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A Relocation Diffusion Model of Selected Retail Businesses in Hamilton, Ontario

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A RELOCATION DIFFUSION MODEL OF

SELECTED RETAIL BUSINESSES IN HAMILTON, ONTARIO

by

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ABSTRACT

In Hamilton, Ontario from 1969 to 1973 the Civic Square Urban Renewal Project was carried out in part of the Central Business District. As a result most of the businesses in the project area were forced to move. This thesis examines the relocation decision which was made by the entrepreneurs who operated retail businesses in the Civic Square Area. The factors which were considered important as input in their decision were incorporated into a model which projects a relocation diffusion pattern similar to the actual pattern created when these businesses spread to other sections of the C.B.D.

The likelihood of the retailer choosing to relocate on a particular block within the C.B.D. is related to a number of factors which are combined in the model. These include the number of store sites in a block, the frequency of vacant stores that occur in the area and the distance of the new site from the original location in the C.B.D. However, not all businesses were prepared to compete for the most desirable locations. Those firms which had not been paying a low rent or were less successful were not likely to outbid a firm which was very successful and had previously been able to afford high rent for a prime location. Thus the probability that a block in the C.B.D. would receive a business which is relocating is modified to allow for these differences.

Considering the factors outlined above each block of the C.B.D. is assigned a probability that reflects the likelihood of that block receiving a business which is moving from the Civic Square Area. The probabilities are then converted to addresses, and each business is assigned a new location according to a random number. This stochastic technique is introduced because it is possible all pertinent factors have not been included or that all ramifications of factors included have not been considered.

The number of businesses which are projected for each block is compared to the actual number of businesses which relocated in that block. In this study Pearsonian Product Moment Correlation results varied from .624 to .654. The model is simple to use and is useful in projecting relocation diffusion patterns of retail businesses resembling the actual relocation diffusion pattern.

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CHAPTER ONE

THE INTRODUCTION OF THE STUDY

A. PURPOSE OF THE STUDY

Urban renewal programmes have been prominent in North America for some time. During the Great Depression attempts were made to solve several social ills while at the same time provide employment for thousands of people. Following World War II our society had moved into an era of unprecedented wealth and expansion. At this time governments and local businessmen initiated programmes to construct beautiful or at least profitable core areas in our cities by rejuvenating buildings or in some cases whole blocks of a Central Business District.[1]

During the 1969-70 an urban renewal project was initiated in the Central Business District of Hamilton, Ontario. As a result many businesses were forced to look for a new location for their enterprise. In selecting the new location the entrepreneur had to assess the advantages and disadvantages of the various sites which were available This study examined several factors which helped determine what decision was made. These factors were incorporated into a model which simulated the relocation diffusion pattern which was established when the businesses relocated.

Models which assume that all the pertinent factors have been included and that perfect knowledge of the effects of these factors is available are deterministic. However, the model in this paper has a chance factor (stochastic technique) built into it. Factors that are known to be im-

portant in relocation decisions are included, however, it
is conceivable that some factor unknown to the researcher or
considered unimportant has been omitted. Likewise it was
entirely possible that all the ramifications of any one
factor had not been accounted for. For these reasons a
stochastic technique was introduced to the model.

Each block in the C.B.D. was assigned a probability
based on the factors in the model. The probability reflected
the likelihood that the block would receive a relocating
business. The new addresses, however, which were assigned
each business were selected randomly. Thus, this paper
deals with a relocation diffusion model which used stochastic
techniques.

Such models have been used by geographers with great
success. Hägerstrand in tracing the spread of various agri-
cultural innovations, and Morrill in developing a model
tracing the spread of the Negro ghetto in Seattle have been
leading exponents of models with a random factor built in.[2]

B. THE STUDY AREA

In 1958 a detailed urban renewal study was conducted
for the city of Hamilton.[3] The results of the study designated
areas of the city for proposed redevelopment. To date the
city has acted on four of these areas. These areas are
referred to as the Burlington Beach and Van Wagner's, the
North End, York Street, and the Civic Square, Urban Renewal
Area (see Figure 1). Hamilton Civic Square was chosen as

the location for the research included in this study.

Hamilton was undergoing a large urban renewal pro-
gramme which resulted in the demolition of several blocks
of the Central Business District and the relocation of 112
retail businesses. The extent of the programme and the size
of the city of Hamilton meant that more businesses were dis-
located than in other communities in southern Ontario such
as Kitchener, Sarnia or Peterborough that engaged in urban
renewal work in their Central Business Districts.[4]

The Hamilton Civic Square Urban Renewal Area consists
of 43 acres of land in 12 blocks of varying size (see
Figure 2). It is generally bounded by Merrick Street on
the north, Bay Street on the west, Main Street on the south
and James Street on the east. In the broadest sense Civic
Square included the western portion of the commercial core
of the City and a small part of the mixed commercial-in-
dustrial area which surrounded the Central Business District.
There were 206 businesses in the Civic Square area. The
following table summarizes the various types of these busi-
nesses.

-PRIMARY TRADE AREA-
HAMILTON CENTRAL BUSINESS DISTRICT

WATERDOWN

BURLINGTON

LAKE
ONTARIO

HAMILTON
BAY

DUNDAS

3.   2.

4.
C.B.D.
(STUDY AREA)

1.

1.

ANCASTER

HAMILTON
MOUNTAIN

URBAN RENEWAL AREAS

1. BURLINGTON, VAN WAGNERS
BEACH

2. THE NORTH END

3. YORK STREET

4. CIVIC SQUARE

STONEY CREEK

BOUNDARIES—CITY OF HAMILTON

FIGURE I.

0 .5 0 1
MILES

HAMILTON CIVIC SQUARE

STUDY AREA

Legend:

- ■ LAND NOT ACQUIRED BY 1972
- A —— EATONS DEPARTMENT STORE
- B —— THE HAMILTON MARKET
- C —— THE HAMILTON EDUCATION CENTRE
- D —— CENTENARY UNITED CHURCH
- □ —— LAND ACQUIRED BY 1972 (EXCLUDING A—D)

FIGURE 2.

TABLE ONE

BUSINESSES IN CIVIC SQUARE AREA[5]

Retail	112
Wholesale	12
Manufacturing	6
Service	_76_
Total	206

Of the 112 retail businesses originally located in
the Civic Square Area the 43 which relocated within the
Hamilton C.B.D. were included in the relocation study (see
Figure 3). Many of the original retail businesses were
not included in the study for the following reasons: Some
of the businessmen retired and did not relocate. A few
others moved into widespread areas outside the Hamilton
Central Business District and because the numbers involved
were few and the areas so extensive it was considered beyond
the scope of this paper. Several were chain store operations
and the data related to the economic viability of the parti-
cular store located in Hamilton was not available. Restaurants
were bought outright by the city because of the large in-
vestment which had been made in equipment. Lastly, the meat
and butcher shops on McNab Street enjoyed retail compatability
with each other and retail affinity with the market and
special arrangements were made for them.

The Civic Square Renewal Area was to be replaced by

HAMILTON CIVIC SQUARE
STUDY AREA
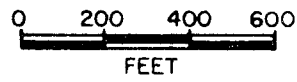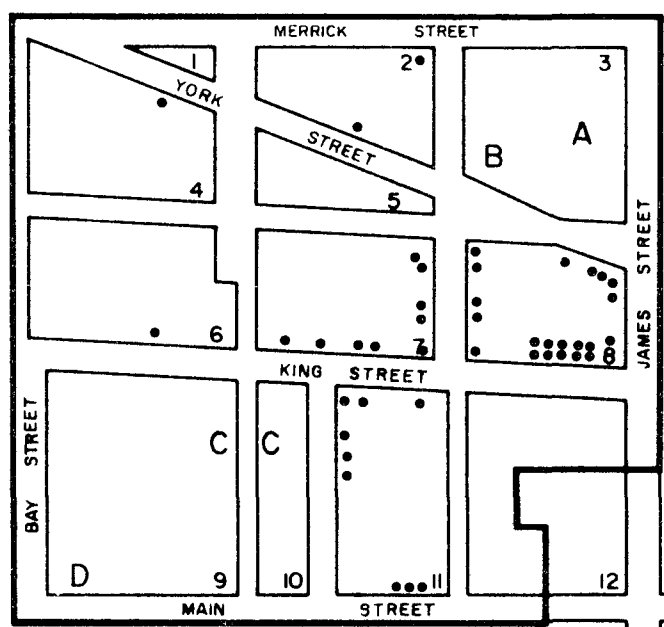
ORIGINAL SITES OF
RETAIL BUSINESSES INCLUDED IN MODEL

i) EACH IS OWNED BY A SINGLE PROPRIETOR
ii) EACH RELOCATED WITHIN THE C.B.D.
(DEFINED BY THE PLANNING DEPT.- CITY OF HAMILTON)

NOTE:
12 BUSINESSES INCLUDED IN THIS STUDY WERE LOCATED
ON BLOCK 8 ON KING ST. WEST BETWEEN THE ADDRESSES
OF 2 AND 46 KING ST. W.

A-EATONS DEPARTMENT STORE   B-THE MARKET

C-TEMPORARY MALL   D-THE EDUCATION CENTRE

FIGURE 3.

a new complex of buildings housing a variety of uses. There were to be two new office towers, an education centre, two theatres, an art gallery, a shopping mall, a hotel and a convention centre.[6] By January 1974 the shopping mall had been completed. The new centre was named after a former Hamilton mayor and is known as the Lloyd D. Jackson Square.

As the urban renewal programme proceeded many questions were raised. Would the businesses forced to move relocate in the Hamilton Central Business District? If many of the businesses did relocate downtown, could a model be developed which could show the spatial distribution of the relocated businesses in the C.B.D.?

C.   THE RELOCATION DIFFUSION MODEL

The movement or spreading of phenomena in space is referred to as diffusion. If a particular phenomena moves from one place and relocates in another place it is referred to as relocation diffusion. The movement of businesses from the Civic Square Area to another part of the Hamilton Central Business District is an example of relocation diffusion. Any model developed predicting a relocation diffusion pattern could be referred to as a relocation diffusion model.[7]

R.L. Nelson who is widely recognized for his work in retail locations lists eight main principles which should serve as a guide in selecting a suitable location for a retail business.[8] Nelson's eight principles are:

1. Check the potential of the present trade area to be quite sure it will continue to grow and be adequate to support your business.

2. The site selected must be accessible to a large portion of the market area. Different forms of accessibility will be required by different forms of businesses such as generative or suscipient businesses.

3. The site chosen should be located in a trading area with a growing population and income.

4. Note whether there is an opportunity for business interception such as locating between two department stores.

5. Businesses often benefit from cumulative attraction. It is often advisable to locate a business near similar or complimentary types of businesses.

6. The area should be compatible and there should be no interruption of shopper traffic.

7. The businessmen must in locating attempt to improve on the location chosen by a rival business thus minimizing the competitive hazard.

8. Site economics such as the overall efficiency of the layout or adjacent amenities are also important in choosing a site.

Other researchers disagree with the number and relative importance of the factors to be considered in site selection. F.J. Jones limits site selection to two main principles.[9] Assuming agreement has been reached on locating within a particular market area the pedestrian traffic passing the site and the store building are prime determinants. Duncan and Phillips elicit several points for considerations under the areas of selecting a city and selecting a specific site.[10] In selecting a site such characteristics of the

population as their numbers, buying habits and wealth are
important considerations. For a specific site the customer
buying habits, estimated business volume, location in relation
to competitors and the availability of the site should be
examined.

William Applebaum has several articles dealing
with aspects of retail trade.[11] In 1966 he set out eighteen
guidelines which could serve for store location strategy.[12]
With respect to the business itself the entrepreneur should
define the objective, analyze the present or potential market
coverage, analyze the stores' performance, appraise the
facilities and physical requirements and project the invest-
ment requirements. It is important to make an inventory of
the competition, to appriase them and calculate the likely
location moves they will make. Study the population and its
characteristics in conjunction with an analysis of the
economic base of the community. Applebaum completes his
list of guidelines with other points such as noting environ-
mental conditions and the need to develop a store-location
strategy.

It is obvious that researchers are in some dis-
agreement about the number of factors to be considered and
the relative importance one might ascribe to any one of them.
Some, such as business objectives could only be determined
by the owner himself. Others, dealing with special cases
such as retail affinity or complimentary sites are neither

easily defined nor applicable to studies such as this
dealing with several different business types simultaneously.
For these reasons factors which were considered universal
and for which data was readily available were included in
this study.

The use of these factors in the model and the
data collected for each will be described in detail in
Chapter V. Two factors are applicable to all businesses
relocating in the C.B.D.. They are:

1. The adequacy and potential of the trade area
for the Hamilton C.B.D.

2. The accessibility of the population to the
entire C.B.D.

Five factors relate directly to variations within
the Hamilton C.B.D.. They are:

1. The number of store sites available in down-
town Hamilton in various blocks.

2. The vacancy rate exhibited in the blocks.

3. The accessibility of a large number of customers
to each block considered individually.

4. The distance of the blocks with potential
locations or sites from the original location
of any business.

5. The rent structure of the C.B.D.

Two factors relate to the businesses included in the
model and will be further amplified in Chapter III. They are:

1. The economic viability of each enterprise in-
cluded in the study as exhibited by the credit
rating of each.

2. The rent paid by each enterprise in its location
within the Civic Square Renewal Area.

D. **DATA FOR STUDY**

A detailed examination of the businesses located
in the Hamilton Civic Square Area was conducted. This in-
volved field studies during 1969, 1970, and 1971. City
directories for 1967, 1968, and 1969 were used to obtain
the address, business name and the owner of each enterprise
in the area.[13] Using records compiled by Mr. Paul Waind,
the Retail Relocation Officer for the Urban Renewal Depart-
ment of the City of Hamilton, information concerning the
Standard Industrial Classification and rents paid by each
business were ascertained.[14] The new location for some
businesses was also available at this office but many had
to be obtained from City Directories.

Information concerning the economic viability of a
firm was not readily available. Retailers would not re-
lease this information to indppendent researchers and the
records compiled by the city were held in confidence.
Credit ratings were used as a surrogate for actual sales
figures or profit and loss statements. The Dun and Brad-
street Canadian Middle Market Directory was used to obtain the
credit rating and the estimated worth of each business.[15]
The figures collected came from the March edition of 1965,
1966 and 1967. These figures reflected the status and success
of the business before expropriation started. By 1969 or
1970 many financial ratings for the firms were not classified
by Dun and Bradstreet because of the uncertainty under which

the businesses operated at the time. Many had not found new locations and it was not certain they would remain in business.

According to Nelson and the other researchers referred to earlier, the retail business relocation decision will be largely affected by the differences which exist within the C.B.D. The Hamilton Central Business District was the receiving area for the businesses included in this thesis. The boundaries of the C.B.D. are the same as those established by the City Planning Department using techniques similar to those outlined by Murphy and Vance.[16] The boundaries are approximately Cannon Street in the north, Wellington Street in the east, Duke Street in the south and Hess Street in the west (see Figure 4). There is some spillage to side streets north-east of the main intersection of King and James Streets but generally the C.B.D. is cross-shaped running along both main arteries.

