

CENTRAL WINNIPEG APARTMENT DEVELOPMENT  
AND THE COST OF URBAN SERVICES

A Thesis

Submitted in Partial Fulfilment  
of the Requirements for the Degree  
Master of City Planning

By

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B.Comm. (Hons.)

University of Manitoba

March 1975

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A dissertation submitted to the Faculty of Graduate Studies of  
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## ACKNOWLEDGEMENTS

The author wishes to thank the several persons who gave their time and knowledge for interviews for this thesis.

Special thanks is given to Professor B. M. Rotoff who was asked to join the thesis committee at a late date.

Particular gratitude is given to Professor E. Nickel who gave me her time and advice over the last year and one half. Her information sources and ideas were of great assistance.

Finally, deep gratitude is expressed to Professor V. J. Kostka whose intervention before, during and after my full-time attendance at the University of Manitoba has extended beyond the usual academic demands. I am deeply grateful for his assistance over the past three years. I would also like to thank Professor Kostka for his valuable advice and his contribution to my thesis.

Special thanks is also given to the Central Mortgage and Housing Corporation whose financial assistance during my final academic year was very much appreciated.

James R. Gallagher,  
March, 1975.

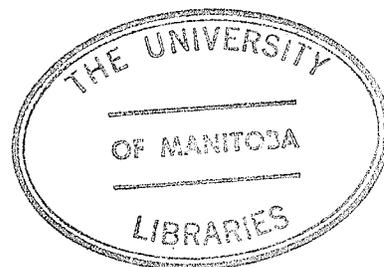


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## INTRODUCTION

Go to, let us build us a city and a tower,  
whose top may reach unto heaven, and let us  
make us a name . . . .

- Genesis, XI, 4

Winnipeg is now at the point where it must  
build a new character and a new image which  
will command confidence and admiration if  
it is to attract the type and magnitude of  
investment which will enable it to continue  
to occupy a place amongst the first rank of  
Canadian cities. Such a character and such  
an image can only be created in the Downtown.

- Downtown Winnipeg Plan, 1969

The "reasoning" behind the Winnipeg Downtown Development Plan was essentially the same as that of the builders of the Tower of Babel. The respect commanded by tall structures has persisted as a part of human culture. The Downtown Plan proposed a revival of the core area through the use of highrise apartment buildings. There was little or no research done regarding the costs or benefits of such development to the citizens of Winnipeg or their government. Yet legislation followed the Downtown Plan that encouraged the construction of over 2,500 Downtown apartment units in five years. The intent of this thesis is directed at obtaining the various causes of the existing Downtown apartment development and future development, as well as the ultimate cost of this development as it affects the cost of key urban services.

There is a complexity of causes and effects in studying highrise buildings. The anthropologist or historian views these structures as a method of allowing man to rise above himself, to dominate as a security

against danger. The sociologist, perhaps, views the effects of highrise apartment buildings on life styles and overcrowding. The architect uses a tall structure as an expression of vogue. The entrepreneur realizes that a highrise building is a method of maximizing profits from a small parcel of land.

The physical, social, psychological, and aesthetic effects of highrise apartment buildings have a great value in determining the living requirements of the future. Because of the vast scope of all the effects of such residential development, it will be the intent of this thesis to concentrate only on the economic implications of highrise apartment development in Downtown Winnipeg and then only as they affect the cost of major urban services. Only the Downtown area will be studied because this area contains the greatest concentration of highrise apartment construction.

The objectives of the thesis are basically two-fold. The first objective is to determine the causes of highrise apartment development in the Downtown area. This will be discussed in Part I of the thesis. Residential Location Theory will be studied first in order to determine key variables or indicators that have been determined as affecting residential location in cities. Next, the extent of residential development in Downtown Winnipeg will be presented in terms of demography and construction. Thirdly, the reasons behind Downtown residential development will be discussed in light of the information presented earlier in Part I.

The second objective of the thesis is to study the ultimate effect of Downtown residential development on the cost of eight major urban

services, specifically fire protection, police protection, water supply service, sanitary and storm sewer service, refuse collection, education, transportation, and parks and recreation. In other words, what are the long-run economic implications of Downtown residential development on the cost of key urban services to the entire city. This will be covered in Part II. It should be added here that all residential development in Downtown Winnipeg has been in the form of highrise buildings since 1960. Therefore, any discussion of Downtown residential development shall be synonymous with highrise apartment development in the area.

The last section of the thesis, Part III, will summarize each of the effects of Part II and discuss the magnitude of each with respect to the others so that the truly important effects in terms of costs will be exposed. Then previous methods of stimulating Downtown residential construction will be discussed with respect to the city's attempts at encouraging such construction. Finally, there will be recommendations that will encourage this residential development to the extent that it deserves in terms of its effect on the cost of urban services to the city as a whole.

For the purposes of this thesis the Study Area shall include the same boundaries as the Downtown Winnipeg Plan. These boundaries are useful because they conform to three census tracts for ease of comparison when discussing demographic information. Also, they contain the only area of the central business district where residential development can occur without massive building demolition. The boundaries of the Study Area are Notre Dame Avenue, Main Street, the Assiniboine River, Osborne Street, Memorial Boulevard and Balmoral Street. See Plate 1.

The definition of a highrise apartment building is subjective. One could choose a height which is regarded by the population of the city as that height which represents a difference in height from medium rise to highrise. Each city's estimate would be different and each city would change over time. For the purposes of this thesis the minimum height of a highrise apartment building is taken as nine stories.

The nine storey limit is a good minimum height for defining Downtown Winnipeg highrise apartment buildings because it represents a sudden change in Downtown apartment development that began in 1960. Until that time all Downtown apartment construction was three or four storeys. After 1960 all apartment construction in the Downtown area was nine storeys and over in height. The change in 1960 was substantial making it a good demarcation point for defining highrise apartment buildings.

I. THE FACTORS AFFECTING RESIDENTIAL LOCATION

## 1. Residential Location Theory

Essentially, most residential location theories assume that each household in a city must make a decision between accessibility to the central business district and a desire for more land. Since the cost of transportation drops as one lives closer to the urban core then the cost of land is higher closer to the core. As one moves very close to the core the cost of land becomes prohibitive. Therefore every household must find its own equilibrium point between the inexpensive land on the periphery and the cost of transportation to the central business district.

The most well-known residential location theories are those of Richard Muth and William Alonso. The main feature of both theories follows the mechanism described above. Other theorists have expanded the reasoning behind both theories to include preference for certain neighborhoods in spite of location, which contradicts the classical residential choices. Jay Siegel introduced a modification regarding the assumed transportation goal of the central business district.<sup>1</sup> He pointed out that many employment areas are not located in the core area, thus substantially reducing the attractiveness of the core for many as the location of residence that is desired. Following is a discussion of general residential location theory with the main components of the theory discussed separately. The component parts will include those major components generally accepted as influencing residential location. They

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<sup>1</sup>Jay Siegel, Intrametropolitan Migration of White and Minority Group Households, (Stanford, Calif., Stanford 1970).

include income and transportation costs, preference, and legislation. Income and transportation costs will be discussed as one component because they are so mutually dependent.

a) Income and Transportation Costs

Households with larger incomes spend a greater percentage of their incomes on housing and land than households with lower incomes.<sup>2,3</sup> For example, a family earning \$10,000 per annum might spend 30% or \$3,000 per year for housing whereas a family earning \$20,000 per annum might spend 35% or \$7,000 on housing. However, the very poor can spend as much as 50% of their income on housing through rental payments.

The percentage of income spent on transportation does not increase with income.<sup>4</sup> Therefore, as income rises the household will seek more land and will be less concerned about transportation costs. The household will move farther away from the city centre. If the income of the entire city rises, the mean distance of all households from the city centre will increase and the population density of the city will fall.

As incomes rose in North America after World War II, the population density fell and cities expanded outward. The importance of the central business district fell also, aided by nearly universal automobile ownership. The marginal cost of transportation dropped for workers commuting

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<sup>2</sup>Brian Goodall, The Economics of Urban Areas, (Oxford, Pergamon Press), p. 153.

<sup>3</sup>Richard Muth, "Demand from Non-Farm Housing," in A. C. Harberger (ed.), The Demand for Durable Goods, (Chicago, The University of Chicago Press, 1960).

<sup>4</sup>M. E. Beezley, "The Value of Time Spent in Travelling: Some New Evidence," Economica, New Series, 1965, pp. 174-185.

to the central business district. As a result, the rate of decline in housing prices per unit of land was now smaller as one moved out from the centre of the city.<sup>5</sup> Expressway construction also contributed to the rush to the suburbs by reducing travel time and thus transportation costs. The expressways also encouraged job locations to move from the core of the city. One study in the late 1960's pointed out that 41% of persons moving to the suburbs also worked in the suburbs.<sup>6</sup> Also, expressways have given the suburbs access to major urban services to the point that these services are more accessible than the same services for central city residents. However, smaller cities without extensive expressway networks, like Winnipeg, still provide the greatest access to urban services for residents in the central city. A study by Walter Hansen of large and small cities in the United States illustrates this point with Tables 1 and 2.<sup>7</sup>

The greater accessibility to urban services for suburbanites in large metropolitan areas is not due to a greater proportion of car ownership in the suburbs because similar proportions of households in the central city drive their own cars.<sup>8</sup>

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<sup>5</sup>Richard Muth, Cities and Housing, (Chicago, The University of Chicago Press, 1969), p. 10.

<sup>6</sup>Michael A. Stegman, "Accessibility Models and Residential Location," J.A.I.P., Vol. XXXV, No. 1, (January 1969), pp. 22-29.

<sup>7</sup>Walter G. Hansen, "How Accessibility Shapes Land Use," J.A.I.P., Vol. XXV, No. 2, (May 1959), p. 28.

<sup>8</sup>Walter G. Hansen, op. cit., p. 22.

TABLE I.

MEAN TIME DISTANCE IN MINUTES TO SELECTED ACTIVITIES FOR RECENT CITY AND SUBURBAN MOVERS IN LARGE STANDARD METROPOLITAN STATISTICAL AREAS (over one million persons)

Activities	Central City	Suburbs
Grocery	8.1	6.8
Home of Best Friend	17.2	13.8
Elementary School	7.9	7.4
Downtown	24.6	20.4
Shopping Centre	14.0	9.9
Park or Playground	8.7	8.2
Doctor's Office	18.5	14.3
Hospital	19.1	15.4
Work	27.7	24.3
Church	13.1	8.9

TABLE 2.

MEAN TIME DISTANCE IN MINUTES TO SELECTED ACTIVITIES FOR RECENT CITY AND SUBURBAN MOVERS IN SMALL STANDARD METROPOLITAN STATISTICAL AREAS (under 100,000 persons).<sup>9</sup>

Activities	Central City	Suburbs
Grocery	6.9	11.1
Home of Best Friend	8.3	7.5
Elementary School	5.8	8.1
Downtown	10.9	16.7
Shopping Centre	10.7	13.6
Park or Playground	6.3	10.5
Doctor's Office	11.6	18.2
Hospital	10.7	17.6
Work	16.1	16.9
Church	8.8	11.7

Hansen's research seriously alters the classic residential location theories that emphasize the attractiveness of the central core in terms of residential location. However his research also indicates that the classic attractiveness of the urban core still exists for smaller cities without extensive high speed road networks.

It should be mentioned that this comparison was based on data from the United States where central city areas suffer from lack of funds for transportation because these areas contain the black poor. As a result the suburbs have better urban services than the central city.

<sup>9</sup>Despite the size of Winnipeg, it still lacks extensive expressway development. A pattern similar to the smaller SMSA would probably occur.

b) Legislation

When dealing with land use, legislation can and does disrupt the market equilibrium and in so doing changes urban densities and mean distances of urban populations from the city centre. Let us suppose that legislators wish to increase the minimum lot size for single family dwellings. By incorporating this intent into zoning legislation the supply of available lots would be reduced relative to demand, and the price of residential lots will rise throughout the city. The interesting case is that which provides for lower densities in only part of the city. The supply of available lots is still reduced and the price of a front foot of land still rises. However, without controls for the rest of the city, the size of lots in the remainder of the city decreases to offset the higher cost of land. As a result the urban density will rise in the areas not subject to the minimum lot size zoning.<sup>10</sup> The price of land could drop in the zoned area and increase elsewhere. A further effect is a change in urban densities throughout the city; lower in the zoned area and higher in the remainder. The mean distance of population from the city centre could move either way depending on the location and size of the land zoned for lower density.

