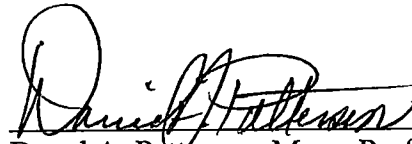
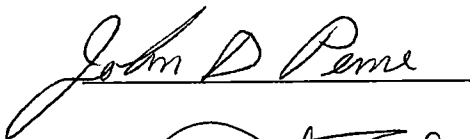


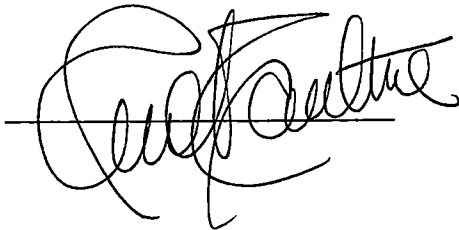
To the Graduate Council:

I am submitting herewith a thesis written by Stanley Williams entitled "An Analysis of the Environmental Determinants of Crime in West Palm Beach's Public Housing " I have examined the final copy for form and content and recommend that it be accepted in partial fulfillment of the requirements for the Master of Science in Planning, with a major in Planning.

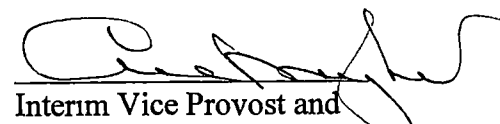

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We have read this thesis
and recommend its acceptance:





Accepted for the Council:


Interim Vice Provost and
Dean of the Graduate School

**AN ANALYSIS OF THE ENVIRONMENTAL DETERMINANTS OF CRIME IN
WEST PALM BEACH'S PUBLIC HOUSING**

**A thesis For
The Degree of Master of Science in Planning
The University of Tennessee at Knoxville**

**By
Stanley Williams
August 2000**

DEDICATION

This thesis is dedicated to my parents

Mr. Noel Henry Williams

and

Mrs. Gloria Merline Williams

who have given me invaluable educational opportunities.

Abstract

Although, planning is based on the construct of the physical environment planners rarely consider the impact of their decisions on crime. This thesis looks at the built environment and its effect on the spatial distribution of crime in four West Palm Beach neighborhoods. The crimes studied are aggravated assault, burglary and robbery. Several theorists have stated that environmental factors do affect criminal behavior. To assess such claims crime locations were geocoded and overlaid with a many different variables including land use, density, road hierarchy, intersections, and access points in order to determine the spatial relationship of these variables to crime location. Neighborhoods were chosen to control for the effect on income and, to the extent possible, level of police service. The research could not confirm many of the variables said to attract crime, it nevertheless found a positive correlation between crime locations and road hierarchy, access points, intersections and commercial uses. Density, a factor often cited as a contributor to crime location had negligible effect.

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Chapter 1 Introduction

I became fascinated with the concept of Defensible Space and Crime Prevention Through Environmental Design(CPTED) after reading an article in Planning magazine. The article mentioned miraculous reductions in crime by applying the Defensible Space and CPTED concepts to several communities. I wondered why planners were not more aware of this concept since planning is bases on the construct of the physical environment. Planners rarely consider the impact of their decisions on crime. After further research I found that many of the CPTED and Defensible Space claims were not based on empirical research or provides adequate control of other variables believed to affect crime.

This thesis looks at the built environment and its effect on the spatial distribution on crime in four West Palm Beach neighborhoods. The crimes studied are aggravated assault, burglary and robbery. Several theorists have stated that environmental factors do affect criminal behavior. To assess such claims crime locations were geocoded and overlaid with a many different independent variables including land use, density, road hierarchy, intersections, and access points in order to determine the spatial relationship of these variables to crime location. Neighborhoods were chosen to control for the effect of income and, to the extent possible, level of police service. The crime points were geocoded from West Palm Beach Police department information. The study is based on the assumption that there is a similar level of unreported crime within the study neighborhoods.

This research could not confirm many of the variables said to attract crime, it nevertheless found a positive correlations between crime locations and road hierarchy, access points, intersections and some commercial uses. When isolated these variables have no or minimal impact on crime location. However, where they coexist they are a strong predictor of crime location. The study also found that the usefulness of the independent variables, in terms of predicting crime location, diminished in higher income areas. These variables are only useful in predicting crime location in low-income areas. The study found variations between the effects of each independent variable on each type of crime. For example residential burglaries diminish in mixed-use settings but aggravated assaults increased. Density, a factor often cited as a contributor to crime location had negligible effect however, I suspect that there is a minimal threshold before density becomes a contributing factor. An important message from this research is that criminal behavior is extremely complex and is affected by several different variables not discussed in this research.

Safety is only one of the many variables that planners must be concerned about. This information should be used to understand the possible effect land use and design may have on the location of crime. This information should not be used to discourage land use patterns that have positive impacts on other planning goals; instead planners should seek a balance between safety and those goals.

The Crime Problem

Crime and the fear of crime have been major problems in American society and are frequent topics for political debate. Political candidates and legislatures, determined to prove their commitment to crime prevention, often argue about the different approaches to crime prevention and the effectiveness and value of these methods. The American public is equally concerned. Increases in violent and property crime as well as increased media coverage has brought the crime problem to the forefront of public attention. Daily reports of muggings, rapes, murders and theft in places we once perceived as sanctuaries, - churches, offices and homes-have created the illusion that no place and no one is safe (Wekerle and Whitzman pg. 1 1995). New forms of violent crime such as drive-by-shootings, smash and grab and carjacking have also added to the problem.

The US Department of Justice 1994 national crime statistics, The Uniform Crime Report, indicates a decrease in violent and property crime for the nation. West Palm Beach's crime statistics mirrors the national trends. However, it is uncertain how accurately these statistics represent changes in criminal behavior because of the exclusion of minor and unreported crimes from the Uniform Crime Report. Nevertheless, the consensus of the general population is that crime is increasing. Regardless of the accuracy of these figures in predicting criminal behavior, the National Crime Victimization Surveys (NCVS) indicate an increase in perceived crime and fear of crime (Wekerle and Whitzman pg 2, 1995)

The 1994 Gallop Poll survey indicates that forty nine percent of respondents identified crime as the most important problem facing this country today. This is an expected response because crime has constantly been ranked as a major concern. One should not be surprised to find the American public greatly concerned about crime and, in many cases, totally traumatized by fear of criminal victimization (Miethe pg. 14, 1995).

Maslow lists security or personal safety as one of the seven factors he perceive, as a fundamental human need. He postulates that in order to progress, one's security needs must be somewhat fulfilled. People that are unable to satisfy this need spend much of their time and resources trying to secure their personal safety. Thus it is understandable why so much emphasis is placed on crime prevention.

We are also immersed with crime issues because of the way crime affects society. Crime affects society in two ways. The psychological and physical damage that it inflicts on victims and the economic cost to victims and the justice system (Clontz pg 3, 1995). Crime victims in 1992 lost 17.6 billion in direct cost according to the NCVS. These costs include losses from property theft or damage, cash losses, medical expenses, and amount of pay lost because of injury or actives related to the crime. Operating cost of the justice system exceeds 64.9 billion per year (Clontz pg. 3, 1995).

The extent of crime is another area of concern. In 1994 the crime index of offenses showed 14 million Crime Index offenses reported to law enforcement. This represents a rate of 5374 offenses for every 100,000 United States inhabitants (Uniform Crime Reporting Program 1995). About one forth of U.S. households are touched by crime

each year. Nearly one half of the population will be victimized by a violent crime (crimes against property or person) in their lifetime. The crime statistics, citizens' reported fear of crime, and the altered behavior that this fear engenders all point to crime as a social issue of great magnitude in the United States today. (See Table 1.)

Table 1.

The Average loss per crime, 1992

In dollars

Personal crimes	218.00
Crimes of violence	206.00
Rape	234.00
Robbery	555.00
Assault	124.00
Household crimes	914.00
Personal & household theft	221.00
Burglary	834.00
Motor vehicle theft	3990.00

Source U S Department of Justice -Federal Bureau of Investigation

Public Housing and Crime

The federal government's objective in the Housing Act of 1937 and subsequent housing acts was to stimulate the economy by eliminating slums and replacing them with safe, decent and sanitary low cost housing in stable, working class neighborhoods. In contrast, evaluation of metropolitan housing indicates that public housing projects have been provided primarily by the devaluation of inner city neighborhoods and restricting low-

income people to as little presence as possible in other areas. This coupled with public sentiment that such housing is of a temporary nature has produced results contrary to the Housing Act of 1937 (Huth pg. 471).

Today, for approximately five to seven percent of the U.S. population (Crow pg. 57 1990), these past policies regarding public assisted housing has resulted in their concentration in low-income neighborhoods. These families are, in many cases, concentrated in large scale, high-density public housing projects, primarily located in the inner city, predominantly in minority areas. Although housing policies have been amended based on the past failures, and different paradigms have influenced public housing policies, remnants of past policies still exist. Gone are the high-rise apartment buildings, the main design factor Oscar Newman's research identified as the major contributor to crime in public housing. However, the crime problems associated with public housing projects still persist. Today we are still striving to meet the objectives that would ensure public housing residents quality life.

Present eligibility requirements for public housing virtually ensure that residents will have low income, that there will be high rates of unemployment, and that there will be many single parent households (Burby and Rhoe pg. 701 1988). These characteristics are associated with high crime areas and may act to increase fear of crime in public housing (Burby and Rhoe pg. 701 1988). Many recent studies have shown that not only are residents of public housing the most vulnerable segment of the US population in terms of criminal victimization, but even in projects where the actual incident of crime is low,

residents still maintain high levels of fear of crime. Therefore these eligibility requirements have led to the concentration of the most vulnerable and fearful segment of the US population.

The statement is often made that public housing is extremely costly because it nurtures an exceptional amount of social disorder. These areas have been blamed for the ills of urban society and often the residents or particular minorities bear the onus for the cities' crimes. However they are more frequently exposed to the threat of victimization. "Minority status and low income were suggested as the primary indicators of physical vulnerability" (Huth pg. 587). Not all segments of the American population are equally vulnerable to criminal victimization; numerous studies sponsored by the Department of Housing and Urban Development have concluded that residents of public housing developments are hardest hit (Huth pg. 587).

The problem is worsened by policy. If a tenant manages to increase their income above a certain level they will then be denied public housing. This restriction results in the continued loss of leaders among tenants and helps to maintain a permanent core of problem families. This also weakens the fundamental base, informal social control, for the success of Defensible Space and Crime Prevention through Environmental Design (CEPTED) projects. Left are the residents of the community that have less of an obligation to the area and are unlikely to defend it. Nevertheless, even within fragmented communities, researchers have identified the physical environment as a relevant factor for crime prevention (Rohe and Burby pg. 705 1988).

Public housing not only results in a high number of units per acre, high density but also a high number of people per unit, overcrowding. It is a common occurrence among public housing residents to bundle up, having more than one family per unit. The pathologies spawned by such dense concentration leads to further poverty (Byrum pg. 31 1994), which in turn leads to a higher rate of crime and delinquency in public housing projects. Hope and Foster who cites the concentration of the social disadvantage as an explanation for the deterioration of public housing and increased crime reinforce this viewpoint. This powerful force overwhelms most inner city neighborhood revitalization efforts and spreads the area of poverty within the inner city. As the troubled and the troublesome concentrate in low-income areas there is a more urgent need, but less ability and expectation for public services, to maintain an acceptable level of public safety.

A contributing factor of crime in public housing is the image and maintenance of the housing project. Most public housing projects are easily identifiable and therefore, targeted by criminals. Improving the visual image, by removing physical blight which promotes a perception of an environment that lacks social cohesiveness and an unwillingness of residents to defend their neighborhood, would render these projects less vulnerable to crime (Malt 1983). However, because public housing projects are exempt from local property taxes, paying only a portion of their net rental income in lieu of taxes, local governments view them as a liability. The revenues generated are not usually sufficient for local government to provide adequate services, which results in maintenance delays and thus the deterioration of the project. The maintenance of housing

projects has been directly linked to increase in vandalism (Meehan pg. 297, 1979). The social problems of disorder such as loitering and graffiti may not be serious offences in themselves. But they nonetheless raise the level of fear in the neighborhood. When people no longer feel comfortable strolling the streets after dark, crime goes unobserved. Like falling dominoes, the initial result of the environmental deterioration leads to more deterioration and to increased crime.

Increases in crime and delinquency reflect the despair, hopelessness and frustration endemic in large public housing projects. Is poor housing a cause for delinquency and crime? "Results of studies in Chicago over a period of thirty years forces this conclusion. These studies show that although the racial make up of a certain slum area has changed repeatedly, the same consistently high rates for delinquency and crime have prevailed in those areas" (Schnapper pg. 21 1939). But deviants who may seem to be the primary factor in delinquency are themselves the product of overcrowding and congested housing. Thus it is understandable that much of the interest about the failure of public housing, particular the medium and high-rise housing, has focused on crime and delinquency

What public housing policies has created is a conglomerate of societies most depressed, unskilled and most vulnerable to crime, which demands the most services. The hopelessness that comes from such situation drives some to consider crime as an option. Crime is not confined to the perpetrator's neighborhood or similar depressed areas but also occurs in neighboring areas. The predator will search for pray in an area that maximizes the chance of success while minimizing the chance of being caught - hence as

close as possible to his home neighborhood. The inner city [and areas surrounding public housing] became isolated clump of older businesses facilities surrounded by a winding belt of deteriorated housing occupied mainly by the very poor, African-Americans, and the permanently unemployed (Meehan pg. 297 1979). Mary Jo Huth identifies "The Most Serious Problems Areas at U. S. Public Housing Projects". Included are the physical and social attributes of the surrounding neighborhood, identified as a problem 43 percent of the time. This illustrates that there is a multi-dimensional force in effect. Planners cannot address the problems on public housing without also considering the effect of its surrounding area as one affects the other.

Low-income areas and public housing projects hold important clues in the search for the solutions of urban problems. The quality of life in these areas is critical to the rest of the city. The better the conditions within our most difficult neighborhoods, the less negative impact they have upon surrounding areas, upon the image of the entire city as a place to live and the strength of all city neighborhoods in the metropolitan housing market. Because crime has important adverse consequences upon public housing and the urban environment, crime should be of concern to planners interested in urban revitalization and creating a sense of community. Since some of the causes of criminal behavior may be a result of environmental factors of the area, these projects and any revitalization efforts are subject to failure unless the environmental factors and its relationship to crime are examined. Thus, planners have a reason to evaluate their decisions in view of their impact on crime.

Elements of Crime Prevention

There are several explanations for the cause of crime. The five main theories as identified by Crow are:

- **THE LEGAL THEORY-** This theory argues that crime is rational. Offenders weight the circumstances and make a decision to commit an offense based upon his or her perception of the amount to be gained versus the risk of punishment. Crime control under this model is oriented around certainty of punishment and making the punishment fit the crime.
- **THE SOCIAL THEORY-** Social theorist believe that criminal behavior is related to and is the result of social conditions. Many of these theories hover around some compelling arguments that social conditions, such as lack of opportunity, improper associations, and poor environmental conditions, cause people to commit crimes. Social theories helped bring about urban reform and contemporary public housing programs. Social theories seem to possess the greatest appeal as examination of crime for public policy makers..."
- **PSYCHOLOGICAL THEORY** -Explains crime in individual terms The psychologist searches for explanations associate with individuals choices to commit crime or with mental pathologies that result in dysfunctional behavior. Learning theories have emerged from this area of research and hold some promise for treating and controlling certain behaviors
- **BIOLOGICAL THEORY-** Attempts to prove relationships between body types and criminal behavior Some contemporary biological researches have established relationships between chemical deficiencies and behavior. Others have demonstrated hereditary relationships between violent fathers and their offspring.
- **POLITICAL THEORY-** Political theorists believe that crimes are natural social reactions to oppressive capitalistic government. These radical criminologists espouse a Marxist view that society is wasting its time attempting to treat criminal behavior Anarchy and violent overthrow of the system are preferred methods of crime prevention. Some other political theories are based in a belief that class or power

conflicts; the clash between the have and the have-nots, are the cause of criminal behavior.

These theories have been used to identify approaches to crime prevention. Public policy has been guided by a succession of philosophies which fail to explain a variety of criminal activities in our communities. Many people believe that the real priority is to deal with the popular root causes of crime, the social, political and economic causes.

Three main approaches to crime prevention are based on these theories

- **THE PUNITIVE APPROACH**, which assumes that crime may be controlled or prevented through punishment that fits the crime. The theory is that criminals will not commit a crime if they will receive one more unit of pain than the amount of pleasure or value derived from a criminal act. This is the classical criminal justice model that relies upon the perception that an offense will be detected and punishment will be swift
- **CORRECTIVE APPROACHES** are aimed at eliminating the motives for committing a crime. These concepts are usually associated with focusing attention on social, economic, and political causes of crime.
- **THE MECHANICAL APPROACH** applies measures that are taken to deny the opportunity for an offender to commit a crime. These methods depend on the denial of access to vulnerable properties and individuals. They also include the use of natural surveillance and access control to ward off the potential offender.

Crow felt that the corrective and punitive approaches are the most socially desirable. He concludes that time has run out on attempts to control and successfully treat criminal behavior. Many of the theories of the relationship to causes of crime and treatment of crime have failed to explain the wide range of criminal behavior and dishonesty that occurs in our communities. Nonetheless because of an incomplete understanding of the

causes of crime he advocates for the application of all three approaches to crime prevention.”(Crow pg.27 1990). Crime is not entirely dependent on social and punitive variables. It has long been known that certain areas of certain cities produce more crime than others. These areas may be dilapidated or new areas. However, over time a greater amount of crime comes from these areas, even when the inhabitants have radically changed. This has lead some theories to conclude that “delinquency areas exercise its pernicious influence ...on any who may occupy it...”

The Planners Role in Crime Prevention

Crime prevention has not been a traditional planning concern and crime prevention is usually dealt with in an indirect manner. The traditional planning approach to crime prevention focuses mainly on improving the social aspects of the community. Handled by advocate and social planners whose primary concern is to enhance residence's quality of life, crime reduction is only an incidental byproduct of their plans.

This study will provide planners and policy makers with a better understanding of the effects of physical planning on crime and the perception of crime. Most planning and zoning decisions result in some form of alteration to the environment and thus to the possibility of crime derived from or facilitated by the environment. However, crime prevention is not a significant criteria in the development review process. Some jurisdictions do require police department review but such comments tend to be based on the level of surveillance that the development provides the police, not on the natural surveillance or territorial rights it allows residents. Robert Cherry, a police department

trainer coordinator, in an effort to develop guidelines for CPTED, recommends “wide streets and well-spaced housing” to permit adequate patrol observation.(Cherry pg 48 1981). However the aim of CPTED and Defensible Space is to alter or create environments that facilitates informal social control by its residents.

Brantingham states the problem best by saying, “planners often manipulate land-use controls to effect specific social and economic goals ” However, “one prominent social goal, crime reduction, has rarely been considered by planners.” He feels that this is rooted in a general lack of knowledge of the relationship between land-use patterns and crime. If certain land use factors can be empirically proven to be related to the crime rate planners would place greater importance on crime prevention design as an evaluating criteria in the development review process.

Previous planning attempts at crime control are also based on the concept of corrective prevention. Measures such as the reduction of overcrowding in dwellings, the creation of viable neighborhoods, the rehabilitation of slums, provision for meaningful recreation can be cited as examples. Although, crime prevention has not been a traditional planning concern and crime prevention is dealt with in an indirect manner, the planner’s attempt to create livable, active neighborhoods with a sense of community may arguable be considered an effort in crime reduction, because some criminologists see social prevention methods as a more effective approach.

Most of the independent variables used in this study such as: building setbacks, visibility into structures from the road; the designs of street pattern, surrounding land-uses, are directly related to planning decisions. Unfortunately, the relationship of these variables to crime is often overlooked. Such oversight in planning decisions has led to many failed or under utilized developments and projects. Planners interested in urban renewal and revitalization should keep the following quote in mind, since it explains the consequences of planning decisions; "Changing the defining characteristics of territory changes the behavior that occurs within it and conversely, changes in behavior lead to changes in territory"(Grenough 1974).

The degree of importance that planners should place on crime prevention techniques varies on a site by site basis. Consideration should be given to the intended use of the space and the primary goals of the project. Planners will find that the crime prevention techniques of Defensible Space and CPTED work in concert with other planning goals, thus, harsh compromises are not required. Planning, Clifford states should not be mainly for crime prevention: it has wider objectives related to the quality of life. Sometimes the crime likely to occur may have to be tolerated, accepted in the interest of a more important objective. That is understandable, but the importance of crime prevention should never be neglected or go unrecognized. There will be no virtue in a materially secure and aesthetically attractive existence, which cannot be enjoyed because of fear of crime (William Clifford 1979).

Responses to Urban Crime

The problems associated with crime are magnified within the city. Whatever the causes of crime, it is now a hard fact of American life that violence has consequences of its own and is causing changes in the urban environment. One of the major consequences is the shift in population. This shift is also the result of a combination of unintended consequences of transportation, land-use, and housing policies. The city was once an area of prestige and was proudly claimed by the wealthy as their home. However, today a perception of the city as unsafe has contributed to the loss of upper- and middle-income citizenry. Thus, the segment of society the old, the poor and minorities, most vulnerable to crime is left concentrated in cities. Our urban areas have also experienced changes in ethnicity and age.

Urbanites react to crime in different ways. These include distrusting others, avoiding particular places, taking protective action, changing their daily activities, and participating in collective action (Miethe pg. 14 1995). One of the main types of avoidance behavior is dodging dangerous people, especially young people and strangers, and avoiding physical contact with risky situations. By limiting encounter with particular types of people, restricting interpersonal relationships, and communication patterns, and restricting participation in particular activities residents hope to reduce their risk of victimization. According to Miethe the typical urban resident in America goes to considerable lengths to avoid contact with strangers, groups of young people, persons of a different race and persons with dirty clothes and poor personal hygiene.

Other type of avoidance reaction is to avoiding particular places at particular times, this includes going downtown, specific streets and certain neighborhoods. "One basic characteristic of urban life is that nearly every resident knows the location of the bad part of town that should be avoided if at all possible" (Miethe pg. 22 1995). Often, these dangerous and avoided parts are associated with public housing projects. Housing projects are easily identified and are immediately perceived as unsafe. Even residents of these projects will avoid certain segments of their housing development.