The model which is developed in Chapter V uses certain information concerning the businesses in the Hamilton Civic Square Renewal Area in conjunction with the information about the C.B.D. Therefore, having delimited the Hamilton Central Business District it was necessary to collect the following data:

1. the number of store sites on each block,

2. the number of vacancies found in any block,

3. the number of pedestrians walking down any street,

4. the mean rents paid for floor space in each
   block of the study area,

5. the distance of each block in the C.B.D. from
   the Civic Square Renewal Area. This was measured
   in city blocks.

The number of store sites was ascertained by field
work. This was carried out in the spring of 1972 and
involved counting each address having a retail, service or
wholesale business as well as vacant building units which
were available if an entrepreneur moved to that location.
It is possible the accuracy of the count could be affected
if a business were to move to a site but only occupy a portion
of it or if a business moved to adjacent vacant units and
occupied both units.

The number of vacancies found during the field work
in the spring of 1972 was not relevant for this study. By
that date many of the businesses examined in this thesis
had already relocated, moving to what had previously been
vacant units. To acquire the information concerning the
number of vacancies before relocation began it was necessary
to obtain records from the Hamilton Urban Renewal Department.
Mr. Waind, the Relocation Officer, had conducted a survey of
the number of vacancies in the Hamilton C.B.D. in 1968 and
these are the figures used in this study.

The Traffic Department which is part of the City
Engineer's Department regularly conducts pedestrian traffic
counts. These counts are conducted at intersections and

solve some of these problems.

This thesis is divided into six chapters. The next chapter describes diffusion studies and outlines types of studies and important terms used in them. A review of the literature covers diffusion studies done by geographers relevant to this study and outlines the history of urban renewal in Hamilton and Canada. A detailed description of the Hamilton Civic Square Urban Renewal Area and the businesses included in this study is provided in Chapter Three. Chapter Four describes the Hamilton C.B.D. in detail and outlines the data which is incorporated in the model. The model is developed in Chapter Five while the final chapter of this thesis outlines the conclusions which can be made concerning the usefulness and reliability of the model.

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CHAPTER TWO

REVIEW OF THE LITERATURE

A. DIFFUSION STUDIES: AN EXPLANATION

Geographers have been concerned about spatial patterns as they existed and spread on their earth for some time.[1] However, in recent years considerably more emphasis has been placed on the dynamics of these patterns.[2] The understanding of man's use of space over time has led to the study of diffusion or the spreading of phenomena.

Most writers recognize at least three distinct types of diffusion. These are expansion or contagious diffusion, hierarchical diffusion and relocation diffusion.[3] The first of these types is distinct because, ideas, techniques, or phenomena are passed directly from a carrier to a receiver and the total number of people or areas using or exhibiting this characteristic is increased. Most studies of this type assume that distance between a receiver and carrier is a factor in the likelihood of the diffusion taking place.[4]

Hierarchical diffusion also results in an increase in the use or occurrence of the phenomena being diffused. However, in this case space is often relative and acceptance of the phenomena is dependent on a compatibility of socio-economic characteristics. Thus an idea is likely to spread from one person of a particular social class or economic standing to a person of similar class or standing even though they may live in a different community. As an example it is argued that a nuclear physicist is more likely to communicate an idea to another nuclear physicist in another country

than he is to tell the historian who is his neighbour.

Relocation diffusion, the type dealt with in this study, differs from the other types because there is no increase in the number of phenomena. The objects studied tend to be discreet and when they relocate in their new spatial context they no longer exist in their old setting. Thus, we might study the diffusion of Quakers in the seventeenth century, or of Jewish people in this century. If 1,000 people emigrate or flee a country they can no longer exist in the old country. Likewise if a group of businesses moves, because the old buildings they were using were demolished, and relocate in another area there will be no increase in their number. This is quite a different thing from studying the diffusion of particular business techniques such as discount selling, take-out foods or co-operative buying.

Three important terms are continually used in diffusion studies. They are carrier, barrier and mean information field. The carrier is the person or thing which transmits the innovation or phenomena to a new area. In relocation diffusion the phenomena itself is moving and is considered by some to be its own carrier. With respect to the retail businesses of this study the entrepreneurs of the businesses can be considered the carriers.

Things which block, slow down or change the direction of the diffusion are considered as barriers of which three

types are generally recognized. Absorbing barriers are
those barriers which stop a diffusion completely. An im-
penetrable jungle may stop human migration completely.
Industrial or residential land use or zoning may serve as
absorbing barriers in the relocation of retail business.
In the study of the Hamilton C.B.D. the boundaries of the
study are absorbing barriers because the diffusion pattern
stops abruptly at its borders.

If a barrier causes the diffusion to be temporarily
stopped and then channelled in another direction it is con-
sidered a reflecting barrier. In a business district the
lack of vacancies or potential sites in one area may cause
an intensification of the relocations occurring in another
area. In this situation incompatible land use in one part
may cause the relocation of the businesses to be channelled
to another section of the business district where more
favourable conditions are present.

A permeable barrier is the third type of barrier
commonly distinguished as a separate type of barrier. This
type of barrier allows a phenomena to pass through or over
it but greatly reduces the strength or size of the diffusion.
Within a Central Business District there may be a main traffic
artery which tends to separate the main retail shopping area
from other businesses in the downtown core. Retail businesses
might appear on the other side of the artery but the in-
tensity of retail uses may decrease sharply.[5]

B. DIFFUSION STUDIES: REVIEW OF THE LITERATURE

This review is not meant to be exhaustive but rather to highlight some studies which pertain to this thesis. Other sources provide a more complete review of the work that has been done.[6]

Learning the way a phenomenom or new idea spreads or fails to spread contributes to our understanding of change. Many studies have been carried out in the natural sciences. Work by botanists on the diffusion of plant types in plant succession studies or the work of stream pattern development by geographers has been important.[7]

In the social sciences various disciplines have had explicit and unique interests in diffusion. Anthropologists have championed diffusion studies as they have examined the spread of various aspects of one civilization to another.[8] Although ideas, and techniques did spread from one area to another it appears that several important ideas and concepts of modern man developed independently in civilizations that were not in contact with one another. Thus the anthropologists who have emphasized diffusion studies have met opposition from other anthropologists who consider evolution as a more important line of attack in their work.[9]

Sociologists have not been concerned with the spread of ideas between societies but rather with the diffusion within a society. Katz, Levin and Hamilton are often cited as having given a classical definition of diffusion in their

field:

> ...the process of diffusion may be characterized
> as the (1) <u>acceptance</u>, (2) over <u>time</u>, (3) of some
> specific <u>item</u> - an idea or practice, (4) by in-
> dividuals, groups or other <u>adopting units</u>, linked
> (5) to specific <u>channels</u> of communication, (6)
> to a social <u>structure</u>, and (7) to a given system
> of values, or culture.[10]

As Cohen points out there is an emphasis on the
spread within a society which is linked by communication
networks. Much of the work by sociologists exhibit little
interest in the impact of the change, the rate of adoption
of the change or the spatial extent of the change.[11]

Economists have concerned themselves with studies
analyzing the impact and rate of change as a result of the
diffusion of an idea. These ideas for economists invariably
deal with technological, managerial or organizational inno-
vations which change a production function or create a new
one.[12]

The credit for being the first geographer to develop
a model which describes the spread of an innovation over
space is usually given to Torsten Hägerstrand. His first
major work in diffusion consisted of three models which des-
cribed the spread of new agricultural techniques from central
Sweden.[13] There were six working assumptions in his model:

1. Only one person possessed the information at
   the start.

2. The probability of the information being accepted
   varied through five classes of "resistance."
   These classes were established entirely arbi-
   trarily.

3. The information is spread only by telling at pairwise meetings.

4. The telling takes place only at certain times with constant time intervals.

5. At each of these times every knower tells one other person, knower or nonknower.

6. The probability of being paired with a knower depends upon geographical distance between teller and receiver of information.

In Hägerstrand's models a floating grid is established and each cell in the matrix acquires a probability based on the likelihood of that cell adopting the phenomenon being diffused. These probabilities are accumulated and each cell acquires an address. Hägerstrand's methods have largely been adopted in this study except in this study the Mean Information Field is not floating. The M.I.F. is stationary because the movement of the businesses occurs only once from a starting position which has been established over a period of years.

At the urban level Richard L. Morrill used a probabilistic approach to a simulation model which described the spatial diffusion process exhibited by the Negro ghetto in Seattle.[14] Morrill argued that using the probabilistic approach was correct because he lacked sufficient definite information concerning the reasons for people making specific house-to-house moves. He noted that this approach was more suitable because the study involved only a few individuals and not a few thousand. As Morrill points out the model is simulated rather than "real" because it does not purport

to predict the behaviour of actual people.

Morrill thought the model was successful with respect to a comparison of the general patterns generated. However if a comparison on a block by block basis was carried out the blocks corresponded directly less than two-thirds of the time. This was attributed to the insufficient weighting of the values of the homes concerned and topographical factors. Neighbourhoods with homes of greater value were more resistant to the infiltration of the ghetto. Likewise the neighbourhoods situated on higher land did not become part of the ghetto as quickly while the ghetto advanced more quickly than the model anticipated into low lying areas.

C. URBAN RENEWAL: REVIEW OF THE LEGISLATION

i) Urban Renewal in Canada

The main catalyst for the following study has been the increasing importance of urban renewal as an aspect of public policy of the municipal governments of Canada. Urban renewal policy of today has developed over the past forty years. In 1935 the Federal Government passed the Dominion Housing Act.[15] The Minister of Finance was empowered to join with lending institutions in making loans "to assist in the building of houses." By 1964 the Dominion Housing Act had undergone revisions and was now known as the National Housing Act.[16]

In 1964 the National Housing Act was amended to allow the Central Mortgage and Housing Corporation to enter

into agreements to assist a province and a municipality
in carrying out an urban renewal scheme.[17] The project did
not have to involve residential property either before or
after the completion of the renewal. Under the scheme
C.M.H.C. would pay 50% of the costs of studies, land ac-
quisition and installation of services for the project as
well as provide loans for another 33 1/3% of the costs pro-
viding they were secured by municipal or provincial deben-
tures.

It was through these measures that cities such as
Hamilton, Ontario, became involved in the type of large
scale urban renewal project causing the relocation diffusion
which is the subject of this thesis.

ii) Urban Renewal in Hamilton

In 1957, the City Planning Commissioner was requested
by the Board of Control to investigate the advisability
of undertaking an urban renewal study. The Planning Commissioner
in his report recommended that such a study be carried out
and that the City apply to C.M.H.C. for a grant of $12,000
for this purpose. The City was to contribute another $4,000.
After the approval by the Minister, the agreement between
C.M.H.C. and the City of Hamilton was signed in November
1957.[18]

The total funds available were later increased from
$16,000 to $28,000 by two additional grants from the federal

government and contributions from the City. After the
initial grant was received, a director and staff were re-
tained as well as a consultant, who under the general super-
vision of the City Planning Department were to prepare and
submit a report. The final report, hereafter referred to
as the 1958 Urban Renewal Study, was submitted to the
Hamilton City Council in February 1959. The report reviewed
the City's legislative means of controlling land use, deter-
mined urban renewal needs and made specific recommendations
for further action.[19]

At the time of the 1958 study, the City of Hamilton
had an official plan specifying five types of land use
namely: residential, commercial, industrial, agricultural
and recreational. The City also had a zoning by-law adopted
in 1950 and 1951 in two parts, both reflecting actual land
use as it was in 1947.

The report concluded that the official plan and zoning
by-law could not serve as meaningful guides to the best land
use in the future; the former was too vague while the latter
merely confirmed a mixture of conflicting uses. The report,
accordingly, recommended certain zoning changes and also
urged the City to undertake further studies with a view to
the preparation of a more adequate official plan.

In 1958 a detailed urban renewal study was carried
out.[20] The results of the study designated areas of the
city for proposed redevelopment. To date the city has
acted on four of these areas. These areas are referred to

as the Burlington Beach and Van Wagner's, the North End,
York Street, and the Civic Square. (see Figure 1).

The Van Wagner Beach project started in 1959. Towards
the end of that year land was expropriated, cleared and con-
verted into a park and beach for recreational purposes.
A number of unsightly and run-down cottages which had been
converted to year round use during the war were removed
and considering the city has few accessible unpolluted shore
areas for recreation a much needed recreation facility was
provided.

The North End Urban Renewal Area is the largest
among those selected by the 1958 Study and also the most
populous. In this area the City has attempted to place
a considerable emphasis on rehabilitation. To encourage and
assist the residents of the area the City acquired a number
of properties which they refurbished and are using as public
housing. A new school which incorporated a community centre
and recreation facility complete with a swimming pool was
constructed. Two large apartment towers near the waterfront
were constructed, one being used for a senior citizen resi-
dence. Having completed these projects the city has had a
hands-off policy attempting to encourage private citizens
and developers to continue the urban renewal work.

The Civic Square Urban Renewal Area and the York
Street Renewal Area were both going to be refurbished and
reconstructed. A lack of money, however, made it necessary

to subsequently shelve the York Street programme. The city
was, however, able to move ahead with the Civic Square pro-
gramme. The total scheme involved 43 acres of land and 12
blocks of varying size. In clearing the land for the new
buildings which included two theatres, two office towers,
an art gallery, education centre and shopping mall, 206
businesses would be forced to give up their present location
and move to a new site.

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[16] Canada, "The National Housing Act 1938," Statutes of Canada. Chapter 49, pp. 353-367.

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[18]*Agreement for Planning Study of Potential Urban Renewal Areas, Hamilton, Ontario*. (Hamilton: City of Hamilton and Central Mortgage and Housing Corporation, 1957).

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CHAPTER THREE

A DESCRIPTION OF THE HAMILTON CIVIC SQUARE
URBAN RENEWAL AREA AND THE BUSINESSES
ORIGINALLY LOCATED THERE

A. PHYSICAL CHARACTERISTICS

    i) Location and Character

        The Civic Square Urban Renewal Scheme consists of
43 acres of land (including streets) in 12 blocks of
varying size. It is generally bounded by Merrick Street
on the north, Bay Street on the west, Main Street on the
south and James Street on the east. The boundaries are
irregular in the south-east corner where only about 60%
of the block (bounded by King, McNab, Main and James) has
been included (see Figure 3).

