

To the Graduate Council:

I am submitting herewith a thesis written by Wendy H. C. Lin entitled "The Function of Pedestrian-Oriented Open Space in Knoxville's Central Business District." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Ornamental Horticulture and Landscape Design.

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THE FUNCTION OF PEDESTRIAN-ORIENTED OPEN SPACE IN
KNOXVILLE'S CENTRAL BUSINESS DISTRICT

A Thesis

Presented for the

Master of Science

Degree

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ABSTRACT

Man is constantly affected by his physical environment. Providing pleasant physical elements in open spaces--such as parks, squares, plazas, small green spaces, and sidewalks--helps to produce a better environment in densely developed urban areas.

The purpose of this study is to find how the existing open spaces in Knoxville's central business district function by surveying their characteristics of continuity, direction, orientation, center, linkage, enclosure, interruption, circulation, and sequence. A checklist was made to make sure that each site was inspected under the same terms.

The data which was obtained by observing the physical items under each characteristic is shown in figures and tables, which indicate the overall condition of a certain survey item. The analysis of the data indicate the strengths and weaknesses of each open space. The result--a description of the character of the whole system of pedestrian open spaces--showed that many marginally functional open spaces break the continuity of open spaces which function well and complement Knoxville's central business district. These findings indicate which places need to be improved the most.

Open spaces on Hill Avenue, Main Avenue, Summit Hill Drive, Wall Avenue, Market Square, and Market Street were found to have a relatively pleasant pedestrian environment.

TABLE OF CONTENTS

CHAPTER	PAGE
I. INTRODUCTION.	1
Statement of the Problem.	3
Purpose of the Study.	3
Limitations of the Study.	4
II. REVIEW OF LITERATURE.	6
Concept Change of the Function and Character of the Pedestrian Open Space in the Downtown Areas of the United States	6
Function of Open Space.	6
The Origin of Urban Open Space.	7
Walkways.	11
Small Spaces.	12
Street-Scale Open Space	13
Pedestrianism	14
Trend Toward Urban Open Space	15
Development of the Pedestrian Open Space in Knoxville's Downtown.	16
III. METHODS AND PROCEDURES.	30
Delineation of the Survey Area.	30
Development of the Characteristic and Checklist	31
The Characteristics	31
Continuity.	33
Direction	35
Orientation	36
Center.	38
Linkage	39
Enclosure	41
Interruption.	43
Circulation	45
Sequence.	46
Summary	47
The Checklist	48
Collection of the Data.	50
IV. DATA ANALYSIS	53
Explanation of the Data	53
Sidewalk Width.	53
Planting.	84

CHAPTER

PAGE

IV. (Continued)

Facades	84
Sound appearance.	84
Mediocre appearance	84
Unsound appearance.	84
Street Names.	85
Sidewalk Pavement	85
Topographic Changes	85
Land Use Intensity.	85
Orientation	86
Center.	86
Linkage	87
Enclosure	87
Human scaled spatial enclosure.	87
Slightly greater than human scaled spatial enclosure.	87
Non-human scaled spatial enclosure.	88
Interruption.	88
Circulation	88
Analysis of the Individual Open Space	89
Hill Avenue--Section N.	89
Hill Avenue--Section S.	90
Main Avenue--Section N.	91
Main Avenue--Section S.	92
Cumberland Avenue--Section N.	93
Cumberland Avenue--Section S.	94
Church Avenue--Section N.	95
Church Avenue--Section S.	95
Clinch Avenue--Section N.	96
Clinch Avenue--Section S.	97
Union Avenue--Section N.	98
Union Avenue--Section S.	99
Summer Place.	100
Wall Avenue	101
Summit Hill Drive--Section N.	102
Summit Hill Drive--Section S.	103
Hickey Place.	104
Vine Avenue--Section N.	105
Vine Avenue--Section S.	106
Henley Street--Section W.	106
Henley Street--Section E.	107
Locust Street--Section W.	108
Locust Street--Section E.	109
Walnut Street--Section W.	110
Walnut Street--Section E.	111
TVA Complex Plaza	112
Market Square	113
Market Square--Section W.	113
Market Square--Section E.	114
Gay Street--Section W.	115
Gay Street--Section E.	116

CHAPTER	PAGE
IV. (Continued)	
State Street--Section W	117
State Street--Section E	118
United American Plaza	119
City-County Building Plaza.	120
Alleys.	121
Summary	122
Continuity.	122
Direction	123
Orientation	123
Center.	123
Linkage	123
Enclosure	124
Interruption.	124
Circulation	125
Sequence.	125
V. CONCLUSIONS AND SUGGESTIONS	134
BIBLIOGRAPHY.	138
APPENDICES.	143
APPENDIX A. SITE FUNCTION CHECKLIST.	144
APPENDIX B. DISTRIBUTION OF MAJOR FLOOR USES	147
VITA.	153

LIST OF FIGURES

FIGURE	PAGE
1. The Examples of the Early American Cities Which Have Open Space Development	10
2. Knoxville in the Earliest Time	18
3. Knoxville in 1863.	19
4. John Lee Playground--An Open Space in Knoxville's Central Business District.	20
5. The Promenade.	22
6. The Boundary of the Survey Area.	32
7. Data Coding.	51
8. Distribution of Planting	54
9. Condition of Facades	55
10. Absence of Street Name	56
11. Broken Sites of Sidewalk Pavement.	57
12. Land Use	58
13. Distribution of Parking Lot.	59
14. Elements of Orientation.	60
15. Places Having the Function of Center	61
16. Linkage.	62
17. Elements of Enclosure.	63
18. Bird's Eye View of Enclosed Open Space	64
19. Different Ratios of Enclosure.	65
20. Three Scales of Spatial Enclosure.	66
21. Elements of Interruption	67
22. Circulation.	68

FIGURE

PAGE

23. Skyway of City-County Building	69
24. Display Windows of Miller's.	69
25. Mural on Church Avenue	70
26. Narrowed Sidewalk on Clinch Avenue	70
27. Damaged Sidewalk Pavement on Union Avenue.	71
28. Directional Qualities of Planting on Summit Hill Drive	71
29. Small Resting Area on Summit Hill Drive.	72
30. Impassable Sidewalk on Hickey Place.	72
31. Resting Area of Miller's	73
32. Elevated Open Space of TVA Complex	73
33. Enclosed Market Square	74
34. Small Resting Area on Market Street.	74
35. Unused Area.	75
36. United American Plaza.	76
37. City-County Building Plaza	77
38. Alleys and Unpleasant Back Walls	78
39. Sequence	133
B-1. Commercial Use	147
B-2. Financial Use.	148
B-3. Institutional Use.	149
B-4. Office Use	150
B-5. Warehouse and Culture and Entertainment Uses	151
B-6. Vacant Structure and Apartment and Lodging Uses.	152

CHAPTER I

INTRODUCTION

Man, like all other creatures, is one element of nature. Man's life cycle is closely related to nature. Jackson pointed out that the man-nature relationship indicates that man is constantly affected by his physical environment (Zube, 1970, p. 78). His needs for health, for pleasant physical surroundings, and for emotional well-being are expressed by his craving for contact with a variety of forms, spaces, colors, lights, and sounds. In suburban or rural areas, these needs will easily be satisfied because of the natural surroundings in the vicinity. In densely developed urban areas, the satisfaction of these needs is sometimes limited because of the lack of change in the monotonous and dull urban scenes. In urban areas, man-made green spaces and open fields act like the "lungs of the city" (Zube, 1970, p. 82). These open spaces not only provide sunlight and fresh air but also help improve the living surroundings and give urban people more pleasant sensory experiences of nature.

Most of the central business districts of American cities have been experiencing some degree of economic deterioration. Rapid suburban development has made people pay less attention to their city environments. However, central business districts still serve as the center of government, institutions, retail businesses, and finance. In order to revitalize the central business district, various downtown renewal projects have been implemented or planned. Each city tries -

to find the solutions to the problems of its own downtown redevelopment. In some cities, the development of residential areas near central business districts is considered a way to stimulate and increase the number of business establishments and the property values in these districts. Thus, more people will use the central business districts. Louis Redstone said that city residents are the supporters of downtown activities (Redstone, 1976, p. xv). He also pointed out that some cities try to combine housing, working, shopping, and recreation areas to make the city a location for most activities (Redstone, 1976, p. xvii).

In order to attract more people to use central business districts, building pleasant and easily recognizable downtown surroundings for pedestrians becomes an important issue in urban planning. Among the different elements of central business district redevelopment, the establishment of parks and squares is a very popular item, and the development of an entire open space system for pedestrians is also an important subject. How to utilize the limited open spaces in the central business district and make them functional for pedestrian use is a problem seriously considered by planners.

Generally, pedestrian-oriented open spaces are the different forms of urban open spaces which function to (1) provide walkways, (2) provide opportunities for active and passive recreation, (3) provide space for cultural activities, (4) increase the pedestrian's ability to orient himself, (5) highlight buildings, (6) add beauty, (7) provide pleasant working and walking surroundings, and (8) provide intense use of land to attract business investments. The pedestrian open space in

this study includes sidewalks, parks, plazas, squares, alleys, pedestrian malls, and pedestrian streets.

I. STATEMENT OF THE PROBLEM

Open space development was not considered as important an individual issue as the other improvement projects in Knoxville's downtown planning; it was just a subordinate concern because of the lack of public awareness and support (Ulmer, 1980). However, the objectives of most of the improvement projects do mention that providing a pleasant environment for pedestrians is important.

There are many unpleasant walkways and very few permanent open spaces interspersed within Knoxville's downtown area. The implicit or explicit function of these pedestrian open spaces is somewhat ambiguous. Very few studies have been made about the independent pedestrian open spaces, such as Market Square Mall and Market Street (Tolbert, 1967; MPC 1979). The function or the specific characters of the overall existing open spaces, which would probably be able to help pedestrians recognize and enjoy their downtown environment, have not been clearly understood. Thus, only parts of the pedestrian walkway and open space system are being improved, and planners are not taking the problem into consideration in its entirety.

II. PURPOSE OF THE STUDY

The purpose of this research is to study the function of pedestrian-oriented open space in downtown areas, specifically in Knoxville's central business district. In order to proceed with the survey, a set of characteristics was developed to be the criteria of

a checklist used to understand the function of existing pedestrian open spaces in Knoxville's central business district. Another purpose of this study is to show the distribution of the pedestrian open spaces which are more functional and the spaces which are less functional in Knoxville's central business district.

The characteristics which have been developed to inventory and analyze the existing condition in downtown Knoxville are the essential elements that show how the open spaces function. Through a survey of these characteristics, the condition of the existing physical environment of the open space can be better understood, and the analysis will also point out where it needs to be improved.

It is hoped that this research will provide some information to help improve the pedestrian environment and the image of Knoxville's downtown. It is also hoped that future plans for providing functional urban open spaces will be designed to favor the pedestrian in Knoxville's downtown area.

III. LIMITATIONS OF THE STUDY

A number of factors may be considered important in judging whether or not a pedestrian open space is functional. Those factors include: user population, location, accessibility, size, form, facilities, landscape amenities, maintenance, safety, and cleanliness. The function of urban open spaces could also be assessed from different points of view such as: climatology, environmental psychology, circulation, economics, and cultural opportunities.

This study is primarily concerned with the development of a set of characteristics which are used to survey the physical features of existing open spaces in downtown Knoxville, and excludes consideration of the above-mentioned factors. However, an individual study of any of those factors merits research and would be an important part of the information base needed to make planning and design decisions for open space improvements.

The survey characteristics in this study describe conditions of the various physical objects within the limits of the survey area only. Therefore this study is considered to be more of a detailed inventory than a broad analysis. The survey is limited to an inventory of existing features in Knoxville's central business district and does not include consideration of sites which are new developments under construction, or sites which are currently being renovated. The study is directed toward an inventory of public open spaces and therefore excludes an in-depth analysis of private residential open space which sporadically occurs in the downtown Knoxville area.

Several projects have been planned for future downtown improvement in Knoxville and although this research is being undertaken for existing downtown conditions, it is expected that the same methods would be adaptable for future surveys of pedestrian open spaces in Knoxville's central business district.

CHAPTER II

REVIEW OF LITERATURE

I. CONCEPT CHANGE OF THE FUNCTION AND CHARACTER OF THE PEDESTRIAN OPEN SPACE IN THE DOWNTOWN AREAS OF THE UNITED STATES

Function of Open Space

Open space, a term having different definitions to different people at different times, is a very important human need. In urban development, it has become an essential issue of remarkable interest. In a few words, open space means the land or water not covered by construction. When the term is used broadly in urban planning, it includes not only "all land and water in and around urban areas which is not covered by buildings, but the space and light above as well" (Wingo, 1963, p. 57).

The functions of urban open space have been stated diversely. Stanley Tankel pointed out Charles Eliot's theory about (1) open space for service and (2) open space for structure (Wingo, 1963, p. 58). He also described what Christopher Tunnard and Boris Pushkarev said about the productive, protective, ornamental, and recreational functions served by open space (Wingo, 1963, p. 58). Tankel distinguished three functions and two kinds of open space to people:

The open space of which people are aware has three functions: it is used--for the wide range of active and passive recreation activities, for circulation; it is viewed--from the home, the road, or other vantage points; and it is felt--it gives privacy, insulation, a sense of spaciousness and scale.

Urban open space of which people are not necessarily aware is of two kinds: open space which does urban work--protects water supply and prevents floods by soaking up runoff, acts as a safety zone in the path of aircraft takeoffs and buildings; and open space which helps shape the development pattern--as space between buildings or communities, as space which channels development, as a land reserve for the future (Wingo, 1963, p. 58).

Marion Clawson also stated that the major functions of open space are for (1) surrounding public buildings or specific public purpose, (2) recreation, (3) ecological protection or the preservation of certain desirable natural characteristics, (4) urban structural and esthetic purpose, (5) future urban growth (Seymour, 1969, p. 125).

Elinor Guggenheimer considered that the functions of open space for recreation are "separating areas, controlling densities, and providing attractive vistas" (Guggenheimer, 1969, p. 56). In a word, open space exists to be the matrix between the other elements, and the combination of them constructs the whole urban environment.

The Origin of Urban Open Space

The earliest expression of open space for public use in urban areas could be found in the "Agora" of the ancient Greek cities in the fifth century B.C. The Agora, lined with shops and market booths, was the center of business and political life. Enclosed was a big open space, occupying 5% of the city, and used for public activity (Gallion and Eisner, 1963, p. 18). Later, in the fourth century B.C., the "Forum," which is a big square, was found in Roman cities. It had the same function as Agora did.

During the Medieval period, the public market place was found in many European cities. Sometimes a church plaza was used as a

marketplace. In China, the open land in front of a temple was also used for public gatherings. During the Renaissance period, formal, classical, grandiose, enclosed plazas and squares could be seen in European cities. The Piazza of St. Peter's in Rome, the Piazza San Marco in Venice, and the Place des Victoires in Paris were the examples which had those characteristics. At this time, one theme in the design of Italian cities was the following:

There is a direct and purposeful design extension from the central square to an outward point where it clamps onto an expression of the forces of the region (Bacon, 1967, p. 84).

In the eighteenth century, the Baroque style of city was flourishing and the design of plazas had a new trend:

They were now opened and less confined, as though moved by a desire to recapture the space of the countryside. Design shifted from walled-in architectural forms to an extension and expansion of open space. Continuity replaced the enclosure of open space as the new direction in civic design (Gallion and Eisner, 1963, p. 51).

Versailles and the Place de la Concorde in Paris, as well as the Piazza del Popolo in Rome, were the examples of Baroque style which had monumental tree-lined vistas and formal squares. About the same time, the concept of open space was also developed in England. The following are some quotations about the open space development in England:

Open space was sought in England as on the continent. The handsome forms facing broad, informal park spaces are shown in Lansdowne Terrace, the Circus, and the Royal Crescent in Bath.

The formal squares in the residential districts of Bloomsbury, London, were not monumental in design or size, but they identify a conscious effort to improve the environment in cities (Gallion and Eisner, 1963, p. 54).

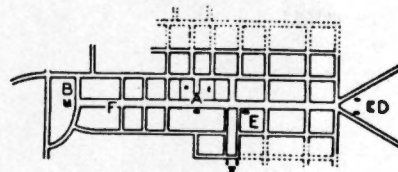
The concept of open space development in the early American cities was also affected by the European city design. Williamsburg, Virginia, laid out in 1633; Philadelphia, Pennsylvania, in 1682; and Savannah, Georgia, in 1733 were famous examples of cities which allocated land for parks and squares (Figure 1). In the Washington, D.C., plan of 1791, the grand scale of diagonal and radial streets gave the city the status of openness and monumentality (Figure 1).

American cities rarely developed large open spaces for public recreation during the first half of the nineteenth century until the 1860's when New York's Central Park was established. Designed and superintended by Frederick Law Olmsted, Sr., Central Park was popularly accepted by the public. And its success aroused city administrators throughout the whole country to pay attention to the development of urban, state, and national parks.

Olmsted designed many other urban parks, such as South Park in Buffalo, Morningside Park in New York, Mount Royal in Montreal, and the outstanding 1893 World Columbian Exposition in Chicago. He embodied natural scenery, movement, and activity in all his designs, and he made open spaces alive. The following are the quotations which describe Olmsted's concept for open space planning for large urban parks.

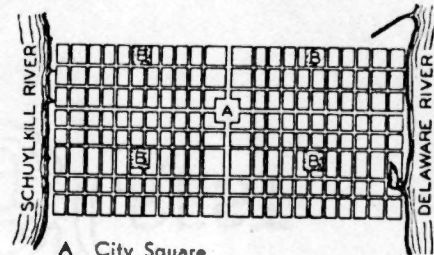
For Olmsted, the ideal urban environment was to be a synthesis of landscape and city scape (Simutis, 1972, p. 277).

His plan included separation of through traffic by depressed roadways and provision for physical, aesthetic, and social enjoyment, without conflict, in different areas of the park (Fabos, Milde, and Weinmayr, 1968, p. 18).



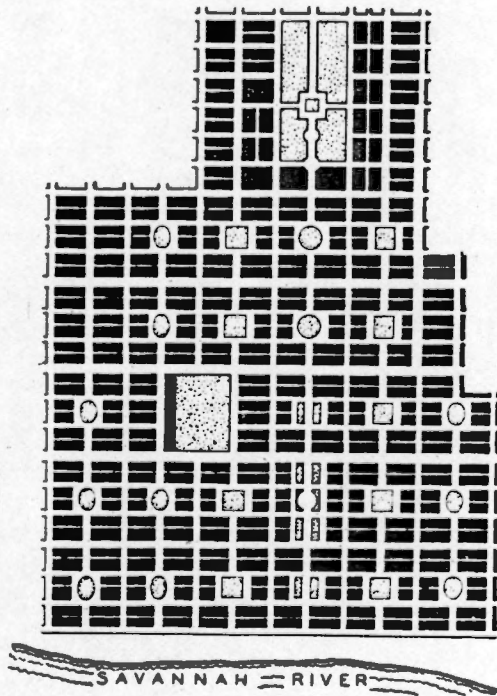
- A Market Square
- B The Capitol
- C Governor's Palace
- D College of William and Mary
- E Bruton Parish Church
- F Duke of Gloucester Street

WILLIAMSBURG



- A City Square
- B Park

PHILADELPHIA



SAVANNAH



WASHINGTON, D.C.

Figure 1. The examples of the early American cities which have open space development.

Source: Gallion and Eisner, The Urban Pattern.

Daniel Burham, a contemporary of Olmsted, also introduced the concept of wide-open space to Chicago's World Fair of 1893 (Heckscher, 1977, p. 19). In later years, his ideas were followed and glorified in the open space development of Cleveland, San Francisco, and Minneapolis. The idea of broadness of space was expressed in splendid vistas, grand boulevards, and monumental public places.

At the beginning of the twentieth century, Americans' rural style of life was largely replaced by urban dwelling. The populations of cities increased. Industry developed rapidly. Downtown areas became overcrowded. Many concepts of urban open space were variously presented.

In the following sections, some concepts which deal with the development and improvement of urban open spaces will be discussed.

Walkways

Since the early 1900's, automobiles have gradually taken precedent over other means of transportation, which has ultimately resulted in streets crowded with automobiles and uncomfortable for pedestrians. Streets were commonly widened over sidewalks, but no effort was made to set buildings back in order to leave space for pedestrians. In 1916, New York City's first zoning law pointed out the congested sidewalk problem, but it didn't suggest any plan to alleviate the condition of congestion. Thomas Adams did a survey on congested sidewalks in 1931 and proposed a method of setting buildings back (Boris and Zupan, 1975, p. 17). In 1958, another study was made, and a method was established to encourage the setting back of buildings to "bring more light and air into streets surrounded by tall buildings, as well as

to create more usable open space,"; under its influence the New York zoning law came into effect in 1961 (Boris and Zupan, 1975, p. 18).

The following are some descriptions of this zoning law.

For each square foot of plaza space, the builder was allowed 10 feet of additional commercial floor area. The requirement of the plazas was that they be accessible to the public at all times.

An urban plaza shall be open to use by the public at all times, with direct access from an adjoining public sidewalk or sidewalk widening along at least 50 percent of its total length of frontage (Whyte, 1980, pp. 112-114).

Small Spaces

Since land use in a downtown area is very restricted, even a small piece of open land could be utilized and well-developed to improve downtown surroundings and benefit pedestrians. The development of large parks is not the only goal to pursue. New York City's first public park, Bowling Green, may have been the precursor of the development of small urban open space. It was set out in 1733 for pedestrians to enjoy the "beauty and ornament of the said street as well as for the recreation and delight of the inhabitants of the city" (Seymour, 1969, p. 1). During the 1960's, "mid-town park," "portable park," and "vest-pocket park" gradually came to be known by the people. Those parks have common characters. They are small in size--even just between buildings. They are away from noise and congestion caused by traffic--even pedestrian traffic. They are human in scale and enclosed, and they provide resting areas for office workers, tourists, shoppers, and passersby. They are "the type of spaces that are now most commonly used as a parking lot" (Seymour, 1969, p. 75).

William Whyte indicated that in any city there are many small unused or abandoned open spaces, "the irregular bits and pieces,"

which would be good linkage between structures, waiting to be developed (Whyte, 1968, p. 13). In recent years, Joardar and Neill made a survey of the small public spaces in Northern American downtown areas. They found that some big plazas, at great expense, were not as functional and attractive to people as those smaller but well-designed open spaces. This finding strengthened the belief that when the small but busy open spaces were effectively utilized, their pedestrian circulation would be more functional than those "non-articulated expensive plazas with dispersed facilities" (Joardar and Neill, 1978, p. 489). Linear open space is another kind of smaller space, narrow and long, but it can be well used when it is properly designed.

Street-Scale Open Space

Streets were traditionally thought to be for the flow of vehicles and people. Actually, streets have functions other than merely allowing the movement of traffic. They provide street-scale open space, especially in densely developed downtown areas, and they could probably be the only open space for public activity. The street-scale open space has many forms including "sidewalk arcades, plazas, vest-pocket parks, roof terraces, interior court commons, pedestrian malls, the street itself and its extensions and structures" (Thomsen, 1970, p. 32). The plazas or vest-pocket parks acting as sidewalk widening will benefit not only their users, but the pedestrians staying on the sidewalks as well.

The street malls or pedestrian paths also link the total open spaces to "form a much-needed net-work" (Schmertz, 1972, p. 132). The recognition of the unique potentialities of this type of open space

initiated a series of development projects subsidized by the U.S. Department of Housing and Urban Development, on street-scale open space. In 1965, President Johnson's Urban Beautification Program authorized 50 percent grants to state and local governments for

The greater use and enjoyment of open spaces and other public land in urban areas. It provides grants for such purposes as the construction of pedestrian malls, the improvement and development of parks in cities, the purchase of street furniture, and the landscaping of public spaces (Seymour, 1969, p. 26).

The Capital Center in Minneapolis, the downtown improvements in Cincinnati, and the Skyline urban renewal project in Denver are all good examples of developments under this program.

Pedestrianism

During the 1960's, the demand for better walking surroundings forced the planners to consider the pedestrian's interest to be one of the most indispensable elements in urban development. In 1960, Logue and Crane introduced the concept of Capital Web to Boston, mentioning that all public buildings and community facilities should be connected by well-maintained public pedestrian walkways and public open spaces (Halpern, 1978, p. 187). The Street for People Project in Washington, D.C., in 1965 encouraged people to express their opinions and needs, and incorporated the civic interest into street improvement programs. In 1971, the remarkable View Corridor was established in San Francisco's zoning regulation of urban design to prevent the good downtown view from the top of the hill from being blocked by tall buildings down the hill. In 1975, New York's zoning legislation set the People-Oriented open spaces as the goal indicating

that the "intensity of plaza use can be related to very specific characteristics of seating, planting, accessibility, and retail facilities" (Halpern, 1978, p. 71).

Trend Toward Urban Open Space

In present urban planning, saving space for people is not less important than saving it for structures. The question has usually been where not to build instead of where to build. In the past, buildings were taken as the free element in urban growth; their size and shape could be changed while the open space was the "fixed element" and unchangeable (Zisman, 1965, p. 52). For example, the direction and width of a vehicular right of way was freely determined by planners, and whatever was left over between the road and the buildings was necessarily fixed by the positions of the free elements. The view that open space should be integrated into its surroundings has shifted and the open space is now considered neither a leftover nor a separate entity.

In the beginning of the twentieth century, large scale blocks and superblocks which had no interruption had been considered the ideal design. The long-distance walkways, however, unexpectedly decreased the pedestrian activities. Gradually, the concept of human-scale was noticed, and the concept of "proportion of open space" was presented to provide more variety, interest, and activity for the pedestrian (Jacobs, 1958, p. 138). Well-planned open spaces will increase pedestrian activities. Jane Jacob mentioned that when the sidewalks are fully used actively and passively, they will attract

walkers, give them more opportunities to choose routes, and weaken the feeling of long, straight streets (Jacobs, 1961, pp. 373-391).

During the last few years, downtown designs have been changed to emphasize the systems of the whole downtown areas instead of some fragmentary works in small sections. Unity of the designable things, which include sidewalks, malls, and others is considered a merit in a good downtown design (Alexander, 1978, p. 5). Undoubtedly, a better pedestrian environment has been one of the important design goals, and "pedestrian circulation, safety, and amenities" have become especially important (Berk, 1976, pp. 20-21).

August Heckscher mentioned that the new downtown is a group of related centers with varied functions, and that each of the functions has its own form of open space: the square of the city hall, the plaza of the commercial building, and the mall of the shopping area. He indicated that the individual open spaces could be united "by a pattern of parks and multi-use streets" (Heckscher, 1977, p. 247).

II. DEVELOPMENT OF THE PEDESTRIAN OPEN SPACE IN KNOXVILLE'S DOWNTOWN

When James White came to Tennessee from North Carolina in 1785, he picked out a peaceful and beautiful place which was upon a plateau and bounded by two natural bodies of water. When more settlers came, this area was planned as a town by William Blount, the first Governor of Territory South of the River Ohio. In 1791 Charles McClung first laid out the town named Knoxville in a simple grid system having - 16 blocks and 64 lots. It was bounded by First Creek, the

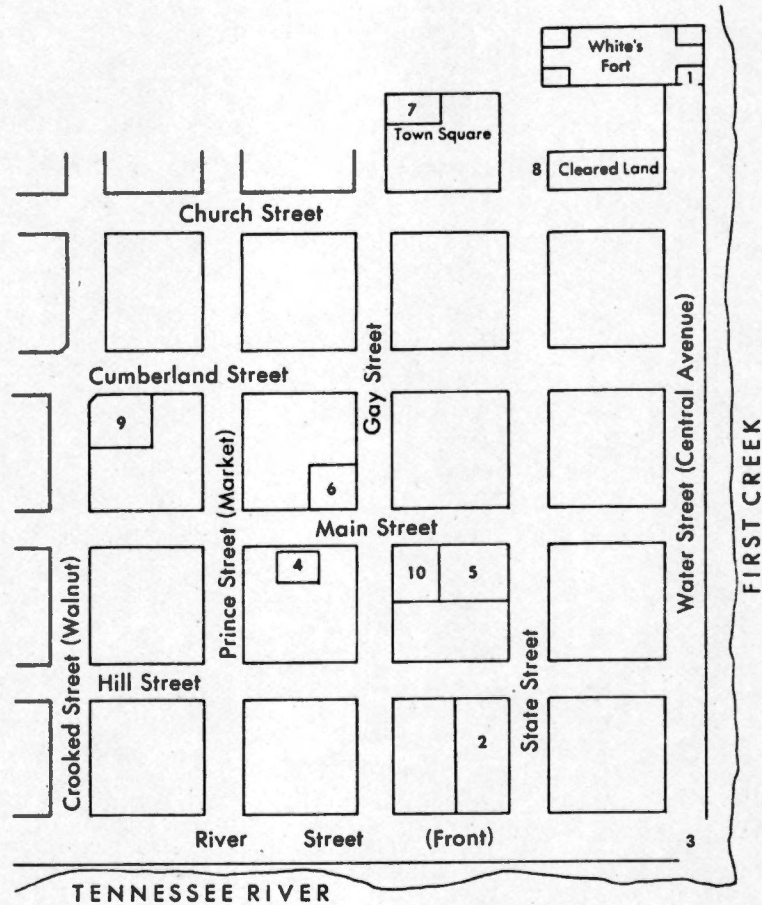
Tennessee River, Crooked Street (Walnut Street), and Church Street (Figure 2). It had wide streets and an easy traffic flow. There was an open space north to Church Street, and it was developed for public use. This open land was then part of the Blount College campus.

