CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN

CPTED PROGRAM MANUAL

Volume III
Analytic Methods Handbook

Prepared by

Imre R. Kohn, Westinghouse Electric Corporation
Richard M. Locasso, Westinghouse Electric Corporation
Avishay Dubnikov, Westinghouse Electric Corporation

April 1978

This project was supported by Contract No. J-LEAA-022-74 awarded by the Law Enforcement Assistance Administration, U. S. Department of Justice, under the Omnibus Crime Control and Safe Streets Act of 1968, as amended. Points of view or opinions stated in this document are those of the authors and do not necessarily represent the official position or policies of the U. S. Department of Justice.

Westinghouse Electric Corporation
Arlington, Virginia 22202

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

APPENDICES

PREFACE

Crime is one of the most significant social problems in the United States, requiring innovative and varied solutions for reduction and prevention. Although Federal, State, and local governments have committed enormous resources towards combatting crime, the fear of crime is a discomforting facet of everyday living in many communities. This fear has combined with other social forces to undermine the vitality of commercial areas, has led to the abandonment of residential areas as families are prompted to flight, enmeshed school administrations with internal disorders which have disrupted educational activities, and has often hastened declines in public transportation ridership.

NILECJ has recognized the need for research and the development of new approaches for crime prevention and the restoration of personal security. Because the environment in which we live is such a fundamental determinant of how we act and perceive our surroundings, it is both natural and imperative that we seek an understanding of its influence upon both crime and the fear of crime within our society.

In 1974, a major exploration of techniques for Crime Prevention Through Environmental Design (CPTED) was initiated with an award to a consortium of firms headed by the Westinghouse Electric Corporation.

The goal of the CPTED Program is to develop and demonstrate design concepts for urban environments that will reduce crime and im-

prove the quality of urban life by reducing the fear of crime. Specific objectives of the Program are:

- To consolidate and extend CPTED concepts that bear upon the prevention of crime in urban settings.
- To mount demonstration projects for the evaluation and refinement of CPTED concepts.
- To distill the concepts and demonstrations' findings into guidelines suited to architects, planners, and developers.
- To disseminate and institutionalize Program results on a wide basis.

There are several products developed by Westinghouse that are based on the experience and knowledge gained from the CPTED Demonstrations. These products were developed with the explicit purpose of articulating and formalizing the process involved in planning and implementing a CPTED project. Chief among these products is the CPTED Program Manual. The Program Manual, which consists of three volumes, was produced to assist urban designers and criminal justice planners in determining the applicability and feasibility of the CPTED concept to the solution of crime or fear-of-crime problems in various different urban environments. The Program Manual also provides detailed guidance for the planning and implementation of a CPTED project. Volume I, the Planning and Implementation Manual, describes the planning framework and related project management activities. Volume II, the Strategies and Directives Manual, presents a catalog of strategies, together with

examples of specific design directives. Volume III, the Analytic Methods Handbook, provides a catalog of appropriate analytic techniques.

The support of the Law Enforcement Assistance Administration is greatly appreciated. Blair Ewing and Fred Heinzelmann of the National Institute of Law Enforcement and Criminal Justice provided essential support for tne CPTED Program. Efforts of other Institute staff - Lois F. Mock - are appreciated. Richard M. Rau and Richard M. Titus, initial and current monitors of the Program for LEAA, have contributed substantially to the effort by resolving problems and providing proper perspective between this program and other research activities.

The consortium also wishes to express its thanks to R.A. Carlston and Dr. L.F. Hanes of Westinghouse National Issues Center especially for their foundation-laying contribution during Phase I of the project. We also thank as a group those many individuals at the demonstration sites who contributed to the development and testing of many elements contained in the Program Manual.

Special acknowledgments are made to the following contributors to this volume:

Leonard B. Bickman, Westinghouse Electric Corporation
David Celeste, Jr., Westinghouse Electric Corporation
John Edwards, Loyola University, Chicago
Jeffrey Henig, George Washington Universtiy
Paul J. Lavrakas, Westinghouse Electric Corporation
Michael G. Maxfield, Northwestern University
W. William Minor, University of Maryland
Charles Wheeler, Mott-McDonald Associates, Inc.

William Minor contributed to the development of Appendix A and, with the assistance of Charles Wheeler, provided a review of the literature on criminal behavior in Appendix B. Also in Appendix B, David Celeste, Jr., reviewed the literature on crime displacement and Jeffrey Henig and Michael Maxfield reviewed the literature on fear of crime. Paul Lavrakas and John Edwards, with the assistance of Leonard Bickman, produced most of the sections in Appendix D.

Finally, Westinghouse wishes to express its grateful appreciation to the following, who provided guidance and review in the evaluation of the CPTED Program Manual and who offered suggestions for its improvement, many of which have been incorporated in this revised version: Sue Heller, Ellen Barhar, and Peter Hart (Cooperative Community Planning, Department of City Planning, New York), Captain Ernest Howard (Crime Prevention Bureau, Middletown, Ohio, Division of Police), Sherry Kinikin (Bowie Against Burglary, Bowie, Maryland), Peirce Eichelberger (Planning Department, Miami, Florida), Lt. W.N. Shoup (Research and Development Section, Arlington County, Virginia, Police Department), Richard Clark (Crime Analysis Team, Criminal Justice Coordinating Council, Atlanta, Georgia), Paul W. Newhouse (St. Louis Commission on Crime and Law Enforcement, St. Louis, Missouri), Richard L. Buck (Forest Preserve District of Cook County, Illinois), Jack H. Cornelius and Robert J. Johannigman (Chicago Central Area Committee, Chicago, Illinois), James W. Taylor (Essex County Park Commission, Newark, New Jersey), Carlie E. Evans (Alamo Area Council of Governments, San Antonio, Texas), Barney

Ring (San Antonio Police Department, San Antonio, Texas), Patricia A. Cain (Leon Valley Police Department, San Antonio, Texas), Michael L. Holder and George Pena (University of Texas at San Antonio, Texas), Kathleen H. Korbelik, Sheila R. Castillo, and Susan J. Lukonits (Chicago Department of Planning, Chicago, Illinois), Lt. Joseph M. Seiffert (Alexandria, Virginia, Police Department), Richard Kleiner (Crime Prevention Unit, San Jose Police Department, San Jose, California), John L. Jones (Denver Anti-Crime Council, Denver, Colorado), James R. Jarboe, Jr., and Kay Nelson (Office of the Mayor, Criminal Justice Planning, Jacksonville, Florida), Sgt. George Haddock (Community Relations, San Diego Police Department, San Diego, California), E. Larry Fonts (Central Atlanta Progress, Inc., Atlanta, Georgia), Gerald B. Gersey (Illinois Law Enforcement Commission, Chicago, Illinois), Lt. William F. Swayne (Dallas Park Police, Dallas, Texas).

CHAPTER 1. INTRODUCTION

1.1 Purpose and Scope

The purpose of the Analytic Methods Handbook (AMH) is to assist criminal justice and urban planners and analysts in finding and generating information about an environmental setting for which a CPTED (Crime Prevention Through Environmental Design) project is being planned and implemented. Using a nonmathematical approach, the AMH describes analytical methods that can be used to accomplish necessary information-gathering steps for diagnosing crime and fear-of-crime problems, and for evaluating strategies designed to deal with these problems.

While it is expected that the AMH will help define problems and point to solutions, it should not be treated as an algorithm (i.e., a fixed set of step-by-step procedures yielding a given result). The current state-of-the-art is inadequate with respect to delineating procedures that, if followed, would lead to site-specific solutions. Rather, the user should anticipate that, after having carefully studied crime and crime-related problems in a community, considerable creative judgment will still be required to determine what types of CPTED prevention approaches should be adopted. Additionally, solutions must be tailored to existing environmental resources and constraints.

The AMH is intended to be used in conjunction with the other two components of the CPTED Program Manual, Volume I -- CPTED Planning and Implementation Manual, and Volume II -- CPTED Strategies and Directives Manual.

The first provides a basic and comprehensive framework for organizing and coordinating the various stages and activities involved in a CPTED project. The second presents an array of CPTED strategies within the context of defined problems, issues, and remedial objectives. *The Planning and Implementation Manual should be read thoroughly prior to working with the Strategies and Directives Manual or the Analytic Methods Handbook intensively.*

The AMH has three introductory chapters and four appendices (A through D). The three chapters give an overview of the crime/environment analysis process, a theoretical perspective, and the basics of data collection methods with guidelines covering the coordination of analytic objectives and resources. Each appendix treats an aspect of crime/environment analysis in depth. Appendices A and B expand on the theoretical discussion in Chapter 2. Appendix C concerns the use of police records, and Appendix D covers CPTED evaluation designs and procedures.

Coordinated with the AMH, but presented in a separate volume, are five CPTED Technical Guidelines which contain material with more of a how-to-do-it flavor concerning environmental assessment methods (Guideline 1), behavioral observation methods (Guideline 2), fear of crime surveys (Guideline 3), victimization surveys (Guideline 4), and quantitative analytic techniques (Guideline 5). These guidelines are written with the assumption that the reader is familiar with the fundamentals of data gathering but may never have had exposure to, or experience with, a specific method and

the type of data generated by that method. For example, Guidelines 3 and 4 assume a general understanding of the interview method (e.g., the types of information that can be obtained, the advantages and disadvantages of surveys). As a result, the contents focus on specific issues concerning instrument design, measurement errors, data coding requirements, and particular validity and reliability problems.

1.2 Potential Users

The AMH is specifically designed to address the requirements of two broad categories of users: Planners and analysts.

1.2.2 Planners

Environmental change via CPTED planning involves physical design, social methods, management programs, and law enforcement techniques. These methods must be programmed, coordinated, and operationalized in such a manner as to clearly articulate CPTED goals and procedures. The CPTED Strategies and Directives Manual presents a full discussion of alternative CPTED approaches, but the AMH is also useful to planners for ascertaining what data collection activities should be undertaken. In this regard, Chapter 2 (The Crime/Environment Perspective) is helpful because it describes the CPTED approach for studying crime- and environment-related problems. It is recommended that CPTED planners also review Chapter 3 (Crime/Environment Methods) to familiarize themselves with the range and diversity of CPTED-related methods.

1.2.3 Analysts

Once planning tasks are established, analysts will be called upon

to execute them. For instance, if a planner wishes to use local police data, it is anticipated that he would call upon the services of someone (perhaps from his own staff) who is knowledgeable about the usefulness and limitations of archival data in general and, within the context of a particular locale, is capable of deciding whether to limit crime/environment analyses to available police records or to undertake other data collection efforts. Appendix C describes the types of information that may be available and provides examples of police recording forms.

It is possible that many users will not be directly concerned with the CPTED concept but would like to familiarize themselves with the contents of specific appendices or guidelines. Each appendix or guideline is so organized to minimize its dependence on material covered in other parts of the AMH. Thus, after reading the present chapter, these Handbook users can proceed to any section of interest.

Among those working with the AMH within the context of a planned or ongoing CPTED project, the three chapters should be read in sequence to gain an understanding of the analytic process and the planning considerations involved in developing an agenda. The reader's need to refer to other material will depend upon decisions about the type and level of data collection activities being planned. Such decisions could be made after reading Chapter 3 because it outlines the basic data collection methods and provides guidance for using the appendices and guidelines.

1.3 Overview of the Crime/Environment Analysis Process

The purpose of this section is to provide a conceptual overview of a process for collecting, interpreting, and using crime-related and environment-related information to design and implement crime prevention strategies. All of the procedures presented in this section are covered in greater detail in Chapter 3.

Figure 1-1 displays the series of steps involved. Essentially, the process begins when a decision is made to initiate a CPTED project. The early activities involve identifying and studying crime-related problems and issues; then, a careful and comprehensive analysis is made of the identified problems. The later analytic activities involve interpreting collected data and translating the findings into program directives.

The nature and direction of activities during any phase of this process can be modified by inputs provided by citizen/user groups and management decisions concerning whether and to what extent evaluation should be included. If a decision is made to include evaluation, the data-gathering activities used to define problems in precise terms also serve to provide baseline data for project monitoring and impact assessments during and following the implementation of CPTED project activities. The following subsections describe specific tasks that can be undertaken during each phase of the process, as shown in Figure 1-1.

1.3.1 Delineation of Issues and Problems

As indicated above, this will allow the project team to establish project objectives with respect to existing crime and crime-related problems within the study area. Through systematic and comparative

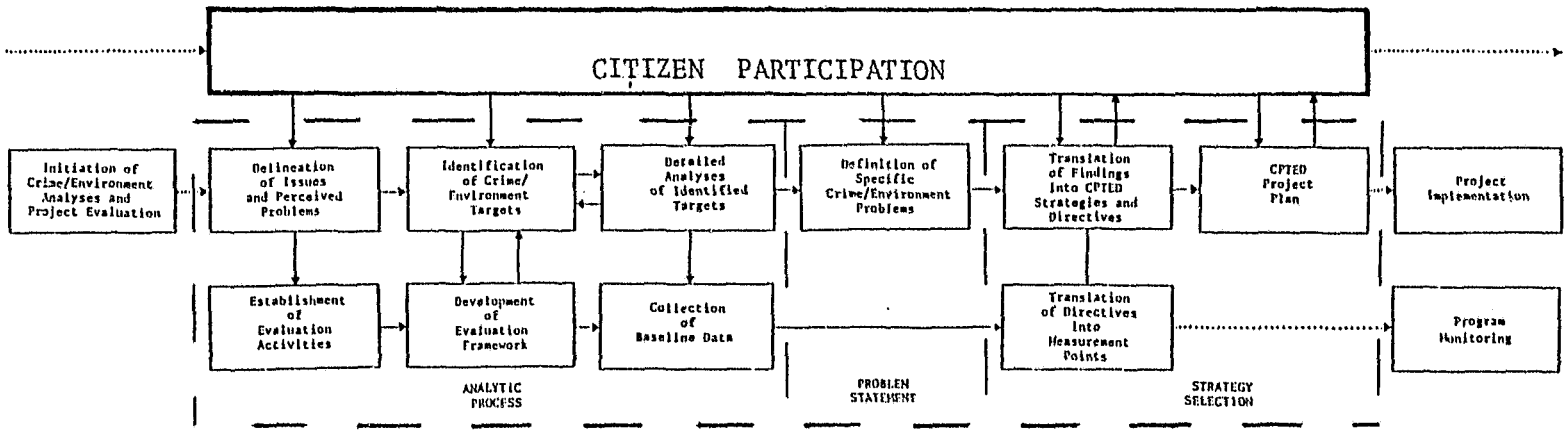


Figure 1-1. Overview of the Crime/Environment Analytic Process

analysis of existing police and census records, a foundation is prepared for focusing on well-documented problems. Specifically, this phase of the process entails:

- Conducting field trips to assess the nature of the project environment and the user population.
- Looking at summary data reports on crime, housing, and population characteristics.
- Meeting informally with individuals or groups.

1.3.2 Identification of Crime/Environment Targets

A crime/environment target is a specific type of crime studied within the context of a specific environmental setting (e.g., residential burglaries in relation to single-family detached houses, personal robberies within the context of outdoor parking lots). Identifying crime/environment targets for detailed examination involves the following activities:

- Conducting structured in-depth interviews with knowledgeable individuals (police, community leaders, persons holding political offices).
- Examining police Offense Reports for an assessment of types and frequencies of crimes, offender methods, temporal and locational data.
- Studying the nature of fear of crime by surveying the population of the project area.
- If the Offense Reports are inadequate for establishing accurate crime rates, conducting a victimization survey.

1.3.3 Project Evaluation

During the initiation of data compilation, certain decisions must also be made about evaluation activities, including whether to conduct an evaluation. The individuals in charge should consider alternative types of evaluation. If evaluation is to be included in the planning agenda, these individuals must then specify the data elements that will be necessary for it. Knowledge about the physical and social environment is important for establishing proximate goals and conducting useful monitoring. Proximate goals are the linkages between project activities and project objectives. For example, if a project goal is to reduce fear, knowledge about existing fear problems is necessary for the measurement of an increase or decrease in the level of fear.

The monitoring system could also be used to establish data gathering priorities. For example, burglary in single-family homes may be the priority crime target at the outset of a project. By designing a system for recording land use characteristics associated with burglaries, the analysts are able to detect a shift in patterns more quickly (e.g., the trend may shift to robbery in food stores). If this occurred, the analyst could analyze various factors in an effort to determine reasons for the shift and design alternative strategies for the commercial robbery problem.

1.3.4 Detailed Analysis of Identified Targets

Regardless of whether evaluation is part of the project agenda, it will be necessary to conduct detailed examinations of specific crime/environment targets. The methods involved are designed to give precise

information about the nature and use of specific settings. Two approaches are recommended:

- Conducting structured observations of environmental design features and of how such features are used,
- Interviewing specific users of targeted areas for their perceptions of relevant crime/environment variables.

In some instances, there may be voids in the findings. For example, the clearance rate for burglaries may be too low to provide information about offender behavior in specific environments. If this should occur, the planners may wish to initiate additional studies concerning this aspect of the problem, or they can rely on interviews with police officials and community leaders. In the Minneapolis Demonstration, there was very little data on burglary offenders and suspects. However, independent interviews with the police, neighborhood residents, and business organizations provided a strong consensus of opinion that the primary offenders were neighborhood juveniles. These perceptions were consistent with the limited amount of available offender and suspect data. This synthesis of approaches provided a basis for establishing the salient characteristics of a crime-and-fear problem.

In many cases, a sound crime/environment analysis will provide considerable direction for the reduction of some portion of the problem. For example, in Broward County, Florida,* an overlay of reported assaults

*See preface of Volume I for details on the schools demonstration project in Broward County.

on a blueprint of the school facilities revealed that the majority of assaults occurred in the bus-loading area. This finding prompted the planning team to conduct use-of-space observations in that area of the school grounds and at the same time to conduct informal interviews among students and teachers to ascertain why this offense occurred frequently in this type of environmental setting. Ultimately, this combination of approaches showed that a primary reason for the high assault rate was a poorly organized bus transportation system. A redesign of the bus-loading area and changes in the loading schedule were intended to reduce the impromptu assaults that were occurring because of crowding and frustration on the part of students.

1.3.5 Translation of Findings into Project Directives

The final phase of the analytic process involves defining crime/environment problems and culling a subset that are most amenable to CPTED solutions, whether achieved through physical design programs, social programs, management programs, or law enforcement programs. The procedures involved in selecting appropriate strategies and designing an implementation plan are addressed in Chapter 5 of the Planning and Implementation Manual.

CHAPTER 2. THE CRIME/ENVIRONMENT PERSPECTIVE

2.1 Introduction

The diversity of CPTED strategies presented in Volume II of the Program Manual is broad, but all strategies have one feature in common: Crime and fear-of-crime problems are examined in terms of environmental variables, social as well as physical, that foster or impede the commission of crimes. Thus, a crime problem is viewed as a crime/environment problem because the focus is on solutions that treat the environment in such a way as to lessen the vulnerability of potential victims, increase the level of effort involved in committing a crime, reduce the potential payoff to the offender, and improve the chances of apprehension. Table 2-1 provides a few examples of the relationship between environmentally defined crime problems and possible CPTED solutions. These examples apply generally to small-scale settings (such as schools, housing complexes, or institutional facilities). This chapter presents a theoretical perspective for conducting crime/environment analyses and identifies the key categories of CPTED variables that should be studied.

2.2 A Theoretical CPTED Perspective

To study crime-environment relations in a way that is useful for the selection of appropriate CPTED intervention strategies, a comprehensive theoretical perspective is needed to understand the complex manner in which elements of the physical and social environment interact to affect levels of crime and fear. The CPTED approach emphasizes the functional

TABLE 2-1

Examples of Crime-Environment Problems and Related CPTED Strategies

Crime-Environment Problem	CPTED Strategies
Isolated and little-used corridors -- preemption of space by groups impeding traffic flow, producing confrontations and fear of assault. Areas are hard to supervise and are avoided by legitimate users, which increases isolation and lack of natural surveillance.	Provide clear definition of the dominant function (and intended use of space) and clearly define transitional zones to increase territorial concern and natural surveillance. Provide a functional activity (or redesignate use) in blind spots or isolated areas to increase natural surveillance (or the perception thereof). Remove obstacles to natural surveillance (increase perception of openness).
Breaking and entering, theft, and vandalism of autos, due to poor design of parking lots.	Redesign parking lots to provide levels of security consistent with variable access needs.
Fear of assault, robbery, or other crime in restrooms.	Remove obstacles to natural surveillance to decrease fear, to increase use, and to increase the risk of detection. Limit access to isolated areas during specific times for access control and to reduce the necessity for surveillance.

aspect of physical and urban design in thwarting criminal intrusion and encouraging users to assume primary responsibility for ensuring adequate safety and control over their immediate surroundings.

If CPTED strategies are to be effective, they must serve a dual function. First, they must instill a sense of confidence and security in the use of the environment on the part of legitimate users and, second, they must create an impression for potential offenders that opportunities for crime in the target environment are nonexistent or are not worth the effort or risk involved. Thus, CPTED strategies are designed to affect the perceptions of legitimate users and offenders, as well as to bring about actual changes in the environment.

One theoretical perspective that can be helpful in the identification of key crime/environment variables is OTREP. The OTREP proposition is that criminal Opportunities are a function of four factors: Target, Risk, Effort, and Payoff. The focus is on crime/environment variables that relate to the decisionmaking process of a criminal.

It is assumed that criminals avoid low-opportunity environments (e.g., those that require much effort to commit a crime, where the risk of apprehension or punishment is high, where few targets exist, and where only a small payoff can be obtained). Similarly, it is assumed that criminals prefer an environment where opportunity is high because targets are available that allow crimes to be committed easily and quickly for large rewards, with little or no risk of apprehension. Based on the OTREP perspective, the important analytic questions to address are:

- What aspects of the environment are the most important to a potential criminal?
- How does the potential offender evaluate the available environments?
- What set of environmentally based dimensions is used in a criminal's decisionmaking process that distinguishes one environment from another?

Target is conceptualized as a dichotomous variable -- it is either present or absent. Conceived narrowly, target will rarely be a limiting consideration, since it can be said to exist whenever a potential victim or target and a potential offender are in proximity. The concept of *risk* implies that, as the risk of punishment or apprehension increases, the attractiveness of an environment (to a potential offender) decreases. This is precisely the notion of deterrence. The third factor, *effort*, assumes that an environment becomes less attractive as the physical effort required to commit a crime increases. The final OTREP concept is *payoff*, or the anticipated benefits of crime to the offender. As the payoff grows larger, the attractiveness of that environment to the criminal is assumed to increase. It should be noted that the payoffs of acquisitive crimes (e.g., robbery and burglary) are more susceptible to reduction through CPTED than are the payoffs of other types of offenses (e.g., murder and assault).*

---

*See Appendix A for a full discussion of the OTREP model.

The ideal environment is one in which no opportunity for any crime would exist. This environment would contain few targets, apprehension would be certain, the amount of effort that a criminal would have to expend would be inordinately high and, finally, the resulting payoff to the criminal for a successful crime would be negligible.

Conducting crime/environment analyses using the OTREP perspective need not be complicated. Moreover, this particular way of looking at possible causes of crime can be applied to a variety of environmental settings. The OTREP factors are fundamental to understanding the nature of crime/environment relations, because these factors will always be present to some degree in the environment.

2.3 Classification of Crime/Environment Variables

OTREP provides a frame of reference for studying environmental characteristics and isolating variables that may support or restrict criminal activity. If OTREP is to provide an empirically derived basis for selecting CPTED anticrime strategies, the crime/environment analysis must shed some light on numerous variables. Table 2-2 lists the types of variables that are important for this analysis. They have been grouped into nine categories:*

- Type of crime.
- Severity of the crime problem.
- Offender behavior.

*See Appendix B for a full discussion of these categories.

TABLE 2-2

Data and Variables Important to the Assessment of Crime-Environment Problems
(Page 1 of 2)

CATEGORY	VARIABLES
Type of Crime	Homicide Assault Rape Robbery Breaking and entering Larceny-theft Auto theft Vandalism Arson
Severity of Crime	Number of incidents by type of crime Number of incidents per capita, household or business establishment Extent of bodily harm per incident Extent of loss Whether the incident involved use of a weapon Whether the incident involved severe assault
Offender Behavior	Use of weapon Force Place of entry Method of entry Visibility of entry point Demographic characteristics (age, sex, area of residence, alone or with others)
Pattern of Crimes	Geographic location of incident Temporal characteristics (hour, day, month, year)
Environmental Design	Density of built environment Structural design Building codes and ordinances Location of street lighting Location of transit routes and waiting stations Location of public amenities (e.g., parks) Land use type Location of parking areas Landscaping and vegetation patterns Layout of streets, alleys, and pedestrian ways Spatial arrangements of buildings

TABLE 2-2

Data and Variables Important to the Assessment of Crime-Environment Problems
(Page 2 of 2)

CATEGORY	VARIABLES
Citizen/User Behavior	Age Sex Racial composition Income Education Family characteristics Community organization-interaction Transience of population Environmental use patterns Offender-victim relations (location when victimized, activity prior to victimization)
Law Enforcement Behavior	Police deployment practices Police community programs Use of private security forces
Displacement	Temporal Tactical Target Functional Territorial
Fear Behavior	Attitude profile Self-protective behavior Environmental associations

Note: This list of variables within each category is intended to be illustrative, not comprehensive. The Handbook user should look for additional variables that may be relevant to his situation.

- Geographic and temporal patterns of crime.
- Environmental design.
- Citizen/user behavior.
- Law enforcement behavior.
- Crime displacement.
- Fear behavior.

2.3.1 Type of Crimes

The crime categories addressed by CPTED are: Criminal homicide, forcible rape, robbery, aggravated assault, burglary, larceny, auto theft, simple assault, arson, and vandalism.

2.3.2 Severity of the Crime Problem

Basic to any prevention effort in a given community is the ability to assess the severity of a particular crime problem, as well as to ascertain what crimes are prevalent. Severity is commonly measured by tabulating the absolute number per crime and the rate. Depending on the type of offense, the rate may be calculated in terms of the number of residents (e.g., robbery), the number of dwellings (e.g., burglary), or some other unit of measurement that is relevant to the particular offense being assessed.

Severity should also be calculated in terms of specific attributes associated with particular incidents. For instance, a robbery rate per se does not reflect the extent of injury or dollar loss incurred.

2.3.3 Offender Variables

In addition to studying patterns of crime, it is important to examine other aspects of offender behavior. These variables include modus operandi (e.g., use of force, concealment, entry tactics, and extent of planning) and offender demographics (e.g., age, sex, and race). The specific variables involved depend on the type of offense being investigated. For example, in the case of burglary, the relevant variables are: Type of structure entered, place of entry, means of entry, the extent of property damage, and the extent of property loss.

It is important for the CPTED planner to ascertain for a given community whether specific offender techniques reflect different types of criminals or different environmental circumstances. That is, does the offender search for environmental opportunities to commit a specific type of crime, or does the offender adjust his behavior according to existing environmental constraints? For instance, if the opportunities for committing larceny are greatly reduced, do potential offenders respond by committing burglaries or robberies?

2.3.4 Patterns of Crime

The term *patterns* refers to geographic and temporal phenomena. With respect to geographic variables, crime occurs more frequently in some areas of cities than in others. Geographic frequencies, the offender's sphere of activity, and the potential for displacement of crime vary by type of crime as well. Geographic patterns may emerge as the concentration of crime varies according to national region, size of the metropolitan area, or type of neighborhood. At the neighborhood level, for example, corner homes or establishments may be victimized more frequently

than others. Moreover, individual elements of the locale may influence the offender's methods of operation (for instance, in affording a selection of escape route), thereby affecting distribution. Data on all of the above patterns provide important input for the development, implementation, and evaluation of CPTED strategies. Types of crime also tend to cluster around particular times of the day, days of the week, and months of the year. Some crimes are more affected by season than others. For example, robberies tend to occur more frequently during warmer months, whereas there appear to be no discernible seasonal patterns for burglaries.

2.3.5 Environmental Design Variables

Building density, relationships among buildings, characteristics of open areas, the quality of physical environment, environmental use patterns, and other design variables must be considered in relation to offender accessibility to potential victims and the user's ability to control the level of security in his environment. With respect to residential burglaries, it would be useful to ascertain whether the place of entry was visible from the street or adjacent dwellings, where the outdoor lights are located, what escape routes the offender could take, and what other features of the physical environment could support criminal activity.

2.3.6 Citizen/User Behavior

Socioeconomic profiles of communities are important because some types of users are more vulnerable to victimization than others. To

varying degrees, in different communities, the literature has documented significant relationships between the following partial list of demographic characteristics and crime: Level of family income, education, household size, percent of families on welfare, percent of single parent households, percent of renters, percent of unemployed, and percent of elderly.

In addition to considering socioeconomic composition, it is important to assess the social cohesiveness of the environment. For instance, areas characterized by ethnic dominance or areas with block clubs or other local organizations may have low crime rates. Conversely, areas experiencing much population transience, or consisting of "turfs" in which juvenile gangs hang out, tend to be supportive of criminal activity.

Demographic information is important for the CPTED planner in two respects. First, data on certain characteristics of victims (age, sex, race, socioeconomic status, or other background variables) provide valuable inputs for the development, implementation, and evaluation of specifically directed CPTED crime control strategies. Second, information concerning the relationship between offender and victim is important because CPTED strategies focus on the prevention of stranger-to-stranger crimes rather than crimes among nonstrangers.

2.3.7 Law Enforcement Behavior

Law enforcement activities are studied in crime/environment analyses with respect to the influence of police behavior on environmental use

patterns and the ways in which citizen anticrime activities can be supported. In this context, the important variables are police deployment practices, levels of police/community interaction, the extent (if any) to which private security personnel are used, and police efforts to improve citizen reporting behavior.

2.3.8 Crime Displacement

Displacement is the phenomenon that occurs when foreclosure of one type of criminal opportunity by anticrime measures causes offenders to shift to: (a) A different time of day (temporal); (b) the use of different methods (tactical); (c) an alternate type of target (target); (d) a new area (territorial); or (e) a different type of crime (functional). Variables related to these five forms of displacement should thus be considered in assessing alternative strategies. An example is a target-hardening strategy that is aimed at reducing household burglaries. Although this strategy may reduce the total number of such incidents, there may also be an increase in burglaries involving extensive property damage. In other words, the offenders may respond by changing to tactics that are more harmful to the environment.

2.3.9 Fear of Crime

In recent years, much attention has been given to fear of crime as a national problem. However, knowledge is very limited concerning what characterizes fear attitudes and behavior, as well as what variables affect fear. At the very least, the relationship of fear to characteristics of crime and levels of crime is complex. For instance, burglary

is a property-related offense and studies have reported that burglars go to great lengths to select unoccupied households. However, the chief attitudinal response of burglary victims is a concern that there may be a second incident where the offender finds someone at home and, hence, the occupants are in danger. In other words, citizens are often highly fearful of events that occur infrequently.

Robbery is probably the offense that engenders the greatest fear of crime. Other offenses are more costly in financial terms (e.g., employee theft) or in terms of personal injury (e.g., assault), but robbery combines the theft of property with the potential for injury, and most often involves stranger-to-stranger confrontation. This last aspect is particularly relevant because, as the U. S. President's Commission of Law Enforcement and the Administration of Justice found in the 1960's, the fear of violent crime is essentially a fear of strangers.

Citizen fear of crimes in the commercial and schools environments is also important to assess. For example, crimes against commercial establishments may be more fear-producing when these establishments: (a) Conduct mostly personal transactions with customers (a grocery store as opposed to a manufacturing plant); (b) are located in places with a diverse mixture of land uses; and (c) are most accessible to users and serve the broadest spectrum of the community (e.g., retail shopping strips).

CPTED planners are concerned about few basic aspects of fear of crime:

- Discrepancies between citizens' perceived and probable chances of being victimized.

- Misperceptions about the nature of crime and the behavior of criminals.
- The social and environmental correlates of fear.
- The physical environmental correlates of fear.

CHAPTER 3. CRIME/ENVIRONMENT METHODS

3.1 Introduction

The purpose of this chapter is threefold -- to provide an overview of data collection methods that can be used for crime/environment analyses; to guide the reader in using the appendices in this volume and the CPTED Technical Guidelines in support of the Analytic Methods Handbook; and to offer some considerations regarding the coordination of analytic objectives and resources.