        In the broadest sense Civic Square includes the western
portion of the commercial core of the city and a small
part of the mixed commercial-industrial area which surrounds
the Central Business District. The area appeared uniformly
old, with rows of 2 and 3 storey structures lining the
street frontages, punctuated by numerous parking lots. The
latter, being in the heart of the central area, were con-
sidered indicative of a lack of interest on the part of
private enterprise to invest in new construction in an un-
certain and poorly organized environment.[1]

    ii) Development Controls

        The Hamilton Zoning By-law (no. 6593) defines most
of the Civic Square as "I-Central Business District."[2]
The only exception is a strip about 120 feet along the north
side of Main Street, across from the City Hall, which is
defined as "HI-Civic Centre (Protected."

Uses permitted in the Central Business District
zone include any residential, institutional or public uses,
commercial uses with few limitations, and some manu-
facturing or industrial land uses of very limited size and
type. Maximum height is 10 storeys and/or 120 feet or
greater if within a 75° light angle. Fifteen-foot minimum
rear yards are required, plus side yards for residential
buildings only. The maximum floor area ratio is 11 to 1,
with a bonus permitted in conjunction with the development
of large lots.

The Civic Centre Protected zone permits hotels,
most public uses including libraries, art galleries, ob-
servatories, etc., and a variety of common commercial
uses, subject to some restrictions but including offices
and private parking garages. Height limits are 4 storeys
or 55 feet without sideyards, and unlimited when 10-foot
setbacks are provided above the fourth floor. The mini-
mum rear yard is ten feet while the maximum permitted floor
area ratio is 8 to 1.

The Official Plan for the City of Hamilton defines
the whole area as commercial; no further policies or de-
finitions can be specified due to the absence of any
text in the Plan.

iii) Existing Land Use

The significant feature of land use in the Civic
Square was the great variety and intermixture of uses.

These ranged from high-quality store and office space, associated with the core of the central area, down to warehouse, manufacturing and wholesale uses in seriously dilapidated buildings.

The blocks on King Street between James and McNab Streets contain a number of retail shops and a few service stores such as restaurants. These were generally high quality businesses, paying relatively high rents because of their good location within the C.B.D. and were in old buildings which had been renovated in terms of their ground floor space and facade.

A great variety of lower quality retail stores were scattered along the remainder of King Street as well as on other streets in the area (particularly York Street). The level of rent (see appendix 2) which they could support was generally in inverse proportion to the distance from the prime corner of King and James Streets. Most of these were small owner-operated businesses, frequently long-established and offering varied and specialized products at low cost and with low profits. They occupied old converted buildings varying in condition from fair to very poor. A small amount of space was used for offices, mostly on the upper floors of buildings scattered throughout the renewal area.

Table 2 shows a complete list of the retail businesses which existed in the study area prior to expropriation. There were 112 retail businesses in the area.[2] Of these, 43 were

included in the model because they met the two criteria of
being operated by a single proprietor and because they re-
located in the study area. As outlined in Chapter One there
were 69 retail businesses not included in the study. Eighteen
were not included because they were part of chain store
operations. As such there was a strong likelihood they
would move into new Civic Square Mall and not be part of the
relocation diffusion to other parts of the C.B.D. Information
concerning the economic viability used as part of the input
for the model was not available for the individual chain
stores in Hamilton but only for the entire chain operation.

Twenty-seven businesses were not included because
they did not relocate in the C.B.D. Some of these were
still planning to relocate but had not done so by September
1973. There were several reasons businessmen did not
plan to relocate in the C.B.D. A few had decided to retire.
Others moved their business to traffic arteries such as
Concession Street. Some relocated in plazas and business
districts in the suburban area of Dundas, Ancaster and
Stoney Creek.

Restaurants and drinking places provided a particular
problem to the Hamilton Civic Square Project. Owners of
restaurants had large investments in equipment which was
very suitable for its location but would not necessarily
be suitable for the locations available in other areas of
the C.B.D. As a result it was decided that the restaurants

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Table 2: Retail Businesses in the Hamilton Civic Square Study Area

Included in Study	Not Included	S.I.C. Number	S.I.C. Description[4]
1	2	5251	Hardware Stores
	4	5411	Grocery Stores
	7	5423	Meat and Fish Markets
1	3	5441	Candy, Nut, Confectionery Stores
2	1	5462	Retail Bakeries
	2	5541	Gasoline Service Stations
4	1	5611	Men's & Boy's Clothing & Furnishing Stores
2	1	5621	Women's Ready-to-Wear Stores
1	1	5631	Women's Accessory and Specialty Stores
2	6	5661	Shoe Stores
3	1	5681	Furriers and Fur Shops
1	1	5699	Miscellaneous Apparel and Accessory Stores
	2	5712	Furniture Stores
1		5713	Floor Covering Stores
1		5719	Miscellaneous Home Furnishing Stores
	1	5722	Household Appliances
3	1	5732	Radio and Television Stores
	16	5812	Restaurants: Eating Places
	1	5813	Restaurants: Drinking Places
3	4	5912	Drug Stores and Proprietary Stores
	1	5921	Liquor Stores
	1	5931	Used Clothing
1		5941	Sporting Goods Stores and Bicycle Stores
3	2	5942	Book Stores
1		5943	Stationery Stores
2	3	5944	Jewellry Stores
1	1	5947	Gift, Novelty and Souvenir Stores
2		5948	Luggage and Leather Goods
	1	5983	Fuel Oil Dealers
2	1	5992	Florists
	1	5996	Cameras, Photographic Equipment
5	2	5999	Miscellaneous Retail Stores

located in the Civic Square Renewal Area would be pur-
chased by the City of Hamilton. Some restaurants did re-
locate in the C.B.D. and with the capital available to them
purchased new equipment, created new decor considerably
enhancing their image.

Lastly, seven meat and fish stores were not included
in the relocation model. These businesses had enjoyed a
particular retail affinity and were complemented by the
market located across York Street behind Eaton's department
store. At the time of this study two of these butchers
had retired, two had taken positions with chain grocery
stores and one had relocated in another part of the C.B.D.
to the east of the market. It was hoped by city planners
that they would relocate in the market itself. Plans to
provide suitable accommodation, however, appear to have
never reached fruition.

Table 3

Total Retail Businesses in Study Area	112
Retail Businesses Included in Study	43
(a) i Individual proprietorship	43
ii Relocated in C.B.D.	43
Total Retail Businesses Not Included	69
(a) Individual Proprietorship but did not re- locate in the C.B.D.	27
(b) Not individual proprietorship	18
(c) Restaurants or drinking places	17
(d) Meat and Fish Stores	7

Table 3 shows a summary of the retail businesses
found in the Civic Square Area indicating the numbers included
in the study and those excluded for various reasons.

The amount of rent paid by a business was generally unavailable since the contract between the tenant and the landlord was considered by both parties to be private information. The rent paid was considered to be high or low depending on which area of figure 6 the business was located. The information for this figure was extrapolated from sample data collected within the C.B.D. as outlined in Chapter 1. The economic viability of a business was determined by using Dun and Bradstreet credit ratings as a surrogate.

Table 4 shows a breakdown of the rents paid and the estimate of the economic viability of the retail businesses included in the study. These figures were used in the modified form of the model and explanations are provided in Chapter V.

Several service industries were located in the Civic Square Area. They are not included in the study because they do not depend on necessarily the same trade area as the retail business; they were in some cases closely integrated with the manufacturing and wholesaling sector of the Civic Square Area economy; the data was not readily available for them with respect to the viability of their enterprise. Several of the service businesses were closely allied with the financial sector of the economy. A chartered bank, licensed loan lender, stock broker, and insurance brokers were among the service industries located in this area. Several industries including 7 beauty shops and 7 barber

TABLE 4

Rents Paid and Economic Viability Ratings of the Retail Businesses Included in Study

S.I.C.[4]	Total Number	Rent Paid		Economic Viability	
		High	Low	High	Low
5251	1		1	1	
5441	1		1	1	
5462	2	1	1		2
5611	4	2	2	3	1
5621	2	1	1	1	1
5631	1	1			
5661	2	2		2	
5671	1		1		1
5681	3	2	1	3	
5713	1		1		1
5719	2		2	1	1
5732	3		3		3
5912	3	1	2	2	1
5942	3	2	1	1	2
5943	1		1	1	
5944	2	1	1	2	
5947	1		1		1
5948	2	1	1	2	
5952	1		1	1	
5992	2		2	2	
5999	5	1	4	2	3
		15	28	25	18
	43	43		43	

shops catered to personal needs. Electric motor repairs and automobile body repair industries were closely integrated with the wholesale automobile industries. Physiotherapists, dentists and optomoetrists represented the health service field. Other professionals included engineers, architects, surveyors, and lawyers. Table 5 shows a complete list of the service industry sector of the economy found in the Civic Square Area excluded from this study for the reasons outlined above.

TABLE 5

Service Industries in the Hamilton Civic Square
Study Area

S.I.C. Number	No. of Businesses	S.I.C. Description[4]
6011	1	Canadian Charter Banks
6145	3	Licensed Small Loan Lenders
6211	1	Security Brokers & Dealers
6311	1	Life Insurance
6411	1	Insurance Agents, Brokers & Service
7011	5	Hotels
7211	2	Drycleaners
7216	1	Dry cleaning plants except rugs
7218	1	Industrial cleaners
7221	3	Photographic Studio
7231	7	Beauty Shops
7241	7	Barber Shops
7251	4	Shoe Repair & Hat Cleaning
7299	4	Miscellaneous Personal Services
7311	1	Advertising Agency
7312	1	Outdoor Advertising Service
7523	2	Parking Lots
7531	2	Automobile Body Repairs
7539	2	Ignition and Electric Repair
7629	1	Electrical Repair Shops
7694	1	Electrical Motor Repair
7922	1	Theatrical Producers & Services
8021	5	Dentists
8041	3	Optometrists
8049	1	Physiotherapist
8111	2	Legal Services
8244	1	Business & Secretarial School
8249	1	Vocational School
8361	1	Residential Care
8611	1	Business Association
8631	4	Labour Unions
8699	3	Membership Organizations
8911	2	Engineering & Architectural Services

The greatest variety of land uses and the buildings

in poorest condition were to be found in the blocks furthest

removed from James Street. A large amount of space was devoted to parking lots, particularly near the City Hall on Main Street. Manufacturing operations were scattered throughout the area, often on upper floors, while wholesale and warehouse operations were also in dispersed locations. Almost all of these operations were located close to the Central Market, some of this space being refrigerated and most of it having 'drive-in' truck loading.

TABLE 6

Wholesale Businesses in Hamilton Civic Square
Study Area

S.I.C. Number	No. of Businesses	S.I.C. Description[4]
5013	4	Automotive Parts Supply
5021	1	Furniture
5048	3	Grocery
5049	1	Fruits and Produce
5051	1	Metal
5064	1	Restaurant & Electrical Equip.
5086	1	Dental Equipment

Several automotive parts distributors were located in the vicinity of Park Street North, most of them occupying all floor levels of old, converted and dilapidated buildings. Their primary needs were for a reasonably central location adequate parking space and a location close to their competitors, all of which helped to account for their grouping in the area. Tables 6 and 7 show a complete list of the manufacturing and wholesale industries found in the area.

TABLE 7

Manufacturing Industries in Hamilton Civic
Square Study Area

S.I.C. Number	No. of Businesses	S.I.C. Description[4]
1711	1	Construction: Special Trade
2512	1	Furniture Manufacturing
2751	1	Commercial Printing
3231	1	Manufactured Products of Purchased Glass
3572	1	Typewriter Manufacturing
3599	1	Miscellaneous non-electrical machinery.

Mixed in with these commercial-industrial uses were a few old houses and some apartments on upper floors over stores. These at present accommodated about 500 people but were mostly in poor condition and had substandard features.

Three large buildings included in Civic Square have been retained. These are the Canadian Imperial Bank of Commerce Building at King and James Streets (a recently modernized 10-storey office building), Eaton's department store at York and James Streets and the combined Central Market and Garage at York and MacNab Streets. The Market Garage is the only publicly owned building in the Civic Square Area.

This chapter examined the characteristics of the Hamilton Civic Square Renewal Area. In particular a complete description of the businesses which were found in the area was provided. Many of these, for reasons which have been cited, were not included in the relocation diffusion model. Those which were included are described in greater detail. The next chapter examines the Central Business District in detail and outlines the differences that exist in the various sections of this area of Hamilton.

FOOTNOTES TO CHAPTER THREE

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[3]Vernon's Hamilton City Directory (Hamilton: Vernon Directories Limited, 1969) pp. 128-200.

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C H A P T E R   F O U R

A DESCRIPTION OF THE VARIATIONS WITHIN
THE HAMILTON CENTRAL BUSINESS DISTRICT

A.   VARIATIONS IN THE HAMILTON CENTRAL BUSINESS DISTRICT

All of the businesses whose relocation decisions are included in this paper had been located in the Hamilton C.B.D. It is assumed that they found the trade sufficient to provide the necessary threshold population for their business. At the time these businessmen were making their relocation decision Hamilton with a population just under 500,000 in its metropolitan area was the sixth largest city in Canada. It had a ten year growth rate from 1959 to 1969 of 28%. The mean income was 121% of the national average and exceeded Montreal, Vancouver, Winnipeg, Calgary and Edmonton. Per capita income in 1969 was $2710 with $1360 being spent on retail purchases.[1] The trade area for the merchants of the Hamilton Central Business District includes much of the suburban area around Hamilton such as Stoney Creek, Ancaster, Dundas, and Burlington. Huff defined a trade area as:

> A geographically delineated region, containing potential customers for whom there exists a probability greater than zero of their purchasing a given class of products or services offered for sale by a particular firm or by a particular agglomeration of firms.[2]

This definition can be shown in a mathematical equation as:

$$Tj = \sum_{i=1}^{n} (Pij \cdot Ci)$$

Where Tj is the trading area of a particular firm, or agglomeration of firms j, that is, the total number of consumers within a given region who are likely to patronize j for a specific class of products or services.

Pij is the probability of an individual consumer residing within a given gradient i shopping at j. Ci is the number of consumers within a given gradient i. In the Hamilton trade area the gradient passing through Burlington may be as low as .10 since many shoppers in that town use their own Burlington Mall or the new malls in west Toronto. On the other hand the gradient passing through the western part of Hamilton may be as high as .80. Regardless of the exact figures it is assumed that businessmen conducting a viable enterprise in the Civic Square Area would wish to relocate in another section of the Hamilton Central Business District.

Since this study is restricted to businesses which relocated in the C.B.D. these figures may not seem necessary. However, it points out two things. First, since the Hamilton C.B.D. is a viable trade area it is one of the reasons many of the businesses originally located in the Civic Square Renewal Area made the decision to stay within the C.B.D. Secondly it in part justifies not including other commercial areas within the Hamilton Region as possible locations in the diffusion model. Thus, assuming the Hamilton C.B.D. as a whole is a viable answer to the relocation problem this next section will examine the variations which exist within the C.B.D. These variations will be included as factors in the model in the next chapter to determine their affect on the relocation decision.