As the example above illustrates, land use legislation can have far-reaching effects beyond the original intent of the legislation. It interferes with the market mechanism and residential location theory.

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<sup>10</sup>William Alonso, Location and Land Use, (Cambridge, Harvard University Press, 1964), p. 104.

It can completely reverse the trends of the market. The wisdom of legislation will depend on the insight of the legislators or their staff in predicting the full impact of the interference with the market process before the legislation is introduced.

c) Preference

Each household has its own non-economic preference for living near the central business district, near the periphery, or somewhere in between. This non-economic preference is related largely to the life style one would like to have. For example, a rich household which could live near the periphery may prefer to live in or near the central business district because it likes the theatre, shopping, or night life, or general activity that the central core provides. Another household which may have a modest income may prefer to live near the periphery of the city because of its rural life style. This household may not like the noise and activity of the central city and may never use the theatre or shopping services of the central core. Therefore, such a household may sacrifice the cost of transportation to the location of employment in exchange for the quiet life style of the urban periphery.

In many cases, the underlying factor concerning location preference is the number of trips that a household makes to the central business district regardless of the reason.<sup>11</sup> This really does not contradict residential location theory but merely expands it. A household that has members working, purchasing, and entertaining in the central core will

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<sup>11</sup>Richard Muth, loc. cit., p. 37.

have a strong desire to live very close to the central core. A case in point is a couple without children who both work in the central core. These people have low space requirements and a very strong preference to be close to the centre of the city. This type of household has become more prominent in the past few years due to more widespread use of effective birth control and an increasing number of couples who choose to remain childless.

A study of reasons for moving revealed little difference between movers to the central city and movers to the suburbs. See Table 3.<sup>13</sup> This study suggests that the same amenities sought after by suburban movers are also sought after by central city movers.

The neighbourhood itself can affect residential location more strongly than the distance to work or the central business district if that neighbourhood contains the desired type of amenities. Many believe that one's neighbourhood should reflect one's station in life. This belief is held not only by suburban families but also by central core families.<sup>12</sup>

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<sup>12</sup>Walter G. Hansen, op. cit., p. 22

TABLE 3.

REASONS FOR MOVING - CITY AND SUBURBAN FAMILIES EXPRESSED AS A PERCENTAGE<sup>13</sup>

Reason	Central City Movers	Suburban Movers
More Space	27	18
Less Space	2	2
More Land	1	1
Less Cost	11	3
Improving Housing Quality	8	5
Improving Neighbourhood Quality	6	6
Disrepair of Former Place	2	2
Change from Apartment to House	2	4
Home Ownership	8	11
More Convenient to Job Location	6	4
Job Change or Retirement	4	6
New Household Formed	9	5
Racial Change in Neighbourhood	1	3
Forced Move	12	5
Miscellaneous	21	10

<sup>13</sup>Michael A. Stegman, *op. cit.*, p. 25.

<sup>14</sup>The totals are more than 100% because more than first choice of reason was permitted.

## 2. Demographic Characteristics and Extent of Highrise Residential Development in Downtown Winnipeg

### a) Demographic Characteristics<sup>15</sup>

This chapter contains a discussion of the study area itself in terms of the changes that have taken place in recent decades concerning residents of the area and the construction around them.

#### Population:

The population of the Study Area since 1941 is contained in Table 4.

TABLE 4.

#### POPULATION OF STUDY AREA FROM 1941 TO 1976

<u>Date</u>	<u>Population</u>	<u>Percentage Change Over Last Period</u>
1941	15,567	
1946	14,439	- 7.2%
1951	13,077	- 9.4%
1956	11,209	- 14.3%
1961	9,470	- 15.5%
1966	8,706	- 8.1%
1971	9,380	+ 7.7%
1976 <sup>16</sup>	13,520	+ 44.1%

The construction of highrise apartment buildings has completely accounted for the dramatic reversal of population trends in the Study

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<sup>15</sup>All figures for demographic characteristics are census data. Figures for highrise residents only were available first in 1971 and only for a selected number of variables.

<sup>16</sup>This figure is extrapolated from current trends.

Area since 1966. The tremendous effect of this type of construction over the past few years is seen most dramatically in the population statistics.

#### AGE

The Study Area deviates from the remainder of the City in that there are few persons under the age of twenty years and a very high percentage of persons between twenty and twenty-nine years of age. See Table 5.

The age distribution for the Study Area is normal for the core area of a city. Table 5 also indicates the age distribution for only highrise apartment buildings in the Study Area. The age distribution shows a further extreme of the characteristics of the Study Area with nearly half the population in its twenties. The preferences discussed in the last chapter are reflected here in the age group that prefers to live in a highrise apartment building. These persons have fewer children than the same age group of a generation earlier, therefore they can live in an apartment environment longer.

It should be pointed out that the latest census figures were taken before the large scale construction of senior citizens housing in the Study Area. Since the last census over 700 units have been constructed for senior citizens.

#### Marital Status

Data for Winnipeg, the Study Area and highrise in the Study Area are given in Table 6.

Despite the difference in age data, the Study Area and highrise population in the Study Area do not differ markedly regarding marital status. This indicates that the Study Area attracts a definite life-style,

TABLE 5.

PERCENTAGE OF PERSONS IN EACH AGE CATEGORY FOR WINNIPEG, THE STUDY AREA AND HIGHRISE ONLY IN THE STUDY AREA IN 1971.

Age	Winnipeg	Study Area	Highrise Only in Study Area
0 - 4	8.0	2.7	-
5 - 9	9.2	1.3	-
10 - 14	9.3	1.3	-
15 - 19	9.4	6.1	4.9
20 - 24	9.8	15.6	27.0
25 - 29	7.5	9.9	18.1
30 - 34	5.8	5.0	7.4
35 - 39	5.6	3.8	5.4
40 - 44	5.6	4.1	3.4
45 - 49	6.0	5.3	5.9
50 - 54	5.3	6.1	6.9
55 - 59	5.0	7.4	4.9
60 - 64	4.0	7.4	3.9
65 - 69	3.2	6.6	3.9
70 - 74	2.3	5.6	2.0
75 - 79	1.8	4.7	2.4
80 - 84	1.2	3.9	1.5
85 - 89	.7	2.5	1.0
90 - 94	.2	.9	-
95 - 99	-	.2	-

but the highrise buildings within it generally house the younger residents. Only 8.6% of the Winnipeg population is widowed, separated, or divorced, yet 24.2% of the Study Area and 22.7% of the highrise residents within the Study Area are widowed, separated or divorced.

The Study Area is a renting population with only 2% of the population owning its own residence compared to 59% for the City generally.

TABLE 6.

MARITAL STATUS FOR WINNIPEG, THE STUDY AREA, AND HIGHRISE ONLY IN THE STUDY AREA BY PERCENTAGE IN 1971

Marital Status	Winnipeg	Study Area	Highrise Only in the Study Area
Single	46.5	43.3	42.7
Married	44.9	32.5	34.7
Widowed	5.4	13.4	12.0
Separated	2.1	6.7	6.7
Divorced	1.1	4.1	4.0

### Households

The size of the average household in the Study Area is only 1.6 persons compared to the Winnipeg average of 3.2. This is due to the smaller number of married couples and fewer children among married couples.

The distribution of households by age of the household head is given in Table 7.

Marital status more than age probably influences this pattern in the Study Area which emphasizes the under 25 and over 65 age groups.

The number of children in Study Area families is low as indicated in Table 8.

TABLE 7.

AGE OF HOUSEHOLD HEAD BY PERCENTAGE, FOR WINNIPEG AND THE STUDY AREA, 1971

<u>Age</u>	<u>Winnipeg</u>	<u>Study Area</u>
Under 25	7.2	14.3
25 - 34	22.5	23.8
35 - 44	21.4	9.6
45 - 54	20.8	12.8
55 - 64	15.5	16.4
65 and over	12.6	23.1

TABLE 8.

NUMBER OF CHILDREN IN FAMILIES IN WINNIPEG AND THE STUDY AREA BY PERCENTAGE IN 1971

<u>Number of Children</u>	<u>Winnipeg</u>	<u>Study Area</u>
0	33.9	73.7
1	21.2	17.6
2	21.5	5.8
3 and 4	19.0	2.2
5 and over	4.2	.6

This distribution is significant because it means not only are there few families due to the low number of married persons but also there are few children among those who are married. Almost three quarters of all married persons in the Study Area have no children. Of those families in the Study Area who do have children, the age distribution of the

children differs from the rest of Winnipeg with more children under the age of six and few between the ages of six and fourteen, as indicated in Table 9.

TABLE 9.

AGE DISTRIBUTION OF CHILDREN IN FAMILIES IN WINNIPEG AND THE STUDY AREA  
BY PERCENTAGE IN 1971

Age	Winnipeg	Study Area
less than 6	25.8	40.8
6 - 14	44.5	27.0
15 - 18	17.8	15.3
19 - 24	12.1	16.8

Data is not available for highrise apartment buildings but the age data indicates that there are almost no children between six and fourteen. The high number of persons in the 20 - 29 age group would explain the low number in the 6 - 14 age group.

b) Extent of Highrise Residential Development in Downtown Winnipeg

Except for a few buildings constructed in the 1960's, all highrise apartment construction in the Study Area has occurred in the 1970's as indicated in Table 10. The area generally has always had a large number of multiple family dwellings, some dating back to the last century. Senior Citizens' Housing accounts for one third of the highrise housing.

The construction of highrise apartment buildings in the Study Area has represented a sizeable portion of all apartment unit construction in Winnipeg since 1970 with the figure in that year and the year following consuming nearly one quarter of the yearly totals as shown in Table 11.

It should be noted that trends in highrise construction require a long period of time to determine. Highrise apartment buildings can contain several hundred units, thus one development can make the difference between a below average year and an above average one. Fluctuations in the money market accentuate the erratic nature of highrise construction and can defer or cancel a proposed development, causing low years followed by a large number of construction starts.

Besides contributing to total apartment construction, recent Study Area apartment construction has also contributed substantially to total construction in the Study Area generally, as indicated in Table 12.

The price of land sold in the Study Area shows little change over the past several years as shown in Table 13.

The data shows little change in the price of land in the Study Area. However, this information cannot be interpreted as a true picture of downtown land prices. Unlike land sales in the rest of the City, there are relatively few in the downtown area. Therefore, only one sale could occur in a year with very peculiar circumstances surrounding it. The motivation to buy or sell could be unusual. It could be the last parcel for a large development, thus commanding a high price. Five feet of frontage may mean nothing to anyone except the owner of 300 feet of adjacent land who needs the five feet to begin a large office and residential development. One Downtown developer paid \$800. per front foot for his first parcel of land and \$2000. per front foot for his last parcel of land, less than two years later.<sup>17</sup>

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<sup>17</sup> \_\_\_\_\_ . Personal Interview with Lewis Landa, Lakeview Properties Limited, December 19, 1973.

Another variable affecting price besides first or last parcel and location is the size of the parcel itself, which can affect the price per front foot in a major way.<sup>18</sup>

Generally speaking, the development of highrise housing in Downtown Winnipeg began in the late 1960's and since then has had a marked effect on the population and age structure of the area. It has formed an appreciable part of all apartment construction in the City as well as all construction in the Downtown area. In five years, it has changed the nature of the core of the City.

The demographic information discussed reveals that the highrise apartment residents in the Downtown area are mostly unmarried and those who are married are mostly childless. As a result, a very high proportion of these persons are working. Also, the number of highrise apartment residents are growing substantially in the Downtown area. This information is particularly important for a discussion to be presented in Chapter 10 concerning transportation.

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<sup>18</sup>U.S. Department of Commerce, Impact of Intensive High-Rise Development in San Francisco, 1972, p. 144.

TABLE 10.