This small town gradually expended. Due to

Its industry, its trade, and its outlying farms, Knoxville was growing and changing with the times. New residents were attracted to the little city because it offered, along with the beauty of its situation and the mildness of its climate, excellent business and educational opportunities (Creekmore, 1958, p. 83).

Some small parks and playgrounds were set out in populous areas. In 1854, Market House was built for public trading and meeting. By 1863, this town had reached the natural water boundaries at three sides and the railroad at the northern side (Figure 3). In 1897, Market House was enlarged and it existed until 1960 (Tolbert, 1967, p. 8).

In 1923, the Knoxville Planning Commission was established. One of its most important duties was to prepare a plan for public improvements of the city. In 1926, the Commission made a contract with Harland Bartholomew and Associates of Saint Louis for the preparation of a comprehensive city plan (Bartholomew, 1929, p. 5). This plan pointed out that City Hall Park was an attractive spot because of the trees. It also noted that John Lee playground, which was located at about the site on Clinch Avenue between Central Street and First Creek (Figure 4), was too small for such a large population and had very unpleasant surroundings. This plan recommended a First Creek Park for providing Knoxville's central business district with a recreation site and a means of enjoying the natural scenery, as well as a Civic Center on Summit Hill to improve the district's appearance.

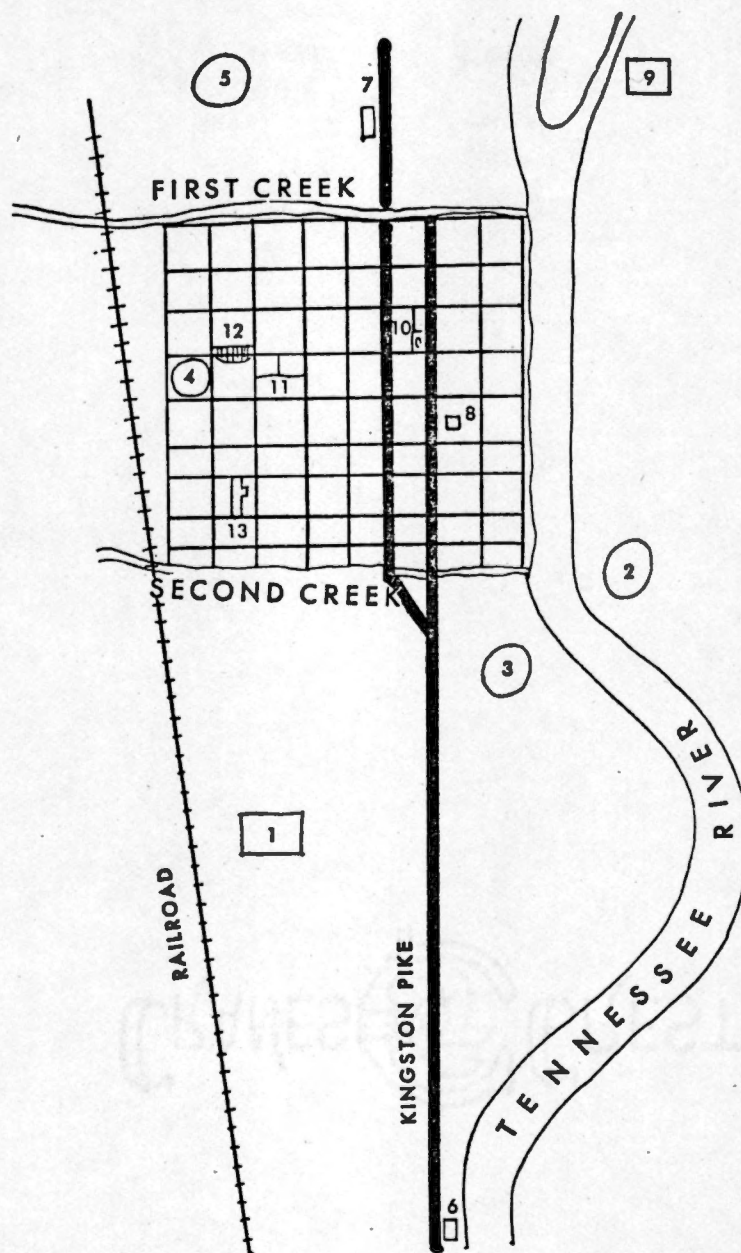


KNOXVILLE—THE FIRST CAPITAL

1—House built by James White, 1786. 2—Blount Mansion, built by William Blount, 1792. 3—Site of Blount's Treaty, 1791. 4—Blockhouse, 1793. 5—Court House. 6—First store on Gay Street (Cowan). 7—Blount College, 1794. 8—First Presbyterian Church and cemetery, on first land cleared by James White in 1786. 9—Sevier-Park House, built by John Sevier but never occupied by him. 10—Jail.

Figure 2. Knoxville in the earliest time.

Source: Creekmore, Knoxville.



1—Fort Sanders. 2—Fort Dickerson. 3—Battery atop College Hill. 4—Battery on Summit Hill. 5—Battery on Mabry's Hill. 6—Armstrong House. 7—Parson Brownlow's House. 8—Perez Dickinson's Main Street House. 9—Perez Dickinson's Island Home. 10—Cowan and Dickinson Store. 11—Second Presbyterian Church and Cemetery. 12—Market Square. 13—The School for the Deaf (presently City Hall).

Figure 3. Knoxville in 1863.

Source: Creekmore, Knoxville.

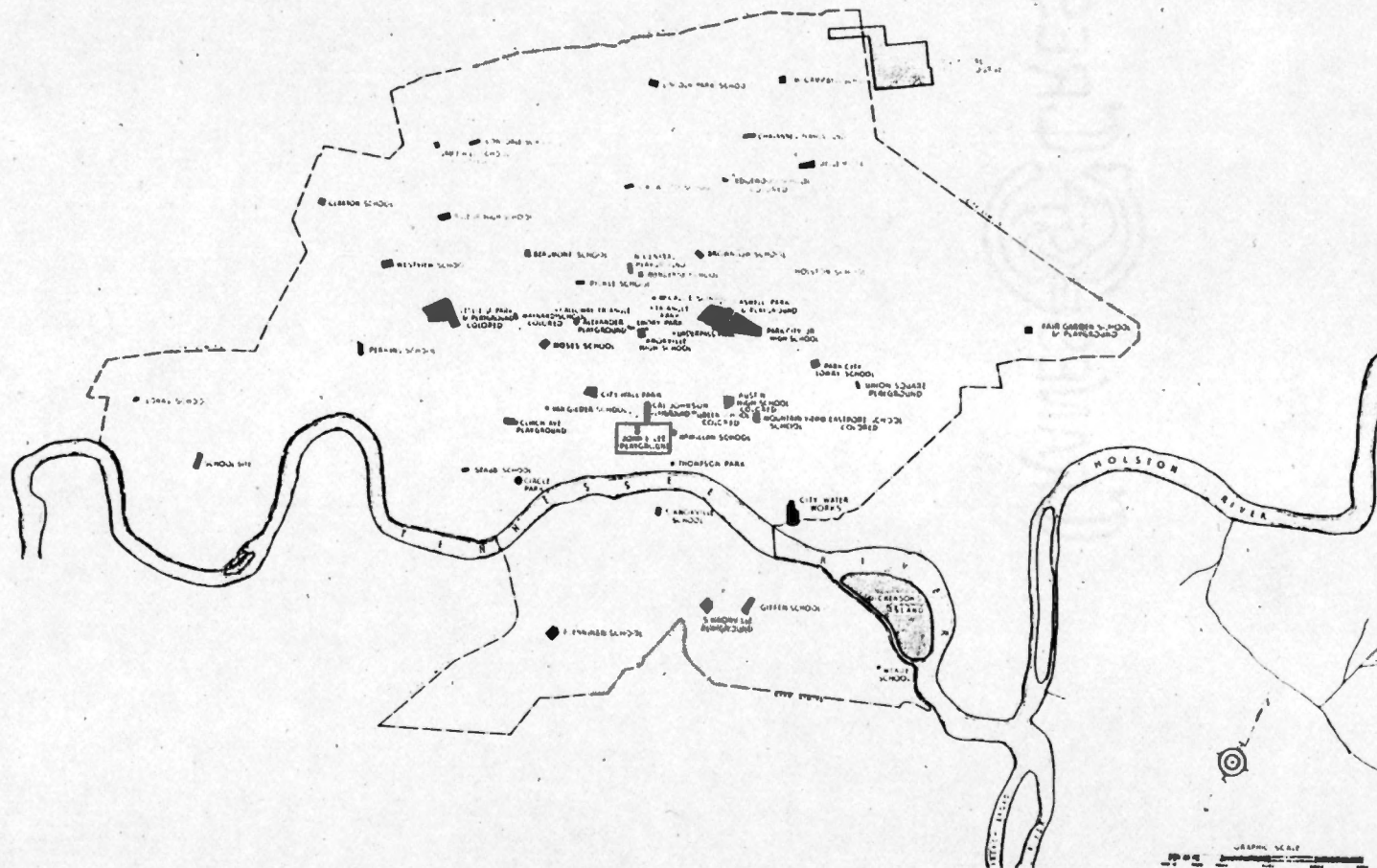


Figure 4. John Lee Playground--An open space in Knoxville's central business district.

Source: Harland Bartholomew and Associates, A Comprehensive City Plan.

The development of a civic center naturally accompanies the acquisition of park lands, the establishment of playgrounds, the creation of wide streets and boulevards, and the control of building development through zoning (Bartholomew, 1929, p. 170).

It also suggested moving obstacles away from sidewalks in order to provide adequate street signs and planting street trees.

However, the Knoxville Planning Commission concentrated on its regulatory phases of planning and did not implement many constructive improvements until the time of World War II when the increase in number of automobiles brought the downtown into a squeeze (Wilson, 1958, p. 19). Its first action was to adopt off-street parking provisions in its zoning ordinance of 1946 (Wilson, 1958, p. 19). In the beginning of the 1950's, the Knoxville Beautiful Commission started its Riverfront Redevelopment Program by removing the slums along Front Street and Central Avenue and building a new highway to help ease the downtown traffic congestion.

Not any specific program dealing with pedestrian open space was mentioned in Knoxville's downtown planning. However, when the Downtown Knoxville Association was established in 1957 for the purposes of improving downtown surroundings and keeping the downtown area prosperous, some emphases on space utilization and pedestrian flow were seen in their downtown improvement projects. Its first project was the construction of the Promenade at the rear of the stores on Gay Street between Wall Avenue and Union Avenue in 1960. The Promenade provided a moving sidewalk ramp with a canopy, giving pedestrians protection from weather and traffic, and some benches for shoppers (Figure 5). In 1961, the old Market House was reconstructed under the promotion of the Downtown Knoxville Association, and a new mall--

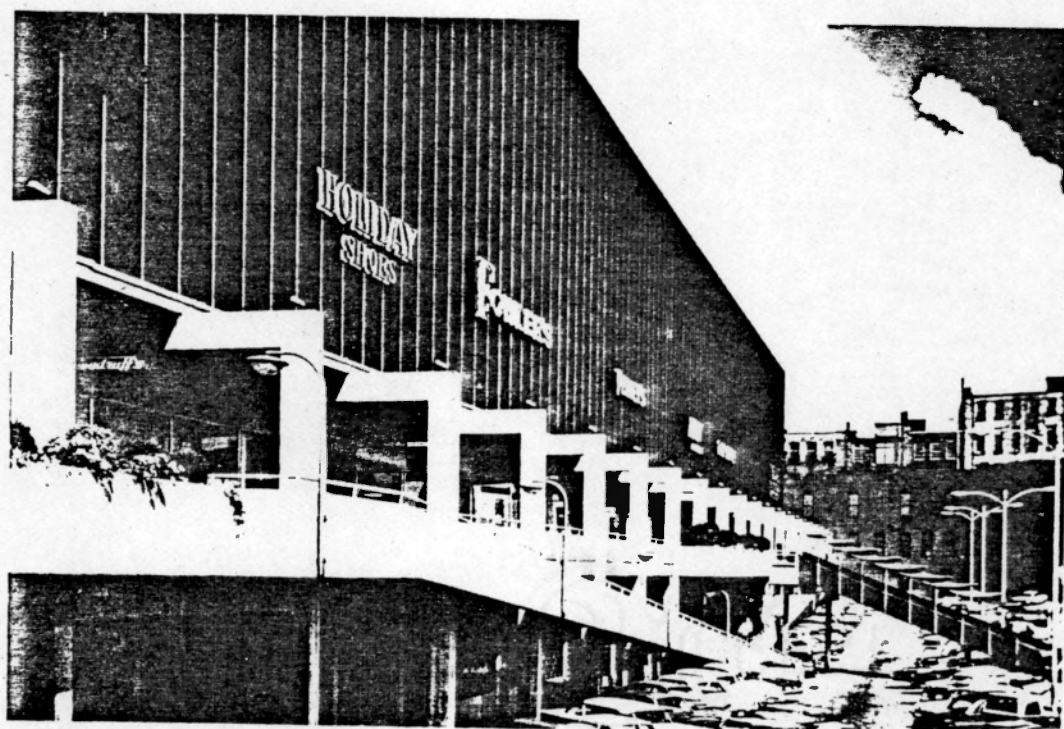


Figure 5. The Promenade.

Source: Creekmore, Knoxville.

Market Square Mall was built with a landscaped square and canopied sidewalks providing multiple uses for exhibitions, fashion shows, and public gatherings. The same year, the original concepts of an east-west mall within the area bounded by Clinch, Gay, Church, and Locust Streets, and a north-south pedestrian spine extending from Market Square Mall to Main Avenue were first proposed. Knoxville-Knox Metropolitan Planning Commission, the former Knoxville Planning Commission, also proposed a downtown park along the riverside in 1961. The third project of the Downtown Knoxville Association was the Gay/Way plan in 1965. The sidewalks of both sides of Gay Street between Union and Clinch were resurfaced and widened, and the permanent canopies with a new lighting system were erected. Another improvement plan, the Market Street Beautification Plan, was announced in 1965. A landscaped pedestrian environment was proposed to connect Market Square Mall with Main Avenue. In 1966, the first phases of the work, such as widening the sidewalks and paving them with brick, adding street trees and trash receptacles, were implemented. This was the fourth project of the Downtown Knoxville Association. All four of the projects concerned pedestrian walkways in Knoxville's downtown.

Affected by President Johnson's Urban Beautification Program, the Knoxville-Knox County Metropolitan Planning Commission presented its Urban Beautification and Improvement Plan in 1966. In the category of "minor and linear open space," it involves

The improvements to streets and boulevards, predominately in the central business district as well as the creation and improvement of plazas, courts, malls, walkways and similar open areas which may be used to create aesthetic oases in densely developed areas (MPC, 1966, p. 4).

Part of the fund of the Market Street Beautification Plan came from this Urban Beautification Program.

The Metropolitan Planning Commission presented the "General Plan 1990" in 1970. This plan pointed out that

Open space is the land set aside for uses other than for buildings and roads. It includes parks, recreation sites, lakes, airport "clear" zones, and the space between buildings. It is not simply leftover, unbuilt upon land but land that serves one or more of five specific functions.

1. Amenity and aesthetics--human psychological needs.
2. Conservation--plant, animal, and environmental maintenance.
3. Production--primarily agricultural.
4. Protection--of environment and of man and his artifacts.
5. Recreation--human physical and psychological needs.

In the CBD this will include small areas of open space to make the CBD a more attractive place for shoppers (MPC, 1970, pp. 48-49).

In 1971, the East Tennessee Development District made a report of a land use plan. This report defined three general types of open space within the District.

Utility Open Space--The nature of utility open space is used for productive land resources. Utility open space is usually soil related and located in rural areas and is used most often for (1) agriculture, (2) forestry, (3) mining, (4) drainage and flood control protection, (5) water collection, protection, and storage, and (6) fish and wildlife habitats or a combination of two or more of these activities. In the past it has been these uses which have been most often encroached upon by urban-type development.

Green Open Space--The second type is green open space which has its function the provision of natural sites in relation to urban areas. In this respect, these open spaces are land areas and water surfaces used for "green" purposes: most often parks and recreational areas, greenbelts, buffer strips and greenways, natural scenic areas, the spaces around and between buildings, and bodies of water which define, limit or control development. Open spaces of this type are found in both rural and urban areas.

Corridor Open Space--Corridor open spaces--both land - and water--are spaces used for rights-of-way of movement and transportation. Their nature is that of passageways and

channels of circulation. This includes roads, streets, highways--both their surfaces and their easements--and waterways (ETDD, 1971, p. 6).

The Mayor's Downtown Task Force pointed out in 1972 that "there is little evidence of permanent open space or public parks" providing adequate spaces for the activities and amenities of tourists, shoppers, and residents to increase the intensity of land use (Mayor's Downtown Plan Task Force, 1972, p. 4). It suggested that:

Open space, whether in a public park, or a plaza of a major office building complex, or along a landscaped walkway in a cluster of townhouses, . . . is also essential to a balanced, attractive community. The network of open spaces envisioned in Central Knoxville would include pedestrian ways and bicycle paths, thus linking housing, parks, Market Square, government facilities, museums, parking facilities, and the riverfront (Mayor's Downtown Plan Task Force, 1972, p. 8).

It also mentioned that an auto-free zone should be established in the core area of Market Street to be a pedestrian-oriented open space. In 1973, the Graduate School of Planning of The University of Tennessee again presented this point for downtown research. It mentioned setting up a "north-south axis" to connect the TVA complex and the City-County Building complex (Frederick, 1973, p. 26).

The Mayor's Downtown Task Force proposed several sites for establishing downtown parks in 1972. These suggested sites were in or near the core area. They were:

1. The area west of the new library on Church Street.
2. The area north of the TVA site near the old library.
3. The area adjacent to Blount Mansion on Hill Avenue, in this case it would be important to acquire the filling station on the southeast corner of the Gay-Hill intersection.
4. Market Street-Gay Street link behind the Old Post Office.
5. The triangle on Wall Street between Walnut and Locust.

The Task Force recommended that sites one and five not be accepted (Gray, 1974, pp. 35-36).

The Downtown Task Force also focused attention on the residential development of Summit Hill to stimulate night-time recreation of the central city and make the city more alive.

In 1973, a Downtown Design Team was appointed by Mayor Testerman to make detailed reports on the CBD revitalizing concept outlined by the Downtown Task Force. This Downtown Design Team proposed a pedestrian walkway system which included possible skyways. Besides the proposed and finished walkways of the Mall, Market Street, and the Promenade,

The system would include ramps and second story street cross-overs with connections between parking areas on State Street and elsewhere to offices, stores, and places of employment.

As a part of the pedestrian system proposals have been made to use the Church Avenue viaduct as a pedestrian walkway (we understand that the viaduct may be abandoned as a traffic bridge if the condition of the bridge is found to be unsafe). The Church Street viaduct would have a cover for pedestrian protection and would connect the CBD with the parking garages in the Coliseum area (Gray, 1974, pp. 15-16).

A proposal for an east-west mall was again presented by the Downtown Design Team in 1973. The Mall, containing restaurants and specialty stores, would be a pedestrian-oriented area. The proposal was soon adopted by the Knoxville Community Development Corporation, and land acquisition was begun. Unfortunately, the 1974 economic recession delayed the establishment of the mall.

The TVA complex, finished in 1974, has a plaza between two tall buildings. This plaza was originally designed for ground circulation. It provided rest areas for TVA workers and was not available for public use. The plaza of TVA buildings would act as a link between Summit Hill which has been gradually developed into an area

with combined residential, commercial, and recreational uses, and Market Square Mall. Summit Hill Drive is a reconstruction of Western Avenue. It has sidewalk trees and shoulders on the north side of the drive between Henley Street and Gay Street. Sidewalk trees also extend from Gay to Central. These sidewalk trees and shoulders were established on the south side of the drive between Henley and Walnut, too. In a section of the TVA Complex which is part of the area between Walnut and Gay, trees were grown between the sidewalk and the TVA towers. Sidewalk trees were also planted in the rest area between Gay and Central. These tree-furnished sidewalks improved the surroundings for walking. Wall Avenue Mall, a pedestrian-oriented open space, surrounded by Walnut, Gay, the TVA Complex, and Market Square Mall, was completed in 1974. It connected the TVA Complex and Market Square Mall, and enhanced their pedestrian environments. This mall was restricted to one-way auto traffic and was not designed only for pedestrians because of some political reasons (Ulmer, 1980).

The 1977 Jackson Avenue Warehouse District Redevelopment Plan, though not under construction yet, also projects the pedestrian environment with diverse designs of open spaces on both of the sidewalks. The following are some general reuse design criteria for redevelopment of the area.

The buildings of the Jackson Avenue Warehouse District are linked by a "pedestrian street" which parallels Jackson Avenue.

This "street" makes use of the broad eave construction of the East and West Freight Depots to provide weather protection.

The "pedestrian street" subdivides the individual Warehouses which average approximately 136 feet in length and are relatively unsuited to the proposed new uses.

Vertical circulation cores within the buildings are contiguous with the "pedestrian street."

The adaptive reuse designs developed for the buildings of the District are to provide "barrier free" access to accommodate the handicapped.

It is generally recommended that the internal hard surface pedestrian streets be at a relatively uniform elevation throughout the contiguous row with ramps providing access to individual use areas (Milner, 1977, pp. 44-45).

The next year, United American Plaza was erected. The building has only a slightly wider sidewalk than normal, and it is not set back from the street; however, at the time of construction a plaza was set aside to enlarge the ground floor space. It was designed as the complement of the building from the visual point of view, and for entertainments and activities, such as exhibitions, eating, and performances (Borden, 1981). The only thing considered a constraint for using the plaza is the wind, which is strong in the plaza and does not encourage pedestrians to stay a long time (Borden, 1981). The same year, the City-County Office Building was finished and an open space was established in front of the building. This open space is a green area with seating facilities designed for the enjoyment of the landscaping and for pedestrian circulation (Bullock, 1981). The seating area runs along the sidewalk and has entrances connected with the sidewalk. In 1979, the Knoxville-Knox County Metropolitan Planning Commission presented its study of the potential for the revitalization of Market Street. It also pointed out that the following revitalization projects were not receiving attention because they were not profitable as private ventures or because public funding was insufficient:

1. Reinforcement of the Market Street Mall
2. Riverfront redevelopment

3. Summit Hill redevelopment
4. East/West Mall development
5. In-town transit system
6. Transportation Terminal development
7. State Office Building development
8. Federal Office Building development

Each of these projects was identified by the General Redevelopment Plan as being a necessary contribution toward making Knoxville a better environment for all people (MPC, 1979, p. 2).

Knoxville's Community Design Center's Inner Connections and Open Space Project, presented in 1979, stressed that open space should have multiple functions in order for it to be livable (ETCDC, 1978, pp. 15-17). The project suggested that common paving, bus-stop booths, and street planting should be provided on walkways. Concerning public space, it said:

The character of the areas of historic interest should be strengthened by the treatment of public spaces. Places of traditional symbolic or aesthetic importance should be enhanced by public spaces landscaped in accordance with their public significance (ETCDC, 1980).

At the time of this study, the Hilton Hotel which is a part of the proposed East-West Mall was under construction. A downtown sidewalk repair plan was announced to the public by the engineer of the city's design section on April 2, 1981, and the work was started from Locust Street at the end of April (Knoxville News Sentinel, 1981). All works were expected to be finished before the 1982 World's Fair. Attention to downtown improvements which would provide a better pedestrian environment has been more strongly aroused.

CHAPTER III

METHODS AND PROCEDURES

This study is concerned with developing a checklist for surveying the functions of the open spaces in Knoxville's central business district. Some characteristics which are the basic elements of a very functional open space were adopted as the criteria for checking the existing open spaces. Under each characteristic, there are several physical elements which will affect that characteristic and will either strengthen or weaken the function of the open space. Therefore, these physical elements were adopted as survey items. An unobtrusive method of simply observing, measuring, and recording the physical elements in the open space was used to produce the survey.

The procedures of this survey involve three steps: (1) delineation of the survey area, (2) development of the characteristic and checklist, and (3) collection of the data.

I. DELINEATION OF THE SURVEY AREA

Knoxville's downtown is very special in geography and topography. It has natural water boundaries on three sides, and railway track on the other side. Because of the abrupt contour change, the section north to Vine Avenue steepens down to the railway track and obstructs the extensive development of retail businesses. There is another steep slope south to Hill Avenue. At the bottom of this slope is Neyland Drive, which connects with Central Avenue. Both

are the main routes for peripheral traffic circulation and are not suited for pedestrian use.

The area west to Henley Street is the World's Fair site, which is under construction at the time of this study. East to Central Street is the site of City Coliseum. Because of the topography, traffic circulation, and present conditions, this study's survey area will be concentrated in the section of downtown Knoxville surrounded by State Street on the east, Hill Avenue on the south, Henley Street on the west, and Vine Avenue on the north (Figure 6). It includes those blocks which are comparatively more popular and more often used by pedestrians. This survey area is also an area which needs proper attention in order to be physically associated with the World's Fair site and City Coliseum.

II. DEVELOPMENT OF THE CHARACTERISTIC AND CHECKLIST

The Characteristics

The set of characteristics used as the survey criteria in this study were derived from

1. Literature concerning the environmental image of a city.
2. Urban space design theories.
3. General studies of the function and spatial qualities of open space.

The nine characteristics include

1. Continuity,
2. Direction,
3. Orientation,

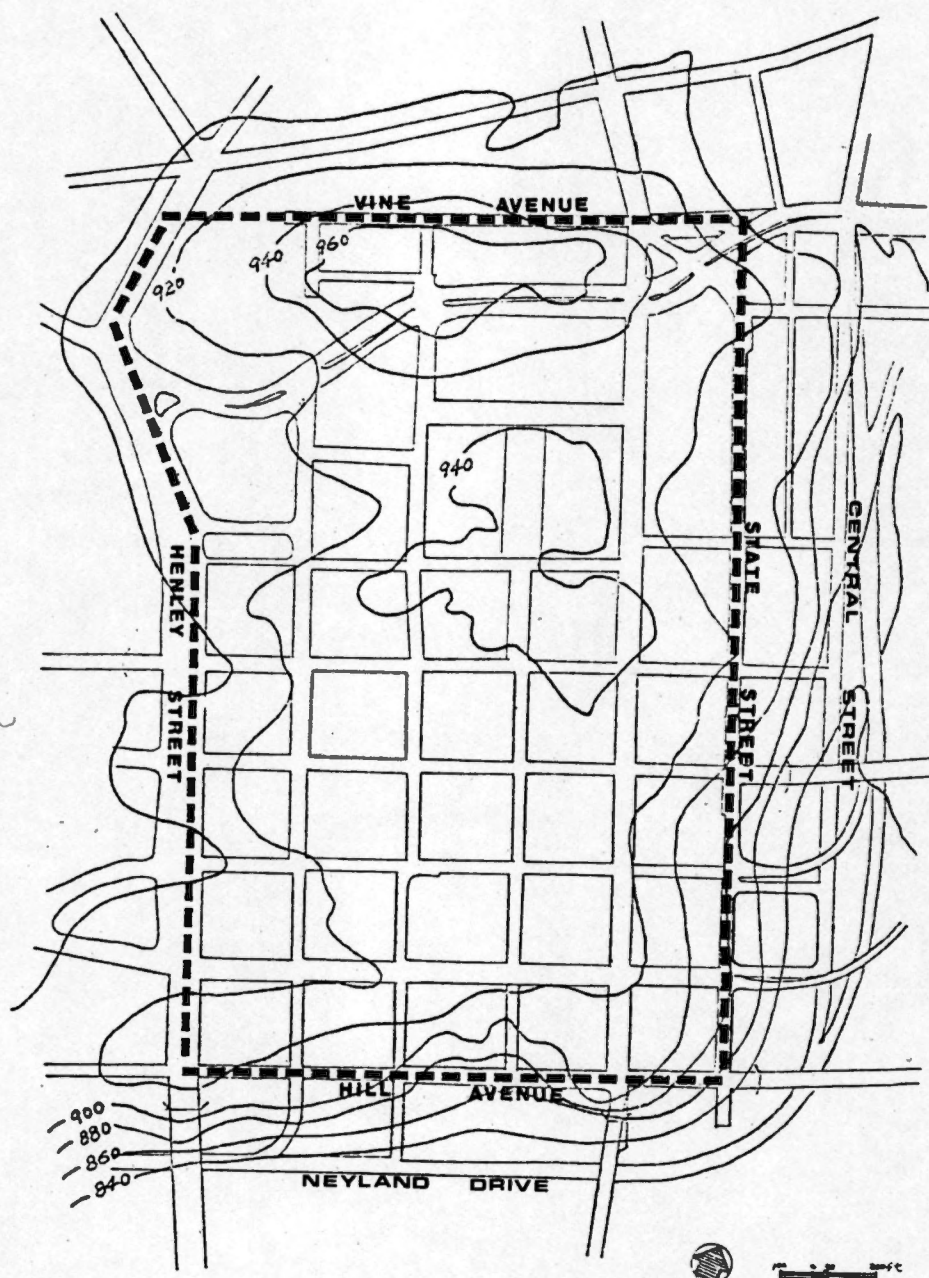


Figure 6. The boundary of the survey area.