In developing the model in Chapter Five several factors are considered collectively to have determined the relocation decision made by the retail merchants. No attempt is made to show which factor had the greatest effect since interviews with the merchants indicated that the decisions made were individual in nature and the factor or factors having the greatest influence varied with each merchant. A weighting factor is used with some of the components of the model to make each equal in the model.

The probability that any block is chosen for the location of a business which is relocating is to a certain extent dependent on or related to the number of store sites located on that block. Assuming a uniform vacancy rate and that all other factors are equal the probability will be directly proportionate to the number of sites on that block. Figure 5 shows the actual number of store sites located in each block of the Hamilton C.B.D. at the time of the study. The number of sites varies greatly. The largest number of sites is found in block 8 and block 22. Both of these blocks have malls contained within the buildings located there. The other blocks located along James Street North and King Street East make up most of the core area for retail trade in the Hamilton C.B.D. Blocks 11 and 12 are used completely for retail trade, however, they have fewer sites than some other blocks because many of the sites are large being occupied by large variety stores (S.S. Kresge, Woolworths) or department stores (Right House). Many blocks have

HAMILTON CENTRAL BUSINESS DISTRICT

CANNON

| 11 [2] | 20 [3] | 10 [4] | 8 [5] |

| 1 [1] | 20 [6] | 5 [7] |

| 35 [8] | 9 [9] | 2 [10] |

| 3 [44] | 4 [45] | 2 [46] | 5 [47] |

| 18 [11] | [12] |

| 5 [43] | 2 [42] | 3 [41] | 2 [40] |

| 21 [13] | 13 [14] | 21 [15] | 14 [16] | 14 [17] | 15 [18] |

BAY ST

HESS

WELLINGTON

| 12 [39] | 12 [38] | 10 [37] | 15 [36] |

KING ST

| 12 [25] | 8 [24] | 16 [23] | 58 [22] | 14 [21] | 12 [20] | 14 [19] |

JOHN ST

| 1 [35] | 1 [26] |

| 1 [34] | 1 [27] |

ACTUAL NUMBER OF
STORE SITES LOCATED
IN EACH BLOCK

5

N

| 1 [33] | 6 [28] |

JAMES ST

| 1 [32] | 4 [29] |

NUMBER ASSIGNED TO
BLOCK IN STUDY

1

| 9 [31] | 1 [30] |

DUKE ST

0   1000'   2000'

1" = 667'

FIGURE 5.

50
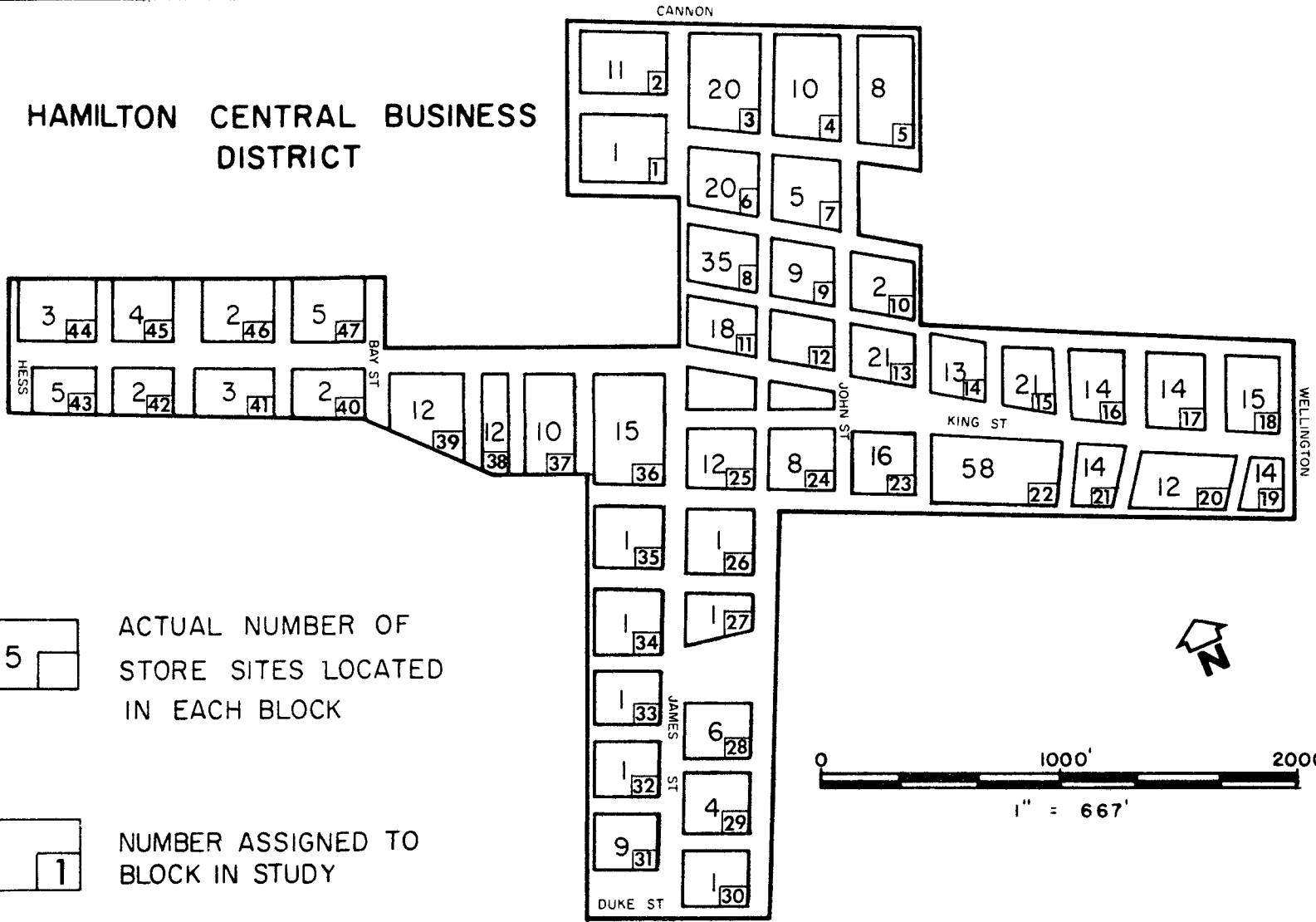
very low totals. On James Street South many of the blocks
are used primarily for institutional uses (i.e. churches,
Y.M.C.A.) or professional uses (i.e. Alexander Square,
Professional Arts Building, Medical Arts Building). As one
approaches the fringes of the C.B.D. or is removed from the
two main axes - King Street and James Street - the number
of sites decreases with much of the land being used for
parking lots.

Because a city block contains many store sites is
no guarantee that a business will be able to locate there.
Obviously it would be necessary to have a vacant site on·
that block. Figure 6 shows the average vacancy rate for
each block of the Hamilton C.B.D. These were established
with the assistance of Mr. Waind and the Hamilton Real
Estate Board. Not every block within the C.B.D. had vacancies.
To a certain extent this reflects the small number of
store sites found on that block. Some blocks may have had
many sites but few vacancies since the locations were quite
desirable.

High vacancies may occur in undesirable areas of a
C.B.D. If this is the case in some areas of the Hamilton
C.B.D. it will be reflected in the low ratings these blocks
receive for other factors in the relocation model.

This factor in the model is a very dynamic one.
In any block some vacant sites will become occupied but others
may become available at any time. Thus, the vacancy situation

HAMILTON CENTRAL BUSINESS DISTRICT

CANNON

1	4	2	1
—	3	1	
	4	2	—
	—	1	

HESS

| 1 | 1 | — | 2 |
| 1 | — | — | — |

BAY ST

| 1 | 1 | — | 2 |

JOHN

3 | 3 | 5 | 3 | 3 | 4

KING ST

| 1 | 1 | 1 | 5 | 2 | 3 | 2 |

WELLINGTON

—	—
—	—
—	—
—	—
—	—
1	—

JAMES ST

DUKE ST

⬛ INDICATES HIGH RENT AREA OF C.B.D.

2 MEAN NUMBER OF VACANCIES RECORDED DURING 1970

VACANCY FACTOR = 4(No. OF VACANCIES)

N

| 0 | 1000' | 2000' |

1" = 667'

FIGURE 6.

52

at any site may change quickly. Field studies and other vacancy figures, however, indicated that the vacancy situation on any individual block did not appear to change very much.

The accessibility of large numbers of potential customers is widely recognized as a prerequisite for a profitable retail location.[3] Within the C.B.D. there is a wide range in the amount of pedestrian traffic on each block. Whether this has resulted from a convergence of bus routes, main arteries with nearby parking, or the shopping opportunities provided at any one block is a moot point.[4] Whatever the reasons there is a wide range in the amount of pedestrian traffic occurring on the various down-town blocks. Figure 7 shows a sample of a seven hour pedestrian traffic flow along King Street. This was re-corded during the summer of 1970 with the datum for each corner being the sum of data recorded for pedestrian crossings in each direction at the corner of the block. The blocks located on King Street East have much heavier pedestrian traffic than the blocks located along king Street West. The pedestrian traffic along King Street East is heaviest at James Street and decreases on the blocks further east. Once pedestrian traffic was collected for each block within the C.B.D. an accessibility factor was interpolated from this data. Figure 8 shows the accessibility factor used for each block of the model. The actual method at arriving at this figure is explained in the next chapter

PEDESTRIAN TRAFFIC
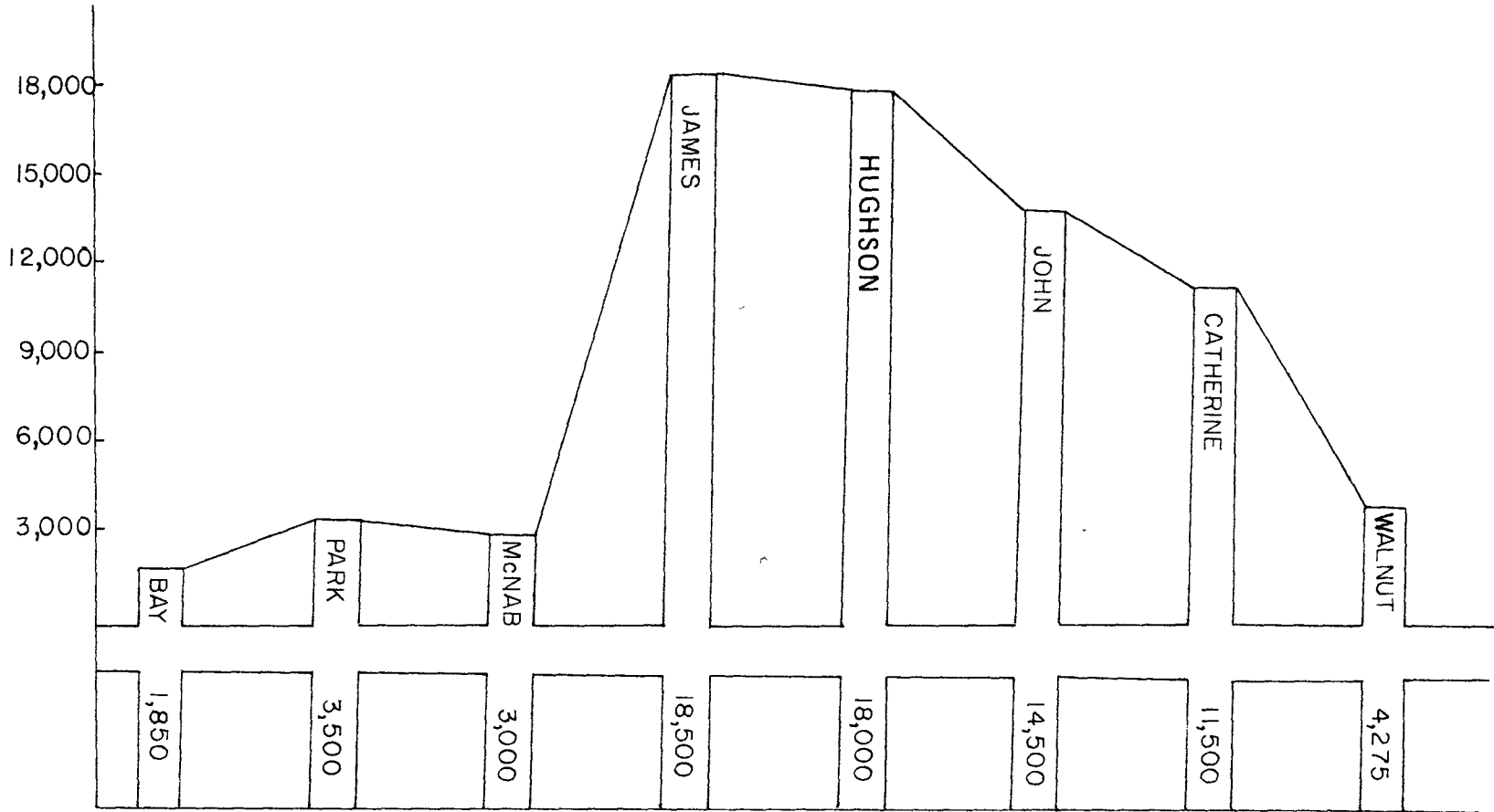
A SAMPLE OF A SEVEN HOUR PEDESTRIAN TRAFFIC FLOW   SUMMER 1970
KING STREET: HAMILTON C.B.D.

SOURCE: ENGINEERING AND TRAFFIC DEPT., CITY OF HAMILTON

FIGURE 7

54

HAMILTON CENTRAL BUSINESS DISTRICT

CANNON

3	3	2	2
3	7	2	
	15	2	2
	20	18	12

BAY ST

HESS

1	1	1	1
1	1	1	1

2   3   4   12

JOHN

9   7   5   3   2

KING ST

| 12 | 12 | 12 | 8 | 5 | 3 | 2 |

12   12   12

9   9

2   2

ACCESSIBILITY FACTOR
INTERPOLATED FROM
PEDESTRIAN TRAFFIC DATA

$\boxed{12}$

2

2

JAMES ST

2

2

2

2

1

1

DUKE ST

WELLINGTON

N

0   1000'   2000'

1" = 667'

FIGURE 8.