## YEAR OF CONSTRUCTION, NUMBER OF STORIES, AND TOTAL UNITS OF ALL HIGHRISE APARTMENT BUILDINGS IN THE STUDY AREA.

Name or Address of Building	Beginning of Construction	Number of Stories	Total Units
59 Donald	1960	9	74
Regency Towers	1963	20	406
440 Edmonton*	1963	13	193
Kelly House	1967	10	114
Place Louis Riel	1970	22	314
Chateau 100	1970	22	252
190 Fort*	1970	9	175
24 Carlton*	1970	10	65
Cumberland House	1971	20	256
447 Sargent*	1971	15	142
Holiday Towers North	1971	26	264
185 Smith*	1971	20	373
House of York	1972	23	216
Holiday Towers South	1973	26	264
Plaza by the Riverside	1973	20	199
385 Carlton*	1973	12	<u>123</u>
			3430

\* Senior Citizens Housing

Source: City of Winnipeg Apartment Inventory and Building Permit Summary.

TABLE 11.

APARTMENT UNITS STARTED IN THE STUDY AREA COMPARED WITH APARTMENT UNITS STARTED IN WINNIPEG FROM 1960 to 1973.

Year	Study Area Units	Winnipeg Units	Study Area as a Percent of Winnipeg
1960	74	1120	6.6
1961	-	1557	-
1962	-	815	-
1963	599	2114	28.4
1964	-	1582	-
1965	-	1760	-
1966	-	1378	-
1967	114	1423	8.0
1968	-	2906	-
1969	-	6180	-
1970	806	3341	24.1
1971	1035	4235	24.4
1972	216	5185	4.2
1973	586	5348	10.9

TABLE 12.

VALUE OF BUILDING PERMITS FOR HIGHRISE APARTMENT BUILDINGS AND ALL CONSTRUCTION IN THE STUDY AREA FROM 1965 TO 1971.

Year	Value of Highrise Apartment Buildings	Value of All Construction	Apartments as a Percent of Total Construction
1965	-	\$ 4,465,720	-
1966	-	2,111,390	-
1967	-	608,000	-
1968	-	1,304,773	-
1969	\$ 8,738,000	18,805,000	46.5
1970	1,497,000	1,497,000	100.0
1971	6,686,000	17,773,500	37.6
1972	1,362,000	9,311,620	14.6
1973	5,385,000	21,382,000	25.2

TABLE 13.

TOTAL PRICE OF LAND AND FRONTAGE FEET SOLD IN STUDY AREA  
FROM 1960 TO 1972

Year	Price	Total Frontage	Average Price Per Front Foot
1960	\$113,500	175	\$ 649
1961	110,000	125	880
1962	-	-	-
1963	-	-	-
1964	-	-	-
1965	480,070	565	850
1966	192,500	225	856
1967	24,375	60	406
1968	135,600	200	678
1969	239,750	300	799
1970	-	-	-
1971	395,000	365	1082
1972	385,000	650	650

### 3. The Factors Affecting Residential Development in Downtown Winnipeg

In chapter one, three factors were discussed which affected residential location generally. These factors are income and transportation costs, legislation and preference. These factors were described to indicate how they would operate in the economy to affect residential locations in urban areas. In this chapter, the same three factors will be discussed as they have affected residential development in Downtown Winnipeg.

#### a) Income and Transportation Costs

Over the past several years in Canada, the cost of housing has risen faster than real income. Predictably, multiple family housing starts have risen along with urban population density. With 1961 prices set at 100, the level of all prices reached 129.7 in 1970. However, in the same year, the cost of single family home ownership reached 161.3 while tenant rental costs reached only 120.3.<sup>19</sup> Rising land prices have been the chief cause of the higher cost of housing. Toronto was the most glaring example of the 1960's with land prices rising 260% between 1964 and 1968.<sup>20</sup>

The major reason for the slow price rise of tenant housing is that this housing is not as land consumptive as single family housing. In early 1973, a highrise apartment developer in Winnipeg might have expected to pay \$800 to \$1,000 per unit for land, while the developer of walk-up

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<sup>19</sup>Kamal S. Sayegh (ed.), Canadian Housing (Waterloo, University of Waterloo, 1972), p. 1.

<sup>20</sup>Ibid., p. 112.

apartments might have expected to pay \$1,600 per unit.<sup>21</sup> The developer of single family housing might have expected to pay \$5,000 per unit.<sup>22</sup> By mid 1974, only eighteen months later, the price of serviced land had more than doubled in price.<sup>23</sup> The increase in land prices pushed up the total construction cost of a single family dwelling by over \$5,000, yet the same increase per unit for the highrise apartment block was only about \$1,000 per unit. Though land costs doubled for both dwellings, the increase in land cost per unit affected single family housing much more. Therefore, it is clear that recent increases in land prices will change the housing mix in Winnipeg in the next few years and the trend toward multiple family housing will be accelerated. The increase in multiple family dwelling construction due to recent increases in the price of land, will not be reflected in housing starts for some time due to lag time between the conception of a project and delivery of the units.

It should be mentioned that data presented earlier in the thesis, regarding the extent of new residential development in Downtown Winnipeg, was compiled before the accelerated increase in land prices had taken any real effect. Until very recently the cost of housing was not a major factor in forcing the Winnipeg population into multiple family housing. As late as 1972, Winnipeg had the second lowest housing prices of the ten

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<sup>21</sup> \_\_\_\_\_ . Personal interview with David Birch, CMHC, Winnipeg Branch, March 5, 1974.

<sup>22</sup> Winnipeg Free Press, February 22, 1974.

<sup>23</sup> Ibid.

largest cities in the country.<sup>24</sup> However, the price of housing will have a very substantial effect on housing types in the future with unquestionable influence in favor of multiple housing.

Transportation costs within the city have also risen in the past few years largely due to fuel prices. This factor will affect the location of new multiple family housing in Winnipeg, in that central locations will be favored because of the convenience of job locations. This factor is still not dominant at the present time.

b) Legislation

City by-laws and an Act of the Provincial Legislature have combined, especially early in the 1970"s, to give a definite incentive to the construction of highrise apartment buildings in the Downtown area of Winnipeg.

In 1965, the City lifted the height restriction on building construction in the Downtown area. At the same time, the floor area ratio was increased from one to one to ten to one. This change meant that a developer could place 435 units on one acre of land at any height whereas before he could only place 43.5 units on the same acre of land. The ten to one floor area ratio only applies to land zoned C-4 and this zone only exists in the Downtown area as shown on Plate 2.

The next influence on Downtown apartment building construction was not legislation but it influenced the passage of legislation a few months later. In April 1969, the Metropolitan Corporation of Greater Winnipeg

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<sup>24</sup>Central Mortgage and Housing Corporation, Canadian Housing Statistics, Ottawa, March 1973, p. 70.

released a document entitled "Downtown Winnipeg" which encouraged the re-development of the central core of Winnipeg on a large scale. A publicity campaign followed with billboards, advertisements, and exhibition in Eastern Canada. One of the major proposals of the document was the encouragement of a residential population in the Downtown area. It proposed the construction of 8,425 apartment units over twenty years in a fourteen block area. See Plate 3. It should be noted that this proposal averaged 420 units per year. Since the publication of "Downtown Winnipeg," 2,520 units have been constructed. This figure is above the projections in the proposal for the same period.

In October 1969, an Act of the Provincial Government was passed which encouraged the residential development of Downtown Winnipeg. The Act was Bill 45 and it amended the Winnipeg Charter in order to assist residential construction in the core of the City. The Act designated the "affected area" where the legislation would apply. See Plate 4. The pertinent insertions of the Charter were as follows:

- 273(2) Notwithstanding any other provision of this or any other Act of the Legislature, where at the time the assessment of any parcel of land in the affected area is made there is being constructed thereon a new residential building or a residential addition to a building, the assessment commissioner shall not, in making his assessment of the land, include therein the value of the residential building or the value of the residential addition to the building, as the case may be.
- 273(3) The exemption from assessment for which provision is made in subsection (2) applies in respect of the new residential building or the new residential addition to the building only

- a) until a date three years after the date on which the construction of the building or addition commenced; or
- b) until a date one year after the date on which the building or addition is substantially completed and is capable and reasonably fit to be occupied and used for purposes other than the construction thereof; or
- c) until seventy per cent of the building or addition designed for residential occupancy is so occupied;

whichever occurs earlier.

Another amendment in Bill 45 limited the effect of the above subsection to construction commenced before January 1, 1972, the date that the new City of Winnipeg Act took effect.

Since the beginning of 1972 there have been no significant legislative incentives to Downtown residential construction. The new City of Winnipeg Act has provided a freedom from assessment to all new construction of this type in Winnipeg with no special incentive to the Downtown area. Also, in the past several years, zoning of suburban land has permitted as much as a five to one floor area ratio. This ratio is only half the value of the downtown ratio of ten to one, yet the price of Downtown land, at more than ten times the suburban price, has more than offset this advantage.

One small indirect incentive to residential development in the core area since 1972 has been mill rate equalization. Presented in Table 14 are the residential mill rates for the Inner City and three Community

Areas with heavy apartment building construction.<sup>25</sup> Mill rates as a percentage of the Inner City are also presented.

TABLE 14.

RESIDENTIAL MILL RATES IN THE WINNIPEG AREA FROM 1970 TO 1973				
Location	1970	1971	1972	1973
Inner City	66.63	73.15	74.39	80.02 <sup>26</sup>
Fort Garry	64.25(96.5%)	63.62(86.9%)	73.17(98.3%)	73.37(91.7%)
North Kildonan	55.00 (84.8%)	66.50(82.6%)	69.23(93.1%)	69.79(87.2%)
St. James- Assiniboia	53.31(80.1%)	55.60(75.9%)	71.43(86.1%)	73.35(91.7%)

The long-run effect of mill rate equalization will be small because the enormous land value differential between the core of the City and the suburbs will more than nullify the effect of equalization. The municipal tradition of the realty tax will always strongly favor suburban development due to the land assessment aspect of the realty tax.

<sup>25</sup>The figure in brackets is the mill rate of the area expressed as a percentage of the Inner City mill rate. The Provincial Government granted subsidies to the former municipalities during the first years of equalization in order to soften the effect of the change over time. The mill rates presented omit these subsidies in order to reveal the true effect of equalization. Temporary local improvement levies are also omitted for the purposes of comparison.

<sup>26</sup>The increase in mill rates for the Inner City in 1973 was due to an increase in school division levies in Winnipeg School Division Number One. School Divisions are independent of the city and can offset mill rate equalization in certain years or more than assist equalization if the school levies occur in the suburbs.

Another effect of the new City of Winnipeg Act that favoured apartment construction indirectly was the new procedures for approval of subdivision applications. The complex procedure resulted in a reduction of subdivision approvals beginning in 1972. This occurred while applications submitted in terms of lots were as numerous as ever.<sup>27</sup> By the end of 1973, the number of lots registered were satisfying only one-third of the demand.<sup>28</sup> As a result, the price for serviced lots more than doubled in eighteen months. This increase removed a large segment of the population from the home-buying market, thus increasing the apartment renting market. While this effect encouraged apartment building construction, it did not specifically encourage Downtown apartment construction.

In summary, legislation definitely encouraged residential construction in Downtown Winnipeg in the early 1970's; however, this incentive was removed in 1972. Legislative encouragement to Downtown apartment construction has been minor since that time.

c) Preference

A number of factors, all related to rising national income, have contributed to the increased popularity of apartment living in general. Increased urbanization and higher incomes have contributed to lower birth rates. Lower death rates have also occurred as a result of medical research over the past several decades. This is also a result of higher

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<sup>27</sup> Underwood McLellan and Associates Limited, Building Sites: A Prime Component of Housing (Winnipeg, 1973), p. 12.

<sup>28</sup> Winnipeg Free Press, February 22, 1974.

national income because larger funds can now be diverted into medical research.

As a direct result of higher national income, a much higher level of disposable income has occurred. The population can spend more on the arts, theatre, symphony, and luxury shopping. All of the above is concentrated in the core area of the City because of the exclusive nature of these services. As a result more people will want to live near the central business district in good housing. Highrise apartment buildings are the only type of housing that can satisfy this demand at a reasonable price.

Higher national income has allowed children to be more financially independent of their parents at an earlier age. Often these persons combine to form one household in Downtown apartments. Winnipeg in particular has a higher proportion of young persons. The Downtown Plan indicated that the group of persons who rent apartment blocks (those under the age of 30 and over the age of 45) represents a greater portion of the total Winnipeg population than either total populations of Calgary or Edmonton.