4. Center,
5. Linkage,
6. Enclosure,
7. Interruption,
8. Circulation, and
9. Sequence.

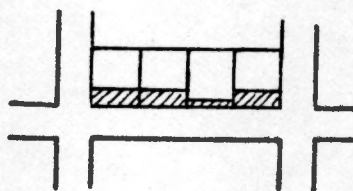
These were thought to be the important elements which will determine the condition of the pedestrian open spaces and how well they are functioning. The characteristics will also help to find what needs to be improved in the open spaces and what potential the spaces have.

Each characteristic is described in the following paragraphs.

Continuity. Continuity is "uninterrupted connection or succession" (Webster Dictionary). In this study, it refers to the physical elements which appear in the open space, producing a continuous visual perception. The continuity sensed by the pedestrians will help them to follow the correct pathway which will lead to their destination. Kevin Lynch said that if a path has satisfactory degree of track continuity, which means if the path is easily identified, it can easily be followed by strangers (Lynch, 1960, p. 52). Some characteristics which give continuity to a path are the following (Lynch, 1960, p. 52):

- a. Sidewalk width--The conformity of walkway width produces a type of spatial continuity. The abrupt narrowing of the walkway width not only causes pedestrian congestion in a diminished

space, but also makes it difficult for people to sense "a continuation of the same path" (Lynch, 1960, p. 52).



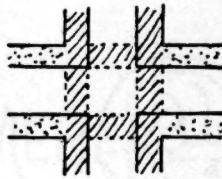
b. Planting--Trees, shrubs, and other vegetation produce the continuity of natural color, form, texture, etc. When trees are planted in a row, they suggest a line "that leads our eyes into the distance," and they indicate the way to be followed (Selleck, 1974, p. 2).



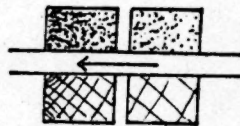
c. Facades--When the frontage of a building is badly kept, it is an unpleasant part of the surroundings, but it is pleasant looking when nicely maintained. The mixture of various styles and ages of buildings would bring diversity to the appearance of the downtown area, however, those facades that have deteriorated or are badly in need of repair would disrupt the continuity of the pedestrian environment.

d. Street names--Street names are very effective signs which would be able to help pedestrians recognize their surroundings. The appearance of such signs on the path is an important characteristic of space succession.

e. Sidewalk pavement--The proper use of different types of pavement on sidewalks will increase the interest in and aesthetic appeal of street scape. For example, brick sidewalks and crossroads will not only indicate the obvious use for pedestrians but also act as a visual conductor directing attention to the continuous pedestrian walkways. But broken, variously and carelessly paved walkways will disrupt visual continuity.



Direction. The character of direction, perceived from the differentiation of topography, land use distribution, building type, and building age, gives a person the sense of forward motion (Lynch, 1960, p. 54). These four elements usually undergo gradual and regular physical changes which are "accumulative in one direction" (Lynch, 1960, p. 54). A linear open space between two parallel districts has the same end-to-end effect. In this study, the directional quality refers to the topographic gradient and the gradient of building use intensity.



a. Topographic gradient--The topographic gradient, moving up and down and making a space a "flowing undulating space," not only suggests directional movement, but also adds interest to the

view (Simonds, 1961, p. 85). A space with a change of topographic gradient would also suggest a change of direction.



b. Use intensity gradient--Another frequently sensed directional quality is the use intensity gradient. From the view of a regional scale, it would mean the gradual change of the density of land use in open land, residence, commercial, and industry from a suburban area to an urban area, and even to a central business district. Generally, land use in a central business district refers to allocation of land for retail businesses, financial institutions, other institutions, offices, apartments and lodgings, and partially or totally vacant structures. However, since the actual land use pattern is not obvious in some central business districts, the intensity gradient of land use is expressed in abstract by functional areas derived from the use of the various floors of the buildings. For example, if retail businesses occupy most of the floors in a building, this building is counted for the use of retail business. If retail businesses occupy most of the floors in a block, then this block belongs to the functional area of retail business.

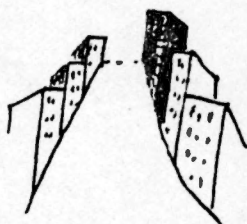
Orientation. The sense of orientation is obtained from the characteristics of a space, which bring one into a situation in which he clearly understands his position and relation to the surroundings. The strength or weakness of orientation of a space depends on the

extent of uniqueness or prominence of the space because of its exterior, its date, or its fame. The strength and weakness also depends on if the distinctive visual features in the space are easily seen or not. The most powerful expressions of orientation are described in terms of landmarks. Kevin Lynch stated that landmarks are simple physical elements which are easily to be identified as a guide when they have "clear forms, memorable context," and when they "contrast with their background" (Lynch, 1960, p. 78). They are the vertical or horizontal symbols of orientation for people from far away or from nearby. Usually, significant buildings, unique constructions, and prominent spatial configurations will give orientation clues.



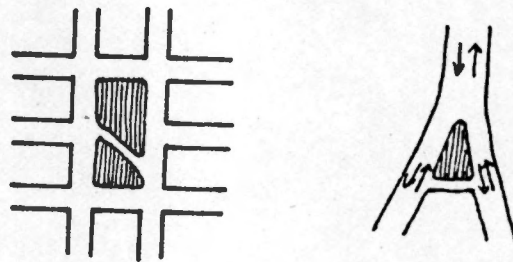
(From Lynch, 1960)

a. Significant buildings--Significant buildings are the buildings which have importance in reflecting history or are unique in architecture. They are usually special in form of facade or color or texture. Since those buildings are very easily identified and remembered, they add to people's recognition of and familiarity with their city environment.



b. Unusual objects--Unusual objects which have importance in architecture, art, and history include statues, sculptures, monuments, fountains, etc.

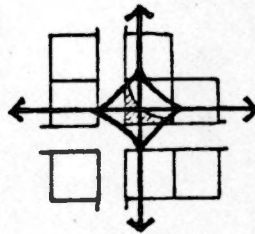
c. Outdoor space--When some outdoor spaces are in special use, such as an activity center, a landscaped area, and a traffic center, or are significant because of the historical events, they act as landmarks (Jacobs, 1961, p. 386). When they are special in shape, they sometimes have directional orientation.



Center. Center means the gathering point for specific activity or interest. It is one of the most important functions of pedestrian open space since a gathering point, the focus of civic activities, is mainly for pedestrian use. Sometimes a gathering place is considered a landmark but can not be seen until people get close to it. And sometimes the importance of a gathering place is not noticed if there is no prominent symbol showing its existence. Most of the city's gathering points are important places economically, socially, and politically. They can be a pedestrian traffic intersection or a recreation place, and they can be used for some special purposes, such as exhibitions, performances, elections, etc.

a. Traffic intersection--A traffic intersection is a circulation hub where people move from one place to another. A street

corner could be a traffic intersection when two heavy pedestrian flows meet. Usually, this kind of gathering point is not distinctive in its space appearance, yet it is very characteristic because of its crowdedness.



b. Recreation place--A recreation place is sometimes a landscaped area with facilities, such as small sports fields or playgrounds, used as areas for strenuous activities, or it may provide places for passive activities, such as picnicking, resting, and viewing. These kinds of gathering points might just be a small space between buildings or a sidewalk widening.

c. Commercial place--A place for commercial use, such as shopping, eating, and trading, is the most often perceived and most densely populated gathering point. Trade and exchange markets and pedestrian malls are good examples.

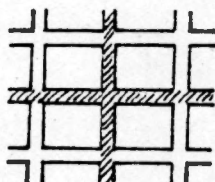
d. Cultural place--Areas which are regularly or periodically used for art exhibitions, cultural events, and musical performances are also civic activity centers.

e. Other purpose place--There are some other purposes, such as political speeches, meetings, and elections, which will draw people together to a place.

Linkage. Linkage means to be a connector. Having the characteristic of linkage is important for pedestrian open spaces. Those

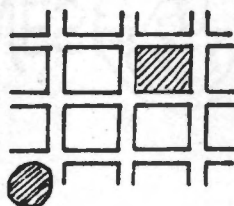
spaces, by, between, or around buildings, were usually established to divide buildings in order to let more air, sunshine, and people in, and to allow the passing of specific vehicles, such as fire trucks. In this aspect, those open spaces act as a divider. However, they could also be for pedestrian use and for landscaping. In this aspect, they play the role of connector rather than that of divider because their facilities bring people together, make those open spaces connect with other pedestrian ways, and cause a more convenient and efficient pedestrian flow. The pedestrian open spaces appear as connectors in different forms. They can be linear spaces or patches of spaces.

a. Corridor space--Corridor space refers to the sidewalk, the pedestrian mall, the auto-free street, and the alley, all of which are used most often for linear pedestrian movement. The sidewalk is one of the preliminary pedestrian spaces, and occupies a large part of the spaces in most of the central business districts. Other items under corridor space are also counted the important connectors of pedestrian spaces in city planning under the trend of pedestrianization.

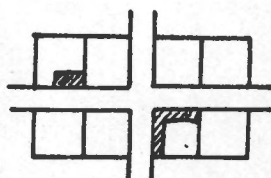


b. Nodal space--Nodal space is another type of preliminary pedestrian space. It refers to public gathering places, such as plazas, squares, and parks, which are large pieces of land or small patches of spaces. The combination of nodal spaces and corridor

spaces forms the network of pedestrian open space and brings the city into an active pattern.



c. Structure space--Structure space is the subsidiary of the building. It is the space used to highlight the building, or it is there for the purpose of landscaping.

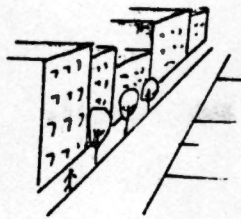


Enclosure. Enclosure is the "quality of being encompassed" (Webster Dictionary). In the designing of urban space, there are some predominant characteristics, such as the quality of enclosure, outfittings, and activities, which will make the space distinguishable (Spreiregen, 1965, p. 55). When "any one of these qualities is sufficiently strong, it alone may establish the sense of urban space" (Spreiregen, 1965, p. 55).

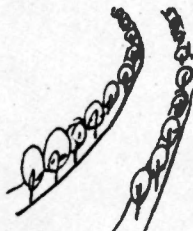
The basic sensation of space is one of confinement and of the dimensions of that confinement. But this sensation may be modified in many ways: by space form or its proportions, by the character of the defining elements or objects in the space by the position of the observer. One can be low down in a concave shape, or high up in a convex one (Appleyard, Lynch, and Myer, 1964, p. 12).

A space could be sufficiently enclosed by structures or plants to provide protection, intimacy, and quietness, and give a sense of "entity," or a sense of "channel of the space" (Spreiregen, 1965, p. 75). Those senses will increase the use of the space. An enclosed place is where the pedestrian could avoid traffic, and it is also "the place to which traffic brings you" (Cullen, 1961, p. 25).

a. Buildings--Buildings are the important elements which form the spatial enclosure. Spatial enclosure is not composed only of uninterrupted building walls; there are some other physical elements which help form the enclosure. However, spatial enclosure is weakened when there are too many empty spaces between buildings or too many abrupt changes among facades (Spreiregen, 1965, p. 75).



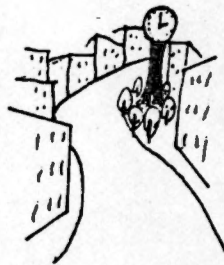
b. Plants--Trees can be planted in a series to form an enclosed space, which is seen as a channel. A plaza or a square will not be focused on by the pedestrian as an entity if it is not sufficiently enclosed by buildings or plants or other materials. Plants can also form a small enclosed space which can be used as a stopping and resting area.



c. Change of elevation--Change of elevation would create a spatial effect. Whether the space is to be raised or lowered depends on its functional, physiological, and visual effects (Cullen, 1961, p. 175). A lowered place gives the feeling of intimacy, protection, coziness, and seclusion, while an elevated place gives privilege and authority (Cullen, 1961, pp. 175-179).

d. Other material--Other materials, such as paving, murals, retaining walls, water falls, and fences, would be helpful in forming spatial enclosures.

Interruption. Interruption means the unexpected changes in repeated and usually unvarying scenery at frequent intervals. Visual perception needs to be stimulated occasionally to avoid becoming tired and bored, but a irregular street pattern is usually difficult for pedestrians to recognize. If some interesting objects were set at certain locations, those objects would act as a hint which not only attracts pedestrians' eyes and stimulates their visions but also indicates to them the way to follow. In a gridiron street pattern, visual interruption is even more important. The ugliness of some cities is



due to their having no strong visual impressions on the straight and regular streets (Jacobs, 1961, p. 379). This problem could be remedied

by "introducing sufficient visual irregularities and interruptions into the city scene" (Jacobs, 1961, p. 380). The street pattern itself could produce interruptions by introducing shorter blocks. Spaces, structures, and spatial amenities, such as patches of spaces, greenery, water features, display windows, murals, and anything attractive will add diversity to prolonged and monotonous walking spaces and will interest pedestrians.

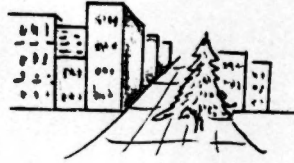
a. Small space--Small open spaces can be pleasant surprises to the pedestrian. Simond pointed out that an ideal streetscape is

To have infrequent cross streets, . . . , interrupted occasionally by a building, a plaza, or a park, to give human scale and interest. The pedestrian areas are variable in width, sometimes widened to receive an island of planting, a bus shelter, a sales stall, or an illuminated display case, or sometimes expanded into a court around which the buildings are spaced (Simonds, 1978, p. 118).



b. Greenery--Greenery is the natural element in the urban setting. It "softens the sometimes harsh hardscape," and is highly preferred by pedestrians (Fritts, 1980, p. 50). A group of trees would decrease the sterility of the pedestrian environment. A single tree would act as an oasis along the way or act as a direction indicator showing the ending point of a square or a plaza so that

"where the eye expects brick or stucco it sees green leaves" (Jacobs, 1958, p. 138).



c. Display window--A display window or a kiosk, showing the newest fashion, commercial products, and books, will always attract pedestrians and cause them to pause.

d. Mural--A mural is usually a large scale painting; therefore, it makes a very strong visual impression. Since an interesting mural would catch the pedestrian's attention and slow down his walking speed, it is an effective visual interruption.

e. Water feature--Water feature is another one of the pedestrian's favorite scenes. "Waterfront plazas were rated more pleasant than most other open spaces of the downtown" because of the water feature (Joardar and Neill, 1978, p. 488). A fountain with some seating facilities will provide an attractive stopping place.

f. Other interesting objects--Some other physical objects, such as sculptures, clocks, flags, banners, and even the specially designed street furniture will be good visual stimuli.

Circulation. Circulation means moving about from place to place. Most of the pedestrian open spaces have the function of circulation for pedestrian flow. They are either pedestrian walkways or the extensions of walkways. They should be completely open to public

use. They should have no obstacles for pedestrian's entering from the adjoining sidewalks or buildings.

a. Pedestrian thoroughfare--A pedestrian thoroughfare is for public use. It is mainly designed for pedestrians and fully open to them.

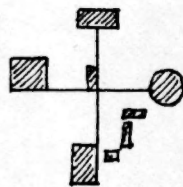
b. Vehicle and pedestrian thoroughfare--A vehicle and pedestrian thoroughfare is the kind of passages open to both vehicles and pedestrians. Sometimes, it is mainly designed for pedestrian use but can also be used by some vehicles, such as service and emergency vehicles. Sometimes it is designed for both vehicles and pedestrians but only allow one-way passing for vehicles to decrease auto traffic.

Sequence. Sequence is "a continuous or connected series" of spatial characteristics in the surroundings. It refers to the overall relationship of the combined pedestrian open spaces. A network of pedestrian walkways is formed when those spaces are connected and related. The linking and joining of those different kinds of spaces "invite movement at changing speeds through environments varied in their form and function, in their degree of openness and constraint" (Heckscher, 1977, p. 48). An individual open space provides an independent spatial experience for pedestrians, and the interrelated open spaces will give pedestrians continued and changing spatial experiences. These accumulated experiences will be helpful for pedestrians to memorize and recognize their surroundings easily.

A network of pedestrian walkways would link scenic places, historical places, recreational places, and

Lead people where they want to go, directly when time is important, as in access links between transit station and office towers, or sometimes indirectly and meandering, as through a park or market place (Simonds, 1978, p. 169).

This network exposes the kaleidoscopic views of the city. In a word, well-planned walkways will give clear mental images of the surroundings to pedestrians.



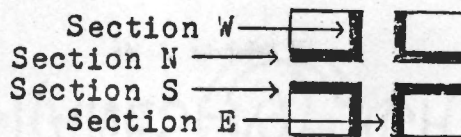
Summary. The nine characteristics are interrelated and complementary. The continuity of a space implies directional movement while the directional quality shows the continuous movement. To prevent the dullness of the excessive conformity of continuity, interruption is needed to break the monotony. But this interruption, "a basic rhythm of attention," should not change so suddenly that it would probably destroy the continuity (Appleyard, Lynch, and Myer, 1964, p. 17). Centers have the quality of concentration; therefore, they are focal points and suggest activity, direction, and orientation. Having the quality of linkage, a pedestrian open space is not necessarily an effective connector unless it has the function of circulation. Spatial enclosure could be enhanced by the continuous and sufficient provision of its elements. Sequence is the summary of the other eight characteristics and is the indispensable quality. How good or bad the sequence is depends on how the physical elements of all the other eight

characteristics are managed. The more sufficient each characteristic is, the stronger the sequence is.

The Checklist

After the criteria were established, a personal inspection of each site located in the survey area followed. Before the collection of data, a checklist was prepared to make sure that each site would be inspected under the same terms. (The checklist is seen in Appendix A.)

General information includes those basic items, such as name of site, location, form of site, and section. The spatial form of each site was recorded according to the name of that site. Section refers to the two separate, parallel, and different sidewalks between two blocks.



The second part of the checklist is the inspection of the specific characteristics of each site. The survey items were derived from the physical elements under each characteristic. A purely quantitative observation was adopted.

Under the criterion of continuity, the width of sidewalks, the number and kinds of plants, the number of building facades with unsound appearance, mediocre appearance, and sound appearance, the existence of street names, and the number of sites of broken or carelessly repaired sidewalk pavement were the survey items.

The percentage of gradually raised or decreased topographic change by blocks is one item under the criterion of direction. The number of different building uses, such as office, retail business, finance, warehouse, apartment and lodging, institution, and vacancy in structure, is another item. The location of parking lots is the appendant item under this criterion.

In surveying orientation, the position of buildings which are historically or architecturally significant are recorded. Whether their appearances are easily seen or not is also pointed out. The kind and position of unusual objects and the different use and position of the outdoor space are also noted.

Under the characteristic of center, the type of gathering point, such as a pedestrian traffic intersection, a recreation place, a commercial place, a cultural place, or other places, is specified. And the type of activity is also recorded.

In surveying linkage, the thing needed to be observed is whether the shape and activity of the space make it act as a connector in the form of a corridor space or a nodal space, or whether the space has the quality of linkage just to be a structure space for high-lighting buildings.

The survey items of the criterion of enclosure are buildings, plants, change of elevation, and other materials which would form spatial enclosures. The common thing needed to be determined is if each of the four elements contributes to enclosure. The vacant land between buildings is also a survey item.

In surveying interruption, the position of the small space, the greenery, the display window, the mural, the water feature, and other interesting objects which would be specified, are marked.

Under the criterion of circulation, a space is inspected to determine whether it is a full pedestrian thoroughfare or a vehicle and pedestrian thoroughfare. The heavy or light condition of pedestrian traffic is also recorded.

III. COLLECTION OF THE DATA

The data in this study were collected by surveying each block in the survey area from February to March. All data were recorded according to the existing physical conditions in downtown Knoxville. The open spaces which could be named and would be considered the pedestrian-oriented open spaces in Knoxville's downtown are sidewalks, Wall Avenue, Market Square, the United American Plaza, Miller's Plaza, and the City-County Building Plaza. The researcher was also concerned with some other small open spaces which do not have names but are available for pedestrian use.

The blocks in every street were named by numbers. The sidewalks on each side of a street were named Section North (N), Section South (S), or Section East (E), Section West (W) separately depending on if they were on a N-S bound street or an E-W bound street. For example, 1N means the north side sidewalk of a certain street on Block 1, and 2N₁ means the first part of the north side sidewalk of a certain street on Block 2. (See the following illustration and Figure 7.)

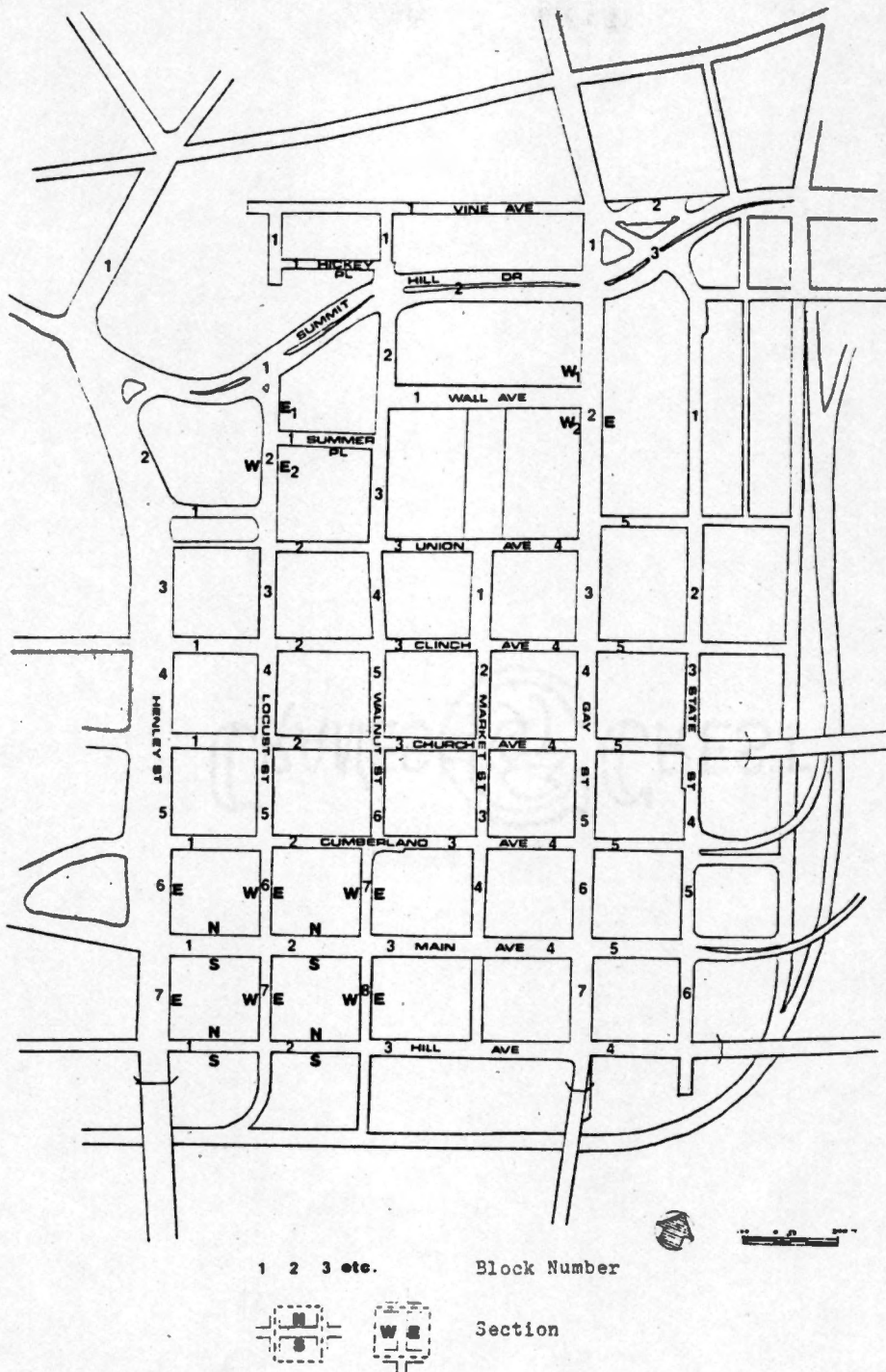
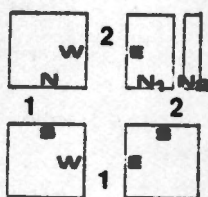


Figure 7. Data coding.

Source: Knoxville City Map--Central Business District.



The data on sidewalks were collected following this naming. The data of the dispersed open spaces were not numbered.

CHAPTER IV

DATA ANALYSIS

The total data gathered block by block were shown from Figure 8 through Figure 38 (pages 54-78) and from Table I to III (pages 79-82). The individual open spaces--classified as sidewalk, sidewalk widening, plaza, park, square, or alley--were analyzed by the sections which are the two parallel walkways, one on each side of a street.

The following are the explanations of the various data which were shown on the figures and tables.

I. EXPLANATION OF THE DATA

Sidewalk Width

Sidewalk width was measured in feet. Different widths of different sidewalks on different streets were shown in Table I, page 79. The width of the street pavement was used as a contrast to show if there is any relationship between the widths of street pavement and sidewalk pavement. For instance, is the width of the sidewalk increased when the street becomes wider? There are a few blocks of sidewalks with grass shoulders. Some blocks of sidewalks have sidewalk trees. There are some sidewalks with both grass shoulders and sidewalk trees. Some sidewalks have two or three different widths on one block because of the various building setbacks. There also are some blocks which do not have sidewalks.

