime Prevention in Canada", *Canadian Journal of Criminology*, 31 (4), pp 366-401.
- Carter, Stan and Carter, Sherry (forthcoming), *The CPTED Project in Sarasota, Florida, Miami, Florida*.
- City of Burnaby 1988, "Implementation of a Voluntary Crime Prevention Through Design (CPTED) Strategy in Burnaby", report from the Director of Planning and Building Inspection to the Municipal Manager.

- City of Toronto 1988, *The Safe City: Municipal Strategies for Preventing Public Violence Against Women*, Toronto, City of Toronto.
- City of Toronto 1990a, *Green Spaces/Safer Places: A Forum on Planning Safer Parks for Women*, Toronto, City of Toronto Planning and Development Department.
- City of Toronto 1990b, "Planning for a Safer City", *Cityplan 91*, 10, Toronto, City of Toronto Planning and Development Department.
- City of Toronto Safe City Committee 1990c, *The Safe City Committee: First Annual Report, 1989-1990*, Toronto, City of Toronto.
- City of Vancouver 1976, Appendix A: Parking Facility Design Guidelines, adopted by Vancouver City Council, October 5, 1976, Vancouver, City of Vancouver.
- Clarke, R. V. G. 1980, "Situational Crime Prevention: Theory and Practice", *British Journal of Criminology*, 20.
- Clarke, R. V. G. (ed), 1992, *Situational Crime Prevention: Successful Case Studies*, New York, Harrow and Heston.
- Clarke, R. V. G. 1995, "Displacement: An Old Problem in New Perspective", in Gregory Saville (ed), *Crime Problems, Community Solutions: Environmental Criminology as a Developing Prevention Strategy*, Port Moody, British Columbia, AAG Publications.
- Clarke, R. V. G., and Mayhew, P. (eds), 1980, *Designing Out Crime*, London, HMSO.
- Clarke, R. V. G., and Hope, T. 1984, *Coping With Burglary*, Boston, Kluwger-Nijhoff.
- Clarke, Ronald V. 1989, "Theoretical Background to Crime Prevention Through Environmental Design (CPTED) and Situational Prevention", pp 13-19 in Susan Geason and Paul R. Wilson (eds), *Designing out Crime: Conference Proceedings*, Canberra, Australian Institute of Criminology.
- Cleveland, G. and Saville, G. 1997, "Second Generation CPTED and School Safety", paper presented at the 2nd Annual International CPTED Conference, Orlando, Florida.
- Crittenden, I. 1986, "Break and Enter Offenders in South Australia", in S. K. Mukherjee and L. Jorgensen (eds), *Burglary: A Social Reality, Proceedings of Seminar on Burglary*, Canberra, Australian Institute of Criminology.
- Cromwell, Paul, Olson, James N. and Avary, Wester 1991, *Breaking and Entering: An Ethnographic Analysis of Burglary*, Newbury Park, Sage.
- Crowe, Timothy D. 1990, "Designing Safer Schools", *School Safety*, Fall, pp 9-13.
- Crowe, Timothy D. 1991, *Crime Prevention Through Environmental Design: Applications of architectural design and space management concepts*, Boston, Butterworths/Heinean.
- Forrester, D., Chatterton, M. and Pease, K. 1988, *The Kirkholt Burglary Project, Rochdale*, Home Office Crime Prevention Unit, Paper 13. London, HMSO, Home Office.
- Geason, Susan, and Wilson, Paul (eds), 1989, *Designing out Crime: Conference Proceedings*, Canberra, Australian Institute of Criminology.
- Gladwell, Malcolm 1996, The Tipping Point, in *The New Yorker*, June 3.
- Geason, S. and Wilson, P. 1989, *Designing Out Crime: Crime Prevention Through Environmental Design*, Canberra, Australian Institute of Criminology.
- Home Office Crime Prevention College 1996, *Campaign Trail for Safety Message*, London, Home Office.