Legislation has permitted persons between the age of eighteen and twenty-one to lease an apartment. This legislation is a result of social change which in turn has given young persons the option to live independently if that is their preference. The reduction of the age of majority in 1970 permitted persons to sign leasing contracts at the age of eighteen. Also, a new Landlord and Tenant Act, which strengthened tenants rights, came into effect.

The abandoning of the home by the children has also left their parents alone with large homes at an earlier age. These persons also have looked to an apartment residence to solve their excessive space problems.

Lower birth rates have permitted married couples to maintain an apartment life style for a longer period. The large Downtown apartment population in its late twenties indicates that this group has probably not faced the responsibility of children.

Retired elderly persons have also joined the Downtown apartment market, particularly in public housing units. Many retired elderly people prefer Downtown living and have been given this option through apartment construction by the Manitoba Housing and Renewal Corporation since 1970. The larger number of persons over the age of sixty-five is due to medical research permitted with increased national wealth. The higher national wealth has, in turn, given persons over the age of sixty-five the option to live in senior citizens housing at a rent level they can afford.

In summary, residential construction in Downtown Winnipeg has been stimulated in recent years. Briefly, the causes of this type of development have been as follows:

- 1) Rapidly rising serviced land costs which have favoured apartment construction because this construction is less land consumptive.
- 2) Higher transportation costs which encourage residential locations near the place of employment. Downtown Winnipeg is most favoured because it contains the largest employment area of the city. The recent fuel crisis has added to the rising costs of transportation.
- 3) The increase in the Downtown floor area ratio from one to one to ten to one in 1965.
- 4) The Downtown Winnipeg Plan of 1969 which encouraged residential development of the central core.
- 5) Provincial legislation in 1969 which postponed the assessment of new Downtown apartment buildings until one year after the completion of the building. (This incentive was applied to the entire city in 1972, thus removing the advantage to Downtown Winnipeg specifically).
- 6) Complicated subdivision approval procedures that commenced in 1972 with the new City of Winnipeg Act. This procedure reduced the output of single family lots for some time.
- 7) Lower birth rates which have made apartment living viable for a larger portion of the population.
- 8) Higher disposable income which has increased spending in Downtown locations for the arts, theatre, symphony, and luxury shopping. Therefore, Downtown residential locations are encouraged also.
- 9) Earlier financial independence of children which has caused an earlier break in the family unit. Therefore more persons (parents and children) are entering the apartment market.

- 10) Large Downtown apartment construction for the elderly by the Manitoba Housing and Renewal Corporation. This has given these persons the option to live in the central core.

Many of the above causes have affected apartment construction in general. However, Downtown Winnipeg is affected by changes in apartment construction as this is the only type of housing that can occur in the central core. The central core will therefore reflect the changes in apartment construction experienced in the entire city.

II. THE IMPACT OF HIGHRISE DOWNTOWN  
RESIDENTIAL DEVELOPMENT ON THE COST  
OF KEY URBAN SERVICES.

If Winnipeg were a city composed exclusively of highrise apartment buildings, its residential area could occupy only two square miles. Most of the population could walk to its place of employment or almost anywhere else in the city. Transportation requirements would obviously be much different and less expensive than that of a city of lower population density. Other urban service requirements would be different as well.

The "highrise city" described above is only hypothetical. However, such a description demonstrates the effect of residential structure, density and location on the type and cost of services that an urban government must provide.

The City of Winnipeg produces about 9,000 housing units every year of which over sixty per cent are now apartment units. The future location of these apartment units will have an impact on the cost of urban services delivered to the entire city.

Downtown apartment development will be discussed in this part of the thesis as it affects the cost of eight urban services. These eight services represent over 80% of the cost of urban government in Winnipeg.

#### 4. Fire Protection

The most significant study which related fire service cost to population density was carried out in the St. Louis metropolitan area in 1955-56. The study revealed that density was insignificant.<sup>1</sup> However, the study did not relate fire service cost to the type of dwelling. High urban densities can be housed in nineteenth century tenements as well as twentieth century highrise buildings.

In Winnipeg, the building by-laws set out several requirements only for apartment buildings in order to prevent the spread of fire. They include fire alarms, fire detection systems, smoke detection systems, and special construction requirements for boiler rooms, machinery rooms, incinerators and refuse chutes. Walls with high fire ratings are required along exit stairs, ramps, and signs.<sup>2</sup> Amendments have been proposed by the City to require fire service at least six inches diameter on all medium and highrise buildings, plus additional pumping capacity in all buildings of twelve stories or more.<sup>3</sup>

The question is whether such requirements reduce the risk and occurrence of fire in apartment buildings. A study in New York City revealed that buildings with sprinkler systems had 100% effectiveness in

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<sup>1</sup>Werner Z. Hirsch, Urban Economics Analysis, (San Francisco, McGraw-Hill Book Company, 1973), p. 373.

<sup>2</sup>Winnipeg Building By-law, Number 711, pp. 65-93.

<sup>3</sup>City of Winnipeg, Proposed Amendments to Building By-law Number 711, 1974, p. 20.

eliminating forty-one fires over two and one-half years.<sup>4</sup> Sprinkler systems are not required for apartment blocks in Winnipeg. However, several other requirements previously mentioned are required and research has not measured their effectiveness in Winnipeg. Such research is nearly impossible because the Winnipeg Fire Department does not, at the present time, classify fires by type of building in the form of annual summaries. The information is contained only in individual case histories. However, the Provincial Fire Commissioner does keep records for Manitoba of fire loss in terms of value by type of building, expressed as a percentage of all fires by dollar loss, the results for apartment buildings and other dwelling units are shown in Table 15.

TABLE 15.

FIRE LOSS IN DWELLINGS AS A PERCENTAGE OF TOTAL DOLLAR LOSS IN MANITOBA FROM 1967 TO 1972<sup>5</sup>

Year	Apartment Buildings	Other Dwellings
1967	1.0	14.6
1968	.9	16.1
1969	1.3	18.7
1970	2.8	18.1
1971	3.2	14.0
1972	1.8	13.1

<sup>4</sup>Edmonton Journal, March 11, 1974.

<sup>5</sup>Province of Manitoba, Department of Labour, Annual Report of the Fire Commissioner, 1967-1972.

The number of apartment units in Manitoba as a percentage of total units was 15.9% in 1961 and 23.0% in 1971.<sup>6</sup> If fire losses are compared to all residential buildings then one should be able to determine if fire losses are lower in apartment buildings. However, two things must be done before such a comparison can be made. Firstly, apartment dwellings must be compared to other dwellings by value, not unit to unit, because apartment units have less value in terms of construction cost. A rough estimate for the purposes of comparison is that apartment units have approximately one-half the value of other dwellings. Secondly, a common time period must be used to match the census data from 1961 to 1971 to the Fire Commissioners data from 1967 to 1972. Interpolation and extrapolation of the census data was therefore used to match it to the Fire Commissioners data. The results are presented below.

During the period 1967 to 1972, fires in apartment buildings accounted for 6.9% of the dollar losses in all dwelling units but apartment buildings accounted for 11.8% of the total value of all dwelling units. Therefore, during the period, the risk of fire loss for each dollar of dwelling unit was slightly more than half as great for apartment buildings than other dwelling units. It would be a fair assumption that the same result would exist for the City of Winnipeg.

In terms of cost of urban services, fire protection costs are mainly fixed costs in that the City must pay whether or not there is a fire. The fact that fire losses are smaller for apartment buildings may not represent much savings in terms of the cost of fire protection. The City must

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<sup>6</sup>Census of Canada, 1961 and 1971.

provide fire protection that can reach any fire in a given number of minutes, then provide enough strength to extinguish the fire. Certainly a higher ratio of apartment buildings will increase urban density and allow fewer fire stations in the future. However, a concentration of apartment buildings in the core area may not be much more economical than an even spread of apartment buildings throughout the City.

## 5. Police Protection

A number of studies have been done relating the demand for police protection to several variables, including the number of officers, the number of patrol vehicles, the number of street miles, percentage of non-white population, assessed valuation of property, etc.<sup>7</sup> One study was carried out by the RAND Corporation using data from the 1968 Kansas City Police Department Survey and the 1968 FBI Uniform Crime Reports. Population density was found to be statistically insignificant. As previously mentioned, dense population can occur within different housing types and for this reason has no significance with regard to the cost of police protection for highrise apartment buildings.

In Toronto, one cruiser car has been assigned to a highrise area to handle all complaints. The cost of police protection for this area is lower per capita than the rest of the City.<sup>8</sup> The same conclusion concerning the cost of police protection has come from the Winnipeg Police Department.<sup>9</sup>

Research has been done by Oscar Newman concerning the location and design of hallways, elevators, lobbies, parking lots, etc.<sup>10</sup> When the incidence of crime is studied for selected highrise apartment buildings

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<sup>7</sup> Werner Z. Hirsch, op. cit., p. 358.

<sup>8</sup> \_\_\_\_\_, Personal Interview with Joseph Tronrud, Inspector, Winnipeg Inner City Police Department, March 28, 1974.

<sup>9</sup> Ibid.

<sup>10</sup> Oscar Newman, et al., Defensible Space, (New York, MacMillan, 1972).

in Winnipeg, there is evidence to suggest that a number of factors may influence the cost of police protection.<sup>11</sup> One highrise apartment building located near the northern fringe of the Study Area has recorded an average of 38.3 crimes per year since it opened. It is located closer to the home addresses of more juvenile offenders than other highrise apartment buildings in the Study Area. Juveniles account for most of the crime in Winnipeg.<sup>12</sup> This particular building has an outdoor parking structure where a great number of the crimes have occurred.

Another highrise located in the southern end of the Study Area recorded only 22.0 crimes per year since it opened. It is not located near a concentration of home addresses of juvenile offenders. Also, its parking structure is more protected. The most interesting statistic is the sudden drop in the rate of break, entry, and theft in suites after 1971 when dead bolts were installed on the suite entrance doors. Since the installation of dead bolts only one crime of this type has been recorded. In 1971 alone, prior to the installation, there were five crimes of this type.

Another apartment building located out of the Study Area in the Roslyn Road district has recorded 18.8 crimes per year. It has a very elaborate security system including security guards, closed circuit television, and dead bolts on suite entrances. It has never had a suite break-in since it opened over four years ago.

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<sup>11</sup>All crime statistics are taken from the Winnipeg Inner City Police Department records. Crimes that occur outside the building but on the property are included.

<sup>12</sup>Ibid.

The statistics suggest that geographical building location, type of parking structure, extent of security system and type of locks on suite entrance doors effect the rate of crime in highrise apartment buildings and literature supports this.<sup>13</sup> Information does not exist in an organized fashion that indicates the rate of crime by type of dwelling in Winnipeg. Therefore, one cannot compare the rate of crime per unit between apartment dwellings and other dwellings and it is impossible to say whether apartment buildings per se are more crime resistant than other dwellings. Again, a concentration of apartment buildings in the Downtown area may not be more efficient than a spread of buildings throughout the City. If apartment buildings are more crime resistant than other buildings it might be better to spread the resistance than concentrate it.

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<sup>13</sup>Joseph Tronrud, "Some Problems and Solutions in Policing Highrise Buildings," RCMP Gazette, June 1972.

## 6. Water Supply Service

The future delivery of water to the central core of Winnipeg has been examined extensively by the Engineering Department of the City of Winnipeg. Through the use of an analogue computer located in Springfield, Massachusetts, a simulation of peak water flows was conducted for the metropolitan Winnipeg area for 1976 and 1986. The 1986 simulation included the projected water supply requirements of the fulfilled Downtown Development Plan. The downtown area of 1986 was projected to have 8,425 new apartment units as well as additional hotels and commercial buildings. The simulation revealed that only a small addition would have to be made to the existing watermains. The only requirement would be a new water main running along Broadway from Portage Avenue to Main Street. The total capital cost of this addition is estimated at \$700,000. in 1974 dollars.<sup>14</sup> Such costs are not high if amortized and spread among 15,000 new residents, plus hotels and commercial buildings.

Therefore new residential growth in the Downtown core will not represent a problem in the delivery of water to the area.