Some persons may desist in a variety of public actives for example, taking public transit, shopping at particular stores, outdoor recreational actives, or participation in community or neighborhood functions. Residences have also modified their daily routine and altered their method of transportation becoming increasingly aware of their surroundings. The type of activity in which we engage and their temporal and spatial location are modified as a result of a direct or vicarious victimization experience (Miethe pg. 25 1995)

One popular reaction to crime and fear of victimization is to organize neighborhood crime watch organizations. These activities are intended to unify the neighborhood in its crime prevention efforts and sends signals to criminals that the community does not tolerate crime. "Although collective actions have been implemented in all major metropolitan areas it is unclear whether they are effective as crime and fear reduction strategies. For example involvement of community members in neighborhood watch programs may decrease risks of victimization because it increases the guardianship or

protection over the communities, but it may also increase fear because of the greater exchange of crime stories between neighbors” (Miethe pg. 25 1995).

Low-income urban residents unable to flee to the suburbs have resorted to fortifying their residences. Urban homes are being fortified, with bars on almost every door and windows, shades over the windows and burglar alarms, as residences seek some level of safety. This is their way of defining and defending their territory. Such behavior is termed “target hardening” and decreases the attractiveness of potential crime targets (Wekerle and Whitzman pg. 3 1995). However even with such precautions, residents are even fearful of staying at home during the nights (Wekerle and Whitzman pg. 3 1995). This behavior is not unique to the central city; the suburbs are also fortifying. Real estate agencies and developers now promote the “walled or gated community.” Although the suburban response may be less intimidating the effects of such behavior on a sense of community are still negative. Fortification results in a decrease in the sense of community (Wilson 1995)

Urbanologist Jane Jacobs states that “It does not take many incidents of violence on a city street, or in a city district to make people fear the streets. In addition, as they fear them, they use them less, which makes the streets more dangerous (Jacobs pg. 30 1960). If residents deem these reactions to crime ineffective, they will abandon these areas. It is important to consider how urbanites will live in the future, because if urban crime continues to increase it is likely that the urban environment will increasingly reflect this condition (Gold pg. 13 1970).

Although it is difficult to discern whether these changes are due to fear of crime or to some other factor, such adjustments in routine activities and avoidance of particular activities and places are common reactions to crime. This is a reasonable conclusion from previous research. These reactive responses to crime results in a withdrawal from public life and reductions in commitment to the community, such behavior perpetrates further crime. (Figure 1) The fear of crime has a variety of negative impacts on individuals and communities.

Hypothesis

This study investigates the relationship between land use and crime. It is believed that crime incidences in lower income neighborhoods are positively related to the areas' surrounding land use, traffic access, and urban design. I suspect that the crime occurrence will be higher in areas where residential uses are in close proximity to commercial and/or industrial uses. It is also believed that the intensity and condition of non-residential use significantly affects an area's crime rate and its resident's perception of crime. The effect is expected to be more pronounced when the residential uses are public housing or low-income housing and the commercial or industrial areas are blighted. Other land uses that have been theorized to affect crime are railway rights-of-ways, schools, parks, and roads and their traffic patterns. The effect of these land uses will also be analyzed. The general intent of this thesis is to add to existing knowledge and decrease the uncertainty of the understanding of the relationship of land use to crime.

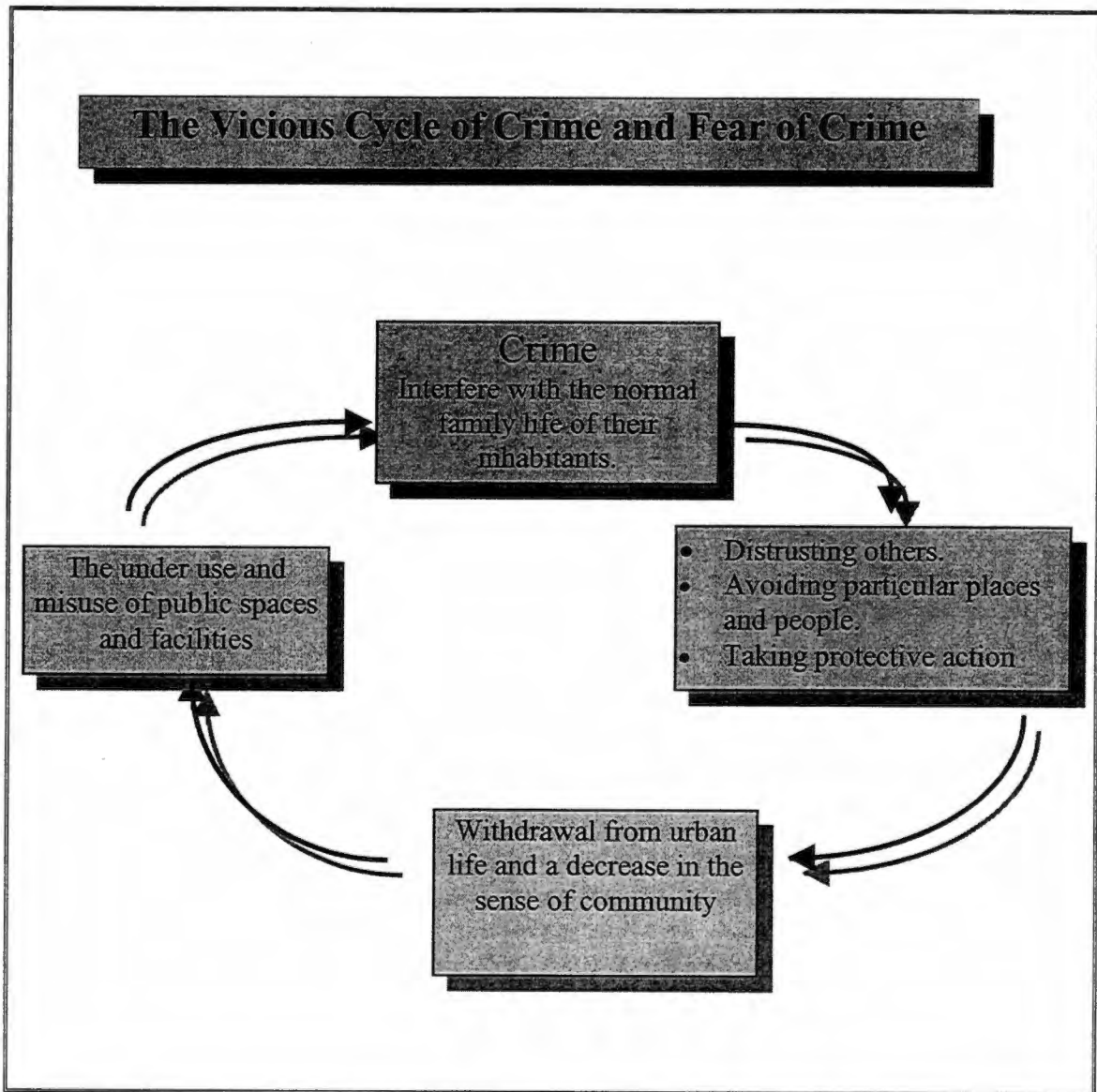


Figure 1. The vicious cycle of crime and fear of crime

The relationship between crime and the physical environment have long been felt to have a profound effect on human behavior. Jane Jacobs wrote about the effect of streets and building placement on human behavior and helped planners to better understand the use of the built environment. However, it was not before Oscar Newman's works in "Defensible Space" were we able to pinpoint the specific design variables affecting crime and the perception of crime. Since then several research studies have been conducted to measure the effect of environmental design on crime.

No clear conclusion can be extrapolated from these research because other researchers have claimed to have refuted these claims. Nevertheless, such research and the possibility of reducing the reality and perception of crime through environmental design decisions have lead the revitalization of the CPTED movement. Although, these concepts were developed more than twenty years ago they have only recently received practical acceptance. This is mainly due to the recent practical applications of the concept by Tim Crow and the continued efforts of Oscar Newman. Although the principles of CPTED and Defensible Space are slightly different they work towards the same goal of altering the environment in order to reduce crime.

This study has been structured to seek answers to the following questions:

To what extent is a low-income residential community affected by it surrounding land-uses, traffic patterns and design?

1. How do different intensities of non- residential uses, mainly commercial and industrial, affect the crime rate of neighboring residential areas?
2. Is there a difference in the effect of commercial, residential, open-space, and institutional land-uses on crime?
3. Is there a difference between the effects of inner city non-residential land-uses and suburban non-residential land-uses on crime?
4. How do street patterns and traffic circulation affect crime? More specifically, answers to the following questions are sought.
 - Is there a positive correlation between the number of access points to a neighborhood and the neighborhood crime distribution?
 - Does the proximity to major arterial roads results in an increase in crime?
5. Do clear neighborhood boundaries and identity affects the crime rate?

Purpose and Need for the Study

Although, several convincing studies have been done examining the relationship between environmental design and crime, much of the knowledge has not transferred into practical planning applications. This may be a result of the focus of the current research. Most studies, to date, have focused on the design of the structure and its layout, an area where even though planners may be involved, they have very little control. Planners may see the application of such principles as the responsibility of the architect. This study

proposed to evaluate variables, more planning related and controlled, that have been overlooked in previous research.

The following is a partial list of the current research and its focus: Newman –architectural design and building placement (1972); Hillier-replication of Newman's work with conflicting results (1973); Becker -multi- family housing development (1974); Marnby-replication of Newman's work with conflicting results; Pyle- spatial dynamics of crime (1974); Brantingham -residential burglary and urban form. (1974); Molumby-landscape and design elements. Most of the current researches are responses to or a replication of Newman's work, several have concentrated on a particular crime, or on the spatial dynamics of crime. Although, land-use, traffic circulation and urban design are mentioned in these studies as a factor contributing to crime, few have isolated the effects of these variables on crime.

Most of the academic research conducted on the Defensible Space and CPTED theories was done during the early 70s when public housing consisted mainly of high-rise buildings. Public housing has changed considerably since then, as a result of the findings of these studies. Therefore, it is questionable as to how effective the application of these principles to present public housing standards and low-income areas will be.

The literature on Defensible Space and CPTED in the past decade consists mainly of general design guidelines and how-to-do manuals, which contain recommendations that are not based on research findings. This research study is designed to control for building

design and placement, as well as socio-economic factors, in order to determine the effect of land-use, traffic circulation, and urban design. Research in this general area, testing the significance of land-use and its effect on crime, is the type of research that Angel has called for (Angel pg. 6 1968).

Oscar Newman also recognizes the need for further research in this area. He states "commercial and institutional generators of activities do not, in and of themselves, necessarily enhance the safety of adjoining streets and areas. The unsupported hypotheses of Jane Jacobs, Shlomo Angel, and Elizabeth Wood must be examined more clearly for a better understanding of the nature of their operating mechanism. The simple decision to locate commercial or institutional facilities within a project to increase activity and so provide the safety that comes with numbers, must be critically evaluated in terms of intended users, their identification with the area, periods of activity, nature, and frequency of presence of concerned authority" (Newman pg.48 1973).

This study will look at a much larger unit- the neighborhood and apply the principles of Defensible Space and CPTED. This study will be more concerned with land use, street patterns, and the access they provided. There are many features of urban form and structure that could tend to facilitate or decrease the probability of crime. These features including the condition and maintenance of buildings, streets and alleys, evidence of recent construction, mixtures of land uses, rates of pedestrian traffic and pedestrian accumulation within various land uses all can facilitate crime (Luedtke). The important factor here is that these variables may not have an effect on crime rates when isolated.

Although, this study focuses on public housing projects, the results can be generalized to apply to most low-income housing developments and areas. The public housing projects were chosen as the unit of analysis for several reasons, mainly the ability they afford in the control of socio-economic variables affecting crime. This minimizes the distortion that differences in socio-economic conditions may have on the study's measure of crime.

Methodology and Scope

Data for this study was obtainable from three sources. First, information for the measure of crime was gathered from the West Palm Beach Police Department. Information was gathered for the calendar years 1998 and 1999. The second source of information was the Housing Authority which maintains files containing socio-economic data, relevant for the study of housing projects. Lastly, Land-use classification, intensity, and conditions criteria was extracted from the West Palm Beach Zoning Codes and Comprehensive Plan and was supplemented with site visits to the area. The existing land use was used to determine what category a site is classified as.

Land Use and Land Use Intensity

Determination of industrial, commercial, institutional, or open space will be consistent with the existing land use and the zoning codes. The zoning codes will also be used to classify the intensities of these land-uses.

Road Classification and Pattern

The number of access points to the neighborhood will be identified, and the road classification system contained in the Comprehensive Plans will serve as a guide in categorizing the area's roadways as either major arterial, arterial, collector or local. The degree of accessibility within the neighborhood to other activity centers will also be discerned.

Neighborhood Boundary

Identify neighborhood boundaries as either clear or blurred based on the linkage between land use, the degree of physical heterogeneity. The boundaries of the housing projects will be observed as to their relationship with the surrounding area, the access they provide, and the similarities they possess in order to determine if these projects are their own, smaller neighborhood or part of a larger neighborhood. My own sense of the physical relationship of the uses surrounding these projects was used to determine the quality of the neighborhood boundary. Boundaries that are continuous in form, and allow no or limited access are classified as clear.

Geographic Location.

Most of the study sites are within the inner core surrounding the central business district, and these sites were classified as urban sites. One study site is on the fringe of the city limit, where the development is characteristic of suburban areas, and was classified as suburban. The importance of this variable is that previous studies have found that crime rates decrease with distance from a city's core (Reppetto page 34). Various theories have

been advanced to account for this. Some suggest that central city neighborhoods are “zones of transition” adjacent to the thriving city center but characterized by mixed land uses, high industrial concentration, physical deterioration, rented dwellings, and transient populations who have few ties to the social institution of the area (Reppetto page 34). Reppetto’s study of residential crime found a wide range of burglary rates for adjacent residential neighborhoods; an indication that factors other than location might have more influence on the residential burglary rate. However, in a comparison the core residential and outlying residential, he found that outlying areas reported fewer burglaries.

The Dependent Variable and its Measure.

Crime

West Palm Beach Police Department offense/incident reports requires the following information:

A description of the incident, Classification of the incident according to NCIC/UCR code corresponding to Part I Index categories; the time and date of the incident; and the location of the incident. Incident reports from the 1998 and 1999 calendar years were used. Interviews conducted with the police department were used to better understand the nature of crime in these areas. These interviews also were used to refine the list of crimes considered for this study and to determine if crime within the study areas are affected by variables, other than those controlled for by the study design.

Control Variables.

Information on socio-economic characteristics and or possible intervening social variables such as age, income, household size, number of female headed households, race, number of units per acre (density), turn over rates, and number of people per unit is available from the West Palm Beach Public Housing Authority.

Methodology

Four public housing projects in the City of West Palm Beach, Florida were used for this study. The projects, are all surrounded by or in close proximity to a variety of non-residential land uses; have different street patterns, urban design, and different locations in relationship to the central city. These differences as well as the similarities are especially important to the design of the study. Similar results are expected where similar situations exist. This will be used to demonstrate the effectiveness of the controlling of intervening variables, and also that there is not a spurious variable affecting both the dependent and independent variable. The differences between these projects illustrates the strength of the correlation of each variable has on crime. Several Housing projects were considered before settling with this set. A unique quality of these housing projects is that they are all basically designed in a similar manner. They all are of the "low-rise, human scale" buildings that Newman advocates, thus an automatic control for building design. A boundary of 1320 feet or a quarter mile from all property line of these projects was used as the study areas

A series of GIS/MapInfo generated maps were produced that illustrate the spatial relationship of crimes, excluding murder and domestic violence since it is unlikely that environmental factors would influence such crimes. Crime incidences were sorted and mapped by robbery, personal assault and burglary. These results were overlaid with the independent variables. The time and day is also an important factor in determining the effect of land-use and crime because such space was used differently at different times of the day. Crime incidences were also be sorted and mapped according to the time and day of occurrence. GIS maps to determine the relationship of the above independent variables to the type of crime, and time and place of occurrence were produced. The crime data from the West Palm Beach Police Department contains addresses of the incident, which was transformed into a GIS database; the resulting data base is displayed as a pin map by placing a different symbol for each different type of crime. The map was then be analyzed for spatial relationships. The police department information system has the capability of extracting information from within any given boundary.

This study analyzed a variety of these physical components for possible causal linkages to crime. If direct causal relationships between the environmental features of West Palm Beach Housing and crime exists, a list of recommendations to decrease the possibility of crime are proposed.

Chapter 2 Review of the Literature

The historical foundation of Defensible Space and Crime Prevention Through Environmental Design are discussed in this chapter, beginning with a look the theoretical bases of the two concepts. From this, the works and contributions of Jane Jacobs, Oscar Newman, C. Ray Jeffery, and Tim Crow are reviewed. Each of these works are critiqued for weaknesses associated with the concept. The purpose of this literature review is to illustrate the historical development of the Defensible Space and CPTED concepts as well as to identify gaps in the existing literature. This process has help in determining how the study could contribute to the existing literature. Other articles and research reports of significance are summarized in Table 2.

The Contributions of Jane Jacobs

Perhaps the most explicit development of a theory linking crime rates to urban planning was made by Jane Jacobs in the *Death and Life of Great American Cities*, a passionate appeal for a rethink of the planning process. (Mawby pg. 170 1977). Her work revived interest in environmental criminology (Clontz pg. 30 1993). Jane Jacobs is a social critic who lived in the Greenwich Village section of New York, and carefully observed the use of space within this community. Her observations of the use of urban space, the interaction between its users are similar to those made by Patrick Geddes. Jacobs sees cities as physical places and in seeking understanding of their behavior, we get useful information by observing what occurs tangibly and physically (pg. 95 1961). Through

Table 2 Review of Significant Literature

Title, Author (alphabetical)	Description of Work
<i>Territoriality, Street Form and Residential Burglary Social and Environmental Analysis</i> Barbara Bess Brown	Examines the social and physical constraints particular to any residential setting, which may influence the establishment of territoriality.
<i>Crime Prevention Through Environmental Policy</i> Thomas A. Reppetto	A critique of the criminology's response to urban design theory for crime prevention. Questions whether the manipulation of the physical environment effects a reduction in crime rates
<i>Defensible Space A Theoretical And Empirical Appraisal</i> R. I. Mawby	Data from a Sheffield survey has been used to test whether area crime patterns do vary with design features Found that the defensible space concepts was so wide that many designs could incorporate both good and poor defensible space qualities and a more rigorous definition was recommended
<i>Defensible Space Undefended Social Factors In Crime Control Through Environmental Design</i> Sally E. Merry	Examines patterns of intervention in crime in a modern American housing development, which contains many of the characteristics of good defensible space design The study finds that much of the defensible space is undefended, and concludes that spaces may be defensible but not defended if the social apparatus for effective defense is lacking
<i>Design for Crime Free Streets</i> Harold Lewis Malt	Tries to determine if and how parks act as an accessory or deterrent to crime The study concludes that if parks were more relevant, they would be more widely used and therefore perceived as safer The theory of non-use of parks can be applied to other public uses
<i>Residential Burglary and Urban Form</i> Patricia L. Brantingham & Paul S. Brantingham.	Attempts to ascertain whether burglary exhibits meaningful spatial patterns. The research findings supports their hypothesis that border blocks would exhibit significantly higher burglary rates than interior blocks
<i>Less Crime By Design</i> Paul Ekblom	Illustrates how design and prevention overlaps
<i>Neighborhood Design and Crime A Test of Two Perspectives</i> Stephanie W. Green berg and William M Rohe.	A test of the defensible space approach and the opportunity approach The study results lend far more support to the opportunity model of crime in residential areas than to the defensible space model
<i>Evaluating Housing Environments for Crime Prevention</i> Dennis J. Dingemans	This study applies Newman's territoriality and surveillance standards to a sample of contemporary suburban townhouses The data collected produced a negative correlation between good defensible space and crime
<i>Discouraging Crime Through City Planning</i> Sholomo Angel	Emphasizes reducing the opportunity to commit violent street crime. Introduces the concept of Critical Intensity Zones According to this concept most street crimes occur in the Critical Intensity Zones where there are enough people to provide criminals with victims but not enough to provide safety through mutual surveillance
<i>Residential Crime</i> Thomas A. Reppetto	Detailed study of robberies and burglaries in Boston One variable investigated was mixed land-use, the study found no correlation with crime. The data revealed low crime in some mixed land-use areas and high crime in other areas Offers no explanation for these findings.

these field observations, gossip, and anecdotes, Jacobs realized that even supposedly similar parts of supposedly similar places have drastic differences in public safety. This difference, she attributes to the physical design of the community. Jacobs noted that higher densities, not overcrowding and mixed land uses creates continuous street activity and provides the necessary eyes on the street which results in less crime, because the space was being utilized twenty-four hours a day (Clontz pg. 40 1993).

Jacobs identifies Euclidean zoning, where land uses are segregated into residential, commercial, and industrial areas as one of the main factors contributing to urban criminal activity. The dominance of a single land use, regardless of what it is, results in a scheduling of use such that the area is deserted for long periods of time. Similarly, Jacobs asserted that certain street designs invite more use than others. Streets with sidewalks for example, were said to encourage children to play there. The more people use streets, the more opportunities there are for informal surveillance. That in turn discourages criminal activity (Jacobs 1961). Planning theory discourages such diverse developments. In this respect she has been very critical of planners and architects, whom she faults for creating cities and districts that are "custom made for easy crime. . ." (Jacobs pg. 31 1961). Such planning philosophy, she states, tends to segment the city, eliminate citizen surveillance of streets and thereby improve opportunities for criminal activities. To reduce crime, Jacobs proposed that city growth be planned. Cities should be zoned so people could live near where they work and shop. Jacobs believed mixed

land-use would provide an effective means of ensuring informal surveillance. She referred to this as “a basic supply activities and eyes on the street” (Clontz pg. 40 1993). The basic requisite for the functional surveillance she advocates is diversity of use (Newman pg. 127 1973). Commercial establishments, usually thought of as incompatible with residential uses are favored by Jacobs. She sees business establishments, especially bar and clubs as a security asset rather than a draw for criminal activity.

Other planning practices Jacobs identifies as contributors to the destruction of cities and the city’s inability to defend itself are: the tendency to reduce the density of an area; prohibiting region serving commerce in neighborhood districts; and the practice of designing secluded “safe places” away from the dangers of the street. Spreading people out more thinly cannot solve the problem of insecurity she states, trading the characteristics of the city for the characteristics of the suburbs.