- Jacobs, Jane 1961, *The Death and Life of Great American Cities*, London, Jonathan Cape and New York Vintage.
- Jeffery, C. R. 1971, *Crime Prevention through Environmental Design*, Beverly Hills, Sage.
- Jeffery, C. R. 1997, *Crime Prevention through Environmental Design*, Beverly Hills, Sage.
- Kaplan, H. M., O'Kane, K. C., Lavrakas, P. J. and Pesce, E. J. 1978, *Crime Prevention Through Environmental Design*, final report on commercial demonstration in Portland, Oregon, Washington, D.C., Westinghouse Electric Corporation.
- Labs, K. 1989, "PIA Technics: Deterrence by Design", *Progressive Architecture*, 11, pp 100-103.
- Lavrakas, Paul and Kushmuk, J. W. 1986, "Evaluating Crime Prevention Through Environmental Design: the Portland Commercial Demonstration Project", pp 202-227 in D. Rosenbaum (ed), *Community Crime Prevention: Does It Work?* Beverly Hills: Sage.
- Laycock, Gloria 1984, *Reducing Burglary: A Study of Chemists' Shops*, Crime Prevention Unity, Paper 1, London, Home Office Crime Prevention Unit.
- Maguire, M. 1980, "Burglary as opportunity", *Home Office Research Unit Bulletin*, 10, pp 6-9.
- Marcus, Clare Cooper and Francis, Carolyn 1990, *People Places: Design Guidelines for Urban Open Space*, New York, Van Nostrand Reinhold.
- Marcus, Clare Cooper, and Sarkissian, Wendy 1986, *Housing as If People Mattered: Illustrated Site Planning Guidelines for Medium-Density Family Housing*, Berkeley, University of California Press.
- Ministry of Justice 1994, *Police Label Safe Housing*, Amsterdam, Steering Committee Public Housing Experiments.

- Moran, Rosalyn, and Dolphin, Ciaran 1986, "The Defensible Space Concept: Theoretical and Operational Explication", in *Environment and Behavior*, 18 (3).
- Nelson, J. F. 1979, "Implications for the Ecological Study of Crime: A Research Note," in W.H. Parsonage (ed) *Perspectives on Victimology*, Beverly Hills, Sage.
- Newman, Oscar 1969, *Physical Parameters of Defensible Space, Past Experience and Hypotheses*, New York, Columbia University Press.
- Newman, Oscar 1972, *Defensible Space: People and Design in the Violent City*, London, Architectural Press.
- Newman, Oscar 1973, *Defensible Space: Crime Prevention Through Environmental Design*, New York, Collier Books.
- Newman, Oscar 1975, *Design Guidelines for Creating Defensible Space*, Washington, DC, USGPO.
- Newman, Oscar 1996, *Creating Defensible Space*, Washington, DC, US Department of Housing and Urban Development, Office of Policy Development and Research.
- Painter, K. 1989, *Lighting and Crime Prevention for Community Safety: The Tower Hamlets Study*, first report, London, Centre for Criminology, Middlesex Polytechnic.
- Painter, K. and Bainbridge, D. 1992, *The Impact of Public Lighting on Crime, Fear of Crime and Quality of Life: A Study of the Moseley, Showell Green area of Birmingham*, Aston Business School, University of Cambridge.
- Pascoe, Tim and Topping, Phil 1997, "Secure by Design: Assessing the Basis of the Scheme", paper accepted for publication in the *International Journal of Risk, Security and Crime Prevention*, spring/summer.
- Peel Regional Police, Crime Prevention Services (nd), *Crime prevention Through Environmental Design: Homes, Business, Public Spaces*, briefing note, Brampton, Ontario, Canada, Peel Regional Police.
- Peel Regional Police, Burglary Prevention Program 1995, *Hardening the Target: Proposed Amendments to the Ontario Building Code*, Brampton, Ontario, Canada, Peel Regional Police, March.