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<sup>14</sup> \_\_\_\_\_. Personal Interview with Magnus Bayne, City of Winnipeg Engineering Department, December 19, 1973.

## 7. Sewerage Service

Apartment building developers in the central business district are not faced with the expense of installing long sewer trunks to existing lines. They must connect their building usually only a few feet beyond the lot line to an existing sewer line. Builders of low density developments sometimes must face large distances to carry the sewerage of their development to existing lines.

In the core area of Winnipeg, a large sewer system exists already. However it is a combined system which carries both storm and sanitary flow. A weir exists in the sewer lines which allows 2.75 times the normal sanitary flow to move to the treatment plant on North Main Street.<sup>15</sup> Any flow above this level will find its way to the river. The combined sewer system that exists throughout most of the Inner City can carry a sanitary flow of nearly three times the population. However, if sanitary flow was increased to this level, any rainfall and all spring run-off would overflow the system, sending all excess flow of any kind into the Red River. The present capacity allows all spring run-off and small rainfalls to flow to the treatment plant without polluting the river. Any increase in population along the combined sewer network will cause a strain on the system. However, the only meaningful population increase at the present time can occur in the central business district where most Inner City highrise construction is taking place. If the

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<sup>15</sup> \_\_\_\_\_ . Personal Interview with J. MacBryde, City of Winnipeg Works and Operations Department, March 14, 1974.

Downtown Development Plan projections are realized, the population of the Inner City will rise by about 15,000 or 6% over 1974 levels. This will not be a significant new strain on the system. If the Downtown population increased by much more than this figure then combination sewers of the Study Area could be separated into sanitary and storm lines. In 1966, a new method was used in Minneapolis which allowed total separation of flow by inserting a partially flattened corrugated steel pipe into the bottom of existing large combination sewers.<sup>16</sup> This method was used in over one mile of sewer line and proved to be satisfactory. This method of separation is achieved at low cost especially when compared to the other alternative of complete reconstruction allowing for two separate lines.

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<sup>16</sup> \_\_\_\_\_, "Combination Sewer Separated into Sanitary and Storm Lines at Low Cost," Civil Engineering, Vol. 36, (May, 1966), p. 55.

## 8. Refuse Collection

Of all the urban services discussed, there is none that varies in cost as markedly from city to city as refuse collection. This stage in the refuse disposal cycle is the most costly, taking up from 75% to 80% of the total cost.<sup>17</sup> A study of thirty-eight cities in 1960 revealed a variation in collection costs per capita from \$ .24 to \$7.40.<sup>18</sup> The variables that influence these costs are as follows:

- 1) climate and geographical difference.
- 2) form in which refuse is presented for collection.
- 3) frequency of collection.
- 4) place from which the refuse is collected (curb, alley, back door, or basement).
- 5) length of haul.
- 6) character or number of classes of refuse collected.
- 7) manner of collection of the various classes in combination or separately.
- 8) wage rates of collectors and drivers.
- 9) population density.
- 10) general overtime, holiday, vacation and sick-time allowance policies.
- 11) kind of service demanded by citizens.
- 12) character of administration and supervisor.
- 13) accounting and field reporting practices.<sup>19</sup>

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<sup>17</sup>Robert M. Clark, "Cost of Residential Solid Waste Collection," Journal of the Sanitary Engineering Division - Proceedings of the American Society of Civil Engineers, Vol. 97, (October, 1971), p. 563.

<sup>18</sup>Committee on Solid Wastes - American Public Works Association, Refuse Collection Practice, (Danville, Interstate Printers and Publishers, 1966), p. 79.

<sup>19</sup>Ibid., p. 80.

Two factors which are of prime importance are the place from which refuse is collected (back door, curb, back lane, etc.) and hauling distance to the disposal site.<sup>20</sup>

There appears to be some disagreement as to the importance of population density in the cost of refuse collection. R. M. Clark states that population density causes costs to fall because crews walk less distances between pick-ups and there is less driving time of trucks.<sup>21</sup> A study by Werner Hirsch revealed that population density was not a significant variable affecting the cost of refuse collection.<sup>22</sup> With refuse collection, the case of building type as a factor different from population density is most clear. With high population density located in tenement housing, there are hundreds of pick-up locations. With highrise apartment buildings there is only one pick-up location. Therefore it can be said with some assurance that the collection costs are lower for apartment blocks than other dwellings.<sup>23</sup> Many new large apartment buildings store refuse in large bins making collection even more convenient. One person in a properly equipped truck can load the refuse of a large highrise in only a few minutes. Amendments have now been proposed by the City that would

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<sup>20</sup> Ibid., p. 91.

<sup>21</sup> Robert M. Clark, op. cit., p. 565.

<sup>22</sup> Werner Hirsch, op. cit., p. 326.

<sup>23</sup> \_\_\_\_\_, Personal Interview with Henry Nortofl, City of Winnipeg, Works and Operations Department, March 20, 1974.

require apartment owners to provide containers for refuse of at least two cubic yards.<sup>24</sup>

Highrise apartment buildings, because of their size and minimal number of chutes, can employ further methods that aid in the collection of refuse. Incineration is often used to reduce garbage to a non-offensive ash with 20% of the original bulk and 25% of the weight. Another method of reducing collection is compaction. This method can produce a bulk almost as low as incineration. The weight is not reduced but this is not a serious problem. Both incineration and compaction reduce the number of pick-up trips required for the collection of refuse.

A third method available for apartment building developments of a larger scale is pneumatic refuse removal. This method is not yet widely used but it is effective. The method is described as follows:

The tenant opens the chute door on his floor and refuse drops down the chute. Twice a day the valve is opened when the exhaust air flow is being drawn through the transport pipes. The refuse is drawn through the transport pipe by the air flow and up into the top of the refuse silo. The refuse drops into the silo, and the exhaust air passes through dust extractors and turbo-exhausters and into the atmosphere. The refuse is removed from the base of the silo by wormscrews into the adjacent refuse incinerator bunker.<sup>25</sup>

Pneumatic collection is employed in an apartment complex near Stockholm. It is suited for developments in excess of 1,000 units, preferably highrise, to obtain higher densities. The system shows no

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<sup>24</sup>City of Winnipeg, Proposed Amendments to the Refuse By-law, 1974, 0.21.

<sup>25</sup>Frank Flintoff, Public Cleansing, (London, MarLaren and Sons, 1969), p. 56.

evidence of blockage, little evidence of wear, and a complete absence of even a trace of the characteristic refuse smell.<sup>26</sup> This system permits the collection of refuse of thousands of people from one point. Incineration or compaction can then be employed to reduce costs further.

Apartment buildings can reduce refuse collection costs mostly because of the reduction of pick-up points, often to just one point. Costs can be reduced further with methods of treatment only available to apartment blocks. Pneumatic collection allows very large developments to reduce costs further. Therefore, the statement could be made that refuse collection costs continue to fall even with very large highrise developments.

In Winnipeg, the Downtown area represents the only location for a very large concentration of apartment buildings. Peak efficiencies can therefore be obtained here with trucks moving only short distances between buildings to obtain quick full loads. More loads can therefore be carried per day. The Downtown apartment group is also located closer to the incineration building than any other group of highrise apartments in Winnipeg, thus making the Downtown apartment location more efficient.

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<sup>26</sup>Ibid., p. 60.

## 9. Education

Three elementary schools existed in the Study Area prior to this decade. One separate school, St. Mary's, was demolished for the construction of Lakeview Square. Of the two public schools, Alexandra was demolished for the construction of the Winnipeg Convention Centre and Isbister School was converted into an adult education centre.

The need for these elementary schools disappeared with the falling population of the Study Area and its conversion into a non-family residential area. The population is now rising significantly, but it remains an area of few school-age children.

A study was conducted in 1969 to determine the educational needs created by apartment construction.<sup>27</sup> It revealed that there were two children of elementary school age (six to thirteen) for every 100 apartment units in the Study Area north of Portage Avenue. However, the Study Area south of Broadway produced six children of elementary school age for every 100 apartment units.<sup>28</sup> The same study revealed that apartment buildings constructed after 1960 produced no children of elementary school age in either portion of the Study Area mentioned above. The Roslyn Road area produced only .5 elementary school children per 100 apartment units.

The 1971 census figures for highrise apartment buildings in the Study Area revealed that there were only five children between the ages

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<sup>27</sup> Reid Crowther and Partners Ltd., Analysis of Apartments in Metropolitan Winnipeg, (Winnipeg, March 1969).

<sup>28</sup> Ibid., p. 21.

of five and fourteen in a total of 1,228 apartment units. Therefore, there would be no need for a new elementary school (for 200 students) in the Study Area unless the number of highrise units reached 40,000, which is a figure too unrealistic to consider based on present trends.

The Toronto metropolitan area has faced very high housing prices for a longer period than other Canadian cities. This trend has forced families with school-age children into apartment blocks, including high-rise. As a result, the number of school-age children per 100 suites is eight.<sup>29</sup> Therefore, only 2,500 apartment units produce a need for a school of 200 students.

It is doubtful that the Toronto experience will be as severe in Winnipeg. Also, Downtown locations would have the lowest proportion of school-age children in the City. If there is a need for a school, then the cost of construction could be assigned to the residents as the case exists elsewhere in the City. However, the school would probably require about three precious acres of Downtown land which, at 1974 prices, could cost \$2,000,000. Bus transportation of children to existing schools outside the core area would probably be the most inexpensive solution should this need ever arise.

The projections for the education requirements are difficult to determine because of declining birth rates and the problems in determining the housing market in the future. Dramatic increases in the cost of

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<sup>29</sup>Price Waterhouse Associates, Metropolitan Toronto Cost/Benefit Factors Relative to Large Apartment Development, (Toronto, May 1973), p. 9.

housing could force most of the population into highrise apartment buildings and this could put great demands on the education requirements of the core of Winnipeg.

## 10. Transportation

Of all the urban services discussed in this thesis, transportation service is affected the most profoundly by the presence of apartment buildings in the Downtown area. Apartment buildings anywhere in the City will reduce the cost of transportation services because population density is increased and distances are shortened in the long-run growth of the City.

The economic relationship of the automobile and the City has influence on the transportation costs of an urban government. The low urban densities in North America occur because of the widespread use of the automobile. The cities are built to accommodate automobile transportation. A study in Nashville revealed that 94% of all jobs in that city were accessible by car within 30 minutes and the other 6% were ultimately accessible by car in more than 30 minutes. However, only 24% of all jobs were accessible by public transit within 30 minutes and 26% were not accessible at all by public transit.<sup>30</sup>

Automobile trips per dwelling unit increase as urban density falls.<sup>31</sup> Also, automobile ownership increases with distance from the urban core.<sup>32</sup> Therefore the situation feeds upon itself. As automobile ownership increases, accessibility to outlying areas increases and the population

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<sup>30</sup>Alan M. Voorhees, "The Changing Role of Transportation in Urban Development," Traffic Quarterly, (October, 1969), p. 530.

<sup>31</sup>Norman A. Abend, "Transportation Inputs in New Town Planning," Traffic Quarterly, (April, 1969), p. 256.

<sup>32</sup>Reid Crowther and Partners Ltd., op. cit., p. 29.

density falls. Therefore, public transit becomes less efficient and more costly while automobile ownership becomes more necessary. The greater automobile ownership requires more land to be devoted to the automobile so densities decline still further.

Two immediate economic problems face urban governments concerning the "automobile - low density spiral." The first problem is that land covered by roadway is not paying taxes. One large interchange can occupy as much as 100 acres of land that is not taxed. The City of Los Angeles may approach a crisis in that there may eventually not be enough tax-paying property left in order to maintain basic community services.<sup>33</sup>

The second problem is that transportation services of a city cost more as population density drops. Transportation services using expressway solutions for low population densities is very costly. Underground rapid transit is much cheaper and elevated rapid transit is the least expensive of the three. Table 16 illustrates this.<sup>34</sup>

TABLE 16.

THE COST OF EXPRESSWAY, EXPRESS SUBWAY AND EXPRESS ELEVATED FOR ONE URBAN ROUTE MILE IN 1964.