The first thing to understand is that the public peace – the sidewalk and the street peace-of cities is not kept by the police, necessary as police are. It is kept primarily by an intricate almost unconscious, network of voluntary controls and standards amongst the people themselves. No amount of police can enforce civilization where the normal, casual enforcement of it has broken down (Mawby pg. 170 1977). She recognizes the importance of commerce serving the neighborhood and the value of strangers on the streets. However, she realizes that although these factors are necessary they are not sufficient, and if they are applied in isolation, they do way more harm than good. She tells of an activity area that draws strangers especially teen-agers from all over Brooklyn. But these strangers... do not halt at the visible corridors, they go into streets... streets that

lack surveillance. It is reasonable to assume that this is the situation in many of our low-income and public housing areas.

Jacobs compares the public safety of several different neighborhoods, she finds that lower income-central city neighborhoods can be lively and safe places and that such places may even have a lower crime rate than the affluent suburban areas. Although she advocated for mixed land-uses she understands that such conditions may not always produce a desirable level of safety.

She emphasizes several key concepts for the creation of safe urban spaces:

First, there must be a clear demarcation between what is public space and what is private space. Public and private space cannot ooze into each other as they do typically in suburban settings or in [housing] projects.

Second, there must be eyes upon the street, eyes belonging to those we might call the natural proprietors of the street. The buildings on the street equipped to handle strangers and to insure the safety of both residents and strangers, must be oriented to the street. They cannot turn their backs or blank sides on it and leave it blind.

And third, the sidewalk must have users on it fairly continuously, both to add to the number of effective eyes on the street and to induce the people in buildings along the street to watch the sidewalks in sufficient numbers. Nobody enjoys sitting on a stoop or looking out a window at an empty street. Almost nobody does such a thing. Large number of people entertain themselves, off and on by watching street activity.

These concepts of territoriality and surveillance were necessary elements for a safe urban environment. Appreciating that a great deal of crime takes place in 'public space', Jacobs emphasizes the role of residents- 'the eye of the streets' and the extent to which their vigilance, due, in part to their community spirit, in part to the design of the buildings,

becomes a policing agent (Mawby pg 170 1977). Thus, as well as providing an important distinction between public and private space, Jacobs put great stress on two concepts- the attitudes of residents towards control in their area and the visibility through presence- which she unequivocally stated were critical to the explanation of urban crime rates. (Mawby pg. 170 1977).

Critique of Jane Jacobs' Works

Jacobs' theories of city design, building, and the function of cities have been refined and tested by researchers in the field of criminal science, architecture and urban planning, with a wide range of results. However, there is consensus amongst most researchers that Jacobs' research methods are unscientific, and results in findings that cannot be generalized. Her work and that of previous contributors has been described as " little more than personal and naturalistic observations" (Newman pg. 119 1973) which cannot be widely applied to the majority of contemporary American cities (Angel pg. 2 1968)

Nevertheless, Jacobs' invites criticism of her work, calling for the constant and skeptical test what the book [The Death and Life of Great American Cities] suggest against ones own knowledge of cities and their behavior. She states "If I have been inaccurate in observations or mistaken in inferences and conclusions, I hope these faults will be quickly corrected." She also limits the findings of her study to "great cities" and hopes that no reader will try to transfer her observations into guides as to what goes on in towns, small cities, or suburbs (pg. 16). However, her recommendations are often taken and criticized on a generalized basis.

Clontz see several problems with Jacobs' line of reasoning. First, research by Greenberg and others (1982& 1984) suggest that homogeneous land-use, not mixed land-use, as Jacobs suggests reduces crime (pg. 32 1993). However, both the observations by Jacobs and the findings of Greenberg may be valid. Shlomo Angel's theory of the "critical intensity zone" offers a explanation of how both may be correct. When intensity is low, as in homogenous areas, there will be virtually no crimes, as not enough potential victims are present and the likeliness of a rewarding opportunity is small. At this intensity of use, the section is safe. As intensity of use increases, enough potential victims are on the scene to warrant attention of potential offenders, but there are not enough people to provide for an adequate surveillance function. This is the critical intensity zone, where most crime takes place. As intensity increases further and the channel section becomes populated, the street becomes safe again (Angel pg.15 1968). See figure 2. Critics should keep in mind that Jacobs findings were meant to be applied to large cities where, the mixed land uses are likely to be intense, therefore, safe.

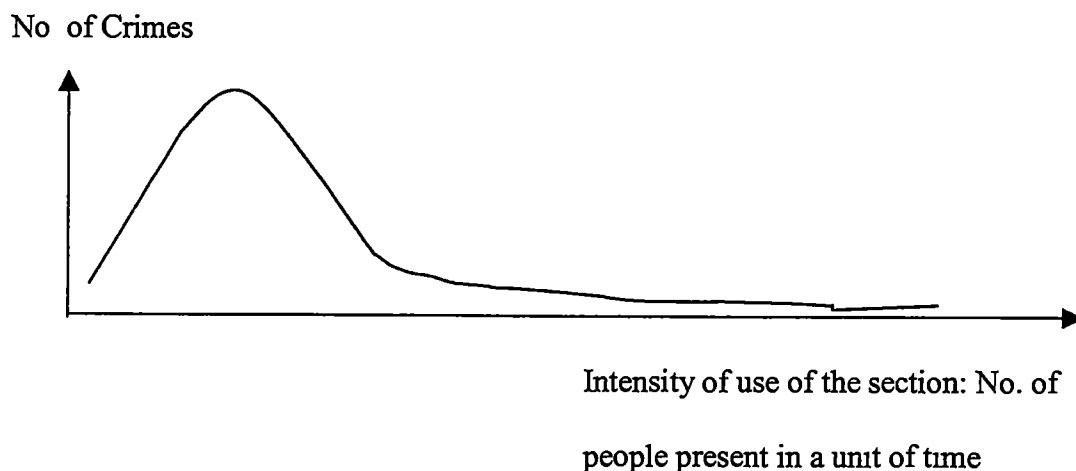


Figure 2. Crime Occurrence in Relation to Intensity of Use

Clontz feels that an increase in the number of people in an area also increases the number of potential victims and offenders. "Additionally, the larger the crowd, the easier it is for the offender to blend in with the group and escape detection" (Pg. 32 1993). Clark, (1983;) Merry, (1981); Newman and Franck, (1982) found that more witnesses might not prevent crimes since people frequently fail to notice crimes in progress (qtd. in Clontz Pg. 32 1993) but there are critical differences in the type of crime.

My own criticism of her study is rooted in her methods of analysis and the practicality of some of her suggestions. I agree with the criticism to of her work as being selective and unscientific. It is true the her findings in Greenwich Village and Boston's North End are atypical of the rest of the city, and could not be applied to most city districts. She omits the importance of other variables contributing to crime. Newman states, the limitation of her approach is that it is the result of observations of existing, well functioning urban communities, and not from a more general theory of human social behavior (pg. 127 1973).

If the social stability of a community were significantly dependant on defensible space, Jacobs' theories and the importance she places on them would be more relevant. Her concepts of increased density; mixed-use; increased surveillance; and territoriality will only have minimal impact in transient and unstable areas. Defensible space is necessary but not sufficient in crime prevention. Jacobs briefly acknowledge this "People using the street have a sense of responsibility towards one another. And would be willing to

intervene in a suspicious or criminal event, or at least that potential criminals perceive that to be so. It [public safety] is kept primarily by an intricate almost, unconscious, network of voluntary controls and standards among the people themselves, in some city areas- older public housing projects and streets with very high population turnover are often conspicuous examples- the keeping of public safety is and enforced by the police and special guards. Such places are jungles”(Pg. 40 1968).

She speaks about the need for clear transitions from public to private space but does not show how such transitions can be achieved especially in mixed-use environments. She does not offer practical applications for her theories

Regardless of the shortcomings of her work, she had a significant impact on the role of the built environment and its effect on crime. Although, only a fraction of the book, one chapter discusses safety, it has stimulated wide interest in urban criminology and provides an essential paradigm for assessing the safety of cities. Other researchers through empirical studies have validated most of the concepts she proposes. Most notable is Oscar Newman who refined and expounds upon Jacobs' theories. In many respects Newman's theory is similar to that developed earlier by Jane Jacobs, indeed more similar than Newman acknowledges (Mawby pg. 169 1977).

The Contributions of Oscar Newman

Oscar Newman first realized the possible effect of the physical environment, when as a professor of architecture at Washington University in St. Louis he saw the demise of Pruitt-Igoe. Pruitt-Igoe was a high-rise; high crime and density public housing project, which was eventually torn down. The failures of Pruitt-Igoe and the relative crime free environment of an adjacent housing project puzzled Newman. Newman realized that while some parts of the city were notorious crime havens others repelled crime and he theorized that much of this difference was the result of building design and placement. Thus, he attempted to understand the design factors that contribute to crime. Newman's tested his theories by undertaking a three-year study where he compared communities in which residents socioeconomic characteristics were controlled and the only difference between these projects were the buildings' design and placement. The study and its findings were published in the 1972 book "Defensible Space". He developed the term defensible space, which he refers to as a surrogate term for the range of mechanisms-real and symbolic barriers, which strongly defined areas of influence, and improved opportunities for surveillance, that combine to bring an environment under the control of its residents (Newman pg 3 1971). The defensible space concept consist of four fundamental features which Newman has identified as contributors to the ideal defensible space, they are as follows.

Territoriality

The first element is the territorial definition of the physical environment, which is the area of influence of the inhabitants. This definition works by subdividing the residential

environment into zones toward which residents easily adopt proprietary attitudes (Newman pg. 9 1971). Residents become responsible for the cleanliness and safety of the space as if it were theirs. Territorial behavior involves personalizing or marking a place or object and communicating that a person or group owns it. Defensive responses may sometimes occur when territorial boundaries are violated. A range of territories make up a person's territorial network. These include public, secondary, and private territories. The longer a person resides in a territory, the more psychologically comfortable and familiar he or she becomes with it. For example, public territories, such as bus seats or city sidewalks, are the least personalized. Secondary territories, such as neighborhoods, which are also characterized by shared ownership among members of a group or culture, are more familiar and personalized. Primary territories, such as homes and apartments, are most personalized. Defensible space, as Newman envisioned it, evolved in a social and spatial hierarchy from private to semiprivate to semipublic to public space, which allows residents to survey their territory and clearly articulate the boundaries between public and private regions. Designs support the residents' latent territoriality and sense of community and allow them some control over their neighborhoods. Architectural design may create a physical layout that extends the private realms of a group of individuals (Newman pg 2 1971). Prospective criminals who detect an atmosphere of mutual neighborly concern are presumably discouraged from initiating crimes.

Natural Surveillance

The second element is the capacity of the physical design to provide surveillance opportunities. For example the positioning of apartment windows to allow residents to

survey the exterior and interior public areas of their living environment (Newman pg. 9 1971) The goal of surveillance is to avoid designing blind spots and allow supervision of open areas that residents can use in a safe manner.

Image

The third element is the capacity of design to influence the perception of a project's uniqueness, isolation, and stigma: mechanisms which neutralize the symbolic stigma of the form of public housing projects, reducing the age, isolation, and the apparent vulnerability of inhabitants (Newman pg.50 1971).

Milieu

Compatible building placement-The fourth element is enhancing safety by locating residential developments in functionally sympathetic urban areas adjacent to non-threatening activities (Newman pg 9 1971). This element is of considerable importance to this study. In this section Newman briefly discusses the possible effect of adjoining uses on residential areas. He stresses the importance of placing compatible-use-building types together, this he feels is a key concept in zoning and building codes and land use plans. Unfortunately, no data is gathered or empirical research conducted to substantiate his claims. Newman feels that "it is possible to increase the safety of residential areas by positioning their public zone and entries so that they face on areas which...are considered safe" (Newman pg. 108-109 1971) These uses include; commercial retailing areas during shopping hours; institutional areas; industrial; entertainment and government offices. These uses are classified as safe functional facilities -because of the nature of

the activities located there. By the number of users and extent of their felt responsibility and by the responsibility assumed by employees. Newman like Jacobs and Angel contends that the areas most usually identified as safe are heavily trafficked public streets and arteries combining both intense vehicular and pedestrian movement (Newman pg. 109 1971). Research conducted by others contradicts this assumption. Newman recognizes the possible contradiction and explains that "a commercial street which may have been identified by surrounding inhabitants and users as safe will, occasionally, be found to have a higher crime rate than adjoining areas which were rated unsafe. This may be explained by the difference in the type of crime occurring and by the lower chance of its occurrence per area user. A purse snatching which occurs on an identified safe street will usually be of the grab and run sort. In an area identified as less safe, it may involve an assault on the victim. One concludes that both victim and criminal assume that witnesses on a well-trafficked commercial street would not tolerate aggravated assault, or the escape time is critical to a criminal in what is considered a more formally patrolled area.

On the other hand Newman sees parks, schools, and teen-age hangout, as unsafe and contributing to residential crime. He tells of a park designed to serve both the project residents and the surrounding community. The park is located near a commercial strip, which contains a bar and a liquor store; it attracts bums and addicts and has become a no-mans land. The buildings suffering most frequent burglary are those juxtaposed with the park. Newman has found similar crime distribution with schools and teen-age hangout located adjacent to residential uses. This has lead him to conclude that commercial and

institutional generators of activity do not, in and of themselves necessarily enhance the safety of adjoining streets and areas. The success of a particular configuration Newman says depends on the degree to which residents can identify with and survey adjoining facility as well as on the nature of the users of that facility and the activities they engage in. (Newman pg. 114 1971). Although, Newman realizes the possible negative impact of land -uses such as parks and schools, he does not recommend the separation of these uses from residential areas, instead he suggests greater creativity in the design. He thinks through design it is possible, within the framework of defensible space, to juxtapose schools and shops with housing so as to create the desired walking distance milieu, while at the same time providing for the territorially intact residential enclave.

All the different elements which combine to make a defensible space have a common goal - an environment in which latent territoriality and sense of community in the inhabitants can be translated into responsibility for ensuring a safe, productive, and well-maintained living space.

Newman's contribution to the field of defensible space did not stop with the book on defensible space. He wrote several other books and has consulted for several municipalities, incorporating the principles of defensible space in many inner city neighborhoods and public housing. Some of his later research and writings have been responsive to criticism of his original concept.

Critique of Newman's Contribution

Despite the popularity of Newman's book and its positive impact on urban crime prevention, his work has received harsh criticism from academics. Criticisms of his work are usually on two levels- the theoretical validity of his concepts and the inadequacies of his research methods. Other critics feel that Newman like all architects overstates the importance of design. Even Newman's application of the "defensible space" concept to existing situations seems to contradict the design recommendations and relationships he advances in his book.

Critique of Newman's Research Design

Bottoms in his review of Newman's book comments that "Newman has in short, drawn our attention to an important theme, but the crudity of his treatment of it he has run a serious risk of debasing the importance of the theme (Bottoms pg. 203 1973). He makes these remarks because of Newman's unexplained selection and analysis of only one pair of housing projects out of the 169 projects studied. Bottoms states "this immediately makes one want to ask why the results for this pair is published but those of the rest of the pairs are not-even in summary form. Could it be, one skeptically muses, that the published pair supports Newman's hypothesis better than the rest" (Bottoms pg. 203 1973) Clontz (1993) and Mawby (1977) are also puzzled by Newman's selection of only Brownsville and Van Dyke projects.

Mawby also argues that although Newman presents considerable comparative data on the two projects, some possible vital data is omitted and charges that data on social class or income is limited to "move-ins". (Mawby pg. 171 1977). However, Newman does provide such information (page 46-47 and appendix B). He uses 1968 New York City Housing Authority data, and illustrates through graphs the similarity of these projects. The book's textual discussion centers on the analysis of move-ins because of charges that many so called "problem families" displaced by the Model Cities" renewal program were among recent move-ins to Van Dyke. The analysis of move-ins to these two projects, Newman concludes show no striking differences in the social characteristics of residents in both projects.

Newman's study is also criticized for not providing for a more detailed examination of the social factors involved in defending space. Merry insinuates that since Newman examines no other features of the social organization of the two projects, it is possible that despite these demographic similarities, they actually have quite different social structures. Since the low-rise project appears to be more desirable, and cohesive, based on Newman's report of tenants' comments and its significantly lower crime rate, it may attract a more stable, satisfied and cohesive core of families. While the high rise may contain a higher proportion of desperate families who are less able to cope in many ways, including finding a more desirable place to live. (Merry pg. 398 1981). These comments are well founded and Newman does not explain the housing authority's placement criteria. For instance, can a public housing recipient select which housing project they are placed in? However, according to the defensible space concept, it is the design of the

area that releases territorial and social responsibility of the resident, which would lead to favorable social structures. So the fact that one project may be favorable relative to the other is still the result of its defensible space design.

Mawby points to Newman's oversight of the difference in offender rates and offence rate as another flaw with his research design. Newman does not discuss the offender rates of the two projects, or indeed the extent to which locals or non-residents commit crime. Yet a number of researchers have considered the relationship between offence rates and offender rates; and it could be argued that the projects may have different offender rates which contribute to the offence rate variation. (Mawby pg. 171 1977). Researches who have studied the spatial distribution of crimes of a criminal have concluded that criminals are not willing to go much beyond their neighborhood. However, the fear of recognition inhibits the criminals from committing crime within their own neighborhood. It is logical to expect a difference in the extent to which locals or non-residents commit crime, as well as the effect of the physical environment (defensible space design) on their behavior. Nevertheless, because of the physical relationship of these two projects, across the street from each other, such an analysis would not be relevant.

Although Newman talked about the interaction of the four concepts, there was no analysis of the data for interaction between the variables. He also failed to evaluate the possibility that these elements might contain contradictions within themselves (Clontz pg. 43 1993).

Some critics have pointed out that Newman's data could be interpreted so as to produce alternative conclusions (Repetto pg. 279 1976). Also there has yet to emerge a

comprehensive explanation of the relationship between urban design and human behavior, particular as it relates to crime.

Critique of Newman's Theoretical Concepts

Repetto suspects that professional "turf" problems may be present in the criticism of Newman's work. " Outsiders are never well received" he states "in any field and the fact that public attention afforded to Jacobs' or Newman's ideas about crime prevention far exceeds any similar attention given to ideas of professional criminologist does not make for smooth interaction"(Repetto pg. 279 1976). It is also noteworthy that despite that fact that Newman's Defensible space received major critical attention in leading magazines and newspapers it has yet to be reviewed by the major criminological journals (Repetto pg. 280 1976).

The National Violence Commission examined the problem and concluded that, in the modern city, distance and not design was the key to crime control. They specifically rejected environmental determinism, arguing that physical design is a result, not a cause of human behavior and concluded that urban design could not act positively to attack the roots of crime, only to determine its type and location (qt. in Repetto pg. 279 1976).

Sally Merry's own study of the effects of environmental design on crime concluded that, "Design can provide preconditions for effective control, but it cannot create such control if the social fabric of the community is fragmented." Many researchers believe that the

physical factors of defensible space are interrelated with social ties and territoriality in the process of crime and fear reduction. Newman does not dispute this. The misunderstanding is of the cause and effect relationship between defensible space and social control. While Merry, see defensible space design as an aid only if there are strong social ties within the community. Spaces may be defensible but not defended if the social apparatus for effective defense is lacking. She acknowledges that poor design facilitates crime, however, good design does not necessarily prevent it and suggests that the enthusiasm for crime control through environmental design should be moderated. (Merry pg. 398 1981) Newman on the other hand believes that defensible space features induce the territoriality and social ties that are necessary to create a truly defensible space. Merry only looks at the effect of defensible space on residents, however, there is also a physiological effect on criminals, who may perceive that the defensible space poses too great of a risk. Also research of social behavior has shown that 30% of the population is honest, and would not commit a crime even if the circumstances were in their favor. Another, 30% are basically honest, nevertheless they may commit the easy crime, the remainder of the population will seek ways to commit crime regardless of the situation. (Crow pg. 11 1991) It is the "basically honest" segment where defensible space is most effective. Therefore, even where strong social ties are absent, defensible space may still be effective. Merry's argument is only justifiable under those circumstances where the lack of strong social control produces physical clues to the criminal, such as litter and graffiti that there is a break down of the neighborhoods' social structure.

Problematic is the fact that Newman does not differentiate between different types of crimes. This creates difficulty in applying the concept to practical situations, as you have no understanding of the degree of importance of these variables and its effect on different crimes.

Newman's own demonstration projects seem to be contradictory to his principles. The nature of crime occurring within a community must first be understood in order to effectively apply his principles, many concepts are not clearly articulated and defined (Clontz pg. 43 1993). Newman talked about the interaction of the four concepts; there was no analysis of the data for interaction between the variables. He also failed to evaluate the possibility that these elements might contain contradictions within themselves (Clontz pg. 43 1993). Newman's work was also strongly criticized by C. Ray Jeffery. Jeffery was unaware of Newman's work at the time he published his 1971 book, however, in his 1977 rewrite of "Crime Prevention through Environmental Design" he acknowledges that although their work has similarities, they are totally different in theoretical orientation. He states that his concept of crime prevention goes beyond target hardening and includes basic issues concerning human behavior and learning theory (Jeffery pg 45 1977) Jeffery sees most of Newman's applications of his theory as involving hardware: floor material, fire doors, window material, window bars and grills, interior lighting, closed circuit television, electronic security devices, intercom systems, security personal and other hardening of the target techniques. This he feels is not a very imaginative approach to environmental-behavior interaction, though it represents the thinking of today on crime prevention (Jeffery pg. 224 1977).

The Contributions of C. Ray Jeffery

C. Ray Jeffrey's most beneficial contribution to the field has been in his efforts to forge a new paradigm within criminology and the theoretical basis for Crime Prevention Through Environmental Design (CPTED). In Jeffrey's 1971 book he calls for a new school of environmental criminology, based on scientific procedures, behaviorism, and environmentalism. "The basic principles of the classic school - i.e., prevention of crime before it occurs and the certainty of the consequences for behavior would be retained, but the emphasis would shift from punishment to reinforcement and from individual offender to the environment. The major form of control would be reinforcement of lawful behavior and the removal of reinforcement for illegal behavior. The focus would be the environment in which crimes are committed, not the individual offender (Jeffery pg. 279 1971).

In Crime Prevention Through Environmental Design C Ray Jeffery:

- argues for a criminology based on a synthesis of biology, sociology, psychology, and other behavioral sciences;
- suggests prevention and treatment as an alternative to the current retribution and deterrence theories of crime and criminal justice;
- emphasizes crime prevention through environmental design and bioenvironmental theories;
- discusses modern genetics, brain sciences, and psychology as critical aspects of behavior; and
- debates legal vs. scientific approaches to criminal behavior.