55
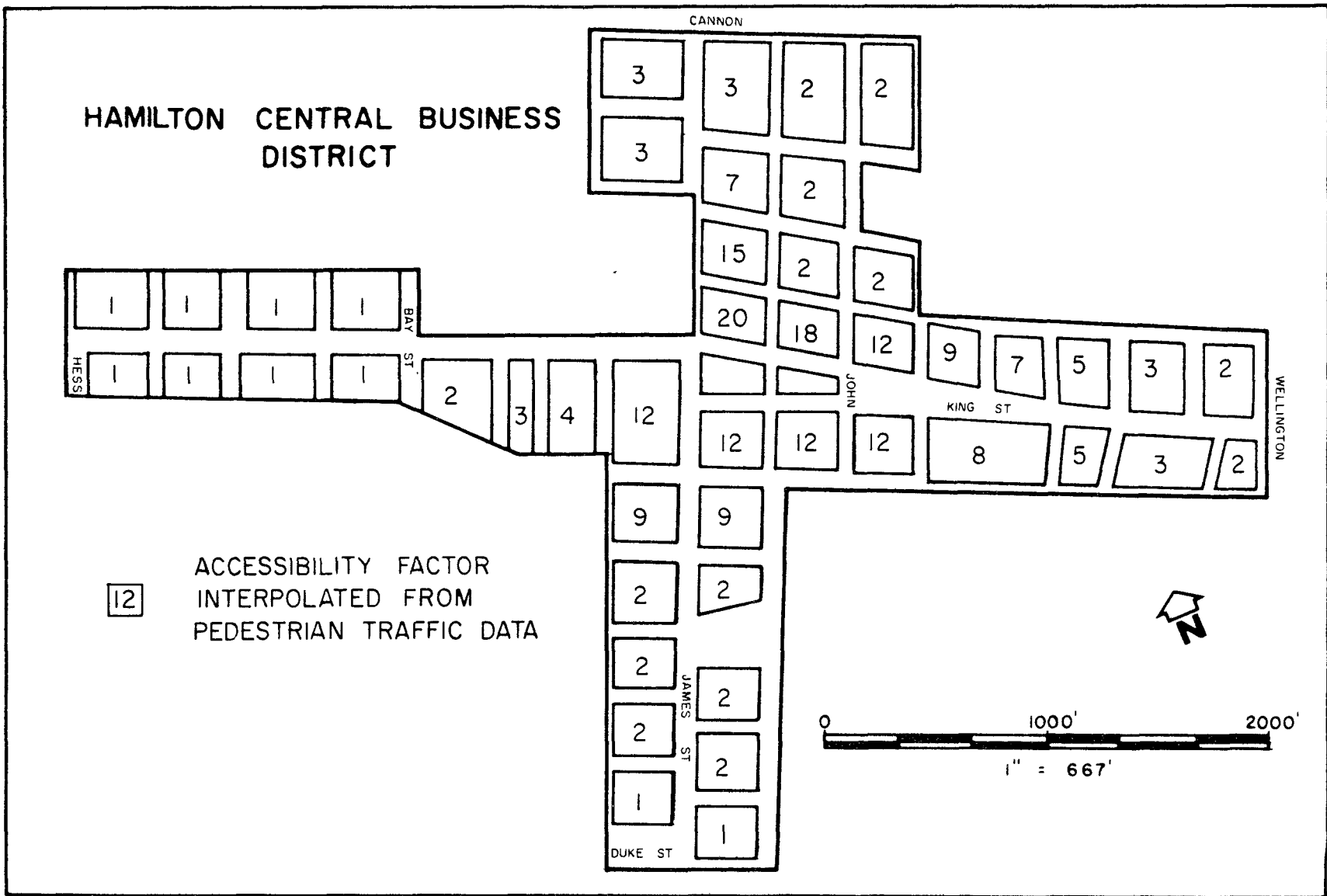
on page 64. It will be noted that pedestrian traffic de-
creases in all directions from the corner of King Street
and James Street.

The fourth factor included in the basic model which
attempts to assess the differences and variations which
exist within the Hamilton C.B.D. is a distance decay factor.
It is assumed that businessmen will wish to acquire new
locations which are close to their former locations in order
not to lose regular customers who may have patronized their
business. This is particularly true for customers who walked
to the former location. These customers may have lived in
apartments nearby, walked to the store during noon hour breaks
or stopped at the store on their way to and from parking
lots. Figure 9 shows the data for the actual distance de-
cay factor used in the model. It will be noted that each
block adjacent to the Civic Square Renewal Area has a score
of twenty. Blocks which are situated one block from the
Civic Square Area have a score of fifteen. Blocks two re-
moved have a factor score of ten, blocks three removed have a
factor score of five and all other blocks have a factor
score of one.

The distance decay factor is weighted in units of
five in order to make the highest values equal the highest
values of the other factors and the lowest value equal the
lowest values of the other factors.

Assigning a factor score for a distance decay
factor changes the relative strength of the probabilities

HAMILTON CENTRAL BUSINESS DISTRICT

CANNON

15 15 10 5
20 20 15

5 10 15 20 20 15 10
5 10 15 20 20 15 10 5 5 5 1 1

BAY ST

HESS

20 20 20 20 15 10 10 5 5 1 1

JOHN

KING ST

WELLINGTON

15 10
10 5

JAMES ST

5
5
1
1

DUKE ST

20 DISTANCE DECAY FACTOR
USE IN THE MODEL

0   1000'   2000'
1" = 667'

N

FIGURE 9.

57
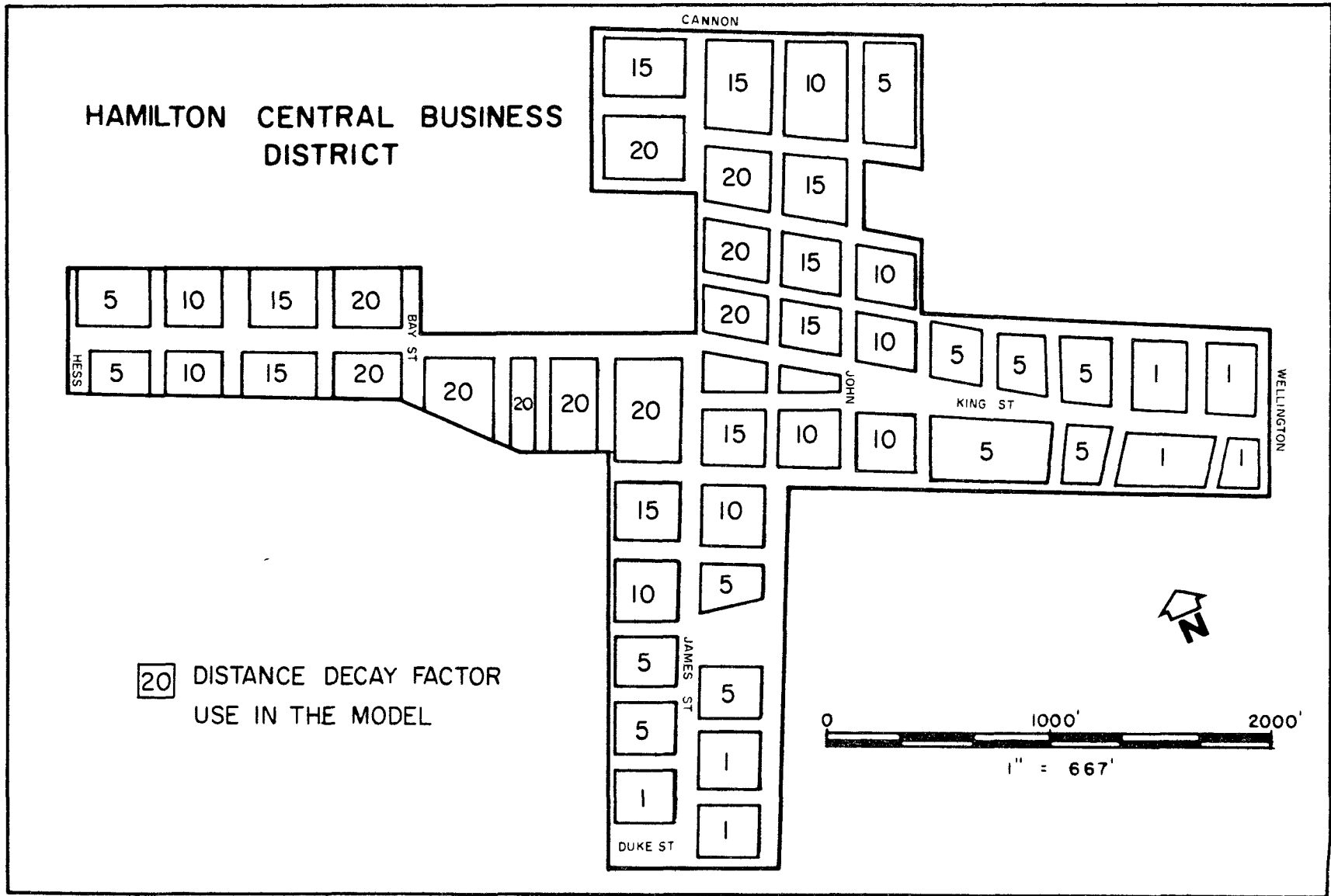
on King Street West. These blocks have low scores when the
other factors are used alone yet a few businesses did
locate on King Street West. Interviews indicated that a
desire to be close to their old locations was a definite
factor in their relocation decision.

In assessing the possibilities of any new location
each entrepreneur had to decide what rent he could afford
or his business could withstand.[6] For this reason it was
necessary to collect information about the rents charged
for retail floor space in the various areas of the Hamilton
C.B.D. Eleven of the blocks within the study had prime
floor space for rent and thus they were considered to con-
stitute the high rent area of the C.B.D. (see Figure 5).
The other thirty-six blocks in the study had properties for
rent at an amount which was considerably less than the
high rent area (see appendix 2).

Having assessed and described the businesses in-
cluded in the study as well as the variations within the
Hamilton C.B.D. it is necessary to develop the model in
the next chapter.

FOOTNOTES TO CHAPTER FOUR

[1] *1969 Survey of Markets and Business Year Book* (Toronto: McLean Hunter Limited, 1969) p. 141.

[2] David L. Huff, "Defining and Estimating Trade Area," *Journal of Marketing*, 1964, pp. 34-38.

[3] John E. Mertes, "A Retail Structural Theory for Site Analysis," *Journal of Retailing*, Vol. 40, No. 2, (Summer 1964), p. 23.

[4] *Hamilton Street Railway Annual Reports* (Hamilton: Hamilton Street Railway, 1969) pp. 20-30.

[5] Field Survey conducted by the author.

[6] Peter Scott, *Geography and Retailing* (London: Hutchinson and Company 1970), p. 25.

CHAPTER FIVE

THE MODEL

A. THE MEAN INFORMATION FIELD

In many geographical diffusion studies the area
which receives the phenomena which are relocating, changes
or moves after each one of the phenomena has relocated.
This is done for two reasons. First, the study may deal
with contagious diffusion and the movements in the second
stage of diffusion will originate from the new location
which was generated or designated in the first stage of
the diffusion. Second, the study may be a relocation study
which studies simultaneous movement of phenomena which are
originally widely dispersed. The mean information field in
the two cases mentioned must be dynamic to allow for
differences which would be evident at the different places
of origin. In this thesis the place of origin, the Civic
Square Urban Renewal Area, is contagious and small relative
to the Central Business District as a whole. The type of
diffusion study which is considered is not contagious.

For these reasons the Mean Information Field (here-
after referred to as M.I.F.) in this study is fixed. It
consists of the Hamilton Central Business District which
is shown in Figure 10. The eastern limit is Wellington
Street; the southern limit is Duke Street; the western
limit is Hess Street; the northern limit is Cannon Street.
The main axes are King Street running east and west and
James Street running north and south. The numbers shown
on each block are those to which reference is made in this

HAMILTON CENTRAL BUSINESS DISTRICT

BLOCK NUMBERS REFERRED TO IN STUDY

GORE PARK

CLEARED EXPROPRIATED AREA
CIVIC SQUARE

1" = 667'
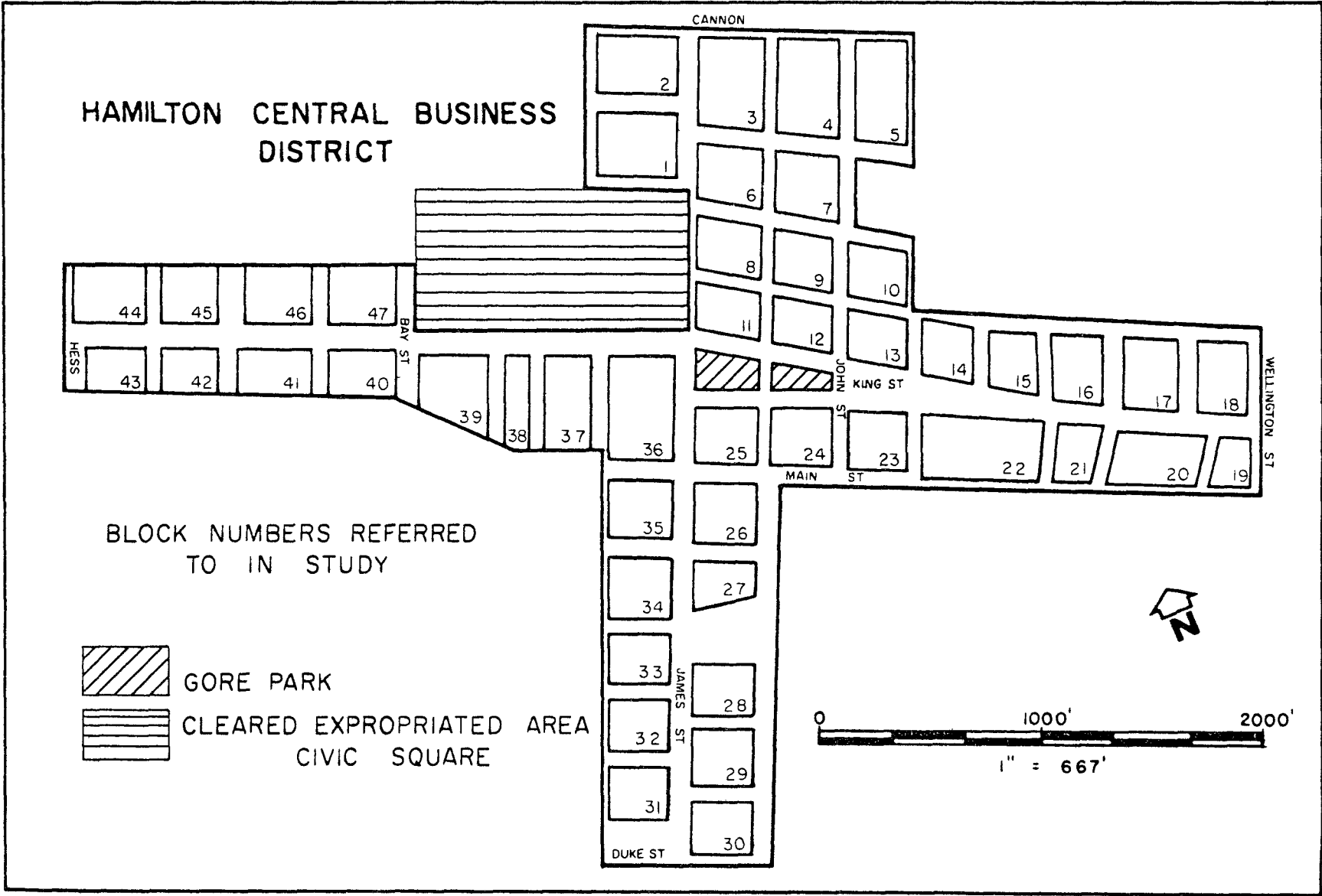
FIGURE 10

chapter. In total there are 47 blocks in the C.B.D. of
Hamilton which is the M.I.F. of this study.