A basic principle in data analysis is the use of a variety of methods, as opposed to a single method, to study all of the nine categories of crime/environment variables. The analyst's objective is to obtain the most comprehensive picture of a project that is technically and economically possible. This does not mean that every method can and should be applied to a CPTED project. Some methods are not applicable or appropriate for a given category of variables because the current state of knowledge could be inadequate, there could be a lack of resources, the methods could violate ethical considerations, or a variety of other reasons. Thus, this section presents only those procedures that are most likely to be appropriate and feasible in view of the types of projects for which the CPTED Program Manual is intended.

3.2 Methods

This section covers briefly four basic approaches:

- Observation of environmental use patterns through the use of behavioral observation methods.

- Observation of environmental design features through the use of observation instruments that focus on physical elements.
- Examination of crime and census data through the use of existing statistical and social archives (police departments, city planning departments, libraries).
- Collection of reports directly from citizens/users through the use of mailed questionnaires and/or face-to-face or telephone interviews.

Each basic approach provides the framework for many related analytic techniques, which are presented in the appendices and the Technical Guidelines. Table 3-1 serves as a guide to relevant sections. For example, the interview or questionnaire approach might be used to obtain information about fear of crime in the project area. A discussion of relevant procedures can be found in Guideline 3. The reader is urged to peruse the descriptions of crime/environment methods in this table before proceeding.

3.2.1 Behavioral Observation Methods

In a broad sense, every type of investigation is based upon some type of observation in that some person or group has to decide what information is needed, how to get it, and how to interpret and use the information. Moreover, observation is a common activity through which people become aware of their surroundings. Behavioral observations refer to methods for observing and recording how people behave in and use their environment.

TABLE 3-1

Crime/Environment Methods in Relation to Each Basic Approach

Methodological Approach	Source*	Description of Contents
Behavioral Observation Methods	Guideline 2, Sections 3 and 4.	Examples of instruments and analytic procedures.
Observations of Environmental Characteristics and Conditions	Guideline 1, Sections 5 and 6.	Application of OTREP procedures for coding the environment as a criminal might perceive it.
	Section 7.	Application of police security surveys for obtaining detailed onsite examinations of buildings and surrounding property.
Use of Statistical Records	Appendix C (entirety).	Discussion of types of police records and data analytic considerations.
	Guideline 1, Section 5.	Description of crime/environment mapping techniques.
	Guideline 5, Sections 1, 2, and 3.	Illustrations of the types of analytical procedures one could undertake with police crime records.
Interviews and Questionnaires	Guideline 1, Section 2.	Discussion of the use of key person interview procedures for assessment of salient crime/environment problems in project area.
	Section 4.	Discussion with illustrations concerning the use of Environment Description Scales, a procedure for obtaining users' assessment of environmental features via rating scales.
	Guideline 3 (entirety).	Discussion of the contents of interview forms used to study fear of crime and descriptions of possible environmental correlates of fear. Example of a fear of crime survey instrument.
	Guideline 4, Section 3.	Discussion of victimization surveys and related procedures with an example of an interview instrument.

*The guidelines are in CPTED Technical Guidelines in Support of the Analytical Methods Handbook. The Appendices are in this volume.

As a general rule, some form of informal observation is the starting point for more rigorous observation. For example, if someone casually notices that more people are out at night on well-lighted than poorly lighted streets, then this may form the basis of further study of the phenomenon using more controlled observation.

Observation, especially of the more systematic type, may be preferred over other methods such as questionnaires or interviews. There are several considerations to keep in mind in weighing the relative advantages and disadvantages of observation as opposed to other approaches. If it is important to determine how people use their environment, the most valid and direct method is observation. However, observational methods are costly in terms of manpower. Observation techniques require the training and supervision of observers and, depending on the scope of a project, these costs may be prohibitive. (These methods are covered in detail in Guideline 2.)

3.2.2 Observation of Environmental Characteristics

Wheras the approach discussed above dealt with observation of human behavior, this section concentrates on the observation of the physical environment. In the case of CPTED projects, there are many aspects of the physical environment that one could record. With respect to a street lighting project, for example, one can record whether the lighting facilities have been installed and are operating. Because of the objective nature of this sort of observation, it is unlikely that more than one observer would be needed (i.e., the problem of reliability of judgment is minimal). On the other hand, there can be other characteristics of the

physical environment that are less obviously implied by the project goals that would also be valuable to record. Changes in these other characteristics could represent unintended positive or negative side effects. For example, the installation of brighter street lights could disturb some residents and cause them to close their curtains or shades. This could have the negative effect of reducing surveillance.

The physical environment includes not only the objects that people design and build but also *traces* of human activity. For example, in studying the degree of utilization of newly constructed parks and recreational equipment, an investigator could go to the park and directly observe the activity there. However, the presence of an observer could cause a change in the normal behavior, if citizens are aware of being observed, and this method could certainly become expensive in terms of manpower costs. An alternative or supplementary technique would be to regularly observe the wear and tear of environmental elements in the park. Such indicators as the trampling of plants, presence of litter, and deterioration of equipment could be taken as indicators of park usage.

Physical design features, physical objects, and physical traces are but three general types of environmental characteristics. Many other variables of possible importance (such as climate/weather conditions, type and density of housing, degree of mixture of residential and commerical buildings, and roadway patterns) could also be examined. (The reader should turn to Sections 5 and 6 of Appendix B for a lengthier disucssion of physical environmental variables.)

Guideline 1 describes methods for obtaining information about the nature of the physical environment that will help the CPTED analyst identify crime/environment problems. Sections 5 through 8 focus specifically on environmental observation procedures.

3.2.3 Statistical Records and Social Archives

A good source of information is the statistical records that are kept by government agencies (e.g., police crime records, census data), business and industry, and various special-interest organizations. The use of statistical records has the advantage of not requiring the actual collection of data as such. If the records are available, their use can be a relatively economical way of answering questions. However, a primary concern in attempting to use statistical records is availability: First, it must be determined that the records exist; second, whether they are accessible; and third, whether the records are in a form that is useful.

The best way to answer such questions is to ask. For example, if sales receipts are used to assess the impact of a project aimed at increasing commercial activity, it is probably safe to assume that sales records would at least exist (although the extent of such records might depend on the size and type of business). Obtaining access to records can require some persuasion to overcome businessmen's resistance to opening their books to scrutiny. This would include assurance of confidentiality, emphasizing the importance and legitimacy of the investigation, and demonstrating the advantages of cooperation (e.g., increased sales if the project is continued or improved).

Access to records of government agencies depends on the particular

agency and the sensitivity of the information requested. The examination of some records (such as crime reports and welfare files) can be regarded as unethical invasion of privacy and can be prohibited by agency policy. Again, guarantees of confidentiality may help open the doors.

As an illustration, in one CPTED environment it was important to gain access to data on file in one of the city's business departments. It was made clear to the CPTED staff that the files contained confidential data, available only to agency personnel. The director would be in violation of a city ordinance if he were to provide access to the CPTED research team or any other outsiders. The research team determined that this was a legal issue that might be dealt with by the City Attorney's Office. This office was approached with due protocol, with special emphasis on the legitimacy of the research team's desire to have access to the business data. Once the legitimacy of the request was established satisfactorily, the City Attorney's Office suggested a legal means of access. This entailed the business department "hiring" CPTED team members to retrieve the needed data. A contract was drawn up. In turn, the "payment" to the city was a copy of a one-page summary of the data analyses prepared by the CPTED team. The report was delivered to the business department's director, thus satisfying the requirements of the contract. The lesson, here, is that through perserverance and good interpersonal skills, gates to data that are initially closed can be opened.

Even if access is gained to statistical records, the investigator faces the problem of deciding what records to use and whether the available information can be conveniently applied to the problem. For example,

police statistics are often kept on the basis of police districts, beats, or other appropriate geographic configurations. If the area in which a CPTED project is being implemented does not correspond exactly to the area of a police district, it can be very time consuming to separate crimes in the CPTED area from those in other areas of the district. Similar types of problems can occur with other forms of statistical records.

Another informative type of social record (or archive), besides official statistics, consists of such unofficial records of human affairs as personal documents (e.g., diaries) and publications (e.g., magazines, books, and newspapers). Ordinarily, these archives are thought to be of interest only to historians, but CPTED investigators can use them as well. For example, local newspapers and community newsletters address issues and concerns that are important to both residents and nonresidents of a project area. Moreover, newspapers are relatively free from the problems noted above with other social records (such as availability and the ethical question of invasion of privacy).

3.2.4 Questionnaires and Interviews

Another approach is to obtain self-report data from individuals concerned with, or affected by, a CPTED project. Questionnaires and interviews are called self-report methods because they allow persons to convey directly their attitudes, opinions, and beliefs about various topics. Questionnaires and interviews have much to recommend them. Each individual knows his or her own thoughts and feelings, and unobservable variables (such as fear of crime and perceptions of the environment) are major

variables of interest in a CPTED study.

Because questionnaires and interviews share so many characteristics, it is appropriate to discuss them together. However, there are some differences. Questionnaire data are typically obtained from written responses and ratings given to a set of printed questions. (See Guidelines 3 and 4 for a description of how to use questionnaires in fear-of-crime and victimization surveys, respectively.) The interviewer need not be present when the answers are given. In face-to-face interviews, or telephone, however, there is a social interaction between the interviewer and the respondent. Interviews allow for the clarification of the meaning of questions and afford more flexibility in how the questions are presented. Key-person interviews (see Section 2 of Guideline 1) are especially useful for gaining an in-depth understanding of issues and problems with respect to the project area.

The specific kinds of data that can be obtained from self-report measures is almost unlimited. Some general categories of data types include the following:

- Information about the Respondent -- Such traits as a person's sex, age, race, political party affiliation, religious preference, membership in organizations, income, and many other such factors can be crucial in a CPTED study.

- Information About Past, Present, and Planned Future Behavior -- If it is important to know whether people have taken or intend to take advantage of some CPTED feature (e.g., expanded transportation services), it is easy enough to ask them.
- Information About Beliefs and Perceptions -- A good case can be made for arguing that people's behavior is determined more by their perceptions of reality than by reality itself. For example, if a citizen believes that a certain area is unsafe for some (perhaps unfounded) reason, he may avoid that area, regardless of how safe it really is.
- Information About Feelings and Attitudes -- One of the intended goals of a CPTED project is to change people's feelings on an issue (e.g., increase positive feelings about a neighborhood). Hence, it is important to know how people feel about existing and possible future conditions or changes.
- Information About the Reasons Underlying Behaviors, Beliefs, and Attitudes -- In addition to answering the question of *what* citizens do and feel,

verbal reports can suggest answers to the question of *why*.

3.3 Importance of an Analytic Design

An important requirement for the use of any data collection method is that the analyst must have control over the variable (or variables) that affects various outcomes being measured. In all of the approaches discussed so far, the analyst does not necessarily have this kind of control. An observer can record the behavior of people in a park but, if he has no control over the factors that brought them there, his observations have little value. There are basically two types of analysis: One in which an investigator examines the degree of relationship among two or more variables as they naturally occur (correlational analysis), and one in which the investigator, through deliberate action, establishes the presence, absence, or relative level of variables and observes the effects of this action on other variables (experimental analysis).

The major consequence of the difference between correlational and experimental analysis is that the latter is a more effective way for inferring cause/effect relationships, and is especially important for evaluation efforts (see Appendix D). In studying the relationship between street lighting and pursesnatching, for example, the correlational approach would involve measuring lighting and pursesnatching levels in a number of different areas and examining the degree to which they are related. A high correlation would be consistent with the hypothesis that lighting deters this type of crime, but it would not

necessarily confirm it. The relationship could be due to the effects of many other extraneous factors (such as affluence of citizens in the different areas). In other words, it would not be legitimate to conclude that lighting, and lighting alone, was the cause of pursesnatching.

An experimental approach would require that the analyst manipulate or at least obtain a record of the level of lighting in all areas, and that the areas be selected randomly for different levels of lighting. Randomization is essential in order that all other possible causes (or extraneous variables) can be ruled out as possible alternative explanations of whatever results are found.

One potential fallacy inherent in experimental analysis is that the results of an experiment can demonstrate that one factor (e.g., street lighting) can be one cause of some outcome (e.g., pursesnatching), but it does not prove that it is the only cause. In addition, the failure of an experiment does not necessarily imply that one's theory about a cause/effect relationship is untrue (e.g., the experiment can have been poorly conducted).

Although the experimental approach is far from perfect, it is useful for testing the assumptions underlying the CPTED concept. For example, part of the CPTED approach could assume that people are more concerned about crime as a function of how much crime there appears to be in their area. An analyst could alter some people's perceptions of the level of crime by providing information (which could be either true or false) about crime rates in the area through various means (e.g., sending them special newsletters about nearby crimes, or paying their

neighbors to talk to them about crime). People in different, randomly selected groups would receive different amounts of information and would then be tested in various ways to determine their concern for crime.

The contrived example given above leads to the question of ethics of experimentation. As the example showed, experiments -- especially those in which people are participating involuntarily -- can entail serious moral issues. Although there are many possible bases for resolving moral dilemmas, the one adopted in the social sciences involves weighing possible moral costs (e.g., deceiving people about the extent of crime in their neighborhood) against possible practical benefits (e.g., discovering some solutions to the crime problem). Unfortunately, there is no mathematical scale for weighing these costs and benefits; therefore, a CPTED planner must be guided mainly by his own value system and the experience and advice of others. (See Section 5 of Appendix D for a discussion of cost/benefit analysis.)

3.4 Coordinating Data Collection Objectives and Resources

The amount of time, manpower, and cost associated with data collection activities will depend upon the objectives involved. Problems can be diagnosed and assessed at a minimum cost if the activities amount to little more than face-to-face interviews with a few key individuals. Their perception of problems can provide the framework for developing CPTED solutions. If more rigorous data collection activities are anticipated, costs will increase sharply. Therefore, it is important that

data collection objectives be clearly articulated before community resources are tapped. This will help local political and administrative decisionmakers support such activities because the benefits will be appreciated.

Prior to the development of a project plan, CPTED planners should assess potential resources regarding the availability and quality of existing data sources and the utility of possible primary data collection efforts. Although the AMH presents a comprehensive array of methods, it is likely that local resources will limit the scope of such activities. Therefore, the data collection objectives should reflect a realistic appraisal of existing local data sources and data gathering and processing capabilities.

3.4.1 Organization of Crime/Environment Analysis

The purpose of this section is to present a rationale for planning data collection activities. Figure 3-1 illustrates a recommended agenda. With few exceptions, which are noted in the illustration, the implied sequence of activities would not be affected if particular methods were dropped from consideration. However, the decision of whether to include a given method will in some cases depend on what is learned from another method. For example, the decision to study police Offense Reports (Appendix C) would follow a determination that the police summary reports are not sufficiently detailed. Similarly, the decision to undertake a victimization survey (Guideline 4) could follow a determination that the police records are inadequate.

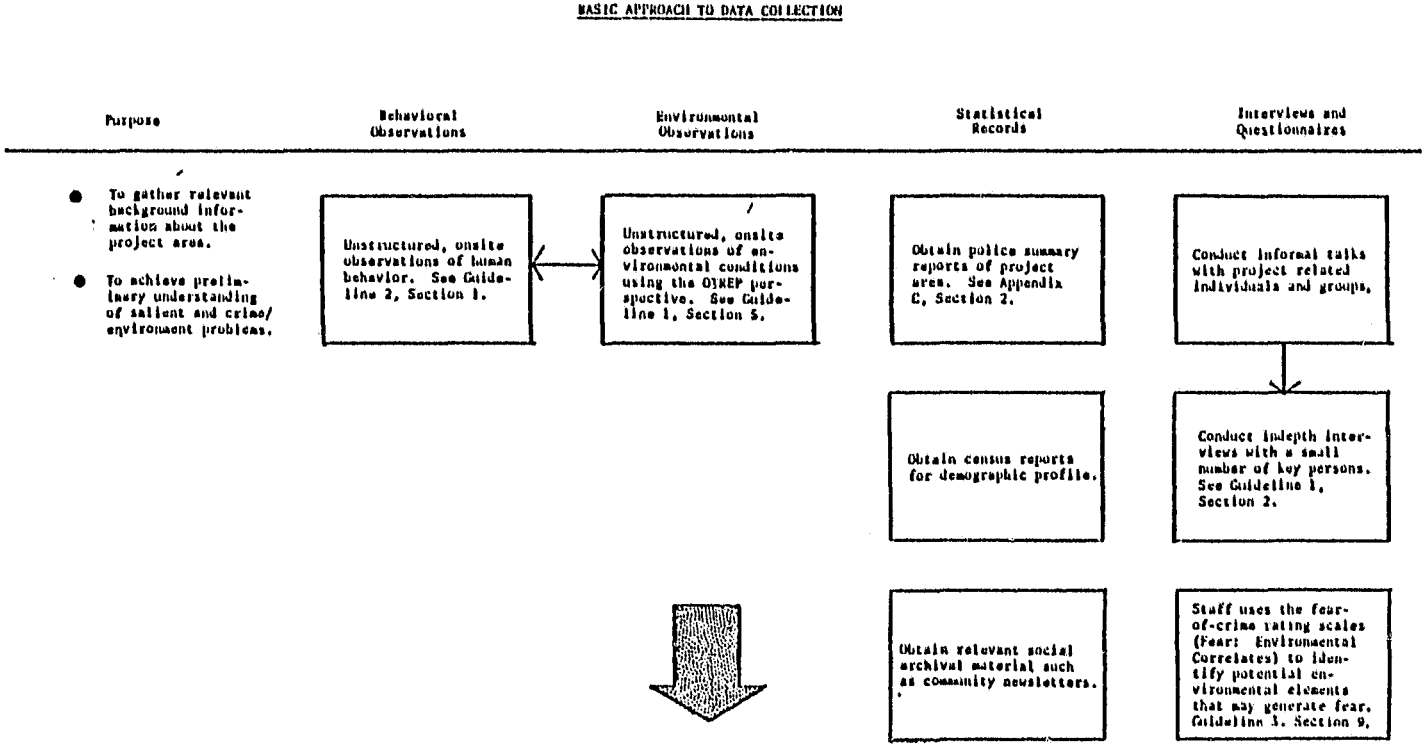


Figure 3-1. Organization of Crime/Environment Analysis
(Page 1 of 3)

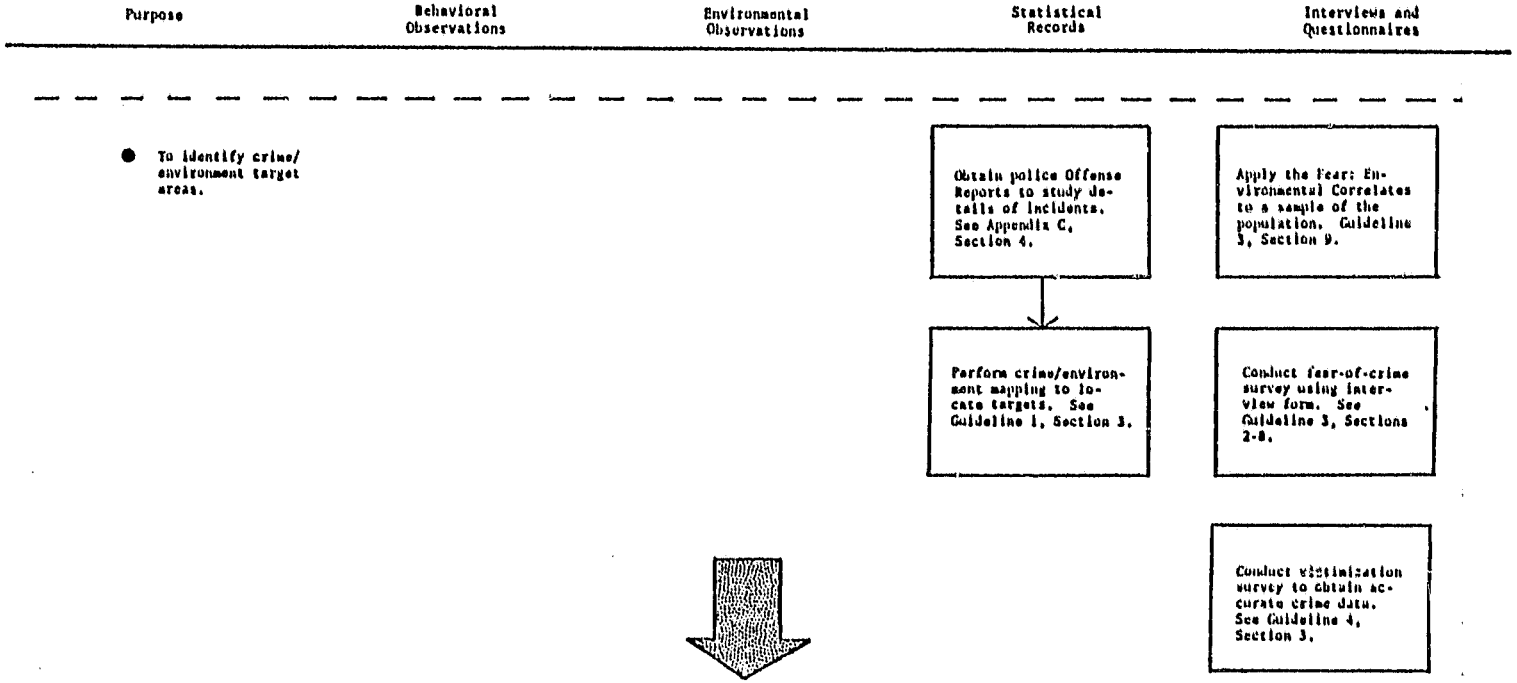


Figure 3-1. Organization of Crime/Environment Analysis
(Page 2 of 3)

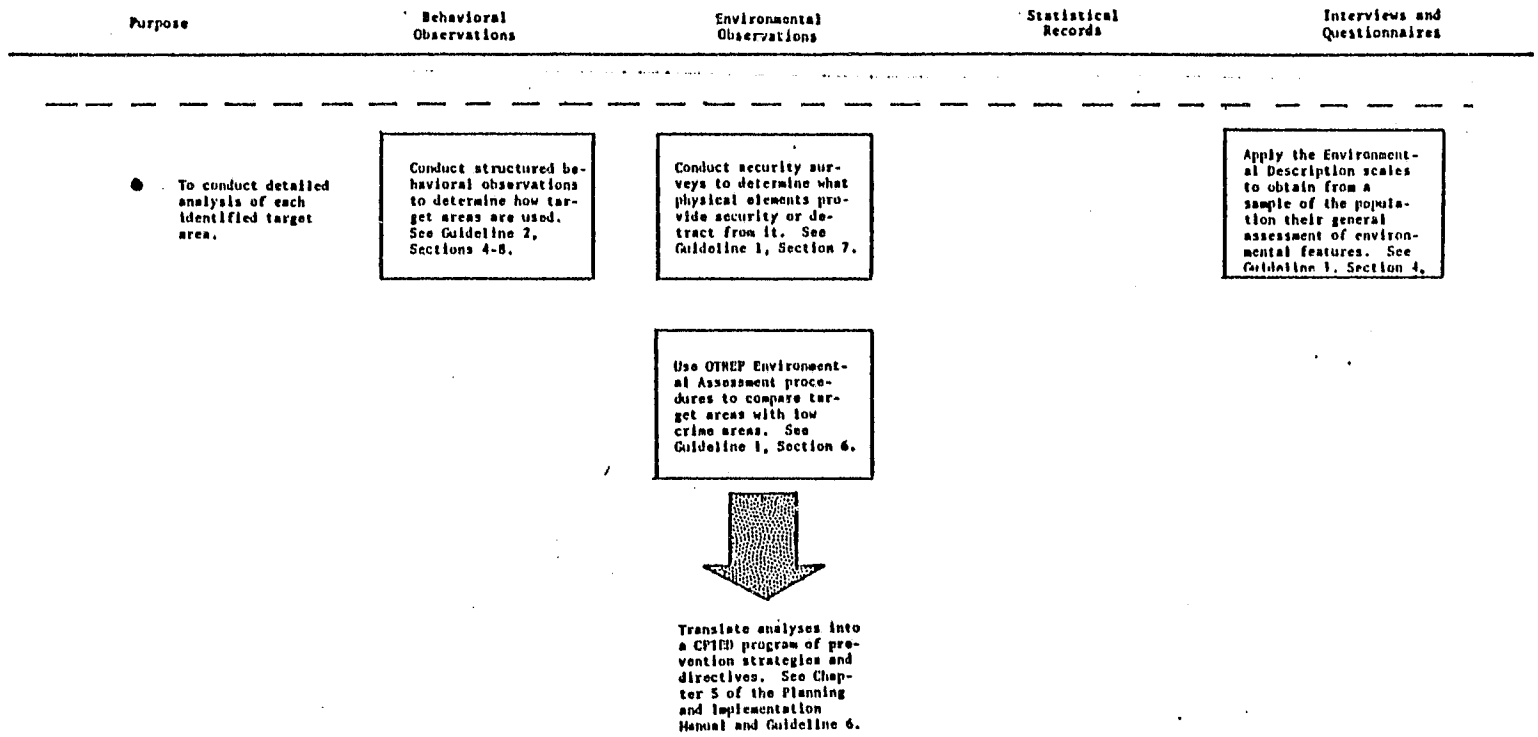


Figure 3-1. Organization of Crime/Environment Analysis
(Page 3 of 3)

The rationale for Figure 3-1 is as follows: To arrive at a preliminary assessment of problems and issues relating to the project area, it is recommended that the planning team familiarize itself with the project area by walking through the environment. In a residential neighborhood or a commercial section, familiarization means looking at features of the built environment with respect to the OTREP factors (Appendix A and Section 5 of Guideline 1) and identifying potential criminal targets and, with respect to each target, the elements of risk, effort, and payoff. Additionally, police summary reports and census records should be obtained to gather background information about crime rates and demographic characteristics. Newspaper articles, community newsletters, and other social archival material will help give a flavor of the diversity of problems and issues that are important to different population segments of the project area.

Following the collection and assimilation of these source materials, it is strongly recommended that interviews be initiated with key persons involved with the project area (Section 2 of Guideline 1). These structured interviews would follow informal talks with residents, shopkeepers, patrolling officers, and others who can recommend particularly knowledgeable individuals: Environmental users (e.g., residents, shopkeepers, teachers, pupils); those charged with protecting and maintaining the project area (e.g., police, persons from the sanitation department); municipal decision-makers (e.g., deputy mayor, assemblymen, city and criminal justice planners); and leaders of community interest groups. The chief objective of these

interviews is to identify the crime and fear targets that warrant detailed crime/environment analysis, as well as to assess the feasibility of alternative anticrime approaches.

Coordinated with the key-person interviews should be an examination of police Offense Reports for precise data on incident location and offender methods. If the interviews reveal a serious fear-of-crime problem, the CPTED planning team should consider undertaking a population survey to assess the nature and extent of fear and, most importantly, the environmental correlates of fear (Guideline 3). If for some reason there are problems with the Offense Reports (e.g., no geographic information) or permission to gain access to the files cannot be obtained, a victimization survey should be seriously contemplated, notwithstanding its cost (Guideline 4).

Whatever data sources are used, the next step is to conduct crime/ and/or fear/environment mapping (Section 3 of Guideline 1). Mapping displays clusters of crimes and high-fear areas in the community for detailed analyses. Analyses of these areas (crime/environment targets) would include behavioral observation techniques (Guideline 2), implementing security surveys (Section 7 of Guideline 1), using the Environmental Description Scales (Section 4), and performing structured OTREP Environmental Assessment procedures (Section 6)

In a narrow sense, the only required method for developing an empirically based foundation that will aid in the selection of CPTED strategies is the OTREP Environmental Assessment procedure. However, without additional data collection activities, the utility of the OTREP

instrument is severely compromised. Therefore, the CPTED analyst is urged to at least study the Offense Reports and to perform crime/environment mapping.

If the local jurisdiction lacks requisite research skills, there may be staffing resources in municipal agencies that are available and possess relevant skills. Expert consultation should be enlisted to help develop a plan so that the collected data and the subsequent analysis will be valid and useful with respect to the defined objectives.

Another consideration is that many information-gathering approaches result in a large amount of collected data and extensive data processing requirements. Data collection takes time, even when it is retrieved from existing files. It is important to recognize that there are key persons within a local environment who can facilitate or impede data collection. For example, waiting for permission to gain access to files can take weeks. Therefore, when approaching key gatekeepers to data sources (regardless of whether these sources are archives, persons, or specific locales), these key individuals should be given precise information about what is needed, how it will be obtained, and what will be done with the information, once it is collected. It is also helpful to explain why this approval is being sought and what benefits can result from cooperation.

The cost of collection, with respect to time and money, is generally higher if new sources of data have to be created (e.g., dovetailing the analysis of police records with victimization). Usually, the use of primary data collection techniques involves designing and pretesting

instruments. Any research method can take up to several months before useful information is produced. If part of the plan is to conduct evaluation research, it may be years before definitive results emerge.

A further consideration is that large amounts of data cannot be processed by hand easily. Data collection and analysis require hardware support, ranging in complexity from the use of pocket calculators to computers. Consultation should be sought regarding the mechanics of data processing and related costs.

3.4.2 Estimating Costs

In Table 3-2, estimates are given in the form of person-days in relation to each crime/environment method. The table presents the relative rather than the absolute cost of a given method. For example, behavior observation methods in general will cost more than an examination of police records. How much more or what the absolute costs are of either method cannot be reliably ascertained unless specific project information is available concerning project goals, the size of the study area, the desired complexity of data analysis, and so on. For the same reason, additional costs (such as equipment rental, use of nonspecialized support staff, etc.) depend on the nature of the project and, hence, little can be said in the way of general guidance.

One useful technique of estimating costs is to list the discrete data collection and analytic phases and make a judgment for each regarding how much time and how many people will be required. For example, a fear of crime survey would likely involve the following steps:

TABLE 3-2

Cost-Related Information on CPTED Data Collection and Analytic Methods
(Page 1 of 2)

Cost-Related Information on Different CPTED Data Collection and Analytic Methods

CPTED Analytic Methods - Ranked from least to most costly.	Data Collection Requirements				Probable Level of Person-Day Requirements[b] for Data Collection			Influence of Different Factors[c] on Research Costs					
	Field Observation	Questionnaire	Interview	Statistical Records	Less than 5	Less than 10	Less than 20	Size of Project Area	Sample Size	Crime Rate	Computer Analyses	Research Consultants	Complexity of Methods
OTREP initial field observations by CPTED Team	P				o			L	N	N	N	N	N
Examination of police summary reports and census records	S			P	o			N	N	N	N[d]	N	N
Fear: Environmental Correlates -- Assessment of potential fear factors by CPTED Team	P				o			N	N	N	N	N	N
Fear: Environmental Correlates -- Assessment by population of users	S	P			o			N	H[e]	N	L	L	L
(EDS) Environmental Description Scale[a]	S	P			o			L	H[e]	N	L	L	L
Key Person Interviews	S		P		o			L	H[f]	N	N	N	L
Examination of police Offense Reports			S	P	o	o		M	M	H[g]	M	N	M
Crime/Environment Mapping	S			P	o	o		H	L	H	L	N	M
OEAP (OTREP Environmental Assessment Package)	P		S		o	o		H	N	L	N	N	M[h]
Behavior Observation Methods	P		S		o	o	o	H	H	N	L	M	H
Fear of Crime Survey	S		P			o	o	H	H	L	H	H	H
Victimization Survey	S		P	S			o[i]	H	H	M[j]	H	H	H

TABLE 3-2

Cost-Related Information on CPTED Data Collection and Analytic Methods
(Page 2 of 2)

P = Primary activity.