- Perlgut Donald J. 1983, *Manageable Space, Crime Prevention and the Design and Management of Public Developments in Australia*, report of a research project funded by the Criminology Research Council, Canberra, Sydney Social Impacts Publications.
- Perlgut, Donald J. 1983, "Vandalism: the Environmental Crime," *Australian Journal of Social Issues*, 18 (3).
- Piombini, Marino 1987, *Crime Prevention Through Environmental Design: The Status and Prospects for CPTED in British Columbia*, unpublished Masters Thesis, Vancouver: School of Community Planning, University of British Columbia.
- Plaster, S. and Carter, S. 1993, *Planning for Prevention: Sarasota, Florida's Approach to Crime Prevention Through Environmental Design*, Tallahassee, Florida, Florida Criminal Justice Executive Institute, Florida Department of Law Enforcement.
- Poyner, Barry 1982, *Crime Prevention through Environmental Design and Management: an Overview*, Home Office Research and Planning Unit, Research Bulletin No. 131, London, HMSO, pp 2-5.
- Poyner, Barry and Webb, B. 1991, *Crime Free Housing*, Oxford, UK, Butterworth.
- Poyner, Barry 1991, "Situational crime prevention in two parking facilities", *Security Journal*, 2, pp 96-101.
- Poyner, Barry 1994, "Lessons from Lisson Green: An Evaluation of Walkway Demolition on a British Housing Estate", pp 127-51 in R. V. G. Clarke (ed), *Crime Prevention Studies*, Vol. 3. Monsey, NY, Criminal Justice Press.
- Poyner, Barry 1983, *Design Against Crime: Beyond Defensible Space*, London, Butterworths.
- Purdie, Anne 1986, *Crime Prevention Through Environmental Design Manual*, Halton Regional Police, Oakville, Ontario.
- Ramsay, M. and Newton, R. 1991, *The Effect of Better Street Lighting on Crime and Fear: A Review*, Crime Prevention Unit Paper 29, London, Home Office.
- Safe Neighbourhoods Advisory Unit 1989, *Safer Neighbourhoods: Re-designing Housing Developments to Reduce Crime and Enhance Community Safety*, York, UK, University of York, Institute of Advanced Architectural Studies.
- Samdahl, D. and Christiansen, H. 1985, "Environmental cues and vandalism: An Exploratory Study of Picnic Table Carving", *Environment and Behavior*, 17, pp 445-458.
- Sampson, Robert J. and Lauritsen, Janet 1990, "Deviant Lifestyles, Proximity to Crime, and the Offender-Victim link in Personal Violence", *Journal of Research in Crime and Delinquency*, 27 (2), pp 110-139.
- Sarkissian, Wendy 1989, "Safe as Houses: the Role of Residents and the Community of Users in Environmental Crime Prevention", pp 47-56 in Susan Geason and Paul R. Wilson (eds), *Designing out Crime Conference Proceedings*, Canberra, Australian Institute of Criminology.
- Sarkissian, Wendy with Forsyth, Ann and Stewart, Kristin 1992, *AMCORD Urban, Housing Needs of Non-traditional Households: Supplementary Volume to the Australian Model Code for Residential Development: Crime Prevention, Housing for Children, Single-Parent Families and Single People Without Dependents*, Canberra, AGPS.

- Saville, Gregory and Wong, Paul 1994, "Exceeding the Crime Threshold: The Carrying Capacity of Neighbourhoods", paper presented at the *53rd Annual Meeting of the American Society of Criminology*, Miami, Florida.
- Saville, Gregory and Wong, Paul 1991, "Cultivating New Urban Forms: Introducing Situational Prevention Measures into the Planning Process of Multinucleated Centres", paper presented at the *50th Annual Meeting of the American Society of Criminology*, San Francisco.
- Saville, Gregory 1988, "Planning and Environmental Criminology: Development of a Hybrid", *Ontario Planning Journal*, 3 (2), pp 5-6.
