

HOUSEHOLD LIFE CYCLE AND SINGLE FAMILY DWELLING EXPANSION:
CASE STUDY IN AN INNER SUBURBAN MUNICIPALITY,
BURNABY, BRITISH COLUMBIA

by

KIMBERLY ANNE ALEXIS

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APPROVAL

Name: Kimberly Anne Alexis

Degree: Master of Arts

Title of Thesis: Household Life Cycle and Single Family Dwelling Expansion:
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Burnaby, British Columbia

Examining Committee:

Chair: A. MacPherson, Professor Emeritus

L.J. Evenden
Associate Professor
Senior Supervisor

R.B. Horsfall
Assistant Professor

V. Strong-Boag
Director
Centre For Research In Women's Studies
and Gender Relations
University of British Columbia

Date Approved:

August 8, 1991

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Household Life Cycle and Single Family Dwelling

Expansion: Case Study in an Inner Suburban Municipality,

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Author: _____

(signature)

Kimberly Anne Alexis

(name)

August 9, 1991

(date)

ABSTRACT

This study enquires into the relationship between changes in the household life cycle stages and additions of enclosed, heated, living space in the detached, single family dwelling. Adding living space to dwellings represents one option among three, the others being a move to a different house in a different location, or inaction. Constraining factors include cost, municipal regulations and location, while pressures to expand living space are experienced differently at different points in the household life cycle.

The approach taken is jointly morphological and behavioral. Physical expansions were analyzed, based on data collected for 232 houses, representing a 20% random sample of all housing additions in Burnaby between 1980 and 1985. Households were sent a questionnaire, and the behavioral analysis and life cycle categorizations were based on information from 105 returns. Life cycle stages were analyzed in two basic groups, those households with children and those without. Supplementary information came from in-depth interviews of a small selection of cases.

The results showed that, for aggregate space, the mean pre-expansion size of sampled dwellings was just over 2000 square feet while the mean addition area was 550 square feet. Households with children lived in bigger pre-expansion houses and made larger additions than did households without children. As for partitioned space, households with children added or extended more rooms per project than did households without. Most expansions were built to

provide bedrooms, family rooms and bathrooms. Variations among households included those without children living in their houses ten years longer, on average, before beginning the addition than households with children. While motives for this building activity are complex, subregional patterns of construction tend to emerge within the municipality. The study shows that patterns of dwelling modification are clearly related to life cycle stages of households, at both individual and general levels of analysis. Additions to houses already built constitute a substantial proportion of all new living space created in the area during the period of study.

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TABLE OF CONTENTS

	PAGE
APPROVAL	ii
ABSTRACT	iii
ACKNOWLEDGEMENTS	v
TABLE OF CONTENTS	vi
LIST OF TABLES	ix
LIST OF FIGURES	xi
CHAPTERS	
1 INTRODUCTION	1
I. DEFINITIONS	3
2 LITERATURE REVIEW	7
I. THE FORM OF A CITY	7
A. Ground Plan	8
B. Land Use Framework	8
C. The Residential Built Environment	10
II. DECISION MAKING MODEL	14
A. Mobility/Migration	14
B. In Situ Adjustment - Addition to the Dwelling	21
III. SUMMARY	28
3 GEOGRAPHIC DEVELOPMENT OF BURNABY	30
I. 1858 - 1900 THE PIONEERING YEARS	33
II. 1901 - 1920 GROWTH AND STABILIZATION	36
III. 1921 - 1945 DIVERSIFICATION	38
IV. 1946 - 1990 SUBURBANIZATION	39
A. Population	40
B. Development Planning and Zoning	44

TABLE OF CONTENTS CONTINUED	PAGE
4 MORPHOLOGICAL CHARACTERISTICS OF EXPANSIONS	5 2
I. METHODS	5 2
A. Building Permits	5 2
B. Questionnaire	5 4
C. North Shore	5 8
D. Rationale Behind Variables	5 9
II. RESULTS	5 9
A. House and Expansion Site	6 0
B. Aggregate Space	6 4
C. Partitioned Space	7 5
D. Functional Space	7 7
5 BEHAVIORAL CHARACTERISTICS OF HOUSEHOLDS	8 1
I. A CLOSER LOOK AT STAGE SIX	9 0
6 CASE STUDIES	9 6
I. CASE STUDY #1	9 6
II. CASE STUDY #2	9 9
III. CASE STUDY #3	1 0 3
IV. CASE STUDY #4	1 0 6
7 CONCLUSION	1 1 1
APPENDICES	1 1 6
A. SURVEY FORMS AND CORRESPONDENCE	1 1 6
1. house characteristics recording form	1 1 7
2. coding sheet	1 1 8
3. letters	1 1 9
4. questionnaire	1 2 3
B. SUMMARY DATA	1 2 5
1. List of rooms added and extended (from building permits)	1 2 5
2. List of the use of basement rooms (A4)	1 2 7

TABLE OF CONTENTS CONTINUED	PAGE
3. Expansion connected to stage in family or household development (D5)	128
4. List of previous locations of households (C2)	132
5. List of Work Destinations (C4)	133
C. CENSUS TRACTS	134
BIBLIOGRAPHY	138

LIST OF TABLES	PAGE
3.1 Population and Household Characteristics of Burnaby	4 0
3.2 Population, households and dwellings, 1986	4 3
3.3 Zoning By-laws for Various Residential Zoning Categories	4 8
3.4 Percentage of Sample and Residential Land within Residential Zoning Categories	5 1
4.1 The Number of Addition Permits and Total Permits Issued	5 3
4.2 Life Cycle Stages (after Duvall) With the Percent Within Each Stage	5 7
4.3 Orientation - A Comparison Among Burnaby Households, Those With Children and Those Without, and the North Shore	6 3
4.4 Aggregate Space - A Comparison Among Burnaby Households, Those With Children and Those Without, and the North Shore	6 5
4.5 Partitioned Space - A Comparison Among Burnaby Households, Those With Children and Those Without, and the North Shore	7 6
4.6 Functional Space - A Comparison Among Burnaby Households, Those With Children and Those Without, and the North Shore	7 8
4.7 Sharing Bedrooms - A Comparison Among Burnaby Households, Those With Children and Those Without, and the North Shore	7 9
5.1 Demographic Characteristics - A Comparison Among Burnaby Households, Those With Children and Those Without, and the North Shore	8 2

LIST OF TABLES CONTINUED	PAGE
5.2 Previous Locations of Households	8 2
5.3 Reasons Given For House Choice - A Comparison Among Burnaby Households With Children and Those Without	8 3
5.4 Work Destinations - A Comparison Among Burnaby Households With Children and Those Without, for Males And Females	8 5
5.5 Addition Timetable for Expansion Projects - A Comparison Among Burnaby Households, Those With Children and Those Without, and the North Shore	8 7
5.6 Preparation of Blueprints - A Comparison Among Burnaby Households With Children and Those Without	8 8
5.7 Participation in Additions - A Comparison Among Burnaby Households With Children and Those Without	8 9
5.8 Number of Households in Reclassified Stage Six	9 0
5.9 Aggregate Space - A Comparison Among Stage Six Groups	9 1
5.10 Partitioned Space - A Comparison Among Stage Six Groups	9 2
5.11 Functional Space - A Comparison Among Stage Six Groups	9 3
5.12 Expansion Decisions - A Comparison Among Stage Six Groups	9 4
A. Summary of Population, Movers and Dwelling Characteristics for Census Tracts in Burnaby, for 1986 Census Year	1 3 4
B. Summary of Census Family Characteristics and Number of Children for Census Tracts in Burnaby, for 1986 Census Year	1 3 6

LIST OF FIGURES	PAGE
1.1 House and Lot Plan: Basic Form	4
2.1 Brown and Moore Model (1971) of the Residential Location Decision Process showing the Connection made in this Study to Evenden's Model	16
2.2 Evenden Model of the Process of Dwelling Expansion	22
3.1 Location of Study Area: Burnaby, B. C.	31
3.2 Burnaby showing Major Roads, Surrounding Municipalities and Neighborhoods	35
3.3 Population Growth of Burnaby, 1892-1986	37
3.4 Burnaby: Socio-demographic Characteristics by Census Tract	42
3.5 Land Use and Zoning, 1920s	46
3.6 Residential Zoning Map, 1980	50
4.1 Distribution of Sample and Households which Returned Questionnaire	55
4.2 Response to Mailed Questionnaire Survey: cumulative frequency	56
4.3 Aspect - A Comparison Between Burnaby and the North Shore	62
4.4 Pre-expansion Areas	69
4.5 Areas of Additions	70
4.6 Ratios of Areas of Additions to Pre-expansion Areas	71
4.7 Large Ratios	72
4.8 Medium Ratios	73

LIST OF FIGURES CONTINUED	PAGE
4.9 Small Ratios	74
6.1 Plan View and East Elevation of House in Case Study #1	97
6.2 Plan View and West Elevation of House in Case Study #2	101
6.3 Plan View and South Elevation of House in Case Study #3	104
6.4 Plan View and North Elevation of House in Case Study #4	107
6.5 Photo of House in Case Study #1	109
6.6 Photo of House in Case Study #2	109
6.7 Photo of House in Case Study #3	110
6.8 Photo of House in Case Study #4	110
A. Numbered Census Tracts	137

Chapter 1

Introduction

Despite recent trends in the diversification of residential building, single family dwellings remain preponderant in North America. In recent decades the average size of such dwellings has increased and the quality of construction has improved. The majority of Canadians are homeowners and it is with homeowner behavior in relation to changes in dwelling space that we are concerned in this thesis.

The rate of Canadian homeownership has increased from 57 percent in 1941 to 63 percent in 1986, and 57 percent of households live in units built since 1960. Average household size has, over the same 45 years, decreased from 4.5 persons to 2.7. These simultaneously occurring but opposed trends are an indication of the improved standards of living enjoyed during the second half of the century.

General trends such as these mask numerous processes which, at the level of the household, are resolved in a decision-making process juxtaposing and relating perceived housing needs with a dwelling structure and its location. As the life cycle of the household proceeds, its housing needs change to the point that larger premises are often felt to be needed. This often precipitates an enlargement of existing premises or a move to a bigger dwelling. As the cycle of housing needs continues to retirement, the household often downsizes and in time, may change location again (Prior 1986).

Although dwellings are physically susceptible to subdivision for multiple occupancy, the single family dwelling cannot by definition proceed to such a stage of development - a point that holds even though the special case of units designated "in-law suites" are permitted in some B. C. municipalities. Further, once a house has been expanded, it would rarely be reduced in size. Thus, the continued activity by successive households in expanding dwellings to suit their perceived needs results in an ever-enlarging basic house throughout the area (Evenden 1988). It is this expansion phase of dwelling development, along with the stage of household development, that defines the focus of this study within the larger contexts of residential landscape formation and socio-demographic dynamics.

To get additional space, householders have two choices. They can move to a new residence which has the characteristics they seek. However, a move will not immediately result in the physical changes to dwellings, old or new, although it might change the household's social position in the community by virtue of a new location. This mobility option is the one most studied in the literature. Their second choice is to improve the existing premises by adding to the building(s) of their property, and this in turn will result in physical change to the house but will have no locational implication. This option of staying and building is little studied. Yet these are related choices in the overall processes of urban development, and thus a contribution of the present work is to highlight the dynamics, and to present findings from a case study, of this dynamic process of residential transformation.

Research in the tradition of gender analysis might lead to expectations of spatial zoning of dwelling interiors according to gender characteristics. In the present study, however, decisions regarding expansions were jointly made by husband and wife couples, even when space such as kitchens, dens or workshops were being considered. Thus the emphasis here has been to focus on the expansion project as a matter of household decision-making, and questions referring to gender related spatial development left to research beyond the present study.

The purpose of this thesis is three-fold: first, to examine and summarize the characteristics of additions made to single family dwellings standing alone on their own properties in the municipality of Burnaby between 1980 and 1985; second, to enquire into the characteristics of the households that made the additions with a view to determining the reasons for their efforts to expand their dwellings, and; third, to examine the relationship between the type of addition and housing needs, and life cycle stages of the household.

I. DEFINITIONS

Definitions here follow those developed by Evenden, 1982, 1988. **Additions** and **expansions** refer to attachments to existing dwellings of enclosures of heated space. Thus, because they do not add heated space, additions of carports, garages, sundecks and patios are not included within the calculations, even though they might have formed parts of expansion projects. Similarly, **renovation** of existing space is not included in the calculations if it did not add new space. The terms, addition and expansion, are used

interchangeably. **Extension** refers specifically to an expansion of an existing room.

There is considerable variability in house shape and size, but the vast majority in of Burnaby dwellings are constrained within a building envelope, defined by municipal regulations, relating lot size and position to house form.

A typical house is built on a legally surveyed lot (solid line, figure 1.1). Its specific location on the lot is constricted by zoning **set-backs** consisting of the front yard, side yards and rear yard (dashed line). A builder cannot violate these setbacks without approval from the Board of Variance. Virtually all modern

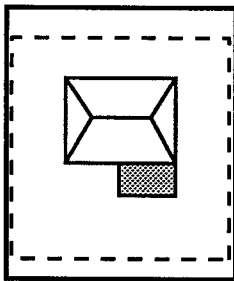


FIGURE 1.1
HOUSE AND LOT
PLAN: BASIC
FORM

construction conforms to the bylaws. Once the house is built, the same laws apply to **additions** (grey). Should the house be situated quite far forward on the lot, then the house might only be expanded to the rear or sides. Similarly, should the house be located to the rear of the lot then the expansion might only be made to the front or sides. The

side of the house on which the addition is made is referred to in this study as the **orientation** of the addition.

The building envelope defines the vertical extent of the building, as well as the horizontal or plan form. Bylaws, within a zoning district, govern how many storeys a house may have. For most residential areas in this study the limit is 2 1/2 storeys. The habitable space between two floors is considered a storey, including the basement. ("The half storey means a storey under a gable, hip,

gambrel or shed roof having a gross floor area not more than fifty percent of the gross floor area of the storey immediately below..." Burnaby Zoning Bylaw 1965: 19). Thus, depending on the original configuration and height of the dwelling, there may be the option within the building envelope to add a basement or storey to the house.

Another component of the expansion is defined here as the **aspect**. This refers to the directions in which additions protrude. Expansions might protrude in any direction, and are recorded here in terms of points of the compass. Moreover, households also consider window and door placement with respect to views and accessibility to roads and lanes. These constraining variables set boundaries for the forms of expansion. Finally, each addition has a specific use, or **function**, which may determine the type of expansion built.

There are two types of households in this study so far as life cycle is concerned. The most frequently occurring type is a family with elementary school children and the other is a middle age household with grown children. In different stages of the life cycle the household has a tendency to add different types and sizes of additions. Specific characteristics are identified and discussed within the following chapters.