S = Secondary activity.

a - The EDS Questionnaire could be administered more than once, depending on the number of subenvironments involved. These figures refer to each application.

b - Represents staff time in the field. Additional time would be required for preparation, data coding, analysis, and interpretation. Also, these estimates do not include support activities or indirect costs.

c - The four levels of influence -- None, Low, Medium, and High -- are defined as follows:
(N) None = Virtually no influence on the absolute cost of a particular method.
(L) Low = May involve an extra two days for preparation and data collection (or the equivalent in costs).
(M) Medium = May involve an extra week of person days (or the equivalent in costs).
(H) High = May involve an extra two weeks of person days (or the equivalent in costs).

d - This assumes that the statistical records already aggregated and organized in a coherent manner. If the data have to be tabulated and aggregated, then the level of influence is medium.

e - If only one population assessment is obtained and simple random sampling is involved, then the level of influence is low. However, if stratified sampling methods are involved and there are additional samples, then the level is high.

f - Key Person Interviews are designed to take time per interviewee, exploring problems and issues in the project area. Thus, the larger the number the longer this phase of the study will take.

g - Clearly, if there are many crimes, examination of police Offence Reports will take longer. However, a high crime rate may not affect costs if the analyst decides to work with a sample rather than the entire set of data. This caveat applies to the other influence categories as well.

h - The requirement to include a low crime "control" site may involve several person-days of searching and comparing potential "controls" to the project area.

i - Large scale victimization surveys will require considerably more than 20 person-days.

j - There is a possibility for savings or additional costs with respect to victimization surveys if the crime rate is high. On the one hand, a smaller sample may be needed to estimate rates. On the other hand, if several subgroups are highly victimized, there may be purposeful oversampling to obtain accurate estimates for preselected population strata - (e.g., single parent households, elderly, blacks, high-rise dwellers, etc.).

- Design analytic plan.
- Develop a new survey instrument or modify the one included in the AMH.
- Select samples.
- Hire research consultant to review plans and instruments.
- Hire and train interviewers.
- Establish analytic procedures and code data for computer analyses.
- Hire coders.
- Perform statistical analyses and interpret findings.

Whereas crime/environment mapping would involve fewer steps:

- Obtain persmission to gain access to police Offense Reports.
- Assess the quality and completeness of the Offense Reports.
- Establish analytic procedures and code for analyses.
- Perform analyses and interpret findings.

Table 3-2 suggests a probable range of person-day requirements for each crime/environment method. These requirements can be converted into salaries, but they would only indicate *the cost of staff time in the field.* Additional costs involve data collection preparation (e.g.,

designing sampling schemes, instrument development) and those activities that follow data collection (e.g., coding, analysis, and interpretation). Once activities are listed and estimates are made, it is desirable to have a specialist review them. Figure 3-2 illustrates one procedure that can be employed for estimating the manpower requirements for a fear-of-crime survey.

3.5 Translation of Analytic Findings into CPTED Strategies

The reason for suggesting the use of these various crime/environment methods is that the more comprehensive the analysis the more likely an effective CPTED project will be designed. The planner, faced with numerous candidate prevention strategies, has to identify a set to be implemented. Chapter 5 of the Planning and Implementation Manual presents an overview of the decisionmaking process that translates problem statements into appropriate CPTED strategies. For a fuller treatment of decisionmaking issues and procedures, the user should read Section 5 of Appendix D, which covers the basics of cost/benefit, cost/effectiveness, cost/utility analysis. A more rigorous review of different decisionmaking models for accomplishing trade-offs and ranking strategies with respect to certain CPTED-related performance criteria (e.g., potential effectiveness, cost limitations, implementability, compatibility with users, and operability) is given in Guideline 6.

Research Activities	Partici-pants	Products	Schedule Start/ Finish	Person-Day Loadings	Labor Cost	Materials	Misc	Total Cost
Design Analytic Plan								
Develop Survey Instrument								
Select Sample								
Hire Spe-cialists								
Hire Inter-viewers								
Establish Data Analytic Procedures								
Hire Coders								
Perform Analysis & Interpret Findings								

Figure 3.2 Suggested Procedure for Listing Research Acitivites and Estimating Cost for a Fear-of-Crime Survey

Figure 3-2. Suggested Procedure for Listing Research Activities and Estimating Cost for a Fear-of-Crime Survey

APPENDIX A

The OTREP Model

APPENDIX A. THE OTREP MODEL

The OTREP model simulates the decisionmaking process of a criminal when he is selecting an environment or setting in which to commit a crime. Through the use of this model, one can (at least in theory), see the environment as the criminal sees it. OTREP offers a useful perspective to the CPTED practitioner because it can uncover environmental trouble spots that might otherwise go unseen. This appendix discusses the conceptual basis of OTREP. For a discussion of OTREP procedures, see Section E.5.

A.1 Background

No setting or place exists where crimes cannot be committed. Burglary, larceny, vandalism, and crimes of violence can occur anywhere. Faced with a wide array of available sites, the potential criminal must select a site for his act. If no logic or rationale for this choice existed, one would expect crimes to be randomly distributed in the environment.* However, such is not the case.

---

*One offender option is not to commit a crime in that or any other site. Although OTREP attempts to simulate the decisionmaking process of criminals, it is not based on the assumption that the potential offender has already decided to act and simply has to decide *where* to act. If this were the case, then the most that CPTED could hope to accomplish would be crime displacement. However, considering what is known about the nature of opportunistic crimes, it appears that the environment can be manipulated so that a large proportion of potential offenders do not even recognize sites as potential targets. Thus, reduction as well as displacement can be achieved.

Crime occurs very frequently in certain areas, while it is almost unheard of in others. Geographic areas characterized as "high crime" or "dangerous" are well known to the residents and police of any municipal locality. Additionally, certain situations involving, for example, the time of day, type of people, nature of the task, and so on are readily perceived as more dangerous than others ("I'd never let myself get into *that* situation!"). For some reason or set of reasons, crime tends to occur more frequently in some environments than others.

Two approaches can be used to examine more closely the spatial distribution of crime. One approach is to study different environments to uncover dimensions that vary among them. The other approach is to examine the spatial distribution of crime from the perspective of the criminal. This approach assumes that criminal acts stem from individual decisionmaking processes occurring inside the potential offender.

Although both the environmental and cognitive approaches seem individually inadequate, a viable method of investigation emerges when both perspectives are simultaneously used.

A.2 Definition of OTREP

Based on the use of this perspective, the OTREP model of environment choice has been developed. The OTREP concept proposes that the opportunity for crime to occur in an environment is a function of four factors: Target, risk, effort, and payoff. These four basic factors are of central importance to the criminal when selecting a site for a

criminal act. It is assumed that criminals avoid low-opportunity environments (e.g., those that require much effort to commit a crime, where the risk of apprehension or punishment is high, where few targets exist, and where only a small payoff can be obtained). Similarly, it is assumed that criminals prefer an environment where opportunity is high because targets are available which allow crimes to be committed easily and quickly for large rewards, with little or no risk of apprehension.

A.3 What the Criminal Thinks

Before further discussion of the four factors of OTREP, a fifth factor (which has purposely been excluded) merits comment. This factor represents an individual, motivational, perceptual, and cognitive element. With this factor, the model would be sensitive to organismic variables that mediate environment/behavior relationships. To illustrate the operation of this factor, one could suggest that individuals in greater need of a reward (e.g., a dope addict in need of a fix) will run higher risks for smaller payoffs than those with less immediate needs. Individuals who perceive an opportunity for a crime may attempt a criminal act, even though no opportunity in fact exists. A criminal might think that the risk of apprehension in a specific environment is low when, in fact, it is quite high.

The mediation of environment/behavior relationships by human predispositional variables is acknowledged. However, this factor is presently excluded from OTREP because the emphasis of CPTED is towards the

environment. CPTED projects must manipulate environments and physical design elements to reduce crime, and the orientation of OTREP reinforces this emphasis. The intent is to avoid shifting the emphasis from design variables that can be controlled and manipulated to motivational and cognitive factors over which the project has little control. However, at some future date, the OTREP model may be expanded to include motivational and cognitive factors if their utility for CPTED programming efforts can be demonstrated.

A.4 OTREP Considerations

OTREP conceptualizes four attributes that relate to criminal behavior. *Target*, the first of these considerations, is conceptualized as a dichotomous variable -- it is either present or absent. Conceived narrowly, target will rarely be a limiting consideration, since it may be said to exist whenever a potential victim or target and a potential offender are in proximity. Thus, the opportunity to steal from a bank or to rape a woman is always present, unless the bank is empty or the "woman" is a man in woman's clothing.

The concept of target allows the same environment to be characterized by different degrees of opportunity for different crimes. If an elderly lady carrying a purse is walking next to a young woman on a semicrowded street, the opportunity for pursesnatch would be much higher than the opportunity for rape. Opportunity for a specific crime can be eliminated if the target of the crime is removed from the environment. However, most CPTED efforts would not eliminate opportunity. One exception to

this is the Cash-Off-The-Streets activity, a CPTED strategy planned for the Commercial Demonstration in Portland, Oregon (see Section 3.7 in Volume II -- Strategies and Directives).

The concept of *risk* implies that, as the risk of being seen and apprehended increases, the attractiveness of an environment (to a potential offender) decreases. This is precisely the notion of deterrence. The principal mechanism for increasing risk would be surveillance, whether it is real or apparent, for example, if an offender knows that residents of a given street participate in a block-watch club, he may be less inclined to look for criminal opportunities even if he sees no one on the street.

The third factor, *effort,* assumes that an environment becomes less attractive as the physical effort required to commit a crime increases. The effort necessary to execute a crime may be increased through CPTED access control strategies, such as target-hardening approaches. This is an area in which CPTED should be expected to have a large impact. Again, the offender's assessment of level of effort is important, whether or not he is correct. For example, burglars may avoid homes with storm windows and double locks on the doors even though the storm windows are easily removed and the residents rarely use both locks.

The last OTREP concept is *payoff.* As the payoff associated with a target grows larger, its attractiveness to the criminal is assumed to increase, and thus he will take greater risks and physical effort to achieve his anticipated benefits. Some CPTED strategies are aimed at

decreasing payoff of targets to offenders but maintaining their value to legitimate users. Operation identification projects, for example, reduce the offender's but not the property owner's ability to convert home possessions into cash.

Some examples of the interplay of these elements are worth noting. If a target is not present, no crime will occur. If a target is present, then payoff must be subjectively greater than both effort and risk for a crime to occur. Effort and risk are not completely independent, in that risk can increase as the amount of time (the effort) required to commit a crime increases.

The four concepts of target, risk, effort, and payoff should always be considered by the CPTED practitioner. All environments can be evaluated with respect to these four factors. In a sense, every environment could be said to have an OTREP profile. This is, each environment is characterized by certain opportunities for crime consisting of specific targets, risk to the criminal, a given amount of effort on the criminal's part, and payoff of some magnitude.

APPENDIX B

Crime/Environment Categories

APPENDIX B. CRIME/ENVIRONMENT CATEGORIES

B.1 Introduction

If crime/environment analyses are to provide an empirically derived basis for selecting CPTED anticrime strategies, they must involve consideration of nine categories of variables described below. These categories are: (a) Type of crime; (b) severity of crime problem; (c) offender behavior; (d) geographic and temporal patterns of crime; (e) environmental design; (f) citizen/user behavior; (g) law enforcement activities; (h) crime displacement patterns; and (i) fear behavior.

B.2 Type of Crime

The offense categories addressed by the CPTED approach are those classified by the Federal Bureau of Investigation as Part I crimes against persons (criminal homicide, forcible rape, robbery, aggravated assault) or property (burglary, larceny, and auto theft), as well as some Part II crimes (simple assaults, arson, and vandalism). These offenses receive attention because they are destructive to the social and physical environment, they engender public fear of crime, and the opportunity for their commission can be eliminated or minimized through environmental design. Excluded from consideration are the so-called "white collar" crimes (fraud, embezzlement), crimes against the government, organized racketeering, morals offenses, family and juvenile offenses, and disorderly conduct.

The following subsections describe these CPTED relevant offenses and indicate the extent to which they represent a national problem.

B.2.1 Violent Crimes

B.2.1.1 Criminal Homicide

The offense of criminal homicide, which is also referred to as murder or nonnegligent manslaughter, includes all willful killings. Figure B-1 shows that the total homicide rate increased by 22 percent between 1970 and 1975. In spite of this increase, however, homicides are still comparatively rare events (9.6 victims per 100,000 persons in 1975) and, in most cases, are not stranger-to-stranger crimes. It is likely that CPTED strategies would only be able to prevent homicides that result from the common predatory crimes that occur between strangers, such as robbery.

B.2.1.2 Forcible Rape

Rape is defined as carnal knowledge through the use of force or threat of force, including attempted rape. Like homicide, the rate for this crime has also increased (41 percent between 1970 and 1975), but rape is still comparatively rare (51 per 100,000 women in 1975) (see Figure B-2). As with homicide, these incidents are likely to be affected by CPTED planning only to the extent that they occur between strangers.

B.2.1.3 Robbery

Robbery is a form of theft (or attempted theft) in which the offender uses force or violence to take something of value from another person. Between 1970 and 1975, the rate of robbery increased by 27

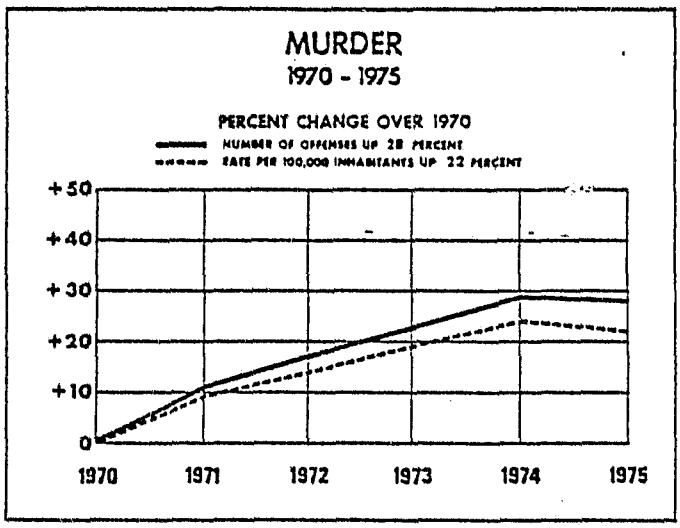


Figure B-1. Trends for Crime of Murder, 1970-1975.

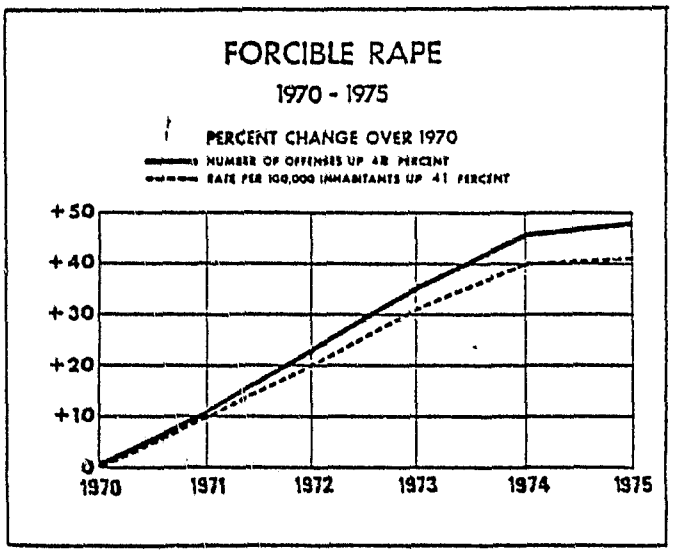


Figure B-2. Trends for Crime of Forcible Rape, 1970-1975.

percent (see Figure B-3).* The 1975 rate was 218 victims per 100,000 persons (284 per 100,000 in urban areas), and the average value loss per incident was $331.

B.2.1.4 Assault

Assaults are unlawful physical attacks, or attempts to attack, by one person upon another. Aggravated assaults involve incidents with intent to inflict bodily harm (usually with the use of a weapon), whereas simple assaults involve attacks without a weapon. The assault rate has increased 88 percent between 1970 and 1975 (see Figure B-4). In 1975, the aggravated assault rate was 227 victims per 100,000 across the Nation and 255 per 100,000 in urban areas.

B.2.2 Crimes Against Property

B.2.2.1 Burglary

Burglary, also known as breaking-and-entering, is unlawful entry of a structure, usually with the intent to commit a theft. The burglary rate in 1975 was 1,526 per 100,000 persons (see Figure B-5). (If burglary were calculated on the basis of per 100,000 households, the rate would be much higher.) It can be expected that a major contribution of a CPTED approach will be a reduction in both residential and commercial burglaries.

---

*In spite of the fact that this increase is in part the result of improved reporting systems for all crimes in general, these data indicate the severity of the problem. A further consideration is that even this high estimate represents only a portion of the actual volume. For instance, the Law Enforcement Assistance Administration's National Crime Panel (NCP) data revealed that Chicago had 63,500 personal robberies, whereas the Federal Bureau of Investigation's Uniform Crime Reports (UCR) data for 1973 listed a total of 24,181 robberies known to police. Although it would be instructive to compare NCP and UCR data for all available cities and years, it is not possible to do so since these respective sources do not always publish findings in comparable form.

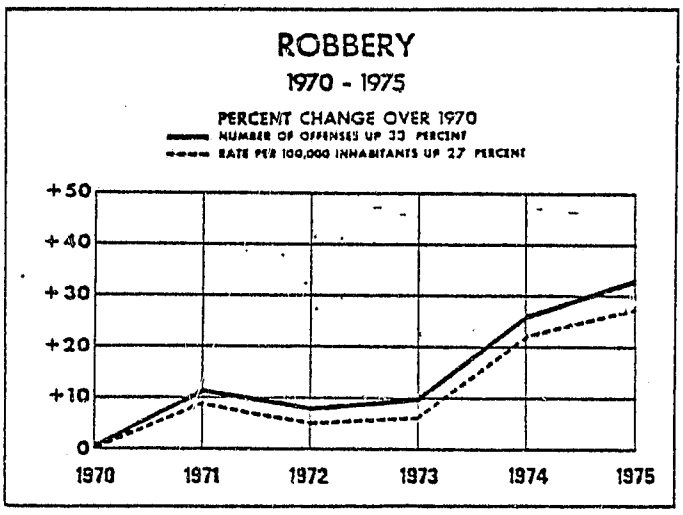


Figure B-3. Trends for Crime of Robbery, 1970-1975.

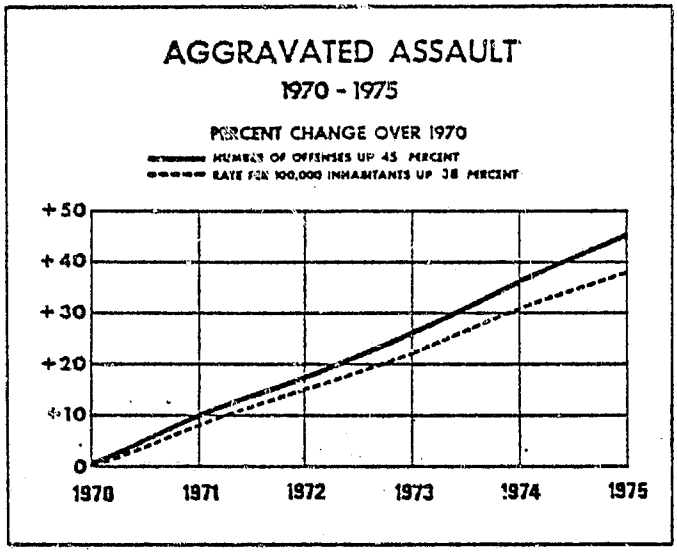


Figure B-4. Trends for Crime of Aggravated Assault, 1970-1975.

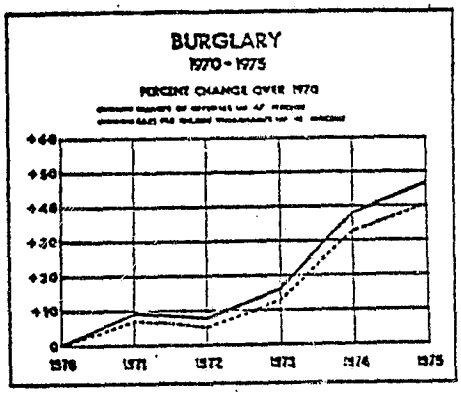


Figure B-5. Trends for Crime of Burglary, 1970-1975.

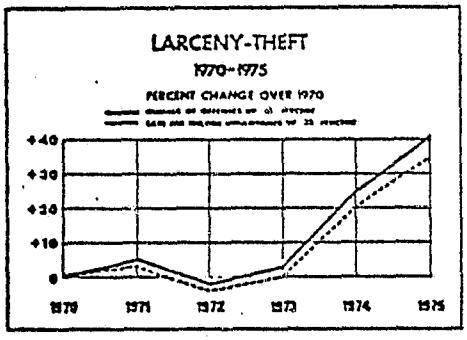


Figure B-6. Trends for Crime of Larceny-Theft, 1970-1975.

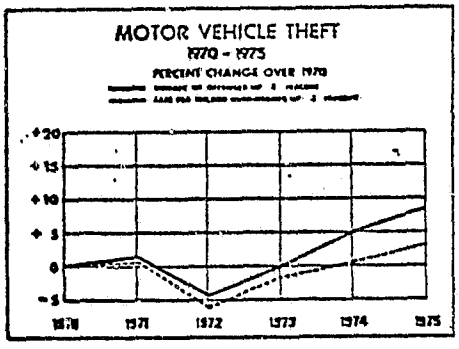


Figure B-7. Trends for Crime of Motor Vehicle Theft, 1970-1975.

B.2.2.2 Larceny and Theft

Acts of larceny or theft involve the unlawful stealing of property without the use of force, violence, or fraud. This category includes pursesnatch, pocket-picking, thefts from motor vehicles (motor vehicle theft is a separate category), shoplifting, and other forms of theft, except "con" games, forgery, and passing worthless checks. In 1975, the per capita rate per 100,000 was 2,805, or, in urban areas, 3,196 per 100,000 (see Figure B-6).

B.2.2.3 Motor Vehicle Theft

This form of larceny is defined as the unlawful taking of an automobile. It is primarily a problem in large cities. The national rate in 1975 was 586 thefts per 100,000 persons, but residents in cities with more than a million residents experienced 1,138 thefts per 100,000.

B.2.2.4 Vandalism and Arson

Vandalism consists of the willful or malicious destruction, injury, or disfigurement of property without the consent of the owner or person in custody. Most arson can be considered as a form of vandalism because such incidents involve willful or malicious burning. Vandalism is included as a target crime because of the seriousness of this offense as reflected in costs to repair and maintain property, and because it engenders fear.

B.3 Severity of the Crime Problem

Basic to any prevention effort is the ability to assess the severity of a particular crime problem, as well as to ascertain what crimes are prevalent. Severity is commonly measured by tabulating the absolute

number per crime and the rate. Depending on the type of offense, the rate can be calculated in terms of persons, households, or business establishments.

Severity should also be calculated in terms of specific attributes associated with particular incidents. Sellin and Wolfgang (1) produced the Crime Seriousness Index (CSI) that proposes to differentiate among similarly classified offenses. For instance, a robbery rate per se does not reflect the extent of injury or dollar loss incurred but, using the CSI, each incident is given a seriousness score. As shown in Table B-1, this score is the sum of the assessed gravity according to a system of weights. Thus, a robbery involving intimidation without a weapon is given a score of 2 points, whereas the use of a weapon increases the score to 4 points. If the victim is also hospitalized, the score is increased to 11 points (4 points intimidation plus 7 points injury). Through the use of these variables of severity, it becomes possible to compare the relative seriousness of particular incidents.

Several researchers have reported a high degree of agreement among citizens concerning the relative seriousness of each index crime. In one study (2), Baltimore residents were surveyed regarding their perceptions of the seriousness of various crimes. Rather than using legal definitions or complex vignettes as Sellin and Wolfgang did, these researchers developed brief descriptions of specific criminal acts. The rank, from most to least serious, and the mean seriousness score of the CPTED-related offenses are reported in Table B-2.

TABLE B-1

The Sellin-Wolfgang Crime Seriousness Index

Severity Variables	Weight
1. Number of Victims of Bodily Harm	
Receiving minor injuries	1
Treated and discharged	4
Hospitalized and discharged	7
Killed	26
2. Number of Victims of Forcible Sex Intercourse	10
Number of such victims intimidated by weapon	2
3. Intimidation (except 2 above)	
Physical or verbal only	2
By weapon	4
4. Number of Premises Forcibly Entered	1
5. Number of Motor Vehicles Stolen	2
6. Value of Property Stolen, Damaged, or Destroyed (In Dollars)	
Under 10 dollars	1
10 - 250	2
251 - 2000	3
2001 - 9000	4
9001 - 30000	5
30001 - 80000	6
Over 80000	7

TABLE B-2

Average Seriousness Ratings of Selected CPTED-Relevant Offenses in Baltimore Survey, by Offense

RANK	CRIME	MEAN RATING
	Robbery	
9	Armed robbery of a bank	8.02
27	Armed robbery of a company payroll	7.57
30	Armed holdup of a taxi driver	7.50
32	Armed robbery of a neighborhood druggist	7.48
35	Armed street holdup stealing of $200 cash	7.41
39	Armed robbery of a supermarket	7.31
41	Armed hijacking of a truck	7.19
43	Armed street holdup stealing $25 in cash	7.16
44	Armed robbery of an armored truck	7.16
53	Mugging and stealing $25 in cash	6.87
56	Mugging and stealing $200 cash	6.69
37.2	Average for Robbery	7.31
	ASSAULT	
11	Assault with a gun on a policeman	7.93
18	Assault with a gun on a stranger	7.84*
24	Assault with a gun on a stranger	7.66
29	Assault with a gun on an acquaintance	7.50
38	Assault with a gun on a spouse	7.32
48	Beating up a policeman	7.02
64	Beating up a stranger	6.60
91	Beating up a spouse	5.79
112	Beating up an acquaintance	5.03
48.3	Average for Assault	6.97
	BURGLARY	
4	Forcible rape after breaking into a house	8.24
52	Breaking and entering a bank	6.90
68	Burglary of a home stealing a color TV set	6.44
77	Burglary of a home stealing a portable transistor radio	6.11
80	Burglary of an appliance store stealing several TV sets	6.06
93	Burglary of a factory stealing machine tools	5.78
62.3	Average for Burglary	6.59
74.0	(without rape item)	6.26
	LARCENY	
55	Cashing stolen payroll checks	6.82
72	Passing worthless checks for more than $500	6.30
85	Shoplifting a diamond ring from a jewelry store	5.93
94	Using stolen credit cards	5.75
104	Passing worthless checks involving less than $100	5.33
111	Shoplifting a dress from a department store	5.07
117	Shoplifting a carton of cigarettes from a supermarket	4.96
129	Shoplifting a book in a bookstore	4.42
95.9	Average for Larceny	5.57

*"This offense was inadvertently repeated, indicating that differences in scores as much as .185 can be obtained through response unreliability."

Source: H. Rossi et al, "The Seriousness of Crimes: Normative Structure and Individual Differences," American Sociological Review, 39(2):224-237, April 1974.

These data are useful for CPTED purposes. While the personal crimes of robbery and assault are rated as far more serious than the property offenses of burglary and larceny, it is instructive to note that *within* a given offense category, crimes more threatening to the social order are generally perceived as more serious than those that are more specifically focused. For example, armed robbery of a bank is viewed as a good deal more serious than an armed street holdup; assaulting a policeman or a stranger is more serious than assaulting a spouse or acquaintance.

This finding implies generally, though not exclusively, that commercial victimizations are seen as more serious offenses than those in which individuals are victimized. Given these data, it might be most appropriate to focus CPTED efforts on commercial establishments, in particular, and on other potential victims symbolic of maintaining the social order.

B.4 Offender Behavior

The previous section indicated the importance of studying the nature of offenses. It is also important in crime/environment analyses to study the behavior of offenders and the characteristics of places where offenses occur. This section covers the behavioral variables and Section B-5 covers the locational variables.

Offender-behavior variables include both modus operandi (e.g., use of force, concealment, entry tactics, and extent of planning) and offender demographics (e.g., age, sex, and race). The specific variables involved

depend on the type of offense being investigated. For instance, in the case of burglary, the relevant variables are type of structure entered, place of entry, means of entry, the extent of property damage, and the extent of property loss.

It is important for the CPTED planner to ascertain for a given community whether specific offender techniques reflect different types of criminals or different environmental circumstances. That is, does the offender search for environmental opportunities to commit a specific type of crime, or does the offender adjust his behavior according to existing environmental constraints? For instance, if the opportunities for committing larceny are greatly reduced, do potential offenders respond by committing burglaries or robberies?

The chief purpose of this section is to summarize what is known about the four *primary* CPTED crime targets -- robbery, assault, burglary, and larceny. Two major impressions are conveyed by the relevant literature. First, the type of offense committed by any given offender at any one time can be determined largely by chance. For example, the difference between a robbery and an assault is determined in many instances by the degree of resistance of the intended victim. The difference between an assault and a murder is largely whether the victim dies -- and this is frequently determined by the response time of police and ambulance personnel rather than by the intent of the offender. Similarly, the times at which urban bank robberies occur are dictated, in part, by the availability of parking spaces.

Second, the behaviors encompassed by each offense category are quite diverse. There is no reason to anticipate uniformity within offense categories with regard to CPTED-relevant characteristics (such as level of offender preparation).

B.4.1 Robbery

The behavior subsumed by this crime category is far from uniform. It may include the burglar surprised in his act of theft, the professional bank robber, the youthful mugger, a juvenile gang robbing drunks, the taxi holdup man, the playground tough forcibly taking money from his schoolmates, and others. The origins of these diverse behaviors can be expected to differ, as can their responsiveness to possible control strategies, including CPTED. A related issue is whether robbery should be considered a crime of violence or a crime against property, since both elements are (at least potentially) present.

There are different types of robbers. One proposed typology identifies four groups (3). *Professional* robbers are "those who manifest a long-term commitment to crime as a source of livelihood, who plan and organize their crimes prior to committing them, and who seek money to support a particular life style that may be called hedonistic... Professional robbers tend to be white, in their mid-twenties, and from middle- or working-class background."

Opportunist robbers -- probably the most common type -- rob infrequently but often commit other forms of theft (e.g., larceny or shoplifting). Targets are chosen on the basis of accessibility and

vulnerability rather than the size of the payoff, which is often small. Opportunists are usually black, younger than professionals (teens or early twenties), and come from lower-class backgrounds. The robberies tend to be spontaneous, committed in a group, without a weapon, and often involve private individuals (rather than commercial agents) as victims. The likelihood of violence is greater in opportunistic robbery than in professional robbery.

Addict robbers are those who rob either to support a drug habit or while under the influence of drugs. In either case, their crimes involve less planning than those of professionals, but usually more than those of opportunists. Addicts tend to prefer burglary to robbery, since the former does not involve victim confrontation. However, if in a hurry to get money, the addict may rob to get immediate cash rather than burglarize to get property, which must be fenced.

Alcoholic robbers operate under the influence of alcohol, take few precautions, do not plan their offenses, and may rob only as an afterthought to an assault. A final category is the *known* robber, who commits the offense against one with whom a previous relationship existed. Usually, these previous relationships are fleeting in duration and sexual in nature (such as a prostitute and her customer, or a homosexual encounter).

Perhaps more important than the typology itself, however, are the dimensions on which it is based: The commitment to crime (and to the

specific crime of robbery), the extent of planning, and the reasons for committing the crime. For CPTED purposes, the level of commitment and the extent of planning are especially salient dimensions.

Another major consideration is the identity of the victim -- corporate agent or private individual. For example, it seems likely that few professional robberies would be of individual victims, although many of the other types of robberies would be.

Despite the sources of variability noted above, some general observations are warranted. Robbery is an urban phenomenon and tends to be highly concentrated within particular urban areas. Approximately half of these incidents take place on the street, one quarter in commercial establishments, and about 10 percent in residences (4). Armed robberies are less likely than unarmed robberies to result in injury to the victim. Robbery victims and offenders rarely know each other, in contrast to the victims and offenders in murder and rape cases.

There is a considerable element of victim proneness to robbery, attributable to high-risk roles such as cab driver, lone operator of a variety store, or liquor store clerk. Professional robbers may not be deterred by alarm systems, since a well-planned robbery can take less than a minute to execute. Cab and street robbers rely on an intimate familiarity with the area to make their escape, but robbers (especially professional robbers) do not limit their activities to their own neighborhoods.