He argues that current emphasis is placed on indirect controls on the individual criminal after the offence has occurred. The model that he proposes is one of direct controls over environmental conditions before the offence has occurred. It is economically less expensive to design an environment in which crimes are not possible than to rehabilitate

all who have the opportunity to commit crimes (Jeffery pg. 20 1971). The attempt is made here to trace the historic origins of our crime control system, to evaluate the effectiveness of crime control measures, and to argue that a new and radically different approach to crime is appropriate (Jeffery pg. 17 1971). Our present policies, Jeffery states, will never control crime, because they deal with the symptoms and not with the causes. We must first determine whether the causes of crime lie in the individual criminal (as current theory assumes) or in the environment. If these causes are to be found in the environment, and then we must resort to environmental engineering in order to prevent and control crime (Jeffery pg. 22 1971).

Jeffery uses the findings of The National Commission on the causes and prevention of violence to conclude that since violent crime was primarily a phenomenon of large cities, it is only logical that environmental engineering can be used to reduce those urban crime rates. The National Commission on the causes and prevention of violence pointed to the urban environment and its design, streets, expressways, apartment buildings, schools, libraries, playground, parks and commercial buildings as the causes of crime. Jeffery argues that the urban environment can influence criminal behavior in two ways- physically, by providing the physical surroundings to which individuals respond; and socially by providing the social relationship to which individuals respond, and develops a framework of crime prevention on this basis.

Jeffery reviews and critiques works to date on crime prevention through design and develops a model of prevention based on understanding from a biological and social-

psychological viewpoint. Jeffery reviews different disciplines' views of the human environment interaction and selected criminology studies that deal with the physical environment. He outlines his psycho-biological learning theory point of view and addresses methodological issues relevant to crime studies that deal with the physical environment

In his 1977 revision of CPTED he notes very little change in the profession with respect to its approach to crime prevention. He finds that the sociological criminologists still focus on the criminal, and not on the environment in which crimes are committed. However, we have a new breed of ecologist who are taking a careful look at the physical environment and crime but he states, these new ecologists are pure environmentalist; they ignore the basic genetic and psychological differences in people who are involved in response patterns. To assume that each rapist is the same or that rapists are the same as murderers or armed robbers is a big assumption and one that is blatantly wrong. To this end he redesigns his theoretical model for crime prevention.

Critique of the CPTED Theory

Although, Jeffery's is a pioneer in the field of CPTED his work has minimal influence outside of the criminology profession. His work led to the acceptance of the CPTED concept by the criminology profession, which makes a distinction from that of Newman's work. Criminologists have even conducted studies to illustrate the effectiveness of CPTED and the failures of Defensible Space. However, architects, planners, crime enforcement officers and other practical applicators of the CPTED and Defensible Space

concepts give minimal credence to Jeffery's theoretical orientation. The primary reason for this is that Jeffery's models of prevention is based on a understanding of biological and socialpsychology, and is difficult to translate into practical application. Jeffery stated that " the closest I have gotten to federal support for my ideas is to have the National Institute of Law Enforcement and Criminal Justice give a multimillion dollar contract to the Westinghouse Electric Corporation for CPTED"(Jeffery pg. 224 1977). Even those who are aware of C. Ray Jeffery's research have often misinterpreted his work. "Many of the proposals growing out of environmental design planning are of the "hardening of the target" variety. "My 1971 book produced this response in many people, even though I made it clear that I felt that environmental design went beyond target hardening and alarm systems"(Jeffery pg. 230 1977).

The New CPTED Movement

Tim Crow's book " Crime Prevention Through Environmental Design; A Basic Training Manual" is partly responsible for the revival of the interest in environmental approaches to crime. Since the publication of Crow's book the CPTED movement has blossomed into an internationally organized movement. Crow, the former Director for the National Crime Prevention Institute in Louisville, built upon the work of both Newman and Jeffery. He introduces some elements of target hardening and blends both Newman and Jeffery's concepts into understandable and practical applications. Authors, Newman and Jeffery have stated that there is a clear distinction between the concept of Defensible Space and CPTED. Crow's book blurs that distinction. Even Crow's work is interpreted differently within different professional fields. The shortfall of the new CPTED

movement is that it lacks empirical analysis for its techniques, most, of which are based on casual observance. Nevertheless, CPTED principles applied to the redevelopment and redesign of communities have achieved successful results. Tim Crows work has significant influence on the design and crime prevention fields.

Chapter 3 Research Methods

Purpose of The Study

This study will provide planners and policy makers with a better understanding of the effects of physical planning on crime, and the perception of crime. Most planning and zoning decisions result in some form of alteration to the environment and thus to the possibility of crime. However, crime prevention is not a significant criterion in the development review process. Some jurisdictions do require police department review, but such comments tend to be based on the level of surveillance that the development provides the police, not on the natural surveillance or territorial rights it allows residents. Robert Cherry, a police department trainer coordinator in an effort to develop guidelines for CPTED recommends "wide streets and well-spaced housing" to permit adequate patrol observation. (Cherry pg 48 1981). However, the aim of CPTED and Defensible Space is to alter or create an environment that facilitates informal social control by its residents.

This study provides planners with an understanding of the possible consequences of their work and decisions on crime. Crime prevention has not been a traditional planning concern, and crime prevention is dealt with in an indirect manner. This study provides an analysis of some of the design variables the planners may control and their effect on crime.

Data Collection

Data for this study were obtained from three sources. First, information on crime statistics and the location of crime were obtained from the West Palm Beach Police Department. This information details area offenses surrounding public housing site, mainly, robberies, burglaries and personal assaults (The study concentrated on crimes against persons) from January 1, 1998 until December 31, 1999. The second source of information concerning traffic counts and roadway classification was gathered for the West Palm Beach Planning Department. These figures were obtained through the Florida Department of Transportation, which conducts traffic, counts on an annual basis. The figures used are 1999 counts. Lastly, data on existing land uses and property conditions was gathered for each area through an on-site surveillance.

The West Palm Beach Police Department has a "Ride Along Program" that allows interested residents to accompany an officer on patrol. Information was gathered while accompanying two different officers assigned to the study neighborhoods. These officers also provided useful insight about the nature and causes of crime in the study neighborhoods.

Hypothesis

The general hypothesis is that **crime patterns are not uniformly distributed, and that certain areas because of the land uses and development patterns will have a higher probability of having an occurrence of crime.** This study investigates the relationship

between land use and crime. It is believed that crime rates in lower income neighbors are positively related to the areas' surrounding land use, traffic access, and urban design. I suspect that the crime rate will be higher in areas where residential uses are in close proximity to commercial and/or industrial uses. It is also believed that the intensity and conditions of non-residential use significantly affects an area's crime rate and its resident's perception of crime. The effect is expected to be more pronounced when the residential uses are public housing or low income housing, and the commercial or industrial areas are blighted. Other land uses that have been theorized to affect crime are railway rights-of-ways, schools, parks, and roads and their traffic patterns. The effect of these land uses will also be analyzed. The general intent of this thesis is to add to existing knowledge and decrease the uncertainty of the understanding of the relationship of land use to crime.

Key Variables

Small neighborhood areas are used as a unit of analysis to understand the micro level situational correlates of crime and the environmental factors that may create opportunities for crime. This study has been structured to seek answers to the following questions:

To what extent is a low-income residential community affected by its surrounding land-uses, traffic patterns and design?

1. How do different intensities of non-residential uses, mainly commercial and industrial, affect the crime rate of neighboring residential areas?

2. Is there a difference in the effect of commercial, residential, open-space, and institutional land-uses on crime?
3. Is there a difference between the effect of inner city non-residential land-uses, and suburban non-residential land-uses on crime?
4. How do street patterns and traffic circulation affect crime? More specifically, answers to the following questions are sought:
 - (A) Is there a positive correlation between the number of access points to a neighborhood and the neighborhood crime rate?
 - (B) Does the proximity to major arterial roads results in an increase in crime?
5. Do clear neighborhood boundaries and identity affect the crime rate?

Description and Analysis of Study areas

The following gives a detailed description of the four study neighborhoods used. Each neighborhood contains a West Palm Beach Public Housing Project, each within a unique neighborhood setting. The four public housing projects are Pleasant City, Dunbar Village, Twin Lakes and Robinson Village. Each study area encompasses an area greater than the housing project but will be referred to by the name of the housing project it contains. The Pleasant City, Dunbar Village and Twin Lakes study areas are some of West Palm Beach's oldest, intact African-American neighborhoods located in the western section of the City. In general, the area is currently in gradual decline. Property

abandonment and disinvestment, population loss, worsening housing conditions and crime are problems that threaten the livability of the area. The Robinson Village study area is located in a newer suburban fringe area of the city. The following describes the existing land uses and character of each study neighborhood (See location map in appendix A).

Twin Lakes Study Neighborhood

Boundary

The Twin Lakes study area is bounded by 12th Street (Palm Beach Lakes Blvd.) on the north, 7th Street to the south, Australian Avenue on the west and Tamrind to the east. The study area contains the Twin Lakes housing project of one hundred and eighteen dwelling units (59 duplexes), developed on both sides of a major collector road. This neighborhood has within its boundaries large sections of land devoted to commercial and institutional uses. There are no clear boundaries to this neighborhood, however presence of major arterial, the railway line and a commercial district creates a physical boundary. To the west of Australian Ave. the land development pattern changes to larger single family homes on large lots, creating a psychological transition to a different neighborhood. The railway track forms an impenetrable boundary to cross movements and provided a strong edge for the neighborhood. The other boundaries can be classified as open because of the many access points they provide to the neighborhood. (See Figure 3)

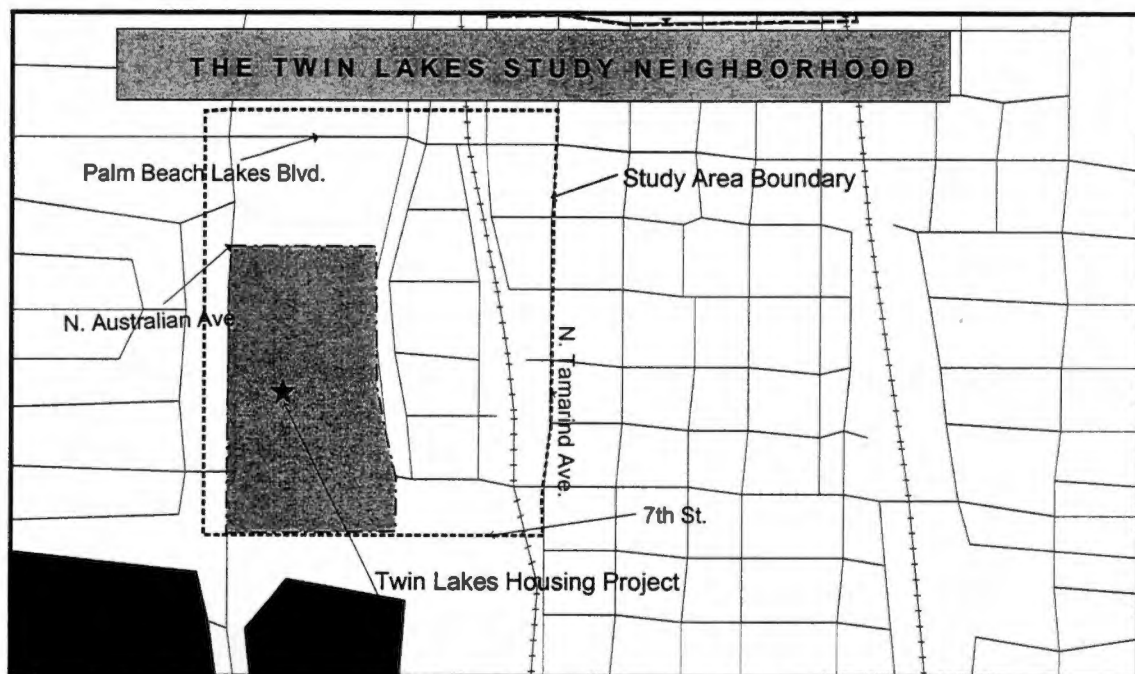


Figure 3. Location Map of the Twin Lakes Study Neighborhood

Land Use

The surrounding land uses are regional commercial to the north along 12th street, a major arterial. Here the commercial uses include a corner store, check cashing store, night club, service station and a liquor store intermixed with vacant store fronts. These commercial uses serve more than the immediate neighborhoods and are uses that Angel would classify as “negative” in terms of preventing crime. The forms of the commercial uses along 12th street are also of importance. Twelfth Street is a commercial strip, and this pattern of commercial development is theorized to be particularly vulnerable to crime, because the linearity of its design thins out and reduces informal surveillance. The area east is the railway line bounded by neighborhood commercial uses and multifamily dwellings. To the east of the railway line has developed into a mixed use district, however, the

commercial uses are all non-conforming uses, and the multi-family uses, including a single room occupancy hotel, provide transient accommodations. This area does not resemble or function similarly to Jane Jacobs' Greenwich Village.

The housing stock within the Twin Lakes Study area is mixed, consisting of duplexes (operated by the West Palm Beach Housing Authority) multi-family rental units on the fringe of the district and single-family homes. The study area is zoned Multifamily-32 (32 units per acre), Multifamily-20 (20 units per acre) and Single family-14 (14 units per acre). Nevertheless, the area has developed at a density of approximately seven units per acre.

The General Commercial zoning district parallels 12th Street and neighborhood runs along Tamrind. The Twin Lake's housing stock, including its public housing are in fair condition, but the area consist of several vacant and overgrown lots, which detracts from the aesthetics of the neighborhood.

Traffic Circulation

This section deals with movement and access to the study area – how people get around, into and out of the neighborhood, whether, driving walking or taking the bus. It describes the ease of entrance, exit and surveillability, which is presumed to be directly related to the location of criminal activity.

The study neighborhood is bounded by two major arterial streets; 12th street (Average Daily Traffic of 28,130 trips), which serves as a high-speed connector between the city and Interstate 95; and Australian Avenue, a major north-south connector. The southern boundary is defined by 7th street, a collector road that also serves as another connector to the city's central business district. The area has a grid street pattern with small blocks. The housing project and the railway line interrupt the grid pattern. Nevertheless, the road network provides numerous access points reducing the effectiveness of natural surveillance. In addition, the homes along 8th, 9th, 10th and 11th street all have alleys, which create more access points as well as hiding places and escape routes for criminals.

Two bus routes and three bus stops serve the neighborhood. The bus stops are along 12th Street and Tamrind, opposite commercial uses. During the morning and early evening, the stops and surrounding commercial uses have a constant flow of pedestrians and bus riders, which would seem to deter crime. However, these stops were identified by police officers as some of the "hot spots" for crime.

Dunbar Village Study Neighborhood

Boundary

The boundaries of the Dunbar Village study area are defined by 19th street to the north, 14th street to the south, the Sea Coast Railway line to the east and Tamrind Street to the west (See figure 4). The Dunbar Village study neighborhood is one

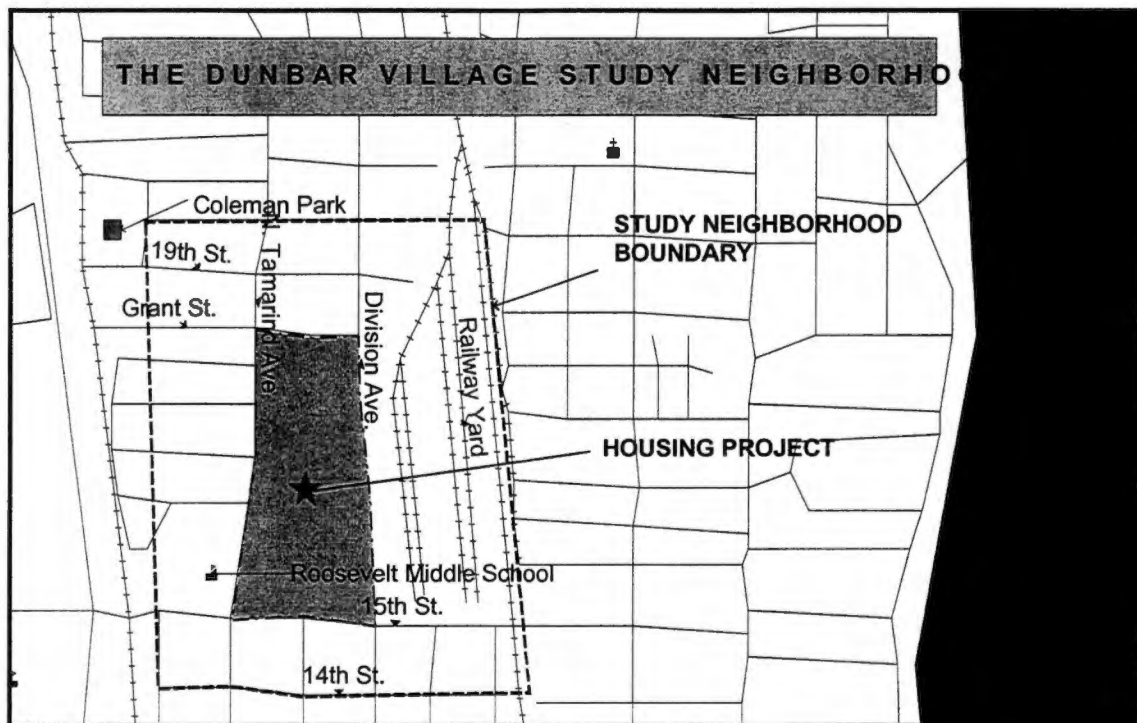


Figure 4. Location Map of the Dunbar Village Study Neighborhood

block north of the Twin Lakes study neighborhood. The Dunbar Village housing project was built in the early 1940s, and contains 248 units in 62 buildings, on eighteen acres, in the center of the study neighborhood. The eastern boundary of the study neighborhood is well defined by the railway line and the industrial uses within the rail yard. The fence surrounding the rail yard and the railway line creates a social divide between the Dunbar Village study neighborhood, and the commercial uses of downtown West Palm Beach. The linear strip of commercial uses along Tamarind Avenue is a visually prominent boundary, although it provides several linkages to other neighborhoods. The neighborhood's other boundaries not well defined because of the numerous linkages to adjacent

neighborhoods and their similarity of housing types and land development patterns.

Land Use

The surrounding land uses consists of single family residential along the northern and southern boundaries, a commercial strip, Roosevelt Middle school and Coleman Park to the west, and the railway yard to the east. Schools and parks are theorized to be magnets for crime. The multifamily uses of the housing project are the only multifamily uses within the study neighborhood.

The commercial area consists primarily of one block of older store fronts along Tamrind Street opposite the housing project. The area has a plethora of businesses such as beauty and barbershops, restaurants, a corner grocery store churches, funeral homes and check cashing stores. Several vacant commercial lots have become de facto open space and ball fields for the neighborhood, and have become informal gathering spots with the grassy shoulders used for curbside parking. These are a popular gathering spot in the evenings and on weekends for loitering and beer drinking and serves as the social center of Dunbar Village and the adjacent neighborhoods. Signs of physical and social incivility abound as litter gathers on the sidewalk and street, graffiti often appears on the boarded-up storefronts, and broken bottles are a common sight. These are important signals to criminals, indicating the stability of the neighborhood. Municipal services are inconsistent.

The housing stock is similar to that of Twin Lakes, small homes on small lots. The multi-family residential areas are zoned Multi Family 32 (thirty-two units per acre) but developed at fourteen units per acre. The housing project is the only multi-family use in the study neighborhood. The Housing project is surrounded by an iron fence and has two entrances, which are manned by residents, hired by the housing agency. An officer mentioned that the gates are only manned occasionally, and even when they are, the guards allow access non-residents. The officers also pointed out the drugs are often traded through the fence and that the fence has not help to deter crime.

The average density of single-family residential uses is approximately eight units per acre. The number of vacant residential lots is similar to that of the Twin Lakes study neighborhood. Much of the housing stock is poorly maintained.

Parks and schools generally are desirable land uses in stable neighborhoods, however, in declining neighborhoods or adjacent to public housing, they have a significant impact on the location of crime. Even though these areas are usually high activity areas and there are more eyes on the street, off hours they are used by teenagers, addicts, and the homeless as open congregation areas and are perceived by residents to be crime infested. Crimes associated with parks and schools often spill over into residential areas. The Dunbar Village study neighborhood has both these uses, Roosevelt Middle school to the southwest corner and Coleman Park along 19th Street. The homes lining the northern,

southern and eastern perimeter of the park offer very limited surveillance because of trees and shrubs. The western end of the park has no homes creating an ideas area for criminal activity.

Traffic Circulation

Two major arterial roads, Tamrind Avenue and Division Avenue, both north-south corridors, serve the Dunbar Village study neighborhood. The area is generally laid out in a grid street pattern, interrupted by the housing project and the railway yard. The street blocks are longer than those of Twin Lakes. The local roads are east-west oriented, and the collector and arterial roads runs north – south. Since there are no east-west collector or arterial road through the study neighborhood, the area receives less cut-through traffic from the suburbs than does Twin Lakes.

The study neighborhood is linear in shape, and its main entrances are along Tamrind Avenue. In fact, most homes within the study area require indirect access from Tamrind Avenue. This could be possibly be a deterrent to crime since it would generate increased activity along Tamrind. However, the amount of activity may not be sufficient to deter crime and may instead increase the number of potential victims

The housing project is accessed from either 15th street or the rear entrance on Grant Street. Within the projects the home all front on “private” streets unlike

Twin Lakes where the units and entrances are on public streets. Dunbar Village exemplifies the type of transition from public to semi-public space Newman refers to. However, the demarcations of public and private spaces are not well defined within the housing project itself.

One bus route serves the study neighborhood. The route runs along Tamrind Avenue and has two stops within the neighborhood. Additional bus routes are accessible from 12th Street.

The study neighborhood network of sidewalks and pedestrian accessible schools, park and shopping areas all create opportunities for informal socialization, a factor theorized to reduce crime. However, contributors to crime may negate these factors.

Pleasant City Study Neighborhood

Boundary

A small neighborhood, which is isolated physically and probably socially from the rest of the community, the Pleasant City study neighborhood is bounded by Northwood Road to the north, 17th Street to the south, North Dixie Highway (US 1) to the east, and the Florida East Coast Railway line and rail yard to the west.

In 1965, the West Palm Beach Housing Authority constructed 132 housing units dispersed throughout the community, in multiplexes of four to six units per

building. Using the scattered site concept prevents the identification of clear boundaries for the housing project. The scattered-site concept is also an attempt to blend public housing with the existing community.