Even though there are economic implications for the household which makes an addition through the purchase of building materials and use of paid or unpaid labour, dollar figures are impossible to measure with any accuracy because municipal figures are unreliable and people typically are unaware of total costs. Therefore the basic unit is better analyzed in the spatial term of area enclosed because

of its exact measure, consisting of value and availability at an individual household level. This is the unit of analysis in the morphological tradition.

The thesis is organized as follows. This chapter gave a brief introduction to the thesis. The second chapter summarizes a literature review on relevant studies in the field. The third chapter outlines the geographic development of Burnaby and provides some statistics about the municipality from the 1986 census. The fourth chapter analyzes the data on the expansions from the building permits. The characteristics of expanding households, gathered from the questionnaires, is the topic of chapter five. Chapter six gives some specific examples of houses and households through case studies. Chapter seven summarizes and concludes the thesis.

Chapter 2

Literature Review

I. THE FORM OF A CITY

The site and situation of cities, particularly as they related to the ground plan of urban areas, have been a traditional focus of urban research. In recent years, approaches to the study of the city have proliferated and have included a renewed emphasis on the study of form (Bourne 1989). In this study the morphological approach is emphasized in conjunction with decision making, a conjunction attempted earlier by Carter and Davies (1970) in a study set in Wales.

The present inquiry is not, however, an extension of the Carter and Davies study, for the study of decision making here is set in an entirely different context as it relates to urban physical transformation. There is an historical enquiry of major public-level decisions resulting in major form developments while the present study is based on incremental changes in form as related to household level decisions. Thus, we begin afresh here, focussing first on the matters of the plan layout of the city.

The form of a city can be divided into three components of space: the ground plan (or town plan), the land use pattern and the building fabric. A broad overview is necessary to see where the components fit into the geographic literature.

A. Ground Plan

The ground plan refers to the layout of streets and block composition. Studies have used ground plans to investigate the morphology of towns, even medieval towns (M. R. G. Conzen 1960, 1968, Carter 1975). Since each period of time leaves distinctive marks in the landscape these may be analyzed for insights into the urban form. The ground plan has traditionally been recognized as the most resistant to change as compared with land use patterns and the building fabric. However, large scale developments, based on the developer's ability to assemble large units of land and to concentrate capital, and based also on a modern planning approach which accommodates large scale developments, changes our understanding of the traditional notion of urban form as being divided into ground plan, land use patterns and the building fabric, advanced by Conzen in 1949. This is not a serious issue here for, although some of the houses sampled in this study may have been built as parts of large scale developments, my unit of analysis is the individual dwelling.

B. Land Use Framework

Land uses have perhaps been the most widely studied of the three urban landscape components identified here. It is this aspect which most directly connects the morphological and functional approaches to urban analysis. Authors who have studied land use patterns have proceeded by dividing the city into distinct subregions, typically including the uses to which building and urban spaces are put and as related to land values, population density and

accessibility. It is conventional to cite as the classic starting points of the work the development of the concentric ring, sector and multiple nuclei models of the city. Burgess (1925) proposed the simple successive rings of various land uses out from the Central Business District (CBD). Hoyt (1939) introduced the concept of transportation corridors as a means of drawing people to live in certain areas radiating as sectors out from the center. The modern city became increasingly complex and spread out. It no longer looked to the CBD for all its major transactions and overall focus. Harris & Ullman (1945) proposed the multiple nuclei model of the city to take into account the expansion of the metropolitan area, in which the CBD changed its character. In a series of studies, Vance and others have extended these three models to portray the new modern conurbation. They accounted for the enormous size and diversity of the modern city by employing a concept of 'urban realms' to describe the vast conglomeration of cities and suburbs such as the San Francisco Bay Area, the region in which the concept was developed. These four morphological models described different ways of characterizing the city.

Numerous studies have been put forward as to the pattern urban growth takes, many being closely related to, or applications of the theories referred to above (Hoover and Vernon 1959, Andrews 1971, Smith and McCann 1981). Each study isolated what happened in particular areas of the city with a view to predicting the course of urban development. For example, Smith & McCann (1981) found that Andrews' cycle of development better described Edmonton's development than the Hoover and Vernon model since it was more

flexible and few neighborhoods in Edmonton showed features of decline (the last stage in the Hoover and Vernon model). Instead, relative location and accessibility were more likely to explain redevelopment than land use succession theory.

C. The Residential Built Environment

The last component of physical form was the building fabric. Within geography it had two fundamental dimensions, one focussed on the building types (Adams 1987, Gottman 1966) and the other, different architectural styles. Both building type and period need combined attention, preferably interweaving subjective elements as well (Goss 1988). Fusch and Ford (1983) described the architectural framework:

The urban landscape is an architectural container that constrains and directs spatial decisions, imparts personality to a place, and plays a major role in the creation of positive and negative images of places that can affect the future character of the urban landscape...[It is]...concerned with space and place - two dimensional patterns and three dimensional landscapes (p. 324).

The element of these three dimensional landscapes with which I am most concerned in this study is the ordinary housing of single family dwelling districts. The neighborhoods contain different socio-economic groups which impose patterns on the landscapes to be studied.

Gentrification is perhaps the most well known phenomenon of the "back to the city" movement. As a process, it occurs when

upwardly mobile, young, childless, (and as reported in the American literature, usually white) professionals move to older areas in the city and begin to repair and renovate the houses. As the look of the area improves and capital is returned to the older sections of the city, land values begin to rise. This has the effect of displacing the incumbent population which can afford neither to redevelop nor to pay the increased taxes which follow improvements. Thus they are often 'forced' to sell and move to other low income areas perhaps becoming renters rather than owners. This has happened to a certain extent in Canada and Ley (1986) has documented this for Vancouver. Other Canadian cities such as Toronto, Montreal and Halifax, showed similar processes (N. Smith 1982, Millward and Davis 1986, Filion 1987).

In an attempt to make systematic upgrading processes, Millward (1988) has proposed a classification of residential upgrading. He has devised six categories according to the change in social status and the amount of renovation activity: full gentrification, partial gentrification, incumbent upgrading, social upgrading, stability, and downgrading. In the context of the present study, incumbent upgrading is the category of most interest. Incumbent upgrading occurs when the resident population begins voluntarily to upgrade their dwellings. Incentive to do this might come from new government programs, community solidarity or nearby zoning changes. However, incumbent upgrading only includes renovation activity and not addition of new space. Thus, it is not the same as expansion processes.

Incumbent upgrading is likely to take place in areas suitable for renovation, (that is, the houses are large and well built) but relatively unattractive to gentrifiers (public housing projects nearby, poor accessibility to downtown, ethnic neighborhoods and mixed land uses). Incumbent upgrading does not involve the problems of displacement and social disruption caused by gentrification. Often, as shown in this thesis, households prefer to stay in their present neighborhood, at considerable cost, and upgrade and expand their present house.

Invisible upgrading is similar to incumbent upgrading except the renovations are carried out only in the interior of homes. Thus they are 'invisible' since they are out of sight of the conventional outdoor landscape. Bunting (1987) and Bunting and Phipps (1988) have reported on this form of upgrading in smaller Canadian cities (Kitchener and Saskatoon). Although Bunting stated that upgrading is invisible, she was more correctly referring to modest investment, since renovation activity was divided into two categories in the study, interior and exterior. In her study, addition/extension was a class of exterior renovation activity reported to have occurred in four of the 65 households. In all these cases, the households used their own unpaid labour instead of contractors to do the job.

Furthermore, the interiors of homes have been the deciding factor in the case of whether to demolish the structure, such as the Chinatown case (Hellyer 1969) and the means of classifying the population. For example, the decoration and furnishings present within a sample of Greater Vancouver homes were used to determine

(along with other information) the mainstream urban lifestyles (Gill 1981).

Stable neighborhoods have been studied in conjunction with declining neighborhoods to analyze the differences between the two and to try to find out why one is declining comparatively, (downgrading). Reasons may stem from zoning practices (Moore 1982, Goldberg and Horwood 1980), redlining (banks refusing to lend money to people in certain areas of the city) and racial steering (real estate agents directing potential home buyers to certain parts of the city depending on their nationality). Decline in the city center seems to be more prevalent in the United States than in Canada perhaps since racial tensions are more severe, and the studies cited here are based mainly on American experience.

McConkey (1985) looked at the repair behavior of owner occupants to see whether it was related to the housing upkeep of neighboring owners, "the Jones effect". Clustering of repair behavior was due to the clustering of ethnic groups and same vintage housing, as well as to a combination of wanting to keep up the neighborhood and keep up with the neighbors. Four study areas in Philadelphia, Pennsylvania showed different degrees of influence. Area C, the most like Burnaby, (a white retirement area) did exhibit clustering of repair activity. In contrast to Area C, residents of Area A, an ethnic area (Hispanic), were not sensitive to how much their neighbors spent on repairs, only to whether they made any repairs at all. In Areas B and D, there was no evidence of clustering of repair activity.

Gentrification, incumbent upgrading and invisible upgrading define what is happening in the **renovation** field. However, within the context of this study, renovation does not fully explain the distinct processes of **addition** and **extension** of the dwelling. These processes will be elaborated in the next section within the context of the decision making model.

II. DECISION MAKING MODEL

It is not enough to study the landscape; one must also understand decisions people make to live in certain dwellings. A number of factors such as costs, journey to work, neighborhood characteristics and family composition determine whether a household is satisfied with a house. If the household is not satisfied it has three options. It may sell the house and move to another with the characteristics it seeks. It may also make additions and renovate its current house, or it may do nothing. The last is not an option that will resolve discontent with the dwelling, but it may be the only course open. The next section gives the background of the literature on household mobility. This is followed by a section reviewing the more modest literature on households making additions to their homes. Households that do nothing except cope with the stress by changing their aspirations is a topic located in other, probably social psychological fields of enquiry.

A. Mobility/Migration

One way a household makes changes when dissatisfied with its dwelling is by moving. Mobility can be tied to job transfers, income

changes, family breakups and neighborhood livability. In many cases these characteristics cause friction and the household relieves tension by moving to a different place.

A landmark study by Rossi (1955) analyzed the reasons why people moved. He found that the principal reasons people change residences are associated with their housing needs at different stages in the life cycle. This held true across low income and high income areas and households.

Various authors since Rossi have tried to capture the dilemma people face when thinking about moving or expanding their existing residences. Brown and Moore (1971) related their ideas to Wolpert's study on the decision to migrate, a study in which the author developed a framework for the study of migration in urban areas. Brown and Moore in turn, developed a model of the residential decision making process (figure 2.1), in which internal and external forces can create stress or strain on a household. The household enters phase one when it decides to seek a new dwelling to relieve the strain. It may seek a new dwelling or remain in its present location and adjust its needs and aspirations. If it decides to seek a new dwelling, the household is faced with the relocation decision, phase two. If it can not resolve the main variables of finding a house at the right location at the right price, it will have to remain in its present location and engage in "in situ adjustment". To the household, this may mean an addition of heated space to the dwelling, a rearrangement of existing space through remodelling or simply an adjustment of needs and aspirations. Which solution a household chooses depends on household characteristics and the

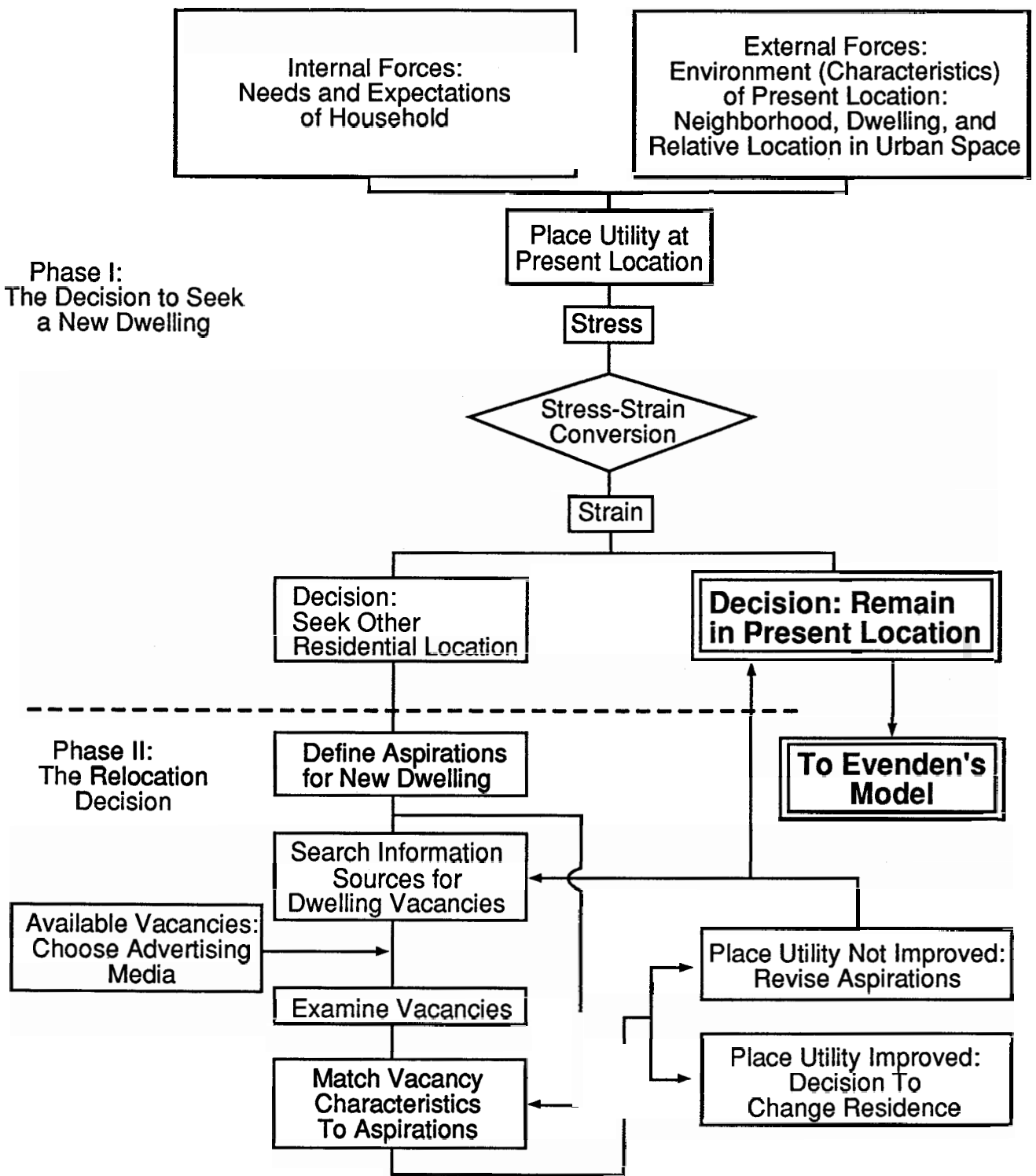


FIGURE 2.1
BROWN AND MOORE'S MODEL OF THE
RESIDENTIAL LOCATION DECISION PROCESS
 SHOWING THE CONNECTION MADE IN THIS STUDY TO EVENDEN'S MODEL

severity of the stress. The model is truncated at this point as far as 'stayers and builders' are concerned. However, it was taken up as a starting point for another model developed by Evenden and explained later in this chapter.