B.4.2 Assault

According to the UCR, aggravated assault (unlike robbery) tends to occur among parties who know each other and, frequently, are related. However, data from the NCP victimization studies indicate that most assaults are committed by strangers. UCR data also indicate that approximately 75 percent of aggravated assaults involve a weapon, with a roughly equal division among guns, knives, and blunt objects. On the other hand, NCP findings indicate that not more than half of the assault cases involve weapons; furthermore, the high proportion of "other weapons" (such as bottles and brickbats) used in incidents of assault points up to the often unpremeditated character of such incidents. Any available object may be picked up in the heat of dispute and used as a weapon. These differences between the UCR and NCP findings most likely reflect differences in reporting. Serious assaults involving dangerous weapons are more likely to be reported to the police than are routine arguments that escalate into fights using whatever potential weapons are available.

B.4.3 Burglary

Like the other offenses discussed, the term *burglary* subsumes diverse behaviors, from a technically proficient safecracking to a drunken kick-in. Other dimensions vary as well. Burglaries may be of residences or of commercial establishments. Residential burglaries tend to occur in the daytime, whereas commercial burglaries more often occur at night and on weekends.

CONTINUED

1 OF 3

Burglaries of commercial establishments can be for cash or for merchandise, but are rarely for both. The reason for this seems to be that the techniques involved in either case are sufficiently diverse that to attempt both would be too time-consuming. Moreover, as one cash burglar stated, "Why should I? If I want something, I can come back the next day and buy it."

Burglary is often considered a more skilled offense than robbery, but that characterization may be an oversimplification. The proper execution of either offense requires skill, but the necessary skills differ. Although both require casing and planning, burglary requires more mechanical skill whereas robbery requires more interpersonal skill for the purpose of victime management. In fact, burglars typically avoid confrontation with residents or proprietors.

Beyond the difference with reference to victim confrontation, two other differences between burglary and robbery are significant for CPTED purposes. First, alarm systems are of much greater concern to burglars than to robbers, since their offenses take longer to commit. Second, burglars are more dependent than robbers on a cooperative social network (e.g., fences, tipsters, and fixers).

Some contend that skilled burglary -- especially safecracking -- is on the decline, due to improvements in security technology, the development of a credit (rather than cash) economy, and the proliferation of night depositories (5,6) For these reasons, the burglary of business establishments has to a large extent been supplanted by armed robbery.

A recent study (7) of burglary incident data from six jurisdictions in California found that burglary losses were typically moderate and involved goods that were readily converted into cash (e.g., jewelry and furs). Most reports involved forcible entry with the use of tools, resulting in property damage. With the exception of alarm systems, deterrents apparently had little effect on the offender's decision to complete a job. It may be that once a house or business establishment is selected as a crime target, the offender willingly exerts a high level of effort unless he perceives a direct relationship between removing the deterrent and risk. Thus, if he is aware of an alarm system or fears that the extra time involved will lead to his discovery, then increased level of effort is an effective deterrent.

B.4.4 Larceny

The crime of larceny is perhaps more difficult to describe succinctly than the other CPTED-relevant offenses, simply because it is not a single type of offense. Larceny involves the unlawful stealing of property without the use of force, violence, or fraud. Personal larceny may or may not involve contact between the victim and the offender, although the theft is committed by stealth rather than use of force. There are some gray areas (such as pursesnatch) that can also be characterized as unarmed robbery. Personal larceny without contact and household larceny are similar to burglary in many instances, with the major difference being that the thief has a legitimate reason for being on the premises (e.g., a hotel maid stealing from an occu-

pant's luggage). Commercial larceny is largely restricted to shoplifting.

Larceny offenses are difficult to deal with from a CPTED perspective for various reasons. In cases involving personal contact, the victim frequently does not realize his loss until some time after commission of the crime. In other cases, the offender has legitimate access to the site of the offense. Additionally, some larceny offenses are apparently viewed as relatively nonserious. For example, few witnesses to shoplifting incidents bother to report them (8).

B.4.5 Summary

These four CPTED target offenses differ in several aspects. In each case, however, it appears that at least some offenders commit crimes largely as the opportunity presents itself rather than as the result of careful planning. Opportunistic offenses (i.e., those that are relatively unplanned) can be easier to inhibit through CPTED intervention strategies. On the other hand, prevention strategies can be more precisely implemented for offenses that require more planning, if the offender's planning requirements are known. For example, making stolen property difficult to fence may inhibit burglary. In either event, knowledge of crime-and-environment-specific characteristics (e.g., the offender's commitment to the offense, the amount of planning required for a specific offense, and environmental characteris-

tics that facilitate or inhibit commission of the offense) are essential for the planning of CPTED intervention strategies.

Three of the offenses appear to have some economic basis as the primary motivation. However, the thrill of committing the offense seems to play a substantial role in many instances. While the strongest data supporting this contention are available for robbery and burglary, it is plausible that this is also a motivating factor in many larceny offenses. Assaults, by their very nature, involve a good deal of excitement. Given the low ranking of assaults on acquaintances in terms of seriousness, the line between crime and manly sport is thin indeed.

Another characteristic that robbery, burglary, and larceny share that make them attractive to the would-be criminal is the relatively low risk of getting caught. Reported assault cases are more likely to result in clearance by an arrest.

If these offenses are to be combatted effectively, they must be prevented, for it is unlikely that their incidence will be substantially reduced by arrests of offenders. Such prevention seems most likely to come from increased efforts to reduce opportunity through CPTED activities.

B.5 Temporal and Geographic Patterns

Types of crime tend to cluster around particular times of day, days of weeks, and months of the year. Some crimes are more affected by seasonal changes than others. Crimes also occur more frequently

in some areas of cities than others. Geographic frequencies, the offender's sphere of activity, and the potential for displacement of crime vary by type of crime, as well. At the neighborhood level, for example, corner homes or establishments can be victimized more frequently than others. Moreover, individual elements of the locale may influence the offender's methods of operation by affording a selection of escape routes, thereby affecting distribution.

This section covers five key variables: Time-of-day, day-of-week, month-of-year, distance traveled by the offender, and locations where crimes occur. Additionally, to give the user a flavor of the variety of analyses one can undertake to generate useful information, examples are included from a recent crime/environment research project conducted in Minneapolis (9), which was not part of the CPTED residential demonstration.

B.5.1 Time-of-Day

Not surprisingly, the police records are more precise concerning the time-of-day for person-related crimes as opposed to property-related crimes (the latter are usually reported as occurring within a given time range). The Minneapolis study found a similar temporal pattern for commercial robberies, street robberies, and stranger-to-stranger assaults: There is a steady upward trend from early morning to late evening. Figure B-8 illustrates this trend for commercial

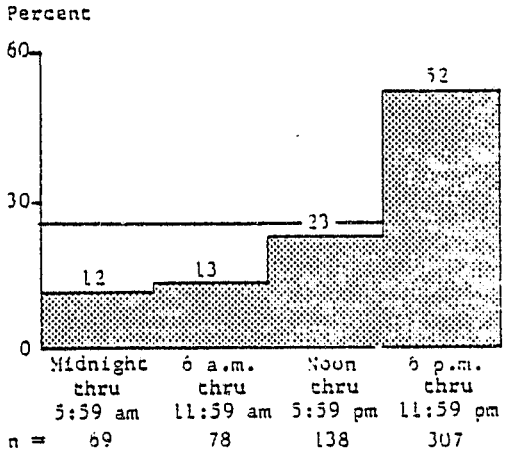
robberies. Clearly, darkness facilitates the commission of robberies.

B.5.2 Day-of-Week

Burglaries, particularly those involving commercial establishments, tend to cluster around weekends (see Figure B-9). The study also found that the frequency of commercial robberies declined towards the end of the week, although the weekday differences were not large (see Figure B-10). This pattern may be determined by such variables as when shops are open and/or when people shop. For instance, purse-snatch peaks around Tuesday or Wednesday, suggesting that most housewives prefer to do their weekly shopping towards the beginning rather than the end of the week. In the case of burglaries, if an offender wishes to find homes or commercial establishments that are vacant at night, his best chance is on Friday, Saturday, or Sunday. Similarly, street robbers find that the weekend offers a larger number of targets because there are more people on the street seeking late night entertainment.

B.5.3 Month

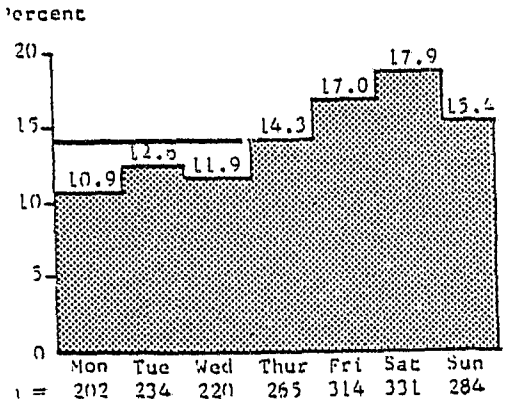
Residential burglaries tend to occur most frequently during the summer months (see Figure B-11). The Minneapolis study suggested two key reasons. First, it is generally believed that many residential burglaries are committed by juveniles who wait until they are out of school for the year. The second factor noted is particularly important in relation to Minneapolis. The winter months increase the difficulty



Note: Data from Minneapolis police offense reports (n = 592). $X^2 = 247.69$, significant at $p \leq .001$ with 3 *df*.

Source: Minnesota. Governor's Commission on Crime Prevention and Control. Crime in Minneapolis: Proposals for Prevention, by D. W. Frisbie et al.; Minnesota Community Crime Prevention Project. St. Paul, MN: Governor's Commission on Crime Prevention and Control, May 1977.

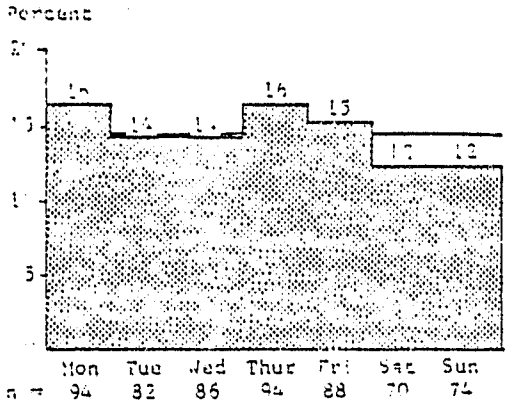
Figure B-8. Commercial Robbery by Time of Day



Note: Data from Minneapolis police offense reports (n = 1,850). $X^2 = 50.65$, significant at $p \leq .001$ with 6 *df*.

Source: Crime in Minneapolis: Proposals for Prevention.

Figure B-9. Commercial Burglary by Day of Week

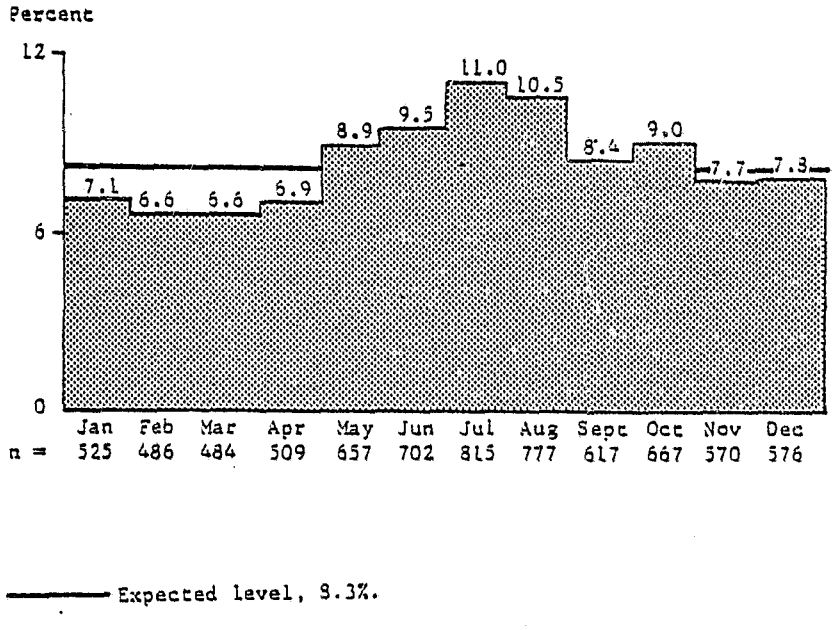


——— Expected level, 14.3%.

Note: Data from Minneapolis police offense reports (n = 588).
$X^2 = 7.01$, significant at $p \leq .5$ with 6 *df*.

Source: Crime in Minneapolis: Proposals for Prevention.

Figure B-10. Commercial Robbery by Day of Week



Note: Data from Minneapolis police offense reports (n = 7,385).
$X^2 = 219.31$, significant at $p < .001$ with 11 *df*.

Source: Crime in Minneapolis: Proposals for Prevention.

Figure B-11. Residential Burglary by Month of Occurrence

of getting about, and homes are more secure because of the protection against the weather (e.g., storm doors and windows). Moreover, deciduous trees and bushes provide less cover without leaves.

Commercial robberies, on the other hand, tend to cluster during the holidays at the end of the year when stores have larger amounts of cash on hand (see Figure B-12). For similar reasons regarding the behavior of shoppers, street robberies are also more frequent at the end of the year.

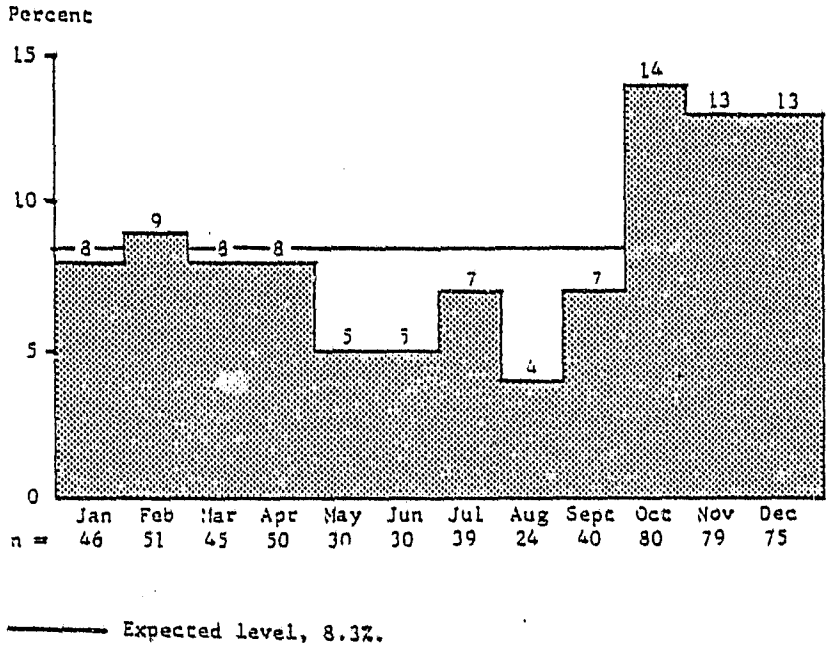
B.5.4 Distance Traveled by Offender

Analysis of burglary suspect characteristics indicates that offenders generally do not travel far from home to commit crimes (see Figure B-13). This conclusion, however, should be treated with some caution because these data may show only that persons who commit burglaries close to home are more likely to be identified. On the other hand, it is also reasonable to assume that burglars prefer certain areas because they are familiar with escape routes, police patrols, etc.

In contrast to burglaries, commercial robberies are less likely to be committed close to home (see Figure B-14). Although these data are also based on a small percentage of incidents, it is probable that robbers do not wish to operate in areas where the chance of recognition is high.

B.5.5 Where Crimes Occur

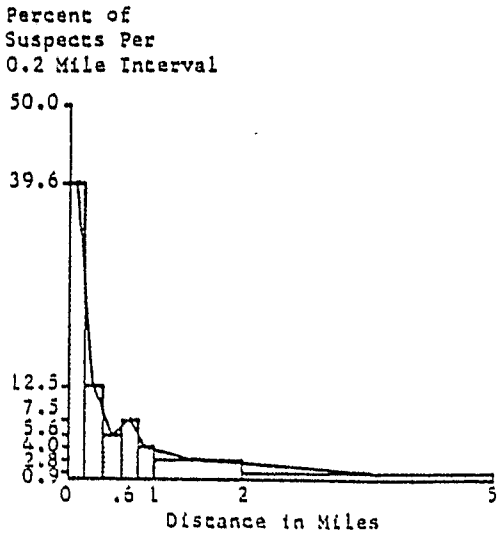
In every city, neighborhoods differ in their attractiveness to criminals. High crime areas are usually located where there is much



Note: Data from Minneapolis police offense reports (n = 589).
$X^2 = 85.05$, significant at $p \leq .001$ with 11 *df*.

Source: Crime in Minneapolis: Proposals for Prevention.

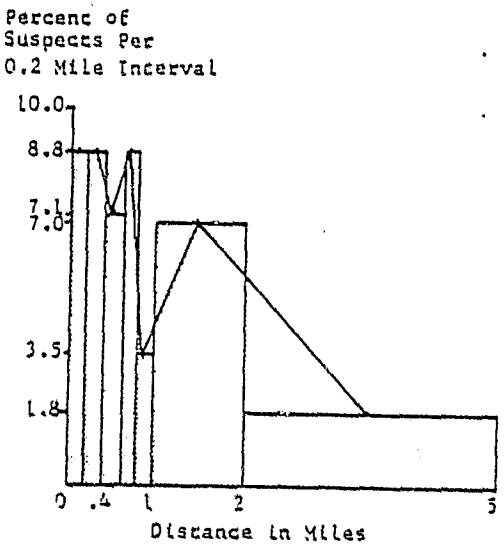
Figure B-12. Commercial Robbery by Month of Occurrence



Note: Data from Minneapolis police offense reports. Random sample of 47 percent of suspects with known home addresses (376 of 800) was drawn and the actual distance in miles to the target burglary site from the suspect's home was computed. Thirty-one percent of the suspects traveled more than one mile.

Source: Crime in Minneapolis: Proposals for Prevention.

Figure-B-13. Percentage of Residential Burglary Suspects by Distance Traveled from Home to Offense Site



Note: Data from Minneapolis police offense reports (n = 73).

Source: Crime in Minneapolis: Proposals for Prevention.

Figure B-14. Percentage of Commercial Robbery Suspects by Distance Traveled from Home to Offense Site

physical blight and where job opportunities are limited. One can usually plot a crime gradient with the lowest rates in the suburbs and the highest towards the center of the metropolitan area. As the literature shows, however, not all urban areas conform to this pattern. Each city has a unique history of social change, patterns of land use, continuity of built and open areas, and other factors that affect the spatial characteristics of the urban landscape. As a result, each city is likely to have unique intraurban crime patterns. Moreover, studies on the geography of crime are based on different perspectives concerning its causes.

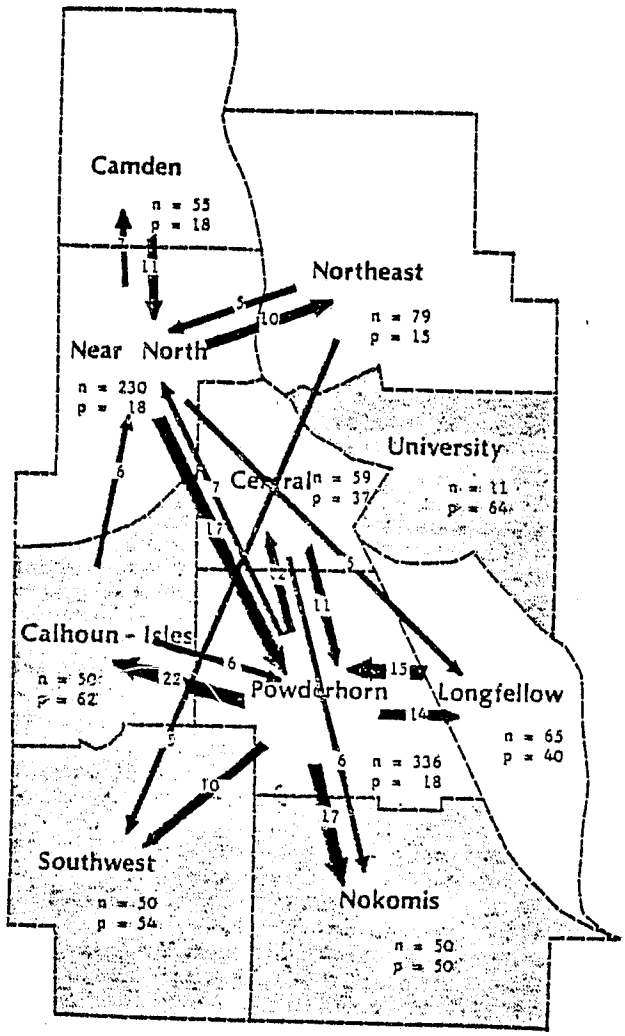
> "The *opportunity* hypothesis suggests that the distribution of crime is primarily a function of opportunity; thus robbery will be most frequent where pedestrian counts are highest. The *drift* hypothesis focuses on the tendency for criminal types of persons to accumulate in certain areas of cities. A third hypothesis is associated with the concepts of *cultural transmission* and *differential association* and suggests that criminality will be high in areas where conventional values do not dominate. The *social alienation* hypothesis submits that criminals have been socially impersonalized, resulting in feelings of insecurity and hostility. One hypothesis is based on the *anomie* concept, which 'implies a disturbance or disruption of the collective order, the external regulating force which de-

fines norms and goals and governs behavior.' Cybriwsky, for example, in a study of the social allocation of neighborhood space in Philadelphia, found that antisocial acts, including wall graffiti and muggings, were concentrated in 'anomic locations,' such as alleys and the end walls of row houses. A sixth hypothesis is *eclectic*, combining the anomic and differential association hypotheses with other ideas, including differentials in illegitimate means" (10).

The Minneapolis study considered suspect mobility patterns using the opportunity hypothesis as a frame of reference. Figure B-15. illustrates the analytic procedures in the case of residential burglaries. The shaded areas represent communities that tend to be burglarized by offenders from other parts of the city. The authors concluded that some areas of the city display special attractions for potential burglars. Since burglars appear not to like to travel far from home, it would be worthwhile to identify and eliminate those special attractions.

B.6 Environmental Design

Both architectural features (structural design of buildings) and urban features (street patterns) potentially affect the offender's access to potential victims and the citizen's ability to control the level of security in his environment. With respect to residential burglaries, for instance, it would be useful to ascertain whether the place of entry was visible from the street or adjacent dwellings, where



Notes: Data from Minneapolis police offense reports (n = 985). Arrows connect offender's home community and community of offense. Numbers indicate frequency; frequencies less than 5 are not shown.

n = Number of crimes committed in community, for which suspect's address is known.
p = Percent of crimes committed by suspects living in other communities.

Communities in which more than half the crimes are committed by suspects living in other communities.

Source: Crime in Minneapolis: Proposals for Prevention.

Figure B-15. Suspect Mobility by Planning Community for Residential Burglary

the outdoor lights are located, what escape routes the offender could take, and other similar factors.

The following discussion of physical design variables is not intended to be all-inclusive. Rather, the objective is to illustrate the nature of possible relationships between environmental design and crime.

B.6.1 Structural Design

Single-family houses are prone to burglaries because they provide a variety of openings through which a burglar can enter -- inadequately locked doors, unlatched windows, an easily opened basement hatch, a second-story window that is easily reached from the garage roof, and so forth. One can improve the security of homes through the adoption of target-hardening practices and defensible-space design principles. With target hardening, reliance is put on physical devices to minimize opportunities for intrusion via deadbolt locks, vandal-resistant glass and screens, and similar physical measures. As a second line of defense, burglar alarms can be installed together with outdoor lighting to provide surveillance opportunities for neighboring houses. High fences that are difficult to scale can be erected around the perimeter of a yard.

The defensible space approach, on the other hand, uses the concept of territoriality as a basis for establishing a relationship between security and environmental design. Residents' concern for and control over their environment is achieved without attempts to "harden" the environment. This perspective assumes that, in any residential setting, a person -- whether resident or not -- perceives the system of indoor and

outdoor spaces as forming a territorial hierarchy, and that this hierarchy may be dimensionalized in terms of the number of persons sharing the use of a given area. As a resident proceeds through these levels (e.g., from his house to the public street), his territorial response changes accordingly, and his sense of intimacy with environmental features and sense of control diminish.

Thus, the citizen's perceived sense of territoriality and safety can be influenced by changes in elevation, scale, visual separation, traffic control, and the manipulation of other environmental elements. These elements are not used to construct real barriers but, rather, to create symbolic barriers (i.e., boundaries that are easily penetrated in a physical sense but nevertheless operate to inhibit intrusion).

The important design variables are not those that directly control access so much as those that provide opportunities for natural surveillance and convey to potential offenders that they are likely to be detected and challenged. Thus, windows should be located to give visual access to the front sidewalk, the alley in back, the entrance to the basement, the outdoor storage shed, and other parts of the house and yard where offenders can gain ready entry. Backyards often provide opportunities for the burglar because residents go to great lengths to ensure visual privacy with high shrubs and patio roofs. As a consequence of poor natural surveillance, these spaces often require high fences. The need is even greater if there is a semipublic alleyway running between juxtaposing yards.

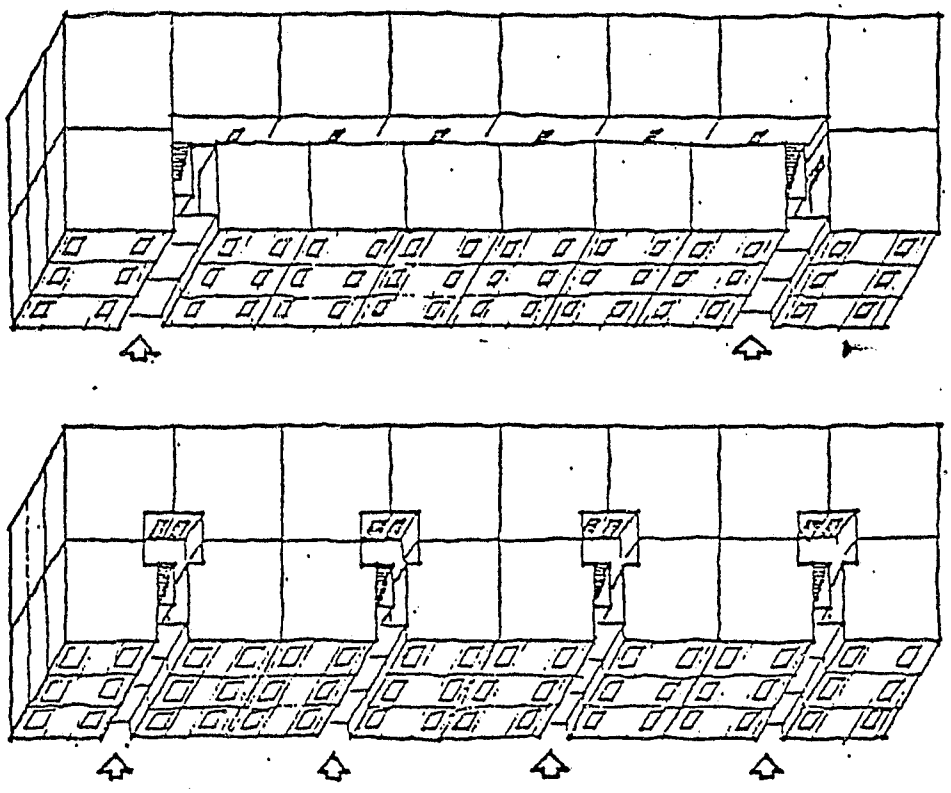
In multiple dwelling units, the important design variables are the number of dwelling units sharing a building entry and the number of units per floor. In theory, the lower the number, the greater is residents' sense of safety. For example, a three-story building with 48 units can have two interconnected entries, one at each end, thus creating corridors that run the length of the building. The same building, however, might be subdivided so that entries and anterior stairways serve only about 12 families, 4 per floor (see Figure B-16).

B.6.2 Site Planning

The positioning of buildings on a site can affect how outdoor areas are perceived and used. Personal robberies and stranger-to-stranger assaults typically occur in places perceived by users as public and anonymous in character. To see someone loitering on the sidewalk of a major thoroughfare is not so likely to arouse suspicion as someone on a more private residential street. Similarly, someone observed trying to break into a car in a public lot is less likely to be reported than on a residential street.

There are five basic guidelines that should be considered for incorporating crime prevention into site planning (11):

- Creating Zones of Influence -- Buildings should be positioned and grounds subdivided and allocated so that residents perceive outdoor areas, including the sidewalk area, as being under their zone of influence. Entry paths approaching buildings,



Source: U.S. Department of Justice. Law Enforcement Assistance Administration. National Institute of Law Enforcement and Criminal Justice. Design Guidelines for Creating Defensible Space, by Oscar Newman. Washington, DC: Government Printing Office, April 1976. S/N 027-000-00395-8

Figure B-16. Two Entry Design Plans for Multifamily Residential Buildings

parking lots, and play areas should be placed within these zones, thus encouraging residents to exert territorial prerogatives when needed.

- Number -- As indicated earlier, the fewer the number of families sharing a building, the stronger is each family's personal attachment to the surrounding grounds. As yet, little is known about how the nature of such territorial attachment changes when the number of families progresses from 2 to 6, or 6 to 12, or 12 to 50. Nevertheless, the number of families sharing common grounds is an important variable to consider.
- Assignment of Grounds -- Outdoor areas are perceived as semiprivate or semipublic, depending on the location of building entries and outdoor barriers. In higher density environments, designers might consider positioning buildings so that it is apparent to nonresidents that the surrounding grounds are intended for a definite group of dwelling units. Psychological barriers (low fences, shrubs, steps, changes in paving texture, etc.) can reinforce the semiprivate character of the grounds.

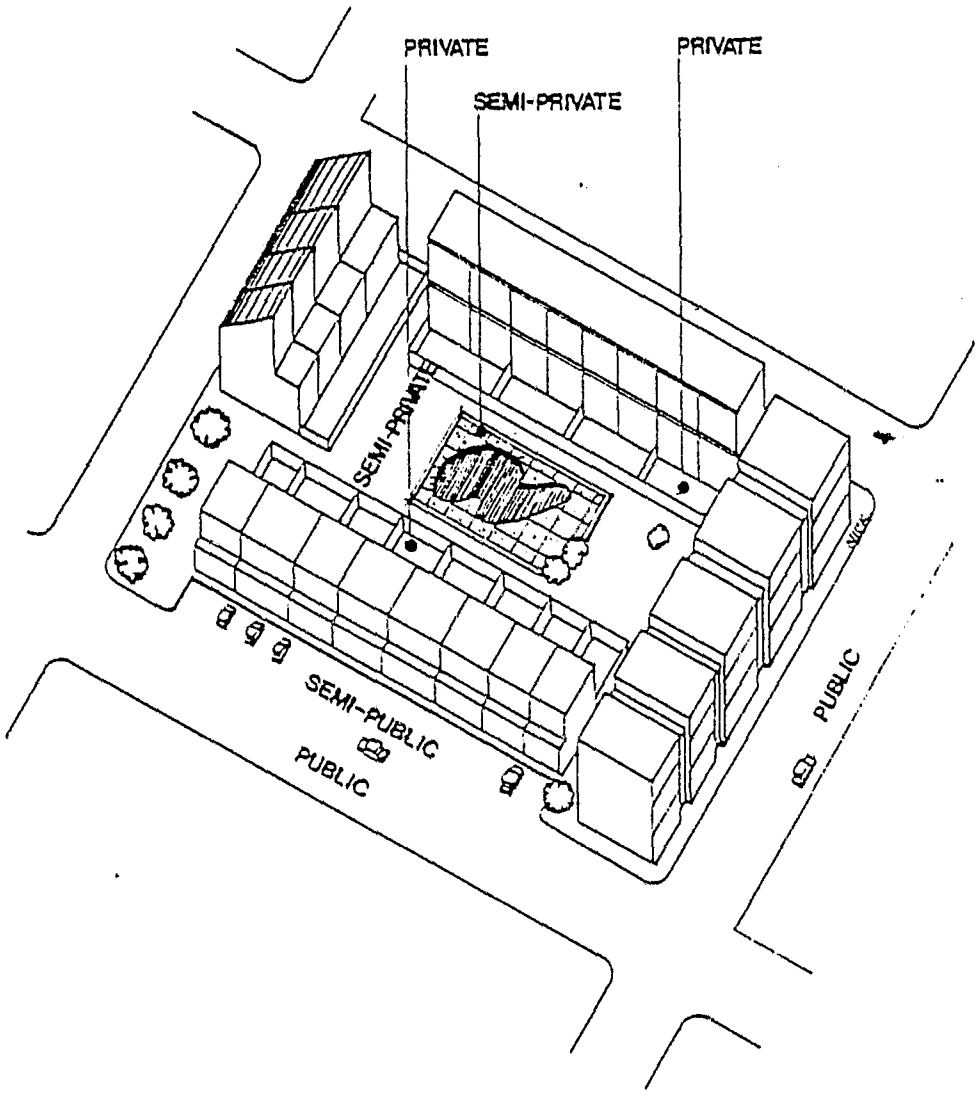
- Placement of Amenities -- The location of sitting areas, play equipment, and parking lots within the zones of influence give residents further reason to adopt territorial attitudes. Moreover, the daily use of the grounds by the intended residents further establishes the comparative privacy of these spaces and provides natural surveillance and activity support.
- Incorporating City Streets into Zones of Influence -- Residents in buildings with windows directly facing city streets are likely to perceive the adjacent sidewalk as an extension of their semiprivate areas. However, the extent to which residents will extend their territorial concerns to the street area depends on how accessible the sidewalk is from the dwelling unit.