- Saville, Gregory 1991, "Transdisciplinarity, Environmental Criminology, and the Toronto Subway Security Audit", *Security Journal*, 2 (4), pp 291-296.
- Saville, Gregory 1995, *Crime Problems, Community Solutions: Environmental Criminology as a Developing Prevention Strategy*, Port Moody, BC, AAG Publications.
- Saville, Gregory 1996, Searching for a neighborhood's crime threshold, *Subject to Debate*, 10 (10), Washington, DC, Police Executive Research Forum Publication, pp 1-6.
- Saville, Gregory 1996, "Situational crime prevention as responsible urban design", *Plan Canada*, 36 (2), pp 27-28.
- Saville, Gregory and Wright, David 1998, *Putting Neighbours back in the neighbourhood: Strategies for Safety, Urban Design and Cohousing*, paper presented at the 1998 Biennial Meeting of the Western Association of Sociology and Anthropology, Vancouver, Canada.
- Shaw, K. 1979, "Vandalism and Public Lighting Systems", pp 44-46 in Design Council and Royal Town Planning Institute, *Streets Ahead*, Rugby, UK, Jolly and Barger Ltd.
- Spelman, William 1992, "Abandoned Buildings: Magnets for Crime?", *Journal of Criminal Justice*, 21, pp 481-95.
- Stevens, Owen 1987, "Lighting Design: A Primary Consideration in Crime Prevention and Detection", *Canadian Security*, May/June, pp 22-24.
- Stevens, Owen 1987, "Lighting Design II: How to Protect Against Vandals and Provide Safety for Guards", *Canadian Security*, July/August, pp 32-34.
- Stevens, Owen 1987, "Lighting Design III: Providing Security and Safety for Walkways and Parking Areas", *Canadian Security*, September/October, pp 18-21.
- Stewart, Kristin 1991a, Summary of Literature on Environmental Crime Prevention, report prepared for the Attorney General's Department, South Australia.
- Stewart, Kristin 1991b, Summary of Review of New Literature on Environmental Crime Prevention, report prepared for the Attorney General's Department, South Australia, Coalition Against Crime, March.
- Stewart, Kristin 1991c, Environmental Crime Prevention: A Review of Recent Crime Prevention Literature, Adelaide, Sarkissian Associates Planners.
- [Toronto] Metro Action Committee on Public Violence Against Women and Children 1989, *Moving Forward: Making Transit Safer for Women*, Toronto, METRAC.
- [Toronto] The Safe City Committee 1990, The Safe City Committee: First Annual Report, 1989-1990, City of Toronto.
- Toronto Transit Commission, METRAC, and the Metro Toronto Police Force 1989, *Moving Forward: Making Transit Safer for Women*, Toronto, TTC.
- Valentine, Gill 1990, "Women's Fear and the Design of Public Space", *Built Environment*, 16 (4), pp 288-303.
- van der Voordt, Theo and van Wegen, Herman 1993, "The Delft Checklist on Safe Neighbourhoods", *Journal of Architectural and Planning Research*, 10 (4), pp 341-355.
- van Soomeren, Paul and Woldendorp, Tobias 1996, "Secured by Design in the Netherlands", *Security Journal*, 7, pp 185-95.
- Waller, I. and Okihiro, N. 1978, *Burglary: The Victim and the Public*, Toronto, University of Toronto Press.
- Wekerle, G., City of Toronto and Safe City Committee 1992, *A Working Guide for Planning and Designing Safer Urban Environments*, City of Toronto: Planning and Development Department.
- White, Garland F. 1990, "Neighbourhood Permeability and Burglary Rates", *Justice Quarterly*, 7 (1) pp 57-67.
- Whitzman, Carolyn 1992, "Taking Back Planning: Promoting Women's Safety in Public Places—the Toronto Experience", *Journal of Architectural and Planning Research*.
- Whyte, William H. 1980, *The Social Life of Small Urban Spaces*, Washington, DC, The Conservation Foundation.