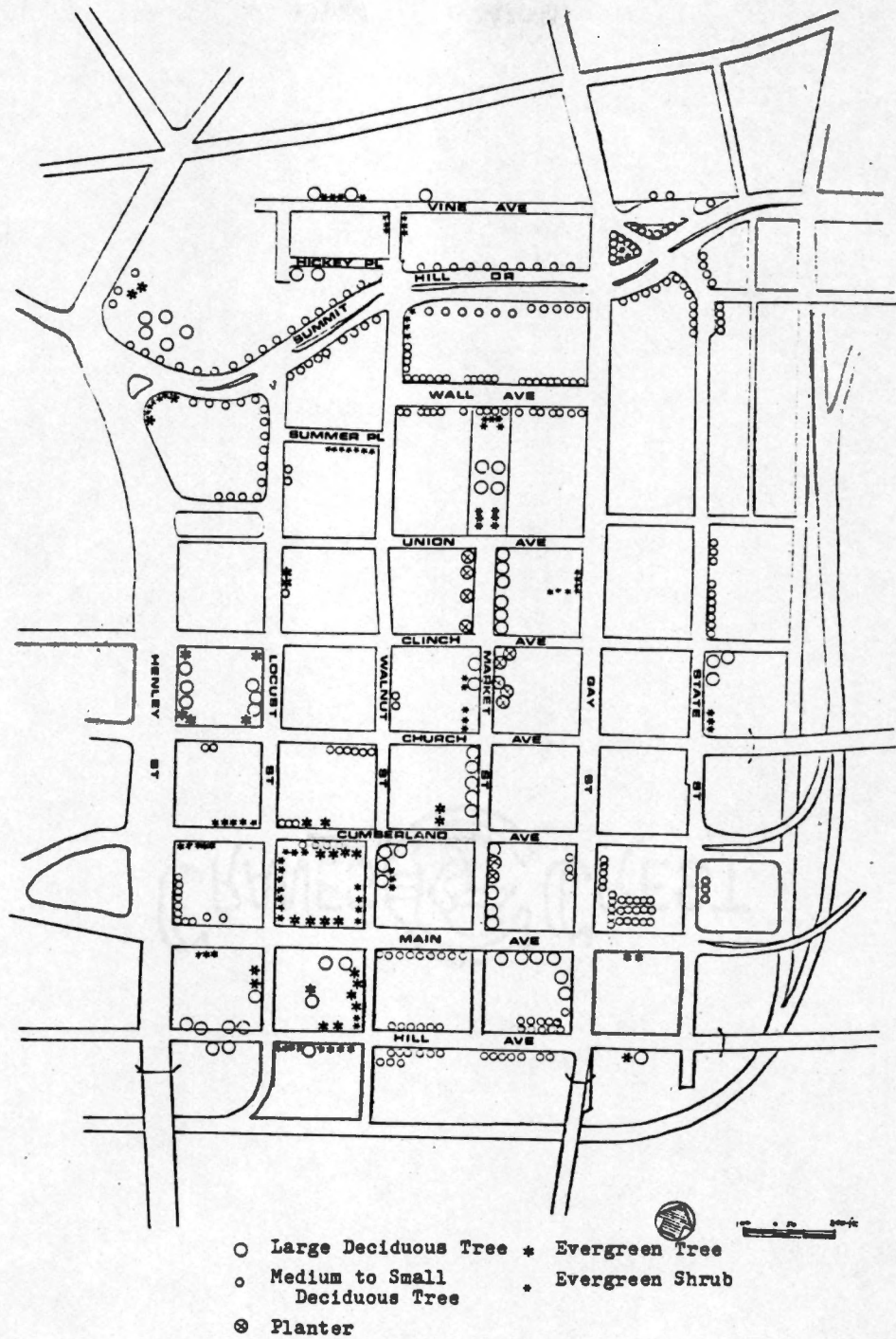


Figure 8. Distribution of planting.

Source: Knoxville City Map--Central Business District.

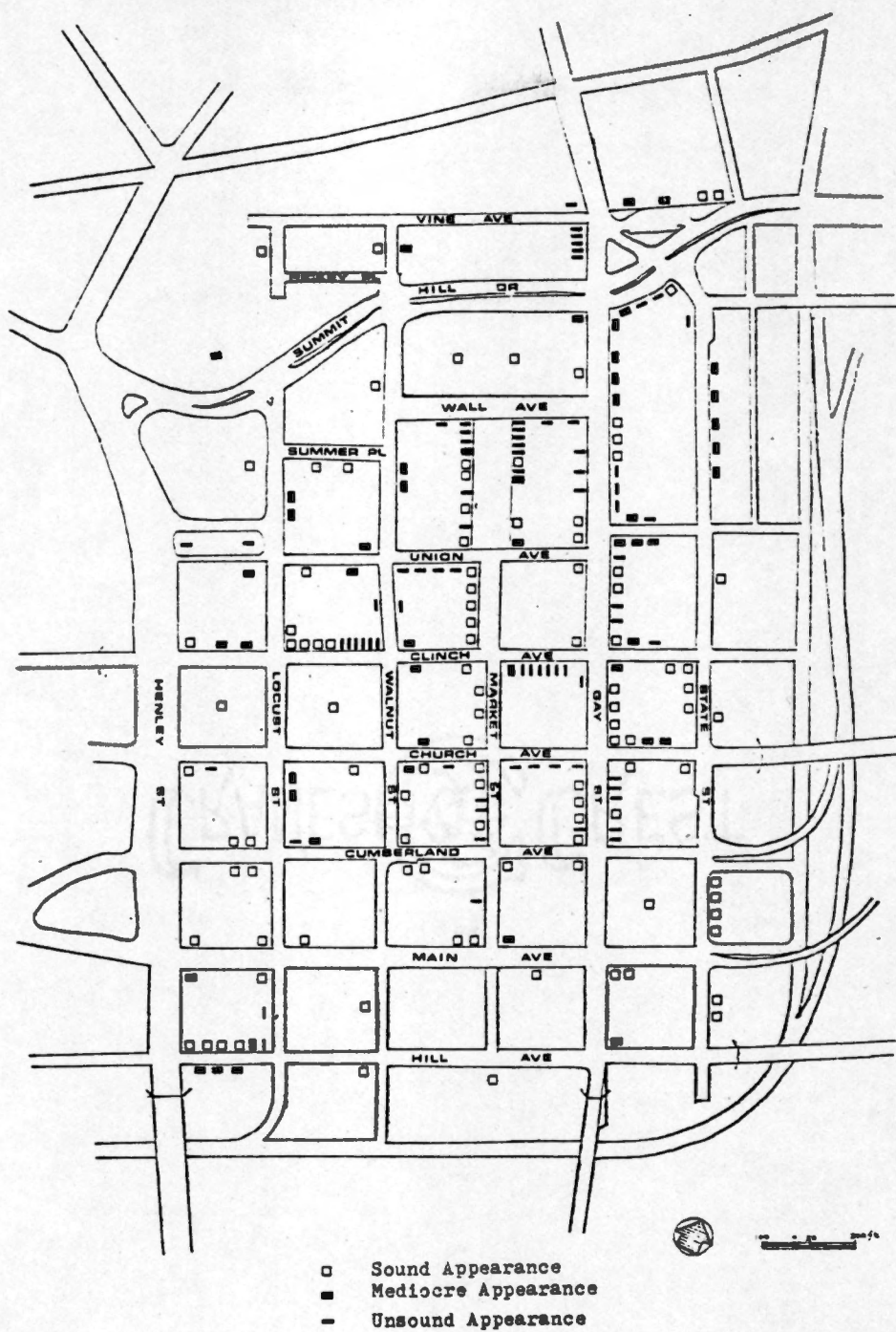


Figure 9. Condition of facades.

Source: Knoxville City Map--Central Business District.

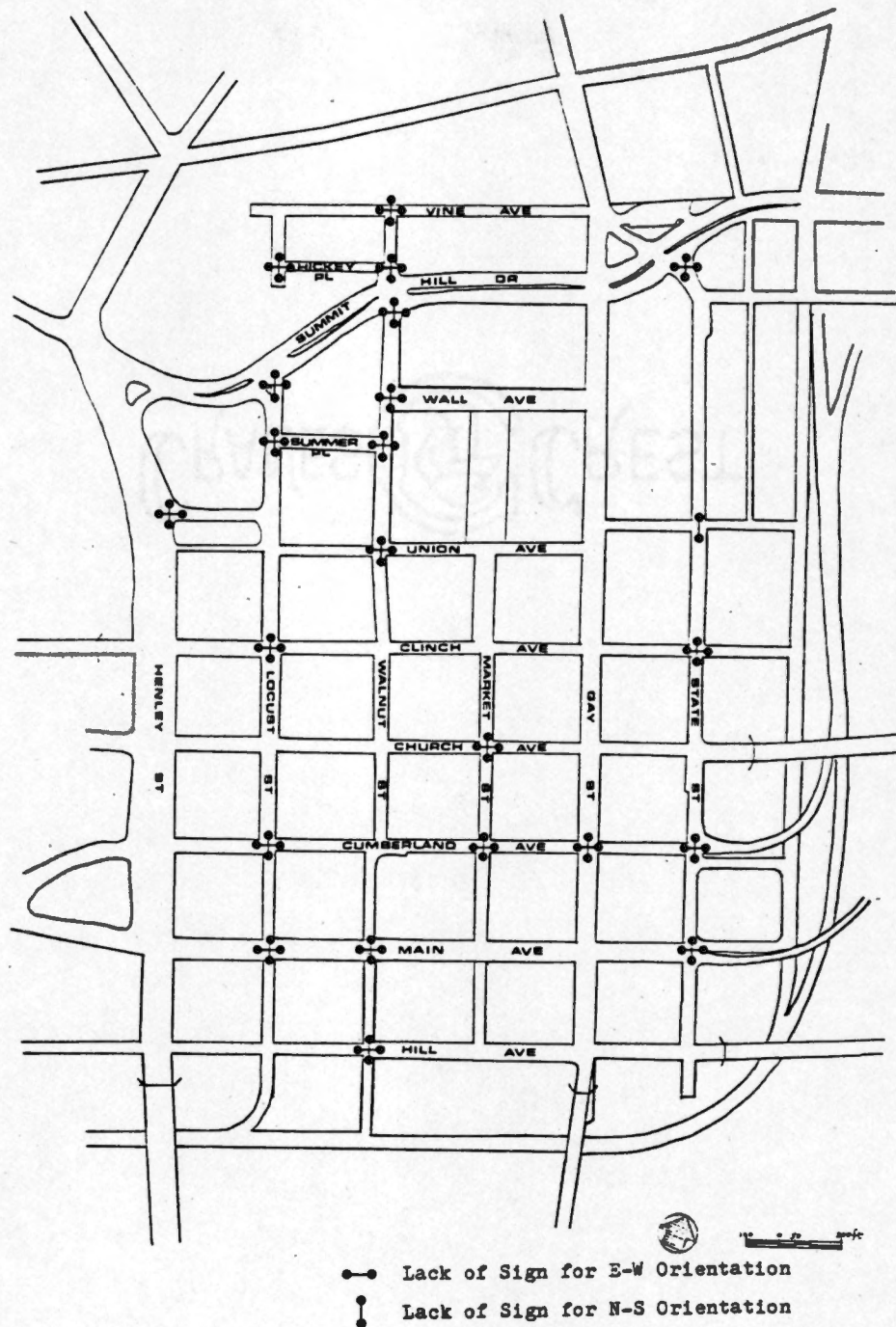


Figure 10. Absence of street name.

Source: Knoxville City Map--Central Business District.

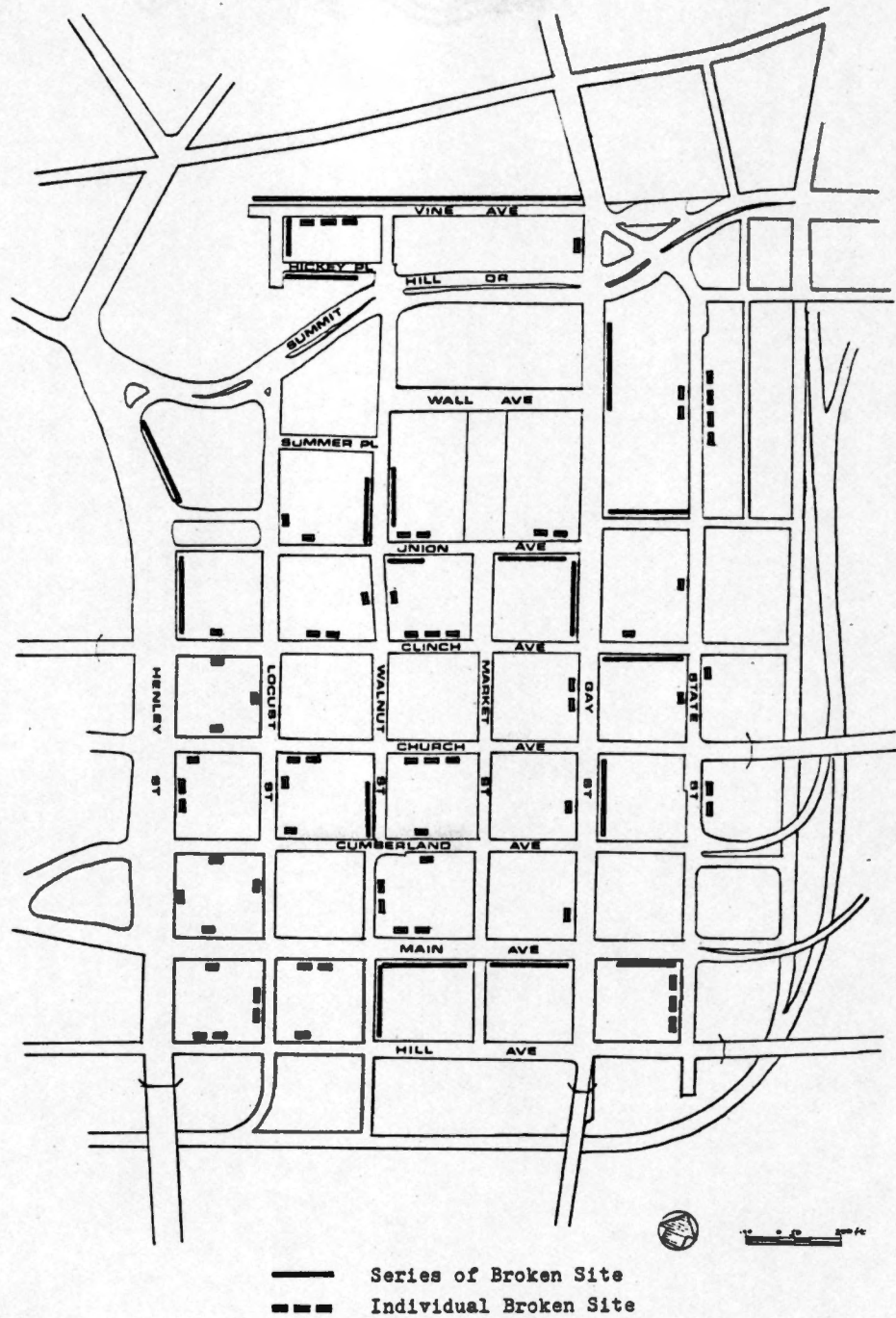


Figure 11. Broken sites of sidewalk pavement.

Source: Knoxville City Map--Central Business District.

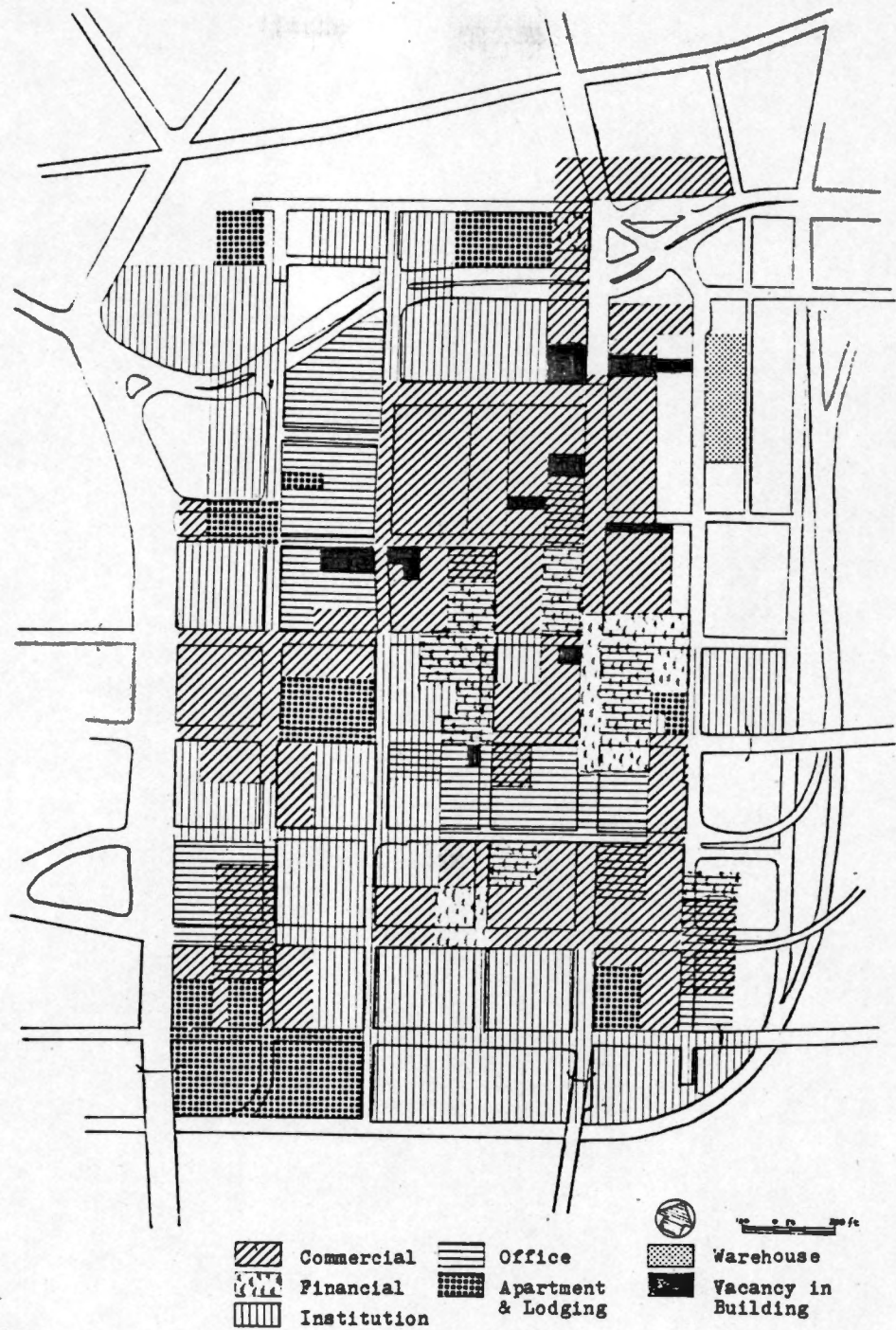


Figure 12. Land use.

Source: Knoxville City Map--Central Business District.

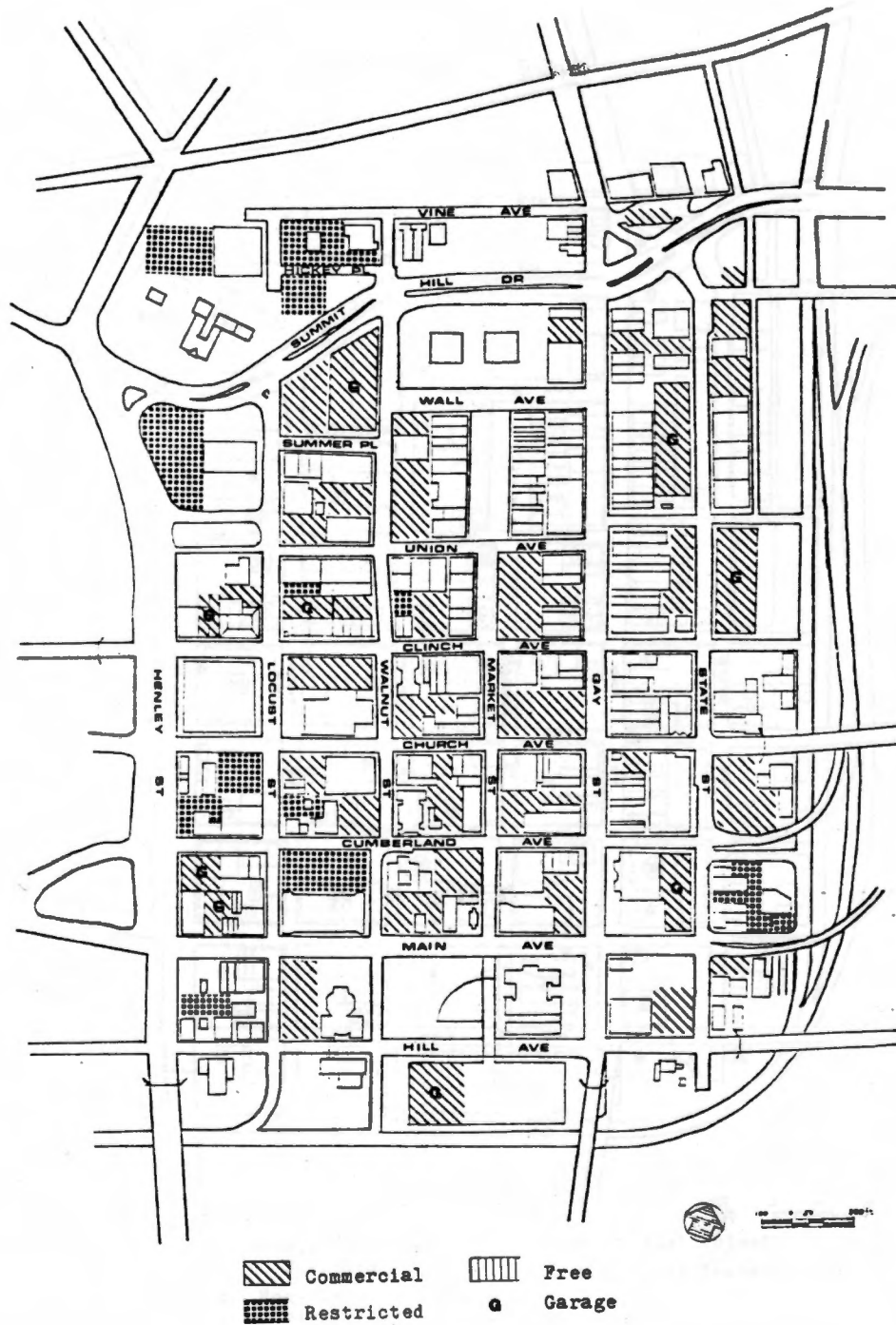


Figure 13. Distribution of parking lot.

Source: Knoxville City Map--Central Business District.

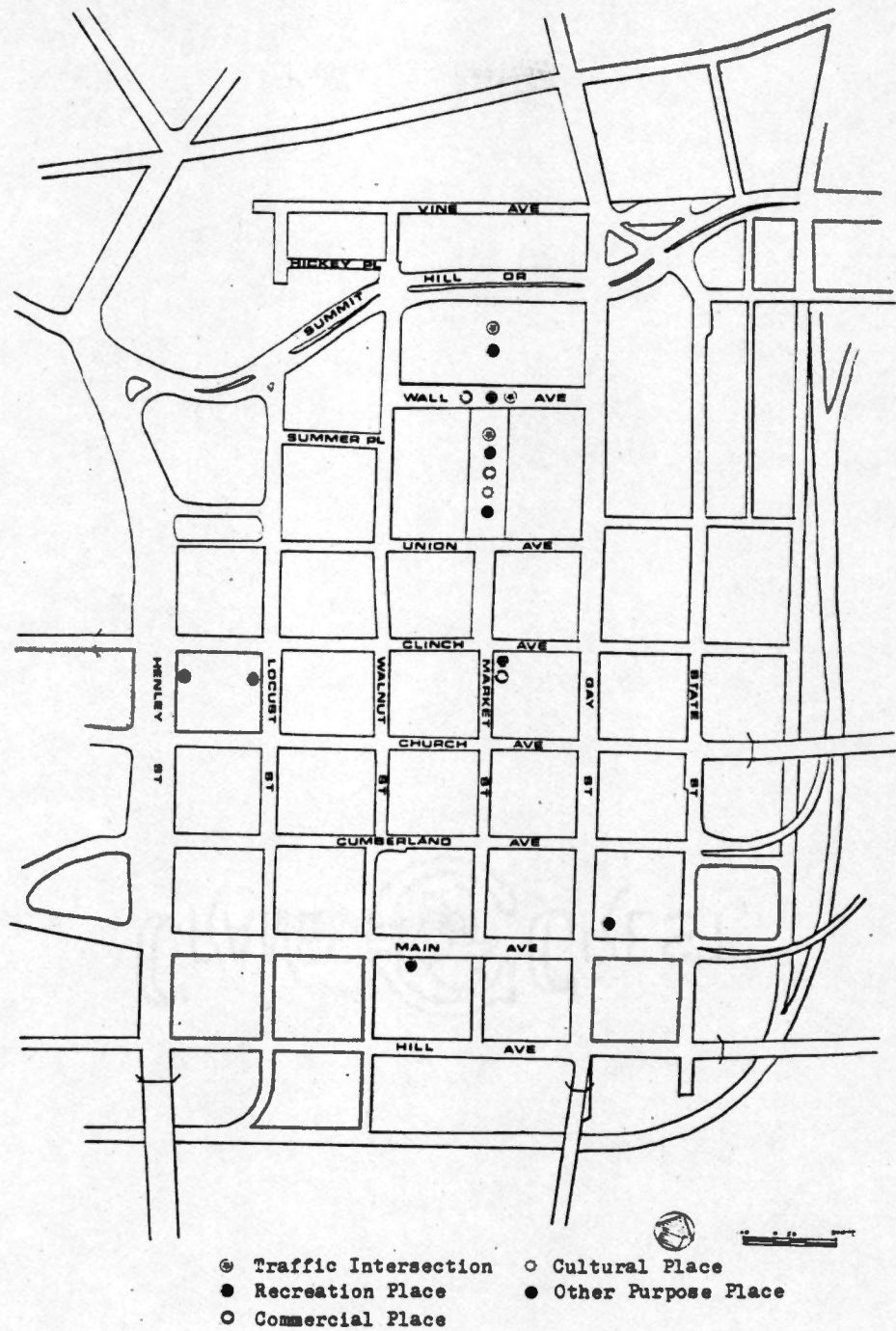


Figure 15. Places having the function of center.

Source: Knoxville City Map--Central Business District.



Figure 16. Linkage.

Source: Knoxville City Map--Central Business District.

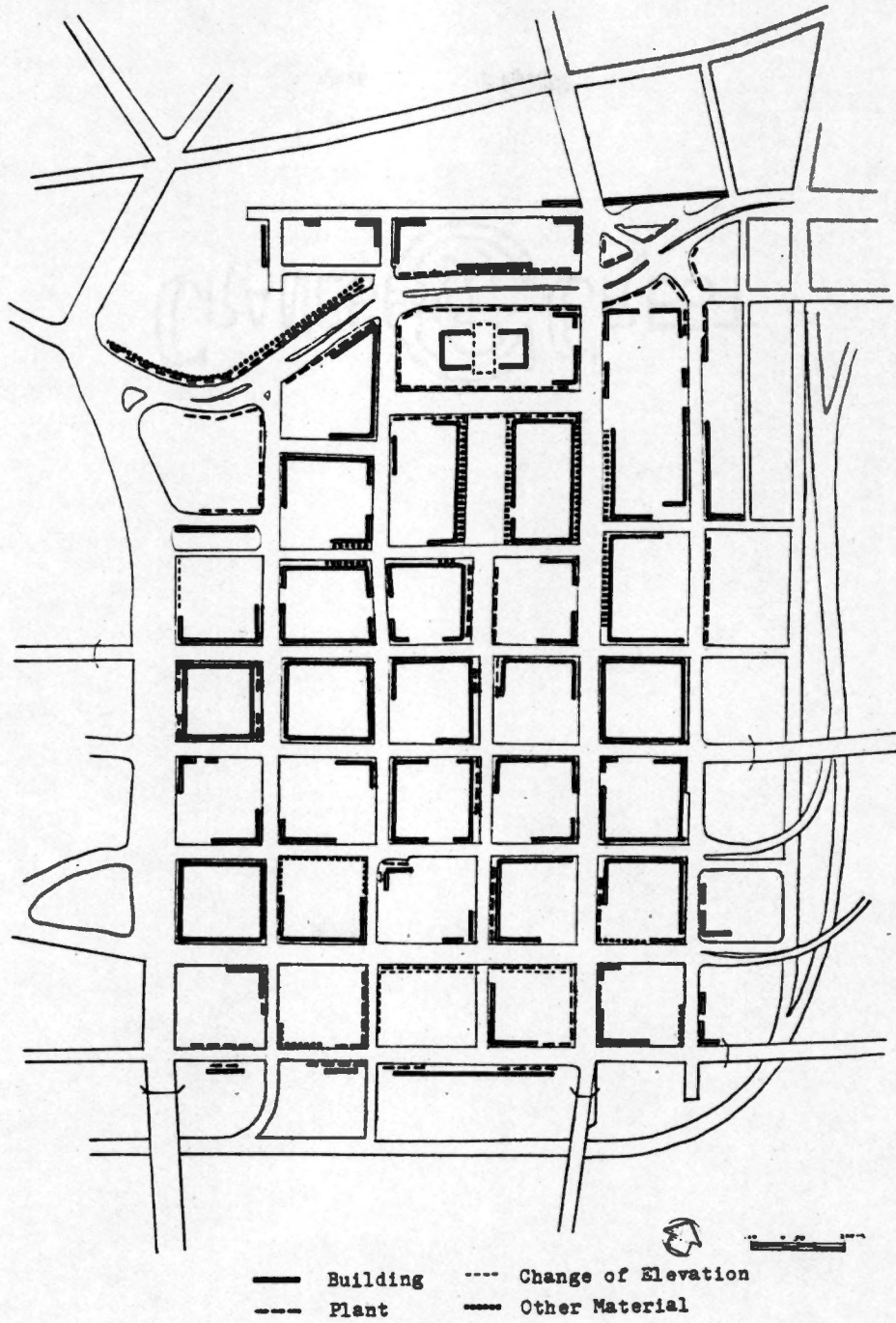


Figure 17. Elements of enclosure.