As an example of this last point, parents are less likely to allow children to play outdoors if they cannot be reached easily in case of an emergency. Thus, apartments should have windows facing the street or the play area, and it should not take more than a matter of seconds to get outdoors (the latter factor explains, in part, why residents in elevator buildings are less personally involved with the use of their sidewalk area).

Figure B-17 illustrates the security-minded site planning principles in relation to garden apartments. Specifically, the front lawns adjacent to each building entry serve as a common area for the residents. The patios adjacent to the buildings in the back are private grounds for the residents of particular buildings. The large courts in the back are common recreation spaces, which are accessible only from the rear entries of the buildings. All of the front entries face the street, and parking is provided on the street in front of the buildings (the inset creates a sense of privacy in relation to the parking space and permits a larger number of parking spaces). Hence, the area from the resident's car to his building entry is likely to be perceived as being within his sphere of control.

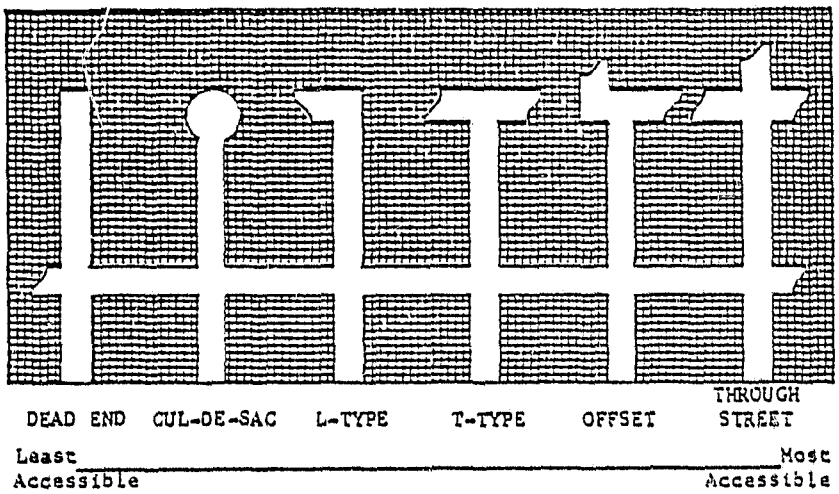
B.6.3 Street Layout

The manner in which streets are laid out (see Figure B-18) can function to deter crime by imparting a stronger proprietary sense and feeling of control on the part of residents. Accessibility is an important criterion. Dead-end and cul-de-sac streets are used mostly by local residents; hence, strangers are more likely to be detected. T-type and through streets are more accessible and, hence, are used more by nonresidents. The literature on offender behavior suggests that burglars select targets that provide easy access and departure, and where the possibility of detection is low. Research in Minneapolis (9) supports this relationship between residential burglary rates and street type, as shown in Figure B-19.



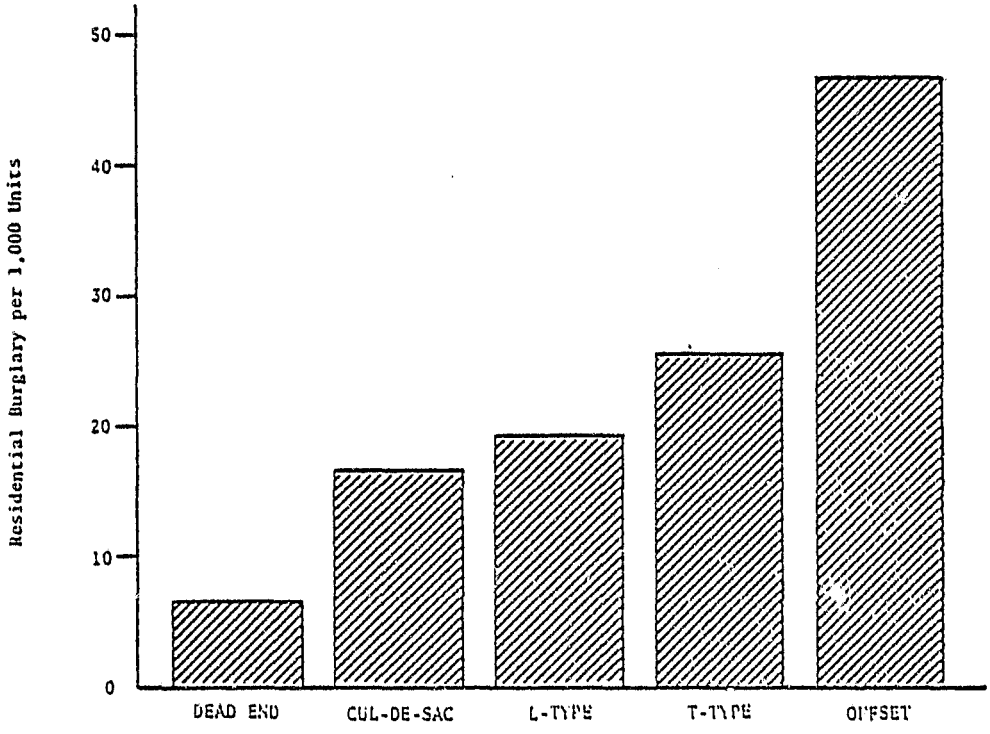
Source: Design Guidelines for Creating Defensible Space.

Figure B-17. Garden Apartment Site Plan



Source: Crime in Minneapolis: Proposals for Prevention.

Figure B-18. Representative Street Layouts



Note: Rates were based on 2,348 residential units.

Source: Crime in Minneapolis: Proposals for Prevention

Figure B-19. Residential Burglary Rate by Type of Street

B.6.4 Land Use Activities

Land use zoning is also a design mechanism through which appropriate environmental uses are established for a given area. CPTED-conscious planning should ensure that local and citywide zoning decisions take into account potential victimization hazards and displacement patterns. CPTED planning can eliminate or reduce undesirable site uses in a variety of ways, including:

- Closing streets and providing public transit routes.
- Locating (relocating) public amenities (such as small parks) to restrict access to and increase surveillance among intended users (e.g., families, the elderly, and children).
- Establishing maximum density levels and thus affecting the mixture of housing types.
- Regulating the types and extent of commercial and industrial development.

Some types of commercial establishments are more vulnerable to crimes because of the kinds of targets and payoff they offer -- gas stations and drug stores, for instance, are open in the evening, have merchandise that is easy to steal, and accumulate cash on a daily basis; schools are frequently prime targets for burglaries; and grocery stores and on-sale liquor establishments are more frequently robbed than burglarized.

Some establishments appear to attract crime to the vicinity. For example, the location of stores with on-sale liquor and beer licenses is related to particular clusterings of street assaults and robberies. The Minneapolis researchers measured the distance of all index crimes from on-sale liquor and beer stores and found that areas within one-tenth of a mile of an on-sale store experienced a much higher number of crimes.

B.7 Citizen/User Behavior

The discussion of environmental design variables is based on the premise that physical elements of the urban environment can be manipulated to influence citizens to defend their environment. A second premise is that there is a potential in any setting to strengthen the users' sense of social responsibility by augmenting existing social control mechanisms. Improving citizen/police relations and restoring community identification and commitment are examples of activities that support this premise. It is necessary for the planner to study community demographic characteristics and citizen attitudes and behavior that relate to crime and the fear of crime. Such information is important because data on certain characteristics of actual and potential victims (age, sex, race, socioeconomic status, or other background variables) provide valuable inputs for the development, implementation, and evaluation of CPTED-directed prevention strategies. In addition, studies in the area of victimology indicate that the behavior of potential victims can influence the behavior of offenders.

To varying degrees the literature has documented significant relationships between crime and social cohesiveness, and crime and population density. These areas are discussed in the following sections.

B.7.1 Social Cohesion

Communities that consider implementing CPTED projects are likely to have experienced some erosion of cohesiveness. The reason can be an increasing crime rate but, additionally or alternatively, the erosion can be due to fear of crime or the anticipation that "crime is just around the corner" because of population or environmental changes in neighboring communities.

Four key variables appear to affect social cohesion most strongly (12). Two concern the manner in which the environment is used (i.e., the extent to which there is common use of community facilities and the nature and intensity of social intervention), and two concern the nature of community attitudes (i.e., the degree to which users perceive themselves as "belonging" to a community and the belief that the other members share personal values regarding environmental use and treatment).

Unfortunately, knowledge is extremely limited about how community cohesiveness is affected by external threats. One study (13) of group cohesiveness and ethnic organizations found that cohesiveness increases when community members perceive a common threat and realize that cooperative behavior may reduce or eliminate the threat. This study noted that anxiety among members should be at a moderate level; extreme anxiety is not conducive to fostering social cohesion.

Moreover, crime is not typically viewed as a common threat. The National Advisory Commission on Criminal Justice Standards and Goals noted that when communities are faced with a growing crime problem, there is a strong tendency for individuals to perceive the problem as theirs alone. The initial response is to solve it individually. Such isolated approaches tend to fragment the community. For example, individuals fortify their residences, thus increasing social isolation and decreasing the ability of the block or neighborhood to present a united front against crime.

Relevant information regarding social cohesiveness of a project area should include the following:

- Population Perceptions of Crime -- These data, obtained directly from the user population, include perceptions and attitudes about the present level of crime, previous records, and what the future holds for them.
- Extent of Social Networks and Degree of Cohesiveness -- Relevant information includes descriptions of social networks (e.g., how many, degree of structure, number of persons), user attitudes towards the community and feelings of identification, and evidence of mutual support activities (e.g., helping behavior).

- Territoriality -- In addition to feelings of attachment, it is important to assess the extent to which users are satisfied with and have adopted proprietary attitudes towards their living spaces, most particularly, their willingness to exert territorial prerogatives (e.g., the likelihood of bystander intervention).
- Citizen/Police Relations -- Evidence of citizen cooperation with the police is another indication of cohesiveness (e.g., a crime reporting campaign in the area, a property identification program, a resident patrol program, or other police support activities).

B.7.2 Population Density

Numerous studies have reported that population density and crime are positively related. A formula has been suggested for ascertaining empirically the critical density level where social cohesion declines and crime increases (10). The rationale is that the number of personal conflicts and opportunities to commit crimes increases with higher densities.

In order to better understand the complexities of density and crime, a framework is needed for distinguishing among the different aspects of density (14). Density can be described as having a physical dimension (e.g., number of persons per unit of space). Nonsocial crowding (where physical elements alone are cramped) can be distinguished from social crowding

(where the feeling of crowding stems from the nature and intensity of social interaction in a given space). Some writers make a distinction between social density effects when the number of persons is varied within a constant space and spatial density effects when the amount of space is varied for a constant number of persons. For instance, overcrowded community facilities (social density) can lead to an increase in vandalism and a reduced likelihood of bystander intervention, whereas increasing the amount of space between single-family houses (spatial density) can increase opportunities for burglaries.

A final point about the relationship between density and crime concerns the unit of measurement. Density can be measured by dwellings per acre, dwellings per building, or rooms per dwelling, but it is important to realize that these differences do not necessarily correspond with housing type. For instance, duplex row houses typically range from 18 to 38 units per acre, whereas three-story garden apartments range from 24 to 36 units per acre. Seven-story elevator buildings range from 50 to 75 units per acre, but five-story brownstones converted into apartment buildings can go as high as 100 units per acre. Thus, in addition to examining spatial density, it is important to look at social density (i.e., the number of persons per acre, per building, or per room).

B.8 Law Enforcement

Law enforcement activities are relevant to crime/environment analyses in terms of the influence of police behavior on environmental

use patterns and the ways in which citizen anticrime activities can be supported. In this context, the important variables relate to police deployment practices, levels of police/community interaction, and the use of private security personnel.

B.8.1 Police Deployment

Patrol has traditionally been the key law enforcement method for preventing and deterring crime. Police walk or drive through assigned areas to check buildings, question suspicious persons, and talk with residents and shopkeepers. The object of patrol is to deploy officers in a manner that minimizes criminal opportunities and maximizes the chance of apprehension. However, the police can only be in certain places at certain times, so it is important that their patrolling activities convey the impression of omnipresence to citizens and potential offenders (i.e., give the appearance that an officer is always nearby).

Police departments are relying more and more on specialized patrols to help combat crime. Four types of specialized patrols are commonly employed: Uniformed tactical, decoy operations, stake-outs, and covert surveillance.

Uniformed tactical units are used to support traditional patrol. These tactical units are deployed to high-crime-rate areas. They are also deployed to areas where citizens fear crime even though the actual crime rate is low. For example, in the CPTED residential demonstration (Willard-Homewood Neighborhood) in Minneapolis, a tactical unit was assigned to the alleyways to discourage burglars from using them as a

means to gain entry to the backs of houses and as an escape route. Residents did not use the alleyways for fear of being robbed, although in the entire city less than one percent of all robberies occurred in the alleyways. Nevertheless, the deployment of tactical units to emphasize the patrol of alleyways reduced fear of crime and reduced the burglary rate slightly, as well.

Decoy operations can be used effectively against crimes for which police officers can convincingly pose as likely "victims." Decoys are frequently used to combat street robberies, pursesnatches, rapes, prostitution, and thefts from vehicles. The primary purpose of decoy operations is to make apprehensions for targeted crimes; however, by publicizing the use of decoys, they can also have a deterrent effect, since would-be offenders can never be certain whether or not prospective victims are police officers.

Stake-outs are used primarily to make apprehensions. There are two basic types of stake-outs: Physical and electronic. The first involves the placement of officers in positions where they can observe a specific location which crime analysis has identified as a likely crime target. The second uses electronic equipment, such as alarms and cameras, to provide the police with prompt notification of crime occurrences at particular locations and/or with information which will assist them in identifying and apprehending suspects. Both types of stake-outs can be directed at virtually any type of suppressible crime; however, they are most often used to cope with commercial robbery and burglary.

Covert surveillance can be used against virtually every type of suppressible crime. There are two basic types of covert surveillance. The first concentrates on criminal suspects and the second on high-crime-rate areas. The objectives of both tactics are to make arrests for crimes in progress and to develop information which will aid in making apprehensions following a crime occurrence.

B.8.2 Police/Community Interaction

Police/community activities are generally of three types: Programs to educate the public concerning diverse aspects of police work; programs to prevent crime; and programs to provide services to the community other than law enforcement. Public educational programs are aimed at improving police/citizen attitudes (e.g., reducing distrust of the police) and encouraging active citizen cooperation (e.g., citizen crime reporting projects). Police/community prevention activities focus on citizen policing activities that provide law enforcement in areas where the police are less effective. For example, citizen auxiliary patrols can focus on neighborhood areas patrolled infrequently by the police; specific housing complexes can be monitored by resident groups, and so forth.

The third type of police/community interaction is police information services that show citizens how they can effectively discourage crime. These services concentrate on reducing payoff (e.g., property identification) or increasing effort on the part of the offender (e.g., conducting police security surveys).

B.8.3 Private Security Services

Private security services play a significant role in crime prevention. Private security personnel perform functions similar to citizen patrols except that these individuals usually have more training and are paid for their services. For instance, block associations frequently pool resources to hire a street guard, shopkeepers get together to hire personnel to patrol parking lots and alleyways around-the-clock, and guards often are placed at the entrances to residential compounds.

B.9 Displacement of Crime

One issue with which the CPTED approach must deal is the possibility of crime displacement. Crime displacement has commanded much attention recently, mostly in reaction to the multitude of crime control or crime prevention programs that arose out of the perceived need to combat a rising crime rate in the mid-1960s. This section attempts to synthesize the existing literature on the crime displacement issue and to propose a number of different ways of relating displacement hpotheses to CPTED.

B.9.1 Crime Displacement Defined

The phenomenon of crime displacement has been referred to by a number of different terms, including mercury effect, toothpaste effect, crime spillover, and interjurisdictional crime. Regardless of terminology, one assumption seems to be central to all displacement discussions: The potential offender perceives some change in the environment that affects his assessment of risk versus gain with respect to a particular crime in a prescribed location. As a result of this perceived change and re-assessment, the potential offender alters his criminal behavior.

Displacement discussions also tend to assume that new crime prevention programs, or some other related changes in the criminal justice system, can decrease crime in a targeted jurisdiction but are just as likely to increase crime in nearby jurisdictions. Thus, most studies of crime displacement are concerned with *repulsive* displacement (i.e., changes in one jurisdiction that cause crimes to be shifted to other jurisdictions). Attention should also be given to *attractive* displacement (i.e., changes within a jurisdiction that induce a shift in criminal activity to that jurisdiction). The consequences of a change in a given jurisdiction, such as the construction of a new complex of apartments or of a declining reputation of a local police department, can result in a jurisdiction becoming more attractive to criminals.

Although the administrator of a CPTED project should concern himself with the possibility of generating repulsive crime displacement, he should also guard against the possibility of creating a situation conducive to attractive displacement. One such hypothetical situation might stem from the implementation of an Operation Identification program. The objective of this anticrime program is to engrave identification on all possessions in a given household, and to warn potential burglars by means of stickers on the household doors and/or windows. This is intended to discourage burglars by making items more difficult to fence. This strategy is an excellent deterrent, unless the program is abused. For example, if such a program were implemented, and it deterred burglars from striking houses with stickers on their doors,

it might become fashionable for citizens to use these stickers without actually engraving possessions. If it became known that people were using only stickers as deterrents, burglars might be attracted to those targets almost exclusively because the use of stickers would indicate that these homes contain items worth stealing. The essential point is that a CPTED administrator must not only be an initiator of project activities but also must attempt to see that they are undertaken in accordance with the concepts and plans developed for them.

B.9.2 Forms of Displacement

Most studies of crime displacement present a number of alternative forms of displacement. The essence of the different types of displacement possibilities is contained in the following description of five basic forms (15):

- Temporal -- A continuation of the same criminal behavior pattern but at a different time.
- Tactical -- A change in tactics in criminal activity, usually precipitated by some change in the accessibility of the target.
- Target -- A shift to another target occurring when one target appears relatively impervious to any criminal tactic.
- Territorial -- A geographic shift in the area where one commits a crime.
- Functional -- A shift from one crime type to another.

Each of these forms might be thought of in terms of dimension rather than dichotomy. For instance, when discussing the target form, displacement can be said to occur when one target appears *relatively* impervious to any criminal tactic. It is a matter of degree as to how impervious, or how repulsive, a target must be in order to induce an offender to shift to another target. It is also a matter of degree as to how attractive another time, tactic, territory, type of crime, or another target must be in order to induce a change in a criminal's behavior. How attractive, in terms of potential criminal gain, would a new complex of apartments have to be to induce a burglar away from his own familiar territory? Would the fact that these new apartments housed an affluent group of families be enough of an attraction? Or would a comparison of the degree of security in the criminal's usual area versus the degree of security in the new apartments be a key factor?

Another factor to consider with respect to this attractive/repulsive dimension is the existence of a *multiplier* effect. If a few offenders demonstrate that a certain crime is safe to commit, many others may also attempt it. This multiplier effect may also work in reverse. If a few offenders get caught, there may be a rapid decrease in that type of crime. This is certainly one objective of punitive prevention.

B.9.3 Implications for CPTED Planners

Although existing research is sketchy, there are several factors that a CPTED planner should keep in mind in developing project policy.

For example, studies indicate that robbery is usually deterred rather than displaced by street lighting, especially if the area lighted is large enough to cover whole communities, rather than just sections. This may be due to the fact that robbers would rather operate in a familiar territory.

The *phantom* effect can also be of use to CPTED administrators. Rotating the deployment of building security guards (for both residential and commercial buildings) can give the impression of guard omnipresence. Such rescheduling could lead to a reduction of crime without the need for expending more resources because it can create the impression that assistance is constantly nearby.

Researchers (15) have provided some insights as to what types of offenders commit which types of crime and what types of offenders are more likely to displace their activities. For example, if a CPTED area is plagued mostly by juvenile crime, there is evidence that target hardening is not likely to displace crime territorially because juveniles lack geographic mobility. In that same area, displacement to daytime crime would also be unlikely when school is in session. However, if only certain targets are protected, juvenile opportunists may find those targets that remain vulnerable.

Other research on offender behavior has suggested that burglars do not like personal confrontation. Thus, if burglary prevention efforts are adopted, these offenders are not likely to shift to robbery. On the other hand, robbery prevention measures can induce robbers to become burglars.

Four policy-relevant criteria have been proposed concerning crime displacement that can be of value to CPTED planners:

- Many patterns of criminal behavior may not be subject to change or to displacement due to their relationship to opportunity and need to operate in a familiar territory.
- Since burglars would rather relocate than switch to another crime category, CPTED measures that limit local crime opportunities may actually lessen the frequency of their burglarizing by forcing them to travel further from their home base. (Note that this suggestion does not deal with the ethics of forcing a shift to other areas.)
- Physical location may not cramp the style of older offenders, nor of armed robbers, who are less dependent on geographic familiarity.
- Crime control programs may be most efficient in areas where most crime is committed by young offenders with the major crimes being residential burglary and street robbery.

B.10 Fear of Crime

There are four basic aspects of fear of crime:

- Fear associated with actual or probable victimization.

- Fear associated with perceptions of crime.
- Fear associated with social disintegration.
- Fear associated with elements of the urban environment.

B.10.1 Actual or Probable Victimization

It has traditionally been assumed that crime rate and fear of crime are directly related. Hence, one way to reduce fear of crime is to reduce victimization itself because, according to this assumption, individuals who have been victims of crime appear to have more fear of crime than do nonvictims. However, those who are most likely to be victimized are not necessarily those who fear crime the most. Surveys conducted in 1966 by the President's Commission on Law Enforcement and the Administration of Justice found that population groups with the highest objective crime risks (such as low-income blacks) did indeed reveal intense fear, but many people who were less likely to become victims also expressed considerable fear.

On a national level, polls indicate that fear of violence and crime fluctuates more with the occurrence of dramatic events such as the Kennedy assassinations or campus unrest than with actual trends in the national crime rate. Women and the elderly are two subgroups in the population for which there is a large disparity between the objective probability and fear of victimization.

B.10.2 Perceptions of Crime

Fear also can be looked at in terms of neuroses and misinformation on the part of individuals. Strategies for reducing fear consistent with this perspective would be directed at correcting these misperceptions rather than reducing the probability of victimization.

B.10.2.1 Xenophobia

Numerous studies (16) have noted that fear of crime manifests itself as xenophobia, or fear of strangers. Individuals tend to be afraid of neighborhoods where there are many unfamiliar people on the streets. In commercial shopping and business areas, these fearful reactions to the presence of strangers are less prevalent.

B.10.2.2 Lack of Symbols of Security

This perspective stresses the need to provide symbolic reassurance to those who are afraid. This can be done either by increasing symbols of security or by decreasing symbols associated with threats to security. If exposure to strangers cannot be eliminated, perhaps the perceived threat from strangers can be reduced. For example, police officers could be placed at fixed posts in cognitively central locations. This strategy does not assume that increased police presence reduces crime, but simply that it reduces the *perceived threat of crime*.

B.10.2.3 Presence of Undesirable Individuals

Similar approaches foster reassurance by decreasing the visibility of certain activities and types of individuals that are associated (correctly or incorrectly) with an increased risk of crime. Loiterers,

prostitutes, panhandlers, and the like offend the middle-class mores of many people. Women are particularly uncomfortable because they are often the recipients of stares, whistles, and offcolor remarks. A study (17) of one small industrial town in California discovered that much fear of crime was simply fear of teenagers who lived in the town. Removing people and activities perceived as threatening is perhaps one of the most effective strategies for reducing fear of crime.

B.10.2.4 Media Distortions

Related to those studies stressing xenophobia and other psychological sources of fear are those that point to inaccurate and distorted information as major sources of fear of crime. Stories and myths are carried by various sources -- mass media, statements by politicians, conversations with friends -- many of which may be several times removed from the experience of actual crime. Newspapers, television, and the movies are frequently cited as being prime contributors to over-inflated estimates of crime risks.

B.10.3 Social Deterioration

The third aspect of fear of crime focuses on the social links that bind individuals into a communal network. When the social links begin to break down, the individual develops feelings of isolation and lack of importance that can be expressed as a general fear of crime. This approach emphasizes the relationship between the individual and his community.

B.10.3.1 Inadequate Social Networks

The absence of small stores and shops, apartments, and other public use areas in certain neighborhoods often precludes the development of informal friendship patterns and social networks. Devoid of factors that encourage social interaction and social cohesion on the part of the occupants, the street and sidewalk areas tend to function only as anonymous transportation corridors.

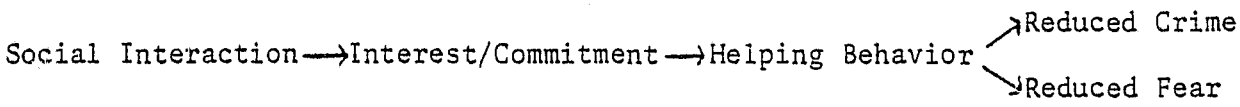
B.10.3.2 Too Few People in the Area

People feel that they will have a better chance against a criminal if there are other people present who could help them. When fear of crime for a specific area is found to fluctuate depending on the time of day, the reason may well be related to variation in the number of people found in the environment at different times.

B.10.3.3 Too Little Social Interaction and Helping Behavior

Implicit in much of the above discussion is a chain of causality linking strong social networks to fear reduction. Where social networks are strong, actual crime and fear can be kept low. Peace and order derive not only from the activities of the police but also from an unconscious network of voluntary controls and standards among the people themselves. Such voluntary controls may increase when the diversity of urban neighborhoods is increased so that people will be attracted to them. This encourages spontaneous street surveillance, an integral part of the informal control system. The process that links increased

community interaction to greater feelings of security and reductions in fear of crime is shown below.



While none of these linkages has been satisfactorily tested, some support for the general concept does exist. Research has shown that areas in which residents do engage in informal street surveillance are likely to have lower levels of crime than those in which such informal social controls are lacking. Fear of crime research among the elderly has shown that fear is lower in protective, age-homogeneous housing where social interaction is likely to be high. Some evidence also suggests that fear is lower when respondents believe that their neighbors are concerned about others, are willing to help the police, and would report a crime if they observed one.

Confidence that others will come to your aid if attacked can help to limit fear of crime. Studies of the circumstances under which individuals will intervene on behalf of others in some distress indicate that familiarity between victim and observer increases the chance of intervention. One study (18) demonstrated that even in circumstances where subject and stooge "victims" had previously encountered one another only briefly, bystanders were more likely to intervene. The authors also demonstrated that models of helping behavior increase the probability of intervention by individuals who observe the helping model. Programs directed at

increasing the reporting of crimes by citizens act to foster confidence that law enforcement, aided by citizen reporting, is more effective. Another study (19) suggests that citizen crime reporting projects may reduce fear of crime by increasing actual and symbolic citizen involvement. The goal is to increase the likelihood of intervention on the part of individuals. To the extent that this is perceived by members of the community, feelings of safety may be increased and fear reduced.

One project (20) designed to increase citizen reporting and intra-community cooperation is WhistleSTOP, instituted in the Hyde Park area surrounding the University of Chicago on the city's South Side. In an analysis of the effects of the project, it was reported that certain categories of street crime were significantly reduced and citizen reporting of street crime increased after the project was implemented. The relevance to fear is, again, indirect. If the link between reporting activities and feelings of safety does in fact operate, then this study is an indicator of the potential effectiveness of community projects directed at increasing the reporting of crime.

B.10.4 The Urban Environment

The fourth general class of correlates of fear concerns the role of the urban environment in shaping behavior and attitudes. Poor lighting, blind spots, and columns behind which an assailant can hide are examples of physical attributes of the environment that combine to produce a perceived high risk of victimization. The design and use of

sidewalks and parks, as well as the routing of street traffic can impact upon both crime and fear by: (1) Attracting people; (2) circulating them throughout the area; and (3) distributing traffic more evenly throughout the day.

The establishment of clearly defined communal areas can serve the dual purpose of promoting surveillance and setting the stage for the establishment of interpersonal contacts. These can, in turn, generate commitment, help people distinguish their neighbors from potentially threatening strangers, and encourage feelings of cohesion that can affect fear independent of any reduction in the actual incidence of crime. Such simple restructuring efforts as opening apartment or office doorways onto a commonly shared hallway can convert the area from an isolated private space into a more public area that facilitates informal surveillance.

A study of security and crime problems in Allentown, Pennsylvania, found that well-lighted streets and sidewalks promoted feelings of safety, while areas containing a number of trees and shrubs affording easy concealment generated feelings of insecurity. The authors of this study recommended environmental design strategies that increase intra-community interaction and alter neighborhood circulation and topography to increase security and reduce fear among the residents of the neighborhood.

A full discussion of urban environmental features that are associated with fear of crime is presented in Technical Guideline 3.

REFERENCES

1. Sellin, Thorsten, and M. E. Wolfgang. The Measurement of Delinquency. New York, NY: Wiley and Sons, 1964.

2. Rossi, H., et al. "The Seriousness of Crimes: Normative Structure and Individual Differences," American Sociological Review, 39(2): 224-237, April 1974.

3. Conklin, J. E. Robbery and the Criminal Justice System. Philadelphia, PA: Lippincott, 1972.

4. U. S. Department of Justice. Law Enforcement Assistance Administration. National Criminal Justice Information and Statistics Service. "Patterns of Robbery Characteristics and their Occurrence Among Social Areas," by Christopher Dunn. Analytic Report 15. Washington, DC: Government Printing Office, 1976.

5. Shover, Neal. "The Social Organization of Burglary," Social Problems, 20(4):499-514, Spring 1973.

6. Letkeman, Peter. Crime as Work. Englewood Cliffs, NJ: Prentice-Hall, 1973.

7. U. S. Department of Justice. Law Envforcement Assistance Administration. National Criminal Justice Information and Statistics Service. "Crime-Specific Analysis: The Characteristics of Burglary Incidents." Analytic Report 10. Washington, DC: Government Printing Office, 1977.

8. Hartmann, D. P., et al. "Rates of Bystander Observation and Reporting of Contrived Shoplifting Incidents," Criminology, 10(3):247-267, November 1972.

9. Minnesota. Governor's Commission on Crime Prevention and Control. Crime in Minneapolis: Proposals for Prevention, by D. W. Frisbie, et al. Prepared for the U. S. Department of Justice, Law Enforcement Assistance Administration. Minneapolis, MN: Governor's Commission on Crime Prevention and Control, May 1977.

10. Harries, K. D. The Geography of Crime and Justice. McGraw-Hill Problems Series in Geography. New York, NY: McGraw-Hill, 1974.

11. U. S. Department of Justice. Law Enforcement Assistance Administration. National Institute of Law Enforcement and Criminal Justice. Design Guidelines for Creating Defensible Space, by Oscar Newman. Prepared in cooperation with the U. S. Department of Housing and Urban Development. Washington, DC: Government Printing Office, April 1976.