Boyce (1971) exemplified work on residential mobility by looking at movement of households within Seattle, identifying both push and pull factors which influence households to move. He stressed that five major items would have to be considered simultaneously to build a satisfactory model of residential mobility: 1. location of area, 2. site characteristics of residence, 3. status of housing-rental versus ownership, 4. class and value of housing, and 5. the characteristics of the residents such as income, size of family, monetary and marital status. Boyce found that, within Seattle, there was no clear-cut movement of the population between the central city and the suburbs. Instead there was a kind of "musical chairs" within the area with major growth of suburban areas coming from other cities rather than from the central city. Further, he found that upward mobility in housing was almost always involved in any voluntary intra-city move.

Bell (1968) emphasized life style in migration decisions. He suggested that those households moving to the suburbs have chosen the goal of familism over careerism. Families in the suburbs largely remained satisfied with their quiet suburban locations; however, they may enlarge the living space. Goals in life may be altered as children grow up or neighborhoods change and therefore the suburban location might not be as suitable as it once was. Consumer

aspirations may precipitate a move to another location within the city which better fits with the goals of upward housing mobility.

Morris and Winter (1975) attempted to provide a flow diagram for the family housing adjustment process, in the spirit of the Brown and Moore model. They suggested that each family evaluated its housing with regards to family and cultural norms. American housing norms combined space, tenure, structure type, quality and locational norms. Fulfillment of these norms came with the ownership of a sturdy, three bedroom, single family dwelling in the suburbs. Obviously, not all individuals could aspire to this. Household adjustment occurred when housing deviated from the norms a household had set, to the point of reduced satisfaction. Housing adjustment was accomplished in three ways: 1. residential mobility - move to another dwelling, 2. family adaptation - postpone childbearing or encourage older children to move out, or 3. residential satisfaction - additions, alterations, remodel and change the function of rooms. This last adjustment is the topic of the present thesis.

Gladhart (1973) studied the conventions which have developed with regards to the number of bedrooms a family should have and who was to use and share them. He tried to set up a model which indicated how many bedrooms a household should have to generate satisfaction with the dwelling, according to the ages of the children. He concluded that one bedroom was needed for each child at home of at least 18 years of age, and one bedroom was needed for each pair of children under 18 years if they are the same sex and similar ages. It was assumed that separate bedrooms were needed if children

were not of the same sex and of similar ages. He also calculated the number of bedrooms within the house against the number of rooms and the ages of the members of the household to come up with a 'flexible housing score'. He made three behavioral judgments with regards to flexible housing: 1. families with children required more flexible space than did families without children, 2. the greater the disparity between the age categories of the oldest and youngest child, the more complex would be the family role patterns and family behavior patterns; consequently, the greater would be the family's demand for flexible and overlapping use of its housing space, 3. babies and teenagers were more demanding of their housing in a variety of ways than were children of other age categories. However, some families, he concluded, became chronic movers since they seemed unable to resolve their housing needs from move to move.

Galster (1987) reviewed a household's satisfaction with the dwelling according to aspirations the household established and perceived needs of the family and how they responded to gaps between such aspirations or needs and reality. Galster stated that "...housing aspirations are undoubtedly influenced by a person's prior residential experiences, perceived status, sense of personal efficacy and potential for upward mobility. Needs ... are a function of family size and demographic composition and life-cycle stage." (p. 546) Using variables which attempted to measure a household's satisfaction, such as rooms per person and bathrooms per person, Galster found that satisfaction with the dwelling was not a linear relation but a curvilinear one, with increases in the amount of a

particular item consumed leading to progressively smaller increments in the householder's sensed well-being. These relationships varied by homeowner type as young families, for example, ceased gaining satisfaction when the rooms per person exceeded 2.4. Galster contributed to the literature of mobility versus addition by analyzing how satisfaction with the dwelling influenced homeowner's decisions.

Michelson (1977) took the view that instead of reacting to apparently unforeseen housing stresses, households could act with reference to their long-term housing ambitions. Households might move even if they had a high degree of housing satisfaction. They might move to fulfill the dream of owning an 'architecturally' designed house, for example, or to a larger place in anticipation of having children. Others may move with the intentions of expanding. Thus Michelson's study allows for the aspirations of the households.

As social patterns change, for example with more women in the paid work force, the findings of these studies will become increasingly dated. But there is still apparently a broad agreement on basic processes and further work on the mobility aspect of the model is reviewed by Bourne (1981). He stated that "the principal means through which changes in the demand for housing are satisfied, especially in the short term is by residential mobility" (p.133). Bourne gave four possible reasons for changing residences: 1. life cycle change, 2. income and employment change, 3. housing attributes, and 4. neighborhood and accessibility needs. One could argue that alteration and expansion of the dwelling could accommodate some of these reasons just as easily as mobility, as

other expansion studies have shown (Evenden 1982, Seek 1983, and Jackson 1985) and this thesis attempts to discover.

B. In Situ Adjustment- Addition to the Dwelling

In the present study on Burnaby, and in Evenden's earlier work on Vancouver's North Shore, it was found that a large portion of the households which redevelop their houses have considered but rejected the moving option. It could be that what was observed was the 'cumulative inertia' described by Huff and Clark (1978). This was the familiarity and attachment to the house which made it harder to move the longer a household had lived in a house. However, the annoying aspects of the dwelling become progressively less tolerable as well, until they eventually dominate. At this point addition and/or renovation of the dwelling occurs, since for this group moving has been rejected as an option.

Evenden devised a model which expanded on the Brown and Moore framework (figure 2.2). It emphasizes the expansion decision instead of the mobility decision. He identifies three steps in the action phase of dwelling expansion which follows the decision to stay and build. The first step is the formulation of the idea. The desired change is imagined, formulated and articulated. The second step involves drawing the plans. For this a professional may be commissioned or plans may be drawn by the householder, a family member or friend. The third step occurs when permission is obtained, contracts tendered and contracts let, not necessarily in that order. In fact, contracts may not be tendered at all if the householder plans to do the work himself. At this point the

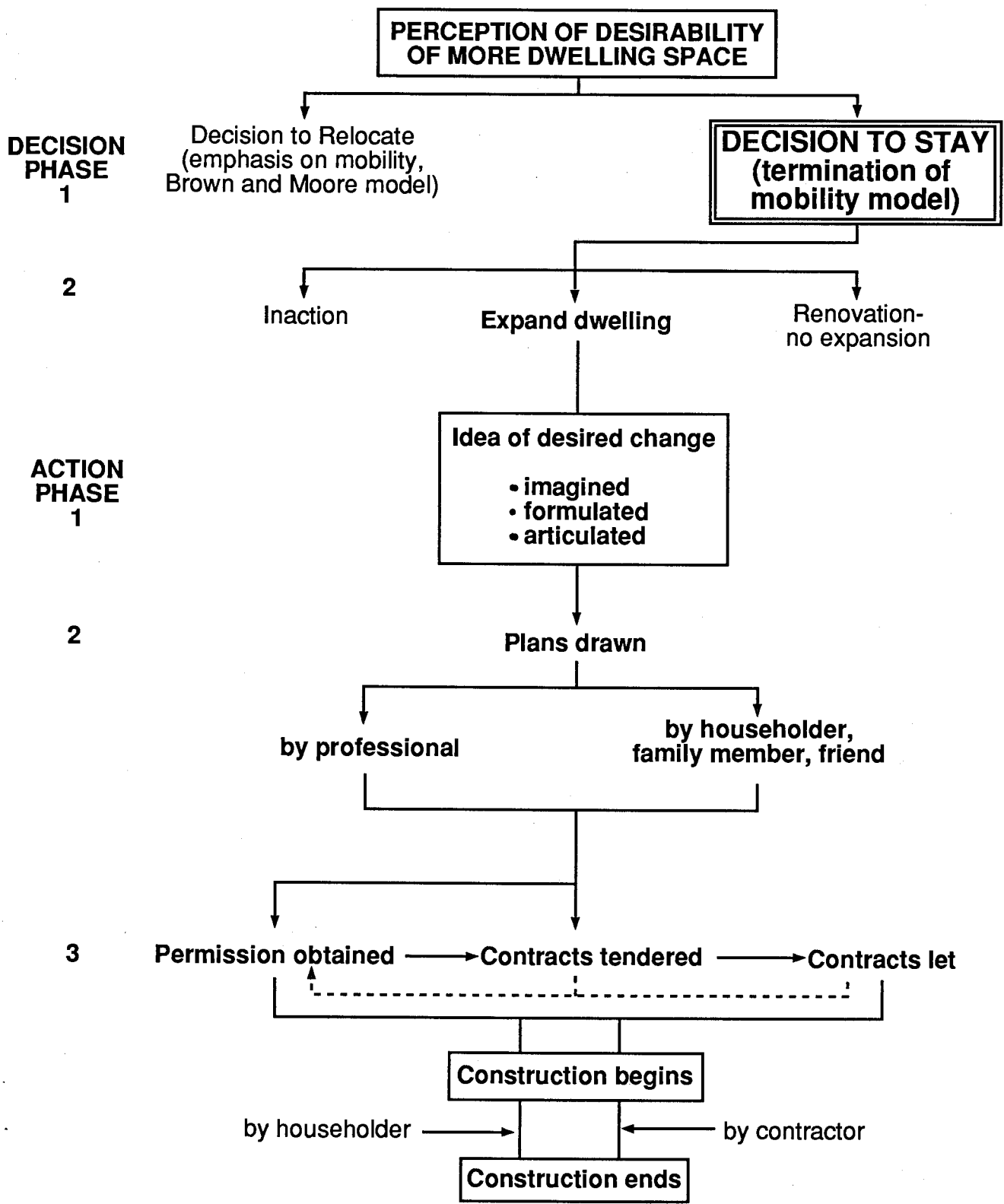


FIGURE 2.2
EVENDEN MODEL OF THE
PROCESS OF DWELLING EXPANSION

householder moves from the private realm of household activity to the public realm of scrutiny of his action and the payment of fees. Finally, construction begins, although it may be some time before construction ends, as finishing work tends to 'drag' in many expansion projects.

Three further studies were of substantial interest for the students of the expansion process in housing adjustment. The first two were Australian studies by N. Seek (1983) and J. T. Jackson (1985) carried out in Adelaide and Perth, respectively, and the third was a study by L. Evenden (1982,1988) based the North Shore of Vancouver, B. C.

Seek (1983) undertook to explain how and why home improvement decisions were made, in order to understand the broader implications of home improving as a housing adjustment process. Home improvements were defined as additions, alterations and renovations. For his study, conducted in Adelaide in October 1978, he interviewed 200 homeowners who undertook improvements to their dwellings, each valued at \$2000 and over, in the twelve months prior to the date of the interview. These homeowners were compared with 677 households which moved during January 1976 and March 1977, data which came from a survey earlier completed by Kendig (1981) in Adelaide.

Seek used the family life cycle concept as developed by Lansing and Kish (1957) to explain housing decisions. Lansing and Kish's life cycle was divided into pre-family, young family, mature family, older family, older couple and other. Seek found that pre-families and young families usually had high incomes, wanted more

space and had commitment to housing (mortgage debt). These young households had the choice of solving their housing needs through moving or through improving (usually making additions), and often bought a smaller ('starter') house with a view to improving and/or selling it. Housing demands increased progressively, to peak at the mature family stage when the income was generally the highest. At this stage the household had been living in the house for an average of eight years and, according to Seek, would usually try to make improvements if possible and stay in the house. This corresponded to the findings of the present study of Burnaby, where households with children began making additions after living in their homes 8 years. Older families and couples were in the contracting phases of the life cycle when their needs for space may diminish. Changes to be made to the dwelling were usually in the form of renovations and alterations, especially to the kitchen and bathrooms. As retirement approached, there was the anticipation of decline in income but possibly an increase in equity by virtue of investment in renovation and even expansion.

Regardless of stage in life cycle, Seek noted that there were costs and benefits related to moving or improving. Costs involved financial payments (mortgage transfer vs cost of lumber and renovation supplies) and psychological adjustment (leaving the house and neighborhood vs inconvenience and dust of construction). Ultimately the household must weigh the costs versus the benefits in monetary, stress and other terms, for both improving and moving.

Even though moving to, and improving a house might seem to offer the worst of both worlds in terms of costs, nearly half of the

improvers in Seek's survey said they intended to make improvements at the time of purchase. Seventy percent of improvements were carried out in the first nine years. In conclusion, Seek stated that households preferred to improve rather than move if there was a choice. One of the implications was that to the extent that people reject the moving option, older, used housing was not being passed along since households were staying and making improvements. Thus the 'filtering' process may be retarded.

Jackson (1980) described the relationships between moving and what he called, extending (and Evenden refers to as expanding) within the context of the model of intra-urban mobility proposed by Brown and Moore (1971) and later modified by others (Morris and Winter 1975 and Michelson 1977). Data were created by a survey of movers and extenders conducted in 1979 in Perth, Australia. In his survey there were 209 households that intended to sell (a 55% response rate) and 368 intended expansions (a 72% response rate). He excluded those moving because of domestic or mortgage difficulties, job transfers and those moving from apartments.

Jackson's study dealt with three questions: 1. "Can potential movers and extenders be differentiated in terms of their present housing situations (internal and external forces as defined by Brown and Moore)?" (p. 209); 2. "If...[potential movers and extenders can be differentiated in terms of their present housing situations], are these differences reflected in their current level of housing satisfaction ('place utility' as defined by Brown and Moore)?" (p. 209-210); 3. "alternatively, were ... extenders potential movers who

revised their housing aspirations as a result of a frustrated search for other housing?" (p. 210).

In answer to the first question, seventeen variables representing both external and internal forces, were condensed into four significant findings: 1. the longer the household marriage, up to 25 years, the more likely it was that the house would be extended as an alternative to moving; 2. the fewer rooms a dwelling had the more likely it was to be extended; 3. the overseas born were more likely to move than were native Australians; 4. movers tended to move either in the first five years of marriage or after twenty-five years.

Jackson assumed that movers and extenders would have different levels of satisfaction. His second question tested this assumption. The answer to whether movers and extenders can be differentiated in terms of housing satisfaction was that half of the movers said they had suffered a recent decline in satisfaction while only 12 percent of the extenders experienced a recent decline in satisfaction.

In light of the differences between movers and extenders Jackson wondered whether extenders were frustrated movers. This seemed not to be the case and life cycle, Jackson suggested, seemed to be the key factor. Jackson indicated that there were at least four distinct groups of people and possibly a fifth, described below.