Dunbar Village and Pleasant City were originally one neighborhood, before the rail yard split the neighborhood; thus, the name Division Street, which parallels the rail yard. The railway line, as in the other study neighborhoods, creates an impenetrable boundary. After the division of the neighborhood, the two areas developed with separate and distinct character. Dunbar Village becoming a mixed use neighborhood, while Pleasant city is primarily a residential neighborhood.

The commercial uses along North Dixie Highway (regional commercial) and along Northwood Road (neighborhood commercial) provides a strong and identifiable boundary to the neighborhood. To the south, the demarcation of a physical boundary is difficult, here the residential land uses, density, and development patterns are similar to the rest of the Pleasant City neighborhood. Only the psychological sense of community changes primarily because of a change in name, below 17th Street is known as Palm Beach North (See figure 5).



Figure 5 Location Map of the Pleasant City Study Neighborhood

Land Use

Pleasant City is an older neighborhood of the city that is characterized by small homes with well-kept yards. A few of the homes have been up graded, and new homes replace dilapidated and abandoned structures. The area has a large percentage of older housing stock. The primary land use is residential, consisting of a mix of small single family homes, and the multiplex developed by the housing authority. The Pleasant City neighborhood has traditionally been a single-family neighborhood. Multi-family uses were introduced into the area in 1965 when the West Palm Beach housing Authority built the Pleasant City housing project. The housing authority's small multi-family units are on scattered site properties, as the term implies, these dwellings are spread over the study area

to blend in with neighboring homes. Developing scattered-site properties is a part of the West Palm Beach Housing Authority long-range plan. This strategy of purchasing vacant and abandoned properties to be redeveloped for public housing has stabilized the Pleasant City neighborhood and has even stimulated some private reinvestment. Pleasant City seems to be a stable residential community, based upon occupancy and the limited number of vacant parcels. The neighborhood is fully developed and has very few vacant lots. The Pleasant City neighborhood has no parks or informal recreational and open space areas.

North Dixie Highway (U.S. 1) is a continuous corridor of strip commercial uses. The uses along the Pleasant City boundary include a furniture store, an antique shop, used car lot and a variety of retail uses. Although, the commercial uses along N. Dixie hwy creates a boundary for the neighborhood because of their intensity and proximity to the neighborhood, they are not considered a part of the neighborhood. This area was included in the study area to see what such regional serving uses may have on adjacent residential uses.

Pleasant City has easy access to a recently redeveloped neighborhood commercial area, along Northwood Road, which serves other communities without requiring access through Pleasant City. The commercial uses along Northwood Road include a restaurant, beauty shop, and ethnic gift shop and other small retail shops. The commercial area has developed in a nodal manner, primarily because

Northwood Road dead ends about one half mile from its intersection with North Dixie Highway.

Traffic Circulation

The Pleasant City study neighborhood is a network of local streets laid out in the traditional grid system that creates short blocks of about five homes in depth. North Dixie Highway, the only major street, runs along the fringe of the neighborhood, the neighborhood is buffered from it by retail, and office uses. There are no residential uses along North Dixie Highway within the study neighborhood. Spruce Avenue, a minor collector road provides north-south access and is the only major entrance to the study neighborhood. Most of the local streets terminate in a dead end by the railway tracts. Thus, much of the neighborhood streets function like cul-de-sacs. Several other streets meet at a "T" Intersection. There are no major through streets and this may cause confusion and discomfort for criminals for outside the neighborhood. The numbers of escape routes are minimal. Despite the neighborhood's many links to North Dixie Hwy, through traffic remains very low probably because these links are along narrow residential streets. The area's only connection to Dunbar Village is along 23rd Street.

Robinson Village Study Neighborhood

Boundary

Robinson Village is an attempt to make public housing less institutionalized, and to help residents become part of a more socially and culturally diverse community. Robinson Village is located on the extreme western fringe of the city in a less urbanized, recently annexed area. This study area can be classified as a developing neighborhood, since it does not fit the traditional definition of community or neighborhood where similarities exist physically, socially or culturally. What exists is a public housing project, a private residential community, large tracts of undeveloped land, and strip shopping along a major arterial located on the edge of the Florida Everglades. Canals bound the area to the north and south, Military Trail (street name) to the east and Haverhill Road to the west. The housing project was constructed in 1984 and consists of eighty-eight housing units, with six units per building. The boundaries of the study area are classified as open, except along the canals, which creates visible and clear boundaries. These boundaries are not really neighborhood boundaries instead, they merely serve as geographic boundaries for the study area (See Figure 6).

Land Use

Robinson Village study area is a stable, low-density suburban neighborhood of mostly single family detached homes. Homes built on medium sized lots ($\frac{1}{2}$ an acre lots) catering to lower and middle income households. The single family development pattern is only departed from by the housing project, which contains

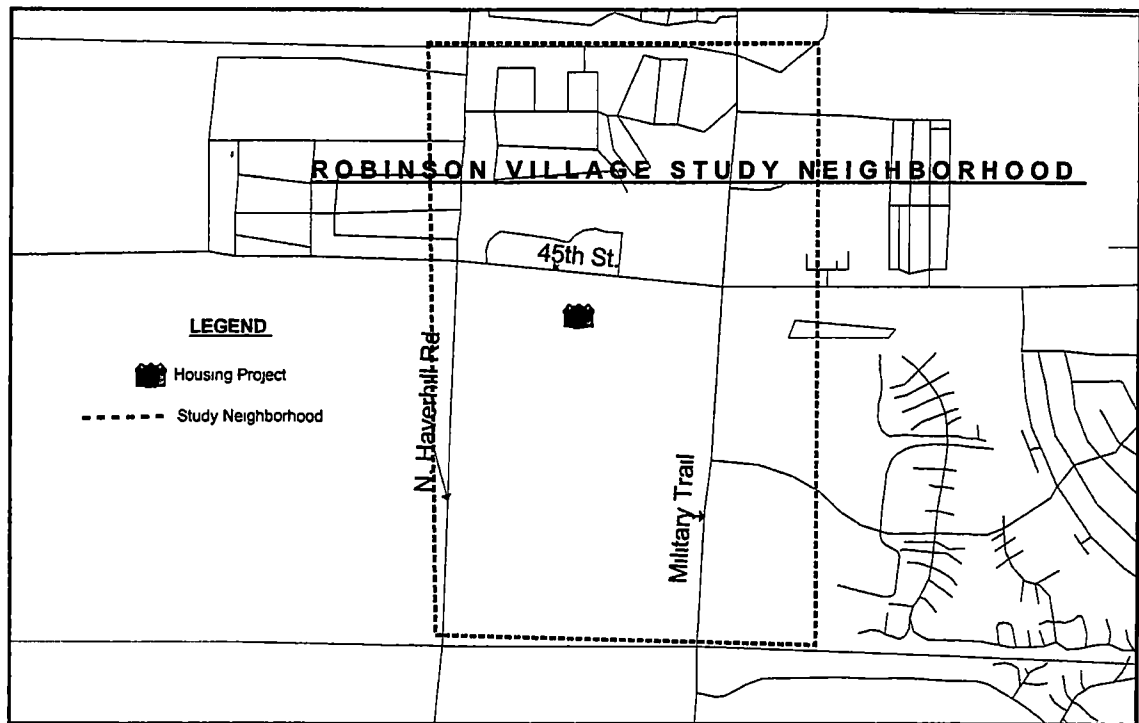


Figure 6. Location Map of the Robinson Village Study Neighborhood

multiple units in two story buildings centered on the parking lot and a tot lot. The neighborhood is sparsely developed with several vacant lots within its platted subdivisions. Most homes and yards are well maintained.

An office park, developed in a campus like setting, occupies the northeastern portion of the study neighborhood. There is very little activity within the office park during the evenings and on weekends. The office park seems to be the perfect homogeneous type setting Jane Jacob predicts would have high crime rates because of the absence of informal surveillance during certain times of the day. The park proximity to public housing may also be a contributing factor.

The commercial land uses are concentrated along 45th street and Military Trail. Here, the commercial uses and services serve both neighborhood and regional needs. With commercial uses at this scale, it is impossible to differentiate between resident and strangers, a required factor in exerting social control over an area. The commercial development includes a newly developed shopping center adjacent to but not easily accessible from the housing project. Loiterers are absent from this area, despite the provision of regional serving commercial uses that attract people from outside of the neighborhood, and even though the commercial uses are similar to those in the Dunbar and Twin Lakes study neighborhood that attract loiters.

Traffic Circulation

The study neighborhood is located between two major north-south arterial roads that provide inter-county connections. Military Trail runs along the eastern boundary and Haverhill road forms the western boundary. The area around Military Trail is evolving into a highway oriented commercial area. Forty-fifth Street forms the spine of the study neighborhood, running through its center. Forty-fifth Street provides access to commercial and office services as well as to Interstate 95. Forty-fifth Street dead-ends into the Everglades, approximately a mile and a half west of the housing project. The study neighborhood has an incomplete system of local and collector streets. The curvilinear street pattern is the predominant form within the residential subdivisions with the primary and

often only entrance on 45th Street. Sidewalks are provided along both side of military and 45th street.

The above description of the four study neighborhoods will be used as a basis to evaluate the location of crimes. It should be evident that these neighborhoods are very similar in many respects. The similarities are uses as controls in the research design, while the differences will help to explain the location of crimes.

Chapter 4 Findings and Conclusion

Survey Findings

The following analysis examines the physical characteristics of each study neighborhood and compares those characteristics to the geocoded crime locations. Figures 7 through 10 show the distribution of crime within each study area. The crimes analyzed are burglary, robbery and aggravated assault from January 1998 to December 1999. The crime statistics are separated by years and one immediately notices the drastic decrease in criminal activity from 1998 to 1999 within all the study neighborhoods. For example, the Twin Lakes study neighborhood had twenty-four incidences of burglary in 1998 and ten in 1999. This change is best explained by improvements in the economy. Also noticeable is the fact that these are all high crime neighborhoods. From a cursory analysis of the spacial patterns of crime among the four study neighborhoods, it is evident that different crimes have different spacial distributions. It is also evident that an explanation of crime locations will not simply be that certain variable has a proportionally positive relationship to crime location but that several interrelated variables affect which areas are victimized.

Road Hierarchy and Traffic Circulation

Figures 11 through 14 show the distribution of crime overlaid with the street type and a one hundred-foot buffer from the roadway (the gray area). From Figure 15 through 18, which illustrate the location of robbery within each study neighborhoods, a clear pattern

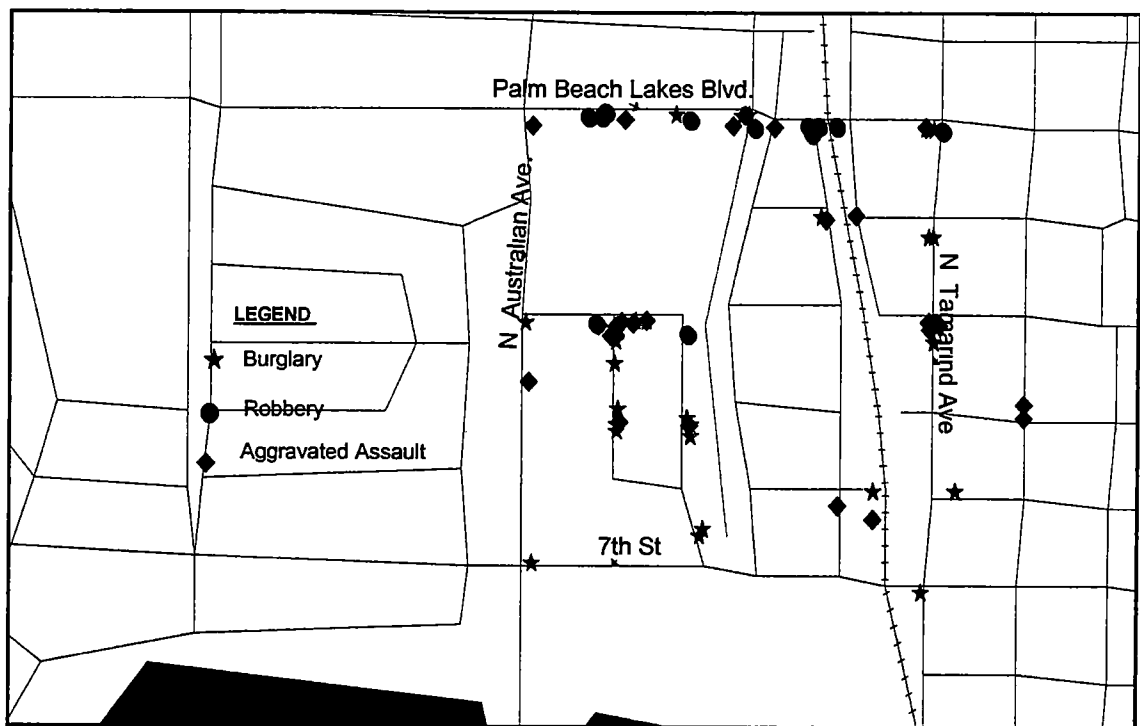


Figure 7. Crime Distribution within the Twin Lakes Study Neighborhood

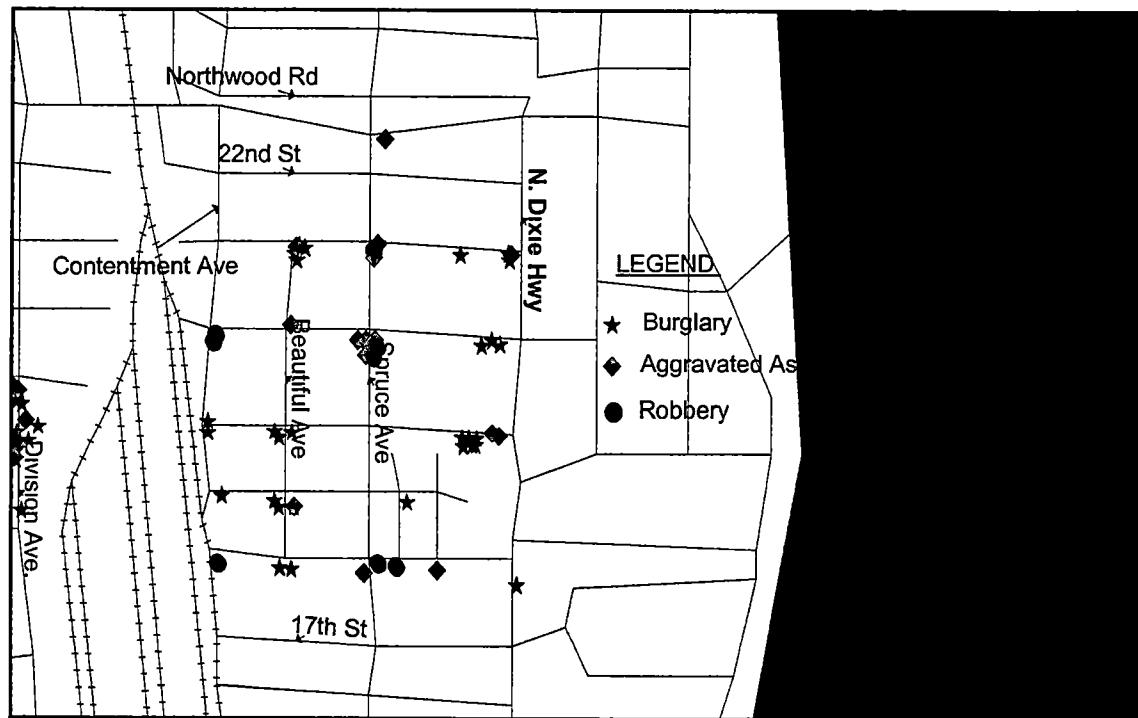


Figure 8. Crime Distribution within the Pleasant City Study Neighborhood

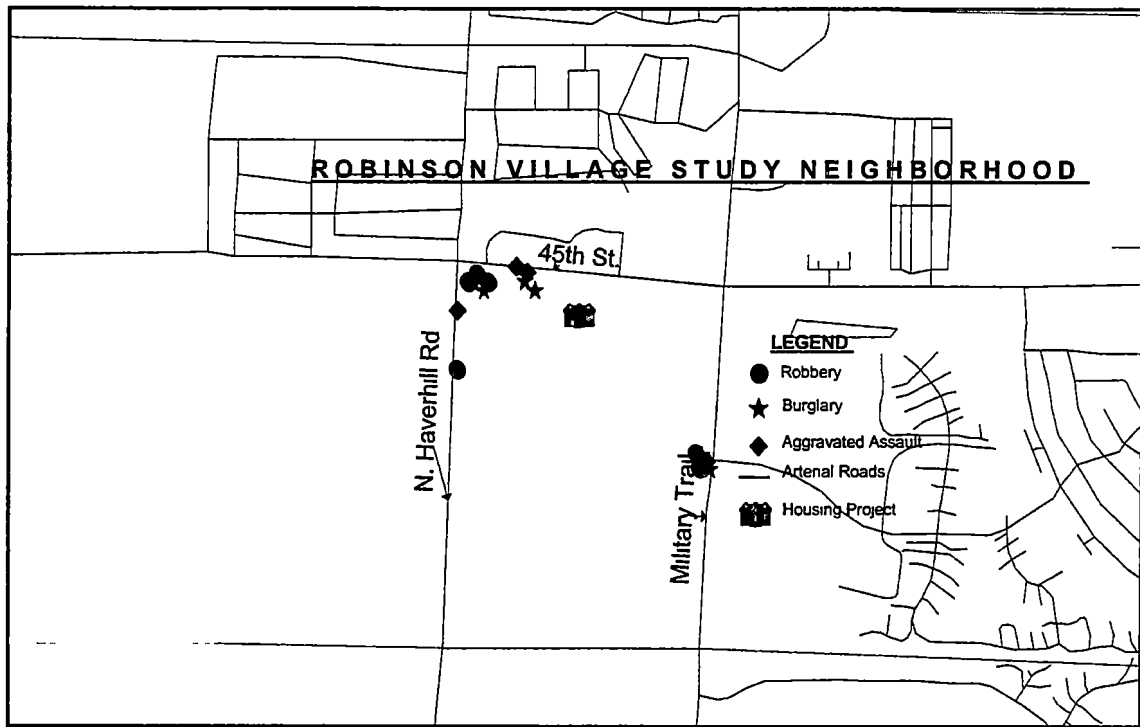


Figure 9 Crime Distribution within the Robinson Village Study Neighborhood

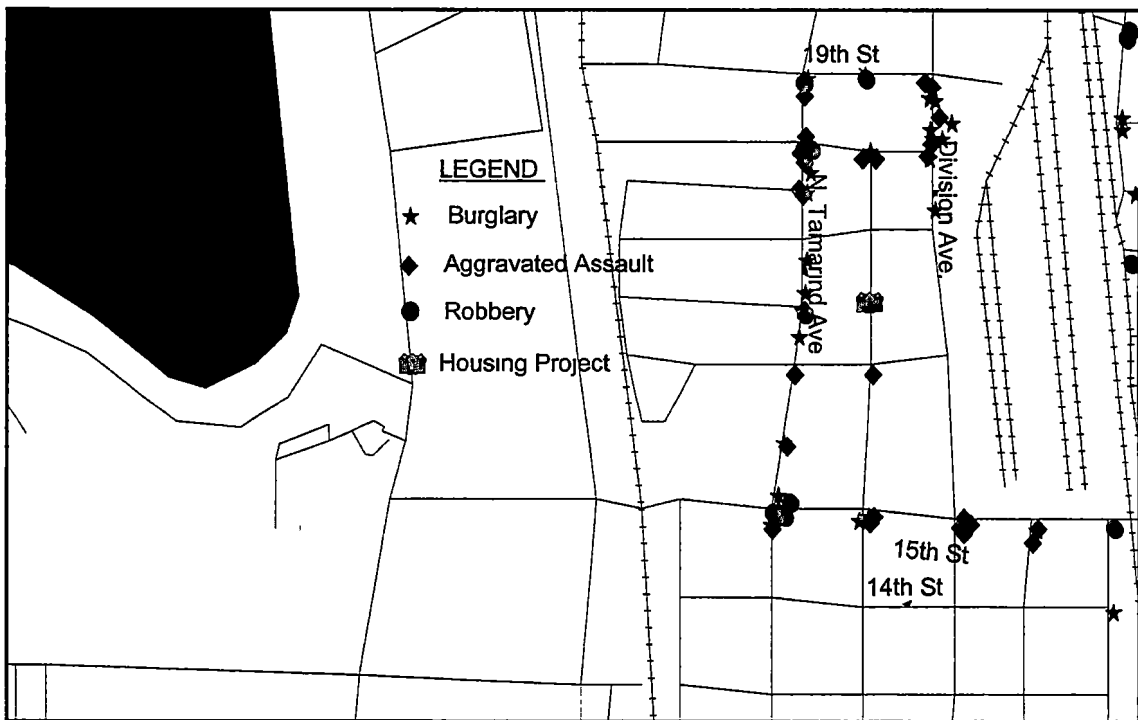


Figure 10. Crime Distribution within the Dunbar Village Study Neighborhood

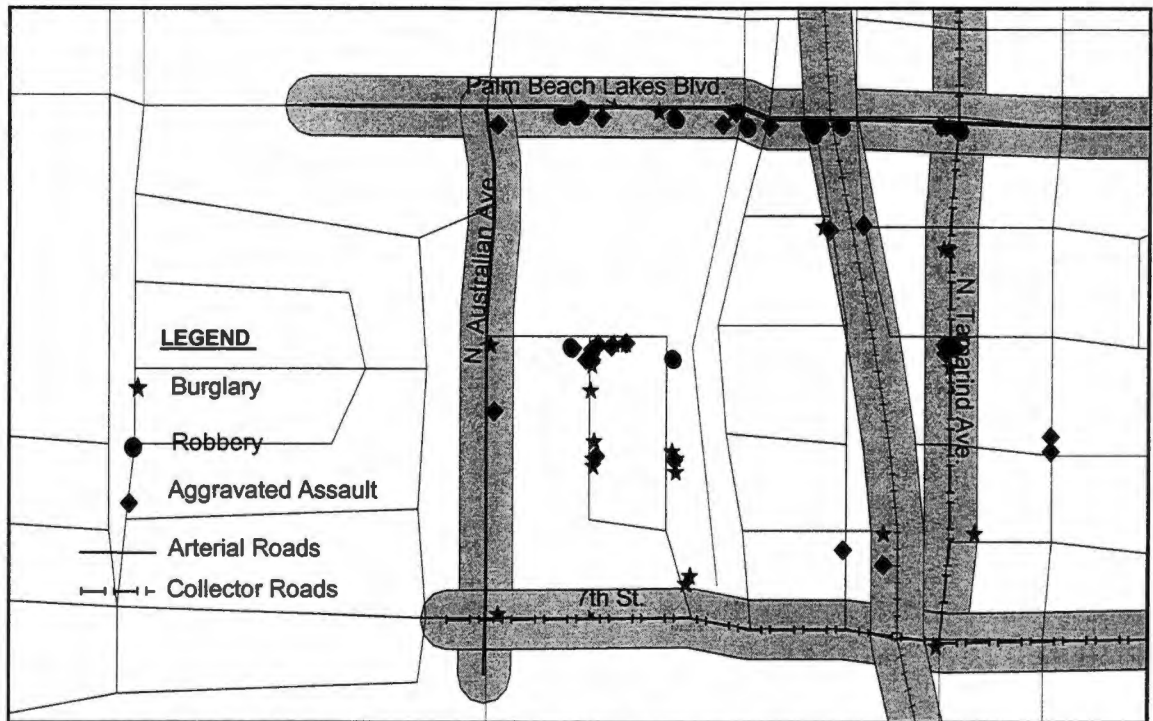


Figure 11. Crime Distribution within the Twin Lakes Study Neighborhood overlaid with 100 feet road buffers.