Source: Knoxville City Map--Central Business District.

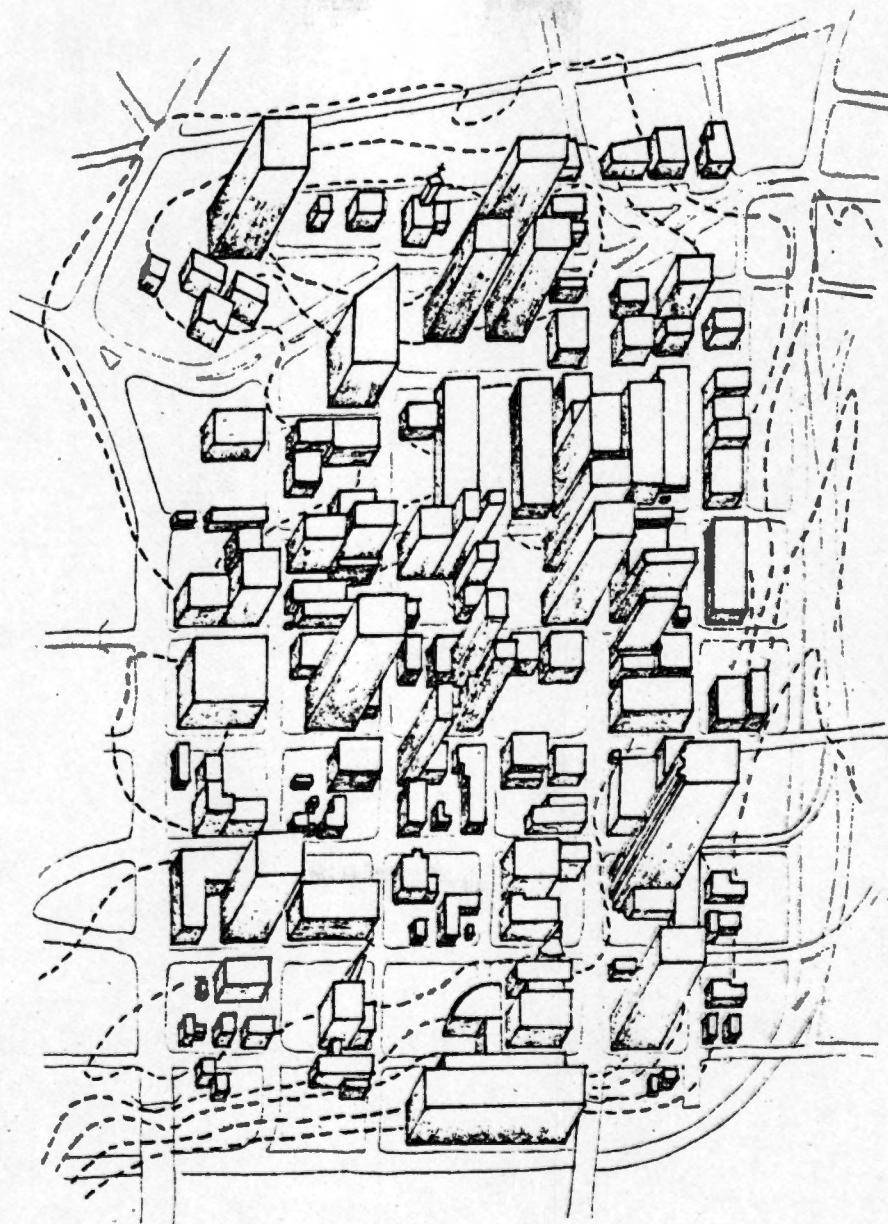


Figure 18. Bird's Eye View of Enclosed Open Space.

Source: Knoxville City Map--Central Business District.

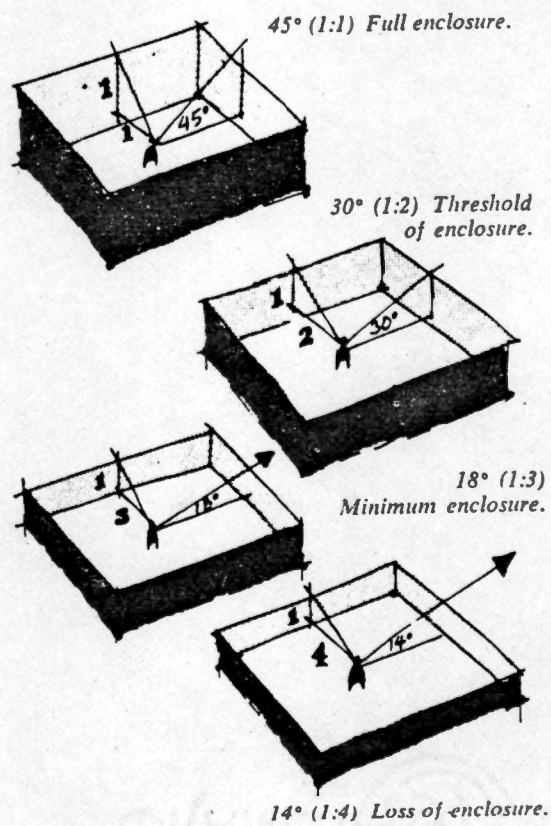


Figure 19. Different ratios of enclosure.

Source: Spreiregen, Urban Design.

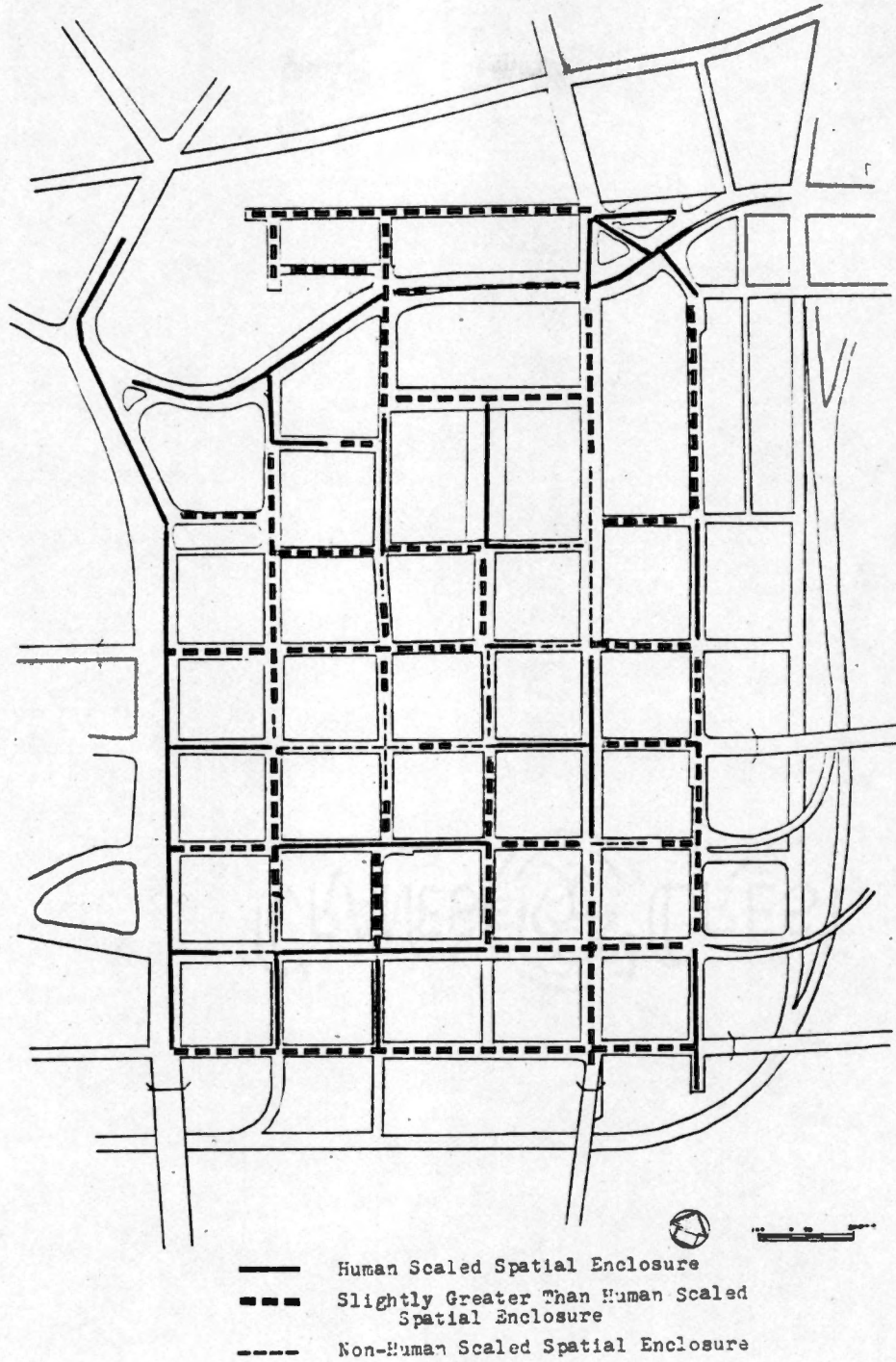


Figure 20. Three scales of spatial enclosure.

Source: Knoxville City Map--Central Business District.

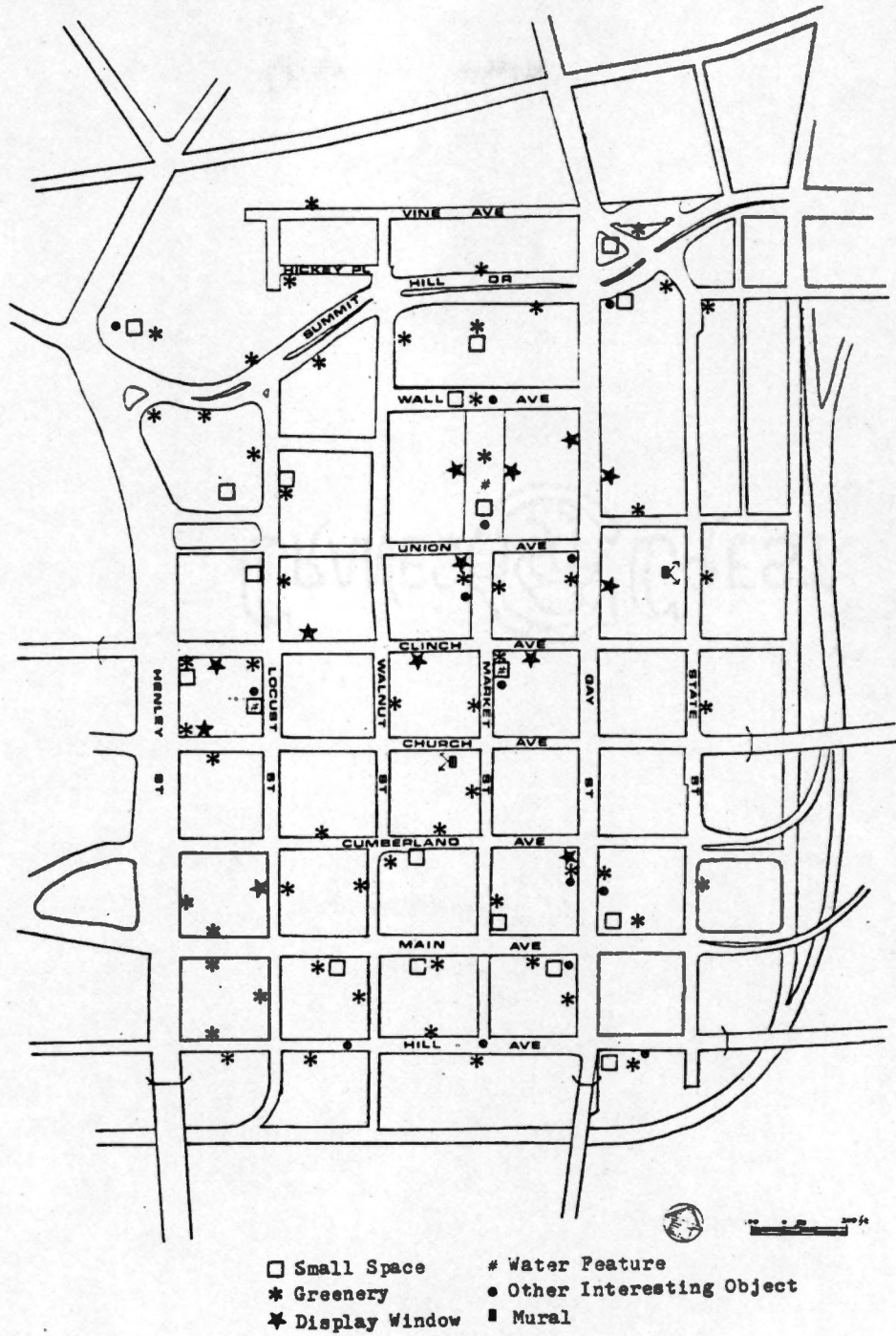


Figure 21. Elements of interruption.

Source: Knoxville City Map--Central Business District.

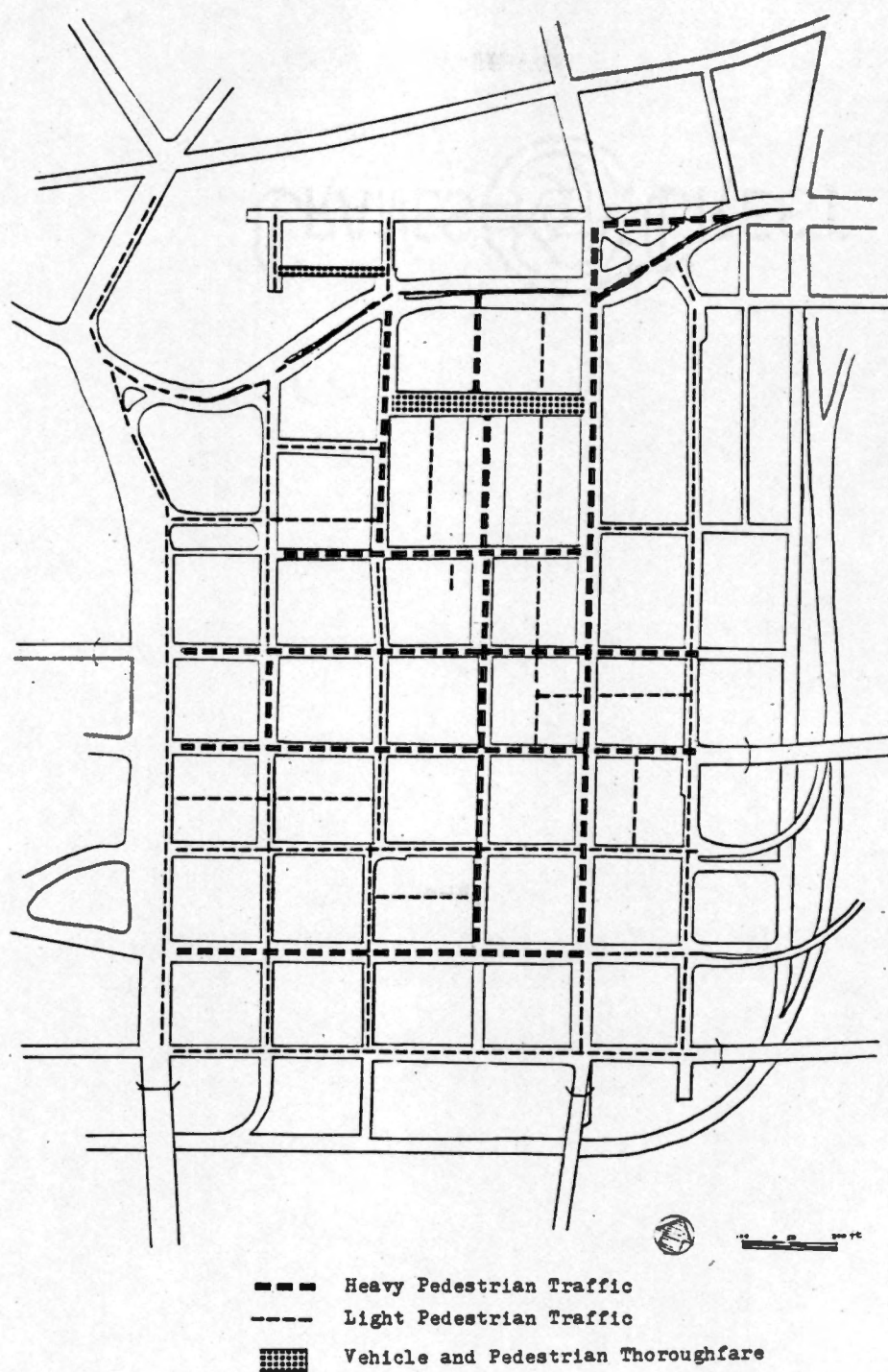


Figure 22. Circulation.

Source: Knoxville City Map--Central Business District.



Figure 23. Skyway of City-County Building.



Figure 24. Display windows of Miller's.



Figure 25. Mural on Church Avenue.



Figure 26. Narrowed sidewalk on Clinch Avenue.

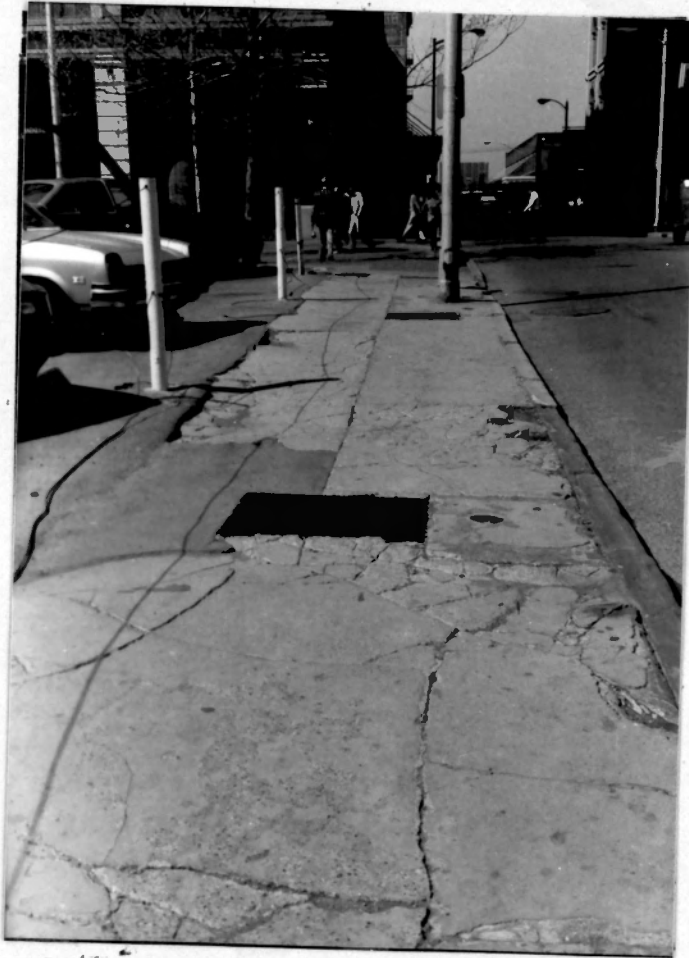


Figure 27. Damaged sidewalk pavement
on Union Avenue.

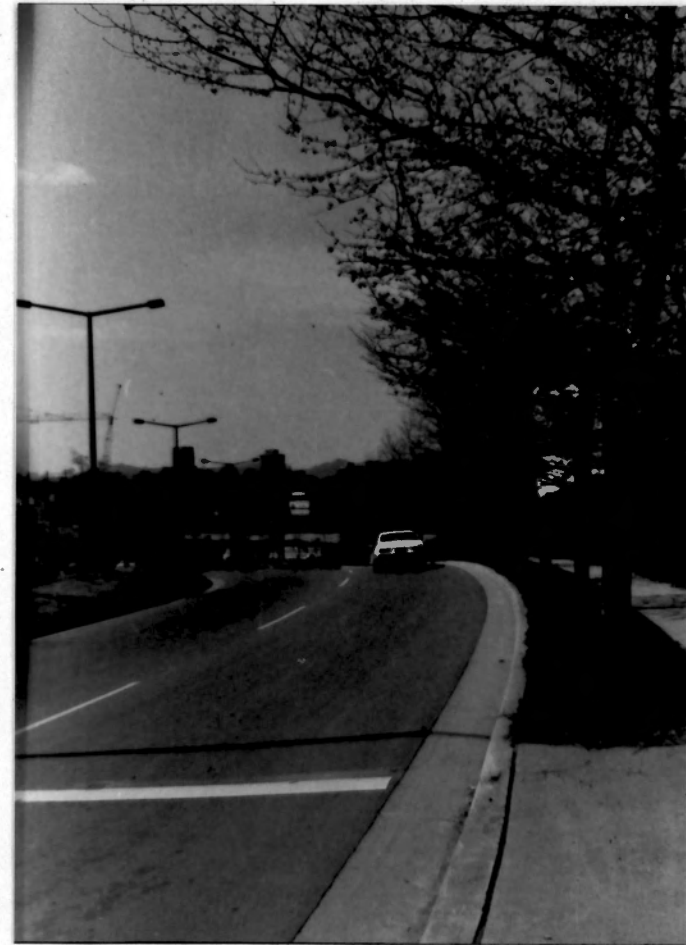


Figure 28. Directional qualities
of planting on Summit Hill Drive.



Figure 29. Small resting area on Summit Hill Drive.



Figure 30. Impassable sidewalk on Hickey Place.

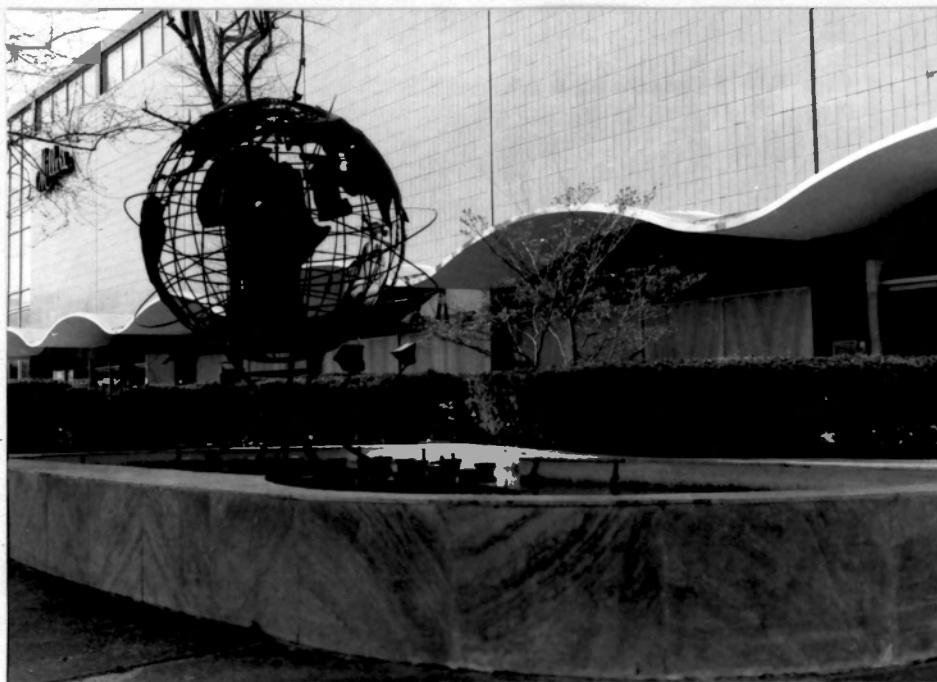


Figure 31. Resting area of Miller's.



Figure 32. Elevated open space of TVA Complex.



Figure 33. Enclosed Market Square.



Figure 34. Small resting area on Market Street.



Figure 35. Unused area.



Figure 36. United American Plaza.



Figure 37. City-County Building Plaza.

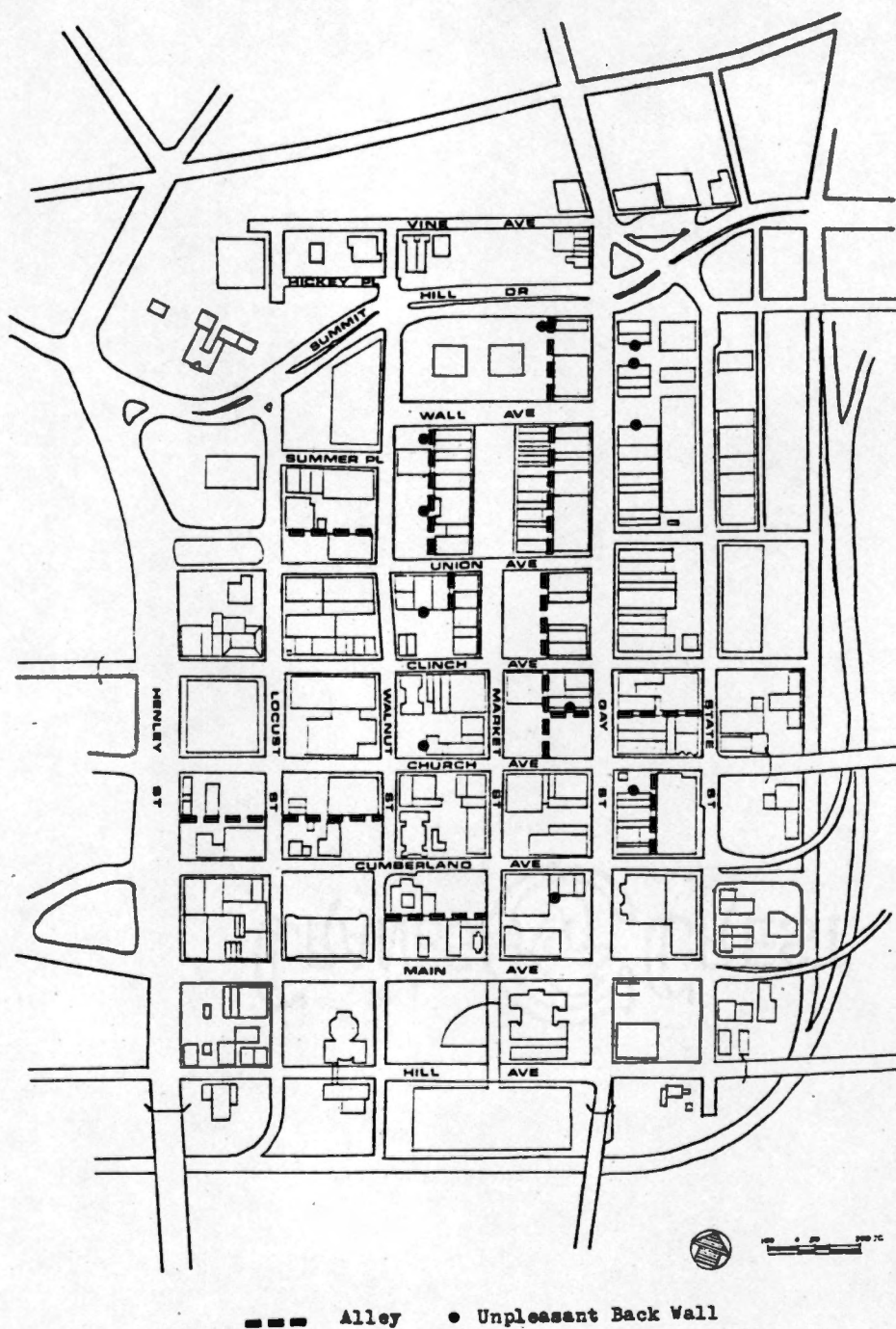


Figure 38. Alleys and unpleasant back walls.

Source: Knoxville City Map--Central Business District.

Table I. Sidewalk and street width comparison.