The first group, movers who did not consider extending, were usually a couple whose children had left and who were moving to a smaller place. The second group, movers who considered extending, were usually younger families with children under six years who moved to a distant suburb. The third group, extenders who never

considered moving, were in the middle life cycle with children over six years but living at home. They were well adjusted to, and like their houses and neighborhoods. The fourth group, extenders who considered moving, usually had a higher income and had a recent decline in housing satisfaction and were born in a different country. They found there was lack of suitable housing elsewhere and claimed it was cheaper to extend. They usually undertook the construction themselves.

A newly emerging fifth group were those who extended a newly bought house. Jackson found that these were usually professional people who purchased smaller houses located in high status suburbs. They were willing to endure the inconvenience of both moving and extending for potential capital gains and social status.

Jackson concluded that housing ambitions are largely conditioned by life cycle. However, he suggested that movers' and extenders' behavior is better viewed through longer term housing ambitions. He agreed with Finighan (1979) that rising housing expectations have paralleled the rising standard of living for most Western Australians. This would appear to be true for Canadians as well.

Evenden (1982, 1988) conducted his study with data representing the North Shore of Greater Vancouver, an area comprising three inner suburban municipalities: the City of North Vancouver and the Districts of North Vancouver and West Vancouver. His study comprised two major sections, a morphological part and a behavioral part. The morphological section used a 10 percent random sample (245 cases) of the building permits of house expansion

projects on the North Shore for the period of 1976 to 1980. He found that the mean number of new rooms added was 2.7 per project, and the mean number of existing rooms extended was 1.7 per project. Most often people added bedrooms and family rooms. In terms of spatial equivalents, he found that there was the equivalent of 636 average sized new houses built for the period 1976-1980 or 106 new houses per year representing one-fifth of all residential construction activity by area.

The behavioral part of the study involved sending out a questionnaire to 203 households, of which 48 percent returned the questionnaire relating to life cycle stages, household tenure, neighborhood characteristics and expansion decisions. Evenden found that a large number of people who expand their houses had children in elementary school (40%) and many had preschool children (21%) and secondary school children (21%). Household size was an average of 3.9 persons with the mean number of children being 1.5. The length of household tenure before expansion was 12 years and the time taken to plan and execute the expansion was about 31 months, or about two and one-half years.

III. SUMMARY

This literature review began by looking at the form of a city, the broad picture. The city may be divided into various components: the ground plan, land use and building fabric. Numerous combinations of these three components exist in the landscape and scientific investigation of them reveals patterns and trends.

The other section of the literature review is a review of the behavioral decision making model. There are three outcomes of the model: mobility/migration, in-situ adjustment or no action. Many studies have been done regarding mobility and these were reviewed with reference to the current thesis. Works on addition/expansion projects are less numerous but are more specific to this thesis, and were reviewed in greater detail.

Chapter 3

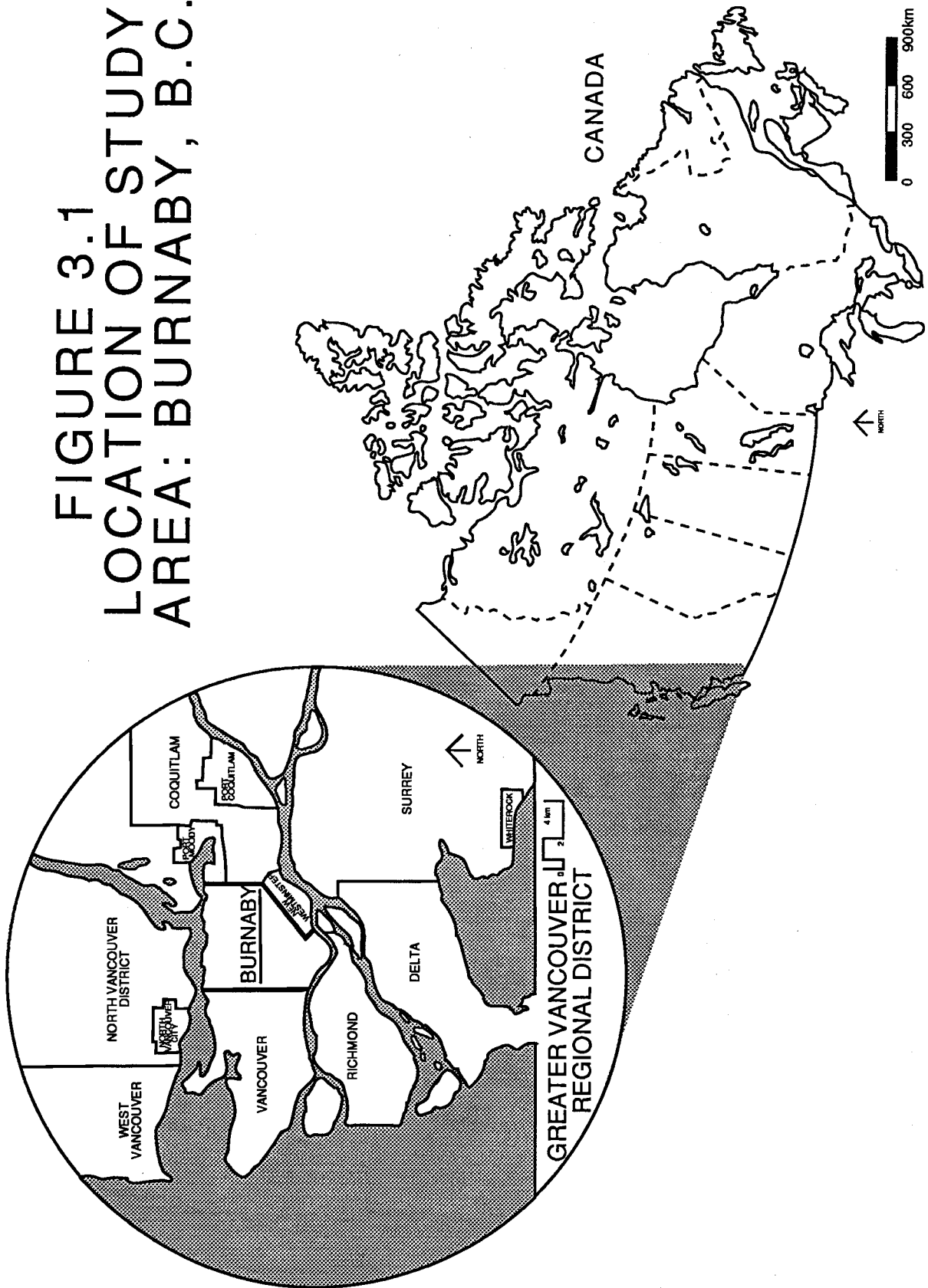
Geographic Development of Burnaby

Burnaby, British Columbia was chosen as the study area for this thesis (figure 3.1). It is located within the Greater Vancouver Regional District and surrounded by the City of Vancouver to the west, the City of New Westminster to the southeast, the municipality of Coquitlam to the east and the City of Port Moody to the northeast. To the north is Burrard Inlet and to the south the Fraser River. It is considered one of the inner suburbs of Vancouver and will be compared to other inner suburbs on the North Shore. The most prominent use of land in Burnaby is for residential buildings, most of them being single family dwellings.

Incorporated in 1892, Burnaby was one of the earliest municipalities to be incorporated in British Columbia. While municipal status gave Burnaby an identity, the municipality suffered from the lack of an internal spatial focus, a problem which persists to the present day. The problem has two principal features, namely, a fragmented physical geography so far as settlement possibilities are concerned, and an orientation of activity towards the nodes of Vancouver and New Westminster.

Overall, the physical landscape of Burnaby is one of hills, ridges and valleys. The northern half of the municipality is dominated by the Hastings ridge, an east-west ridge rising steeply from Burrard Inlet. Burnaby Mountain, the highest point in the municipality, is located in the northeast section. South of the Hastings ridge, the Central Valley traverses the municipality,

**FIGURE 3.1
LOCATION OF STUDY
AREA: BURNABY, B.C.**



accommodating Deer Lake and Burnaby Lake, as well as Still Creek and the Brunette River. This wide shallow valley has been the major transportation corridor, the site of railways and two provincial highways. South of the Central Valley, the land rises up to the Kingsway ridge, which traverses the south-central portion of the municipality. The final topographic feature is the Big Bend, a low lying alluvial area along the Fraser River.

The various topographic zones of the municipality relate in a general way to the pattern of development in the community. The ridges and their slopes are associated with higher density residential and commercial development, while the low lying areas, with their poorer foundation and drainage conditions, are largely associated with industrial, agricultural and recreational uses. Moreover, they were developed later in the municipality's history (Official Community Plan, 1987).

For the first 50 years of its existence, Burnaby was dominated by its location between the expanding urban centers of Vancouver and New Westminister. As a transportation corridor between Vancouver and New Westminister and later as a rural agricultural area supplying the nearby markets, it has had the reputation of being a place to pass through, further contributing to the problem of identity. But it has gradually forged an identity through uniting and linking its early growth areas, adjacent to New Westminister, along the B. C. Electric Railway and Kingsway alignments, and along East Hastings Street in the north. In the 1950s and 60s an intentional focus was developed at the interchange of Highway 401 and Sperling Avenue with the establishment of the city hall in that location,

away from the earlier location of Edmonds and Kingsway. The municipal hall now anchors the institutional center of Burnaby, surrounded by the art gallery, James Cowan theatre, Heritage Village, Burnaby Central High School, the courts and R. C. M. P., sports complex, a business complex and, more prosaically, the regional bus depot.

A brief overview will sketch development through four periods. These may be characterized as the pioneering years (1858-1900), growth and stabilization (1901-1920), diversification (1921-1945), and suburbanization (1946-1990).

I. 1858-1900 THE PIONEERING YEARS

The early developments of Burnaby have been intimately bound to the events and development of the two adjacent cities, Vancouver and New Westminster. When the first pioneers arrived in the Lower Mainland and the survey crew from England, the Royal Engineers, set about laying out the streets of New Westminster in 1860, Burnaby was still a dense forested wilderness. Early accounts of the area point to the abundant wildlife and teeming streams.

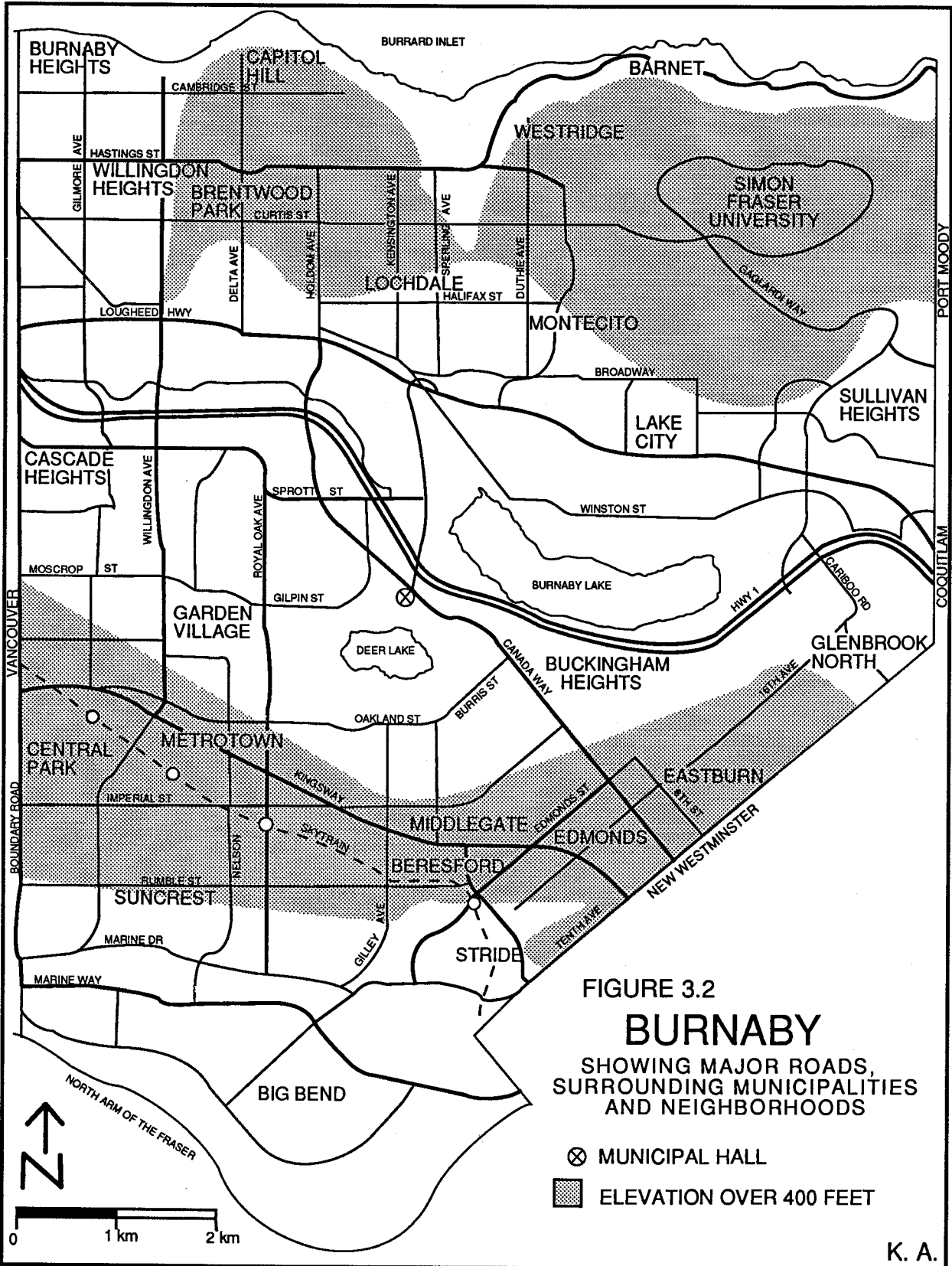
Green (1947:144) states that "beautiful Burnaby owes much of its loveliness to the attractive Burnaby Lake, the largest lake within its borders. It was so named in early midsummer of 1859, and so attractive was it that a pleasure path was cut to its shores from the embryo city of New Westminster, through the almost impenetrable jungle of forest undergrowth beneath towering trees from the little clearing beside the Fraser." Within two months of arrival at New Westminster, in May 1859, Colonel Moody, of the Royal Engineers,

decided to reside at the lake. Thus the character of south Burnaby was established early as a place developed out of but away from New Westminster.

A slow trickle of pioneers came to Burnaby during the Klondike Gold Rush of the 1860s and sporadic development occurred along with the extension of the Canadian Pacific Railway (CPR) line from the original terminus of Port Moody to Vancouver in 1887, through the area of north Burnaby. South Burnaby developed around the interurban single track line, built in a NW-SE alignment, along the Kingsway ridge between New Westminster and Vancouver. After the inaugural run of the train in October of 1891, land along the route was subdivided and sold.