Mode	Capital Cost	Person Trip Capacity	Cost/Capacity Ratio
Expressway	\$15,000,000	9,000	\$1,670
Express Subway	\$22,000,000	50,000	\$ 440
Express Elevated	\$ 7,000,000	50,000	\$ 140

<sup>33</sup>The Editors of Fortune, The Exploding Metropolis, (New York, Doubleday, 1958), p. 35.

<sup>34</sup>Paul Ritter, Planning for Man and Motor, 1964, p. 100.

The space requirements of the expressway absorb much of the cost of construction as well as removing much more tax-paying property than rapid public transit. Rapid transit can carry five times as many commuters as an expressway, yet occupy one-fourth the area of land.<sup>35</sup> Chicago's Eisenhower Expressway carries more commuters on the median at peak hours than eight lanes of roadway, due to the rapid transit rails.<sup>36</sup>

Unfortunately, the great savings achieved by rapid transit are only possible with high urban densities. The Chicago Transit Authority states that 35,000 persons per square mile are necessary for this mode of transportation, about six times the average density of Winnipeg. Highrise apartment buildings can increase the urban density to provide rapid transit along designated corridors spreading out to the suburbs from the downtown core.

The Downtown highrise apartment buildings, however, provide a unique solution to urban transportation problems in that they remove potential commuters entirely from the transportation system of a city. This occurs when housing is supplied so close to the place of employment that the resident can walk to work. This can only be provided on a large scale in the urban core, because the core contains at least 30% of the city's jobs (patterned work trips) in a concentrated area.

The Winnipeg Area Transportation Study (WATS) of 1968 was completed before the Downtown Development Plan was released. Scheme 5 of WATS was

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<sup>35</sup>Ibid., p. 103.

<sup>36</sup>Ibid., p. 96.

selected as the most viable of the Streets and Transit Division of Metro. It proposed a basic expressway solution to the transportation needs of Winnipeg until 1991. The Scheme also included a rapid transit line from Polo Park along Portage Avenue, then Main Street to the Redwood Bridge. The estimated total cost of WATS Scheme 5 was \$767,400,000 in 1968 dollars.<sup>37</sup>

In 1969, the Downtown Development Plan was released proposing 8,425 new apartment units in the core area over twenty years, thus removing potential commuters from using the transportation facilities. As a result the expressway capacity proposed in WATS Scheme 5 was amended, changing bridge crossing proposals, downtown expressway requirements, and other expressway requirements. The amended plan, known as WATS Scheme 6 reduced the total estimated cost over WATS Scheme 5 by approximately \$110,000,000.<sup>38</sup> This figure would be closer to \$200,000,000 in 1974 dollars. The WATS proposals were never implemented as policy, nevertheless, the cost saving produced by the shift in population to the central business district was demonstrated.

The WATS Scheme 6 proposals and support data were not published so the methods of calculation, assumptions and projections, cannot be studied or criticized. Following is an argument to demonstrate the profound effect of Downtown highrise apartment construction on the urban transportation needs of Winnipeg.

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<sup>37</sup> The Metropolitan Corporation of Greater Winnipeg, Winnipeg Area Transportation Study, (Winnipeg, 1968), Vol. III, p. 14.

<sup>38</sup> \_\_\_\_\_ . Personal Interview with Richard Borland, City of Winnipeg Streets and Transportation Division, March 19, 1974.

In late 1973 the most recent projections of future housing requirements for Winnipeg were released.<sup>39</sup> It projected 8,500 new housing units for Winnipeg in 1976 of which 62% would be apartment units. The 1981 projection was 9,200 units of which 65% would be apartments. If 9,000 units is accepted as an average yearly production until 1991, then it could be said that Winnipeg will average 6,000 new apartment units annually.

It is difficult to say what percentage of the 6,000 apartment units would be constructed in the Study Area. In 1970 and 1971, nearly 25% of all apartment units were constructed in the Study Area. However, this happened under favorable legislative conditions. The construction after this period suggests that a more conservative figure of 10% would be a realistic average for Study Area apartments as a percentage of the entire city. If the 10% figure is taken, then 600 new apartment units will be constructed in the Study Area annually until 1991 in addition to the 3,400 units already constructed since 1962.<sup>40</sup> With 1.6 persons per unit, there will be 960 new residents in the Study Area each year until 1991. By 1991 there will be 21,760 more residents in the Study Area than 1962.

The very significant factor here is that most of these new residents will be working because of their age and low child ratio. The 1971 census

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<sup>39</sup> Underwood McLellan and Associates Limited, op. cit., Table II.

<sup>40</sup> The year 1962 is used here because projections used by WATS will be discussed. The base year for WATS projections was 1962. The year 1991 is the projection date for the WATS study, hence the reason for this date also.

data indicates that 85% of the highrise population in the Study Area is between the ages of 20 and 65. If almost all of the 85% work or attend classes, then one could say that working people would include 80% of the highrise population in the Study Area.

Two studies exist to indicate the percentage of persons in Downtown highrise apartments who walk to work. Lakeview Properties Limited conducted a study of their own tenants in Lakeview Square. The survey revealed that 57% of the residents did not require parking. Of the remainder, fully 80% did not use their cars during the day. Therefore, 91% of the tenants did not use a car during the day.

The Downtown Development Plan states that 58.2% of working Downtown residents live within one mile of work.<sup>41</sup> If one assumes that the highrise population in the Study Area has more white collar workers than the rest of the Study Area, then it is fair to say that a greater proportion would also work Downtown because white collar jobs are the most numerous in the Downtown area. A figure of 65% would not be unreasonable to assume. Yet the Lakeview study indicated 91% did not use automobile transportation to go to work. This figure includes persons who would take public transit to work, probably because they work outside the Downtown area. Therefore, the Lakeview population that walks to work is likely closer to 65%.

If the 65% figure is accepted then 65% of working people walk to work but only 80% work. Therefore, about 52% of all highrise residents

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<sup>41</sup>The Metropolitan Corporation of Greater Winnipeg, Downtown Winnipeg, (Winnipeg, 1969), p. 57.

in the Study Area both work or attend classes and walk in order to get to that destination. (65% of 80% = 52%) Therefore, if there are 21,760 new residents between 1962 and 1991, fully 11,315 (52% of 21,760) will work Downtown and walk to get there. These 11,315 persons would not require transportation facilities of any kind in order to get to work.

The WATS study predicted an increase in Downtown patterned work trips of 13,300 from 1962 to 1991, for a total of 73,700 trips in all.<sup>42</sup> Therefore, WATS Scheme 5 proposed an elaborate system of expressways and rapid transit in order to handle the extra 13,300 commuters. It did not foresee the increase in Downtown population. However, it is now evident that about 11,315 of these commuters will not require transportation because they will be walking to work. Only 1,985 persons or 15% of the original projection will in fact require transportation into the core area.

The above argument was based on the assumption that 10% of new apartment construction would occur in the Study Area. If this figure were raised to only 13%, then the above reasoning would lead to a net decrease in the number of persons requiring transportation to the Downtown core between 1962 and 1991.

These projections involve two key variables. The first is the percentage of total patterned work trips located in the Downtown core. The above argument used the WATS assumption of 30% by 1991. The percentage

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<sup>42</sup>The WATS and Underwood McLellan projections are used together for comparison because both are based on a similar population growth pattern for Winnipeg.

in 1991 could be as high as 40%, but this would mean a tremendous trend reversal of the past several decades. A figure above 40% seems very unrealistic, given the jobs that are required in the industrial areas and suburban locations. Another big variable is the percentage of downtown apartment construction as a percentage of total apartment construction. A figure of 10% seems realistic but favorable legislation has moved the figure to 25% in the past.

Both of the above variables can be accommodated in a mathematical relationship. If 73,700 patterned work trips represent 30% of total patterned work trips in 1991, then a change of 1% would be about 2,457 patterned work trips. If 960 new downtown residents are produced by 10% of total apartment construction occurring in the Study Area, then between 1974 and 1991 (seventeen years), a 1% change would produce 1,632 persons (17 x 96). However only 52% or about 848 would be patterned work trips not requiring transportation. Since 1962, when the WATS projections were made, about 3,400 apartment units had already been constructed in the Study Area, removing about 2,830 patterned work trips (3400 x 1.6 x .52) already from the commuter total in 1991.

Therefore, the variables can be defined as follows:

- W = Net increase in patterned work trips requiring transportation into the Downtown core between 1962 and 1991.
- T = Percentage of total patterned work trips located in the Downtown core in 1991.
- A = Percentage of total apartment units constructed in the Downtown core between 1974 and 1991.
- K = Total patterned work trips in the Downtown core in 1962 (a total of 60,400) plus patterned work trips already removed by downtown apartments constructed between 1962 and 1974 (a total of 2,830). This figure is therefore a constant at 63,230.

The formula would be:

$$W = 2457T - 848A - K$$

The relationship of Downtown oriented patterned work trips to Downtown apartment units could vary depending on economic conditions, legislation, or preference. Suppose the percentage of patterned work trips into the Downtown area reached 40% of the total in 1991. This percentage would probably be the upper limit possible. Using the formula presented above, Downtown apartment construction between 1974 and 1991 would have to be 42% of total apartment construction in order to produce a net decrease in patterned work trips into the core area between 1962 and 1991. This figure would be possible but only with very favorable legislative encouragement.

The two situations presented above are presented below as examples:

1. If patterned work trips to the Downtown core in 1991 are 30% of all work trips (as projected), then what percentage of all apartment unit construction must occur also in the Downtown core in order to produce no net increase of daily commuters entering the Downtown core by 1991?

Therefore:  $W = 0$

$$T = 30$$

$$K = 63,230$$

where  $W = 2457T - 848A - K$

$$0 = 2457(30) - 848A - 63,230$$

$$848A = 73,710 - 63,230$$

$$A = \frac{73,710 - 63,230}{848}$$

$$A = \frac{10,480}{848} = 12.4$$

Therefore 12.4% of all apartment unit construction must occur in the Downtown core to produce no net increase of daily commuters entering the Downtown core by 1991. A figure of 13% would produce a net decrease of daily commuters entering the Downtown core by 1991.

2. If patterned work trips to the Downtown core in 1991 are 40% of all work trips (the upper limit for the Downtown core), then what percentage of all apartment unit construction must occur also in the Downtown core in order to produce no net increase of daily commuters entering the Downtown core by 1991?

$$\begin{aligned} \text{Therefore:} \quad W &= 0 \\ T &= 40 \\ K &= 63,230 \end{aligned}$$

$$\begin{aligned} \text{where} \quad W &= 2457T - 848A - K \\ 0 &= 2457(40) - 848A - 63,230 \\ 848A &= 98,280 - 63,230 \\ A &= \frac{98,280 - 63,230}{848} \\ A &= \frac{35,050}{848} = 41.3 \end{aligned}$$

Therefore 41.3% of all apartment unit construction must occur in the Downtown core to produce no net increase of daily commuters entering the Downtown core by 1991. A figure of 42% would produce a net decrease of daily commuters entering the Downtown core by 1991.

Therefore it is possible to halt the increase in patterned work trips to the Downtown core through the construction of Downtown highrise apartment buildings.

It is beyond the scope of this thesis to estimate the cost saving in transportation services to the City by encouraging highrise apartment development in the Downtown area. Judging from the savings derived by WATS Scheme 6 over Scheme 5, a saving of at least \$200,000,000 in current dollars would not be unreasonable. Perhaps much larger savings would occur, however, the WATS Scheme 6 data, assumptions, and calculations cannot be rechecked for this. Current plans of the City are short-term covering five years. Again, costs, assumptions, calculations and other data are not available for study.

Nevertheless, the savings that occur as a result of the presence of Downtown highrise apartment buildings are large and these savings justify more legislative encouragement than the present conditions provide.

It is important to mention that the above discussion is related to the cost of transportation to the city government only. The higher fuel prices of recent years is not mentioned because this influence affects the private citizens of the City. Rising fuel prices will encourage residential locations close to the Downtown core regardless of attempts by the City to encourage Downtown apartment building construction.

### 11. Parks and Recreation Space

Open space requirements for Downtown residents are burdensome to satisfy because the land required for the space is costly. Some persons argue that inside open space is more important than outside open space because urban man faces interior space most of the time.<sup>43</sup> Therefore, density per acre is not as important as the amount of interior area per person. One could argue that a large open area or concourse within a building complex is much more important than the open space provided outside the building. Such concept is part of the Downtown Winnipeg Plan. Certainly in a climate with cold weather in the winter, the indoor inner open space allocation in a dense residential environment is very important.