Street Name	Pavement	Block Number							
		1	2	3	4	5	6	7	8
Hill Avenue	Sidewalk N	5.8	5.3	5.0	11.3				
	Street	33.2	33.2	33.2	35.0				
	Sidewalk S	5.2	5.0	5.0	5.7				
Main Avenue	Sidewalk N	8.5	10.0	10.0	8.5	10.3			
	Street	51.6	51.6	51.6	50.0	48.8			
	Sidewalk S	11.8	12.0	14.0	14.0	8.0			
Cumberland Avenue	Sidewalk N	6.5	5.3	6.5	8.0	7.0			
	Street	28.3	32.0	23.5	21.8	23.0			
	Sidewalk N	6.0	6.0	6.5	7.5	9.5			
Church Avenue	Sidewalk N	12.0	*	6.8	7.5	7.3			
	Street	33.2	32.2	30.8	30.8	35.0			
	Sidewalk S	7.7	10.0	5.5	5.0	6.7			
Clinch Avenue	Sidewalk N	8.3	6.0, 10.5	12.3	7.0	6.0			
	Street	26.3	26.3	27.0	24.0	24.0			
	Sidewalk S	12.0	10.7	15.5	9.2, 5.8	5.5			
Union Avenue	Sidewalk N	5.8 ^a	8.8	6.8	6.5	6.8			
	Street	14.0	19.7	26.0	19.7	26.0			
	Sidewalk S	**	11.5	9.4, 13.6	12.0	8.0			
Summer Place	Sidewalk N	5.0							
	Street	32.0							
	Sidewalk S	14.2, 7.3							
Wall Avenue	Sidewalk N	8.2							
	Street	18.5							
	Sidewalk S	10.0							
Summit Hill Drive	Sidewalk N	4.2 ^{a,b}	*	5.4 ^{a,b}					
	Street	47.0, 63.6	63.6	70.0					
	Sidewalk S ₁	5.0 ^{a,b}	9.6	5.0 ^{a,b}					
	S ₂	5.0 ^{a,b}							
Hickey Place	Sidewalk N	5.0							
	Street	19.0							
	Sidewalk S	5.0							

Table I (Continued)

Street Name	Pavement	Block Number							
		1	2	3	4	5	6	7	8
Vine Avenue	Sidewalk N	4.8	10.0						
	Street	35.0							
	Sidewalk S ₁	5.8	**						
	S ₂	5.0							
Henley Street	Sidewalk W	*	*	*	*	*	*	*	
	Street	60.8	89.9	110.2	110.2	110.2	110.2	69.7	
	Sidewalk E	4.2 ^{a,b}	15.2	14.8	14.8	14.8	11.0	15.3	
Locust Street	Sidewalk W		4.7 ^{a,b}	5.0, 8.7	12.3	6.0	8.8	5.3	
	Street	22.5	26.5	29.0	29.0	24.3	25.0	25.0	
	Sidewalk E ₁	5.6	5.0 ^b	6.5	14.3	4.8	7.0	6.0	
	E ₂		9.0						
Walnut Street	Sidewalk W	3.0	5.0 ^b	5.8, 9.7	5.3	10.8	12.0, 6.0	7.0	5.0
	Street	22.1	33.5	43.0	22.8	28.7	27.0	22.0	19.8
	Sidewalk E	7.3	10.0	9.7, 12.8	6.0	6.0	6.0, 9.7	5.2	5.2
Market Street	Sidewalk W	13.0 ^a	16.0 ^a , 9.0, 11.0	12.0 ^a , 5.3	5.3				
	Street	25.6	18.3	22.5	20.5				
	Sidewalk E	14.4 ^a	24.0 ^a , 7.0	15.5	13.3 ^a				
Gay Street	Sidewalk W ₁	10.4	12.5	13.4	11.3	12.6	12.6	15.0	
	W ₂		8.8						
	Street	29.0	32.0	32.0	29.8	28.7	28.0	28.0	
	Sidewalk E	16.0 ^a	16.0	16.0	12.7	11.3	12.0 ^a	10.8	
State Street	Sidewalk W	14.6 ^a , 9.5	5.5	5.5	5.6, 10.5	6.0	8.0		
	Street	30.5	30.5	30.5	30.5	28.0	28.0		
	Sidewalk E	14.6 ^a	10.5	6.4	5.5	7.0	5.5		

*Under construction.

**No sidewalk

^aWith sidewalk trees.^bWith grass shoulder (its width is not included in sidewalk width).

Note: All street and sidewalk widths shown in feet.

Table II. Topographic changes in percentage.

Street Name	Block							
	1	2	3	4	5	6	7	8
Hill Avenue	2.5	3.0	2.0	2.0	5.0			
Main Avenue	1.0	0.0	0.0	1.0	8.5			
Cumberland Avenue	2.5	2.5	0.5	0.6	8.3			
Church Avenue	5.0	3.0	0.0	0.5	4.3			
Clinch Avenue	4.5	0.5	1.0	1.0	5.0			
Union Avenue	6.0	1.0	2.0	1.0	6.5			
Summer Place	3.0							
Wall Avenue	0.0							
Summit Hill Drive	4.5	5.0	W3.0* E5.0*	5.0				
Vine Avenue	14.0	3.0						
Hickey Place	W3.0* E0.8*							
Henley Street	4.2	2.0	0.5	3.0	1.0	4.5	1.5	
Locust Street	3.0	N1.0 S6.0	5.0	1.8	1.0	3.0	2.0	
Walnut Street	5.0	4.0	3.5	2.5	1.0	0.0	1.0	N3.0* S9.0*
Market Street	0.2	0.2	0.5	0.0				
Gay Street	2.8	0.5	0.2	0.5	1.0	1.5	2.2	
State Street	1.5	2.5	3.0	5.0	0.2	3.0		

*Two topographic changes within a block.

Note: "W" represents the west part, "E" represents the east part, "N" represents the north part, and "S" represents the south part.

Table III. Significant buildings.

Building Name	Visual Significance	Historical or Architectural Significance		
		50 Landmarks ^a	Downtown Tour ^b	Mayor's Downtown Task Force ^c
1. Immaculate Conception	X	X		X
2. L & N Station	X	X		X
3. City Hall	X	X		X
4. TVA Tower	X			
5. Market Square	X			X
6. Kern Building	X		X	
7. Gay Street Group	X	X		
8. Sprankle Building				X
9. First American Bank	X			X
10. Arstein Building	X		X	
11. National Park Bank	X			X
12. United American Bank	X		X	X
13. Miller's	X			X
14. Valley Fidelity Bank	X			X
15. Bank of Knoxville	X		X	X
16. Old Custom House	X	X	X	
17. Fouche Building		X		
18. Tennessee Theater		X	X	X
19. Arcade Building		X	X	
20. KUB				X
21. Knoxville Business College	X			
22. First Presbyterian Graveyard	X	X		X
23. State Office				X
24. Lawson McGhee Library				X
25. St. John's Episcopal Church	X	X	X	X

Table III (Continued)

Building Name	Visual Significance	Historical or Architectural Significance		
		50 Landmarks ^a	Downtown Tour ^b	Mayor's Downtown Task Force ^c
26. St. John's Office		X		
27. Post Office	X		X	X
28. James Park House	X	X	X	X
29. Bijou-Lamar House	X	X	X	
30. Lord Lindsey Restaurant	X	X		
31. First Baptist Church	X		X	X
32. Court House	X	X	X	
33. Andrew Johnson Hotel	X			X
34. Blount Mansion	X	X	X	
35. Craighead-Jackson House	X	X	X	
36. United American Building	X			
37. City-County Building	X			
38. Y.M.C.A.	X			
39. Y.W.C.A.	X			
40. Ramble Building	X			
41. Farragut	X			
42. Kendrick Place	X			

^aA list prepared by Knoxville Heritage, Inc.

^bA list prepared by Knoxville Heritage, Inc. for a 2-hour walking tour in Knoxville's downtown.

^cA map of landmarks made by Mayor's Downtown Task Force.

Planting

Plants that appear in pedestrian open spaces were shown in Figure 8, page 54. Generally, those plants were divided into five groups.

- a. Large deciduous trees,
- b. Small to medium deciduous trees,
- c. Evergreen trees,
- d. Evergreen shrubs,
- e. Planters.

The numbers of circles and dots which symbolize plants in Figure 8, page 54 are quite close to the existing numbers of plants.

Facades

The visible condition of facades in the survey area was shown in Figure 9, page 55. Comparatively, the conditions were classified into three categories.

Sound appearance. It refers to those facades which appear to be structurally and aesthetically sound.

Mediocre appearance. It refers to the facades which look less sound in appearance because their paint is fading or mottled or because they need minor repairs.

Unsound appearance. It refers to the facades which are deteriorated or have quite unpleasant appearances, and which need major repairs.

There were 231 facades inspected in this research.

Street Names

The absence of street name signs was shown in Figure 10, page 56. The symbols indicating north-south orientation and east-west orientation on every intersection indicate the missing signs.

Sidewalk Pavement

The visible condition of pavement on sidewalks was seen in Figure 11, page 57. The damage or carelessly repaired pavements were recorded as broken sites. Each short line within a block stands for one broken site. A long line in a block means that there are five or more broken sites and that possibly the whole pavement needs repairing or replacing. Partial data were gained from the Knoxville Engineering Department.

Topographic Changes

The percentage of topographic change gradient was shown in Table II. The change of slope within a block was recorded in percentages. When there is one number in a block, it means the slope keeps ascending or descending without changing. Two numbers in a block means the slope changes from ascending (descending) to descending (ascending) within the block; therefore, there are two different percentages. Zero means there is no slope on that block.

Land Use Intensity

The gradient of land use intensity was shown in Figure 12, page 58. Since the real land use is not obvious, different kinds of floor uses in a building were recorded. Therefore, a building would possibly be marked more than once. The major floor uses of commercial,

financial, institutional, office, lodging, warehouse, and vacant buildings are varied (Appendix B). These different uses were put together in one figure to see their intensity and gradient. Parking is another major land use. Since parking lots were observed in almost every block (Figure 13, page 59), they were shown separately from the other land uses to decrease the complexity of the symbols.

Orientation

The positions of the physical elements which have the function of orientation were shown in Figure 14, page 60. Significant buildings include buildings which have historical or architectural importance or were listed as landmarks by different organizations, and buildings which were not listed as landmarks but have visual significance (Table III, page 82). A historically or architecturally significant building is not necessarily a visual significant one; therefore, Figure 14, page 60, only differentiates visually significant buildings from non-visually significant buildings. Unusual objects and outdoor space are shown by their approximate position.

Center

The open spaces which have the function of a center and are used as a gathering point were shown in Figure 15, page 61. The gathering of people was observed through a random survey of routine activities that happen most often in the space during a normal day. The information about some activities which were not able to be recorded during the usual time was obtained through interviewing the related people and reviewing the past studies, such as "The Knoxville

Market Square Mall." Different uses of a gathering point were shown by different symbols.

Linkage

The open spaces which have the function of linkage were shown in Figure 16, page 62. The use that an individual space serves was recorded according to its form and function. When a space has more than one symbol, it means that the space functions as more than one kind of space. For instance, a space could function as both a corridor space for linear movement and a nodal space for gathering and circular movement. The darkened block lines indicate symbolically sidewalks functioning as corridor space. Symbols which are within the symbols of corridor spaces show the function of open spaces which are within sidewalks.

Enclosure

The conditions of enclosure of the pedestrian open spaces were shown in Figure 17 and 18, pages 63-64. According to the integration of those physical elements--such as buildings, plants, changes of elevation, and other materials which enclose a space--the extent of enclosure could be classified as:

Human scaled spatial enclosure. It refers to the spaces which are enclosed by objects whose heights are one-half or one-third of the width of the space. In this ratio, the most comfortable sense of human-sized enclosure is obtained (Lynch, 1971, p. 194).

Slightly greater than human scaled spatial enclosure. It refers to the spaces which are enclosed by physical elements which

are enclosed by physical elements which are almost as high as or higher than the width of the space. A less comfortable sense of human-sized enclosure is obtained.

Non-human scaled spatial enclosure. It refers to the spaces which are enclosed by objects whose heights greatly exceed the width of the spaces. A very strong sense of enclosure is obtained, and the space is felt to be much smaller than it really is.

An illustration of the different ratios of enclosure was shown in Figure 19, page 65 and an inventory of the three scales of open spaces in the survey area was shown in Figure 20, page 66.

Interruption

The existence and kinds of physical elements which would possibly be regarded as visual interruptions were shown in Figure 21, page 67. Small spaces which could be walked in or used as resting sites were marked. Greenery which could be seen along the walkway were all counted as visual stimulants. The symbol shows the existence of greenery instead of the exact number and position of physical elements. Blocks which have attractive display windows, regardless of how many sites there are, were marked. Since a mural could only be observed from certain directions, arrows were added to the symbol to show the directions from which the mural could be seen. Water features and other interesting objects were also shown by their approximate locations.

Circulation

The open spaces which have the function of pedestrian circulation were shown in Figure 22, page 68. The pedestrian thoroughfare

was divided into two categories--heavy pedestrian traffic and light pedestrian traffic--according to its comparative use by the pedestrians.

The individual open spaces were analyzed by sections in the following paragraphs. The physical condition which would enhance the character of the pedestrian open space is put into the category of advantageous conditions. The physical condition which would weaken the character of the pedestrian open space is put into the category of disadvantageous conditions. The miscellaneous category refers to the detailed condition which is neither advantageous nor disadvantageous.

II. ANALYSIS OF THE INDIVIDUAL OPEN SPACE

Hill Avenue--Section N

Advantageous conditions:

- a. Planting: on 1N, 2N, and 3N.
- b. Facades: sound appearances; Hotel Monday and Andrew Johnson Hotel under reconstruction.
- c. Topographic change: production of an interesting scene of a flowing space through gradual change.*
- d. Orientation: easy to see Lord Lindsey Restaurant, the First Baptist Church, the Court House, the Andrew Johnson Hotel, the skyways of the City-County Building (Figure 23, page 69) and the First Baptist Church, and the City-County Building Plaza.
- e. Linkage: sidewalks in the form of a corridor space.
- f. Enclosure: buildings and plants, and a small part of wall on 2N.

*The data of these two items are the same in Section N and Section S or in Section W and Section E; therefore, they will only be mentioned in one section in the analyses of other streets.

- g. Interruptions: greenery and skyways.
- h. Circulation: pedestrian thoroughfare with light

traffic.

Disadvantageous conditions:

- a. Sidewalk width: four various widths; widest at the southern side of the Andrew Johnson Hotel on 4N.
- b. Street name signs: one missing between 2N and 3N.*
- c. Gradient of land use intensity: vague.
- d. Sidewalk pavement: light damages on 1N and 2N.
- e. Linkage: green space at the Court House more for landscaping than for walking.

Miscellaneous:

- a. Trees: along the sidewalks on 1N and 2N--inside private properties; on 3N--planted on the shoulder between the street pavement and the sidewalk pavement.
- b. Land: used mainly for institutions and residences.
- c. Auto traffic: dangerous to the pedestrians crossing from 3N to 4N on Gay Street.

Hill Avenue--Section S

Advantageous conditions:

- a. Sidewalk width: almost uniform.
- b. Planting: small trees on each block.
- c. Facades: sound appearances.
- d. Sidewalk pavement: good condition.
- e. Gradient of land use intensity: obvious.
- f. Orientation: easy to see the City-County Building.

g. Linkage: sidewalks in the form of a corridor space; Blount Mansion's outdoor space for both landscaping and walking.

h. Enclosure: buildings and small trees.

i. Interruptions: greenery, Blount Mansion's white fence and outdoor space.

j. Circulation: pedestrian thoroughfare with light traffic.

Disadvantageous conditions:

a. Planting: no obvious continuity.

b. Orientation: not so easy to see Blount Mansion and its lowered outdoor space since the Mansion's west side is blocked by large trees.

Miscellaneous:

a. Land: used mainly for institutions and residences.

b. Unused areas: open spaces on 1S and 2S toward the river.

Main Avenue--Section N

Advantageous conditions:

a. Sidewalk width: uniform.

b. Planting: on 1N and 2N.

c. Facades: sound appearances.

d. Orientation: easy to see the Post Office, and the United American Plaza.

e. Linkage: sidewalks in the form of a corridor space.

f. Enclosure: buildings.

g. Interruptions: a small space with trees and seats at the west corner of 4N.

h. Circulation: pedestrian thoroughfare with less light traffic.

Disadvantageous conditions:

- a. Street name signs: three missing signs.
- b. Sidewalk pavement: broken sites on 1N and 3N.
- c. Topographic change: not obvious.
- d. Gradient of land use intensity: vague.

Miscellaneous:

- a. Pleasing views--on 5N toward the east.

Main Avenue--Section S

Advantageous conditions:

- a. Planting: small elevated trees on 3S, large trees on 4S.
- b. Facades: in good condition.
- c. Orientation: easy to see the First Baptist Church, the Court House and its green space, and the City-County Building Plaza.
- d. Linkage: sidewalks in the form of a corridor space.
- e. Enclosure: buildings and plants.
- f. Interruptions: trees, open spaces, and the statue and monuments of the Court House.
- g. Circulation: pedestrian thoroughfare with less light traffic.

Disadvantageous conditions:

- a. Sidewalk width: quite wide, but narrow on 5S.
- b. Sidewalk pavement: broken sites on 1S, 2S, 3S, 4S, and 5S.
- c. Gradient of land use intensity: not very obvious.
- d. Linkage: open spaces of the City-County Building, the First Baptist Church, and the Cort House used for landscaping more than for walking.

Miscellaneous:

- a. Land--mainly for institutional use.

Cumberland Avenue--Section N

Advantageous conditions:

- a. Planting: on 1N, 2N, and 3N.
- b. Topographic change: gradual from 1N to 4N.
- c. Orientation: easy to see St. John's Episcopal Church.
- d. Linkage: sidewalks in the form of a corridor space.
- e. Enclosure: buildings.
- f. Interruptions: greenery.
- g. Circulation: pedestrian thoroughfare with light traffic.

Disadvantageous conditions:

- a. Sidewalk width: various widths, narrow on 2N and wider on 4N.
- b. Facades: unsound facades on 2N, 3N, and 5N.
- c. Street name signs: four missing signs.

- d. Sidewalk pavement: a few damaged sites on 2N and 3N.
- e. Gradient of land use intensity: not obvious.

Miscellaneous:

- a. Sharp topographic change--production of a good view toward east on 5N.

Cumberland Avenue--Section S

Advantageous conditions:

- a. Planting: on 1S, 2S, and 3S.
- b. Facades: in good condition; James Park House under repair.
- c. Orientation: easy to see James Park House, Bijou-Lamar House, and United American Plaza.
- d. Linkage: sidewalks in the form of a corridor space.
- e. Enclosure: buildings, plants, and the wall on 2S.
- f. Interruptions: plants and the small yard in front of James Park House.
- g. Circulation: pedestrian thoroughfare with light traffic.

Disadvantageous conditions:

- a. Sidewalk width: 3 feet for practical use at the Bijou-Lamar House because of the fire steps.
- b. Sidewalk pavement: one broken site on 2S and 3S.
- c. Gradient of land use intensity: not obvious.
- d. Unpleasant interruptions: black wooden light poles on 2S.

Church Avenue--Section N

Advantageous conditions:

- a. Planting: on 1N.
- b. Sidewalk pavement: in good condition; only one broken site on 1N.
- c. Topographic change: sharp from 1N to 2N.
- d. Orientation: easy to see Miller's, Bank of Knoxville, and Knoxville Business College.
- e. Linkage: sidewalks in the form of a corridor space.
- f. Enclosure: buildings.
- g. Interruptions: display windows of Miller's (Figure 24, page 69) and greenery.
- h. Circulation: pedestrian thoroughfare with heavy traffic.

Disadvantageous conditions:

- a. Sidewalk width: narrow on 3N, 4N, and 5N.
- b. Facades: minor repairs needed on 3N and 5N.
- c. Street name signs: one missing sign between 3N and 4N.
- d. Gradient of land use intensity: vague.

Church Avenue--Section S

Advantageous conditions:

- a. Planting: on 1S and 2S.
- b. Facades: south Central Bell building undergoing renovation.
- c. Orientation: easy to see Hilton Hotel.

- d. Linkage: sidewalks in the form of a corridor space.
- e. Enclosure: buildings.
- f. Interruptions: greenery; a mural on 3S (Figure 25, page 70).
- g. Circulation: pedestrian thoroughfare with heavy traffic.

Disadvantageous conditions:

- a. Sidewalk width: suddenly narrowed down on 3S and 4S.
- b. Facades: unsound facades on 1S and 3S, very disturbed facades on 4S.
- c. Sidewalk pavement: broken sites on 1S, 2S, and 3S.
- d. Gradient of land use intensity: vague.

Clinch Avenue--Section N

Advantageous conditions:

- a. Topographic change: not very sharp; production of a long slope through gradual change from 1N to 3N.
- b. Orientation: easy to see Y.M.C.A., First American Bank, and United American Bank.
- c. Linkage: sidewalks in the form of a corridor space.
- d. Enclosure: buildings.
- e. Interruptions: display windows with dim light on 2N.
- f. Circulation: main pedestrian thoroughfare with heavy traffic.

Disadvantageous conditions:

- a. Sidewalk width: various widths, suddenly narrowed down at the eastern half of 2N (Figure 26, page 70).

- b. Planting: none.
- c. Facades: minor repairs needed on 1N, 3N, and 5N;
major repairs needed on 2N.
- d. Street name signs: two missing signs.
- e. Sidewalk pavement: broken sites on 1N, 2N, 3N, and
5N.
- f. Gradient of land use intensity: not very obvious.

Clinch Avenue--Section S

Advantageous conditions:

- a. Planting: on 1S and 5S.
- b. Orientation: easy to see Valley Fidelity Bank and
the Old Custom House.
- c. Linkage: sidewalks in the form of a corridor space.
- d. Enclosure: buildings.
- e. Interruptions: greenery and display windows.
- f. Circulation: main pedestrian thoroughfare with
heavy traffic.

Disadvantageous conditions:

- a. Sidewalk width: narrowed down on 4S; much narrower
in front of the Fouch Building.
- b. Facades: minor repairs needed on 3S and 5S; major
repairs needed on 4S.
- c. Sidewalk pavement: broken sites on 1S and 5S.
- d. Gradient of land use intensity: not obvious.

Union Avenue--Section N

Advantageous conditions:

- a. Planting: on 1N.
- b. Facades: Kern Building repainted.
- c. Topographic change: fairly sharp on 1N and 5N.
- d. Orientation: easy to see Kern Building, the outdoor space on 1N, and the square between 1N and 4N.
- e. Linkage: sidewalks in the form of a corridor space.
- f. Enclosure: buildings, plants, and the shelter on 2N.
- g. Interruptions: the sculpture at the entrance of Market Square, the square itself, the greenery on 1N, and the pendulous greenery on the top floor of Kimble on 5N.
- h. Circulation: main pedestrian thoroughfare with heavy traffic on 2N, 3N, and 4N, and light traffic on 1N and 5N.

Disadvantageous conditions:

- a. Sidewalk width: narrower on 3N and 4N; impediments in the form of a newsstand and a bus stop.
- b. Facades: minor repairs needed on half of the facades.
- c. Street name signs: two missing signs.
- d. Sidewalk pavement: broken sites on 2N, 3N, 4N, and 5N.
- e. Gradient of land use intensity: not obvious.

Miscellaneous:

- a. Sidewalk disconnection: sidewalks on 1N and 5N not directly connected to the other sidewalks in this section.

b. Directional effect: not shown on the slopes on 1N and 5N since the scenes ahead of pedestrians blocked by buildings between 1N and 2N and between 4N and 5N.

Union Avenue--Section S

Advantageous conditions:

- a. Planting: no plants.
- b. Facades: Kendrick Place on 1S under reconstruction.
- c. Orientation: easy to see Kendrick Place, Arstein Building and National Park Bank.
- d. Linkage: sidewalks in the form of a corridor space.
- e. Enclosure: some shelters on 2S and 3S and some buildings.
- f. Interruptions: the convex, decorated, and transparent windows of Union Cafe.
- g. Circulation: main pedestrian thoroughfare with heavy traffic on 2S, 3S, and 4S.

Disadvantageous conditions:

- a. Linkage: sidewalks not directly connected between 1S and 2S and between 4S and 5S.
- b. Sidewalk width: sidewalks at the two ends of 3S narrower than in the middle; no sidewalk behind the residential area on 1S.
- c. Facades: major repairs needed on 1S and 3S; minor repairs needed on 2S and 5S.

d. Sidewalk pavement: broken sites on 3S and 4S
(Figure 27, page 71).

e. Gradient of land use intensity: not obvious.

Summer Place

Advantageous conditions:

- a. Sidewalk width: uniform on both sections.
- b. Planting: shrubs in front of Liberty Building.
- c. Facades: in good condition.
- d. Sidewalk pavement: in good condition.
- e. Topographic change: gradual.
- f. Gradient of land use intensity: obvious.
- g. Linkage: sidewalks in the form of a corridor space.
- h. Enclosure: buildings.
- i. Interruptions: greenery.
- j. Circulation: pedestrian thoroughfare with light traffic.

Disadvantageous conditions:

- a. Sidewalk disconnection: not linked to any other sidewalks.
- b. Street name signs: no signs at either end.
- c. Orientation: no visually significant buildings, objects, or outdoor spaces.

Miscellaneous:

- a. Narrowed sidewalks: at the east part of Section S for the purpose of parking and loading.
- b. Major land uses: offices on Section N and Section S.

Wall Avenue

Advantageous conditions:

- a. Sidewalk width: uniform on both Section S and Section N; brick-paved street also part of the sidewalk.
- b. Planting: in a continuous row on both sections; protections at the bottom of some of the trees.
- c. Sidewalk pavement: in good condition.
- d. Topographic change: none; a production of a flat open space.
- e. Gradient of land use intensity: obvious on both sections.
- f. Orientation: easy to see TVA towers and Wall Avenue itself.
- g. Linkage: in the form of a corridor space for linear movement and a nodal space for stopping and gathering.
- h. Center: a traffic intersection; a recreation place for sitting, talking, and viewing; a commercial place for shopping and eating.
- i. Enclosure: plants and buildings.
- j. Interruptions: plants, artistic street lights.
- k. Circulation: vehicle and pedestrian thoroughfare with heavy traffic.

Disadvantageous conditions:

- a. Facades: major repairs needed on Section S.
- b. Street name signs: no name at the west entry.

Miscellaneous:

- a. Major land uses--institutions on Section N; retail businesses on Section S.

Summit Hill Drive--Section N

Advantageous conditions:

- a. Sidewalk width: narrow but uniform.
- b. Planting: trees of the same size and variety showing directional movement (Figure 28, page 71).
- c. Sidewalk pavement: in good condition, not including the one under construction on 2N.
- d. Topographic change: mainly a long, curving slope.
- e. Gradient of land use intensity: not vague.
- f. Orientation: easy to see City Hall, the Immaculate Conception Church, the outdoor space of City Hall on 1N, and two traffic triangles on 3N.
- g. Linkage: sidewalks in the form of a corridor space; City Hall's outdoor space used more for landscaping than for walking and gathering.
- h. Enclosure: retaining walls and rising elevation on 2N; trees.
- i. Interruptions: greenery, outdoor spaces, and a statue on 1N.
- j. Circulation: pedestrian thoroughfare with light traffic.

Disadvantageous conditions:

- a. Facades: minor repairs needed on City Hall and the Immaculate Conception Church.
- b. Street name signs: one missing sign between 1N and 2N.

Miscellaneous:

- a. Major land use--institutions.

Summit Hill Drive--Section S

Advantageous conditions:

- a. Sidewalk width: uniform on 1S₁, 1S₂, and 3S; wider at the site of TVA tower complex on 2S.
- b. Planting: on 1S₁, 1S₂, and 3S.
- c. Sidewalk pavement: in good condition.
- d. Orientation: easy to see TVA towers and a small resting space at the west corner of 3S.
- e. Linkage: sidewalks in the form of a corridor space; the outdoor space within Knoxville Fire Department's property on 2S used for landscaping and in the form of a structure space.
- f. Enclosure: trees and buildings.
- g. Interruptions: greenery and a resting place on 3S (Figure 29, page 72).
- h. Circulation: pedestrian thoroughfare with light traffic.

Disadvantageous conditions:

- a. Facades: major repairs needed on 3S.
- b. Street name signs: three missing signs.
- c. Gradient of land use intensity: not obvious.

Miscellaneous:

- a. Trees: inside private properties at the western part of 2S and in the whole of 3S; with protected bottom on the eastern sidewalk of 2S.