Burnaby was incorporated with a population of about 200 people. Most of the pioneers lived in the communities of Eastburn, Edmonds, Deer Lake, and Central Park. Figure 3.2 shows these historic communities as well as present day neighborhoods. The main employment at this time was in agriculture and logging. Incorporation proved beneficial to the community because taxes could be collected for roads and services. The earliest schools were Douglas Road (1894) and, two years later, Central Park (West Burnaby School). Before the turn of the century, Burnaby boasted its first park (Central Park), with a store, post office and church in this area. The municipal hall was built at Edmonds and Kingsway.

Most of the settlement to this point had been in the southern part of Burnaby. This would soon change as the Barnet Mill, opened in 1899 on the shore of Burrard Inlet, in the extreme northeast corner of the municipality, would initiate development in North Burnaby.



II. 1901-1920 GROWTH AND STABILIZATION

By 1900, Burnaby, with a population of approximately 400, depended mostly on agriculture. Many people owned small to medium-sized market gardens and the produce was taken by tram or wagon to Vancouver and New Westminster. Both settlement and industry were enhanced by the construction of the Great Northern Railway through central Burnaby in 1904 (just north of Burnaby Lake).

Real estate developers soon realized the potential of Burnaby lands located near the boundaries of both Vancouver and New Westminster. In 1909 developers began to subdivide large tracts of land. With the completion of the Hastings Tram line (to Holdom) new subdivisions such as Vancouver Heights (now referred to as Burnaby Heights) and Capitol Hill sprang up. The municipality experienced dramatic population increases about this time. In 1908 the population was about 800. By 1910 this figure had more than quadrupled to 3500 people. Two years later Burnaby's population was 15,000 (Sone 1987). Figure 3.3 shows the growth of the municipality's population from 1892 to 1986.

The municipal government continued to spend money on road building, sidewalks, water works, sewers and even a new municipal hall. Six more schools were built to keep pace with development despite a mild recession from 1912 to 1914.

Growth in the municipality ended abruptly in 1914 with the outbreak of war. About 1,200 of Burnaby's men went overseas to represent this nation. Ninety did not return (Sone 1987) and the years immediately after the war were difficult as residents coped

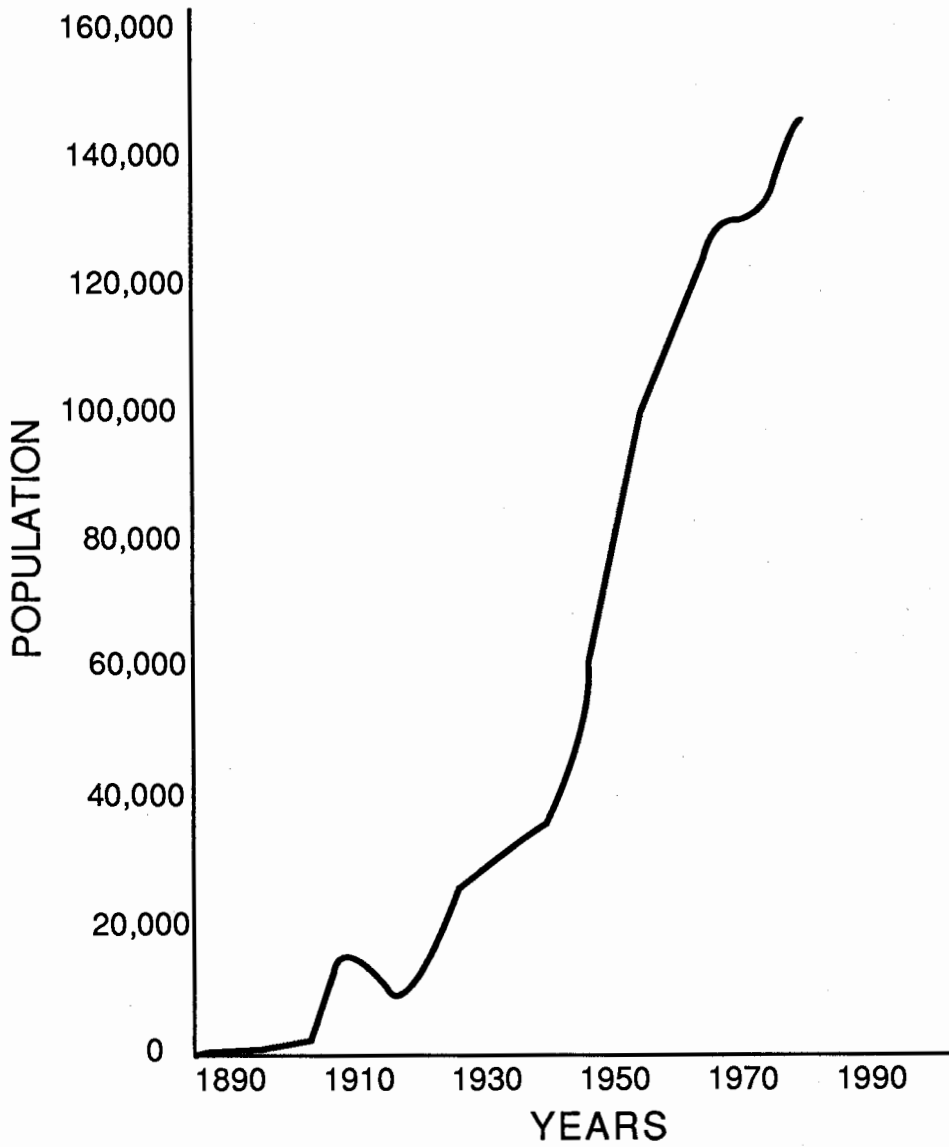


FIGURE 3.3
POPULATION GROWTH OF BURNABY
1892-1986

with war losses and financial hardship.

III. 1921-1945 DIVERSIFICATION

Returning soldiers and migrants were attracted to Burnaby by cheap land and reasonable taxes, so that by 1921 the population had climbed back up to 13,000. After the war, agriculture became more diversified. As well as growing vegetables for the nearby urban markets, farmers engaged in dairy production, chicken and hog raising and flower growing. Industry also diversified. Logging became less important as local logs ran out. New industries such as oil refining began to locate in Burnaby (on the north shore). Commercial shopping districts developed along Kingsway and Hastings Street.

Development in Burnaby during the 1920s was clustered in the south and north, areas separated by Burnaby Lake and associated swamps. North-south routes that were in existence at this time were North Road (built well before 1903), Boundary Road from Kingsway to Curtis (before 1903), Douglas Road (before 1903), Sperling Road (1905), Royal Oak (1904-1913), and Cariboo (1912) although they were all in poor condition. Upgrading of these north-south routes proceeded during the 1920s and by demand from the new residents (Burnaby Archives and Council Minute Books). But it took years to establish easy road communications between north and south.

Following the 1929 stock market crash, Burnaby, as well as the rest of the world, was caught up in the Great Depression. In December of 1932, the municipality defaulted on its interest on

bonds, and a commissioner was appointed by the provincial government to govern the municipality (Green 1947). The population by this time was 24,000.

Arrangements were made to pay interest to bond holders and, by 1940, the municipality was out of debt. During World War II a measure of prosperity returned. As the war ended, the 35,000 residents of Burnaby found themselves with housing shortages and labour turmoil. Restructuring of the economy occurred as taxes, diverted to military ventures in the previous five years, were invested in the local infrastructure.

IV. 1946-1990 SUBURBANIZATION

The suburbanization of Burnaby started in its modern form, and at a rapid pace, after World War II. Many new households formed, others moved in, and all these families were looking for places to live. One subdivision created during this time was Willingdon Heights. Financed by Central Mortgage and Housing Corporation, and built by Whitsell Construction and subcontractors, it contained 550 homes with streets, sewers, sidewalks and a church (Green 1947). Other housing developments settled the west slopes of Burnaby Mountain (Westridge) and the new subdivisions of Suncrest and Cascade Heights were established. In 1940 the South Burnaby High School was built and five years later the North Burnaby High School was completed. By 1952 Burnaby boasted a fire department, 100 bed hospital, tax based garbage collection and bus service. The population stood at 61,000.

A number of apartment buildings were built during the 1950s and 1960s, and Burnaby became increasingly urban in addition to suburban. The trend to apartment construction has increased and, within core areas of Burnaby, accounted for approximately 70 percent of its dwelling unit increase between 1961 and 1981 (Official Community Plan 1987).

A. Population

During the 1970s and 1980s, the growth rate of the municipality slowed down. Table 3.1 shows the population data for Burnaby for the last twenty-five years.

Census Year	Population*	Average Annual Growth Rate for the period (%)	Average Household Size*	Number of Dwelling Units*	Increase in Number of Dwelling Units for the period (%)
1951	58,400				
1951-1961	100,157	7.2	3.6	28,200	
1961-1971	125,665	2.6	3.3	38,655	27
1971-1976	131,600	0.94	2.8	46,010	19
1976-1981	136,500	0.75	2.6	52,615	14
1981-1986	145,161	1.27	2.5	58,295	11

Table 3.1 Population and Household Characteristics of Burnaby

* last census year shown in row

Source: Statistics Canada

Between 1981 and 1986 the annual growth rate for the municipality had risen measurably to 1.27 from 0.75, to give Burnaby a population of 145,161. Although the average annual growth rate has increased recently, the average household size has declined,

from 3.6 persons in 1961 to 2.5 persons in 1986. Dwelling units were also being built at a declining rate. During the period from 1971 to 1976, the number of dwelling units increased by nineteen percent, while from 1976 to 1981 they increased by 14 percent and from 1981 to 1986 by only 11 percent. In 1961, 95 percent of the 28,200 housing units in Burnaby were single or two family units (26,790). In 1981, 59 percent of the 52,615 housing units in Burnaby were single or two family units (31,043). However, apartment units increased by 38 percent (Official Community Plan, 1987). Figure 3.4 shows the spatial variation among census tracts for the percentage of single family dwellings, the percentage of owned dwellings, the percentage of the population over five which did not move since the last census year (1981) and, the percentage of census families with husband, wife and children at home.

For the most part, those census tracts with a high percentage of single family dwellings also have a high ownership percentage. Furthermore, these tracts also had a medium to high percentage of the population which had not moved since the last census year. On average, about half of the census families had husband, wife and children at home. (Tables from which the maps were made, other 1986 census data and a map showing the numbering of the census tracts are given in Appendix C.) Table 3.2 summarizes some household census data as well as survey data for the study area.

Burnaby has experienced changes in the age composition of the municipality as the baby boom generation makes its way through the age pyramid. Between 1961 and 1981, the size of the under twenty age group decreased by 14 percent, the 20-34 age group increased by

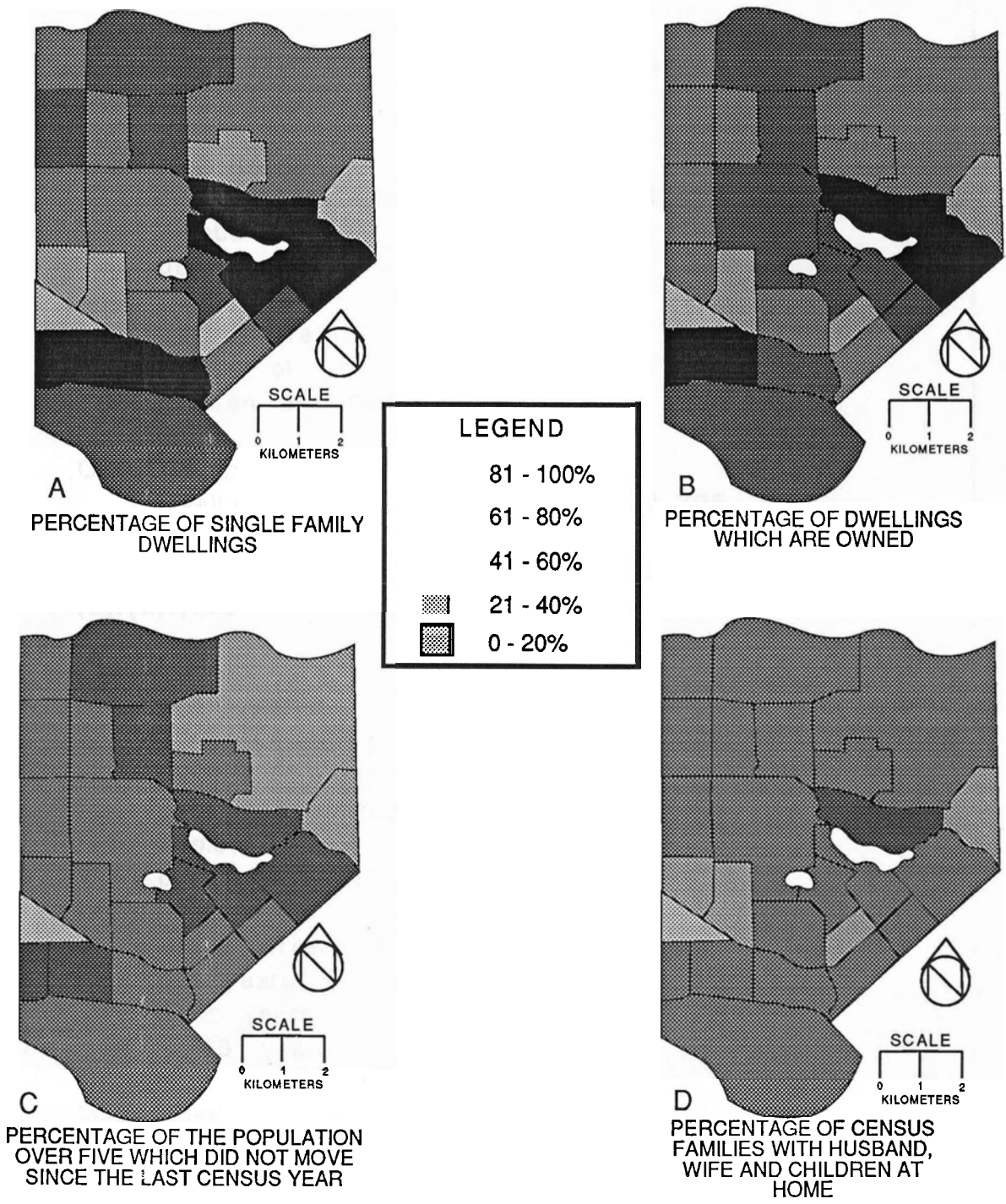


FIGURE 3.4 BURNABY: SOCIO-DEMOGRAPHIC CHARACTERISTICS BY CENSUS TRACT

SOURCE: STATISTICS CANADA, 1986

K. A.

A. Census Data

Population	145,161
Population % change 1981-1986	6.3%
Population in private households	141,870
Mean number of persons/household	2.4
Mean number of persons/family	2.9
Mean number of children at home	1.0
Occupied private dwellings (a)	58,295
Occupied single detached dwellings (b)	26,845
(b)/(a)X100	46

B. Survey Data

Mean number of persons/household	3.75
Mean number of adults/household	2.4
Mean number of children/household	1.2
Children by age (as a percent of total)	
0-5 years	29
6-12 years	38
13-18 years	33
Mean ages of adults	
M	47
F	44

Table 3.2 Populations, households and dwellings, 1986

Sources: A. Census of Canada, 1986

B. Burnaby - Author's survey 1980-1985

105 percent, the 35-64 age group increased by 41 percent and the over 65 age group increased by 93 percent. The decrease in the number of children has led to declining school enrollments and, since 1976, Burnaby has closed eight schools. Moreover there are fewer children and fewer households containing children. In 1971, 40 percent of all households had no children present but by 1981, this proportion had risen to 62 percent (Official Community Plan, 1987).