APPENDIX C

Use of Police Data

APPENDIX C. USE OF POLICE DATA

C.1 Introduction

This appendix describes police reporting practices and how the CPTED analyst can use the information contained in police reports. The purpose is to assist the analyst in conducting quantitative and intuitive analyses of crime/environment problems.

A police officer who responds to a reported crime or who intervenes during the commission of a crime is normally required to prepare a report describing the nature of the incident and any actions taken (such as arrest or subsequent field investigation). The initial and followup investigations of an incident are recorded on specific field report forms that constitute the agency's official record of its activities concerning the event.

There are numerous reasons for preparing field reports. These include:

- Providing an official written record of the incident and police investigation.
- Assisting in the further investigation of the reported crime or incident.
- Assisting in the development of leads for further investigation.
- Assisting in the identification, location, and arrest of the suspect.

- Furnishing pertinent descriptions of identifiable markings and serial numbers of property taken for subsequent investigation and recovery.
- Providing pertinent information for preparation of complaints and affidavits for arrest and search warrants.
- Providing a basis for presenting sworn testimony in court.
- Assisting in the prosecution of accused suspects.
- Forming an information base for use by the police agency in analyzing crime patterns and trends, as well as allocation and deployment of manpower resources.
- Being used by the police agency in compiling periodic or special reports reflecting crime statistics within the jurisdiction.

C.2 Sources and Types of Information

The first step is to identify all of the relevant and available information sources in the local police department and become familiar with the field reporting system. Usually, a police department generates two types of documents of interest to the CPTED analyst:

- Police reports, which record discrete criminal events, incidents, related investigations, and arrests.
- Periodic reports, which summarize criminal and other police-related activities according to a number of parameters (e.g., type of incident, time-of-day, day-of-week, location, and census tract). These reports normally contain basic analyses of criminal activity (using one or more of the parameters mentioned) for both operational and administrative planning.

Police reports constitute the primary sources of information for CPTED analysis since they contain the greatest amount of detailed information on discrete criminal events. Periodic reports provide a secondary source of information for the CPTED analyst because of their absence of detailed crime informaiton. Despite their secondary role in CPTED analysis, periodic reports are an excellent source of information for the initial identification of crime/environment problems. Once identified, these crime/environment problems can be studied further, using the police reports.

C.2.1 Typical Police Reporting Forms

Police reports reflect the day-to-day activities of the agency, and the information contained in these forms constitutes the raw data for preparation of periodic summary reports. Examples of reports normally available in law enforcement agencies are:

- Offense Report -- A record of a preliminary

investigation conducted by an officer concerning a crime. The report is used to record the circumstances of all criminal offenses coming to the attention of the police, regardless of the value of property taken, extent of injury to the victim, or likelihood of successful apprehension and/or prosecution.

- Miscellaneous Incident Report -- A form used to record officially and permanently actions of officers and/or incidents not reported on the offense report. Usage is generally limited to noncriminal situations of such importance that a detailed official record is desirable. Examples of such situations are an industrial injury, missing person, dog bite, or lost property.
- Supplementary Report -- A form used as a continuation for any other report when additional space is needed, to provide additional information concerning a previously reported crime or other incident, to record the progress of a continuing investigation, or to close an investigation.

- Arrest Report -- A form used to record identifying information and details of the arrest of all persons taken into custody. This report serves as a permanent agency record of the officer's legal cause for arrest, his actions, the arrestee's actions and statements, and any other details of the arrest. In some jurisdictions, an arrest report may be the only available and detailed record of an offense, since many departments require that only an arrest report be prepared for an offense in which an on-scene arrest is made (rather than requiring that the officer complete *both* an Offense Report and an Arrest Report).

Although these are only a few of the reports available from a department, they represent the primary sources of information for the CPTED analyst. Other reports of possible interest are the Field Interrogation Report, Complaint Dispatch Card, and the Daily Activity Log. Because of the limited value of these reports to the CPTED analyst, they are not covered in this appendix.

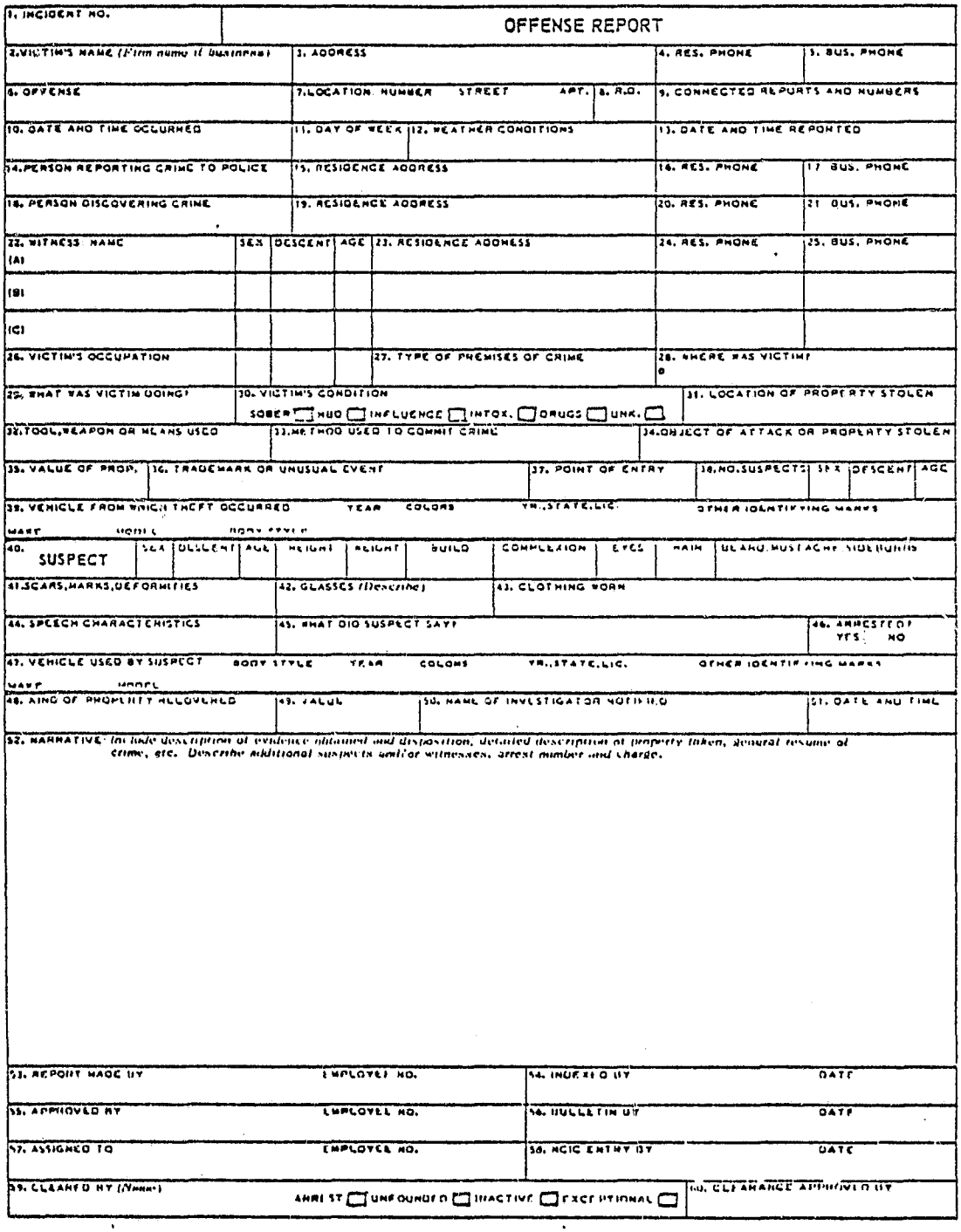
C.2.1.1 Offense Reports

The Offense Report is the primary source of crime-element information that can be analyzed by the CPTED planner. In some cases, the

Offense Report will be the only source of information. Generally, the Offense Report includes the following:

- Crime type.
- Victim information (sex, age, race, address, telephone number).
- Time the offense occurred (month, day, hour).
- Location where the crime occurred (address or the nearest address).
- Property loss (dollar value, description of items, and number of items).
- Suspect information (physical description, age, sex, race, height, weight).
- Modus operandi information (how the crime was committed, how the suspect approached the victim, whether or not the suspect was armed, and any specific behavioral characteristics both on the part of the victim and suspect).
- Witnesses (number, location, and description of crime as they saw it).

Offense Reports normally include both structured and narrative formats. In a typical Offense Report (see Figure C-1) the top portion of the form represents the structured format for recording specific elements of a crime scene. The narrative porition (the bottom half) provides space for a detailed description of the crime scene to be recorded by the officer. Some Offense Reports involve only forced-choice entries in a highly structured format while others use very little structure.



1. INCIDENT NO.

OFFENSE REPORT

2. VICTIM'S NAME (Firm name if business) | 3. ADDRESS | 4. RES. PHONE | 5. BUS. PHONE

6. OFFENSE | 7. LOCATION: NUMBER STREET APT. | 8. R.D. | 9. CONNECTED REPORTS AND NUMBERS

10. DATE AND TIME OCCURRED | 11. DAY OF WEEK | 12. WEATHER CONDITIONS | 13. DATE AND TIME REPORTED

14. PERSON REPORTING CRIME TO POLICE | 15. RESIDENCE ADDRESS | 16. RES. PHONE | 17. BUS. PHONE

18. PERSON DISCOVERING CRIME | 19. RESIDENCE ADDRESS | 20. RES. PHONE | 21. BUS. PHONE

22. WITNESS NAME	SEX	DESCENT	AGE	23. RESIDENCE ADDRESS	24. RES. PHONE	25. BUS. PHONE
(A)						
(B)						
(C)						

26. VICTIM'S OCCUPATION | 27. TYPE OF PREMISES OF CRIME | 28. WHERE WAS VICTIM?

29. WHAT WAS VICTIM DOING? | 30. VICTIM'S CONDITION: SOBER ☐ HBD ☐ INFLUENCE ☐ INTOX. ☐ DRUGS ☐ UNK. ☐ | 31. LOCATION OF PROPERTY STOLEN

32. TOOL, WEAPON OR MEANS USED | 33. METHOD USED TO COMMIT CRIME | 34. OBJECT OF ATTACK OR PROPERTY STOLEN

35. VALUE OF PROP.	36. TRADEMARK OR UNUSUAL EVENT	37. POINT OF ENTRY	38. NO. SUSPECTS	SEX	DESCENT	AGE

39. VEHICLE FROM WHICH THEFT OCCURRED YEAR COLORS YR., STATE, LIC. OTHER IDENTIFYING MARKS
MAKE MODEL BODY STYLE

40. SUSPECT	SEX	DESCENT	AGE	HEIGHT	WEIGHT	BUILD	COMPLEXION	EYES	HAIR	BEARD, MUSTACHE, SIDEBURNS

41. SCARS, MARKS, DEFORMITIES | 42. GLASSES (Describe) | 43. CLOTHING WORN

44. SPEECH CHARACTERISTICS | 45. WHAT DID SUSPECT SAY? | 46. ARRESTED? YES NO

47. VEHICLE USED BY SUSPECT YEAR COLORS YR., STATE, LIC. OTHER IDENTIFYING MARKS
MAKE MODEL BODY STYLE

48. KIND OF PROPERTY RECOVERED | 49. VALUE | 50. NAME OF INVESTIGATOR NOTIFIED | 51. DATE AND TIME

52. NARRATIVE: *Include description of evidence obtained and disposition, detailed description of property taken, general resume of crime, etc. Describe additional suspects and/or witnesses, arrest number and charge.*

53. REPORT MADE BY	EMPLOYEE NO.	54. INDEXED BY	DATE
55. APPROVED BY	EMPLOYEE NO.	56. BULLETIN BY	DATE
57. ASSIGNED TO	EMPLOYEE NO.	58. NCIC ENTRY BY	DATE

59. CLEARED BY (Name) ARREST ☐ UNFOUNDED ☐ INACTIVE ☐ EXCEPTIONAL ☐ | 60. CLEARANCE APPROVED BY

Figure C-1. Offense Report

C.2.1.2 Miscellaneous Incident Report

Field reporting procedures vary depending upon the nature of the incidents. Some law enforcement agencies use Offense Reports for Part I crimes and use Miscellaneous Incident Reports (see Figure C-2) for all other incidents. This report is used to record information concerning noncriminal matters (such as suspicious activity, violation of local ordinances, or a report of a prowler).

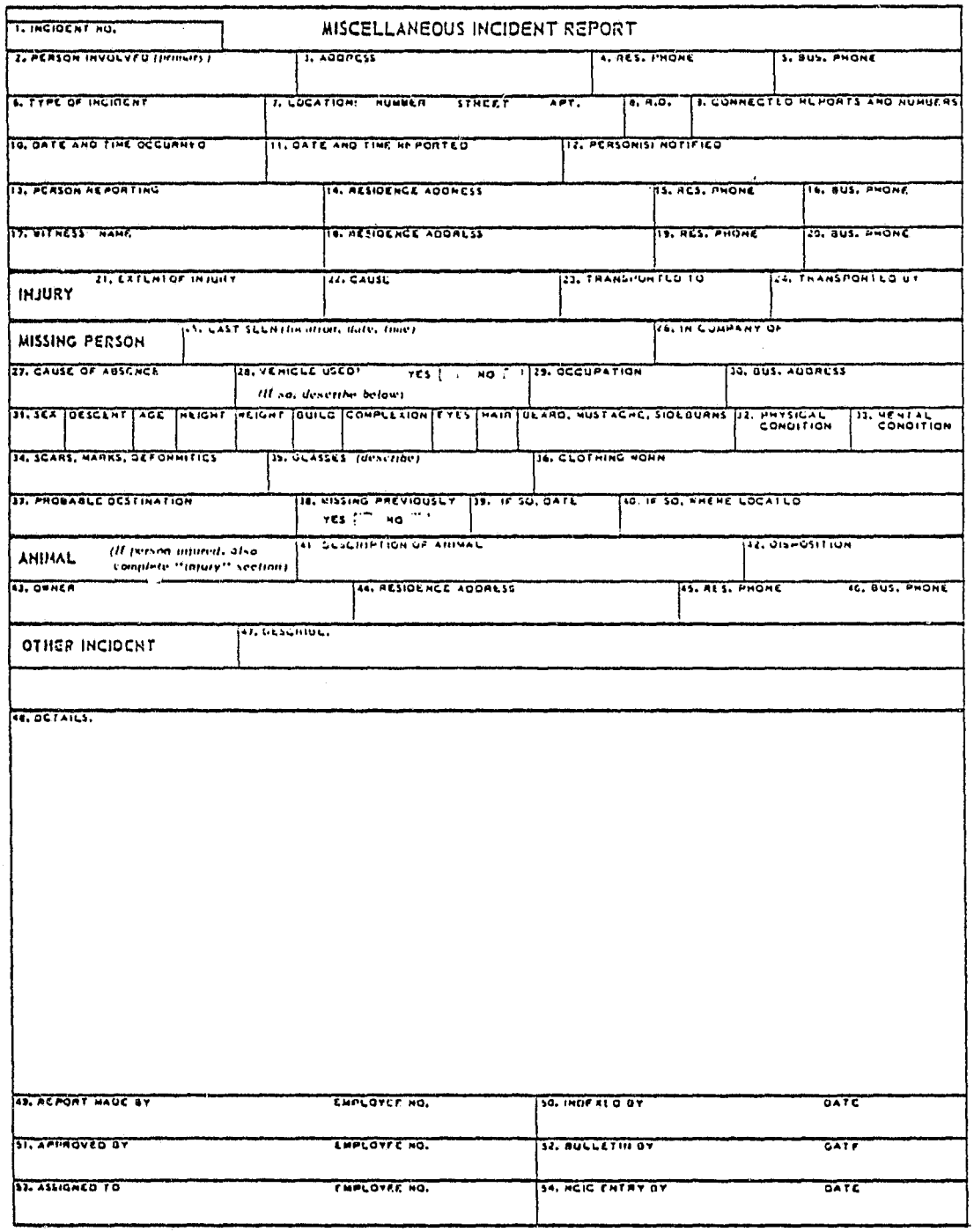
Miscellaneous Incident Reports are of value to the CPTED analyst because incidents that are not serious crimes nevertheless can be of interest in CPTED planning. These reports provide additional detailed information about a crime environment, as well as give indications of the frequency of Part II incidents (such as harassment, loitering, and drunkenness).

C.2.1.3 Supplementary Reports

The Supplementary Report is used by most departments to record the followup investigation of an incident previously reported in an Offense or Miscellaneous Incident Report. Supplementary Reports (see Figure C-3) are usually narrative in nature and contain information on changes in crime classification or status of case, additional evidence, and suspect description. It is a record of the continuing investigation by detectives of an offense, and hence, it should provide additional useful information to the CPTED analyst.

C.2.1.4 Arrest Report

Arrest Reports are a primary source of information about suspects.



MISCELLANEOUS INCIDENT REPORT

1. INCIDENT NO.

2. PERSON INVOLVED (Initials)
3. ADDRESS
4. RES. PHONE
5. BUS. PHONE
6. TYPE OF INCIDENT
7. LOCATION: NUMBER STREET APT.
8. R.D.
9. CONNECTED REPORTS AND NUMBERS
10. DATE AND TIME OCCURRED
11. DATE AND TIME REPORTED
12. PERSON(S) NOTIFIED
13. PERSON REPORTING
14. RESIDENCE ADDRESS
15. RES. PHONE
16. BUS. PHONE
17. WITNESS NAME
18. RESIDENCE ADDRESS
19. RES. PHONE
20. BUS. PHONE

INJURY
21. EXTENT OF INJURY
22. CAUSE
23. TRANSPORTED TO
24. TRANSPORTED BY

MISSING PERSON
25. LAST SEEN (location, date, time)
26. IN COMPANY OF
27. CAUSE OF ABSENCE
28. VEHICLE USED? YES [ ] NO [ ] (If so, describe below)
29. OCCUPATION
30. BUS. ADDRESS
31. SEX | DESCENT | AGE | HEIGHT | WEIGHT | BUILD | COMPLEXION | EYES | HAIR | BEARD, MUSTACHE, SIDEBURNS
32. PHYSICAL CONDITION
33. MENTAL CONDITION
34. SCARS, MARKS, DEFORMITIES
35. GLASSES (description)
36. CLOTHING WORN
37. PROBABLE DESTINATION
38. MISSING PREVIOUSLY YES [ ] NO [ ]
39. IF SO, DATE
40. IF SO, WHERE LOCATED

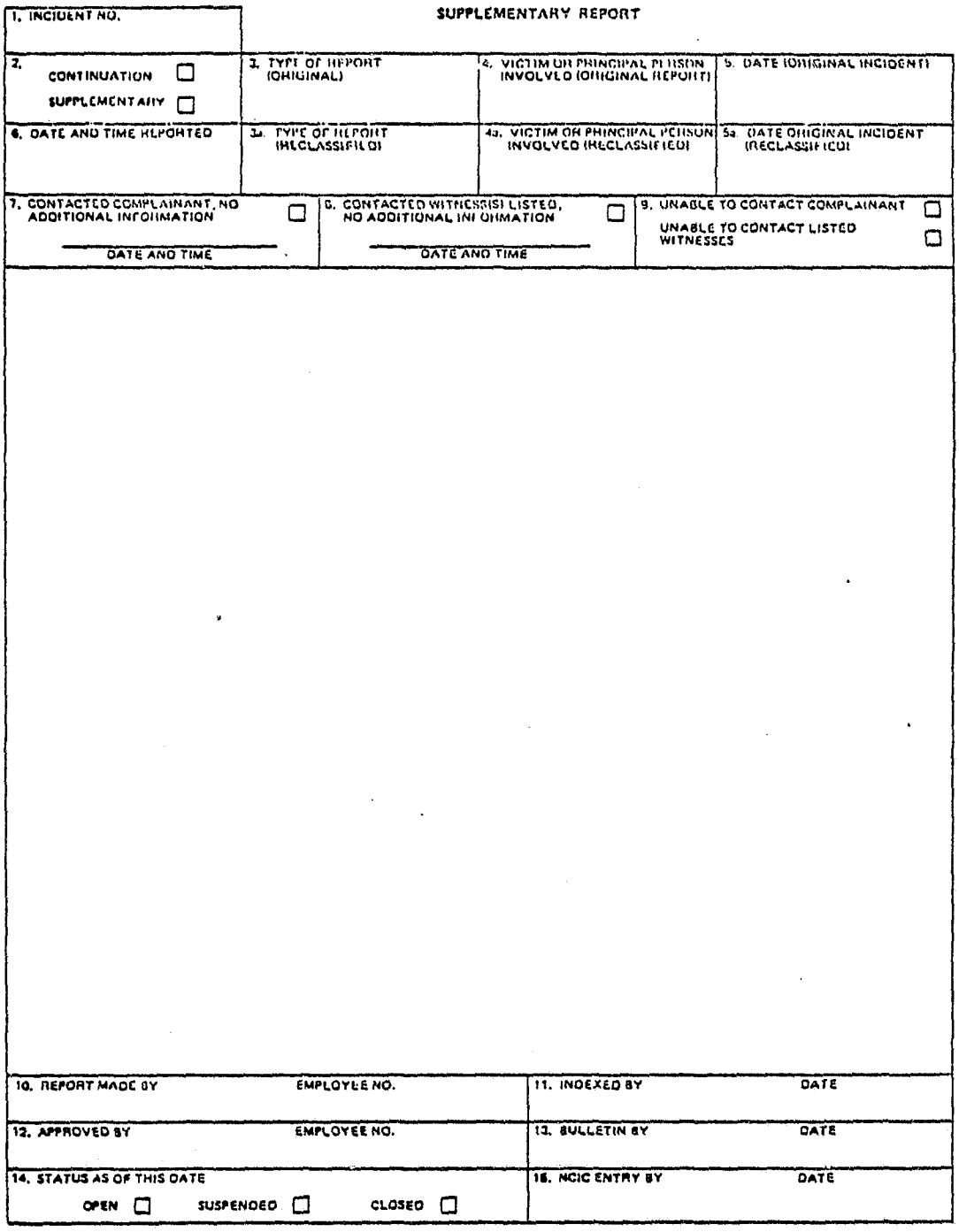
ANIMAL (If person injured, also complete "Injury" section)
41. DESCRIPTION OF ANIMAL
42. DISPOSITION
43. OWNER
44. RESIDENCE ADDRESS
45. RES. PHONE
46. BUS. PHONE

OTHER INCIDENT
47. DESCRIBE:

48. DETAILS.

49. REPORT MADE BY | EMPLOYEE NO.
50. INDEXED BY | DATE
51. APPROVED BY | EMPLOYEE NO.
52. BULLETIN BY | DATE
53. ASSIGNED TO | EMPLOYEE NO.
54. NCIC ENTRY BY | DATE

Figure C-2. Miscellaneous Incident Report



SUPPLEMENTARY REPORT

1. INCIDENT NO.			
2. CONTINUATION ☐ SUPPLEMENTARY ☐	3. TYPE OF REPORT (ORIGINAL)	4. VICTIM OR PRINCIPAL PERSON INVOLVED (ORIGINAL REPORT)	5. DATE (ORIGINAL INCIDENT)
6. DATE AND TIME REPORTED	3a. TYPE OF REPORT (RECLASSIFIED)	4a. VICTIM OR PRINCIPAL PERSON INVOLVED (RECLASSIFIED)	5a. DATE ORIGINAL INCIDENT (RECLASSIFIED)

7. CONTACTED COMPLAINANT, NO ADDITIONAL INFORMATION ☐ DATE AND TIME	8. CONTACTED WITNESS(S) LISTED, NO ADDITIONAL INFORMATION ☐ DATE AND TIME	9. UNABLE TO CONTACT COMPLAINANT ☐ UNABLE TO CONTACT LISTED WITNESSES ☐

10. REPORT MADE BY	EMPLOYEE NO.	11. INDEXED BY	DATE
12. APPROVED BY	EMPLOYEE NO.	13. BULLETIN BY	DATE
14. STATUS AS OF THIS DATE OPEN ☐ SUSPENDED ☐ CLOSED ☐		15. NCIC ENTRY BY	DATE

Figure C-3. Supplementary Report

Information usually found in the Arrest Report (see Figure C-4) includes:

- Physical description (weight, height, complexion, color of eyes).
- Personal identification (name, age, race, occupation, sex).
- Alias or nickname.
- Crime type as reported on the origianl offense report.
- Charges (the official charges against the suspect).
- Accomplices.
- Location of arrest (address, type of place, e.g., home, street, school, bar).
- Residence (home address of suspect).
- Vehicle description (getaway car).
- Modus operandi.
- Armed/unarmed and type of weapon.

Arrest Reports are of some (although limited) interest to the CPTED analyst, because they identify common characteristics of offenders operating within a specific setting. For example, an analysis of a series of arrests in a target area may reveal a common modus operandi because of the nature of the opportunity provided by the environment to commit a crime. In this case, the CPTED analyst should also review the corresponding original Offense Reports to obtain additional information concerning vulnerability of victims, means of attack, locational

ARREST REPORT

1. BOOKING NO. | 2. MISD. [ ] FEL. [ ] OTHER [ ]

3. SUBJECT'S NAME | 4. RES. ADDRESS | 5. RES. PHONE | 6. BUS. PHONE

7. CHARGE *(Section No., Code and Definition)* | 8. LOCATION ARRESTED | 9. R.D. | 10. CONNECTED REPORTS AND NUMBERS

11. DATE/TIME ARRESTED | 12. DATE TIME BOOKED | 13. OCCUPATION | 14. BUSINESS ADDRESS | 15. RESISTED YES [ ] NO [ ] | 16. ARMED YES [ ] NO [ ]

17. DESCRIPTION | SEX | DESCENT | AGE | HEIGHT | WEIGHT | BUILD | COMPLEXION | BEARD, MUSTACHE, SIDEBURNS | 18. DATE OF BIRTH

19. SCARS, MARKS, DEFORMITIES | 20. GLASSES *(Describe)* | 21. CLOTHING WORN

22. SPEECH CHARACTERISTICS | 23. ALIAS | 24. SOCIAL SECURITY NO. | 25. DRIVER'S LIC. NO., STATE

26. COMPLAINTS OR EVIDENCE OF ILLNESS OR INJURY-BY WHOM TREATED | 27. BIRTHPLACE | 28. EVIDENCE BOOKED YES [ ] NO [ ]

29. LOCATION CRIME COMMITTED | 30. R.D. | 31. DISPOSITION OF ARRESTEE'S VEHICLE | 32. HOLD FOR

33. VEHICLE USED IN CRIME — MAKE | MODEL | BODY STYLE | YR. | COLORS | YR., STATE, LIC. | OTHER IDENTIFYING MARKS

34. DRIVING VEHICLE *(Direction and Street Name)* | 35. AT OR BETWEEN STREETS

36. CODE: V - VICTIM *(Firm name if business)* W - WITNESS P OR G - PARENT OR GUARDIAN *(Juvenile Only)*

NAME	CODE	RES. ADDRESS	RES. PHONE	BUS. PHONE

OFFENSE REPORT INFO: 37. VICTIM'S OCCUPATION, DESCENT, AGE | 38. TYPE OF PREMISES | 39. TOTAL VALUE
40. TYPE OF OFFENSE *(Till-tap, Shoplift, Theft from Veh., Battery, etc.)* | 41. TYPE OF PROPERTY TAKEN

JUV. ONLY: 42. PARENTS NOTIFIED BY | 43. TIME | 44. PLACE DETAINED | 45. DATE, TIME, LOCATION COURT | 46. REG. APP. BY | 47. DET. APP. BY

48. ADMONITION OF RIGHTS: *The subject was advised that he had the right to remain silent, and that if he gave up the right to remain silent, anything he said can and will be used against him in a court of law and that he had the right to speak with an attorney and to have the attorney present during questioning, and that if he so desired and could not afford one, an attorney would be appointed for him without charge before questioning.* ADMONITION GIVEN BY ________________

49. DETAILS: *Background info on arrest, complaint, radio call, etc., narrative story of circumstances and pertinent statements. If intoxication involved, describe appearance, actions and officer's opinion as to degree of intoxication. If physical evidence found, where found, who by and disposition. Describe evidence of narcotic addiction.*
ARRESTEE'S STATEMENT

If additional space is needed, use supplemental report.

50. ARRESTING OFFICER | EMPLOYEE NO. | 51. DATE AND TIME REPORTED | 52. VACATION DATES

53. TRANSPORTING OFFICER | EMPLOYEE NO. | 54. BOOKING OFFICER | EMP. NO. | 55. INDEXED BY | DATE

56. APPROVED BY | EMPLOYEE NO. | 57. BULLETIN BY | DATE

58. ASSIGNED TO | EMPLOYEE NO. | 59. NCIC ENTRY BY | DATE

Figure C-4. Arrest Report

characteristics, and other details. Thus, Arrest Reports can help the CPTED analyst to identify subenvironments that are physically conducive to the commission of certain crimes.

C.2.2 Periodic Reports

Periodic reports usually are summaries of activities prepared by law enforcement agencies for two major reasons:

- To satisfy administrative requirements.
- To satisfy operational requirements within the law enforcement agency.

The Annual Report is an example of a periodic report. Local ordinances usually require agencies to produce an Annual Report that corresponds to the fiscal year. A second report, which is an input to the U. S. Federal Bureau of Investigation's Uniform Crime Reporting Program, aggregates crime information according to calendar year.

Even in cases where the CPTED team has enough resources to undertake an independent analysis, it is recommended that local periodic records be examined. Data elements which merit study are: Index of crime, frequencies of crime, the proportion of certain offenses, geographic distributions, trends over years and months, and high-, medium-, and low-crime census tracts. The analyst should verify percentages and total, and determine whether tables and graphs contradict other sources.

For illustrative purposes, a sample table from a typical police Annual Report of a suburban county in Northern Viriginia (population 170,000) is shown in Table C-1. It presents data for eight major crime

TABLE C-1.

County Crime Data, FY76

FY 76 DATA

	1975 JUL	AUG	SEP	OCT	NOV	DEC /	1976 JAN	FEB	MAR	APR	MAY	JUN	TOTALS
VANDALISM	144	150	154	161	194	156	237	150	135	177	135	158	1951
LARCENY	632	599	562	615	498	483	476	472	484	533	500	539	6393
BURGLARY	137	156	121	164	197	173	149	135	124	137	141	115	1749
ROBBERY	14	15	11	22	15	29	28	23	20	12	15	13	217
ASSAULT	119	135	112	114	100	85	82	93	83	96	121	98	1238
RAPE	5	6	7	4	3	5	2	1	1	2	2	4	42
MURDER & NON-NEG. MANSLGH.	0	0	1	0	0	0	1	0	1	1	1	1	6
NEG-MANSLGH.	0	2	1	0	3	1	1	0	0	0	1	1	10
	1051	1063	969	1080	1010	932	973	874	863	958	916	929	

categories by month of FY 1976. Aggregate reports such as these are seen as guides to the CPTED team in directing further research. Usually, the analyst will have to go back to primary sources of information (such as Offense Reports) in order to extract the most desirable elements of crime information. It is this further analysis that enables the team to draw conclusions about the crime problem from a CPTED point of view. For example, if detailed analysis shows that most of the assaults were family disturbances, then CPTED strategies will be of limited use.

C.3 Data Limitations

Research indicates that there are often large discrepancies between actual crime rates and the rates reflected in official reports. This problem can be a result of certain methodological errors in the compilation of these reports, specifically concerning the lack of reliability and validity (see Guideline 5, Section 6, for a review of reliability and validity principles).

Reliability is concerned with whether or not the information was collected consistently following the same instructions by all personnel, whereas validity addresses the question of whether the reported incidents are correct. Reliability alone is not sufficient, because consistency in reporting can still reflect invalid information.

Underreporting is a major problem with official records. There are various reasons for this problem, including the following:

- A great many crimes, such as larcenies, are undetected.