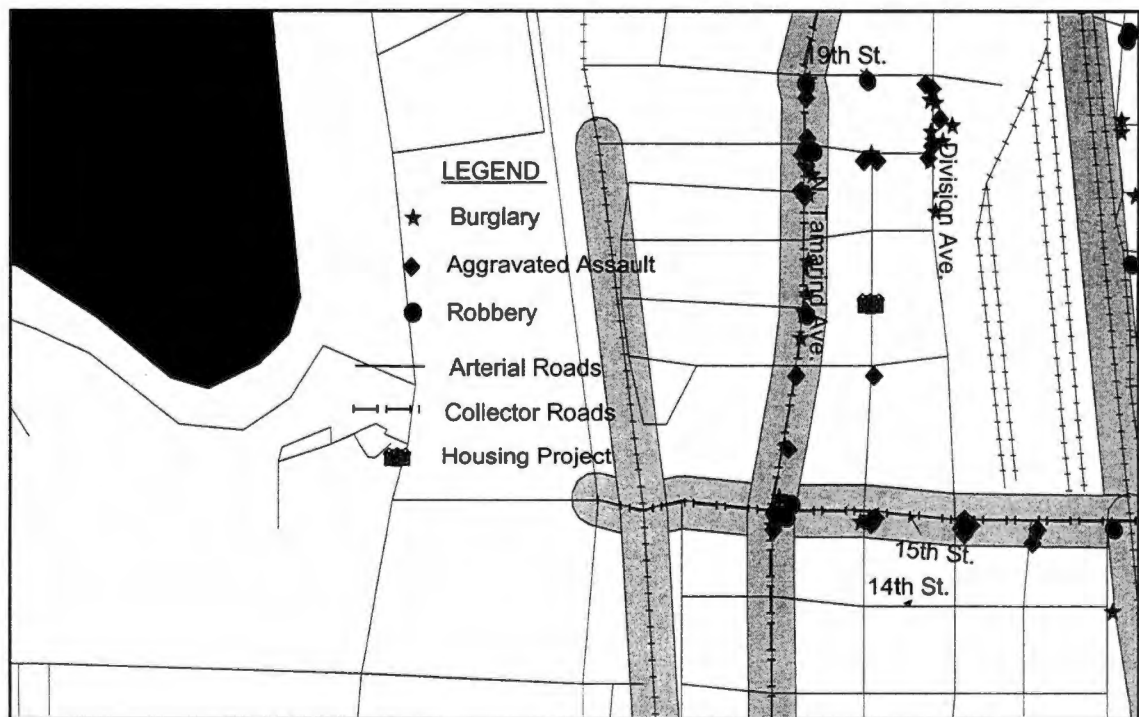


Figure 12. Crime distribution within the Dunbar Village Study neighborhood overlaid with 100 feet road buffers

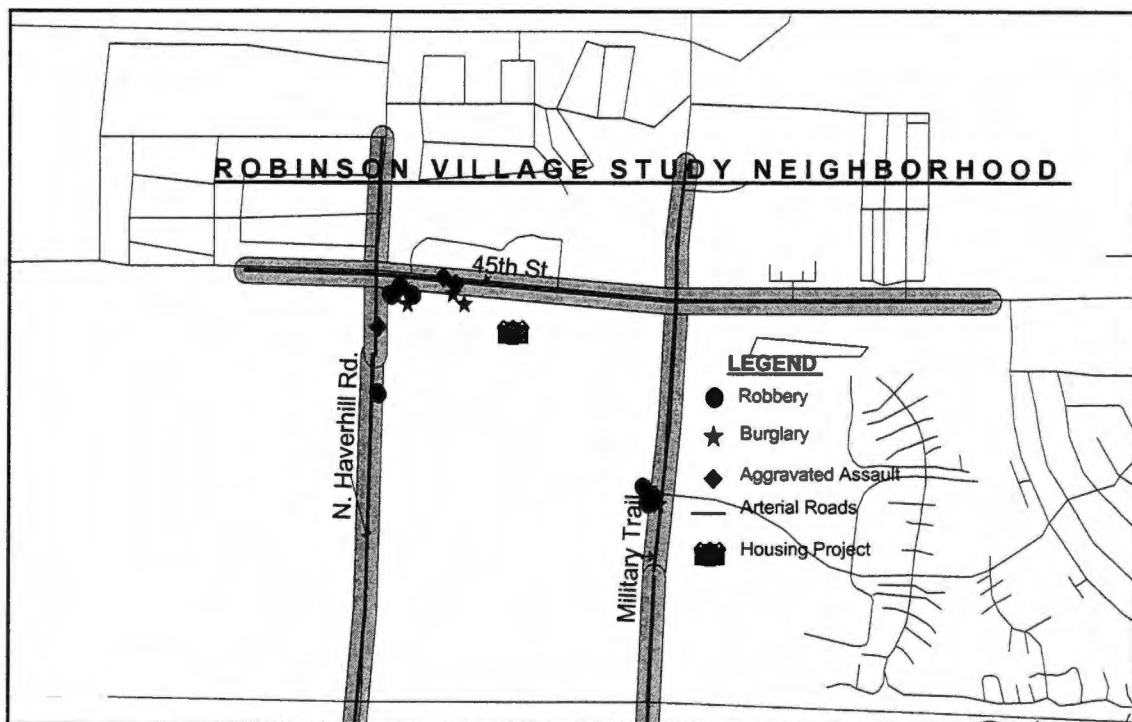


Figure 13. Crime distribution within the Robinson Village Study neighborhood overlaid with 100 feet road buffers

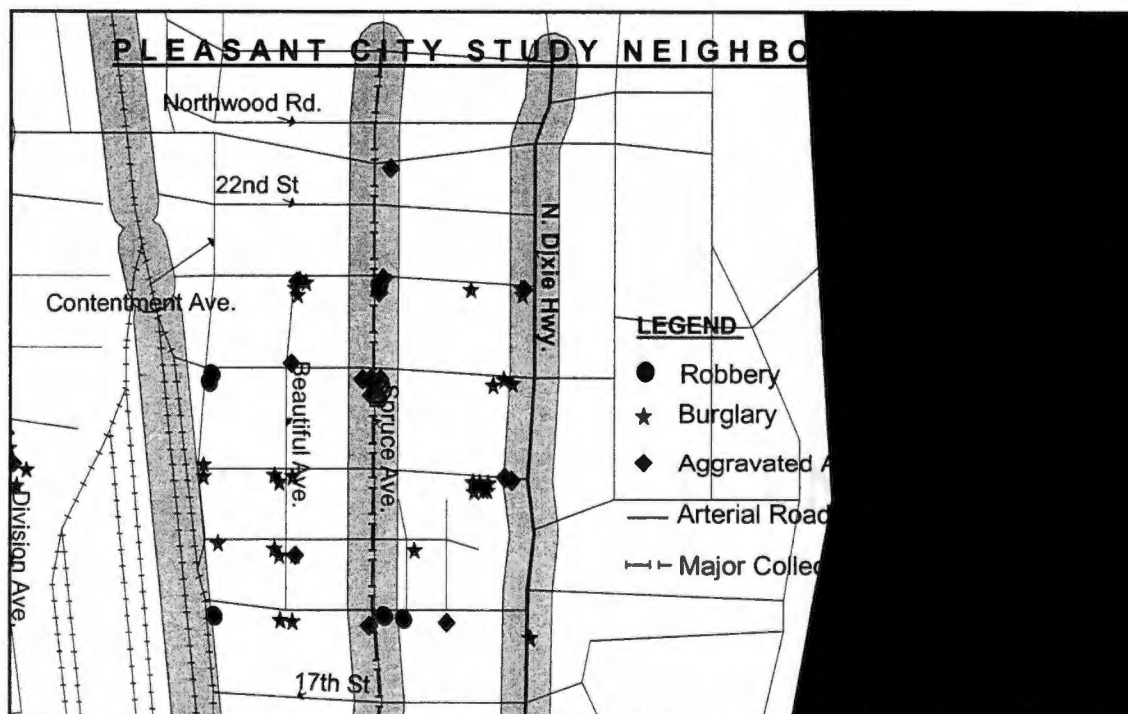


Figure 14. Crime Distribution within the Pleasant City Study Neighborhood Overlaid with 100 feet road buffers

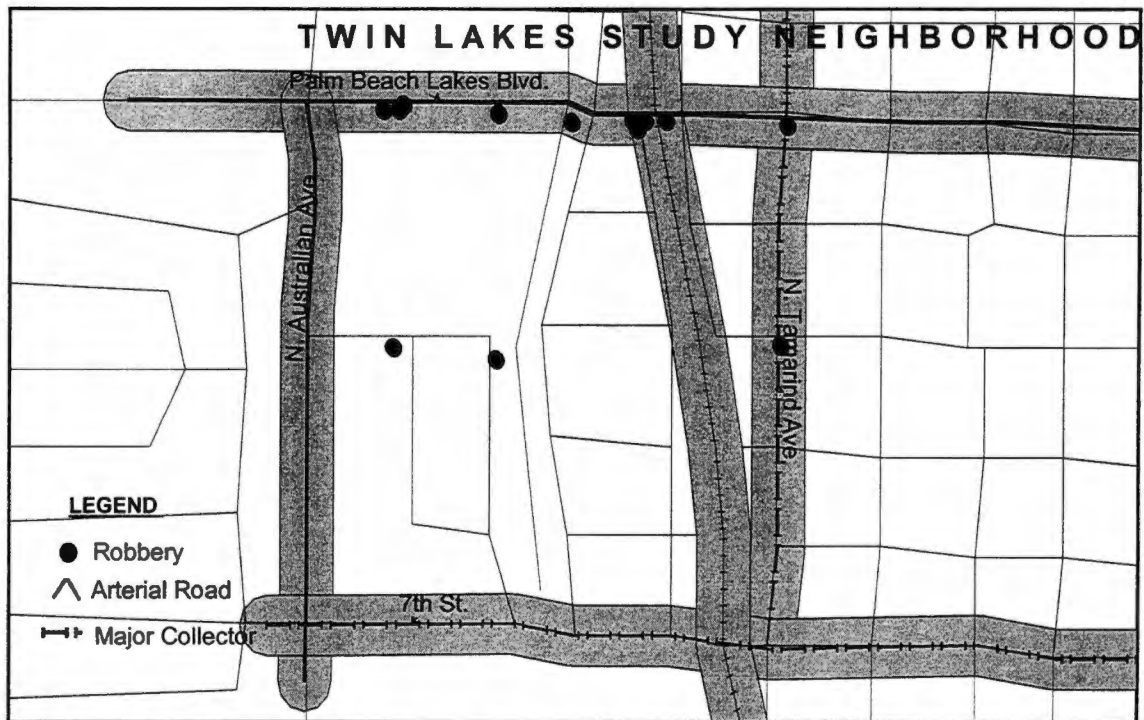


Figure 15. Robbery locations within the Twin Lakes Study Neighborhood Overlaid with 100 feet road buffers

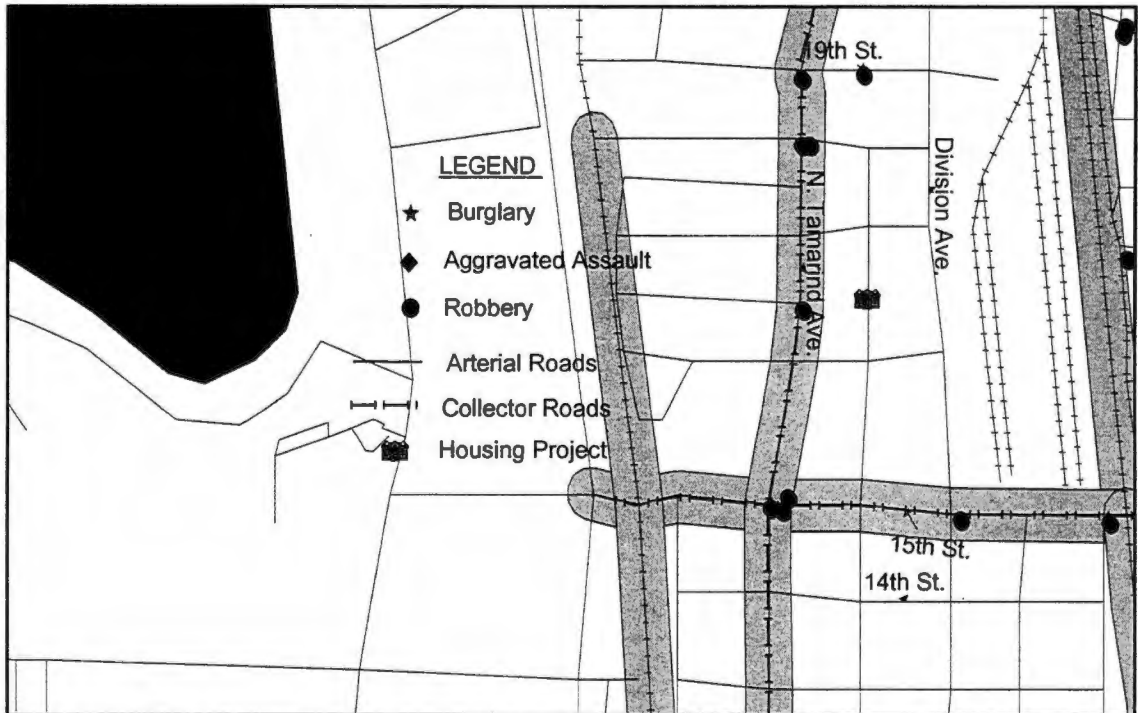


Figure 16. Robbery locations within the Dunbar Village Study Neighborhood Overlaid with 100 feet road buffers

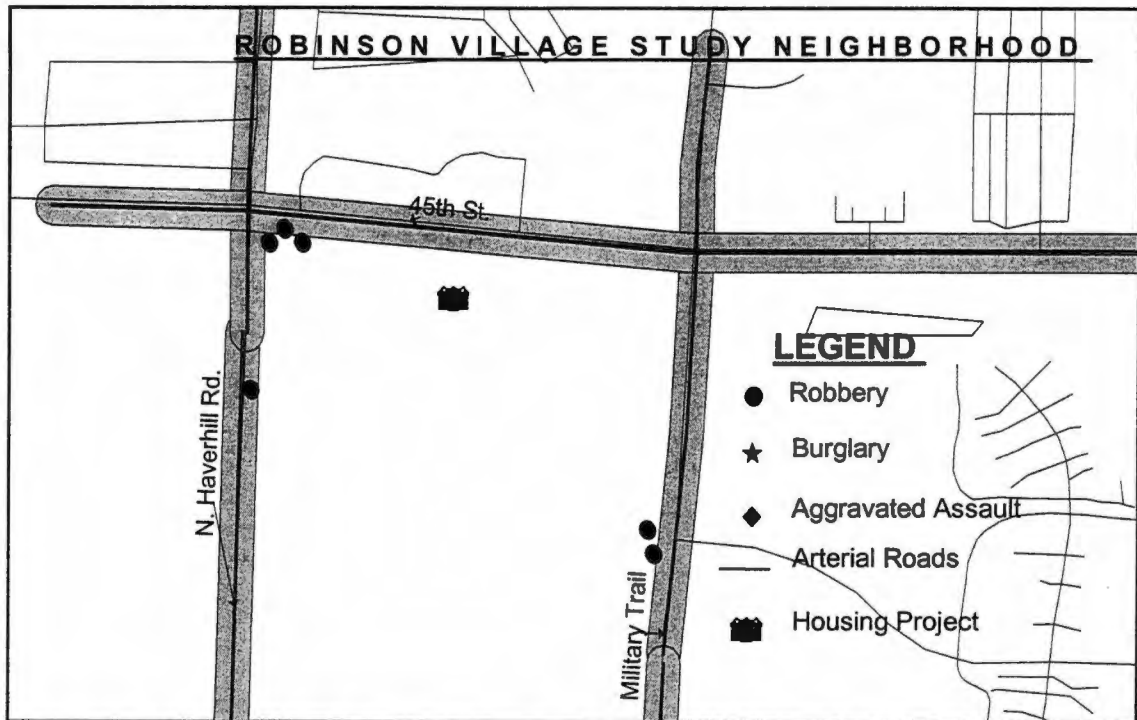


Figure 17. Robbery locations within the Robinson Village Neighborhood Overlaid with 100 feet road buffers

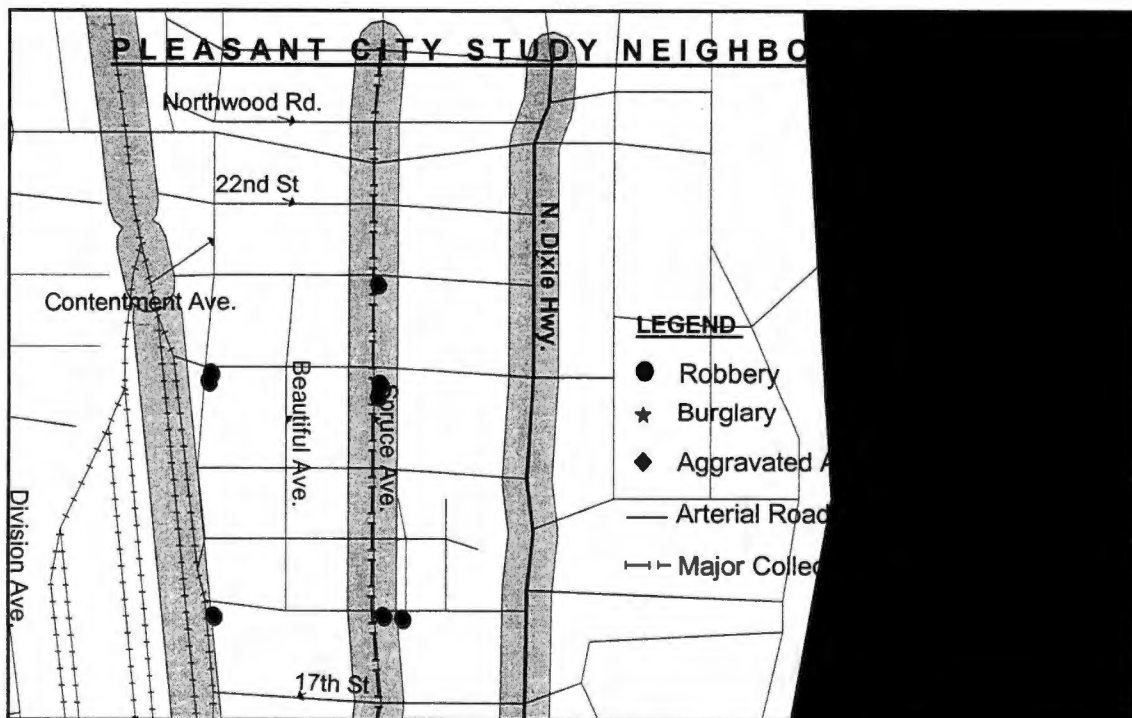


Figure 18. Robbery locations within the Pleasant City Study Neighborhood Overlaid with 100 feet road buffer

emerges, indicating that the presence of arterial and major collector roads definitely influences the location of robberies. Within the Twin Lakes Study neighborhood eighty five percent of robberies occurred within one hundred feet from a major collector or arterial. The local roads within the core of the neighborhood were almost robbery free. Robberies within one hundred feet of an arterial or major collector road, for the other study neighborhood, are distributed as follows: sixty-six percent in Pleasant City, ninety one percent in Dunbar Village and all within Robinson Village. Aggravated assault follows a similar pattern with victimization occurring close to collector or arterial roads. Although, local and arterial roads influence the location of crime the presence of a major roadway does not automatically generate crime. Segments of major roadways are crime free indicating that the spacial distribution of crime is only partly explained by roadway hierarchy.