Burnaby's labour force rose from 52,745 in 1971 to 72,660 in 1981. However, Burnaby's total share of the regional employed labour force declined slightly (11.98 to 11.24). There was an increase in jobs in Burnaby for this same period. Burnaby gained from a net increase in inter-municipal journey to work movements since approximately 6,600 more people came from other parts of the region to work in Burnaby than people left Burnaby to work outside the municipality.

The central position of the municipality, in relation to the Greater Vancouver Regional District should become more important as time goes on. Since a lot of traffic must pass through Burnaby to get to downtown Vancouver, from outlying areas, the 'commute' will become increasingly time consuming and many workers and businesses will begin to locate elsewhere. Burnaby with its central location on the Burrard Peninsula will be one of the business relocation destinations.

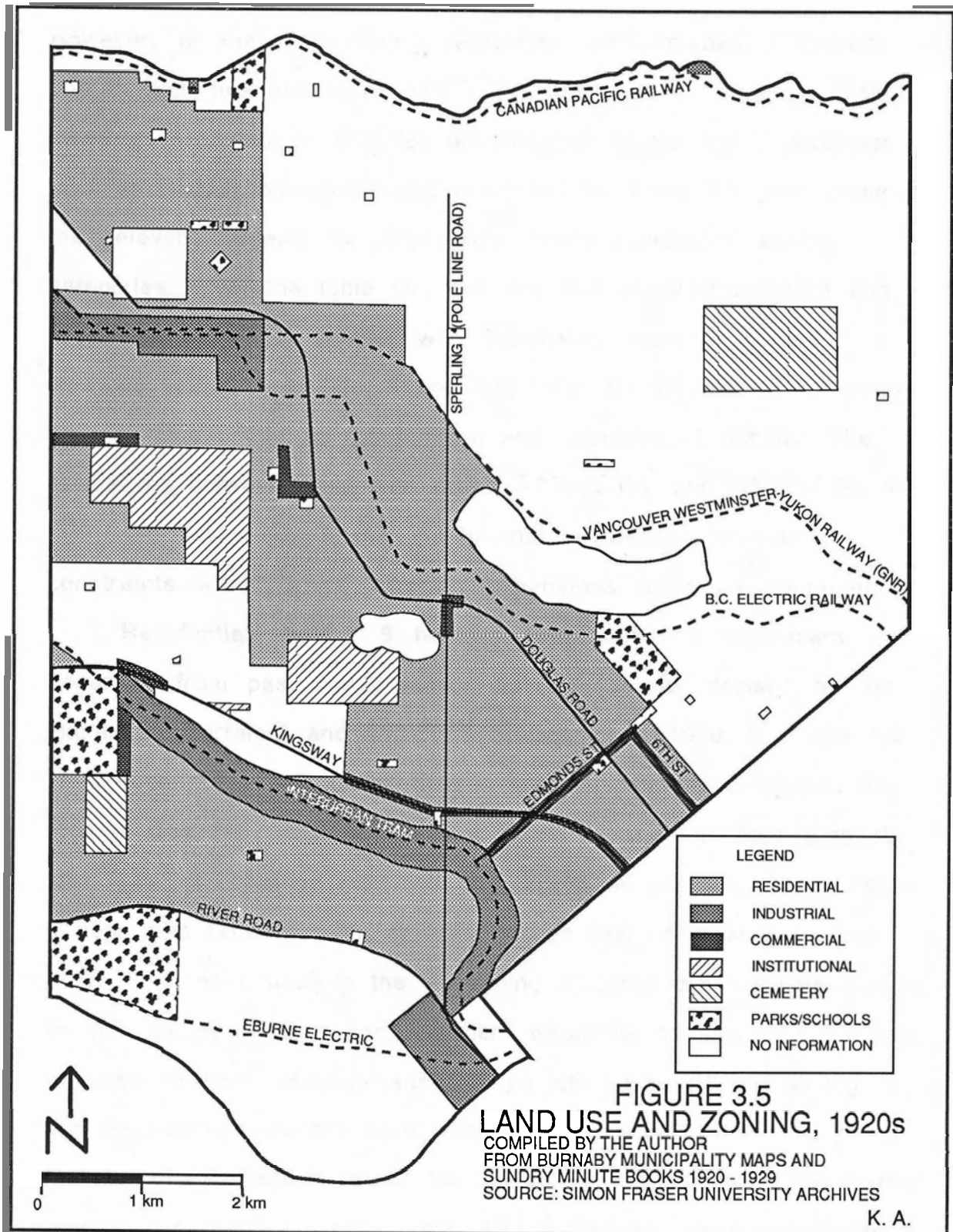
B. Development planning and zoning

According to the Official Community Plan, "Burnaby, in recognition of its physiography and historical development, has

elected to organize its residential areas around four general geographic sectors, each of which has a town center: Northwest-Brentwood, Northeast- Lougheed, Southwest- Metrotown, and Southeast- Edmonds." Metrotown is also the Regional Town Center for the municipality. Residents have expressed the opinion that the low density residential areas are one of Burnaby's greatest strengths and should be protected. Accordingly the maintenance of the suburban low density single family dwelling and two family dwelling districts has become an important structuring component in Burnaby's land use and zoning framework.

The issue of zoning has become significantly more complex within Burnaby over the years. Early zoning data show some beginnings towards separation of land uses: residential, industrial and commercial. A composite map constructed by the author from archival documents shows the general pattern of land use and zoning in effect within Burnaby in the 1920s (figure 3.5). But the first official zoning by-law was not passed until in 1965. By that time the issues of land use organization had become complex, as shown by the development of 27 zoning categories. As the municipality has continued to develop, the issues have become even more complex and there are in 1988 some 42 different categories (Burnaby Zoning Bylaw 1965, amended to Jan 1988). The need to simplify the regulations is illustrated by a new zoning category, passed in 1972, called the Comprehensive Development Zone (CD). This allows combinations of existing zoning categories.

So far as residential development is concerned, the zoning by-law contains nine residential districts, each with different



regulations which apply to such things as setbacks and lot areas. However, of the nine zoning categories, only residential districts one through five and nine (R1-R5, R9) apply solely to single family dwellings. The others (R6-R8) are for non single family dwellings such as mobile home parks and group homes. Table 3.3 gives some of the relevant by-laws for the single family residential zoning categories. From the table one can see that required setbacks and lot areas generally get smaller with increasing category number. However, certain regulations are the same for all categories, such as maximum height of the building and development density. The differences between residential zones R2 and R4, and R3 and R5 are the uses permitted. These institutional regulations provide the constraints within which dwelling expansions must be contained.

Residential District 9 however, represents a significant departure from past single family districts. It was devised by the planning department and approved by council in 1980. It allows the construction of 2 1/2 storey houses provided that each lot has an area of less than 4000 square feet and a width of not less than 40 feet. The lot coverage may still not exceed 40 percent, that is, have a floor area ratio of 0.60, or 2852 square feet of gross floor area. There were no houses in the R9 zoning category drawn in the sample for this study, probably because there would be no space on the lots to make additions. Most houses built on lots zoned R9 are as big as the development density by-law allows-2852 square feet. To get a feel for the average sizes of houses within the sample, 2852 square feet is considerably smaller than 12 percent of the pre-expansion houses and 32 percent of the post-expansion houses. Such a small lot

	Lot Area	Lot Width	Development Density*	Front Yard Setback	Side Yard Setback	Rear Yard Setback
R1	890 m ² (9580 sq ft)	24.5 m (80 ft)	590 m ² (6350 sq ft) of gross floor area	9 m (30 ft)	2.4 m (8 ft) 4.5 m corner lot	9 m (30 ft)
R2	670 m ² (7212 sq ft)	18.5 m (61 ft)	440 m ² (4736 sq ft) of gross floor area	7.5 m (25 ft)	1.5 m (4 ft) 3.5 m corner lot	9 m (30 ft)
R3	560 m ² (6028 sq ft)	15 m (49 ft)	370 m ² (3982 sq ft) of gross floor area	6 m (20 ft)	1.5 m (4 ft) 3 m corner lot	7.5 m (25 ft)
R4	670 m ² (7212 sq ft)	18.5 m (61 ft)	440 m ² (4736 sq ft) of gross floor area	7.5 m (25 ft)	1.5 m (4 ft) 3.5 m corner lot	9 m (30 ft)
R5	560 m ² (6028 sq ft)	15 m (49 ft)	370 m ² (3982 sq ft) of gross floor area	6 m (20 ft)	1.5 m (4 ft) 3 m corner lot	7.5 m (25 ft)
R9	372 m ² (4000 sq ft)	12.2 m (40 ft)	265 m ² (2852 sq ft) of gross floor area	6 m (20 ft)	1.2 m (4 ft) 1.8 m corner lot	7.5 m (25 ft)

Table 3.3 Zoning Bylaws for Various Residential Zoning Categories

* Lot coverage may not exceed 40% for all residential categories. This translates into different floor area maxima, because lot sizes vary.

Source: Burnaby Zoning Bylaw 1965.

would limit households from making additions to their houses. Consequently, there may be a trend towards fewer additions as lot sizes get smaller. In contrast, there were 12 post-expansion houses in the sample for this study which were bigger than 3982 square feet (the maximum size limit for R3 and R5). Most were located within the size limit of the R4 zone which allows houses up to 4736 square feet. The trend seems to be towards larger houses on smaller

lots, a trend supported by the activity of expanding already existing dwellings.

The houses sampled in this study were located primarily in residential zoning categories one through five (R1-R5), with a few within the Comprehensive Development Zone (CD). Figure 3.6 shows the location of these zoning districts. From this map and by referring to table 3.4 one can see that over 60 per cent of the houses sampled were built on lots zoned R5 and R2 which contained 63 percent of the residential land area. These two zoning categories are shown in the darker shades on figure 3.6. There is less land zoned R1 and R3, only 17 percent, which contained 14 percent of the houses sampled. Since there is less land in these two categories, they are shown in lighter shades in figure 3.6. The close correspondence of sample areas and areas by zoning category spatially confirms the even spread of the sample across residential areas (table 3.4).

There are many factors which affect a household living in Burnaby. The forces which shape this community come from past decisions made as well as from the physical landscape. Burnaby will continue to develop residential, commercial and industrial land uses through infill and redevelopment of existing uses. Each change will affect the way the households view their municipality, community, neighborhood and dwelling. The decision of a household to move or stay, and perhaps to build, gives some indication of the feelings within the population of how spatially to adjust their developing circumstances. Exactly what households do with their houses, should they elect to stay rather than move, is the topic of the next chapter.

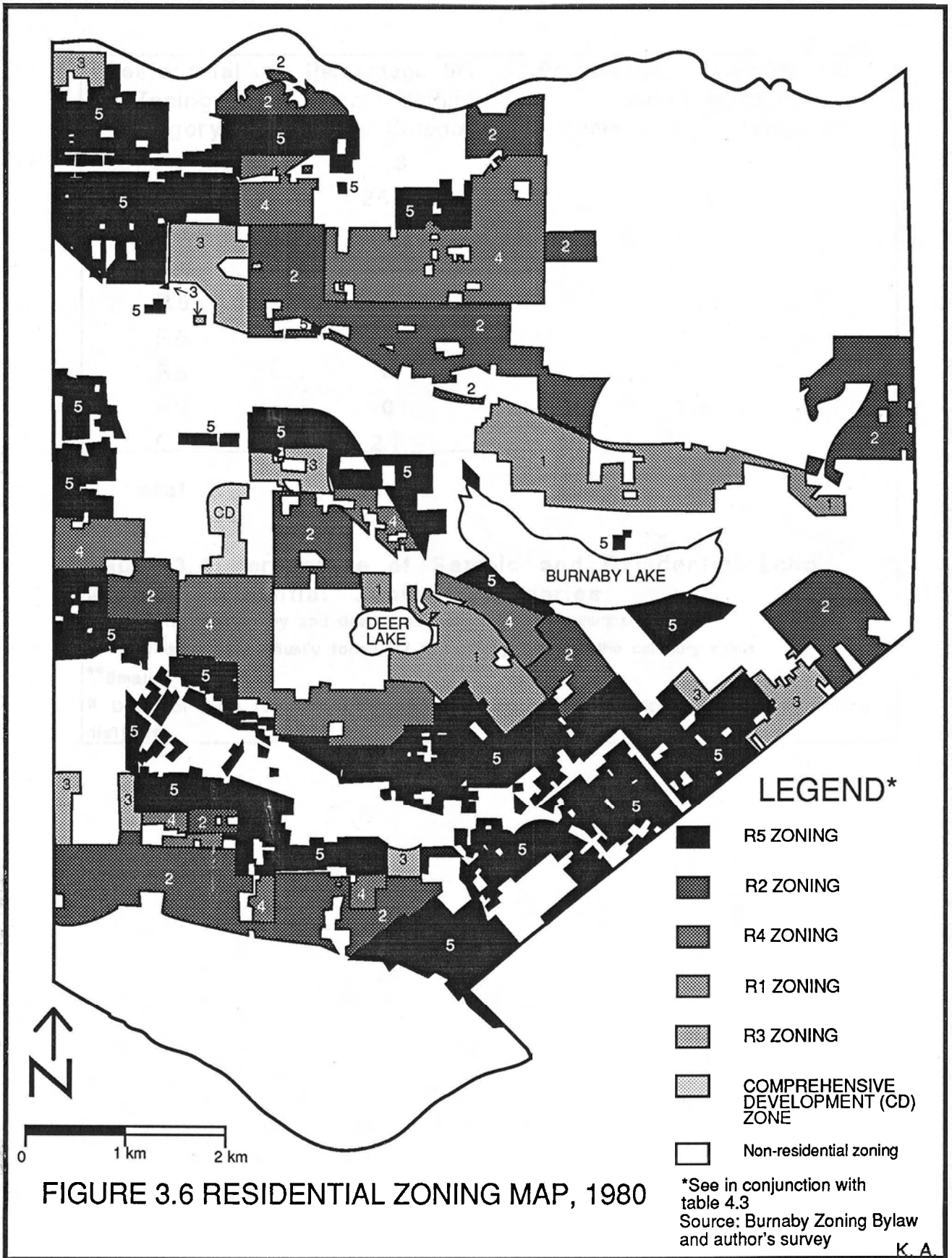


FIGURE 3.6 RESIDENTIAL ZONING MAP, 1980

*See in conjunction with table 4.3
 Source: Burnaby Zoning Bylaw and author's survey

K. A.

Residential Zoning Category*	Percentage of Sample Within Zoning Category	Percentage of Residential Land in Burnaby Within Zoning Category
R1	7.3	9.8
R2	26.7	27.9
R3	6.4	7.1
R4	19.4	17.2
R5	37.0	35.8
R6	0	**
R8	0	**
R9	0	1.6
CD	2.1	0.6
Total	98.9#	100

Table 3.4 Percentage of Sample and Residential Land within Residential Zoning Categories

Source: Author's survey and data base from Burnaby Municipal Hall.