Hickey Place

Advantageous conditions:

- a. Planting: two large trees on 1S.
- b. Topographic change: gradual.
- c. Gradient of land use intensity: obvious.
- d. Linkage: the sidewalk on 1N in the form of a corridor space.
- e. Enclosure: plants and buildings.
- f. Interruptions: trees.
- g. Circulation: pedestrian thoroughfare with moderately heavy traffic.

Disadvantageous conditions:

- a. Sidewalk width: narrow on Section N.
- b. Street name signs: none.
- c. Sidewalk pavement: unkept sidewalk on most of Section S (Figure 30, page 72).
- d. Orientation: no visually significant buildings, objects, or outdoor spaces.

Miscellaneous:

- a. Major land uses: institutions on 1N; parking on 1S.
- b. Vehicle and pedestrian thoroughfare: auto way not designed for both cars and pedestrians, but now used as such since the establishment of an apartment building and because of the narrow sidewalk on 1N.

Vine Avenue--Section N

Advantageous conditions:

- a. Planting: large trees on 1N.
- b. Gradient of land use intensity: obvious.
- c. Linkage: sidewalks in the form of a corridor space.
- d. Enclosure: trees and buildings.
- e. Interruptions: trees.
- f. Circulation: pedestrian thoroughfare with light traffic.

Disadvantageous conditions:

- a. Sidewalk width: very narrow.
- b. Sidewalk pavement: damaged.
- c. Facades: major repairs needed on 1N; minor repairs needed on 2N.
- d. Street name signs: one missing sign.
- e. Topographic change: too sharp from 1N to 2N for walking.
- f. Orientation: no visually significant buildings, objects, or outdoor spaces.

Miscellaneous:

- a. Major land use: temporary parking lot.
- b. Sidewalk disconnection: between 1N and 2N because of the construction of Quality Inn on 1S₂.

Vine Avenue--Section S

Advantageous conditions:

- a. Gradient of land use intensity: obvious.
- b. Orientation: east to see the Immaculate Conception Church.
- c. Linkage: sidewalks in the form of a corridor space.
- d. Enclosure: buildings.
- e. Circulation: pedestrian thoroughfare with light traffic.

Disadvantageous conditions:

- a. Planting: no plants.
- b. Sidewalk width: no sidewalk at the western part of 1S₁ at the site of the apartment building.
- c. Facades: major repairs needed on 1S₂.
- d. Sidewalk pavement: broken sites on 1S₁.

Miscellaneous:

- a. Under construction: most of 1S₂.
- b. Major land uses residences and institutions.
- c. Dead ends: the west end of Vine Avenue.

Henley Street--Section W

Since this section is under construction, it will not be discussed in this study.

Henley Street--Section E

Advantageous conditions:

- a. Sidewalk width: wide and even in general, but narrower on 1E.
- b. Planting: on 4E and 6E.
- c. Facades: generally in good condition.
- d. Topographic change: gradual.
- e. Orientation: easy to see City Hall, Miller's, the outdoor space in front of Miller's, and the Henley Street Bridge.
- f. Linkage: sidewalks in the form of a corridor space; Miller's outdoor space in the form of a nodal space and used as a recreation place for sitting, talking, and waiting.
- g. Enclosure: buildings, plants, and a small part of a retaining wall on 1E.
- h. Interruptions: greenery, small open spaces; display windows on 4E.
- i. Circulation: pedestrian thoroughfare with light traffic.

Disadvantageous conditions:

- a. Facades: major repairs needed on the ones between 2E and 3E.
- b. Street name signs: one missing sign between 2E and 3E.
- c. Sidewalk pavement: broken sites on 2E, 3E, 5E, and 6E.
- d. Gradient of land use intensity: not very obvious.-

Miscellaneous:

- a. Major land use: institutions, offices, and retail businesses.
- b. Pedestrian traffic: heavier on 4E because of the bus stop and the outdoor space of Miller's.

Locust Street--Section W

Advantageous conditions:

- a. Planting: on 2W, 4W, and 7W.
- b. Topographic change: fairly sharp on 2W and 7W.
- c. Orientation: easy to see Ramble, Y.M.C.A., Miller's, and its outdoor space.
- d. Linkage: sidewalks in the form of a corridor space.
- e. Enclosure: buildings and trees.
- f. Interruptions: Miller's fountain and sculpture; display windows on 6W.
- g. Circulation: pedestrian thoroughfare with light traffice.

Disadvantageous conditions:

- a. Sidewalk width: various widths; no sidewalk on 1W.
- b. Facades: unsound condition on 3W and 7W.
- c. Street name signs: six missing signs.
- d. Sidewalk pavement: broken sites on 4W, 6W, and 7W.
- e. Gradient of land use intensity: not obvious.

Miscellaneous:

- a. Various sidewalk widths: on 4W--the widest sidewalk in this section and an extension of Miller's outdoor space; on 3W--sidewalk with two different widths because it is widened at Y.M.C.A.
- b. Interesting objects: none along the slope on 2W to emphasize the flowing space and make the view ahead of the pedestrian more pleasant.
- c. Blocked view: vacant lot with weeds and other plants south to Hill Avenue on 7W.
- d. Recreation place: Miller's outdoor space for gathering and resting.
- e. Small open spaces: in front of Ramble with no landscaping and no structures.
- f. Miller's water pool: dry and dirty during the winter (Figure 31, page 73).
- g. Pedestrian traffic: heavier on 4W because of the existence of Miller's outdoor space.

Locust Street--Section E

Advantageous conditions:

- a. Planting: on 2E₂, 3E, and 6E.
- b. Orientation: easy to see the Post Office.
- c. Linkage: sidewalks in the form of a corridor space.
- d. Enclosure: buildings.
- e. Interruptions: greenery and Locust Apartments' small open space.
- f. Circulation: pedestrian thoroughfare with light traffic.

Disadvantageous conditions:

- a. Sidewalk width: various widths.
- b. Facades: minor repairs needed on 2E₂ and 5E; major repairs needed on 5E.
- c. Sidewalk pavement: broken sites on 1E, 2E₂, and 5E.
- d. Gradient of land use intensity: not obvious.

Miscellaneous:

- a. Various sidewalk widths: widest in front of Hilton Hotel and narrowest on 5E.
- b. Unpleasant objects: black light poles on 5E.
- c. Small landscaped area: the outdoor space in front of Locust Apartments.

Walnut Street--Section W

Advantageous conditions:

- a. Planting: on 1W, 7W, and 8W.
- b. Topographic change: fairly sharp on 1W and 2W.
- c. Orientation: easy to see the Post Office and the First Baptist Church.
- d. Linkage: sidewalks in the form of a corridor space.
- e. Enclosure: trees and buildings.
- f. Interruptions: greenery.
- g. Circulation: pedestrian thoroughfare with heavy traffic on 2W and 3W and with light traffic on the other blocks.

Disadvantageous conditions:

- a. Sidewalk width: various widths.
- b. Facades: major repairs needed on 4W.

- c. Street name signs: eight missing signs.
- d. Sidewalk pavement: broken sites on 3W, 4W, and 6W.
- e. Gradient of land use intensity: not very obvious.

Miscellaneous:

- a. Sidewalk: very narrow on 1W and less than the minimum 4-foot width of regular sidewalks.
- b. Various sidewalk widths: on 3W--two different widths with the wider part at Daylight Building; on 6W--the wider part at Lawson McGhee Library.
- c. Major land uses: offices and institutions.

Walnut Street--Section E

Advantageous conditions:

- a. Planting: on 2E, 5E, and 7E.
- b. Facades: south Central Bell under repair.
- c. Orientation: easy to see the Immaculate Conception Church, TVA tower, Y.W.C.A., St. John's Episcopal Church, and James Park House.
- d. Linkage: sidewalks in the form of a corridor space; the outdoor space of TVA complex on 2E--a structure space for landscaping.
- e. Enclosure: buildings and plants.
- f. Interruptions: greenery.
- g. Circulation: pedestrian thoroughfare with fairly heavy traffic only on 2E and 3E.

Disadvantageous conditions:

- a. Sidewalk width: various widths.
- b. Facades: mediocre appearances in general.
- c. Sidewalk pavement: broken sites on 3E, 4E, 7E, and 8E.
- d. Gradient of land use intensity: not very obvious.

Miscellaneous:

- a. Sidewalks: on 3E--wider in the middle part but narrow at both ends; on 6E--narrower at the Bell Company, then wider at St. John's Episcopal Church.
- b. Major land uses: institutions and retail businesses.

TVA Complex Plaza

Advantageous conditions:

- a. Facades: in good condition.
- b. Pavement: in good condition.
- c. Center: a recreation place for sitting, talking, and viewing.
- d. Orientation: easy to see TVA tower; not easy to see its elevated outdoor space (Figure 32, page 73).
- e. Linkage: in the form of a nodal space.
- f. Enclosure: buildings.
- g. Interruptions: planting beds and greenery.
- h. Circulation: pedestrian thoroughfare with fairly heavy traffic.

Miscellaneous:

- a. Limited use--plaza used mainly by TVA employees and not really used as a nodal space.

Market Square

Advantageous conditions:

- a. Pavement: in good condition.
- b. Center: a traffic intersection for pedestrians coming in and out from north and south entries; a recreation place for sitting, talking, playing, contests, and festival activities; a commercial place for selling goods and plants, for shopping, and for eating; a cultural place for musical performances, art shows, and various exhibitions; also a political place for campaigning and making speeches.
- c. Linkage: in the forms of both a corridor space and a nodal space.
- d. Enclosure: buildings and canopies (Figure 33, page 74).
- e. Interruptions: greenery, fountain, sculpture, and market.
- f. Circulation: main pedestrian thoroughfare with heavy traffic.

Disadvantageous conditions:

- a. Facades: major repairs needed in general.
- b. Vacant land between buildings: one lot close to the south end of the east side of the square.

Miscellaneous:

- a. Surface: often unpleasant when spread with litter.

Market Street--Section W

Advantageous conditions:

- a. Planting: on 1W, 2W, and 3W.
- b. Sidewalk pavement: in good condition.

c. Topographic change: production of a relatively flat walkway through slight change.

d. Orientation: easy to see Arstein Building, First American Bank Building, Valley Fidelity Building, and Bank of Knoxville Building.

e. Linkage: sidewalks in the form of a corridor space.

f. Enclosure: buildings and plants.

g. Interruptions: potted plants and brick sidewalk.

h. Circulation: main pedestrian thoroughfare with heavy traffic.

Disadvantageous conditions:

a. Sidewalk width: various widths.

b. Facades: major repairs needed on 3W and 4W.

c. Street name signs: no signs between 2W and 3W and between 3W and 4W.

d. Gradient of land use intensity: not obvious.

Miscellaneous:

a. Sidewalks--very narrow in the middle on 2W, then wider in front of Bank of Knoxville, and much wider in front of Valley Fidelity Bank; sidewalk on 3W also narrow in the middle and wider at both ends.

Market Street--Section E

Advantageous conditions:

a. Sidewalk width: wide and even in general.

b. Planting: on 1E, 2E, and 4E.

c. Facades: Old Custom House under renovation.

- d. Sidewalk pavement: in good condition.
- e. Orientation: easy to see the Old Custom House and its small outdoor space provided with fountains and seats.
- f. Linkage: sidewalks in the form of a corridor space.
- g. Enclosure: buildings and trees.
- h. Interruptions: the small space, fountains, and potted trees.
- i. Circulation: main pedestrian thoroughfare with heavy traffic.

Disadvantageous conditions:

- a. Facades: major repairs needed on 3E.
- b. Gradient of land use intensity: vague.

Miscellaneous:

- a. Sidewalks: the one along the parking lot on 2E probably unsafe for pedestrians walking because no screens around the parking lot.
- b. Old Custom Hous's outdoor space: used not only as a recreation place for resting and gathering but also as a commercial place for vendors (Figure 34, page 74).

Gay Street--Section W

Advantageous conditions:

- a. Sidewalk width: almost uniform.
- b. Planting: on 3W, 6W, and 7W.
- c. Topographic change: gradual.
- d. Orientation: easy to see the National Park Bank, the United American Bank, the Bijou-Lamar House, and the Court House.

- e. Linkage: sidewalks in the form of a corridor space.
- f. Enclosure: buildings and sidewalk canopies.
- g. Interruptions: greenery, display windows on $2W_2$ and 6W, the digital clock on 3W, and the antique light poles on 6W.
- h. Circulation: main pedestrian thoroughfare with heavy traffic especially on $2W_1$ and $2W_2$.

Disadvantageous conditions:

- a. Facades: unsound facades on 1W, $2W_2$, 4W, and 5W.
- b. Street name signs: one missing sign.
- c. Sidewalk pavement: broken sites on 1W, 3W, 4W, 5W, and 6W.
- d. Gradient of land use intensity: not obvious.

Miscellaneous:

- a. Sidewalks: narrower on $2W_2$; often very congested because of large numbers of pedestrians and people standing to wait for buses.
- b. Unused areas: a strip of land with rectangular concrete dividers between the sidewalk and the parking lot on 4W (Figure 35, page 75).

Gay Street--Section E

Advantageous conditions:

- a. Planting: on 1E and 6E.
- b. Orientation: easy to see the Gay Street Group, the Farragut Building, the United American Plaza, and the Andrew Johnson Hotel.
- c. Linkage: sidewalks in the form of a corridor space.

- d. Enclosure: buildings and some sidewalk canopies.
- e. Interruptions: greenery, display windows on 2E and 3E, and modern black light poles on 6E.
- f. Circulation: main pedestrian thoroughfare with heavy traffic.

Disadvantageous conditions:

- a. Sidewalk width: wider on 1E, 2E, and 3E.
- b. Facades: major repairs needed on 2E, 3E, and 5E.
- c. Sidewalk pavement: broken sites on 2E and 5E.
- d. Gradient of land use intensity: not very obvious.

Miscellaneous:

- a. Major land uses: retail businesses and financial institutions.

State Street--Section W

Advantageous conditions:

- a. Planting: on 1W.
- b. Topographic change: descending from 3W to 6W, (or ascending from 6W to 3W).
- c. Linkage: sidewalks in the form of a corridor space.
- d. Enclosure: buildings, trees, overgrown shrubs on 6W.
- e. Interruptions: greenery; a mural on 2W.
- f. Circulation: pedestrian thoroughfare with very light traffic.

Disadvantageous conditions:

- a. Sidewalk width: wider at the north end of 1W and at the Sentinel Building.

- b. Facades: major repairs needed on 1W.
- c. Street name signs: five missing signs.
- d. Sidewalk pavement: broken sites on 1W, 2W, 3W, and 6W.
- e. Gradient of land use intensity: not obvious.
- f. Orientation: none.

Miscellaneous:

- a. Unpleasant scenes: at the flowing space from 3W to 6W--broken sidewalk pavements, black wooden light poles, uneven building set backs, and plain sidewalks.
- b. Major land uses: parking lots and garages.

State Street--Section E

Advantageous conditions:

- a. Planting: on 1E, 2E, 3E, and 5E.
- b. Orientation: easy to see the First Presbyterian Church and its graveyard.
- c. Linkage: sidewalks in the form of a corridor space.
- d. Enclosure: buildings and plants.
- e. Interruptions: greenery.
- f. Circulation: pedestrian thoroughfare with very light traffic.

Disadvantageous conditions:

- a. Sidewalk width: wider on 1E and 2E.
- b. Facades: minor repairs needed on 1E.
- c. Sidewalk pavement: broken sites on 1E, 3E, and 4E.
- d. Gradient of land use intensity: not very obvious.

Miscellaneous:

- a. Major land uses: warehouses and parking garages and lots.

United American Plaza

Advantageous conditions:

- a. Facades: in good condition.
- b. Pavement: in good condition.
- c. Orientation: easy to see the United American Plaza Building and its open space.
- d. Linkage: the outdoor space used more as a structure space or an access for landscaping than for passive pedestrian activities.
- e. Enclosure: buildings, plants, and the short wall at the south side of the plaza.
- f. Circulation: pedestrian thoroughfare with light traffic.

Disadvantageous conditions:

- a. Center: not a traffic intersection; just open to people going into or out from the United American Plaza building and McDonald's.
- b. Linkage: not a real nodal space because very few people who are neither office workers and shoppers from the plaza building nor customers of McDonald's were observed using the outdoor space as a gathering place.

Miscellaneous:

- a. Facilities: small trees in square plant pots and wooden chairs around the trees.
- b. Openings to the sidewalk: separated from the sidewalk by some ground covers and medium-sized trees; only two entrances at both ends of the outdoor space (Figure 36, page 76).

City-County Building Plaza

Advantageous conditions:

- a. Facades: in good condition.
- b. Pavement: in good condition.
- c. Orientation: the building and its outdoor space.
- d. Center: a recreation place for limited activities, such as resting and viewing.
- e. Linkage: the walkway in the form of a corridor space; the lawn in the form of a structure space for landscaping.
- f. Enclosure: the walkway--a few steps lower than the sidewalk and separated from it by a strip of elevated short plant beds which have ground covers and small trees (Figure 37, page 77); the lawn area--a few steps lower than the walkway and separated from it by loose shrubs.
- g. Circulation: pedestrian thoroughfare with light traffic.

Disadvantageous conditions:

- a. Position--the walkway--parallel to the sidewalk and paved with brick; the lawn area--inside the walkway and extending to

meet the building; both at the west side of the entrance to the City-County Building.

Miscellaneous:

a. Facilities: the walkway--with chairs facing Main Avenue; the lawn area--with chairs facing the lawn.

b. Possible users: people coming from the west to the City-County Building or coming out of the City-County Building going toward the west.

Alleys

Advantageous conditions:

- a. Pavement width: uniform on each alley.
- b. Linkage: in the form of a corridor space.
- c. Enclosure: buildings.
- d. Circulation: pedestrian thoroughfare with light traffic.

Disadvantageous conditions:

- a. Planting: none.
- b. Alley names: missing.
- c. Pavement condition: broken and deteriorated and covered with litter or water.
- d. Facades: unpleasant back walls of buildings.
- e. Orientation: none.
- f. Interruption: none.

Miscellaneous:

- a. Pavement width: from 7.5 to 15 feet.
- b. Open space scales: slightly greater than human scale and non-human scale.

Summary

Continuity. According to Table I, page 79, main pedestrian thoroughfares, such as Main Avenue, Church Avenue, Clinch Avenue, Union Avenue, Market Street, and Gay Street, do have comparatively wider sidewalks regardless of street pavement widths. Table I also implies that these sidewalks have more usable pedestrian spaces. However, sidewalks in the survey area vary greatly in widths, even within a street. The frequent narrowing of the sidewalks causes walking inconvenience. Church Avenue, Clinch Avenue, Union Avenue, Locust Street, Walnut Street, and State Street have sidewalks that vary greatly in width.

Walkways which have series of plants implying space continuity are found on Hill Avenue, Wall Avenue, Summit Hill Drive, and Market Street.

Within the inspected 231 facades, 44.6% have sound appearances, 21.6% need minor repairs, and 34.8% need major repairs. The facades which have disturbed appearances and spoil the pedestrian environment are mostly in Church Avenue, Clinch Avenue, Union Avenue, Wall Avenue, Vine Avenue, Locust Street, and Gay Street.

Street name signs were missing in many intersections. Hill Avenue, Church Avenue, Clinch Avenue, Henley Street, and Gay Street have the greatest number of street name signs.

The sidewalk pavements within the study area have many damaged or deteriorated sites. The worst conditions are in Main Avenue, Union Avenue, Vine Avenue, Henley Street, Walnut Street, and State Street.

Direction. The topographic gradient is very obvious. The topographic changes produce some large, flowing spaces which add interest to the walkways and help indicate the directions. These slopes can be found on Hill Avenue, Church Avenue, Clinch Avenue, Summit Hill Drive, Vine Avenue, Locust Street, Walnut Street, and State Street.

The gradient of land use intensity is generally vague and does not help much to show the direction of movement. Union Avenue, Wall Avenue, Summit Hill Drive, Walnut Street, and Gay Street have a comparatively less vague gradient of land use intensity.

Orientation. The physical elements which give the most orientation are the significant buildings. They can be found all over the study area, especially on Main Avenue, Walnut Street, Market Street, and Gay Street.

There are quite a few outdoor spaces and very few unusual objects which show orientation. These two elements can be found mostly in the study area between Walnut Street and Gay Street and between Clinch Avenue and Church Avenue.

Center. The open spaces which can be used for activities and as gathering points are very few. Even if they function as centers, they mostly act as recreation places for passive activities. These open spaces can be found on Wall Avenue, Market Square, Market Street, and Main Avenue.

Linkage. All sidewalks, excluding those which are under construction within the study area, are in the form of corridor spaces

and have the function of linkage. Among the fifteen scattered open spaces which were considered having the function of linkage, half of them act as nodal spaces, and half of them act as structure spaces.

Enclosure. Buildings are the main element of enclosure. The relatively lower buildings and open parking lots transform the spatial enclosure of the pedestrian open spaces into human-scaled spatial enclosure, or slightly greater than human-scaled spatial enclosure. However, because of the lack of other enclosing elements, such as plants and murals, or too many open areas, such as large parking lots, pedestrian open spaces categorized under the above two kinds of spatial enclosures do not necessarily give pedestrians a sense of entity or a sense of a channel of space. The better-enclosed and human-scaled open spaces can be found on Hill Avenue, Wall Avenue, Summit Hill Drive, Market Square, and Market Street.

Interruption. Lots of objects within the study area were considered visual interruptions. Among those objects, greenery is the most commonly perceived interruption, since most of the greenery is deciduous trees, the effect changes with the seasons. Very little green was observed during the winter time.

There are nineteen open spaces considered as having the function of interruptions; only half of them, which are mostly in Wall Avenue, Market Square, Market Street, and Main Avenue, are available for pedestrian use.

There are some attractive store display windows on Clinch Avenue and Gay Street, but not any kiosks were found on walkways.

Only two murals with limited exposures were observed. Quite a few unpleasant blank wall were found within the study area (Figure 38, page 78).

Water features--such as the three fountains, which are on Market Square, Market Street, and Locust Street--are very attractive scenes, but they can also be unpleasant scenes when there is no water in them or when mud builds up in the bottom of a pool.

There are few other interesting subjects--such as light poles, statues, and skyways--which can be found on Gay Street, Main Avenue, Hill Avenue, and Summit Hill Drive.

Circulation. All pedestrian open spaces which are used as walkways are for pedestrian circulation, and all streets, except for Wall Avenue, are for auto circulation. There is no pedestrian street in the study area.

Sequence

According to the above analyses, the pedestrian open spaces which function better in terms of the characteristics of continuity, direction, orientation, center, linkage, enclosure, interruption, and circulation were considered to be functioning better than the pedestrian open spaces which were in a weaker condition with reference to these eight characteristics.

The comparatively functional areas and less functional areas were determined by a ranking method. Each block gets one point for having one specific physical element in such good condition that it will enhance one certain characteristic. For example, a block gets

one point for its uniformity of sidewalk width or its good condition of sidewalk pavement. A block will also get one point for having the function of linkage or circulation. The items used as ranking determinants and the total points for each block are shown in Table IV. The various total points are divided into three ranks, L, M, and H. Blocks ranked as H mean they have better function of pedestrian open spaces. Blocks ranked as L function poorly as pedestrian open spaces, and blocks ranked as M function moderately well as pedestrian open spaces. The strong sequence is composed of rank H and rank M while the weak sequence is directly from rank L. The overall relation and distribution of the areas which have either strong sequence or weak sequence is shown in Figure 39. In the study area, obviously, many less functional open spaces break the linking of better functional open spaces.

Table IV. Ranking.

Site	Block	Characteristic			Point	Total Points	Rank
		Continuity	Direction	Orientation			
Hill Avenue	1	X			X	10	H
	2	X			X	8	M
	3	X			X	12	H
	4	X			X	9	M
Main Avenue	1	X			X	9	M
	2	X			X	9	M
	3	X			X	11	H
	4	X			X	12	H
Cumberland Avenue	1	X			X	7	M
	2	X			X	7	M
	3	X			X	7	M
	4	X			X	6	L
	5	X			X	6	L
	1	X			X	6	L
	2	X			X	6	L
	3	X			X	6	L
	4	X			X	6	L
	5	X			X	6	L

Table IV (Continued)

Site	Characteristic			Point	Block	Sidewalk Width	Planting	Facade	Street Name	Pavement	Topographic Change	Land Use Intensity	Building	Unusual Construction	Outdoor Space	Center	Linkage	Human Scale or Slightly Greater	Interruption	Circulation	Total Points	Rank
	Continuity	Direction	Orientation																			
Church Avenue					1		X	X	X		X	X	X				X	X	X	X	8	M
					2			X	X				X	X			X				6	L
					3			X	X				X	X			X	X	X	X	5	L
					4				X	X							X	X			5	L
					5			X	X		X		X	X			X	X			8	M
Cinch Avenue					1			X	X		X	X	X	X			X	X	X	X	9	M
					2				X		X	X	X				X	X	X	X	7	M
					3			X	X			X	X	X			X	X	X	X	7	M
					4				X	X			X	X			X	X	X	X	6	L
					5				X	X	X		X	X			X	X	X	X	6	L
Union Avenue					1		X		X	X	X		X	X	X	X	X	X	X	X	9	M
					2				X		X		X	X		X	X	X	X	X	6	L
					3				X			X	X	X		X	X	X	X	X	8	M
					4			X	X			X	X	X		X	X	X	X	X	6	L
					5				X		X	X	X			X	X	X	X	X	6	L

Table IV (Continued)

Site	Block	Characteristic			Point	Total Points	Rank
		Continuity	Direction	Orientation			
Summer Place	1	X	X	X	X	8	M
Wall Avenue	1		X		X	11	H
Summit Hill Drive	1	X	X	X	X	12	H
	2	X	X	X	X	9	M
	3	X	X	X	X	11	H
Hickey Place	1		X		X	6	L
Vine Avenue	1		X	X	X	5	L
	2		X	X	X	9	M
Henley Street	1	X	X	X	X	12	H
	2	X	X	X	X	5	L
	3	X	X	X	X	5	L
	4	X	X	X	X	13	H
	5	X	X	X	X	6	M
	6	X	X	X	X	8	M
	7	X	X	X	X	6	M

Table IV (Continued)

Site	Block	Sidewalk Width	Planting	Facade	Street Name	Pavement	Topographic Change	Land Use Intensity	Building	Unusual Construction	Outdoor Space	Center	Linkage	Human Scale or Slightly Greater	Interruption	Circulation	Total Points	Rank	Characteristic			
																			Continuity	Direction	Orientation	
Locust Street	1																	5	L			
	2			X		X		X	X				X	X	X			8	M			
	3			X		X		X	X				X	X	X			9	M			
	4			X		X		X	X		X		X	X	X		X	10	H			
	5												X	X	X			3	L			
	6			X		X			X	X			X	X	X			5	L			
	7									X			X	X	X			5	L			
	Walnut Street	1			X		X		X	X				X	X	X		X	5	L		
		2							X	X				X	X	X			10	H		
		3												X	X	X			5	L		
4						X		X	X				X	X	X			3	L			
5								X	X				X	X	X			7	M			
6						X		X	X				X	X	X			5	L			
7				X		X		X	X				X	X	X			8	M			
8								X	X				X	X	X			6	L			

Table IV (Continued)

Site	Block	Characteristic			Point	Total Points	Rank
		Continuity	Direction	Orientation			
Market Street	1	X	X	X	X	10	H
	2	X	X	X	X	12	H
	3	X	X	X	X	8	M
	4	X	X	X	X	7	M
Gay Street	1	X	X	X	X	8	M
	2	X	X	X	X	6	L
	3	X	X	X	X	6	L
	4	X	X	X	X	6	L
	5	X	X	X	X	5	L
	6	X	X	X	X	11	H
	7	X	X	X	X	11	H
State Street	1	X	X	X	X	4	L
	2	X	X	X	X	4	L
	3	X	X	X	X	7	M
	4	X	X	X	X	6	L
	5	X	X	X	X	5	L
	6	X	X	X	X	4	L

•

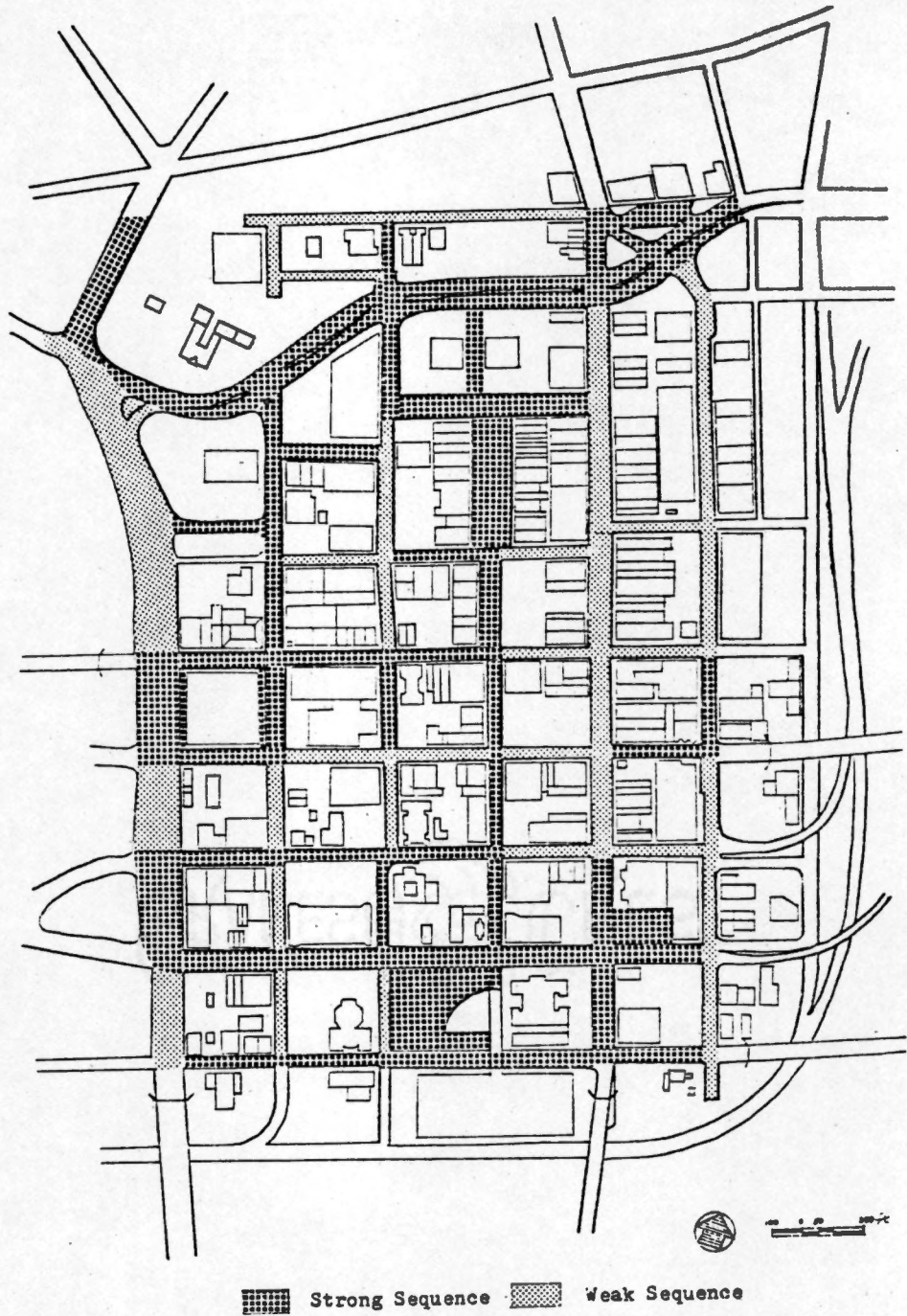


Figure 39. Sequence.