B. THE BASIC COMPONENTS OF THE MODEL

The basic model is build around four factors which
are used to determine the probability in that block that
any business would relocate (for each block of the Hamilton
C.B.D.). This formula is additive rather than multiplicative.
In certain circumstances it may be impossible for a block
within the Central Business District to receive a business
when it relocates. If a block had no vacant store sites
at the time a business was relocating it would be impossible
for that block to receive that business. This factor
in the formula would be zero. Since the number of vacant
stores sites in any block is often rapidly changing and since
there is often a lag between the time data is collected and
subsequently used it was decided the formula should be additive.
In this way no block was eliminated from the possiblity of
receiving a business even though at the time of the survey
or data collection there was no store vacancy on that block.
In this situation the weight of the probability would be
determined by the other factors.

Each factor or component in the basic model is
given an equal weighting in the formulae used. It is
quite possible one factor is more important in determining
the relocation of the businesses in particular cases. How-

ever, a refinement of the formula which would vary the
weightings would have little credibility unless it were
verified through its use in several cities with a similar
relocation diffusion. Such testing is beyond the scope of
this paper and would be recommended for further research.

The formula for the store site factor in the basic
model is as follows. Upper case letters are used to de-
signate the factor involved and lower case letters are used
to designate the raw data. This formula is followed
throughout the model.

The formula for the number of store sites is
shown in the following manner

$$N_{B_i} = nB_i$$

In this formula: N_{B_i} = the number of store
                       sites used in the
                       basic formula

                     nB_i = the actual number
                       of store sites counted
                       in each block of the
                       M.I.F. during field
                       surveys.

The vacancy ratio for each block is determined
using the following formula. It will be noted that the
vacancy ratio is multiplied by 20. Thus, the highest
score which can be assigned to any block will be 20. This is
done with the second, third and fourth component to make them
of equal weight with the first component.

$$V_{B_i} = \frac{vB_i}{vB_h} \cdot 20$$

In this formula:

vB_i = the mean number of vacant sites for block i during the survey period.

vB_h = is the actual mean number of vacant sites for the block with the highest mean number of vacant sites during the survey period. In this thesis this number is 5.

An important consideration in determining a new location for any business is the accessibility that the shoppers within the trade area will have to that site. Generally, the entire C.B.D. is accessible and it is difficult to isolate the most accessible parts from the least accessible parts. As a surrogate measure of this factor, pedestrian traffic data was collected for each intersection within the study area. A factor was assigned each block by taking the mean of the pedestrian traffic entering the block at each corner of the busiest traffic artery (street) of the block.

The accessibility factor for each block is deter-mined using the following formula:

$$A_{Bi} = \frac{aB_i}{aB_h} \cdot 20$$

In this formula: AB_i = the actual pedestrian traffic along the busiest edge (street) of block i as determined by the traffic counts of the Hamilton Traffic and Engineering Department

                                           aB_h = the actual pedestrian traffic along the busiest edge (street) of the block located in the M.I.F. which had the highest pedestrian traffic count as determined by the Hamilton Traffic and Engineering Department.

The distance decay factor for each block is determined using the following formula:

$$D_{Bi} = k \cdot \frac{d}{I}$$

In this formula: k = is a constant required to make the highest category match the total of the highest other factors. In this thesis the constant is 5 since there are 4 categories in the distance decay mapping and the highest category for other factors is 20.

                                           d = distance decay factor which is assigned the rings of blocks. These range from 4 for those blocks adjacent to the Civic Square Renewal Area, 3 for those blocks one block further away, 2 for those blocks 3 blocks away from the Civic Square Renewal Area and 1 for all blocks 4 blocks away from the Civic Square Renewal Area and 1/5

for all other blocks.

C. THE BASIC MODEL

The model in this thesis can be expressed in the following mathematical formula.

$$P_{Bi} = \frac{(N_{B_i} + V_{B_i} + A_{B_i} + D_{B_i})}{(N_{B_1} + V_{B_1} + A_{B_1} + D_{B_1} \ldots N_{B_n} + V_{B_n} + A_{B_1} + D_{B_1})}$$

In this formula:

P_{B_i} = the probability that block i in the Hamilton Central Business District will receive any business which is relocating

N_{B_i} = the number of store sites which are located on block i

V_{B_i} = the vacancy factor for block i

A_{B_i} = the accessibility factor for block i

D_{B_i} = the distance decay factor for block i

The probability that any one block in the M.I.F. would receive a retail business during the relocation diffusion process is expressed by the above formula. Each factor - the number of store sites, store vacancies, accessibility, distance decay - is given an equal weight in the formula.

Table 8 shows the data used in the basic formula.
Using these data in conjunction with formula, probabilities
for each block were determined. Beginning with block one
addresses were assigned for each block. Block one had a
probability of .016 and received the addresses 1 to 16;
block two had a probability of .023 and received the addresses
17 to 39; block three had a probability of .037 and received
the addresses 40 to 76; block forty-seven had a probability
of .024 and received the addresses 977 to 1000.

D. THE METHOD FOR USING THE BASIC MODEL

Once the addresses had been assigned for the entire
C.B.D. the selection of expected locations for the businesses
included in the study was begun. This process was carried
out using random numbers which were taken from a table of
random numbers. A business was assigned a random number
which became its address. Once all forty-three businesses
in the study had been assigned addresses a new relocation
diffusion pattern was completed. This process was carried
out ten times for the entire group of businesses. Once the
pattern had been generated ten times the mean number of
businesses relocating in a block was calculated. This
mean statistic was considered the expected number of busi-
nesses for that block. This was compared with the actual
number of businesses which had relocated in that block of
the C.B.D. Because there were only forty-three businesses
relocating in forty-seven blocks, the blocks were put in

groups of eight and the sum of the actual for all the blocks
in a group was compared to the sum of the expected for all
the blocks in the same group. Pearsonian Product Moment
Correlation tests were administered to test the strength
of the relationship between the actual and the expected.
The results of these tests are completely described and
explained in Section F of this chapter.

E. THE MODIFIED MODEL

The basic model used characteristics of the mean
information field as the significant variables which would
determine the pattern of the relocation diffusion process
while assuming the phenomena relocating were equal or
uniform in all respects.

It is true that all the businesses relocating had
a number of characteristics in common. They were retail
businesses; they were operated by a single proprietor; they
had been located in the Civic Square Renewal Area; they
all relocated in another area of the Central Business
District. Despite these similarities the businesses differed
in rather significant ways. Some of the businesses were
located in high rent sections of the Civic Square Area while
the remainder paid comparatively low rents. The better locations
of the C.B.D. command higher rents and businessmen will attempt
to relocate in the best location they can afford. Those
in high rent areas will attempt to relocate in the high rent

TABLE 8   DATA FOR BASIC FORMULA OF THE MODEL

BLOCK	S.	V.	A.	D.	P.	ADDRESSES
1	1	-	3	20	.016	1-16
2	11	4	3	15	.023	17-39
3	20	16	3	15	.037	40-76
4	10	8	2	10	.021	77-97
5	8	4	2	5	.013	98-110
6	20	12	7	20	.042	111-152
7	5	4	2	15	.018	153-170
8	35	16		20	.058	171-228
9	9	8	2	15	.024	229-252
10	2	--	2	10	.009	253-261
11	18	--	20	20	.040	262-301
12	18	4	18	15	.038	302-339
13	21	12	12	10	.038	340-377
14	13	12	9	5	.027	378-404
15	21	20	7	5	.036	405-440
16	14	12	5	5	.025	441-465
17	14	12	3	1	.021	466-486
18	15	16	2	1	.024	487-510
19	14	18	2	11	.017	511-527
20	12	12	3	1	.019	528-546
21	14	8	5	5	.022	547-568
22	58	20	8	5	.063	569-631
23	16	4	12	10	.029	632-660
24	8	4	12	10	.024	661-684
25	12	4	12	15	.030	685-714
26	1	--	9	10	.013	715-727
27	1	--	2	5	.006	728-733
28	6	--	2	5	.009	734-742
29	4	--	2	1	.005	743-747
30	1	--	1	1	.002	748-749
31	9	4	1	1	.010	750-759
32	1	--	2	5	.006	760-765
33	1	--	2	5	.006	766-771
34	1	--	2	10	.009	772-780
35	1	--	9	15	.017	781-797
36	15	8	12	20	.019	798-816
37	10	--	4	20	.024	817-840
38	12	4	3	20	.027	841-867
39	12	4	2	20	.027	868-894
40	2	--	1	20	.016	895-910
41	3	--	1	15	.013	911-923
42	2	--	1	10	.009	924-932
43	5	4	1	5	.010	933-942
44	3	4	1	5	.009	943-951
45	4	4	1	10	.013	952-964
46	2	--	1	15	.012	965-976
47	5	8	1	20	.024	977-1000

area of the C.B.D. It can be assumed that if a businessman
could only afford a low rent site in the Civic Square Area
he will likely be forced to relocate his business in the
other low rent area of the C.B.D. Although this is logical
and straightforward it overlooks some important considerations.
Not all businesses have perfect knowledge of the urban land
market. Many businessmen have seen the profitability of
their business change radically since they moved into their
old location. Therefore a man operating a business which
has been very successful in a low rent area may be tempted
to acquire a location in a high rent area in the hope that
increased sales will more than offset any increase in rent.
Unfortunately some businessmen have seen their profit de-
cline in their old location. As a result they may wish to
relocate in a new site which has a lower rent than was being
paid at the old location. As a surrogate for the success
of a particular business Dun and Bradstreet credit appraisals
were used.

It was difficult to determine exactly how well the
businesses in this study were actually doing. No financial
statements or profit or loss statements were available.
As a surrogate to overcome this void in the research data,
composite credit appraisals available from Dun and Bradstreet's
Middle Market Directories were used. Retail businesses are
very dependent on having credit extended to them by the
various wholesalers who supply them. The better a firm's
credit appraisal the more merchandise they will be able to

have on hand. This, of course, provides them greater
opportunities for sales and hence profits. It is assumed
that each business in this study wishes to have the highest
credit appraisal possible. It is also assumed that a fair
or limited credit appraisal is an indication that the firm's
profit in the months preceeding the appraisal was less
than the amount desired.

During expropriation proceedings from 1969 to 1972
the normal business patterns in the Civic Square Area were
greatly disrupted. For this reason credit appraisals during
this period were often not listed or classified for the
businesses in this study. For this reason the figures
collected came from the March editions of 1965, 1966 and
1967.

Interviews with the retail merchants in Hamilton
confirmed the following trends. Four out of five businesses
with good or high credit appraisals which had been located
in the high rent area of the Civic Square Area located in
the high rent area of the C.B.D. One out of every five
businesses with these credentials relocated in the low
rent area of the C.B.D. Four out of five businesses with
a fair or limited credit appraisal which had been located
in the low rent sections of the Civic Square Area were
forced to relocate in the low rent areas of the C.B.D. As
in the former case it was found that about one out of
five businesses with these characteristics shifted the rent

structure of the operating costs.

Businesses which had been in the high rent area but had only fair or limited credit appraisals as well as businesses which had been in the low rent area but had good or high credit appraisals showed no marked trend to relocate in the high rent areas or low rent areas of the C.B.D. Table 9 summarizes these trends and relates them to probabilities which will be used as input in determining probabilities and addresses for the modified form of the basic model.

TABLE 9

PROBABILITIES OF RELOCATION RELATED TO ECONOMIC VIABILITY
AND RENT PAID

Former Characteristics	Probability of Relocating in:	
	High Rent Area	or Low Rent Area
1. High rent/good credit	.800	.200
2. High rent/limited credit	.500	.500
3. Low rent/good credit	.500	.500
4. Low rent/limited credit	.200	.800

The figures collected for the businesses included in this study showed 25 had high or good credit appraisals and 18 had only fair or limited appraisals. Of the twenty-five businesses which had high credit appraisals eleven were located in the high rent areas and fourteen were located in the low rent areas of the Civic Square Area. Of the

eighteen businesses which had low credit appraisals sixteen
were located in the low rent areas and only two were located
in the high rent areas of the Civic Square Area. As a
result of these findings the businesses were put into three
categories. Category A included those businesses which had
paid high rent but had a limited credit rating, as well
as those businesses which had been in the low rent area
but had a good credit rating. The probability that any
block within the M.I.F. would receive a business in this
category when it relocated was determined using the basic
formula of the model. However, the probabilities for all
the blocks in the high rent area of C.B.D. and the pro-
babilities for all the blocks in the low rent area of the
C.B.D. are modified to give each area an equal chance of
receiving a business in category A which is relocating.
Thus the probability of a block in the low rent area re-
ceiving a business in category A is:

$$P_{B_{iL}} = .5 \ \frac{(N_{B_{iL}} + V_{B_{iL}} + A_{B_{iL}} + D_{B_{iL}})}{(N_{B_{1L}} + V_{B_{1L}} + A_{B_{1L}} + D_{B_{1L}} \ldots N_{B_{nL}} + V_{B_{nL}} + A_{B_{nL}} + D_{B_{nL}})}$$

In this formula B_{iL} is the ith block in the low rent area
of the M.I.F.

The probability of a block in the high rent area
receiving a business in category A is:

$$P_{B_{iH}} = .5 \frac{(N_{B_{iH}} + V_{B_{iH}} + A_{B_{iH}} + D_{B_{iH}})}{(N_{B_{1H}} + V_{B_{1H}} + A_{B_{1H}} + D_{B_{1H}} \ldots N_{B_{nH}} + V_{B_{nH}} + A_{B_{nH}} + D_{B_{nH}})}$$

In this formula: B_{iL} = is the ith block in the low rent area of the M.I.F.

The second category, Category B, included those businesses which had paid high rent and had a high credit rating. The probability that any block within the M.I.F. would receive a business in this category depended on the rent paid in that area of the M.I.F. The field studies and interviews had determined that businesses with these attributes would relocate in the high rent area four times out of five. The basic formula of the model used to determine probabilities for each block in the M.I.F. was modified in the following manner:

$$P_{B_{iH}} = .8 \frac{(N_{B_{iH}} + V_{B_{iH}} + A_{B_{iH}} + D_{B_{iH}})}{(N_{H_{1H}} + V_{B_{1H}} + A_{B_{1H}} + D_{B_{1H}} \ldots N_{B_{nH}} + V_{B_{nH}} + A_{B_{nH}} + D_{B_{nH}})}$$

In this formula: B_{iH} = is the ith block in the high rent area of the M.I.F.

The sum of the probabilities for the blocks in the high rent area will be .800 and the number of addresses assigned to blocks in that area of the M.I.F. will be 800.