* There is no land actually zoned R7 in Burnaby although the category exists.

** Smaller than 0.05.

Does not equal 100% since three houses were located in agricultural and manufacturing districts.

Chapter 4

The Morphological Characteristics of Expansions

I. METHODS

The methods used in obtaining information for this study may be divided into two types. Information was obtained from building permits and from questionnaires. Results are divided according to life cycle stages and, where applicable, compared to a precedent study conducted on the North Shore.

A. Building Permits

This section describes the physical characteristics of house expansion. Data for this analysis were obtained from public files maintained by the Burnaby Building Department. A "basic list" of 1,226 permits were numbered in sequence, and a 20 per cent random sample was drawn, for a total sample size of 245.

The total number of permits, (including renovations, new buildings and demolitions), the permits issued for additions only, and the percentage of building permits that were additions for each year, is given in table 4.1. The relationship of addition permits to general permits issued shows that they follow the same basic pattern. Thus additions to existing dwellings may be seen to have been especially important during the early part of the study period and indeed, they maintained their importance throughout.

The information for each house was recorded (see appendix A for sample forms) and was later transferred to a master spreadsheet document. Permits contain the name and address of the

Year	Total Number of Permits Issued*	Total Number of Addition Permits	Percentage of Addition Permits within Each Year's Total Building Permits
1980	998	218	22
1981	756	233	31
1982	657	206	31
1983	719	233	32
1984	657	180	27
1985	617	156	25

Table 4.1 The Number of Addition Permits and Total Permits

* Permits for renovations, additions, new buildings and demolitions
Source: Summary files at the Burnaby Municipal Hall

permit holder, the legal description of the property, the dimensions of the addition, (usually in feet, although six additions in 1986 used meters), the intended use of rooms and the estimated cost of the addition. In order to obtain a permit, the builder or owner must submit a drawing of the expansion project and have it pass inspection. These drawings are essential for extracting information on the pre-expansion areas of houses and the areas of additions. However, the quality of the drawings varies significantly, since the permit holder is not required to provide professionally prepared blueprints. Some expansion projects, usually the smaller ones, include only rough drawings of the space to be added; not the rest of the house.

Other contextual information such as lot zoning, lot size, and age of house were recorded to round out the complete record of each addition project insofar as it could be determined from the records.

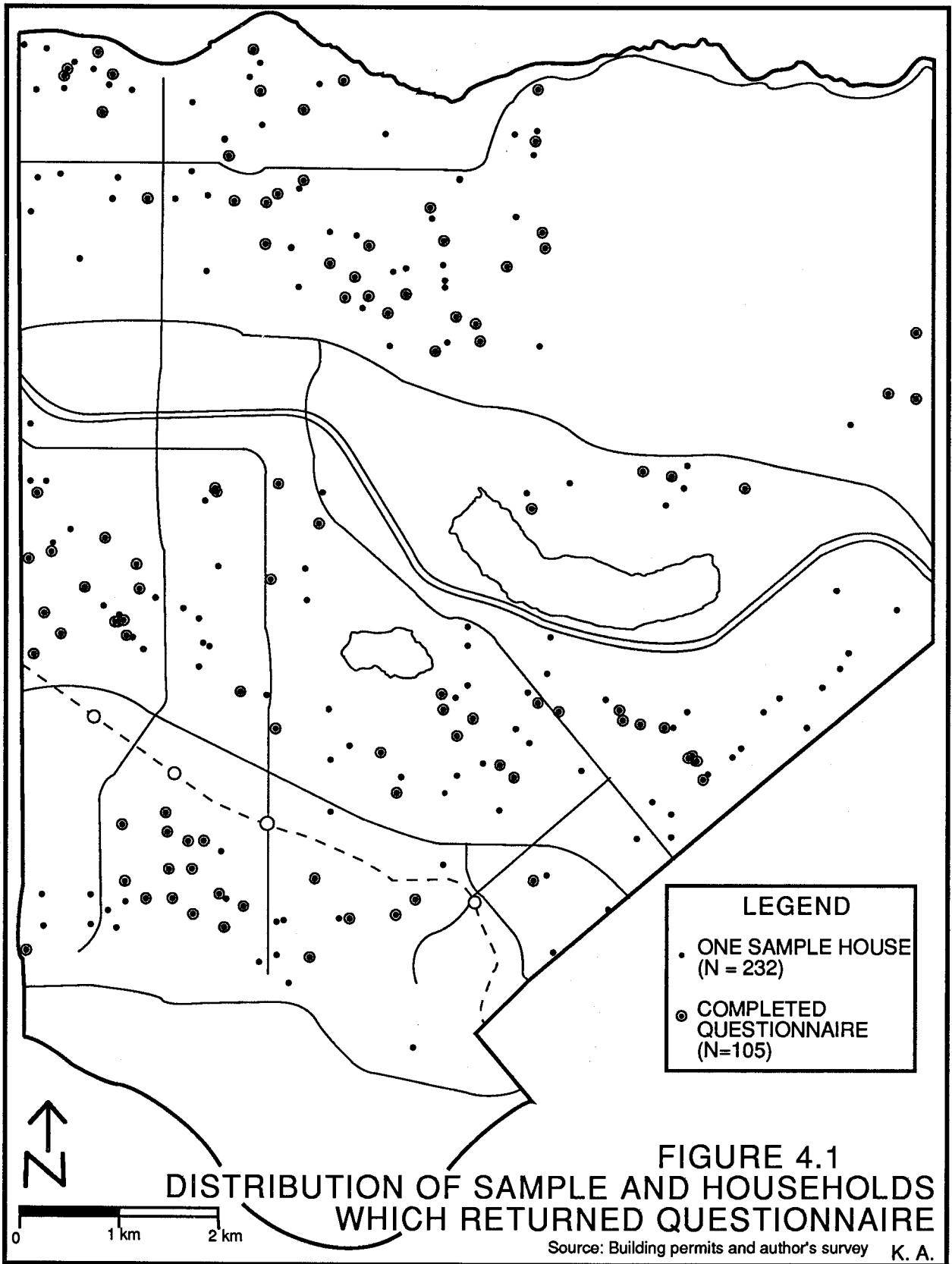
A sketch of the house with the expansion project highlighted was included on the back of each individual study record sheet for identification and descriptive purposes. In some cases, however, building data were incomplete and blueprints were missing. Thus the final sample included only the 232 building permits which contained complete records of the house. Figure 4.1 shows the distribution of the sample for completed building permits. The sample is spread evenly throughout all residential areas of Burnaby, as indicated in table 3.4.

2. Questionnaire

A questionnaire was devised based on Evenden's North Shore study and other sources (example in appendix A). The questionnaire package contained a self-addressed, stamped envelope.

Questionnaires were mailed to all sample households (232) on November 1, 1989. On November 27, 1989 a further 134 reminder letters, including another copy of the questionnaire, were sent to those households which had not yet responded. Figure 4.2 shows the pattern of responses. Over the two mailings, a total of 105 useable questionnaires was returned, for a response rate of 45 per cent.

The questionnaire was divided into four major sections. The first dealt with house characteristics and details about the expansion project. Secondly, it contained questions about family and household characteristics, such as the number of people in the house and their ages. The third section dealt with household tenure and journey to work. The fourth section contained questions about



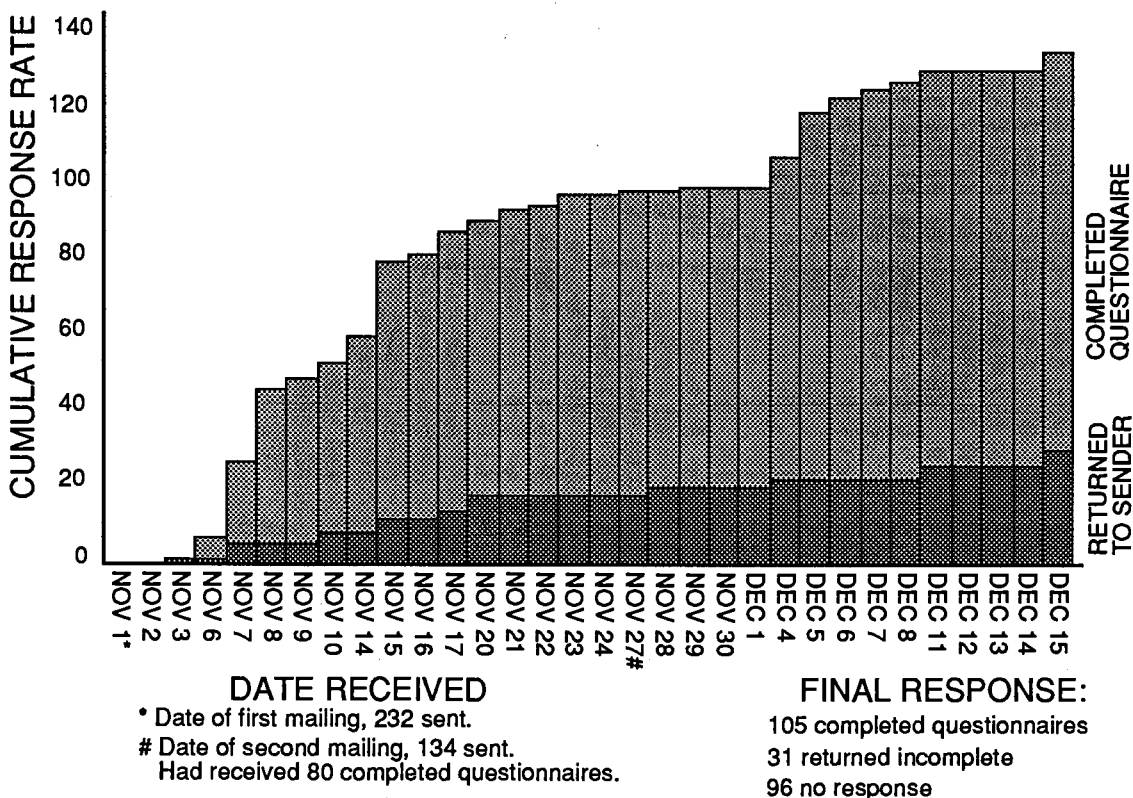


FIGURE 4.2 RESPONSE TO MAILED QUESTIONNAIRE SURVEY: CUMULATIVE FREQUENCY

expansion decisions and project details. It treated such aspects as why moving was rejected and how long the project took.

The answers from the returned questionnaires were coded and tabulated. The spatial distribution of households which returned the questionnaire is shown, in relation to the total sample, in figure 4.1. Three households removed the code by which location was recorded, and are thus not shown on the map.

Households which answered the questionnaire were grouped according to life cycle stage using the answers given in the section

on the decade of adults' birth and the years of children's birth. Stages in the family life cycle used here were suggested by Duvall (1967), and have been applied to housing expansion studies in Australia (McLeod and Ellis 1982), and Vancouver (Evenden 1982,1988). Duvall's classification is used because it emphasizes stages of child development, and it is thought that the spatial needs of the family are closely tied to the maturation stage of the oldest child. This is based on the argument that the space needs for the oldest child 'set the stage' for younger siblings, in that the parents project the future needs of space for younger siblings from the experience of providing for the needs of the oldest child. Table 4.2 lists the stages and their description as well as the number of households in each stage from this study.

Stage	Description	Percent in Each Stage: Burnaby Data
1.	single, age of head less than 35 years, no children.	0
2.	couple, age of head less than 35 years, no children.	7
3.	couple, age of eldest child less than 6 years.	15
4.	couple, age of eldest child between 6 and 12 years.	20
5.	couple, age of eldest child between 13 and 17 years.	18
6.	couple, age of head 35 years or above, no children.	37
7.	single, age of head 35 years or above, no children.	3
8.	single parent family.	0
		100%(95)

Table 4.2 Life-Cycle Stages (after Duvall) with the Percent within Each Stage

Only stages 2-7 were represented among the cases sampled. The total number of respondents used in this section was 95; less than the 105 questionnaires received, since respondents who did not indicate the decade of adult's birth or the years of children's births could not be classified into a life cycle stage.

The relationship between life cycle and the propensity to expand dwellings may be examined at a general level by combining stages 2-5 and 6-7 into two basic groups. Group one (stages 2-5) has children under 18 years of age or is probably expecting to have children soon; therefore this group will be referred to as the group 'with children'. Group two (stages 6 & 7) has the eldest child over 18 years of age, or adult children or no children. For the purposes of this study those households will be referred to as having 'no children'. By this scheme, fifty-seven households (60%) had children and 38 households (40%) had no children.

C. North Shore

A study done by Evenden (1982, 1988) on the North Shore of Vancouver is referred to in this chapter and the following chapter for comparative purposes. That study involved the three inner suburban municipalities of North Vancouver City, North Vancouver District and West Vancouver District. Collectively they are similar to Burnaby in population size, housing characteristics and inner suburban status. The data were taken from the time period 1975-1980, just ahead of the time frame for the present study, 1980-1985.

D. Rationale Behind Variables

The variables used in the morphological part of the study focus on the physical aspects of the house. Enquiry was made into aspect and orientation of the addition, to focus on the relationship to cardinal directions and sun factors. The actual space added was then analyzed within frameworks; the amount of space added, aggregate space, the partitioning of the space and the function of the space. It was thought that each household would use the space differently, although patterns may begin to emerge by grouping households into life cycle stages.

In the behavioral part of the study, variables focussed on the households. The number of persons in the house and their ages were thought to have some bearing on the need to expand the house. Previous household location and journey to work characteristics were studied as these variables have an impact on moving or staying decisions. Enquiry was made into the decisions leading up to the expansion project as well as involvement along the way to provide insight into the addition itself.

II. RESULTS

This section describes the morphological characteristics of expansions. The first section is a discussion of house site characteristics, referring specifically to the external directional relationships of expansions with cardinal directions or house orientation and position on the lot. Results show that additions are poorly correlated with cardinal directions but strongly related to zoning bylaws, pre-existing house shapes, lot shapes and sizes.

Aggregate space, treated in the second section, summarizes the amounts of space added. A spatial distribution of the largest and smallest houses and additions is illustrated in this section. The third and fourth sections focus on how space was utilized within a house. Projects were differentiated between those adding rooms and those extending existing rooms. The fourth section analyzes the function of the added space.