- Many victims decline to report crime because they think that the event was minor in nature, and does not necessitate bothering the police.
- Victims are frightened by offenders. On many occasions, victims know their attackers; they may be friends or neighbors. Victims feel that reporting to the police may lead to revenge on the part of the offenders.
- Nonreporting is common in certain communities where all disputed issues are solved "within the family." In those communities, the police are perceived as unsympathetic strangers.
- Victims sometimes recognize that a crime has been committed but they decline to report it because they hesitate to get involved with the tedious process of justice.
- Victims are often skeptical about the ability of the police to solve the crime or to apprehend the suspects.

Another source of error is found in police department procedures, where there are three major sources of unreliability:

- Recording Policies -- Law enforcement agencies work under changing conditions. From time to time, internal policies are revised, resulting

in some crimes receiving increased attention while others are dismissed. Official reports reflect policy changes.

- Interpersonal Unreliability -- Law enforcement officers on the scene are given much latitude to interpret events. The result is that some events are recorded and pursued, while others are not. This tends to vary among officers.
- Specific Law Enforcement Programs -- When police departments launch anticrime campaigns, a larger number of criminal events are reported and this is often interpreted as an increase in crime rates. An example of this is the implementation of the 911 emergency number, which increases citizen reporting rates.

Local reports are more manageable than Uniform Crime Reports or statewide data because the CPTED analyst can trace sources of errors. By checking on the procedures and practices of the local police department, the analyst can gain a more accurate understanding of the situation. For example, if underreporting is judged to be a problem, by combining law enforcement data with the results of victimization studies, the analyst will be able to assess the extent of the problem. Therefore, in spite of these possible data limitations, the CPTED analyst is still urged to use local reports.

C.4 Extracting Information

In the previous sections, considerations regarding the use of law enforcement forms and records were raised. The purpose of this section is threefold. First, to emphasize the importance of CPTED planners interacting with law enforcement agencies; second, to identify aspects of CPTED-related information that can be extracted from law enforcement records; and third, to discuss procedures for integrating various data sources for CPTED purposes. Unfortunately, this section can present general guidelines only. As already noted, each police department in the country employs its own unique procedures and practices for information gathering and processing. In addition, law enforcement data collection is not specifically designed to accommodate CPTED research needs.

C.4.1 Major Considerations

A prerequisite for gaining access to Offense Reports is obtaining permission from the proper sources. Most police departments require the permission of the chief; some may require the additional approval of the county district attorney.

Obtaining permission takes time -- perhaps as long as two weeks. The CPTED analyst should begin this task by contacting the head of the agency's planning division to ascertain whose permission is required, and what information about the CPTED project will be requested before permission is granted. For example, the CPTED analyst may be required to state in writing the name of the organization conducting the research, the purpose of the research, the specific information desired in the

offense categories, the time span involved in years and months, the specific jurisdiction, and so on. The project manager is typically required to submit his written assurance that no identifying characteristics of victims, witnesses, or suspects (such as names or addresses) will be used, and that no police files will be removed from the department.

The head of the planning division can provide information about the quality and completeness of the records, as well as copies of the department's periodic reports. He also can provide information about what data elements of the Offense Reports, if any, are computerized, and whether the analyst can access these data directly from the computer.

This initial contact with the planning division may prove to be a valuable investment of the CPTED analyst's time. Support of the request for permission can facilitate the process of gaining access to the records. The officer's superiors, especially the chief, are more receptive to an outsider's request if it is presented favorably by one of their own staff.

Even with the assistance of a planning officer, the process of gaining access to police data can require a number of meetings with police personnel and/or the district attorney to answer questions about the project. Granting requests to nonpolice personnel to study individual Offense Reports is not within the scope of routine police operations. Some cities will not allow anything more than the Uniform Crime

Reporting data to be released, while others will grant permission to a researcher to collect all of the information requested.

After written permission is granted, there are six preliminary steps to be taken:

- Become familiar with the operational procedures of the local police department.
- Learn the job structure and the hierarchy of responsibilities in the department.
- Identify the reporting system of the department (or precinct) where applicable.
- Identify the forms in use. Prepare a list of forms and examine their preliminary relevance to CPTED needs.
- Examine the structure of the forms.
- If possible, accompany regular police patrol in routine work. Observe how officers comply with instructions for completion of forms, how they react to criminal events, how they determine what crimes have been committed, and check on their completeness.

The analysis should begin with careful examination of Annual Reports and any other available periodic reports. The CPTED analyst should be able to determine from the Annual Reports what offenses are most common in the area, how these offenses are distributed geographically, and what crimes have increased or decreased in volume from previous years.

After the periodic reports have been obtained and reviewed, it is worthwhile to find out why certain types of tables, charts, and diagrams are prepared and maintained, and what information might have been displayed but was discontinued.

Next, the analyst should obtain the reports that deal with specific crime events. The questions presented below deal with the availability of these reports:

- How are Offense/Incident reports filed (according to type of crime, according to dates, or any other method of classification)? Are specific crime reports employed? Are they cross indexed? If so, how?
- How are Supplementary Reports filed?
- Are these reports accessible? Can they be reproduced for research purposes and destroyed after the analysis is completed?

C.4.2 Use of Computers

As mentioned above, many police departments use computers to store, retrieve, and compile information. Computer storage can facilitate the work of the CPTED analyst, but it will be necessary for the analyst to become familiar with the procedures of storage, retrieval, and processing information. The following points merit examination:

- Find out what reports serve as input sources. Usually Offense/Incident Reports are the major sources of information.

- Determine what items actually are coded and stored in the machine.
- Find out what, and how, information can be retrieved. In order to retrieve information, there must be a program. The purpose of such a program is determined by the operational requirements of the department. It is assumed that it will be possible to retrieve information according to given parameters. For example, if type, location, and dates of crime are among the coded items (they usually are), it will be possible to obtain a printout of certain types of crimes that occur on a street during a given time period.

In some instances, it might be necessary for the CPTED team to employ a computer specialist. This person could write programs that take advantage of stored information (with permission of the local police department) and also take into consideration the specific needs of the CPTED project. He also could assume other responsibilities in connection with all phases of data analyses.

The ease of the data collection process is directly related to the extent to which the data are computerized. If all of the CPTED-related data elements are stored in a computer, it will take only a few minutes to explain to the department's programmer (or to a CPTED computer consultant) what analyses are desired. If the computer is not available

to the analyst, or the department does not use a computer, then the data will have to be collected by hand from the Offense Reports or Supplementary Reports.

Even if a computer is available, it will usually take some time to receive a printout. Most jurisdictions are overburdened with requests for information from the many city or county agencies which share the computer facilities. It is likely that this backlog will result in the CPTED request being assigned a low priority in both the keypunch and computer operations.

C.4.3 Additional Guidelines

Before the actual information processing begins, reports pertaining to CPTED-related crimes must be selected. The CPTED analyst should scan all the Offense Reports and select those that involve CPTED-related offenses, as described in Appendix B. It may be possible to use the computer to generate a printout of information on CPTED-relevant incidents only. However, it will probably still be necessary to examine each Offense Report's narrative section and Supplementary Reports for additional information, because not all data are coded and stored in a computer. The narratives describe such items as point of entry and exit in a burglary, use of a weapon in a robbery, and whether the property or premises were properly secured. These sections can also yield more detailed information about certain items covered in the more structured parts of the Offense Reports. For example, in the structured section of an Offense Report, an officer can record that an offense occurred in

the 800 block of Main Street. However, in the narrative section, he can note that the offense occurred in the south parking lot of a given restaurant in the 800 block. This detail is essential for accurate crime/environment mapping (see Technical Guideline 1).

To facilitate the collection of police data, a data collection instrument should be prepared prior to accessing police files. Figure C-5 presents a suggested format. This instrument allows the analyst to record as much information as is available about each item. After all this information is collected from police department files, the analyst can choose appropriate analytic techniques. Transferring the relevant data from the Offense Reports to the forms that have been chosen for information extraction will require a few days. It is highly unlikely that the analyst will be allowed to photocopy the Offense Reports.

One potential payoff of spending time collecting data in a police department comes from the informal conversations with police and civilian staff members. These conversations can lead to a better understanding of the procedures under which police data are generated, the unique characteristics of the given police department operation, how the final classification of each offense is made, how the reporting and crime classification standards vary due to differences in local and state statutes, and in what situations the classification process is largely subjective.

C.4.4 Crime/Environment Variables and Police Records

There are numerous crime-specific data elements recorded for analysis

Case No.	Exact Location of Offense	Use of Weapon and Type	Property or Premises Secured (How Secured?)	Point of Entry	Other Relevant Information

Figure C-5. Sample Data Collection Form

purposes (see Table C-2). Chapter 2 and Appendix B identified 9 categories of crime/environment variables. This section discusses the relevance of six of these categories to data elements found in the police records.

- Type of Crime -- The type of crime is generally established by the reporting officer at the crime scene, although sometimes a report review officer makes a judgement (if a victim presses charges).* The officer uses his judgement in relation to the victim's or witnesses' description of the event. Often, a criminal event is comprised of more than one offense. For CPTED purposes, it is essential to be aware of all the offenses involved in the case.
- Severity of Crime -- Aggregated police data can be used to determine the severity of specific crime problems in a community. Information from various reports might also be useful in ascertaining the seriousness of specific incidents with respect to injuries, property damage, financial loss, etc.
- Geographic and Temporal Patterns of Crime -- Geographic factors are one of the most important inputs to the CPTED project analysis, but forms that deal with the criminal event do not address this area in any depth. The officer usually

*In some police departments, all Offense/Incident Reports are examined by a report review officer who determines the type of crime for record-keeping purposes.

TABLE C-2

Crime-Specific Factors for Crime Analysis

• RESIDENTIAL BURGLARY SPECIFIC	Type premise attacked (house, exterior apt., interior apt., etc.) Occupied vs. unoccupied Point of entry (window, door, etc.) Method of entry (pry door or window, pipe wrench door, break window, etc.) Presence of physical evidence (latent prints, etc.)
• COMMERCIAL BURGLARY SPECIFIC	Type of business attacked (TV store, clothing store, svgns. & loan, etc.) Alarm information (no alarm, alarm defeated, method, etc.) Point of entry (window, door, roof, wall, floor, vent, etc.) Method of entry (window smash, lock in-break out, peel wall, etc.) Safe attack method (rip, punch, peel, burn, drill, grind, etc.)
• ROBBERY SPECIFIC	Type of business victim (diner, bar, taxi, savings & loan, gas station, etc.) Victim person descriptors (sex, race, age, occupation, etc.) Type weapon used (handgun, shotgun, knife, club, etc.) Suspect mask and type (facial area covered) Suspect statement during commission (or note), particular M.O.
• THEFT FROM PERSON SPECIFIC	Exact location of victim (sidewalk, park, hallway, bar, etc.) Victim person descriptors (sex, race, age, etc.) Victim condition after attack Suspect particular M.O. (approach, flight, statement, etc.) Object of theft (cash, checks, credit cards, jewelry, etc.)
• AUTO THEFT SPECIFIC	Area stolen vs. area recovered Exact last location (on-street, parking lot, carport, sales lot, etc.) Make, year and model of vehicle Degree of strippage and parts Presence or absence of physical evidence
• LARCENY SPECIFIC	Type victim property (business, personal, use, purpose, etc.) Location of property (left unattended, in vehicle, etc.) Specific property taken and market potential Suspect particular M.O. Presence or absence of physical evidence
• FORGERY SPECIFIC	Check and credit card specifics (how obtained, type, etc.) Type business or person victimized Document descriptors (stolen commercial, personal, etc.) Type of identification used Confidence game specifics (ploy used, etc.)
• RAPE AND SEX OFFENSE SPECIFIC	Victim person descriptors (age, race, sex, occupation, etc.) Location of encounter vs. location of departure Suspect statements during commission Suspect particular actions or M.O. (include relationship) Weapon or degree of force used
• AGGRAVATED ASSAULT AND MURDER SPECIFIC	Degree of relationship between victim and suspect Victim personal descriptors Motive Weapon used Physical evidence

Source: U. S. Department of Justice. Law Enforcement Assistance Administration. National Institute of Law Enforcement and Criminal Justice. Police Crime Analysis Unit Handbook.

indicates where the crime occurred by recording the nearest address. In the case of burglaries, for example, some forms ask about point of entry and point of exit and some do not. All information concerning location and address will be found on the original Offense/Incident Report. Temporal factors are generally easy to identify because some record of time is required on all Offense Reports. The accuracy varies according to the type of crime. Where the case is a person-against-person offense (except homicide), the victim will be able to cite the time. In cases of crimes against property, it is often an estimate. Frequently, Offense Reports will cite a range (e.g., between Monday, 9 p.m., and Tuesday, 2:30 a.m.).

- Criminal Behavior -- This is a broad category of variables. In the description of the criminal event on the Offense Report, the officer will sketch preliminary information about use of force, use of weapons, method of break-in, as well as a physical description of the offender. The quality and reliability

of this information is contingent upon the officer on the scene, the investigator who pursues the case, and the reliability of descriptions given by the victim. There is a tendency to describe all aspects of criminal behavior because the police are interested in such information in order to increase chances of apprehension. Thus, other reports (such as Arrest Reports and Supplementary Reports) will deal with some aspects of criminal behavior.

- Environmental Design and Land Use Factors -- Environmental design factors are not systematically addressed by police forms. Only where these factors are instrumental in solving a crime might they be included. Usually one cannot obtain this type of information from police records. Regarding land use, some Offense Reports address this factor by requiring that the type of premises be indicated. Usually, there is a distinction between commercial and residential premises, but some departments require elaboration on this point. For example, subsets of residential and commercial premises may be considered (such as single-family home, garden apartment, high-rise office building,

storefront office, department store, gas station, shop, or factory).

- Victim Characteristics -- Most Offense Reports require basic information about victims. Usually this will include sex, race, age, and address. The description of the event, however, can supply more information about the behavior of the victim while the crime occurred (such as why he was present in the locale and how he interacted with the offender).

APPENDIX D

Evaluation

APPENDIX D. EVALUATION

D.1 An Introduction to Evaluation

This section is intended as an aid to CPTED project planners, implementers, and potential project evaluators who are unfamiliar with the "what, why, when, and who" of evaluation. The intent is to provide these individuals with an introduction and overview of rationale and methods to facilitate their understanding and planning of a CPTED evaluation.

D.1.1 Evaluation Defined

The purpose of evaluation is to measure the effects of a project against the goals it sets out to accomplish. Stated another way, an evaluation is a systematic investigation to determine what has been accomplished, and the specific reason that is responsible for this result. Can the attainment of project goals be attributed to the project's efforts, or did some factors unrelated to the project bring about the desired results? For example, suppose a CPTED project that is operating in a school environment has the goal to reduce the number of student-to-student thefts. A year later, it is found that the number of thefts has shown a marked decrease following the CPTED changes in the school. Can it be concluded that the CPTED project was responsible for this reduction in thefts? If the students who were responsible for the thefts had dropped out of school during the CPTED project, this would not be true. Although it would appear that the activities of the project brought

about the reduction in thefts, the actual reason would be the absence of the offenders from the school environment.

As another example of alternative explanations of cause, suppose a CPTED project is implemented to reduce the number of pursesnatches in a downtown commercial area. Further suppose that, at the end of a year, there is a significant drop in pursesnatches within the target area. Does this mean the CPTED project was successful? Not if, during the course of the year, a new suburban shopping center opened up that attracted traditional downtown shoppers to its location. In this instance, it would not necessarily be true that the CPTED project had reduced the number of pursesnatches. The fact that there were significantly fewer persons now shopping in the downtown area could have also contributed to or been responsibile for the crime reduction.

These examples illustrate the need for caution and the complexity involved in interpreting apparent successes. In a sense, everyone is an "evaluator;" in the absence of other forms of information, people rely on their own common sense to make judgements. For most people, using common sense is an informal, unsystematic approach to complex decisionmaking. Instead of a common sense approach, it is a scientific approach to evaluation that is advocated here; this systematic approach is intended to avoid biases in judgement.

D.1.2 Formative and Summative Evaluation

A well-planned and -executed evaluation program can provide both formative and summative evaluation. Formative evaluation provides

feedback to help assess the development of an ongoing project, while summative evaluation documents the effects of a project after its implementation has been completed. More specifically, formative and summative evaluations can provide information to help make the following decisions:

- Formative:
  - To help improve current practices for implementing an ongoing project.
  - If resources become limited, evaluation results can be used to decide where to best allocate resources (i.e., fund those aspects that seem to be working better than others).
  - If current project activities appear inadequate to meet CPTED goals, evaluation results can serve as a warning that new strategies are needed and the ineffective strategies should be dropped.
- Summative:
  - Once the CPTED project has been operational for enough time to reasonably expect to see some goal attainment, evaluation results can help make the decision to either continue or discontinue the project.

- After the CPTED project has been fully implemented and a reasonable amount of time has passed, evaluation results can be used to either support or reject CPTED principles.
- Finally, the results of an evaluation can aid future decisionmakers in their decisions to institute a CPTED project in another locale and/or at another point in time.

D.1.3 When to Evaluate

Planning for an evaluation should begin during the early stages of planning for a CPTED project. An evaluation plan should be written before the actual implementation of the project begins. Thus, it is necessary to "plan" for the evaluation plan so as to allow adequate lead-in time. The importance of designing the evaluation before the CPTED project starts cannot be stressed sufficiently. In fact, the timing of an evaluation will, in part, determine what kind of an evaluation design is feasible.

D.1.4 Who Will Evaluate

Coinciding with the decision regarding when to design and start evaluation, a decision must also be made about who will perform the evaluation. Basically, this becomes a choice between having an inside vis-a-vis an outside evaluation, that is an evaluation conducted by

persons in the agency responsible for implementing the CPTED project or an evaluation conducted by an individual or group that has no affiliation with the implementing agency. The decision regarding an inside or outside evaluation team should be based, in part, on the following factors:

- Administrative Confidence -- Unless the project administrators have confidence in the ability of the evaluators, it is unlikely that the evaluation effort will be viewed as worthwhile or valid. Therefore, it is important that the evaluator be viewed as competent and legitimate. The factor applies equally to both inside and outside evaluators.
- Objectivity -- For evaluation findings to be regarded as unbiased, it is important that the evaluators remain objective and not be pressured to make the CPTED project look like a success. An outside evaluation is usually more immune to this criticism than one performed by insiders.
- Knowledge of CPTED -- On the other hand, to design a good evaluation of CPTED, an evaluator must have a working knowledge of the theory. The evaluation team must be able to work with the project administrators to get a clear

statement of the project's goals. Without an explicit identification of project goals, the evaluation may not be measuring the right things. An evaluator who understands the CPTED theory should be better able to plan a valid evaluation. While outside evaluators can gain adequate knowledge and sensitivity, inside evaluators are in a better position to do so.

- Use of Evaluation Findings -- Once an evaluation has been conducted, the results must be given a fair hearing by project administrators. Depending on the specific CPTED project that has been evaluated, it may be either an inside evaluation team or an outside team that carries more clout and will draw adequate attention to the evaluation results.

These are some factors that can be considered when determining whether to use an inside or outside evaluator. It is important that this decision not be arbitrary.

D.1.5 Potential Problems

Once the evaluation team is chosen and an evaluation plan is written, it is also necessary to realize (and expect) that problems may be encountered while conducting the evaluation. Typically, the following problems may occur:

- Discrepancies Between Planned and Actual Project Activities -- For a variety of reasons, the implemented CPTED project usually will not be the exact CPTED project that was planned. Depending on the magnitude and type of such discrepancies, the evaluation design may no longer be appropriate to the project as implemented. These discrepancies may require continuing modification in the evaluation plan to conform to the changes in the project.
- Changes in User Needs -- Depending on the length of the evaluation, the decisionmakers and policymakers who originally supported the CPTED project may be replaced by new individuals. New decisionmakers may set new policies that may or may not be supportive of CPTED. If the CPTED effort is weakened, the evaluators may need to modify the evaluation design (specifically with respect to CPTED goals).
- Difficulties with Data Collection -- In an evaluation, one must often rely on records that are kept by others (e.g., police department, county assessor's office, and board of education) as a major source of data. It is not unusual to find

that these data are not so well kept, organized, or accessible as originally expected. Problems of this type may not only delay the evaluation but, in the extreme, preclude measuring some variables in the evaluation design.

When any or all of these problems are encountered, there are two basic approaches that are available to the evaluator. First, if, while monitoring the progress of the CPTED project, the evaluator finds that things are not going as planned, he may want to try to persuade the CPTED administrators to revert to the original plan. A second approach, as mentioned above, is to change the evaluation design so that it is adapted to the problems that are encountered. This cannot always be done with complete success. However, in most instances, an evaluator who is sensitive to the problems should be able to adapt the evaluation so that it remains a worthwhile venture.

Now that some of the basic issues of evaluation planning have been introduced, it may appear that evaluation is an awesome task and too demanding for a local CPTED effort. Before such a conclusion is reached, it is important for the practitioner to realize that all evaluations, even the best, are less than perfect. This chapter contains recommendations for planning and executing a good evaluation. To those CPTED planners and administrators who feel that most of what is suggested is beyond their resources and capabilities, it is suggested that even a small or partial evaluation is better than none. Section D.2 discusses

various types of evaluation. An understanding of the forms evaluation can take will allow CPTED planners to choose the type that is most realistic, given their resources, capabilities, and objectives.

D.2 Types of Evaluation

This introduces five types of evaluation. An understanding of what information each type can provide will allow CPTED planners to choose the type that is best for them. This decision is, in part, a compromise between how comprehensive and valid the evaluation will be, and how much it will cost (1).

D.2.1 Effort

The type of evaluation that is probably most common is that of effort. An effort evaluation is conducted to document the amount and kind of activities that take place during the implementation of a CPTED project. Effort indicators for CPTED could include such things as the number of street lights installed, the number of blockwatch meetings held, or the number and kind of target-hardening devices that were installed. Basically, evaluations of effort focus only on the activities of the CPTED staff and other supporting personnel that have occurred as part of the total project. No attention is devoted to the effectiveness or results of these activities. Although effort evaluations provide useful and necessary information, they are usually not sufficient for

the CPTED administrator's needs (i.e., most decisionmakers will also want to know something about the effects of the project's activities).

D.2.2 Performance

Evaluations of performance concentrate on the results of the CPTED project. Performance evaluation tries to determine if the crime rate and the fear of crime victimization have been reduced in the CPTED project area. To evaluate performance, an evaluator examines changes in the physical and social environment that appear to be brought about by the CPTED project. For example, CPTED projects will not only want to document how many persons attend blockwatch meetings (evaluation of effort) but will also want to determine the number of persons who have subsequently increased the quantity and improved the quality of their surveillance and crime reporting behavior. Specifically, the evaluator may want to find out if citizens in the target area know how to recognize a suspicious incident and if they give a good crime report to the police, and whether these reports are of an improved quality. For each goal that a CPTED project strives to attain, there will be a series of measurement points linking project activities (effort) to the project goals. Unless there is an adequate evaluation of performance, it is unlikely that anyone will know whether the CPTED project met its goals of reduced crime and fear of crime.

D.2.3 Adequacy

An adequacy evaluation is dependent on the results of a performance evaluation, as it focuses on a comparison of the project's actual performance

CONTINUED

2 OF 3

versus the project's goals.* For example, suppose that, while planning the CPTED project, it was reasoned that if 50 percent of the businesses in a target area installed adequate devices, this would be a sufficient deterrent to commercial burglary. If, in actuality, 25 percent of the businesses followed the recommendations of security surveys, then this would not be adequate. Likewise, CPTED administrators may set a goal that 40 percent of all unemployed youth will be employed in neighborhood revitalization activities that increase the youth's sense of identification with and belonging in the environment. If, in actuality, 20 percent of these youth become employed, this is not an adequate attainment of the original goal.

Evaluations of adequacy are very useful, but they do require that the original goals are well thought out and that CPTED officials are committed to these goals. Otherwise, the findings that CPTED's performance is "inadequate" can easily be ignored by officials and decision-makers who believe that the original goals were "naive" or "too optimistic." If CPTED administrators are sincerely committed to the project, they must be willing to face the results of an adequacy evaluation.

D.2.4 Process

As the most involved and difficult type of evaluation, a process evaluation attempts to link effort to performance (i.e., a venture in

*Goals that were set at the time the CPTED evaluation plan was finalized.

making cause-and-effect statements). A relatively simple process evaluation would involve a clear description of the CPTED project's activities, an identification of the CPTED target area and target citizens, specification of the time period involved, and a documentation of the intended and unintended effects of CPTED. A more elaborate evaluation of process might examine the contribution of the various components of the CPTED project. In this instance, the evaluator would try to ascertain the individual contributions of each CPTED strategy.

The best and most sophisticated of the process evaluations would demand complex and well-controlled designs that separate out the contributions of the various strategies. A local CPTED team would need expert consultation if they wanted to implement such an evaluation. While these sophisticated process evaluations are considered too costly or too unrealistic by many individuals, they provide CPTED decisionmakers with the most valid information about CPTED's impact.

Without process evaluations, attempts to attribute CPTED goal attainment to CPTED project effort will be open to severe criticisms regarding alternative explanations of cause (i.e., it was not CPTED that brought about the goal attainment, but some other unrelated, extraneous factors). With this warning in mind, it is recommended that, at a minimum, simple process evaluations be undertaken as they do provide some formally structured statement of why and how the project worked. This information can be useful to future decisionmakers who may or may not choose to agree with the conclusions of the CPTED process evaluation.

D.2.5 Efficiency

Efficiency evaluations concern cost-effectiveness statements (i.e., were the results worth the resources required to produce them?). Since CPTED projects involve many qualitative factors, highly quantitative efficiency evaluations are typically unrealistic and impossible and, perhaps, even unnecessary. For most local CPTED projects, it is sufficient to use professional judgements in weighing the identifiable costs (conservatively estimated by the amount of money required to fund the project activities and related changes in the environment) against the identifiable impacts of CPTED. While such a qualitative approach to efficiency evaluation will lead to a differing expert opinion, it will remain for the CPTED decisionmakers to draw their own conculsions.

In summary, evaluations of effort provide information of the time, money, and work associated with the CPTED project; evaluations of performance and adequacy strive to identify changes related to CPTED goals; evaluations of process examine how and why effort led to performance; and evaluations of efficiency compare the amount of effort with the amount of performance. When CPTED planners begin to think about evaluation, they should first determine which forms of evaluation are necessary for informed decisionmaking. Then they can compare their needs with what they feel they can realistically afford.

D.3 Research Designs for Evaluation

The design of a CPTED evaluation is critical if the attainment of goals is to be attributed to the CPTED project rather than to some

extraneous factors (i.e., factors outside the operation and control of the CPTED project). Despite their importance, design considerations are often given only minimal attention in many project evaluations. The purpose of this section is to introduce CPTED officials to these design considerations and to increase their awareness of the issues involved; but this introductory section will by no means make the reader an expert in design. It is strongly suggested that CPTED officials seek out expert consultation and/or examine some evaluation texts before planning their evaluation design.

An adequate evaluation design allows the evaluator to state with confidence that the observed attainment of goals is actually due to the effort of CPTED. Here, the specific question is whether these effects would have occurred if no CPTED project had been initiated. An evaluation that can adequately answer that question is called an internally valid evaluation (see Section 3.4 in this appendix and Guideline 5, Section 6, for a more detailed discussion of validity issues).

D.3.1 CPTED Target Area and Target Population

To evaluate the performance of a CPTED project, it is necessary to clearly define the target area and target population. The target area refers to the geographical area within which CPTED changes are being implemented and CPTED effects are expected to occur. The target population includes those citizens that the CPTED project is intended to reach. It is important that the evaluator recognize that the intended target area and target population are not necessarily the same area and/or

population that is actually reached or served by the project. For various reasons, the actual targets are usually smaller than the intended ones. Thus, it is important to define both the intended targets and the actual targets.

The identification of the target area and target population is useful for two reasons. First, it is important to know for which types of citizens and areas CPTED is or is not effective. Second, the specification of the target population and area allows an evaluator to compare any attainment of the ultimate goals with comparable changes in another similar area and/or population that is not being served by CPTED. This second population and/or area is called a comparison group. The usefulness of such a comparison group will become apparent in the following discussion of typical evaluation designs.

D.3.2 Typical Evaluation Designs

The five *typical* evaluation designs are presented and discussed here. However, there are several other designs that may be suitable for the needs and resources of specific CPTED projects (2).

D.3.2.1 Design 1 -- Controlled Experimentation

A controlled experiment, with random assignment of an available area and population to target and comparison groups, is by far the most powerful design to be discussed. While it is unlikely that any CPTED project can be implemented with the control necessary to regard it as a time experiment, it is nonetheless important for local CPTED administrators and evaluators to be aware of this ideal evaluation design. It is hoped that this will provide an understanding of the limitations of

the quasi-experimental and nonexperimental approaches that they will more likely employ. This design controls for the effects of extraneous factors by comparing changes in evaluation criteria in essentially equivalent areas and/or areas in which CPTED is or is not being implemented. This equivalence of populations and/or areas is achieved by the process of random assignment. Different areas or citizens within the total population are randomly assigned (assigned by chance) to a target group or a comparison group. For example, if the available population is a city, the wards or precincts in the city could be randomly assigned to a target group and a comparison group so that half the precincts participate in CPTED and half do not. If reduction in the crime rate and fear of crime in the CPTED precincts was greater than changes in the non-CPTED precincts, the evaluator could state with confidence that the reductions were due to CPTED and would not have occurred anyway.

This design can be justified most easily when there are not enough resources to implement CPTED adequately in all segments of an available area. Thus, the only fair way to assign the limited project resources is to do it by chance (i.e., randomly). Controlled experimentation requires that the available population and/or area be divided into several segments that are then randomly assigned to the target or control groups. Both the target and control groups should contain more than one segment and, preferably, more than five. Thus, evaluation design is most easily implemented in large geographical units (such as cities, counties, or States).

The basic steps involved in employing controlled experimentation are:

- Identify relevant CPTED measurement points and data elements.
- Specify available population segments (e.g., precincts).
- Randomly assign these segments to target and comparison groups.
- Collect pre-CPTED baseline data in the target and comparison groups for each data element.
- Implement CPTED in the preselected target areas; monitor to ensure that the basic experimental design has been maintained.
- Collect post-CPTED data in target and non-CPTED areas for each data element.
- Check for pre-CPTED/post-CPTED changes in the data elements for target and comparison areas.
- Check for differences in the amount of change between the CPTED target areas and the non-CPTED comparison areas.

As noted above, the controlled experimentation design is an ideal that will be beyond the capabilities of most local CPTED efforts. It is anticipated that local projects will be more capable of employing one of the quasi-experimental designs that follow.

D.3.2.2 Design 2 -- Multiple Time Series

Often, data elements (e.g., crime statistics) relevant to the evaluation of a CPTED project have been collected regularly over a long period. If this is the case, a time series design can be employed. This design compares data collected after a CPTED project is implemented with estimates of what the data would be if trends in past years were to continue. Because CPTED is implemented to change trends (e.g., an escalating crime rate), a change in the general trend of the data is expected if CPTED is successful. Thus, if a rapid decrease in the crime rate occurred after a CPTED project was implemented, the evaluator might conclude that this rapid change in trend was due to CPTED. In a multiple time series design, the trend in the target area is compared with the trend for a similar comparison group.

Like all evaluation designs, the multiple time series has several requirements that must be met if it is to produce valid results. There are four rules to observe:

- Keep the measurement system constant.
- Introduce the CPTED project as abruptly as possible. A project introduced too gradually may produce gradual changes in the data that cannot be distinguished from long-term trends.
- Delay reaction to acute problems. If the CPTED project is instituted after temporary peaks in crime, the crime rate can be expected to regress

(i.e., change back) towards the previous rate shortly afterward. This regression artifact can cause misleading changes in the data. From an evaluation perspective, the implementation of CPTED projects immediately after peaks in the crime rate should be avoided whenever possible.

- Seek out a comparison series from a comparable nonparticipating area.

Before the basic steps in the multiple time series design are addressed, one final word of caution is in order. It is relatively simple to collect statistics concerning rate of reported crime and plot them on a graph over a period of time. However, only in a few cases will looking at a graph of the data be useful or meaningful in itself. The analysis of multiple time series data is a fairly complex mathematical process, and expert knowledge is essential.