The same field studies and interviews had determined that businesses with these attributes would relocate in the low rent area one time in five. For blocks in the low rent

area the basic formula for determining probabilities for each block in the M.I.F. was modified in the following manner:

$$P_{B_{iL}} = .2 \frac{(N_{B_{iL}} + V_{B_{iL}} + A_{B_{iL}} + D_{B_{iL}})}{(N_{B_{1L}} + V_{B_{1L}} + A_{B_{1L}} + D_{B_{1L}} \ldots N_{B_{nL}} + V_{B_{nL}} + A_{B_{nL}} + D_{B_{nL}})}$$

In this formula: B_{iL} = is the ith block in the low rent area of the M.I.F.

The sum of the probabilities for the blocks in the low rent area will be .200 and the number of addresses assigned to the blocks in that area of the M.I.F. will be 200. The sum of the probabilities for all the blocks in the M.I.F. used in conjunction with businesses in category B is 1.000 and with addresses assigned total 1000.

The third category, category C, included those businesses which had paid low rent and had a low credit rating. The probability that any block within the M.I.F. would receive a business in this category depended on the rent paid in that area of the M.I.F. The field studies and interviews had determined that businesses in this category would relocate in the low rent area of the M.I.F. four times out of five. For blocks in the low rent area the basic formula was modified in the following manner.

$$P_{B_{iL}} = .8 \frac{(N_{B_{iL}} + V_{B_{iL}} + A_{B_{iL}} + D_{B_{iL}})}{(N_{B_{1L}} + V_{B_{1L}} + A_{B_{1L}} + D_{B_{1L}} \ldots N_{B_{nL}} + V_{B_{nL}} + A_{B_{nL}} + D_{B_{nL}})}$$

In this formula: B_{iL} = is the ith block in the low rent of the M.I.F.

The sum of the probabilities for the blocks in the low rent area will be .800 and the number of addresses assigned to the blocks in that area of the M.I.F. will be 800.

The same field studies and interviews had determined that businesses with these attributes would relocate in the high rent area one time in five. For blocks in the high rent area the basic formula for determining probabilities for each block in the M.I.F. was modified in the following manner:

$$P_{B_{iH}} = .2 \; \frac{(N_{B_{iH}} + V_{B_{iH}} + A_{B_{iH}} + D_{B_{iH}})}{(N_{B_{1H}} + V_{B_{1H}} + A_{B_{1H}} + D_{B_{1H}} \ldots N_{B_{nH}} + V_{H_{nH}} + A_{B_{nH}} + D_{B_{nH}})}$$

In this formula: B_{iH} = is the ith block in the high rent area of the M.I.F.

The sum of the probabilities for the blocks in the high rent area will be .200 and the number of addresses assigned to the blocks in that area of the M.I.F. will be 200.

The sum of the probabilities for all the blocks in the M.I.F. used in conjunction with the businesses in category C is 1.000 and the addresses assigned total 1000.

Table 10 shows a complete breakdown of the pro-babilities and addresses which were used for the various

TABLE 10 PROBABILITIES AND ADDRESSES DERIVED FROM THE MODIFIED FORMULAE OF THE MODEL

BLOCK NO.		CATEGORY A P.	A.	CATEGORY B P.	A.	CATEGORY C P.	A.
1		.013	1-13	.005	1-5	.020	1-20
2		.019	14-32	.008	6-13	.032	21-52
3		.031	33-63	.013	14-26	.052	53-104
4		.018	64-81	.007	27-33	.028	105-132
5		.011	82-92	.004	34-37	.016	133-148
6		.035	93-127	.014	38-51	.056	149-204
7		.015	128-142	.006	52-57	.024	205-228
8	H	.073	143-215	.115	58-172	.029	229-257
9		.020	216-235	.008	173-180	.032	258-289
10		.008	236-243	.003	181-183	.012	290-301
11	H	.050	244-293	.079	184-262	.020	302-321
12	H	.047	294-340	.076	263-338	.019	322-340
13	H	.047	341-387	.076	339-414	.019	341-359
14	H	.034	388-421	.054	415-468	.013	360-372
15	H	.045	422-466	.072	469-540	.018	373-390
16		.021	467-487	.009	541-549	.036	391-426
17		.018	488-505	.007	550-556	.028	427-454
18		.020	506-525	.008	557-564	.032	455-486
19		.014	526-539	.006	565-570	.024	487-510
20		.016	540-555	.006	571-576	.024	511-534
21		.018	556-573	.008	577-584	.032	535-566
22	H	.078	574-651	.124	585-708	.031	567-597
23	H	.036	652-687	.058	709-766	.015	598-612
24	H	.030	688-717	.048	767-814	.012	613-624
25	H	.037	718-754	.060	815-874	.015	625-639
26		.011	755-765	.004	875-878	.016	640-655
27		.005	766-770	.002	879-880	.008	656-663
28		.008	771-778	.003	881-883	.012	664-675
29		.004	779-782	.002	884-885	.008	676-683
30		.002	783-784	.001	886	.004	684-687
31		.008	785-792	.003	887-889	.012	688-699
32		.005	793-797	.002	890-891	.008	700-707
33		.005	798-802	.002	892-893	.008	708-715
34		.008	803-810	.003	894-896	.012	716-727
35		.014	811-824	.006	897-902	.024	728-751
36	H	.023	825-847	.038	903-940	.009	752-760
37		.020	848-867	.008	941-948	.032	761-792
38		.022	868-889	.009	949-957	.036	793-828
39		.022	890-911	.009	958-966	.036	829-864
40		.013	912-924	.005	967-971	.020	865-884
41		.011	925-935	.004	972-975	.016	885-900
42		.008	936-943	.003	976-978	.012	901-912
43		.008	944-951	.003	979-981	.012	913-924
44		.008	952-959	.003	982-984	.012	925-936
45		.011	960-970	.004	985-988	.016	937-952
46		.010	971-980	.004	989-992	.016	953-968
47		.020	981-1000	.008	993-1000	.032	969-1000

HAMILTON CENTRAL BUSINESS DISTRICT

MEAN INFORMATION FIELD:
ADDRESSES ASSIGNED BLOCKS USED IN
CONJUNCTION WITH BUSINESSES IN
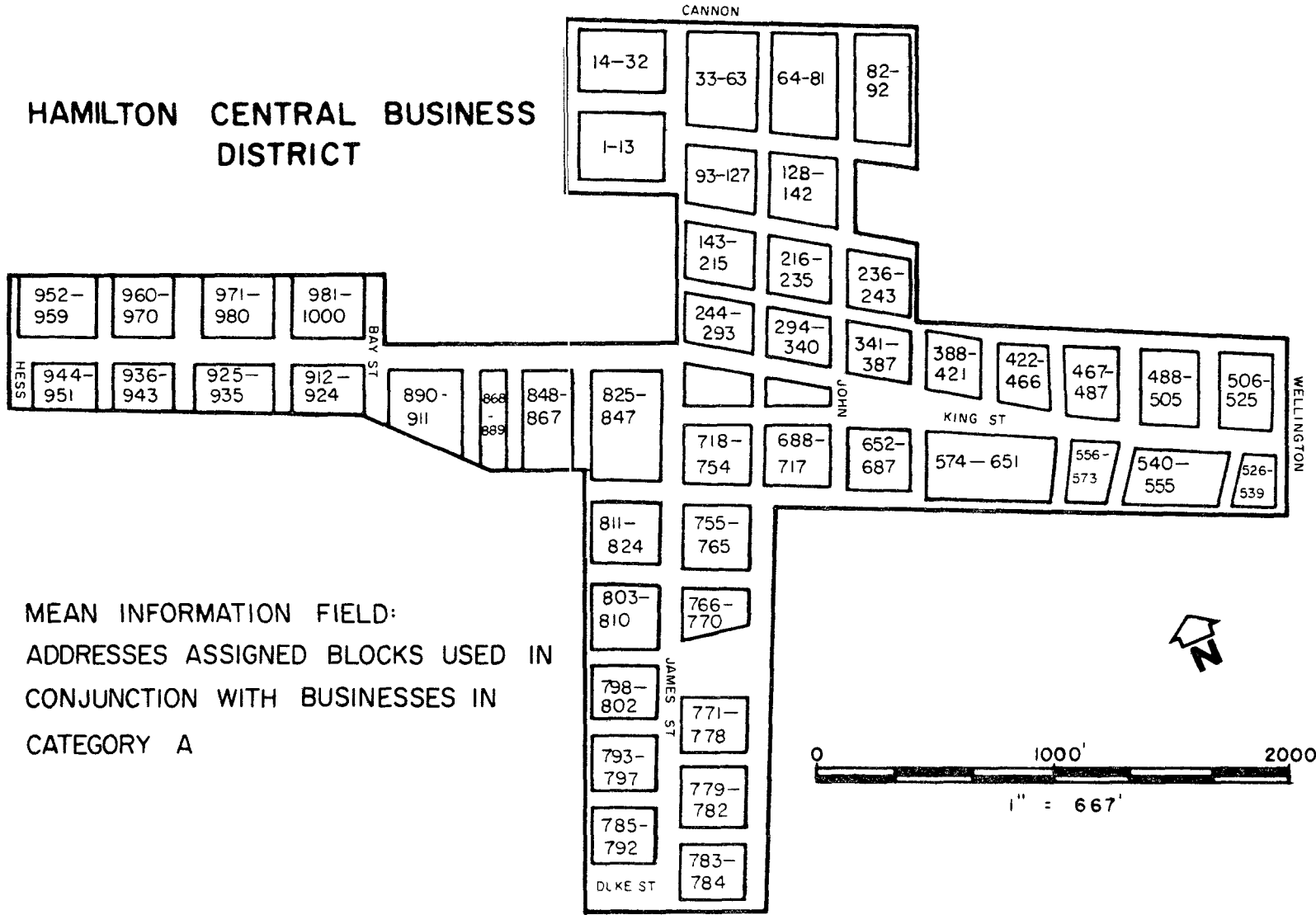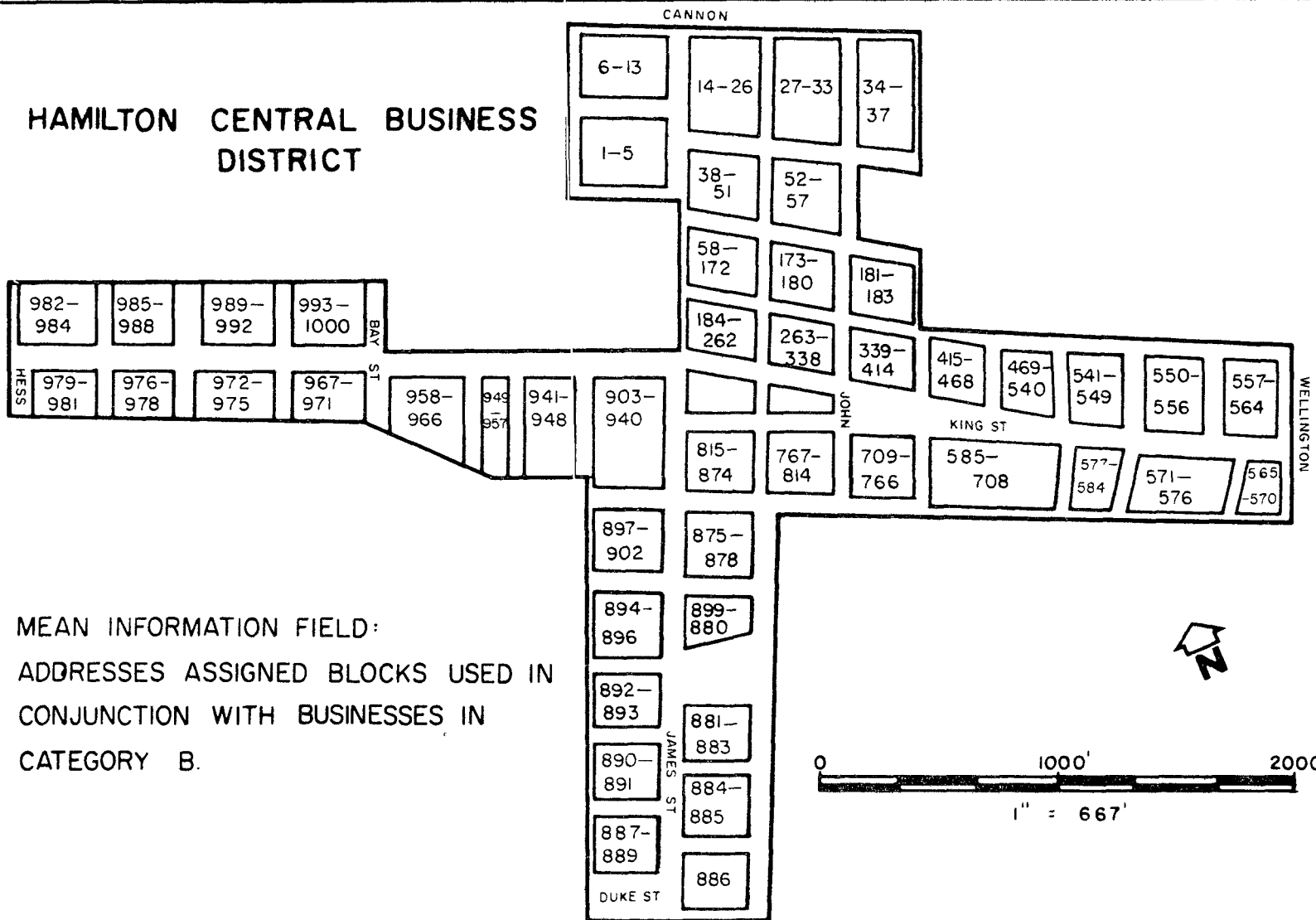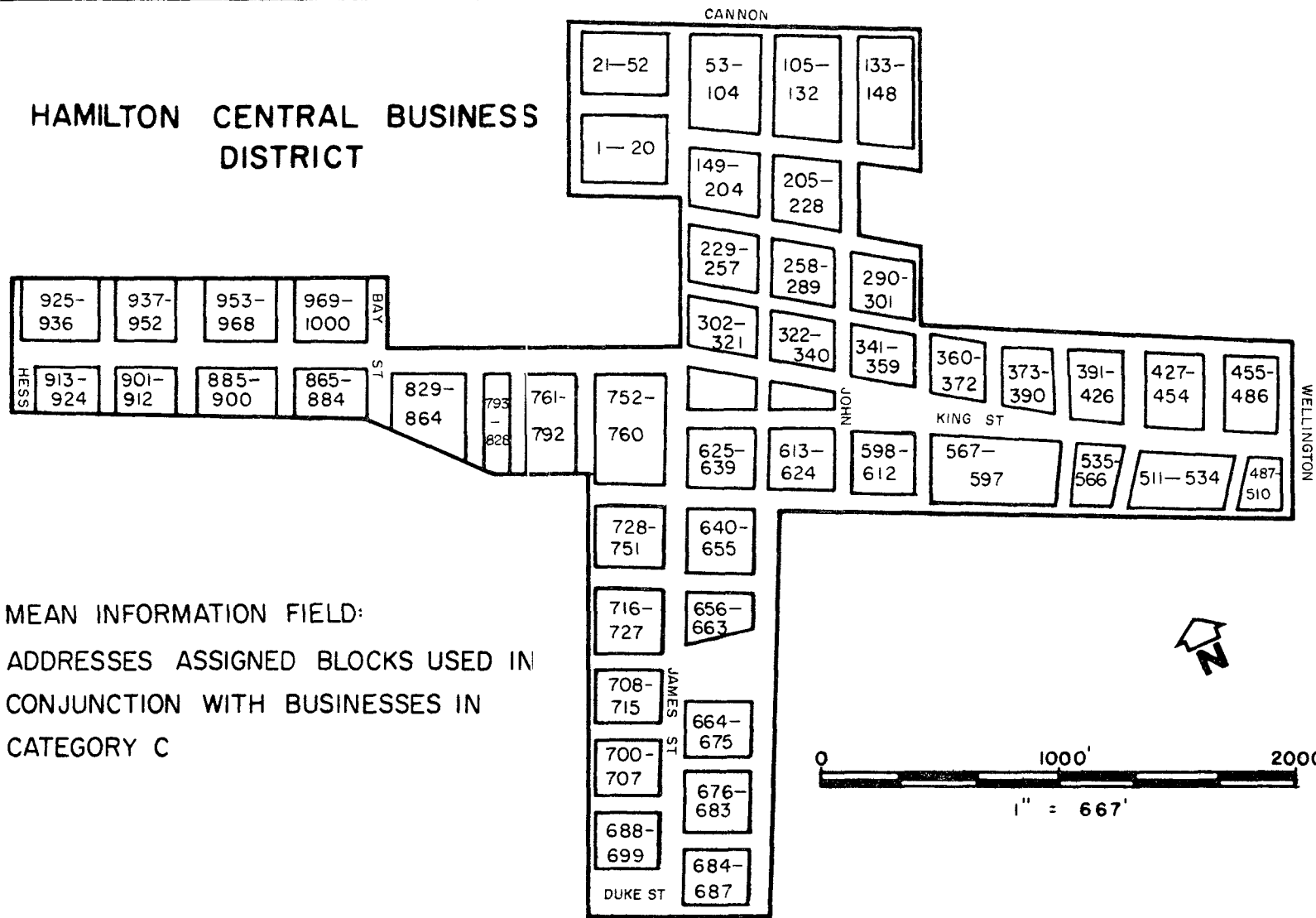CATEGORY A