The location of burglary is less dependant of the presence of arterial or collector roads than is robbery and aggravated assault. This seems logical since, generally, residential uses are burglarized to a greater degree than commercial uses and residential uses are mainly along local roads. In fact, residential uses along arterial roads experienced fewer burglaries. Increased surveillance for motorist may be a factor in deterring burglaries along arterial roads. However, Figure 19 indicates that the number of burglaries are not directly related to the number of motorists. The Pleasant City study neighborhood experienced thirty-nine burglaries during the study period, of which only fifteen percent occurred along arterial or collector roads. A similar pattern immersed within the Twin

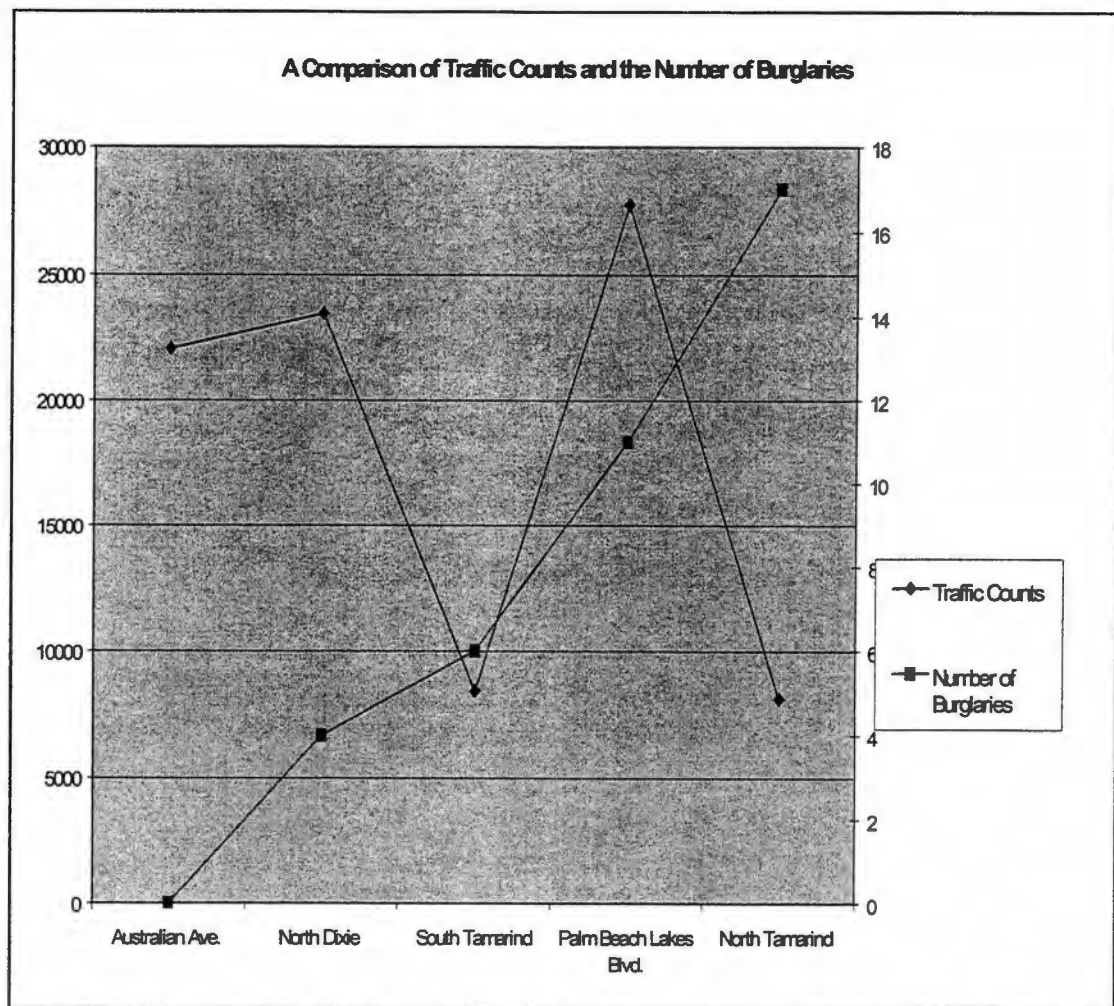


Figure 19. A Comparison of Traffic Counts And The Number of Burglaries illustrating that there is no correlation between traffic counts and the number of crimes committed

Lakes and Dunbar Village areas, however, at a lower ratio. These two areas experienced a higher proportion of commercial burglaries.

From the crime distribution maps, it is also evident that criminal activity is also concentrated around road intersections. In other words, corner lots have a higher incidence of crime than does non-corner lots. This is the case with both commercial and

residential crimes. The impact of intersections is reduced in neighborhoods with curvilinear streets, such as the western portion of Twin Lakes neighborhood and Robinson Village where the distribution of crime is randomly distributed. Within neighborhoods with a grid street pattern such as Pleasant City and Dunbar Village the effect is much more pronounced. The intersection impact is noticeable for the three crimes studied. Of the thirty-three residential burglaries committed in the Pleasant City neighborhood, fifty-five percent were concentrated around intersections. Eighty-three percent of the aggravated assaults in Dunbar village were centered around intersections. Intersections do not necessarily result in increased crime; nevertheless, it is a useful predictor of crime location.

The maps indicate that in all four-study neighborhoods the lower crime neighborhoods tend to have fewer arterial or streets. The presence of an arterial street is even more pronounced when it goes through the neighborhood rather than along its boundaries such as in the Pleasant City neighborhood. Thus, the evidence suggests that higher crime neighborhoods were more likely to have arterial roads through them or local roads that permits heavy cut through traffic, such as the Twin Lake Study neighborhood.

Crime seems to be concentrated around bus stops; nevertheless, it is inconclusive whether bus stops locations actually induce criminal activity. The bus stops within the study areas are all located at the intersection of, or along major commercial arterial. Thus, it is difficult to isolate the effect of bus stops on crime location. Commercial uses, arterial roads and intersections are all expected to influence crime location. From the crime,

location maps a similar pattern of concentrated criminal activity emerges around intersection with and without bus stops. While it is tempting to argue that bus stops are responsible for an increase in, and the concentration of crime within the study neighborhoods, the causal relationship between bus stop and crime location is unclear from the structure of this study. Although, it may be argued that bus stops provide a concentrated area of victims. The argument that bus stops influence crime location is only hypothetical at this stage. A study that is adequately structured to compare the difference in crime between bus stops in residential areas and those at commercial locations and stops along arterial versus local roads would be required.

Boundaries defined by railway lines and local streets are expected to inhibit crime more than a major thoroughfare. The evidence indicated that there is less crime along railway lines. The two railway lines through the study area provide few access points and in fact, create an impenetrable boundary, which prevents both victims and offenders from entering. The desolation of these areas may encourage other types of crime but because of the lack of victims and the limited access, there are few crimes against person. The railway line that divides Pleasant City from Dunbar Village experienced only four incidences of burglary and these burglaries occurred around the rail line intersection with a road. Within the Twin Lakes study neighborhood, only six incidences of crime occurred within one hundred feet of the railway line and these crimes may not have been influenced by the presence of the railway line. This research indicated that a railway line has no influence on the location of robbery, aggravated assault and burglary.

To assess the impact of access points on the distribution of crime, I compared Australian Avenue (Twin Lakes) to Spruce Avenue (Pleasant City). Both roads are of comparable length and both are lined with a mix of residential uses including public housing. The comparison shows, as expected, that an increase in access points results in an increase in crime. There are three access points to Australian Avenue and nine to Spruce Avenue. There were 3 incidences of crime along Australian Ave and 17 along Spruce Road. A similar comparison of the commercial areas along Northwood Road (Pleasant City) and Tamrind Avenue (Twin Lakes) produced similar results. These results also support the finding that intersections influence the location of crime.

Land Use

Figures 20 through 23 illustrate the relationship between commercial uses and the distribution of crime. The maps indicate that generally crime is concentrated along commercial nodes and corridors. However, one may argue that because commercial uses are along arterial and collector roads, have several access points and intersection, then the crimes associated with these areas may be independent of the land use. This research has produced varying results concerning the impact of commercial land uses, the research also indicates that the number of crimes committed is not proportional to the intensity of commercial use. It was interesting to find that both regional commercial (the most intense commercial uses) and neighborhood commercial (the least intense commercial uses) had minimal impact on the location of crime. Commercial areas that provide both regional and neighborhood service as found along Tamrind Avenue in

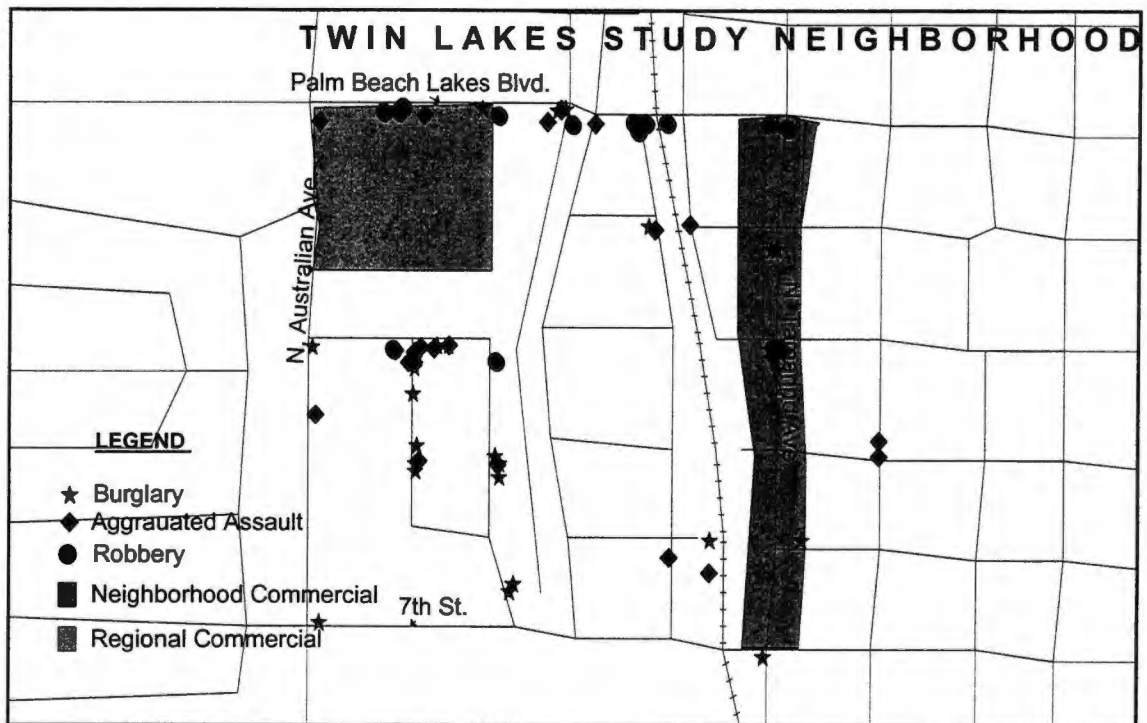


Figure 20 Crime Locations in Relationship to Commercial Uses within the Twin Lakes Study Neighborhood

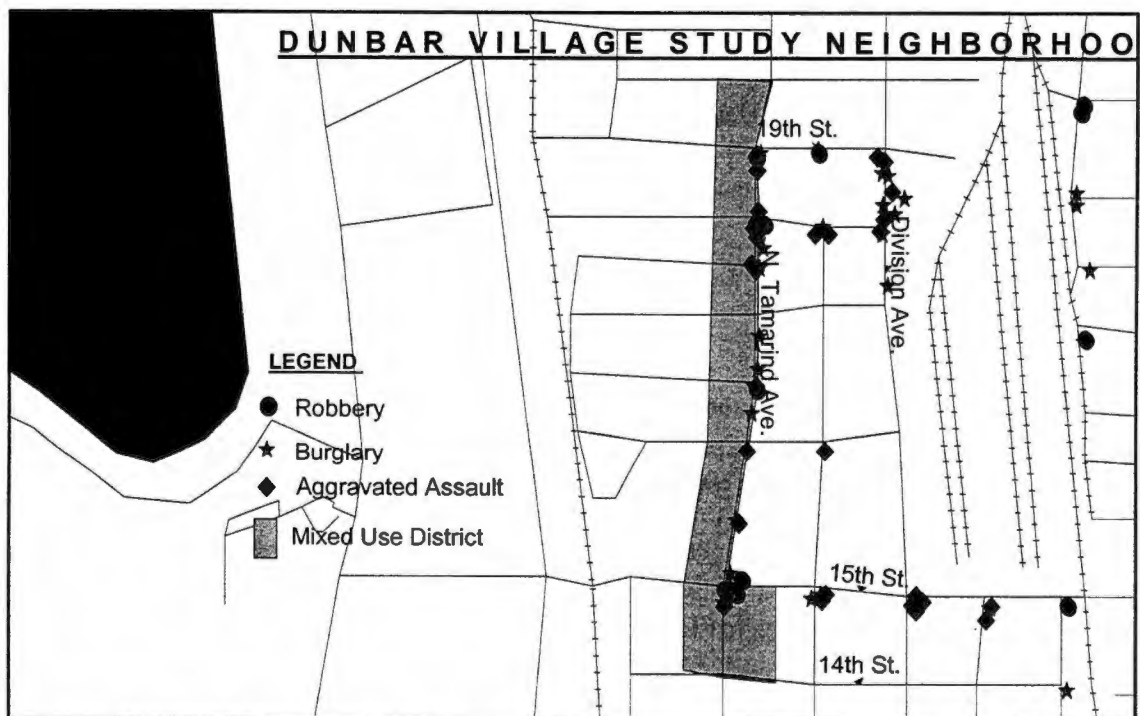


Figure 21 Crime Locations in Relationship to Commercial Uses within the Dunbar Village Study Neighborhood

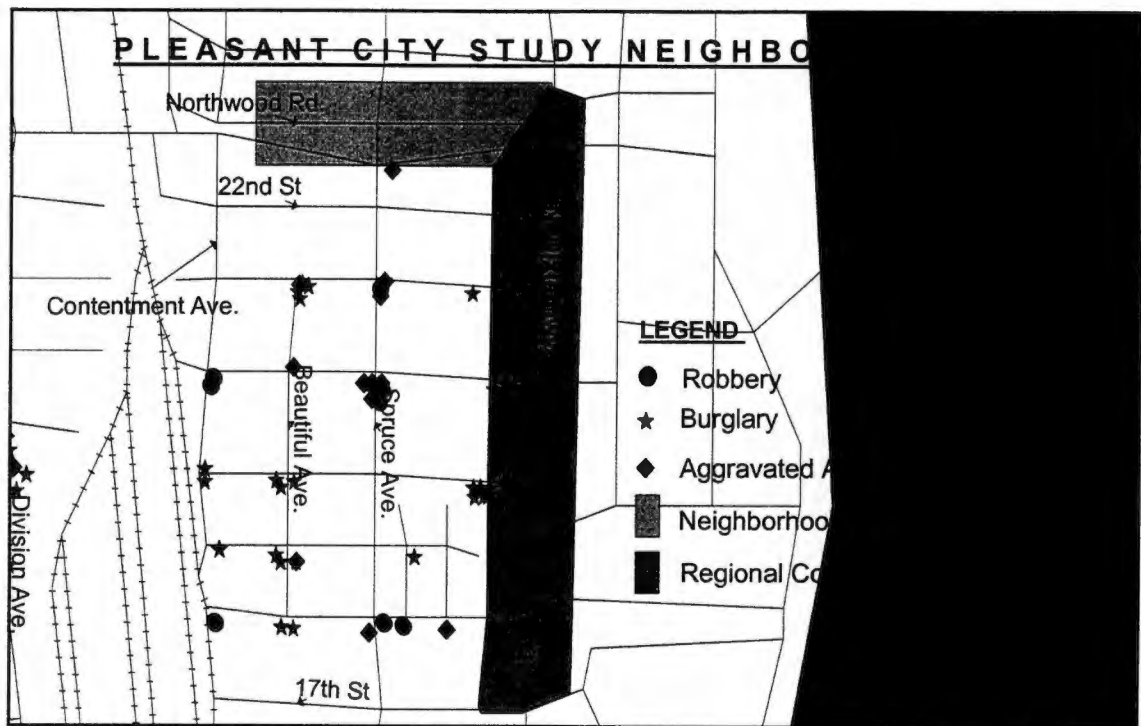


Figure 22 Crime Locations in Relationship to Commercial Uses within the Pleasant City Study Neighborhood

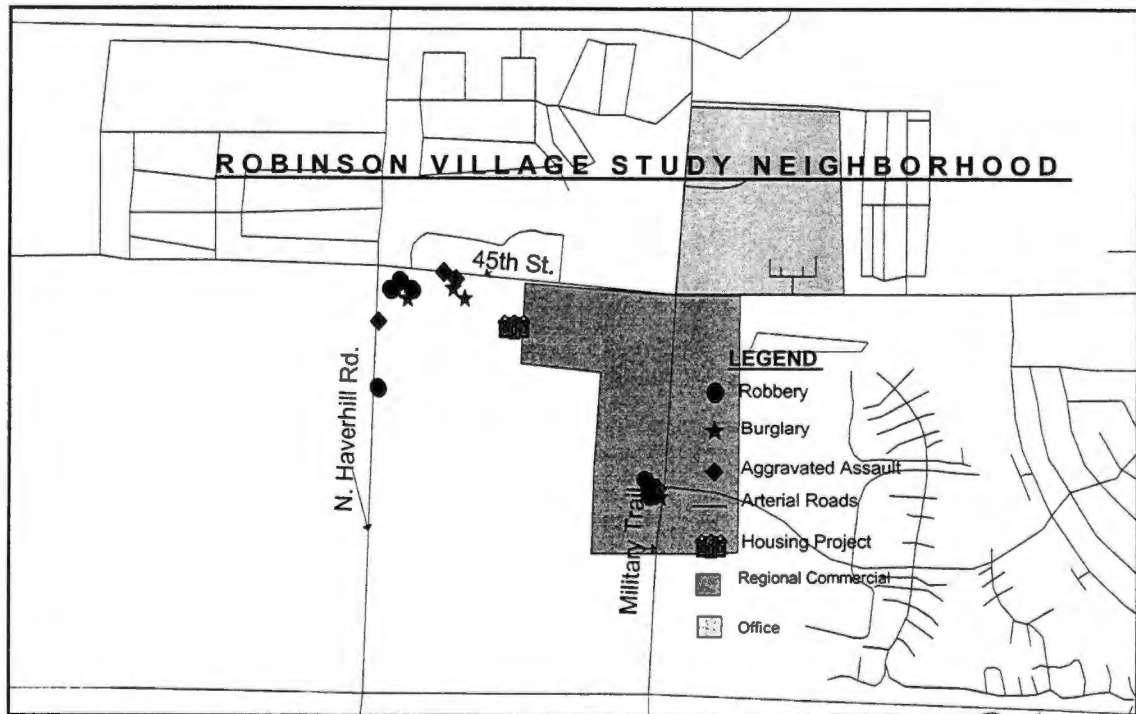


Figure 23 Crime Locations in Relationship to Commercial Uses within the Pleasant City Study Neighborhood

Dunbar Village significantly influenced the location of crime. The neighborhood commercial uses along Northwood Road and the regional commercial uses along Military Trail and US 1 were almost crime free.

The distribution of crime within Northwood Road commercial area was compared to that of the Tamrind Avenue area. Both areas have similar commercial uses, however, the Tamrind Avenue area experienced much more incidences of crime. The difference in traffic circulation rather than a difference in land use explain this result, Northwood Avenue is a local dead-end road and Tamrind Avenue is a major collector. This example illustrates that neighborhood commercial uses may be provided without inviting criminal activity. It also illustrates the fact that neither traffic circulation nor land uses are sufficient in determining crime location but the presence of both influences crime. Neighborhood commercial uses independently do not seem to influence crime however, when in conjunction with a major thoroughfare they do. The commercial strips along US 1 and along Tamrind Avenue (Dunbar Village) are similar in design. They are along major thoroughfares, lined with commercial uses, and both provide several access points to the neighborhood core. Nevertheless, the spacial distribution of crime is very different. The major different between these commercial areas is the type of commercial services provided and the areas social link to the neighborhoods. The US 1 corridor serves a regional market and is not considered a part of the community. Tamrind Avenue, however is the heart of the community where both residents and outsiders come to socialize. The openness of this area and the difficulty to differentiate between resident and stranger substantiates Oscar Newman's claims that in areas where territorial control

diminishes crime increases. The numerous bars and nightclubs of Dunbar Village commercial area provide ideal areas for offenders to lay wait for victims. Even though the Dunbar Village commercial businesses are hardened with burglar bars and shutters to a greater extent than those along US 1 they are victimized more frequently. This research has found that where arterial or major collector roads are present along with commercial land uses a stronger relationship between land use and crime location begins to appear.

This analysis discovered that there are indeed substantial differences between not only among the commercial areas within the inner city neighborhoods but also with the suburban Robinson Village study neighborhood as well. Retail and office areas of the Robinson Village study neighborhood had comparatively low incidences of crime compared to the inner city study areas, even though variables such as the number of intersections, access points, and thoroughfares that influence crime in the inner city areas were all present. This may be a result of the study design, which controlled for income only within the housing project instead of the entire study neighborhood. The commercial area of this study neighborhood targets a higher income bracket. As expected the significance of variables that influence criminal behavior in lower income areas diminishes in higher income areas. For example loitering on vacant lots is less tolerated in higher income areas because residents see their territorial rights extending beyond their property line to neighboring vacant parcels. The use of private security service also helps to retard criminal activity. Income is the most important control variable affecting crime; thus, it was important that study areas were closely matched in

terms of income. The above analysis of the Robinson village reveals that the study variables may only be influential in lower income neighborhoods.

Other non-residential land uses such as the school, the church and park did not have significant effect on crime location. It is expected that study neighborhoods with a higher percentage of non-residential land uses would experience a greater incidence of crime and that crime would be centered around non-residential uses. This expected pattern is not evident from the crime distribution maps.

Residential land uses does not significantly influence the location of crime. However, residential areas were affected mainly by burglary. The pattern of burglaries seems to be dictated primarily by street pattern and the distribution of vacant and abandoned properties. Of the thirty-three burglaries committed in the Pleasant City study neighborhood seventy two percent occurred on or adjacent to vacant properties. It is interesting to note that most of the vacant lots had no burglaries, in fact seventy percent of vacant lots experienced no burglaries. No clear pattern of which vacant lots were burglarized emerged.

It was expected that Pleasant Village study neighborhood would have a lower incidence of burglary and crime in general compared to the other inner city study neighborhoods, however this is not so. As the map shows, most of the burglary within this study neighborhood tends to occur at isolated settings with low levels of activity. Studies of residential crime have shown that corner homes are more susceptible to victimization,

simple because the intersection offers more escape routes for criminals. Conversely, homes on cul-de-sacs seem to score better in terms of safety. (Loukaitou-Sideris pg.395 1999) I agree that intersections do affect criminal behavior. However, the crime location maps of The Pleasant City neighborhood could not validate the difference between through streets and dead end streets. Properties along dead end streets seem to be victimized just as frequently as those on through streets.

From the analysis of the time of occurrence of crimes (Table3) within the Pleasant City Neighborhood, most burglaries occurred between 6a m. and 5p.m. It may be argued that this is the result of a segregated land use pattern, wherever stable, well-designed neighborhoods that are left untended during work hours will be burglarized. The pattern of a high occurrence of burglaries within residential areas during work hours held true in all the other study neighborhoods except for Robinson Village. Aggravated assault and robbery occurred mainly during off work hours and on weekends when the numbers of victim are greater.