The basic steps in the time series design are:

- Identify relevant objectives, evaluation criteria, and data sources.
- Identify a non-CPTED comparison population.
- Obtain data on the evaluation criteria at several intervals prior to the CPTED project and after its implementation. Similar data should also be obtained for the comparison group. Monthly data are recommended. For an adequate statistical

analysis, the total observations, before and after program implementation, should be at least 48 (representing 4 years), although statistical analysis can sometimes be accomplished with fewer data points.

- Check for changes in data trends after CPTED is instituted.
- Compare trend changes in the target series with any trend changes in the comparison series.
- Rule out, if possible, alternative explanations for trend changes in the target series.

D.3.2.3 Design 3 -- Time Series

When no non-CPTED comparison area is available to compare with the trends in the CPTED area, the time series design uses the target population before CPTED is implemented as a comparison group for the target population after CPTED. Without a distinct non-CPTED comparison group, the time series design does not allow an evaluator to rule out historical trends (discussed earlier) as an alternative explanation of trend changes. Otherwise, recommendations for the use of the time series design are similar to those suggested for the multiple time series.

D.3.2.4 Design 4 -- Pretest/Posttest with a Nonequivalent Comparison Group

This design is often confused erroneously with the controlled experimental design. Its similarity is that it requires before-CPTED and

after-CPTED data to be collected in both a target area and comparison area. The major structural difference between this design and controlled experimentation is that the CPTED area and non-CPTED area are not chosen randomly. Therefore, it is far more difficult to rule out the effects of extraneous factors when using this design.

To maximize the interpretability of the pretest/posttest nonequivalent comparison group design, it is important to choose a comparison population that is as similar as possible to the CPTED population. The less similar the two populations are, the more difficult it is to rule out the effects of extraneous factors. Thus, it is important to define the non-CPTED comparison area as accurately as the CPTED target area. In addition, the comparison population should not have any crime prevention projects of its own that might cause changes in the evaluation criteria. For example, an evaluator would not want to choose a comparison group in which another crime prevention project (e.g., an offender counseling program) was about to be initiated.

Because comparison populations are never truly equivalent to the target population, the effects of extraneous factors cannot be ruled out entirely. The basic steps in this design include:

- Identify relevant evaluation criteria.
- Identify a comparison population where CPTED is not in operation.
- Measure (or obtain data about) criteria before initiation of the project in both target and comparison populations.

- Implement the project.
- Measure criteria in both target and comparison populations after the project has been in operation for a specified period of time.
- Compare pretest and posttest data for changes in both CPTED target and non-CPTED comparison populations.
- Compare changes in the target population with changes in the comparison population.
- Rule out, if possible, the effects of extraneous factors.

D.3.2.5 Design 5 -- Before-and-After Comparison

This approach is also referred to as the pretest/posttest-only design. This design is the simplest and least expensive of the five designs discussed in this section. As such, it is also one of the most common designs. Unfortunately, it also provides the least amount of control over the effects of extraneous factors. Therefore, it is recommended only when nothing better can be used.

The major steps in this design include:

- Identify relevant evaluation criteria (measurement points).
- Obtain data about the behavior of the CPTED target population on the evaluation criteria before implementation of the project (pretest).

- Implement the CPTED project.
- Measure criteria after CPTED has been in operation for a given time period (post-test).
- Compare pretest and posttest data for changes.
- Rule out, if possible, the effects of any extraneous factors.

The evaluator who uses this design compares the before-CPTED behavior of the target population with the after-CPTED behavior. That is, the evaluator looks for changes in the behavior of the target population after the project is put into effect. Unfortunately, the evaluator has no way of knowing if the changes would have occurred even without CPTED. To know if that is the case, the evaluator must observe another population that does not have the project (i.e., use one of the first four designs presented here).

D.3.3 Case Study Approach

A final evaluation approach to be discussed is the one-shot case study. It has been observed that this approach has such a total absence of control as to be of almost no scientific value. A CPTED case study evaluation would involve a careful documentation of the evaluation criteria after the CPTED project had been implemented and operationalized for a given time period. The data collected to document the after-CPTED level of the evaluation criteria are then compared with general expectations of what the data would have been if CPTED

had not occurred. Clearly, it is impossible to validly rule out alternative explanations of cause. Thus, the case study approach is not recommended for a CPTED evaluation. While it can provide useful descriptive information, it does not allow for inferences other than those based on opinion. It must be remembered that evaluation is intended to provide CPTED decisionmakers with scientifically based information to supplement their own common sense.

D.3.4 Threats to the Validity of Evaluation Results

An important benefit of evaluation research is that the results can be used to aid the decisionmaking function. In any evaluation effort, no matter how well the research design is conceptualized and executed, there are potential environmental factors that can compromise the results -- factors that for one reason or another make the CPTED planner uncertain whether he can use the findings (positive or negative) as a guide for future resource allocations. Thus, the utility of a project is reduced because the validity of the evaluation findings are in question.

As mentioned earlier, if a project is observed to have had some impact, even the predicted impact, the question of *internal validity* is raised. This refers to the possibility of alternative explanations of why the measured outcome was produced. High internal validity means that the outcome can be attributed to the project's operation. In contrast, low internal validity indicates that the outcome can be attributed to the project's operation. In contrast, low internal validity indicates that the outcome was possible even if the project never existed.

For example, if increased street lighting has been found to result in more pedestrian traffic at night, is this increased traffic due to the lighting or to some other extraneous factor (such as a change in the weather)?

A typical procedure for evaluating an intervention program is to employ a pretest/posttest design in which measures of the variables of interest are taken both before and after the implementation of the program. In such cases, there are many factors that can threaten internal validity. Following is a list of some of these threats which could produce changes in the measured variables regardless of the impact of the program itself (2):

- History -- Differences in measures taken at two different times can result from events that have occurred in the interim between measures that are unrelated to the program intervention. For example, there can be changes in the law that happen to coincide with the introduction of a crime prevention program. One of the major frustrations of social programming is the lack of control over such outside events. Awareness of such events is necessary to avoid drawing false conclusions about a program's impact.
- Maturation -- Another consequence of the passage of time between measurements involves changes in the conditions of the object of study. People

may become uninterested in a project or issue for various reasons, and this will affect their feelings and behavior.

- Testing -- As mentioned earlier, having been tested on one occassion by filling out a questionnaire can influence responses on subsequent measurements. Sitting through a 2-hour interview on the crime problem is likely to sensitize people to this issue. They then might seek more information, talk to their friends, and otherwise expose themselves to influences other than the program that will, in turn, alter their reactions on the second interview.
- Instrumentation -- Changes over time can occur, not because of changes in the object of study but in terms of how it is measured. Interviewers can become careless, items on a questionnaire can become out of date, police departments can change their recordkeeping procedures, and so on. These and other changes in the measures themselves result in a false impression of a program's impact.
- Regression -- Because of the random fluctuation that characterizes any measure that is not

perfectly reliable, some changes will appear to occur regardless of the presence or absence of a program. This problem is particularly acute when one is dealing with extreme scores on the initial measurement. For example, a person who rates himself very high on fear of crime at one time is more likely to have a lower fear score at a later time than he is to have an even higher score. This is due to the fact that random fluctuations naturally tend to favor the middle rather than the extremes of a measurement scale. This phenomenon is sometimes called regression toward the mean.

- Selection -- When measures for two or more groups of people are being compared, differences between groups could be due to the procedures used in selecting the groups. For example, if apartment dwellers and homeowners are being compared in terms of the precautions they take to prevent burglary and the latter group is selected from records at the real estate tax office while the former is chosen from membership lists of the tenants' association, these groups could be different for many reasons other than their type of residence.

- Mortality -- If two or more groups are being compared and people from one group drop out of the sample (more so than others) this can result in a change in the difference among groups that is more apparent than real. One obvious example would be that a comparison of nursing home residents and middle-aged persons in terms of their fear of crime would be jeopardized if, as would be likely, more people in the former group were to pass away during the program period. Less literal forms of mortality can also occur. Some groups of people, (e.g., the socially disadvantaged) can be more likely than other groups to refuse to continue in a project with which they cannot identify. Mortality also applies to other sources of data. Records can be lost or destroyed in one police district but not another, making continued comparisons impossible.

This does not exhaust the possible reasons why internal validity can be threatened, but it should serve to illustrate the necessity of remaining aware of alternative explanations of evaluation results. These sources of invalidity can often be eliminated or controlled when using true experimental designs. However, it is rare to have the opportunity to employ this type of design when evaluating social programs.

In contrast to internal validity, there is *external validity*. This refers to the extent to which the results of a project can be generalized to future CPTED projects. If a project works in one neighborhood or city, will it work in other locations? The most direct way of determining external validity is to undertake a CPTED project elsewhere, under other circumstances, and see if the same results are achieved. Although generalizability often receives little attention, it is important to planners. If a project works solely because of a fortunate set of circumstances in which it was first implemented, not only is there no evidence provided for the ideas behind the project but there is also no guarantee that it will work in other places or in the same place at a later time. Moreover, systematic investigation of situations in which a project works and situations in which is fails can lead to the development of more effective projects and a better understanding of why strategies are effective.

D.4 Measurement Points and Data Elements of CPTED Evaluation

In writing the actual evaluation plan, the evaluator must identify what has to be measured; this task requires the explicit identification of measurement points. Once this is done, the next task is to decide what data will be collected that are representative of these measurement points; this task requires the explicit identification of data elements. This section presents a discussion of the major measurement points in the generalized CPTED evaluation framework. This is followed by a list of suggested data elements and suggested data collection techniques that might be employed in a CPTED evaluation.

D.4.1 Effort Measurement Points

The first set of measurement points regards the effort (activity) that is expended to implement and maintain the CPTED project. This requires description (number, type, quality) of the project activities and documentation of the costs associated with these activities. The next measurement point is the quantity and quality of the immediate changes in the environment (e.g., if new lighting is installed, the type, quantity, and quality of this lighting should be documented). Included in this is a documentation of the costs of these changes.

D.4.2 Proximate Goal Measurement Points

Following the effort-related measurement points are those associated with the CPTED project's proximate goals. The measurement points related to the physical environment include:

- The state of the physical security of the built environment (i.e., target hardness).
- The potential surveyability of the built environment (i.e., how well can one see what is going on).
- The potential usability of the built environment (i.e., what is in the physical environment and how it can be used by citizens).
- Specific psychological dimensions of the built environment related to CPTED design concepts (e.g., aesthetic quality, degree of personalization and decentralization, and clarity of defined spaces).

Those measurement points associated with the proximate goals for the social environment are:

- Citizens' knowledge about their attitudes towards surveillance and crime reporting.
- The degree to which citizens are committed to watch for suspicious/criminal activities and the degree to which they are committed to report suspicious/criminal activities.
- Actual citizen crime reporting behavior (specifically, the amount of surveillance, the quality of crime reports, and the quantity of reports).
- The manner in which law enforcement authorities respond to reports of suspicious/criminal activities.
- The extent of social networks and the degree of citizen/community cohesiveness.
- The degree of territoriality (i.e., behaving as though the generalized built environment is an extension of one's own immediate habitat) and, subsequently, the degree of social barriers to an area.
- The degree of psychological barriers associated with an area (specifically, the reputation of an area in the eyes of potential offenders).
- The actual usage of the built environment by the nonoffender and potential offender populations.

- Citizen identification with the environment (i.e., to what extent is there a sense of belongingness).

Evaluating these measurement points for the various proximate goals is critical to the evaluation of the CPTED process. As previously mentioned, these proximate goals are the bridges that link the project's activities (effort) to its ultimate goals. Unless it can be demonstrated that the proximate goals were attained, it will be difficult to attribute any attainment of the ultimate goals to the project.

D.4.3 Ultimate Goal Measurement Points

The measurement points associated with a CPTED project's ultimate goals of crime reduction are:

- The crime rate, arrest rate, and conviction rate, by type of crime.
- The types of tactics that are employed in criminal offenses.
- The offenders' perceptions of opportunity and risk.
- The nonoffender population's perception of the rate of crime.

Associated with the ultimate goal of a reduction in the fear of crime are the following measurement points:

- The nonoffender population's usage of the built environment.

- The nonoffender population's perceptions of fear of crime.
- The reputation of the area on a safe-to-dangerous continuum.

While these are measurement points that will span all CPTED projects, there are other measurement points that will be unique to specific CPTED projects. These others will depend upon the subenvironment in which the project is being implemented. These measurement points and their related data elements will have to be identified at the time a specific evaluation plan is being written. In addition to these, measurement points and data elements for potential side effects (specifically displacement issues) and extraneous variables will also need attention. In Section 5.4.4, some data elements are presented for measuring quality of life and displacement. But it is important to note that these may not generalize to all CPTED projects; thus, planning for these issues may require assistance from an evaluation consultant.

D.4.4 Data Elements

The foundation of any evaluation effort is the collection of data on which conclusions will be based. The decision of what data to collect is, in part, determined by the measurement points in the CPTED evaluation framework. The evaluator's task is to determine what data are representative of the specific measurement points. In determining the types of data to use, it is strongly recommended that the evaluator take the approach of multiple operationalism; this refers to the need

to measure a variable (e.g., the amount of surveillance citizens engage in) by more than one approach. The following listing of data elements is not meant to be all-inclusive. It does represent a broad list of what is presently recommended as the preferred types of data to collect for a detailed evaluation of CPTED. In addition to a listing of the types of data needed, recommended methods for collecting the information are presented.

D.4.4.1 Effort Measurement Points

The following data elements are associated with effort measurement points:

(a) Costs and Time Associated with Staff Activities:

- Documentation of the number of persons on the CPTED project staff.
- Documentation of the amount of time spent by the CPTED staff.
- Documentation of the total cost of labor and operating expenses (e.g., rent, supplies, and telephone) of the CPTED staff.
- Documentation of comparable operating costs and time of other groups performing work associated with the CPTED project.

(b) Quantity and Quality of Changes in the Physical and Social Environment:

- Documentation of what activities were engaged in to change the social and physical environment.
- Documentation of the extent to which these activities were performed.
- Documentation of the costs and time associated with these environmental changes.
- Judgments of the quality of these changes (by citizens and experts).
- Physical evidence of the social and physical environmental changes (e.g., photographs).

D.4.4.2 Proximate Goal Measurement Points Related to the Physical Environment

The following data elements are associated with proximate goal measurement points related to the physical environment:

(a) Physical Security of the Built Environment:

- Documentation of the type and quantity of physical security measures employed in the built environment.
- Judgments of the quality of target hardiness of the built environment (by experts).
- Physical evidence of target hardness (e.g., photographs).

(b) Surveyability of the Built Environment:

- Ratings of how easy it is to see what is going on (by citizens).
- Physical evidence of surveyability (e.g., photographs).
- Tests to measure the surveyability of simulated suspicious/criminal activities.

(c) Potential Usability of the Built Environment:

- Documentation of the type and quantity of physical amenities and other public structures and areas in the built environment.
- Ratings of the quality of these physical structures to promote and support usage (by citizens and by experts).

(d) Psychological Dimensions of the Built Environment:

- Ratings of the aesthetic quality of the built environment (by citizens).
- Ratings of the degree of personalization and decentralization of built environment (by citizens and by experts).
- Judgments of the clarity of defined spaces (i.e., boundaries) in the environment (by experts).

D.4.4.3 Proximate Goal Measurement Points Related to the Social Environment

The following data elements are associated with proximate goal measurement points related to the social environment:

(a) Citizens' Knowledge of, and Attitudes Towards, Crime Reporting:

- Questionnaire items to measure citizen attitudes about the importance of surveillance and crime reporting.
- Tests to measure the degree of knowledge citizens have about the proper way to report suspicious/criminal activity.

(b) Citizens' Commitments to Surveillance and Crime Reporting:

- Questionnaire items to measure citizen willingness to engage in surveillance and crime reporting.
- Questionnaire items to measure the percentage of citizens who are members of blockwatch-type groups.
- Questionnaire items to measure the percentage of citizens who actively participate (attend meetings) in a blockwatch-type group.

- Questionnaire items and observational surveys to measure the percentage of citizens who:
  - Display blockwatch-type stickers.
  - Carry blockwatch membership cards.
  - Buy and utilize blockwatch-related devices (e.g., whistles).

(c) Actual Citizen Surveillance and Crime Reporting Behavior:

- Documentation of the quantity, regularity, and type of surveillance citizens engage in.
- Ratings by dispatchers and/or investigators of the quality of citizen crime reports, specifically related to the speed, clarity, degree of detail, and accuracy of the reports.
- Total number of citizen crime reports (from police records).
- Number of inprogress calls (from police records).
- Number of suspicious/criminal activity calls (from police records).

(d) Law Enforcement Response to Citizen Crime Reports:

- Speed of response to crime reports, including mean and variance (from police records).
- Number of crimes interrupted in progress (from police records).

- Questionnaire items to measure citizens' perceptions of police response time.
- Number of inprogress responses that lead to arrest (from police records).
- Number of inprogress responses that lead to conviction (from police and court records).

(e) Extent of Social Networks and Degree of Cohesiveness:

- Description of social networks (e.g., how many, degree of structure, number of people involved, and so on [from citizen interviews]).
- Questionnaire items to measure citizen attitudes about community cohesiveness.
- Observation of behaviors indicative of community cohesiveness (e.g., helping behaviors).

(f) Degree of Territoriality and Social Barriers:

- Questionnaire items to measure citizens' behavioral intentions in situations that could elicit a territorial response.
- Questionnaire items to measure citizens' intensity of their territorial feelings.
- Questionnaire items to measure citizens' self-reported frequency of their own territorial behavior.

- Observation of frequency of territorial behavior, such as the number of times a "suspicious stranger" is approached (bystander intervention).

(g) The Extent of Psychological Barriers (i.e., a Target Area's Reputation):

- Questionnaire items to measure attitudes about offender's risk continuum.
- Potential offender population's attitudes about citizens' surveillance and crime reporting behavior (from interviews).

(h) Use of the Built Environment:

- Documentation of the type and frequency of use of the built environment by both nonoffender and potential offender population.
- Judgments of the quality of use by both populations (by experts).

(i) Citizen Identification with the Environment:

- Questionnaire items to measure the degree to which citizens feel a sense of belonging to the environment.
- Judgments that project a sense of belonging from citizen behavior (by experts).

D.4.4.4 Measurement Points for Reduction in Crime

The following data elements are associated with measurement points for reduction in crime:

(a) Actual Crime Rate by Type of Crime (Stranger-to-Stranger):

- The number of victimizations for each type of crime (victimization survey).
- The number of crime reports for each type of crime (from police records).
- The number of arrests for each type of crime (from police records).
- The number of convictions for each type of crime (from court records).

(b) Tactics Employed in Criminal Offenses (e.g., Burglary):

- The number of incidents of burglaries (from police records).
- The number of incidents of burglaries with forced entry (from police records).
- The ratio of forced entry burglaries to the total number of burglaries (from police records).
- Similar data elements for other targeted CPTED offenses.

(c) Offenders' Perceptions of Opportunity and Risk:

- The number of attempted crimes (victimization survey).
- Change in the number of attempted crimes.

(d) Nonoffender Population Perceptions of Crime Rate:

- Questionnaire items to measure citizens' attitudes about the present level of crime.
- Questionnaire items to measure citizens' attitudes about the past change in the local crime rate.
- Questionnaire items to measure citizens' predictions about future changes in the local crime rate.

D.4.4.5 Fear-of-Crime Measurement Points

The following data elements are associated with fear-of-crime measurement points:

(a) General Population's Usage of the Built Environment:

- Observations of the frequency and type of pedestrian activity level.
- Questionnaire items to measure citizens' self-reports of the frequency and type of pedestrian activity.

(b) Perceptions of Fear and Concern of Crime:

- Ratings by citizens of their own level of the fear of crime.
- Ratings by citizens of their own perceptions of change in the level of fear of crime.
- Ratings by citizens of their own levels of concern for crime.
- Ratings by citizens of their own perceptions of change in the level of concern for crime.
- Self-report descriptions by citizens of behavioral restrictions due to fear of, and concern for, crime.

(c) Target Area's Reputation on the Safe-to-Dangerous Continuum:

- Target area citizen attitudes about the target area's reputation for safeness (questionnaire survey).
- Non-target-area citizens' attitudes about the target area's reputation for safeness (questionnaire survey).
- Expert judgments about the target area's reputation for safeness.

D.4.4.6 Quality-of-Life Measurement Points

The following data elements are associated with quality-of-life measurement points:

(a) Standard of Living for Target Population:

- Financial security of target area citizens (e.g., average size of personal savings from local banks).
- Self-report descriptions by citizens of the frequency of their usage of restaurants and entertainment facilities.

(b) Target Population's Satisfaction with Life:

- Citizen ratings of the quality of life on various psychological dimensions (e.g., pleasant versus unpleasant).
- Clinical assessment of the citizens' quality of life (by psychologists and psychiatrists).
- The number of mental health difficulties in the target population.

(c) Quality of Business Activities:

- Trend changes in numbers of businesses opened and closed in target area (e.g., City's Business License Bureau).
- Trend changes in overall commercial activity in target area (e.g., City's Business License Bureau).

- Indications of changes in locations for commercial activity within target area (such as greater dispersion or losses of commercial property (e.g., City's Business License Bureau).

D.4.4.7 Displacement Measurement Points

The following data elements are associated with displacement measurement points:

(a) Displacement to Other Types of Crimes:

- Differential change in the frequency of types of crime reports.
- Differential change in the frequency of types of crime.

(b) Displacement to Other Crime Targets:

- Differential change within a target area in the frequency of crime reports from target-hardened locations versus non-target-hardened locations.
- Differential change within a target area in the frequency of crimes at target-hardened locations versus non-target-hardened locations.

(c) Displacement to Other Areas:

- Differential change in the frequency of crime reports by type of crime between the target area and surrounding nontarget areas.
- Differential change in the frequency of crimes by type of crime between the target area and surrounding nontarget areas.

(d) Displacement to Other Time Periods:

- Differential change in the frequency of crime reports during different times of the day and night.
- Differential changes in the frequency of crimes during different times of the day and night.

(e) Displacement to Other Crime Tactics:

- Differential change in offenders' modus operandi, as described in crime reports.
- Differential change in offenders' modus operandi, as described in investigatory officer reports.

D.5 Cost/Benefit, Cost/Effectiveness, and Cost/Utility Analyses

The purpose of this section is to introduce the reader to some of the basic principles of three major approaches to evaluating the results of projects relative to the economic and social costs involved. It is important to realize that at this stage in the development of the CPTED concept, it is not possible to present procedures that have been validated extensively in the field. However, it is anticipated that the state-of-the-art will advance as CPTED-type projects continue to be implemented and evaluated. Therefore, the following presents a general framework that may be useful for future CPTED projects. Additionally, CPTED Technical Guideline 6 illustrates some quantitative and semi-quantitative procedures for performing trade-offs among conflicting project objectives and for choosing among strategy alternatives.

D.5.1 Cost/Benefit

Cost/benefit analysis is more of a conceptual approach than a specific set of procedures for assessing the desirability of different ameliorative actions. A given security option (e.g., resident patrol program, street lighting program) is desirable if the benefits achieved are shown to exceed the costs involved. Alternative project options must be articulated so that the selection of a given option will have explicit implications regarding whether and to what extent other options can be included. Knowledge of the likely consequences of each option is also necessary, because the desirability of particular options depends on the desirability of their consequences.

The benefits and costs of each option must also be quantified so that one can determine whether the performance of an option is in accord with project objectives. Typically, benefits as well as costs are expressed in dollars. The arithmetic difference between the calculated costs and benefits shows the net gain or loss to the community. The assumption underlying this calculation is that a given dollar amount of net gain or loss is the same for any member of the community. Hence, a one dollar loss by 5 individuals is, in theory, offset by a 5 dollar gain for one individual. The aggregate net cost or benefit for the community can thus be ascertained by summing the individual net gains or losses. A positive sum means that the project was a success, i.e., the resultant distribution of gains and losses among community members would, in principle, provide those who gained with additional resources

to compensate those who lost, so that no one is worse off and at least one person is better off.

As an oversimplified example, a cost/benefit analysis of an Operation Identification project might include only one cost variable (the number of hours per household, translated into an hourly wage, spent engraving possessions), and one benefit variable (the savings that accrue from a reduced burglary rate -- fewer possessions stolen, less property damage). Assume also that only four possibilities exist for each household: To participate or not to participate in the project, and to be burglarized or not to be burglarized after the project was initiated. The most costly possibility is to participate and still be burglarized. (For convenience, it is assumed that the burglarized items are not eventually returned.) A second possibility, which is less costly, is not to participate and to be burglarized. The third possibility, which is still less costly, is to participate and not be burglarized. (The assumption is that the loss stemming from a burglary exceeds that of each household's investment in burglary prevention.) And the fourth possibility, which ironically represents the least cost, is not to participate and not to be burglarized.

Although the cost can be calculated on a per household basis, the benefit would have to be derived from a communitywide comparison of the total losses due to burglaries before and after project implementation.*

*The benefit could be calculated on a per household basis if it were known which houses would have been burglarized but were not as a result of the project.

If the reduction in losses following implementation exceeded the hours (translated into dollars) put in by all participating households, then the community has experienced a net gain.

In order to perform cost/benefit analysis, the analyst must define the relevant population, the set of alternatives, and the evaluation criteria.

D.5.1.1 The Relevant Population

Decisions have to be made about who will be targeted for potential project benefits and, to some degree, who will be ignored even if it means a net loss for them. Therefore, an understanding of the types of users, when and how they utilize parts of the environmental setting, and their attitudes, habits, and socioeconomic characteristics is important. Additionally, nonusers should be considered in terms of whether there are people who normally would use the setting but do not because of a crime or fear-of-crime problem. This latter group can represent an opportunity for gain in the community (e.g., the influx of new shoppers to a revitalized commercial area) or loss (increase in the number of vagrants to a redesigned park).

Defining the relevant population is a complex process because the decisionmakers have to achieve consensus regarding exclusionary criteria in the case of occasional or potential users, or even in the case of certain nonusers. (For instance, can a CPTED planning team ignore populations that might experience possible geographic displacement effects?)

If the relevant population is vaguely defined, then the task of establishing net gains or losses per individual member is made more difficult.

D.5.1.2 Project Alternatives

Decisions have to be made about project alternatives at two levels: First, whether a CPTED project should be undertaken, and (if yes) then what strategies should be implemented. Part of the strategy selection process, in addition to establishing the domain of mutually exclusive alternatives, involves the institutional processes (political, social, economic) that determine the feasibility of alternatives. For example, in a given setting, improved outdoor lighting may be a more effective fear reduction device than housing rehabilitation, but housing funds may be easier to obtain. In other words, knowledge of actual alternatives requires an indepth understanding of the institutional and social context within which the crime/environment problem is posed. A major consideration are the values of the defined relevant population. If a given anticrime action is unpopular (e.g., establishing curfews), the implementation cost may increase and exceed the derived benefits (e.g., people may choose to leave that setting).

D.5.1.3 Evaluation Criteria

The cost/benefit equation is perhaps most useful to planners when community values concerning different options are translated into dollars that relevant members are willing to spend. A typical case if for a block association to hire a security guard. Here, one might compare the cost of a security guard with the savings gained from the reduced number

of local robberies and burglaries. However, most anticrime services are not bought by the relevant population, and as a result, there are no market transactions to measure gains or losses. Thus, in many instances the analyst will have to derive hypothetical values for both costs and benefits. For example, costs can be interpreted in terms of a diminished amount of social interaction because of fear.

Some benefit criteria are perhaps most usefully rendered in terms of their own natural dimensions (e.g., crime rates, number of injuries) rather than in economic terms. However, the cost/benefit calculation still presents difficulties. If a project is designed to enhance residents' sense of security, how does one calculate in dollar amounts, or via other objective criteria, the possible results of the project. Some of the monetary benefits of an enhanced sense of security might be studied in terms of possible increased sales receipts from local cinemas, restaurants, or other businesses, or in terms of an observed increase in outdoor evening activities, but one has to be certain that the selected dimensions are valid indicators of reduced fear.

D.5.2 Cost/Effectiveness

Cost/effectiveness analysis is closely related to cost/benefit analysis. The same approach is involved except that the cost criterion is monetary and the effectiveness criteria are intentionally nonmonetary. It is a framework for determining what CPTED action or set of actions is likely to maximize the desired outcomes (however operationalized) given a limited project budget. As with cost/benefit analysis, in order

to conduct cost/effectiveness analysis the CPTED planner must have some knowledge about the likely results of particular strategies as well as what they will cost. Since in cost/effectiveness analysis the magnitude of success or failure is not translated into dollars, it is not possible to determine for the relevant population whether a given strategy was worth the cost in terms of a net benefit. The assumption that "X" amount of satisfaction for one individual is equal to half of that amount for two individuals is untenable. Someone who is not concerned with crime may find the presence of the police intrusive. How can this response be compared to another person's increased sense of security? Thus, the primary difference between cost/benefit and cost/effectiveness is that, with the former, the project results are expressed in monetary terms (they may be converted from nonmonetary criteria), while with the latter, the emphasis is on the comparative effectiveness of alternative security options in relation to established budget levels. With a small budget option A may be more effective than B; but with a large budget, B may be more effective.

Physical improvement projects are a good example of a CPTED approach that is cost/effective with large budgets but may not be with small budgets. Modifying the physical design of a residential setting can reduce crime, fear of crime, and improve the quality of life in other ways (more attractive appearance, greater neighborhood stability). Physical modification can also run into millions of dollars. If considerably less money is available, the decisionmaker can opt to

scale down all of the modifications (e.g., replace fewer street lamps, rehabilitate fewer homes, plant fewer trees) or he can go forward with some types of modification and sacrifice others. Whichever approach, or combination of approaches, the decisionmaker should not assume that there is a constant relationship between cost and effectiveness. If a $50,000 street lighting project in one jurisdiction is associated with a 50 percent reduction in the rate of robberies, one cannot assume that a $25,000 project will reduce robberies by 25 percent and, hence, will be similarly cost/effective. A $25,000 project may reduce robberies by 10 percent, or less, or not at all.

One example of this is presented by the CPTED school demonstration in Broward County, Florida. Students were afraid of using the corridors because of numerous criminal incidents. A strategy was developed to provide more visual access to the corridors by installing interior windows along the walls separating classrooms from corridors. However, a cutback in funds resulted in only one corridor being modified. It is unlikely that the limited nature of this physical change significantly reduced the students' general fear of being in the corridors. It would appear that once the cutback was established, the remaining funds might have been allocated more effectively to some other course of action.

D.5.3 Cost/Utility

In many instances, benefit and/or effectiveness criteria cannot be adequately quantified. Instead, decisionmakers evaluate the effects of strategies according to subjective judgments (their own or those from

a sample of the relevant population) of derived utility from particular strategies. In CPTED projects, cost/utility judgments will have to be included with the more objective assessments, because there are many outcomes associated with each strategy and only some of them can be expressed in objective performance criteria. The fact that there are benefits or costs that cannot be meaningfully translated into objective criteria does not mean that they should be ignored. Indeed, they should not. Much attention is given to evaluating the perceived utility of alternative courses of action so that planning assumptions are clearly stated and can be tested during the course of a project. If the cost/utility equation is false, then the subjective criteria for choosing strategies should be changed.

For example, urban planners often assume that major physical improvements in a residential community will result in greater social cohesiveness. If the anticipated greater cohesiveness is a primary motivating force for the project, then various aspects of this phenomenon, both quantitative (e.g., number of relevant members who use community facilities) and qualitative (e.g., perceived sense of belonging to a community), should be studied to ascertain whether people relate to one another differently as a result of the physical changes.

References

1. For an indepth presentation of these evaluation types, see E. A. Suchman, Evaluation Research: Principles and Practice in Public Service and Social Action Programs. New York: Russell Sage Foundation, 1967.

2. For a more complete listing, see D. T. Campbell and J. C. Stanley, Experimental and Quasi-Experimental Designs for Research, Chicago, IL: Rand McNally, 1966; or see T. Cook and D. T. Campbell, "The Design and Conduct of Quasi-Experiments in Field Setting," in M. Dunnett (ed.), Handbook of Industrial and Organizational Psychology, Chicago, IL: Rand McNally, 1976.

END