However, if one considers only the provision of outdoor open space then solutions must be found within the highrise environment to allocate enough areas for parks and recreation. Highrise buildings create open space by shifting floor space from the horizontal to the vertical, but they also permit more total floor space and simply accommodate more highrise buildings. Given that space must be provided in the highrise environment, some innovative arrangements have developed using roof tops. The typical roof size for a highrise building is between .25 and .50 acres. These areas can include plazas, dining facilities, sunbathing areas, play areas, swimming pools, volleyball courts, basketball and tennis courts, putting greens and even driving ranges. They can also include

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<sup>43</sup>J. Marshall Miller, "Residential Density: Relating People to Space Rather Than to Ground Area," J.A.I.P., Vol. 27, (February, 1961), p. 78.

gardens, concert and stage areas, dance areas and arts and crafts centres.<sup>44</sup> However, the roof top is a small space that cannot be integrated with the mainstream of the Downtown environment.

Open space requirements have been calculated at 4.6 acres for 1,000 persons.<sup>45</sup> A further refinement requires 1.5 acres for 1,000 persons plus 18.5 acres of district and regional park area.<sup>46</sup> If this allocation is accepted, the district and regional park area for Downtown residents can be provided out of the central core area. Therefore, the 1974 downtown population in Winnipeg, of 11,600, would require 17.4 acres of open space located within the Downtown area. The two parks in the area, Memorial Park and Central Park, provide 7.9 acres in total. However, the newly acquired Assiniboine Riverbank property provides a further 20 acres. Therefore, the present space of about 28 acres is enough space to meet the needs of the Downtown population until 1980. An acquisition program for new open space was proposed in March 1974. The estimated value of the land required was \$5,900,000 at that time.<sup>47</sup> Some of the cost of the new land must be incurred due to the increase in population in the Downtown area. However, some of the use of the new space will go to office workers who use the parks during the day, plus non-residents who use the

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<sup>44</sup>Werner Hirsch, op. cit., p. 381.

<sup>45</sup>Underwood McLellan and Associates Ltd., Report of the Technical Advisory Group on Development Agreements, Appendix.

<sup>46</sup>U.S. Department of Commerce, op. cit., p. 236.

<sup>47</sup>Winnipeg Free Press, March 21, 1974.

parks all the time. The core area, unlike other areas of the City, faces a large degree of park use from non-residents of the area; therefore, it is difficult to say what percentage of users are residents. Further, it is difficult to say if 1.5 acres per 1,000 residents should be used as a requirement. Perhaps more space should be provided due to the heavy use by non-residents; however, the non-resident use partially compliments the resident use in that office workers use the park space during the day, while residents (many who are the same office workers) use the space in the evenings and on weekends. The importance of indoor space must also be considered especially in view of the winter temperatures in Winnipeg.

If large public space inside a complex is considered as valid open space and it may even be better than outdoor open space, then new development in the core area may require only .5 acres of outdoor open space for every 1,000 residents. This space is easily produced with large full block developments although fewer but larger outdoor spaces may be desirable also.

In any case, the provision of open space for new Downtown residents is not a critical problem because many solutions are available.

### III. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

## 12. Summary of the Impact on the Cost of Urban Services

Some of the research presented earlier is inconclusive in terms of making a case for or against Downtown apartment development. The research provides enough evidence, in most cases, to indicate that more involved research on a larger scale would be fruitful. Some of the information presented does, however, present a clear case in favor of Downtown apartment development. This chapter will weigh the material previously presented, in summary form, to relate all the information in a more concise and definite manner.

One of the major objectives of this thesis was to determine the effect of Downtown highrise apartment development on the cost of eight key urban services in the City of Winnipeg. In order to discuss this question in the proper perspective, it is necessary to present the current estimates of the City so as to weigh the importance of each service in dollar terms. The 1973 Current Estimates were the most recent at the time of research. They are summarized in Table 17.

The estimates clearly indicate that education and transportation are the expenditures accounting for most of the City's expenditures. However, education expenditure is controlled by the various school divisions, leaving transportation as the predominant urban service controlled by the City. The other six services are dwarfed by transportation in comparison.

TABLE 17.

CURRENT ESTIMATES OF THE CITY OF WINNIPEG FOR EIGHT KEY URBAN SERVICES  
IN 1973

Type of Service	Amount	Percentage of Total Estimates
Fire Protection	\$10,514,569	5.5
Police Protection	13,210,079	6.9
Water Supply Service	10,644,841	5.5
Sewerage Service	7,880,937	4.1
Refuse Collection	4,789,396	2.5
Education	59,830,455	31.0
Transportation <sup>1</sup>	40,807,074	21.2
Parks and Recreation	<u>11,789,041</u>	<u>6.1</u>
TOTAL OF THE EIGHT SERVICES	<u><u>\$159,466,492</u></u>	<u><u>82.8%</u></u>

<sup>1</sup>The transportation figure includes \$21,759,442 for public works related to road construction and maintenance plus debt service for the same items. The figure also includes \$19,047,652 for the transit system.

The following conclusions can be made regarding the eight urban services and Downtown highrise apartment development.

#### Fire Protection

Regulations regarding the construction of apartment buildings force them to be safer than other dwellings. The information presented indicates that apartment buildings are nearly twice as safe as other dwelling units in terms of dollar value of the dwellings themselves. However, Downtown apartment locations should have no particular advantages over other locations. A suburban concentration of apartment buildings could be as economical as a Downtown concentration for highrise apartment buildings versus other types of apartment buildings. It is difficult to say if a concentration of apartment buildings in the core area would be less costly to service than the same apartment buildings spread throughout the City. The fire districts in Winnipeg have an overlapping system in case of fire such that a fire in one district can involve the services of neighboring districts. Therefore it is difficult to assess the costs of one district against the other.

In any case, fire protection must be based on available service within a given time not the probability of fire in a district. Therefore, reducing the chance of fire substantially does not necessarily reduce the need for fire protection. Any statements for this service would have to remain inconclusive.

#### Police Protection

Opinions of the Winnipeg and Toronto police forces indicate that it is generally less costly to police highrise apartment buildings than

other types of dwellings. However, no organized research has provided this conclusion. No crime data is available in an organized fashion for dwellings other than apartment buildings; therefore a comparison between the two dwelling types is not possible. However, comparisons between highrise apartment buildings in or near the Study Area indicate that geographic location, type of parking structure and degree of security are the most crucial in determining whether one building is safer than another. No evidence exists to indicate that Downtown highrise apartments are safer than suburban locations. Indeed, locations within the Study Area alone indicate that the peculiarities of each particular site make statements about general areas impossible.

#### Water Supply Service

Future Downtown highrise apartment development presents no burden to the City in terms of the supply of water. Only small changes in the supply network will be required.

#### Sewerage Service

Future projections for residential development in the Study Area indicate that there will be only a small strain on the combined sewer system in the Downtown area. Very large-scale development might require some expenditure for separation of sanitary and storm flow, but inexpensive methods now exist to do this.

#### Refuse Collection

There is considerable evidence to suggest that apartment buildings are cheaper to service than other buildings, particularly those buildings

using large storage bins suitable for mechanical collection. A concentration of Downtown highrise apartment buildings would be even more efficient because specialized trucks that handle large containers could operate at peak efficiency due to the small distance between each apartment building and the proximity of the Downtown area to the city incinerator.

#### Education

Downtown highrise apartment buildings present almost no requirement for the education of children in the future. Only a radical change in the demography of the Downtown highrise population would produce a need for a new school in the area.

#### Transportation

WATS Scheme 6 estimated a \$110,000,000 saving in 1968 dollars over Scheme 5 due to the introduction of 400 new apartment units each year in the core area for twenty years. Present projections indicate that 600 new units will be constructed each year and that this construction level will result in very little increase in the number of patterned work trips into the Downtown area over the next several years. The savings could be higher if more than 10% of all apartment units are constructed in the core area over the next several years.

#### Parks and Recreation Space

The present Downtown population is adequately served in terms of outdoor open space. More space will be required by 1980 but innovations using indoor open space and roof top open space through developer dedication could satisfy requirements for both office workers and residents.

When it is considered that the City spends massive amounts annually on transportation, much more than other services under City control; and that Downtown highrise apartment buildings have a tremendously favorable effect on long-term transportation costs, the conclusion can only be that such residential development should be encouraged by the City, if economic effects only are considered.

### 13. Conclusions

In his writings about government finance, John F. Due stated three considerations to be used in the design of taxation programs.<sup>2</sup> They are equity, economic effects, and administrative costs. All three must find a balance within any government program of taxation and spending. If one is stressed too strongly, it will be stressed at the expense of the other two. For example, in order to achieve equity, such that all citizens are taxed with absolute fairness, it would be necessary to design very elaborate programs with high administrative costs. This may drain the economy leaving everyone poor, but equally poor. Therefore, a fine balance must be found such that marginal benefits equal marginal cost.

Unfortunately, government does not have the test of the market to balance its costs and benefits. It must use other methods to assess its programs of collection and dispersement. Cost-benefit analysis is used in the public sector to evaluate such programs in order to establish which parts of the community bear the costs or receive the benefits.

The major vehicle for financing urban services is the taxation of land and improvements based on some percentage of market value. Winnipeg also depends heavily on the realty tax. In 1973, the realty tax accounted for 70.9% of city revenue with provincial government grants accounting for 5.2% and direct revenue mainly from Winnipeg Hydro, transit fares and water bills accounting for 23.9%.

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<sup>2</sup>John F. Due, Government Finance: Economics of the Public Sector, Homewood, Richard D. Irwin Inc., 1968), p. 145

The property tax has been criticized for being regressive, inflexible, unfair, and not related to ability to pay.<sup>3</sup> It has also been criticized for discouraging development because investors are encouraged not to improve their land due to the threat of higher taxes.<sup>4</sup> In addition, it has been accused of being a very subjective method of taxation.<sup>5</sup>

Under the realty taxation system, land is levied a higher tax if it has a higher value. The most valuable land is in the core area. As a result, the same apartment building will be charged more property tax if it is located in the Downtown area than if it is located in the suburbs. However, the Downtown highrise will place a minimum burden on the transportation system and will save possibly hundreds of thousands of dollars in public works costs by relieving the burden of the transportation arteries to the centre of the City.

In effect, the City is discouraging, through taxation, a central location for apartment buildings. For example, let us suppose that a developer is about to build two identical highrise apartment buildings, each with 435 units. He intends to build one in Fort Garry on a parcel of land zoned C4-1 and another in Downtown on a parcel of land zoned C4. The C4-1 zoning allows 218 units per acre so the Fort Garry development will need two acres. The C4 zoning allows 435 units per acre so the Downtown development needs only one acre. However, Downtown land costs

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<sup>3</sup>Arthur D. Lynn, Jr., The Property Tax and its Administration, (Madison, The University of Wisconsin Press, 1969), p. 203.

<sup>4</sup>Arthur P. Becker, Land and Building Taxes - Their Effect on Economic Development, (Madison, The University of Wisconsin Press, 1969), p. 12.

<sup>5</sup>Arthur D. Lynn, Jr., op. cit., p. 22.

roughly twelve times more than the Fort Garry land. With financing costs removed from the discussion, the comparison of the two developments, concerning total construction costs, is as follows:

	<u>FORT GARRY</u>	<u>DOWNTOWN</u>
Zoning	C4-1	C4
Units Permitted Per Acre	218	435
Number of Acres Required	2	1
Total Units	435	435
Cost of Land Per Acre	\$ 80,000	\$1,000,000
Total Cost of Land	160,000	1,000,000
Total Building Cost	6,525,000	6,525,000
Total Cost	6,685,000	7,525,000

The Downtown development faces a higher construction cost of 12.6% that can be overcome by charging higher rent. The higher rent is possible because of the lower transportation costs to tenants plus proximity to downtown amenities.

It is difficult to estimate the extent that personal transportation costs are reduced by a central core residential location. The savings in personal transportation costs depends on several factors. For example, a person moving Downtown who does not own a car will have different savings than the person who does own a car. Debt charges for cars will vary within the car owning public. Another possibility is the person who no longer feels the need for a car upon moving Downtown and therefore sells his car in favor of public transit.