The pattern of residential burglaries somewhat reinforces Jacob's theory that the segregation of land uses increases the opportunity for crime. The research also finds that mixed uses, such as those along Tamrind Avenue in both the Twin Lakes and Dunbar Study Neighborhood are also generators of crime. Thus, mixed land uses in and of itself is not a deterrent of crime. The mixed land uses of Dunbar Village only deters residential burglaries. Burglary is more prevalent in single use districts while aggravated assaults and robbery, which has similar distribution patterns, has greater impact within mixed-use areas.

Table 3. An Analysis of Crime Within The Pleasant City Study Neighborhood By Time of Occurrence

TIME OF DAY	CRIME OCCURRENCE			
	Robbery	Burglary	Aggravated Assault	Total
12:00 a.m.-6.00 a.m.	2	5	11	18
6:00a.m.-5:00 p.m.	1	23	16	40
5:00p.m. -12:00a.m.	6	11	18	35

The following is a analysis of crime location within the Twin lakes study neighborhood as it relates to density. The other study areas were excluded because of their uniformity in density or because of scattered multi-family units, which makes it possible to define an area at set density. A more generalized analysis of crime location based on the mean density of all study neighborhoods follows.

While it is tempting to argue that an increase in density influences criminal behavior, as previous research has shown, that relationship could not be substantiated by this research. Within the Twin Lakes study neighborhood there are three housing types of different densities: multifamily at approximately 9 units per acre, public housing duplex at 4.4 units per acre and single family detached at 6.4 units per gross acre. The single family and apartment complex experienced few crimes, mainly burglary. The Duplex operated by the West Palm Beach Housing Authority accounted for seventy five percent of the

residential burglaries. Thirty-one of the thirty-nine incidences of aggravated assault occurred within the housing project. The duplex, which is developed at the lowest density within the Twin Lakes Study Neighborhood, experienced more crime than the other residential areas.

It would not be appropriate to draw broad, general conclusions as to the impact of density on the location of crime since it was impossible to separate the effect of the two variables, public housing and density. Even a comparison of crime within housing projects at different densities is not possible with this study. The Dunbar Village housing project is developed at a high density but has few incidences of crime probably because the fence that surrounds it has pushed crime to the adjacent streets. Thus, an analysis of density using Dunbar Village would be flawed. Likewise, Pleasant City scattered multifamily units prevents this type of analysis. A more formal statistical analysis is needed not only to verify the presumed causal connection between density and criminal behavior

Further Research

To further guide development and design within lower income neighborhoods several other research areas should be pursued. A much more rigorous evaluation of the specific land uses, drug stores, convenience stores, bus stops, and nightclubs, is needed. These land uses are perceived to be generators of crime, without the benefit of empirical research. Also needed is a longitudinal study of the reaction of criminals to changes in the environment. For instance, a road closing, the addition of traffic calming features, or

the development of commercial or multifamily uses in a single-family neighborhood. It would be interesting to research the impact of the Dunbar Village fence; did it reduce crime or simply shift it to the adjacent streets. The problem with a longitudinal study is controlling for changes in the economy. Significant reductions in crime occurred in all study neighborhoods between 1998 to 1999, without changes in the design and land use of the neighborhoods.

Defensible Space and CPTED theories are based on the concept that certain environmental conditions increase the probability of crime. Conversely, well-designed neighborhoods can prevent and reduce crime. It is inconclusive from this research if crime was reduced. The research showed that crime is less prevalent under certain circumstances. However, because ideal conditions for crime exist within close proximity to each study neighborhood, criminal activity was probably not reduced but shifted. Further research is also needed to see if environmental variables actually reduce the crime rate and not just displace crime. Does it reduce the opportunity of crime in a given neighborhood?

Conclusion

The findings of this research have important implications for the field of planning, architecture, and criminology. Environmental factors do have an impact on criminal behavior. This impact is significant enough to make a difference in the livability of neighborhoods and thus, should warrant the attention of planners. It is possible for

planning, design and the use of technology to decrease the probability of crime occurrence. The study hypothesis that **crime patterns are not uniformly distributed, and that certain areas because of the land uses and development patterns will have a higher probability of having an occurrence of crime** is supported by this research. However, Neither Jane Jacobs theory that crime decreases with increases in density nor Newman's theory that crime increases with increased density were not supported by this research. The research found that density has on significance on crime location. I suspect that there is a minimal threshold before density becomes a contributing factor and none of the residential uses in the study area met that threshold.

The study also refutes the very broad claim of Jane Jacobs that mixed-uses will result in decreased crime and her attack on homogenous land uses. Instead I found that mixed-uses only deterred residential burglaries but experienced increases in other crimes. The analysis of mixed-use areas substantiates Angel's hypothesis that both homogeneous land uses and mixed uses (only those mixed uses generating a critical level of activity) influences crime location.

Several other variables, such as bus stops, parks, schools and railway lines, and the intensity of non residential uses, believed to be positively correlated with crime could not be substantiated. This research has indicated that different variables have varying significance under different circumstances, and planners should keep this in mind when making land use decisions.

The research also found substantial differences in the number of crime occurrences between the similar uses when located in a suburban setting versus the inner city. The Main difference between the Robinson village study neighborhood (located in the suburbs) and those of the inner city is income. The variables that were effective in determining crime location in the inner city had no effect in the suburban areas.

An important message from this research is that criminal behavior is extremely complex and is affected by several different variables not discussed in this research. It would be misleading to say that a particular variable leads to an increase in crime or attracts crime because the variables are all so interrelated. It has been shown throughout this research that whenever independent variables have been isolated, their impact on crime has been negligible. For instance, commercial uses may be provided with convenient connections to residential areas without affecting the safety of residents, as is the case in the Pleasant City neighborhood. However, a commercial area when coupled with a major roadway attracts criminal activity.

The independent variables that positively correlate to crime location are summarized in the Table 4 below along with possible mitigation strategies.

The interdependency of variables affecting crime makes possible solutions easier. Mitigating the impact of one variable may dramatically alter criminal behavior. By

Table 4. A Summary of Variables Having a Positive Effect on Crime Location

Variable	Impact On Crime	Mitigation Strategies
Road Hierarchy	Aggravated assaults and robberies are concentrated along major arterial and collector roads. However, burglaries are deterred.	• Traffic calming techniques such as a chocker. • One-way streets. • Stop signs. • Reconfiguration of roadways.
Access Points and Intersections	Aggravated assaults, robberies and burglaries are concentrated at access points and intersections	• Increased lighting. • Fenestration requirements for non residential uses of at least 50% of façade • Landscaping requirements to increase surveillance • Extend formal territorial space of property owners. • Neighborhood entry signs.
Vacant Lots and Abandoned buildings	All crimes are affected, residential burglaries more so than the other crimes.	• Create an infill and redevelopment plan • Landscaping requirements to increase surveillance • Land acquisition program • Regular garbage and trash pick up programs.
Commercial Uses	All crimes are affected. Commercial areas and uses however, have to be combined with other variables to affect criminal behavior.	• Allow commercial development in small nodes • Permit only neighborhood serving commercial uses. • Increased lighting. • Mixed uses areas only along major arterials and these areas should allow a mix of uses that generates constant activity • Fenestration requirements of at least 50% of façade

altering the street configuration with traffic calming techniques, commercial areas such as the Dunbar Village neighborhood may become less crime prone.

Urban planners need to rethink approaches to planning and design of low-income and public housing areas. Firstly, they should work on two scales: the community and the neighborhood. Comprehensive planning is not sufficient to address problems at the micro level. Area or Neighborhood Plans should provide a close examination of community and neighborhood issues. Community and Area plans should address environmental variables and how they may possibly affect crime. Residents' involvement is critical since they have a good understanding of the nature of crime within their community and they may help to explain the factors for crime locations. GIS mapping of crime locations is another important community planning tool to be used in understanding the spacial relationship of crime. Planners should be aware of the possible effects when several of the study variables coexist and try to mitigate the impact of these variables and use GIS mapping of crime locations to evaluate their efforts.

Some variables that deter criminal activity may conflict with other planning objectives. A major caveat, however, has to be made regarding the use of these findings, that is: Safety is only one of the many variables that planners must be concerned about. This information should be used to understand the possible effect land use and design may have on the location of crime. This information should not be used to discourage land use patterns that have positive impacts on other planning goals.

One factor that leads to crime is the state of the person's economy. The data shows drastic changes in the number of crimes between 1998 and 1999, most likely due to improvements in the economy. Nevertheless, for whatever reason a crime is committed the offender assesses the risk of being caught (some offenders can tolerate a higher level of risk) and the risk of the location. Thus proper planning and design may create more viable areas that are not predator oriented. Some may argue that the criminal simply moves on to another area, however, in doing so the probability of being caught increases, which in turn leads to a decrease in crime. Planners may use urban design and the placement of public housing projects to help deter crime

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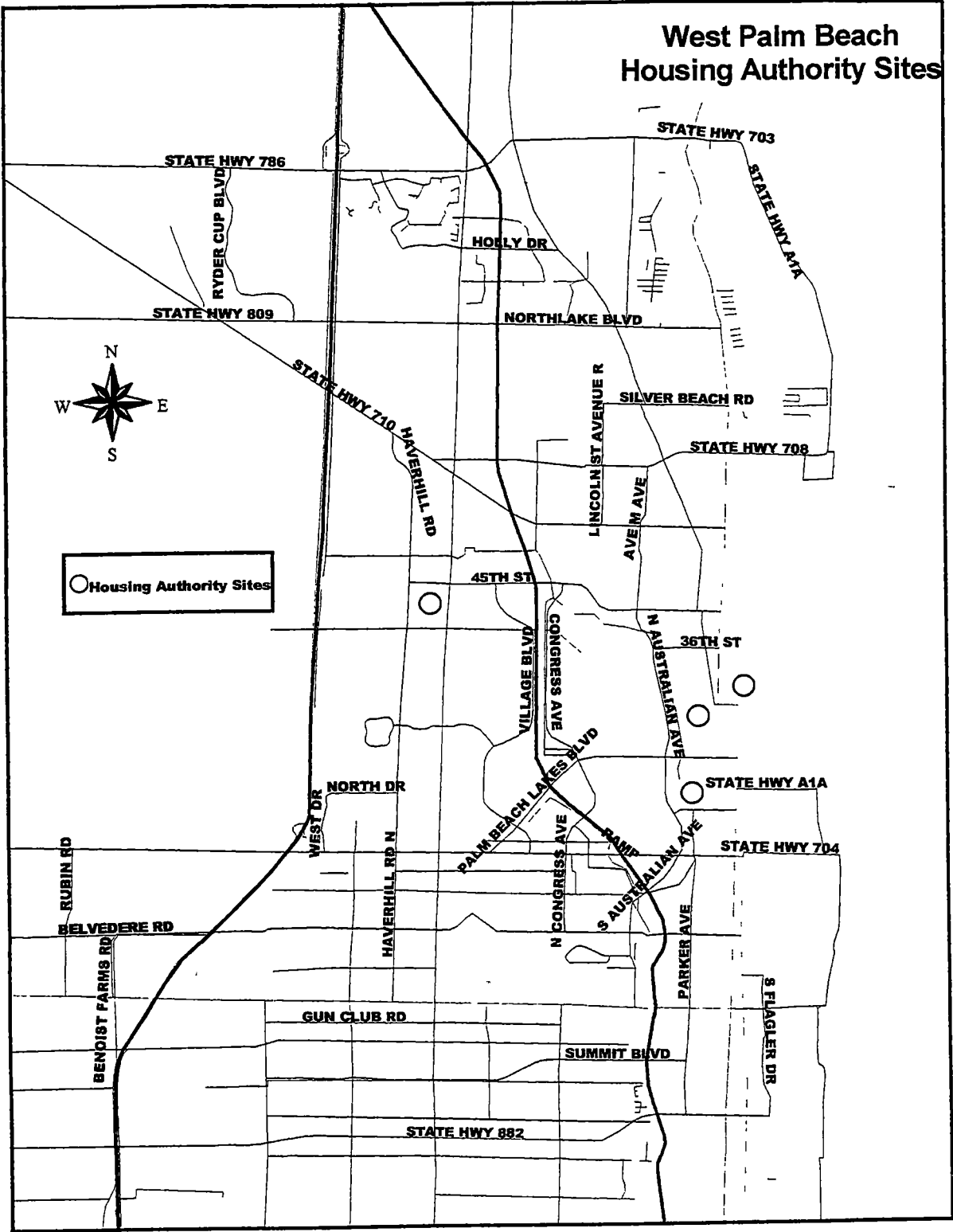
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APPENDICES

APPENDIX A

Location Map of West Palm Beach Housing Projects

West Palm Beach Housing Authority Sites



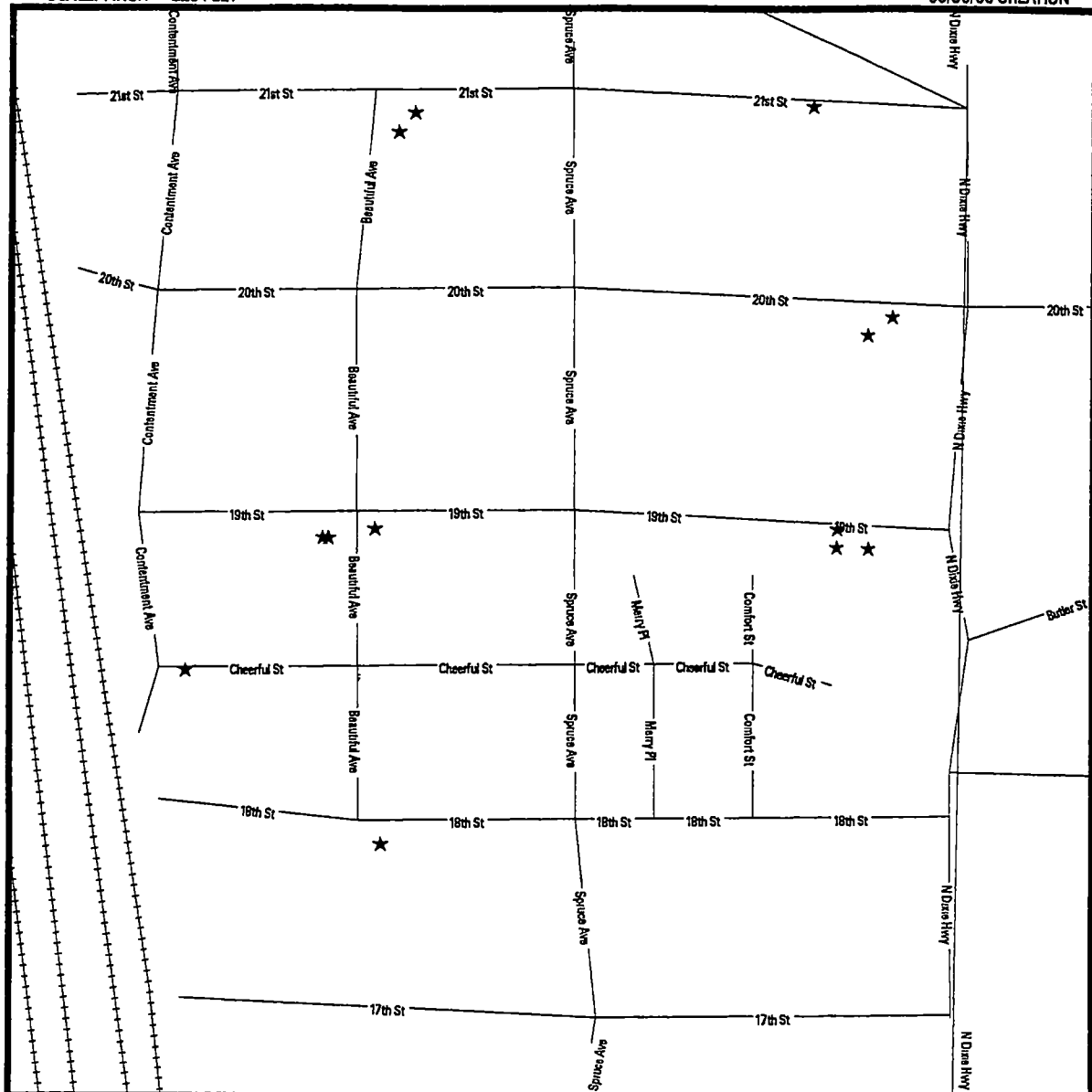
APPENDIX B

Sample West Palm Beach Police Department Data

1998-BURGLARY-17TH ST/21ST ST AND N DIXIE/CONTENTMENT (A E ISAACS)

SCALE: 1 INCH = 223 FEET

05/30/00 CREATION



LEGEND.		WATER AREAS			
	ROADS		INDUSTRIAL		murder
	STREAMS / SHORELINE		MARSH		neg/mansl
	RAILROAD		INTERMITTANT LAKES		rape
	AIRPORTS		STREAM / LAKE OCEAN		sodomy
					fondling
					robbery
					burglary
					assault/agg
					stalking/agg
					assault/sim
					stalking/sim
					threat
					theft from motor vehicle
					pocket pick
					purse snatch
					shoplifting
					theft from building or machine
					all other larc
					vehicle theft
					drugs/narc
					drugs/equip
					prostitution
					weapons
					other
					blank ucr code

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THE USER IS WARNED TO UTILIZE AT OWN RISK AND THE USER ASSUMES RISK OF ANY AND ALL LOSS

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WEST PALM BEACH POLICE DAPARTMENT

SUMMARY REPORT FOR: ALL_1998

1998-BURGLARY-17TH ST/21ST ST AND N DIXIE/CONTENTMENT (A E ISAACS)

FOR INCIDENTS REPORTED WITHIN:

---DATE RANGE: 1998-01-04 thru 1998-11-03

---TIME RANGE: 01:27:16 thru 20:13:58

FOR INCIDENTS WHICH OCCURRED WITHIN:

---DATE RANGE: 1998-01-02 thru 1998-11-03

---TIME RANGE: 01:27:00 thru 18:00:00

The total number of selected incidents = 16

=====

SUMMARY BY RESIDENTIAL/NON-RESIDENTIAL:

Blank = 0
Residential = 16
Nonresidential = 0

SUMMARY BY UCR OFFENSE TYPE:

16 2200 BURGLARY

SUMMARY BY DISPATCH CODE:

12 S21R
1 S21RAT
1 S21RJO
2 S30

SUMMARY BY TIME OF DAY OCCURRED:

0 between 00:00:00 and 01:00:00
1 between 01:00:00 and 02:00:00
0 between 02:00:00 and 03:00:00
0 between 03:00:00 and 04:00:00
1 between 04:00:00 and 05:00:00
0 between 05:00:00 and 06:00:00
0 between 06:00:00 and 07:00:00
1 between 07:00:00 and 08:00:00
1 between 08:00:00 and 09:00:00
3 between 09:00:00 and 10:00:00
0 between 10:00:00 and 11:00:00
0 between 11:00:00 and 12:00:00
3 between 12:00:00 and 13:00:00
0 between 13:00:00 and 14:00:00
0 between 14:00:00 and 15:00:00
1 between 15:00:00 and 16:00:00
2 between 16:00:00 and 17:00:00
2 between 17:00:00 and 18:00:00
1 between 18:00:00 and 19:00:00
0 between 19:00:00 and 20:00:00
0 between 20:00:00 and 21:00:00
0 between 21:00:00 and 22:00:00
0 between 22:00:00 and 23:00:00
0 between 23:00:00 and 24:00:00

ADULT / JUVENILE SUMMARY:

16 Blank

=====

WEST PALM BEACH POLICE DAPARTMENT

ITEMIZED LIST OF INCIDENTS SELECTED FROM ALL_1998

1998-BURGLARY-17TH ST/21ST ST AND N DIXIE/CONTENTMENT (A E ISAACS)

FOR INCIDENTS REPORTED WITHIN:

---DATE RANGE: 1998-01-04 thru 1998-11-03

---TIME RANGE: 01:27:16 thru 20:13:58

FOR INCIDENTS WHICH OCCURRED WITHIN:

---DATE RANGE: 1998-01-02 thru 1998-11-03

---TIME RANGE: 01:27:00 thru 18:00:00

The Total Number of selected incidents = 16

=====

\$RECNO	UCR	ADDRESS		INC NBR	DATETIME_OCC
1	2200	550 18TH	ST	199800015518	1998-02-26 07:25:00
2	2200	550 18TH	ST	199800080819	1998-10-22 08:45:00
3	2200	428 19TH	ST	199800011438	1998-02-11 16:30:00
4	2200	436 19TH	ST	199800084443	1998-11-03 09:45:00
5	2200	437 19TH	ST	199800080539	1998-10-21 09:45:00
6	2200	544 19TH	ST	199800067402	1998-09-03 09:00:00
7	2200	546 19TH	ST	199800015007	1998-02-24 16:30:00
8	2200	425 20TH	ST	199800006324	1998-01-22 17:50:00
9	2200	425 20TH	ST	199800010447	1998-02-07 18:00:00
10	2200	430 20TH	ST	199800000910	1998-01-02 15:30:00
11	2200	445 21ST	ST	199800064649	1998-08-22 12:00:00
12	2200	545 21ST	ST	199800005711	1998-01-22 01:27:00
13	2200	550 21ST	ST	199800073590	1998-09-26 04:15:00
14	2200	1926 A E ISAACS	AV	199800005010	1998-01-18 17:30:00
15	2200	1926 A E ISAACS	AV	199800016180	1998-02-27 12:30:00
16	2200	2001 BEAUTIFUL	AV	199800015600	1998-02-26 12:00:00

----End of File created 30 May 00 12:29:09 Tuesday----

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RDOW = WEEKDAY INCIDENT REPORTED

ADOW = WEEKDAY ARREST OCCURRED

ODOW = WEEKDAY INCIDENT OCCURRED

SUMMARY BY DAY OF THE WEEK REPORTED:

2	MON
3	SAT
2	SUN
6	THU
2	TUE
1	WED

SUMMARY BY DAY OF THE WEEK OCCURRED:

2	FRI
3	SAT
1	SUN
6	THU
2	TUE
2	WED

---End of File created 30 May 00 12:29:53 Tuesday---

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VITA

Stanley C. Williams was born in Grange Hill, Jamaica, West Indies on May 25, 1961. He attended private boarding school in the Parish of Manchester where he graduated from Knox College (High School) in June 1978. He entered Miami Dade Community College, Miami, Florida, during January 1980 where in July 1984 he received an Associated of Arts in Aviation Administration. He entered Florida International University, Miami, Florida and received the Bachelor of Arts in Public Administration in 1993. In August of 1994, he attended the University of Tennessee, Knoxville to pursue the Masters of Science in Planning, officially graduating in August 2000. He is currently working as a planner in Beaufort County South Carolina.