FIGURE 11

78

HAMILTON CENTRAL BUSINESS DISTRICT

MEAN INFORMATION FIELD:
ADDRESSES ASSIGNED BLOCKS USED IN
CONJUNCTION WITH BUSINESSES IN
CATEGORY B.

FIGURE 12.

79

HAMILTON CENTRAL BUSINESS DISTRICT

CANNON

MEAN INFORMATION FIELD:

ADDRESSES ASSIGNED BLOCKS USED IN CONJUNCTION WITH BUSINESSES IN CATEGORY C

1" = 667'

FIGURE 13.

80
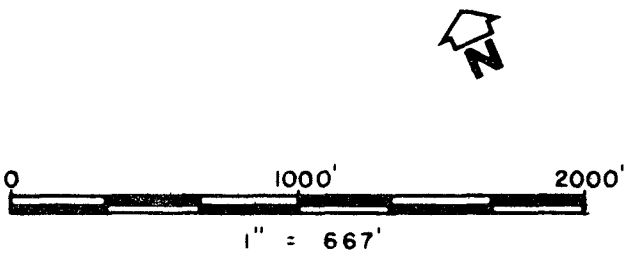
blocks of the M.I.F. in conjunction with each of the three categories of businesses. Figures 11, 12, and 13 show the actual location of the various addresses used with each category.

F.   EXPECTED RELOCATION DIFFUSION PATTERN

Once each business was assigned a category related to its particular attributes of rent paid and credit ratings the diffusion patterns were created for all forty-seven businesses. This was repeated ten times.

The first column of expected values in Table 11 shows the mean number of businesses relocating in each block of the M.I.F. after projecting the diffusion pattern ten times. These results were grouped as indicated in Table 12. Using the Pearsonian Product Moment Correlation Test in the Statistical Packages for Social Science the strength of the relationship between the actual relocation diffusion and the expected relocation diffusion was tested. The results were as follows:

	Mean	Std. Deviation	r
E.1	7.1667	4.2397	.6496
A	7.1667	3.7639	

The second column of expected values in Table 11 shows the mean number of businesses relocating in each block of the M.I.F. after projecting the diffusion pattern ten more times. Again these results were grouped as indicated

in Table 12. The Pearsonian Product Moment Correlation test
was administered. The results were:

	Mean	Std. Deviation	r
E.2	7.1667	4.6877	.6238
A	7.1667	3.7639	

The third column of expected values in Table 11
shows the mean number of businesses relocating in each
block of the M.I.F. after projecting the diffusion pattern
another ten times. Once more these results were grouped
as is shown in Table 12. The results from the Pearson Product
Moment Correlation test were:

	Mean	Std. Deviation	r
E.3	7.1667	4.2415	.6544
A	7.1667	3.7639	

These tests had four degrees of freedom. The
number of degrees of freedom is equal to $N - n_r$ where N
is the number of groups of observations (pairs, trials,
etc.) and n_r is the number of variables, counting both
dependent and independent variables. The tests reported
here compared two variables, one dependent one independent.
The results were arranged and tabulated in six groups of
observations. Thus, the degree of freedom was equal to
six minus two.

TABLE 11   ACTUAL AND PROJECTED RESULTS USING THE RELOCATION
DIFFUSION MODEL

BLOCK NO.	ACTUAL	1. EXPECTED	2. EXPECTED	3. EXPECTED
1	----	----	.2	----
2	1.0	.8	.7	1.0
3	2.0	1.2	.8	1.0
4	----	1.0	----	.7
5	2.0	1.3	.6	.8
6	2.0	2.0	1.7	1.2
7	1.0	.3	----	.5
8	5.0	3.2	4.6	3.6
9	1.0	.2	.4	.4
10	1.0	.3	----	.4
11	1.0	2.8	2.5	3.0
12	----	2.0	3.4	1.7
13	1.0	1.5	1.8	2.2
14	1.0	1.2	.7	1.0
15	2.0	2.7	1.8	.9
16	----	1.3	1.0	1.2
17	4.0	1.3	1.2	1.6
18	----	.6	1.5	.7
19	1.0	.9	.9	1.0
20	----	1.6	1.0	1.4
21	----	.7	1.3	1.7
22	4.0	4.3	5.1	4.0
23	1.0	1.4	2.2	2.4
24	2.0	.8	.6	.9
25	1.0	2.0	1.2	1.5
26	----	----	----	.3
27	----	----	.7	.2
28	----	.3	----	.2
29	----	----	----	.3
30	----	.6	.3	.4
31	----	.5	.6	.6
32	1.0	.5	----	----
33	----	----	.2	.4
34	----	.2	----	----
35	----	.4	.5	----
36	1.0	1.6	2.8	1.4
37	----	.7	.7	.7
38	1.0	.8	.5	.5
39	1.0	.4	.3	1.0
40	1.0	.1	----	.3
41	----	----	.2	----
42	----	.2	----	.6
43	1.0	.4	.5	.4
44	1.0	.3	.4	.5
45	----	----	----	----
46	1.0	----	.2	.4
47	2.0	.6	.3	----

TABLE 12   ACTUAL AND PROJECTED RESULTS SHOWN IN GROUPS USED
           FOR CORRELATION TESTS

BLOCK NO.	ACTUAL	1. EXPECTED	2. EXPECTED	3. EXPECTED
1-8	13	9.8	8.6	8.8
9-16	7	12.0	11.6	10.8
17-23	10	10.8	13.2	12.8
24-31	3	4.2	3.4	4.4
32-39	4	4.6	4.6	4.0
40-47	6	1.6	1.6	2.2
TOTAL	43.0	43.0	43.0	43.0

This thesis deals with human decision and subsequent action. It is contended that in view of the difficulty in predicting human decision the r values obtained are quite acceptable. The model does work and it does accurately reflect the relocation diffusion process in the Hamilton Central Business District.

CHAPTER SIX

CONCLUSIONS

A. SUMMARY

The model developed in this thesis generates a relocation diffusion pattern for retail businesses. A number of factors were combined in this model and when used collectively in this manner give a close fit to reality. The model is developed around five premises which are combined to project the diffusion pattern. The premises include:

1. A business is more likely to relocate in a block which has a great many store sites.

2. A business is more likely to relocate in a block of the C.B.D. which has a large number of vacant sites.

3. If a city block in the C.B.D. has a great deal of pedestrian traffic and therefore is quite accessible, it is more likely to receive a business when they relocate.

4. A business is more likely to relocate in a block of the C.B.D. close to its original location.

5. A retail business is most likely going to relocate in a block in which the mean rents charged are consistent with that firm's ability to pay that rent.

Based on these premises the model developed used raw data in a modified form to assign probabilities which were converted to addresses from 1 to 1,000. Each block in the C.B.D. was assigned a score using the following input:

1. The actual number of store sites as determined by a field survey was assigned to each block as raw data.

2. A score of 1 per 1,000 pedestrians was added to the raw score for each block. The pedestrian traffic data for a block was based on data for the busiest axis of that block. The data for the block was extrapolated from traffic counts taken at the corners at either end of the major axis of the block.

3. A score of 1, 5, 10, 15, or 20 was assigned a block based on its distance from the Civic Square Urban Renewal Area.

4. The addresses were adjusted to relate the rents which a business could afford to the rents demanded in parts of the C.B.D. Addresses in the high rent areas were adjusted to total 500, and 500 in low rent areas of the C.B.D. for businesses which had high financial ratings but were formerly located in low rent areas or for businesses which had low financial ratings but were formerly in high rent areas. Businesses which fell in these two categories showed no marked trends in relocating in particular rent sections of the C.B.D. Thus, each section of the C.B.D. (the high rent area and the low rent area) had the same number of addresses assigned to it. Addresses in the high rent areas were adjusted to total 800 and 200 in the low rent areas of the C.B.D., for businesses which had a high financial rating and had been located in a high rent area. Addresses in high rent areas totalled 200, and 800 in low rent areas of the C.B.D. for businesses which a

low financial rating and had been located in a low rent
area.

5. As an alternative to adjusting the addresses
assigned in step 4 a range could be assigned for each rent
category and using a computer, random numbers could be
selected from the first range four times and from the second
range one time.

B. EVALUATION OF THE MODEL THE STOCHASTIC APPROACH

Interviews with merchants who operate retail busi-
nesses indicate there are many reasons why a businessman
may choose to relocate in a particular location. It is
this researcher's opinion that it would be unrealistic an
impractical to attempt to incorporate every reason or cause
in a model which would be completely deterministic. A more
correct approach would be to incorporate some main deter-
mining factors in a model and then use random numbers to
assign new locations. The stochastic approach compensates
for the fact that it is virtually impossible to develop
perfect cause and effect situations when the human element
is a major component. The stochastic approach is realistic
and the simulated diffusion patterns which were generated
reflect the actual pattern which developed.

The relocation diffusion pattern which is generated
using stochastic techniques may differ each time it is
generated. For obvious reasons, models using these techni-

niques are often criticized and their validity doubted since there is no guarantee that the next time they are used they will generate a diffusion pattern which resembles the actual diffusion pattern. This is a fair criticism and one which the researcher who uses stochastic techniques must accept.

Over the long run these techniques, however, do generate simulated relocation diffusion patterns which resemble the actual relocation diffusion pattern. The model does not require a great quantity of data; it is easily administered; the results reflect the actual situation.

C. AREAS FOR FURTHER RESEARCH

1. This model should be tried in other communities where for some reason a large number of retail businesses have been forced to relocate.

2. Models should be developed that would account for and predict the relocation of:

    (i) retail businesses operated as part of a chain,
    (ii) service industries
    (iii) wholesale businesses
    (iv) manufacturing industries.

3. Using a computer the model could be refined to allow for the effects of changes over time. If a block of the C.B.D. received a business the probability it would receive another business would be reduced.

4. The model could be enlarged to allow for the predicting of and accounting for relocations outside the C.B.D.

5. Using the results of this study further research may uncover ways to provide greater assistance to private entrepreneurs who are going to relocate.

6. The results of further study will provide civic administrators with information which will assist them in minimizing the problems created in cities when relocation of businesses is made necessary on a large scale.

A P P E N D I X   O N E

<u>COMMERCIAL RELOCATION INVENTORY FORM</u>

WATERLOO LUTHERAN UNIVERSITY

GEOGRAPHY DEPARTMENT

Commercial Relocation Inventory   Student Paper

1. Name of Business

2. Type   3. Classification No.

4. Old Address   5. New Address

6. New Telephone No.

7. Ownership Structure

8. Rent: Old Location

9. Financial Data

            Year   Rating   Net Worth

10. Other Comments

A P P E N D I X   T W O

APPENDIX TWO

Those blocks with rents exceeding $4.00 per square foot per annum excluding taxes and common costs are considered to be in the high rent area for ground floor retail space.

Block No.		Sample Rents		
		1	2	3
	1	3.50		
	2	3.00	2.90	
	3	3.00	3.50	
	4	2.90	2.50	
	5	2.50	2.90	2.90
	6	3.75	3.50	
	7	2.90	2.75	
H	8	6.50	5.25	
	9	3.75	3.75	
	10	3.75	3.50	
H	11	7.00	6.50	
H	12	6.50	7.00	6.25
H	13	6.00	6.00	6.00
H	14	5.00	4.50	5.25
15 H		5.50	4.00	
16		3.75	3.50	
17		3.00	3.50	
18		2.75		
19		3.00	3.25	
20		3.25	2.90	
21		4.00	3.00	
22 H		6.00	5.25	
23 II		6.50	5.72	
24 H		6.50	6.00	
25 H		6.00	6.00	
26		3.75		
27		3.50		
28		3.00	3.00	
29		2.90	3.50	
30		3.50	3.00	
31		3.00	2.75	
32		3.00		
33		3.00		
34		3.50		
35		4.00	3.75	
36		4.50	5.50	
37		4.00	3.00	
38		3.00	3.50	

Block No.	Sample Rents		
	1	2	3
39	3.00	3.00	3.50
40	2.90	3.50	
41	2.90		
42	3.50		
43	4.00	2.50	
44	3.50	3.50	3.00
45	3.00	3.50	
46	3.50		
47.	4.00	3.50	3.50

1. Source: Interviews with owners and Hamilton Real
    Estate Board, 1972. Data shows rents charged during
    1971-72.

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