The lowest change in transportation costs will likely occur with two persons who shared a suburban apartment and used public transit to go to work before moving Downtown. The highest change in transportation costs will likely be the couple who sold their car when moving to a Downtown location.

The two persons sharing the Downtown apartment will each save \$.50 per working day in bus fare eliminated through walking to work. With twenty-two working days per month, each person will save \$11.00 per month for a total of \$22.00. If this saving represented the 12.6% difference in rent required in the earlier example, then the Downtown location could charge a monthly rent of \$197.00 compared to the Fort Garry location which would charge a monthly rent of \$175.00.

This type of rent differential reflects the added cost of Downtown land. However, the unfair disadvantage of the Downtown location occurs because the property tax is also 12.6% higher than the suburban location. This cost must also be reflected in the rent charged to Downtown tenants. Yet the Downtown location almost certainly creates less burden than the suburban location when the cost of urban services are considered.

In short, the realty tax has a disadvantageous economic effect since it discourages the proper location of highrise residential development. The administrative cost of the realty tax is low in certain respects because of the ease of calculation of tax based on property value.

However, the Assessment Division of the City of Winnipeg costs over \$1,000,000 annually to maintain. Perhaps other methods could be employed with a budget of this magnitude. When the economic effects are considered, the possible administration savings become small or negative.

Two of the eight urban services discussed earlier are financed through direct taxation based on use. Water and sewer service are taxed in this manner due to accurate measurement of volume through the use of the water meter. Perhaps the feasibility of a more direct method of taxation of transportation services could be studied. The key transportation patterns are the morning and evening rush hour and the great majority of commuters follow a definite route with the same point of departure and arrival. Therefore there is at least enough information for a feasibility study.

The history of Downtown apartment development reveals that the activities of government have had a critical influence. The concessions of the provincial government in the early 1970's conceivably may have been too beneficial to Downtown residential development in relation to the benefits of such development on the use of urban services. The realty tax of the city has discouraged Downtown residential development at all times. During the early 1970's, the provincial incentives were in conflict with the city's taxation system. On the one hand, the Province was encouraging Downtown residential development by eliminating taxation during construction and afterwards. At the same time, the realty tax, with higher taxation of Downtown land, was discouraging Downtown residential development.

#### 14. Recommendations

The discussion has indicated that some revision of the city's taxation procedures are necessary in order to align costs and benefits. Programs of the provincial and city governments must compliment each other to achieve this end.

In order to do this, the costs and benefits of apartment block location must be studied carefully. Apartment block locations throughout the City should be studied to determine their burden on the delivery of urban services. Concerning transportation, it is conceivable that a remote suburban highrise may not contribute to the transportation burden of the City because its residents have patterned work trips that do not strain major traffic arteries. For example, a highrise near the University of Manitoba could conceivably have residents who all work or attend classes at the University. Therefore this highrise should not be taxed the same as another suburban highrise whose residents all use the major arteries to get to work in the Downtown area.

Another recommendation would be the inclusion of other considerations besides economic considerations in the study of Downtown highrise apartment buildings. These considerations are necessary before residential growth in the core area should be encouraged. The social and psychological impact of Downtown highrise apartments should be investigated as it affects existing residents.

The design of buildings should be studied not only to achieve maximum safety in terms of fire and police protection, but also to ensure most efficient refuse collection. Design should be encouraged that

creates an optimum aesthetic environment in the Downtown area and ensures the proper allocation of indoor and outdoor open space.

In Summary, the economic arguments presented earlier concerning transportation indicate massive savings to the City of Winnipeg through the construction of Downtown apartment buildings. Further study is necessary to determine more precisely the degree that Downtown apartment construction reduces long-run transportation costs to the City of Winnipeg.

A strong policy is required by the City concerning apartment construction. The locations of these buildings have a tremendous influence on the cost of urban services. Therefore, a long-run optimum distribution pattern of apartment buildings should be determined. Then this policy should be enforced through economic incentive either by reduced assessment of Downtown apartment buildings or abandonment of realty tax system as a method of obtaining most of the revenue of the City.

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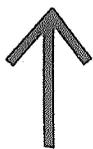
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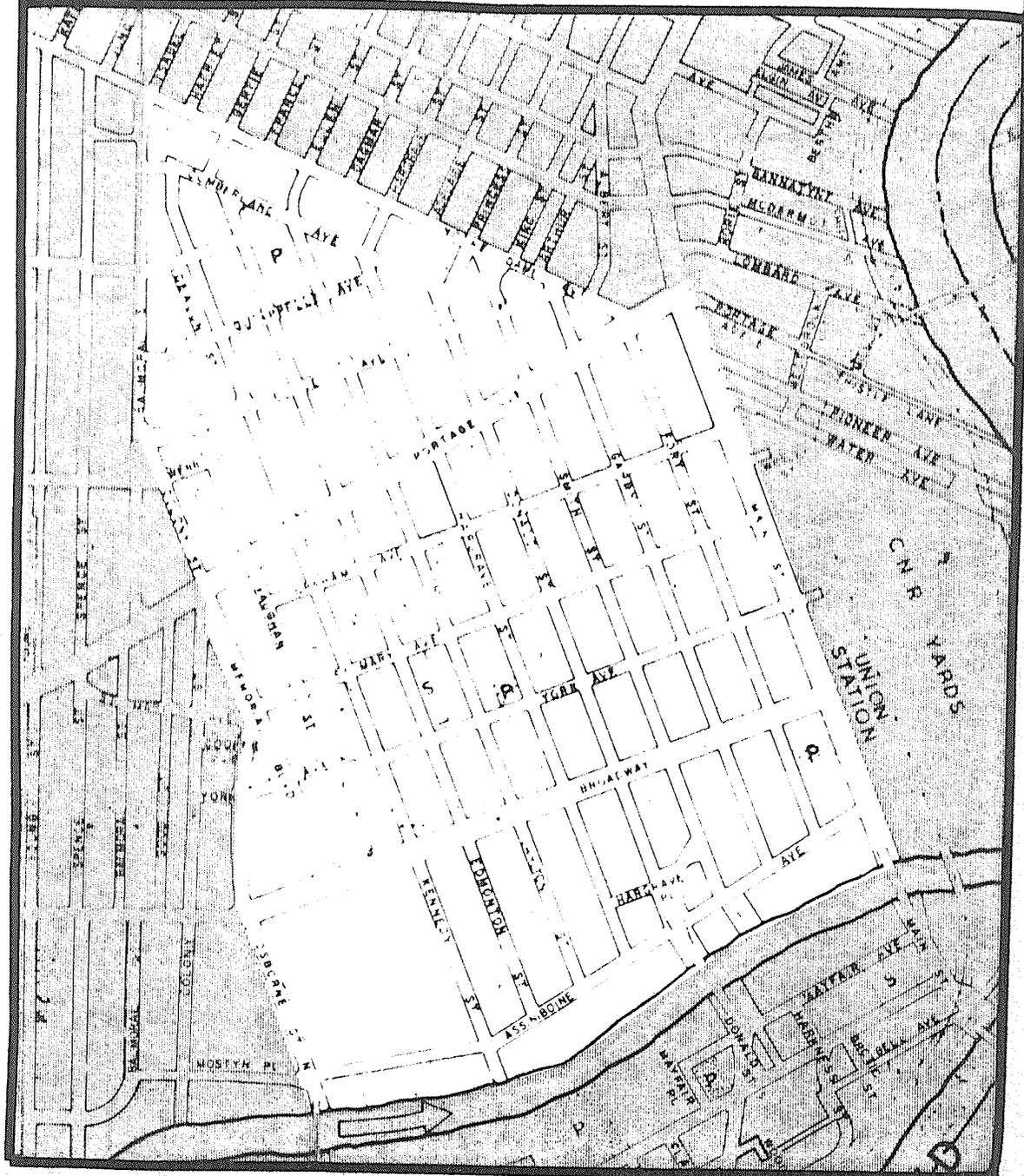
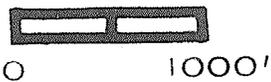
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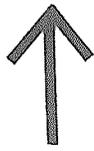
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PLATES

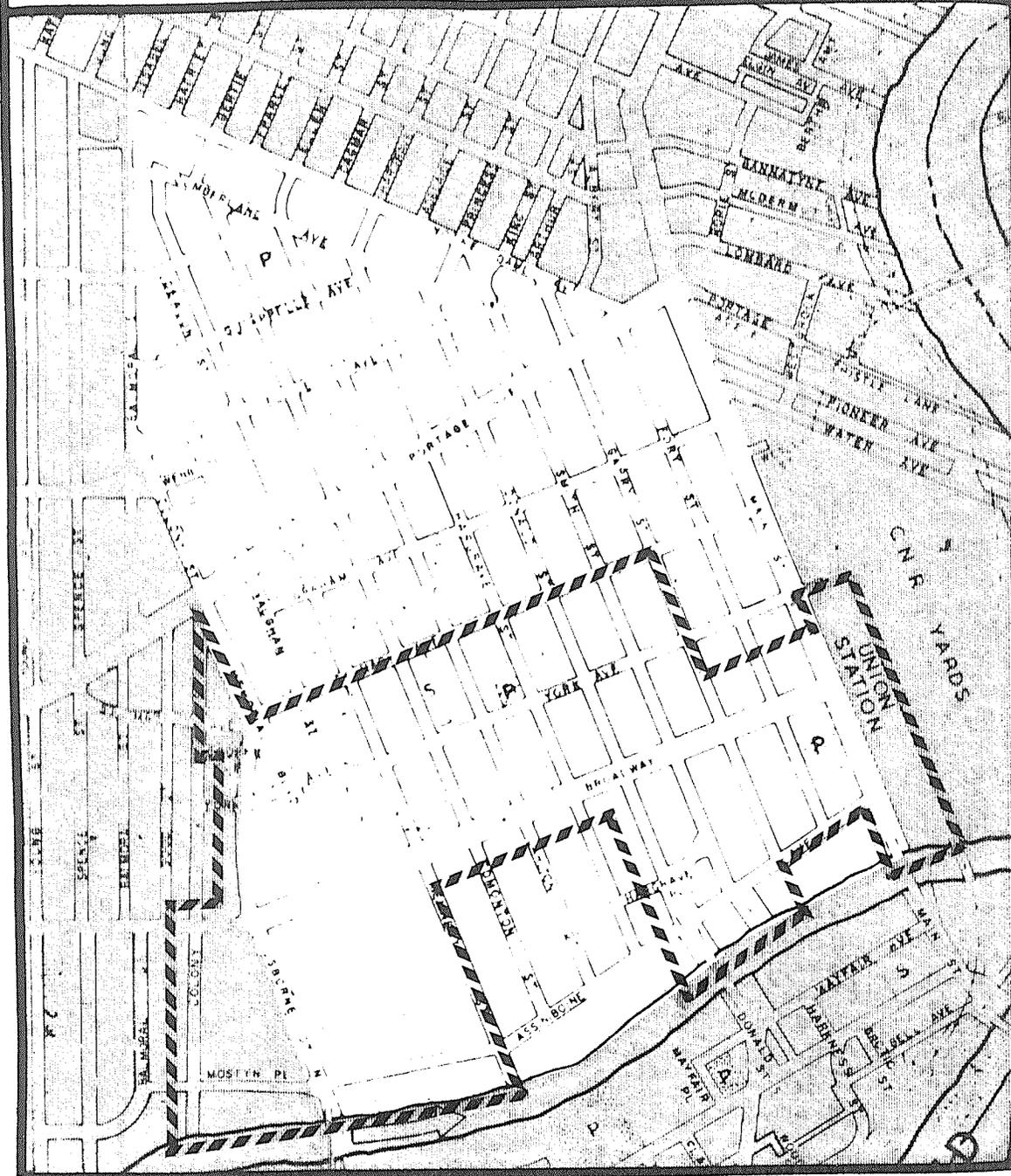
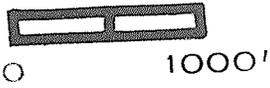


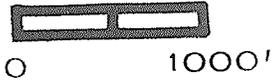
The Study Area





Area Zoned C4





### Fourteen Block Development Area