Source: Knoxville City Map--Central Business District.

CHAPTER V

CONCLUSIONS AND SUGGESTIONS

The problem investigated in this study dealt with finding the function of the pedestrian-oriented open spaces in Knoxville's central business district. The informal analyses of the data of the function of each individual open space gathered block by block were summarized by indicating the strengths and weaknesses of the eight characteristics in each street. The result was an illumination of the sequence of the whole system of pedestrian open spaces.

The physical elements of the open spaces on Hill Avenue, Main Avenue, Summit Hill Drive, Wall Avenue, Market Square, and Market Street function well in terms of the characteristics of continuity, direction, orientation, center, linkage, enclosure, interruption, and circulation. They have better continuous qualities of the eight characteristics on a street from block to block or from one street to another than the other streets in the study area do. The feeling of a connected series--the sequence--is sensed, and a comparatively more pleasant pedestrian environment is created as a result.

Open spaces at other streets were less functional and attractive because they were interrupted by some unpleasant qualities, such as uneven sidewalk widths, a shortage of sidewalk trees, disturbed facades, missing street name signs, damaged sidewalk pavements, vague gradients of land use intensity, a shortage of easily-recognized objects, and a lack of linkage on certain blocks. Small spaces such-

as the resting area by the Old Custom House and the small park at Miller's were well combined with the pedestrian ways while United American Plaza and the City-County Building Plaza were not sufficiently utilized because of the poor connection with the sidewalks.

The mixture of more functional open spaces and less functional open spaces makes the linking of the network of pedestrian-oriented open spaces quite difficult. This problem could be one of the reasons that Knoxville's downtown is not very impressive.

In order to increase the function of open spaces for pedestrian use in Knoxville's downtown and produce a better environment, the researcher would suggest that open spaces need to be developed by considering the overall situation.

1. In order to increase the function of continuity, sidewalk widths need to be kept uniform, especially on the streets with heavy pedestrian traffic, such as Clinch Avenue and Church Avenue. Sidewalks should be widened according to the pedestrian flow, and sidewalk pavements should be kept in undamaged condition.

2. More sidewalk trees or shrubs are needed on wide streets, such as Main Avenue, Henley Street, Market Street, and Gay Street.

The topographic change contributes to natural scenery; its effect of showing directional movement could probably be increased by installing plants and some artificial objects along the slope. The slopes on Clinch Avenue, Church Avenue, Locust Street, and Walnut Street are examples of poor landscaping.

3. Damaged facades and back walls need to be repaired, repainted, and redecorated. Unpleasant walls which enclose parking lots also need good maintenance.

4. Street name signs are the most convenient element which prevents pedestrians from being lost. Adequate signs should be considered.

5. More enclosed outdoor spaces with proper seating facilities need to be considered. Parts of some parking lots along the sidewalks which have heavy pedestrian traffic probably need to be converted into small recreational areas, not only for temporary stopping but also for waiting for buses. Cumberland Avenue, Henley Street, and Gay Street have these needs mostly. Parking lot screening is also needed to protect pedestrians and add beauty.

6. In order to make an open space available and attractive for pedestrians gathering, better site selection and landscaping are needed. More activities are also needed to make plazas more useful places. Providing more facilities, such as shelters and water features, would possibly add interest and recreational function to the United American Plaza and the City-County Building Plaza.

7. Buildings determine the extent of enclosure in Knoxville's downtown. Parts of the open spaces which were categorized as human-scaled spatial enclosure have very little landscaping to add pleasantness to the space. Spaces which were categorized as slightly greater than human-scaled spatial enclosure also need eye-level objects to make the spaces being sensed more comfortable. Because of insufficient enclosure, few people use some areas such as the City-County Building Plaza.

8. Alleys need clearing and repairing in order to be integrated into the whole pedestrian system.

The above-mentioned suggestions do not deal with design details. The researcher just wants to point out what could be done to improve the pedestrian environment by improving the pedestrian open spaces. It is hoped that this work has aroused public attention on open space development in Knoxville's downtown and has given information about the places that need to be improved.

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APPENDICES

APPENDIX A

SITE FUNCTION CHECKLIST

I. General Information

1. Name of site _____
2. Location _____
3. Form of site _____
4. Section _____

II. Specific characters

1. Continuity

- a. Sidewalk width (in feet) _____
- b. Number and kinds of plants _____
- c. Number of building facades with unsound appearance, mediocre appearance, and sound appearance _____
- d. Existence of street name _____
- e. Number of sites of broken or carelessly repaired pavement _____

2. Direction

- a. Topographic change in percentage _____
- b. Use intensity gradient (kinds of different building uses) _____

3. Orientation

- a. Significant building (number and position) _____
- b. Unusual object (kinds and position) _____
- c. Outdoor space (use and position) _____

4. Center

- a. Traffic intersection _____
- b. Recreation place (type of activity) _____
- c. Commercial place (activity) _____
- d. Cultural place (activity) _____
- e. Other purpose place (Specify) _____

5. Linkage

- a. Corridor space _____
- b. Nodal space _____
- c. Structure space _____

6. Enclosure

- a. Building (vacant land between it?) _____
- b. Plant _____
- c. Change of elevation _____
- d. Other material (specify) _____

7. Interruption

- a. Small space (position) _____
- b. Greenery (position) _____
- c. Display window (position) _____
- d. Mural (position) _____
- e. Water feature (position) _____
- f. Other interesting objects (specify) _____

8. Circulation

- a. Pedestrian thoroughfare _____
- b. Vehicle and pedestrian thoroughfare _____

APPENDIX B

DISTRIBUTION OF MAJOR FLOOR USES

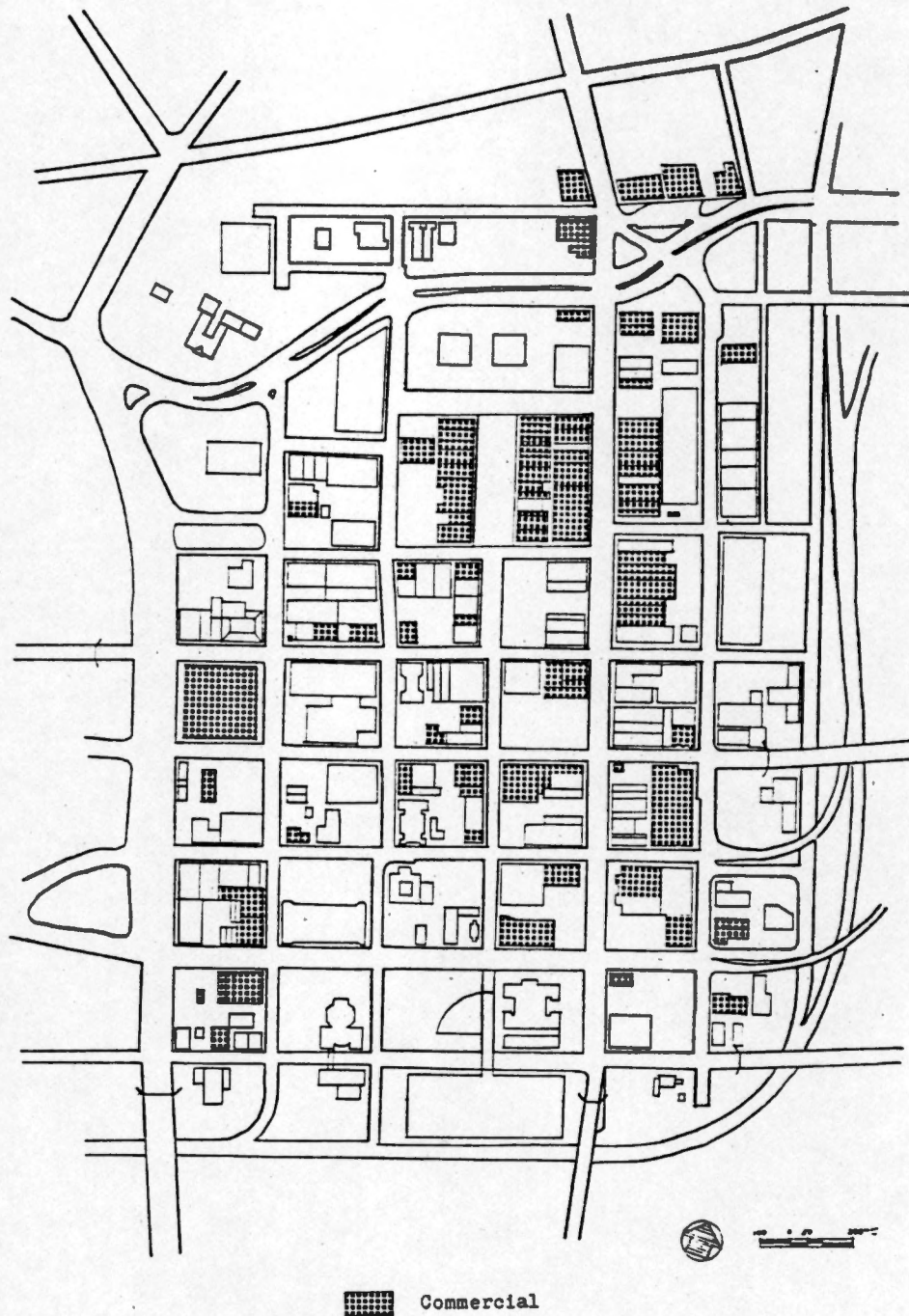


Figure B-1. Commercial use.

Source: Knoxville City Map--Central Business District.

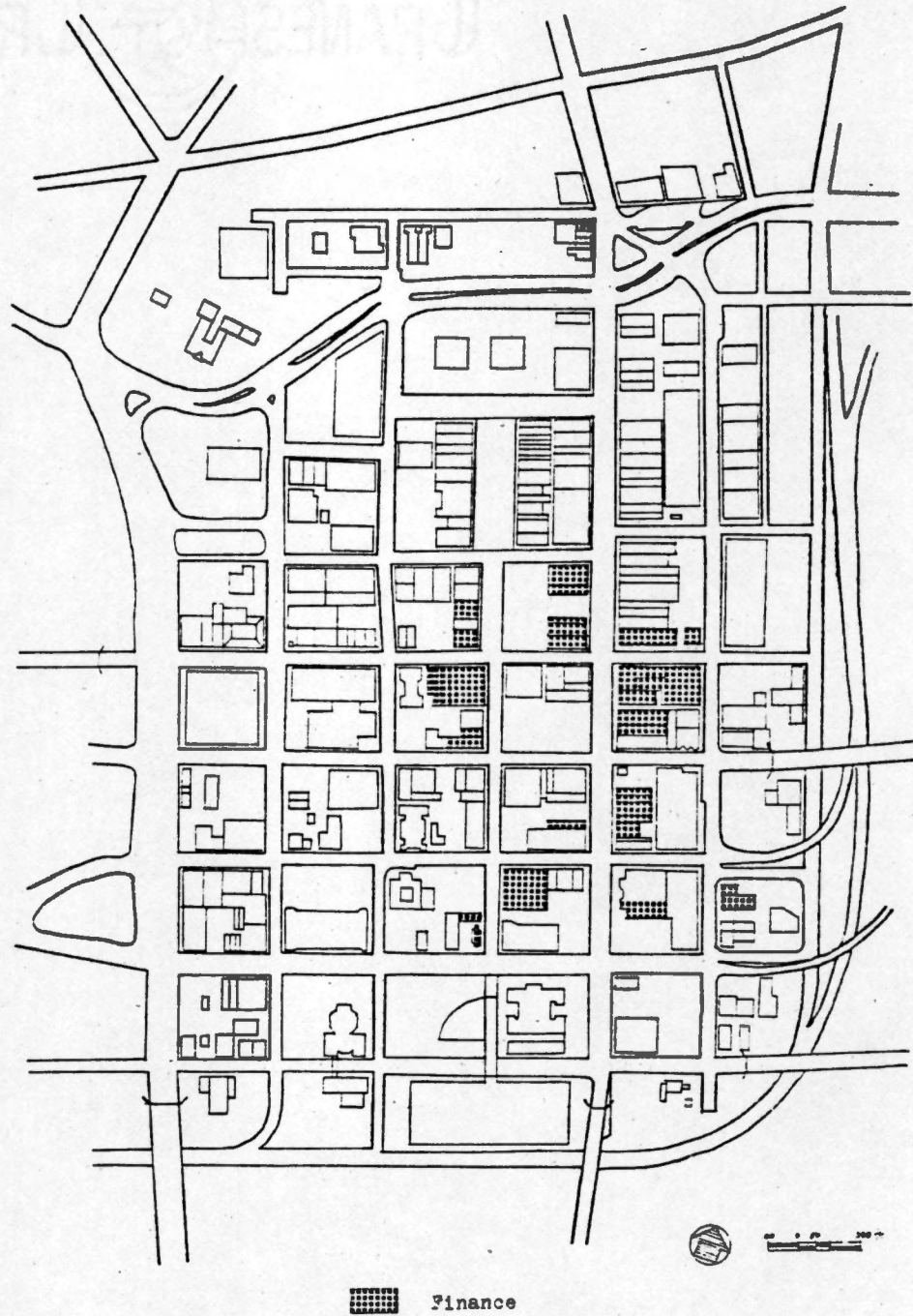


Figure B-2. Financial use.

Source: Knoxville City Map--Central Business District.

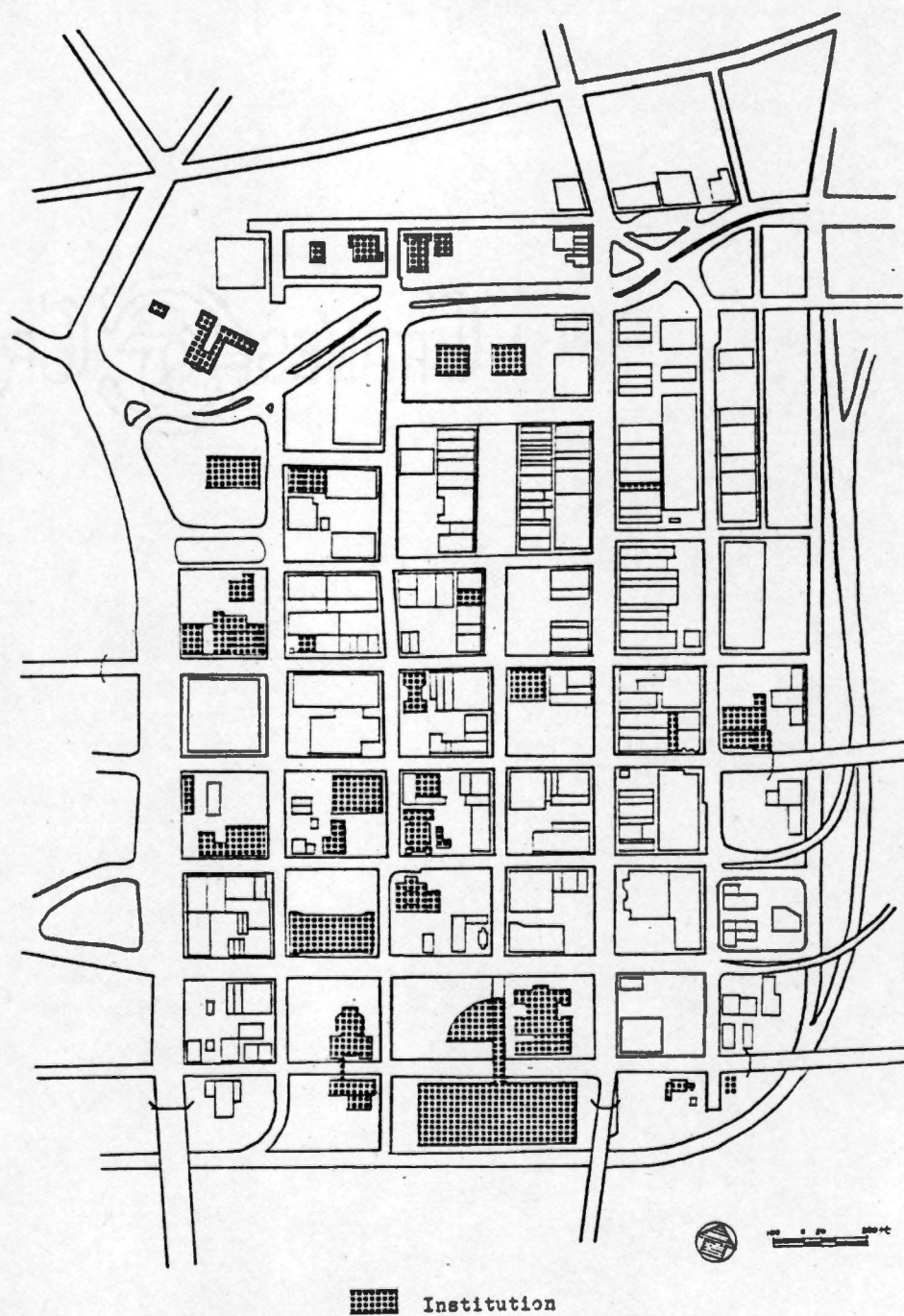


Figure B-3. Institutional use.

Source: Knoxville City Map--Central Business District.

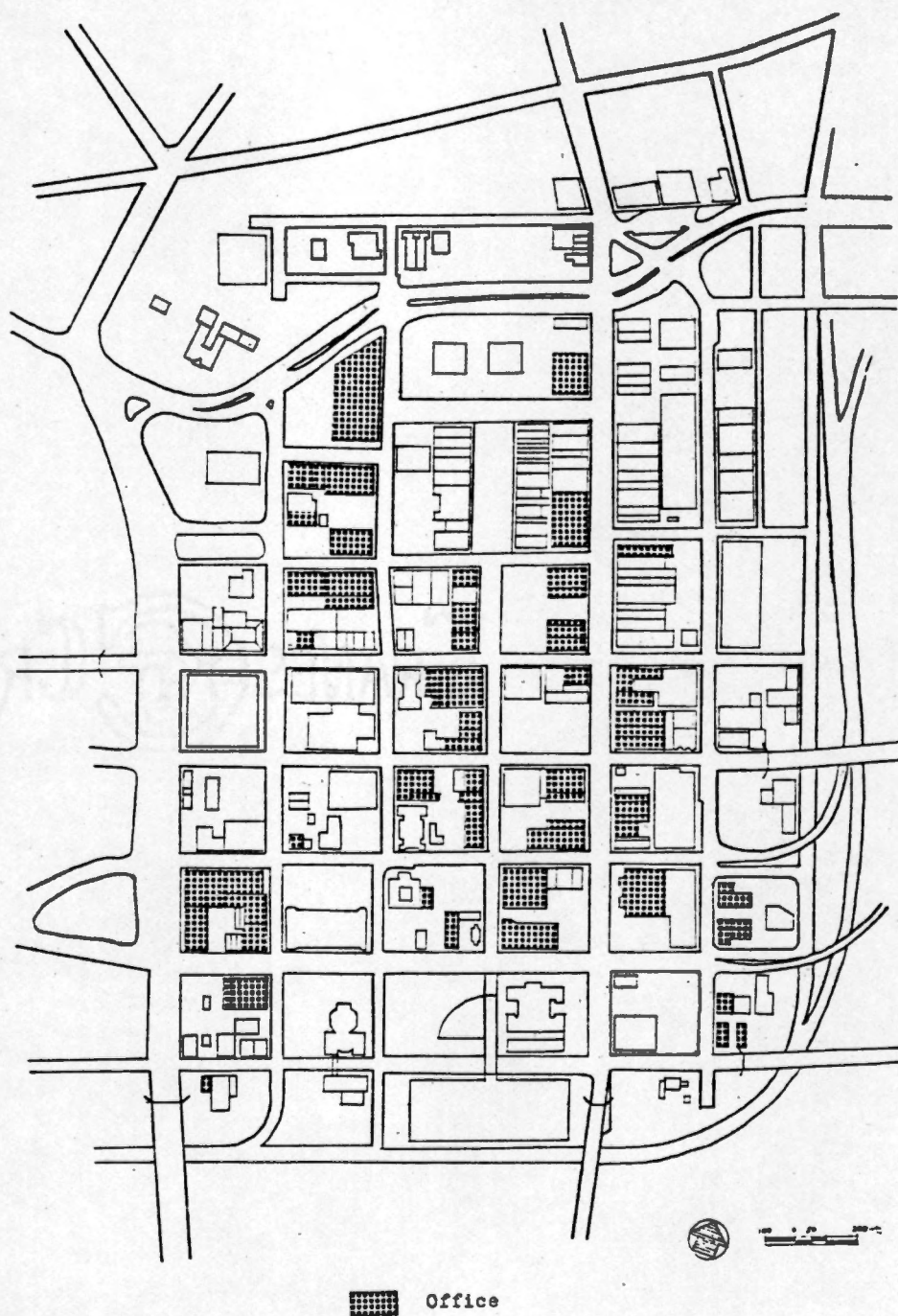


Figure B-4. Office use.

Source: Knoxville City Map--Central Business District.

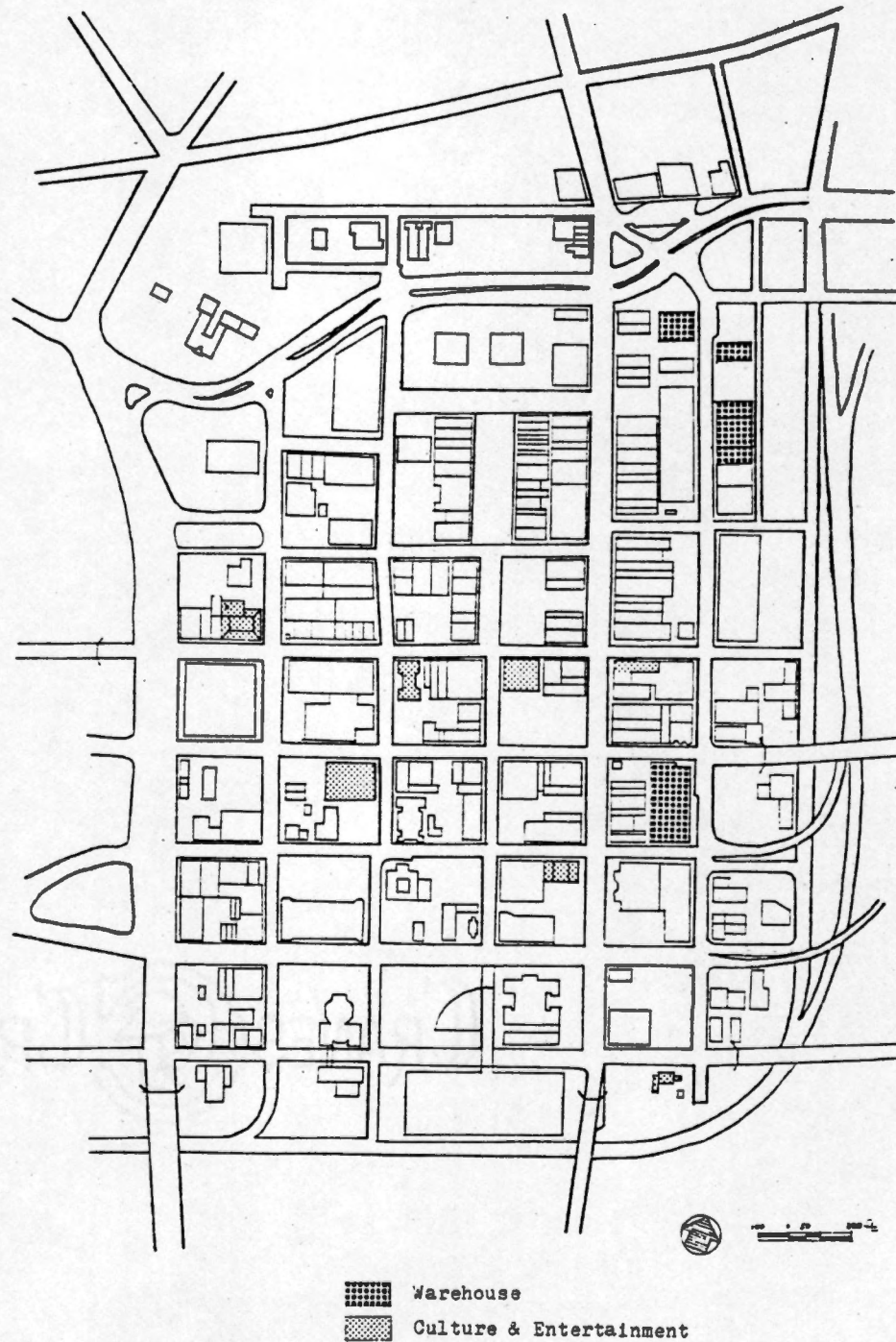


Figure B-5. Warehouse and culture and entertainment uses.

Source: Knoxville City Map--Central Business District.



Figure B-6. Vacant structure and apartment and lodging uses.

Source: Knoxville City Map--Central Business District.

VITA

Wendy H. C. Lin was born in Chung-Li, Taiwan on November 7, 1952. She attended the College of Chinese Culture in Taipei, Taiwan, and in 1974 she received a Bachelor of Agriculture in Horticulture. Then she worked as a technician for Known-You Nursery and Seed Company in Kao-Shung, Taiwan until August 1976. The following September she worked on landscaping for several individuals in Taiwan. In January 1978, she entered The University of Tennessee, Knoxville, and began study toward a Master of Science degree with a major in Landscape Design. She went back to Taiwan in August 1981.