- Whyte, William H. 1988, *City: Rediscovering the Center*, Doubleday: New York.
- Wilson, J.Q. and Kelling, G. L. 1982, "Broken Windows: The Police and Neighbourhood Safety", *The Atlantic Monthly*, March, pp. 29-38.
- Wilson, J. Q. and Kelling, G. L. 1989, "Making Neighborhoods Safe", *The Atlantic Monthly*, February, pp 46-52.
- Wright, J. L. and Thomas, R. L. 1992, "Crime Prevention Through Environmental Design", *Aslet Journal*, 7 (3), pp 14-17.
- Wright, R., Heilweil, M., Pelletier, P. and Dickinson, K. 1974, *The Impact of Street Lighting on Street Crime*, Ann Arbor, MI, University of Michigan.
- Zehring, T. L. 1994, "Mesa Crime-Free Multi-Housing Program", *Law Enforcement Bulletin*, 63 (6), pp 8-12.

INDEX

- Activity generators, 8, 28
- Automatic Teller Machines, 21, 26, 27, 52
- Barrier-free access, 41
 - Slopes, 46
 - Walkway widths, 46
- Bicycle paths, 35, 26
- Building elements, 9
- Bus stops, 15, 16, 27, 35, 37–39
- Car parks, 13, 15, 18, 21, 29, 31–34
 - Signs, 33
 - Size, 33
- Commercial centres, 26–27, 42
 - Civic and town centres, 26–27
- Community facilities, 29
- Conflicting user groups, 8, 30, 41
- Crime prevention through
 - environmental design, 1–2, 8, 19, 38, 45
- Defensible space, 45
- Displacement, 9
- Edge effects, 8
- Entrapment spaces, 13, 16, 17, 20, 21, 27, 40, 43
 - Building design, 17
- Fences, 28, 29
- Footpaths, 14, 20, 27, 40, 41
 - Materials, 46–47
- Graffiti, 20, 22, 23, 29
- Hotspots, 9
- Landscaping, 3, 8, 14, 15, 18, 19, 20, 32, 33, 42
 - Bicycle paths, 36
- Licensed premises, 21, 26
- Lifts, 17
- Lighting, 4, 12–14, 21, 22, 28, 29, 36, 37, 38, 40, 49, 50–51
 - Buildings, 18
 - Car parks, 13, 31
 - Older people, 12, 14
 - Pedestrian lighting, 12, 13, 40
 - Types, 13
- Location Guidelines for Community and Recreation Facilities*, 29
- Maintenance, 14, 16, 19, 22, 29, 30
- Mix of land uses, 18–19, 26, 28
- Movement predictors, 8, 35
- Natural surveillance, 3, 8, 14–15, 17, 19, 27, 30
 - Buildings, 18, 35
 - Bus stops, 39
 - Car parks, 32
 - Sightlines, 15, 18, 19, 21, 28, 32
- Older people, 48
 - Bus stops, 38
- Public open space, 12, 17, 27–29, 34
- Public toilets, 13, 41
- Public transport, 3, 27, 29, 30, 37–39, 42, 52
- Residential developments, 34–35
- Risk assessment, 2, 7–9, 19, 26, 28, 29, 30, 36, 38, 39, 42
- Safe routes, 13, 16, 28, 33, 36, 39
- Safety audit, 8, 28, 52
- Sightlines, 8, 14, 15, 17, 18, 19, 21, 27, 28, 30, 36, 39, 40, 42, 49
 - Car parks, 32
- Signs, 9, 16, 33, 37, 42, 48
- Space hierarchy, 35
- Sustainability, 5
- Taxi ranks, 16, 27, 37, 39
- Territory Plan, 2
- Transport, 3, 4, 27, 29, 30, 35
 - Bus shelters, 38
 - Public transport, 42
- Underpasses, 36
- Vandalism, 14, 17, 22, 42
- Young people, 3, 30, 39, 42