1. House and Expansion Site

Aspect, following Evenden's definition, is the relationship of the addition to cardinal directions i.e. in which direction does the expansion protrude from the pre-existing dwelling. Some expansions had more than one component, on different sides of the house, and in such cases more than one entry was made in the record. In other cases, notably those in which full basements and full second storeys were constructed, all directions were implied but no directions could be clearly identified in the expansion. No notations regarding aspect were made in such cases.

Based on a traditional idea in northern hemisphere settlement geography, and on the field observation that some expansions emphasize window and deck areas on the south and west sides, it was thought that there would be significant trends towards additions being built on the south and west faces of the house to take advantage of the sun. Data on aspect of expansions is summarized in tabular and diagrammatic form in figure 4.3. This figure shows a balance between the cardinal directions (N, S, E, W) in both Burnaby and the North Shore. In Burnaby, the directions with

the most additions were to the north (25%) and to the south (23%). East and west directions also seem to balance with both having 14 percent of additions. Since this did not reveal any relationship with the sunny side of the house, it was thought that perhaps corners and sides grouped together would show a relationship. Thus in part A of figure 4.5 the totals for three adjacent values centered on cardinal points are grouped together. For example, the total given under the "north" column (75 additions) is actually made up of additions which were built to the northwest, north and northeast ($16+50+9=75$). Of the 252 additions, this "north group" made up 30 percent of the additions. The percentages from the columns above do not add to the columns in part A because overlap occurs between categories. That is, the "east group" uses additions listed as northeast, east and southeast. For section A, there seems to be a slight tendency for additions to be built to the north of the house (30%) although the south side is prominent (28%). Part B of figure 4.5 uses the same procedure as part A except this time centering the values on diagonal points. This reveals a very even balance between the diagonal points. Part C shows the results of part A in diagrammatic form. The width of the line is proportional to the percentage size.

There are at least two explanations for the balance of directions. The first explanation relates to the aspect of original house on the lot. The direction of building additions is constrained by the siting of the house on the lot. Due to the street alignment of many areas in Burnaby, most houses face N-S-E-W already (as opposed to NW, NE, SW, or SE). Thus the simple additions to the side or back of a house would continue this pattern. In this way aspect

	N	NE	E	SE	S	SW	W	NW	TOTAL
Bby*	50(25)	9(4)	28(14)	11(5)	47(23)	13(6)	29(14)	16(8)	203(99)
N. S.	42(18)	22(9)	24(10)	25(11)	41(18)	25(10)	30(13)	25(10)	234(99)

(A) totals for three adjacent values centered on cardinal points.

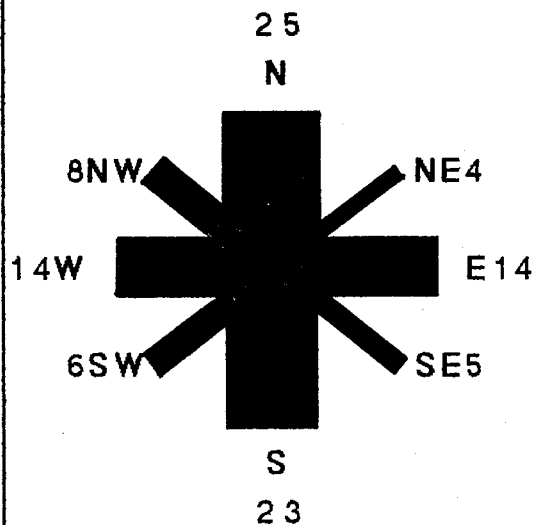
Bby	75(30)	48(19)	71(28)	58(23)	252(100)
N. S.	89(27)	71(22)	91(28)	80(24)	331(101)

(B) totals for three adjacent values centered on diagonal points.

Bby	78(24)	86(24)	89(25)	95(27)	357(100)
N. S.	88(24)	90(24)	96(26)	97(26)	371(100)

*percent in parentheses

(C) BURNABY (percentage)



NORTH SHORE (percentage)

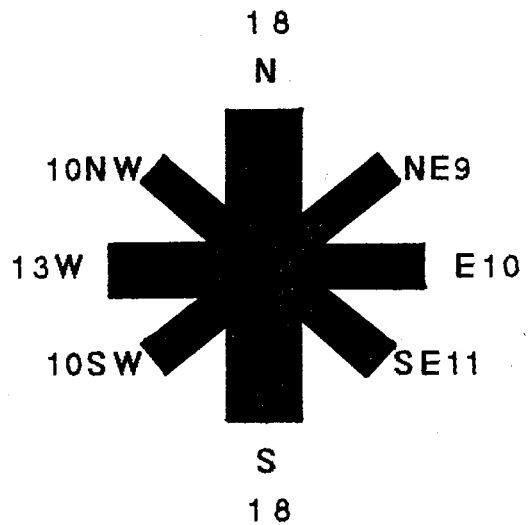


Figure 4.3 Aspect - Comparisons Between Burnaby and the North Shore

Note: 33 permits indicated full storey additions. These were not included in calculations.

and orientation are intertwined and also correlate with building form, legal surveys, street and zoning patterns. A further explanation for the location of additions might be based on

positioning of windows. The addition may protrude to the north, for example, yet the windows could be located along the west side of the addition. Thus, the relationship between additions and the sun is masked and not available within the information given in the building permits.

Orientation refers to the side of the house on which the additions were made, taking the layout of the house itself as the directional referent. As with aspect, some houses may have more than one orientation recorded if expansions were built onto more than one side, or they may have no specific orientation in the case of full storey additions.

Table 4.3 summarizes orientation of additions and compares Burnaby as a whole with North Shore data (Evenden 1982) and Burnaby households with children and those without children.

	Burnaby	With Children	Without Children	North Shore
Rear*	136(66)	26(59)	27(71)	117(41)
Sides	43(21)	12(27)	10(26)	88(31)
Front	26(13)	6(14)	1(3)	79(28)
Total	205(100)	44(100)	38(100)	284(100)

Table 4.3 Orientation - A Comparison Among Burnaby Households, Those With Children and Those Without, and The North Shore

* Percent in parentheses

Most additions were built to the rear of the houses. This was followed by sides; the front was least common. Households without children built onto the rear of the houses most often (71%) and

rarely to the front of the houses. On the North Shore, the orientation of the additions was more evenly distributed among the front, back and sides, although front was the most dominant (41%). Although the trend is the same between the two areas, it is more pronounced in Burnaby.

The data were examined to determine whether there was a relationship between aspect and orientation and those uses which require the sun (eg.-solariums, sunrooms, greenhouse, hothouse and plantroom) to be discussed more fully below. There seems to be some relationship since 62 percent of these additions were to the south, west or southwest while only eighteen percent of these additions were to the north, east or northeast. However, all north additions were to the rear of the houses, pointing out the interplay between aspect and orientation.

Site characteristics partially explain the reason for one side of the house to appeal as an expansion point. Some people like the look of the house from the front. In other cases it may be that the rear of the lot contains the space for expansions. Aspect, orientation and zoning influence the siting of the house and expansion decisions. Future research will give more insight into people's feelings and behavior towards their houses with respect to the sun, house façades and zoning setbacks.

B. Aggregate Space

Aggregate space is a measure of the total amount of floor space added to the houses during expansion projects. Table 4.4 indicates the aggregate figure for Burnaby, first as a whole, then

divided into those households with children and those without children and compared to the North Shore.

	Burnaby*	With Children	Without Children	North Shore
Pre-expansion area				
Total	455040	121666	72895	452109
Mean	2014	2135	1918	1868
Median	1997	2175	2090	1833
Range	465-5746	465-5746	638-3413	520-5844
N	226	57#	38#	242
Addition area				
Total	124885	39148	17822	114534
Mean	550	687	469	464
Median	339	550	255	300
Range	6-3008	51-2942	8-1946	16-2213
N	227	57	38	247
Post-expansion area				
Total	579747	160814	90717	566643
Mean	2565	2821	2387	2342
Median	2422	2784	2462	2212
Range	750-6074	1372-5893	995-3797	690-7294
N	226	57	38	242

Table 4.4 Aggregate Space - A Comparison Among Burnaby Households, Those With Children and Those Without, and the North Shore

* All figures given in square feet.

The data from these two columns, 95 households, are those who fully completed the questionnaire, which included adult's ages and children's ages for life cycle categorization.

This table displays the pre-expansion areas, addition areas, and post-expansion areas of houses in this sample. In most cases the means are higher than the medians, indicating a tendency to a skewed distribution to the right. That is, within the sample there

were some extremely large pre-expansion houses and additions to increase the size of the mean, as compared to the median. The range of values given for Burnaby as a whole indicate that the pre-expansion sizes of some houses is extreme, quite small to quite large. The underlined figures in the table indicate that some of the largest additions are bigger than the smallest houses. Some permits were issued for very small projects, (6 sq. ft) such as a bay window. By referring to the figures in bold, one can see that the means and medians for pre-expansion areas, additions areas and post-expansion areas were higher for those households with children than for those without children. These results indicate that the two groups started out with fairly similar sized houses, those households with children added bigger additions and consequently ended up with significantly larger houses. The North Shore compares most closely to those households without children, although all means and medians are smaller than in the Burnaby data. Households on the North Shore, for the most part, had smaller houses and added smaller additions.

Aggregate space is hard to envision when given as a sum total. In terms of what it means to the housing stock in Burnaby, an illustration might make this more clear. If all the households in Burnaby were making additions, how much space would be added to each house? There were 26,845 occupied single detached dwellings in Burnaby in 1986. If sample data were to be extrapolated, it would be seen that about 624,425 square feet were added in total across all projects over the study period. Thus, it can be seen that this activity would add about 23 square feet to each house, or a space measuring 4.8 feet by 4.8 feet. In comparison, the space added to

each house on the North Shore was 37 square feet, 6.1 feet square. This seems to contradict statements made earlier that North Shore had smaller houses and made smaller additions. However it does not, since there were more expansion projects for the five year time period, providing, collectively, more space.

Another illustration of the overall magnitude of expansions would be to express additional space in terms of mean house equivalents. If the extrapolated area of additions (624,425 sq ft) is taken in terms of the mean pre-expansion size of houses (2014 sq ft), then the number of house equivalents would be 310. Over the six year study period this would represent the addition of just over 50 house equivalents annually to the housing stock. If the same calculation is made on the basis of post-expansion sizes of the dwelling, then the number of house equivalents would be 243 or 41 per year. By comparison, the house equivalents for the North Shore were considerably higher: 100 house equivalents per year for pre-expansion size and 82 house equivalents per year for post-expansion size. This shows the considerable magnitude of building of additions that was going on in Burnaby during the period of 1980-1985 and the North Shore, 1975 -1980.

Distributional characteristics of expansion activity, by size in relation to pre-existing dwellings, may be analyzed with reference to figures 4.4 to 4.9. Pre-expansion areas, addition areas and ratios (of addition area to pre-expansion area) are spatially shown by quartile distributions. Some clustering occurs. The dotted area on figure 4.4 isolates an area with a predominance of large and fairly large houses (over 1998 sq ft). However the same area in figure 4.5

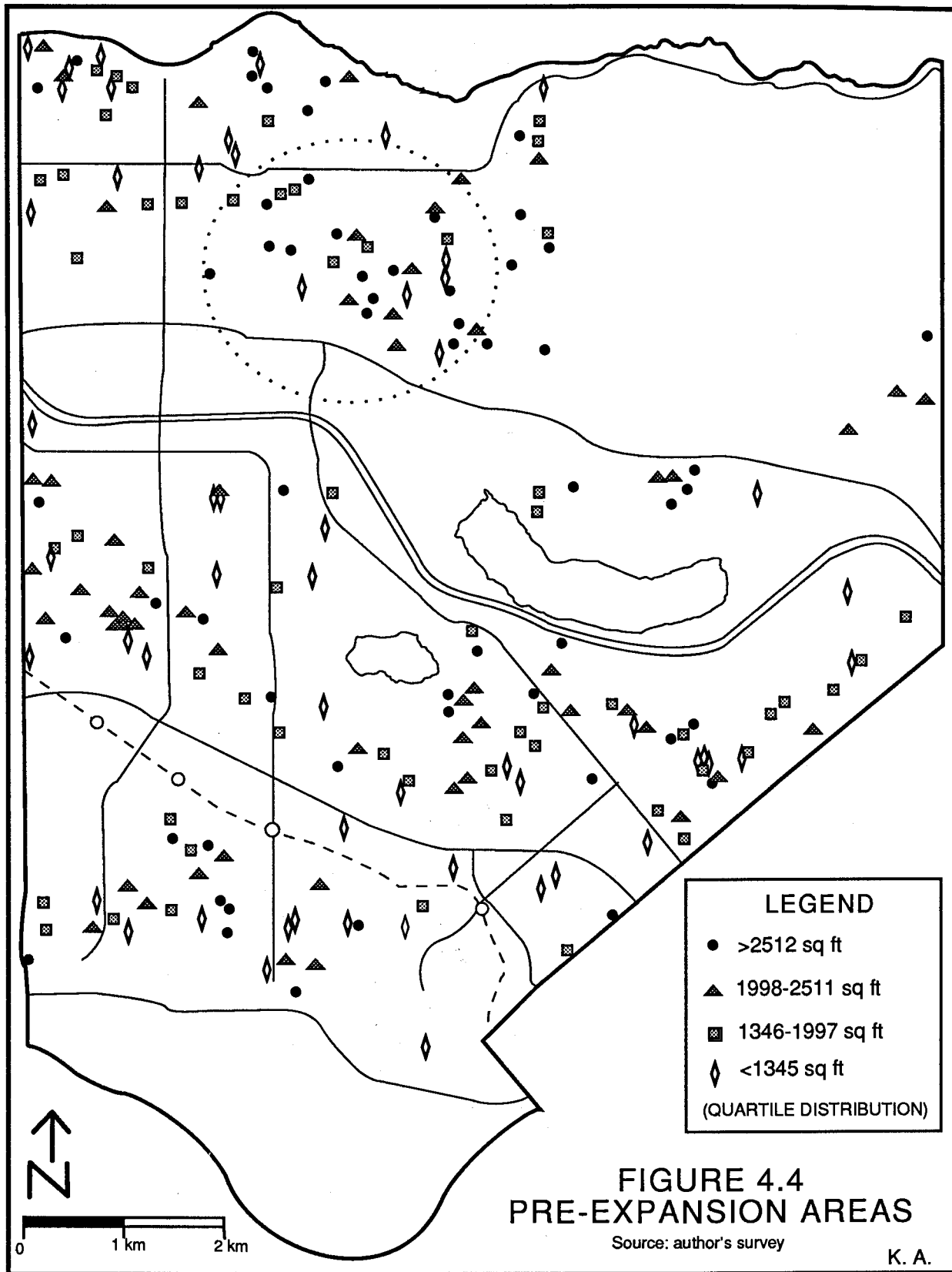
exhibits small and fairly small additions (under 351 sq ft). Thus in this area large houses have small additions.

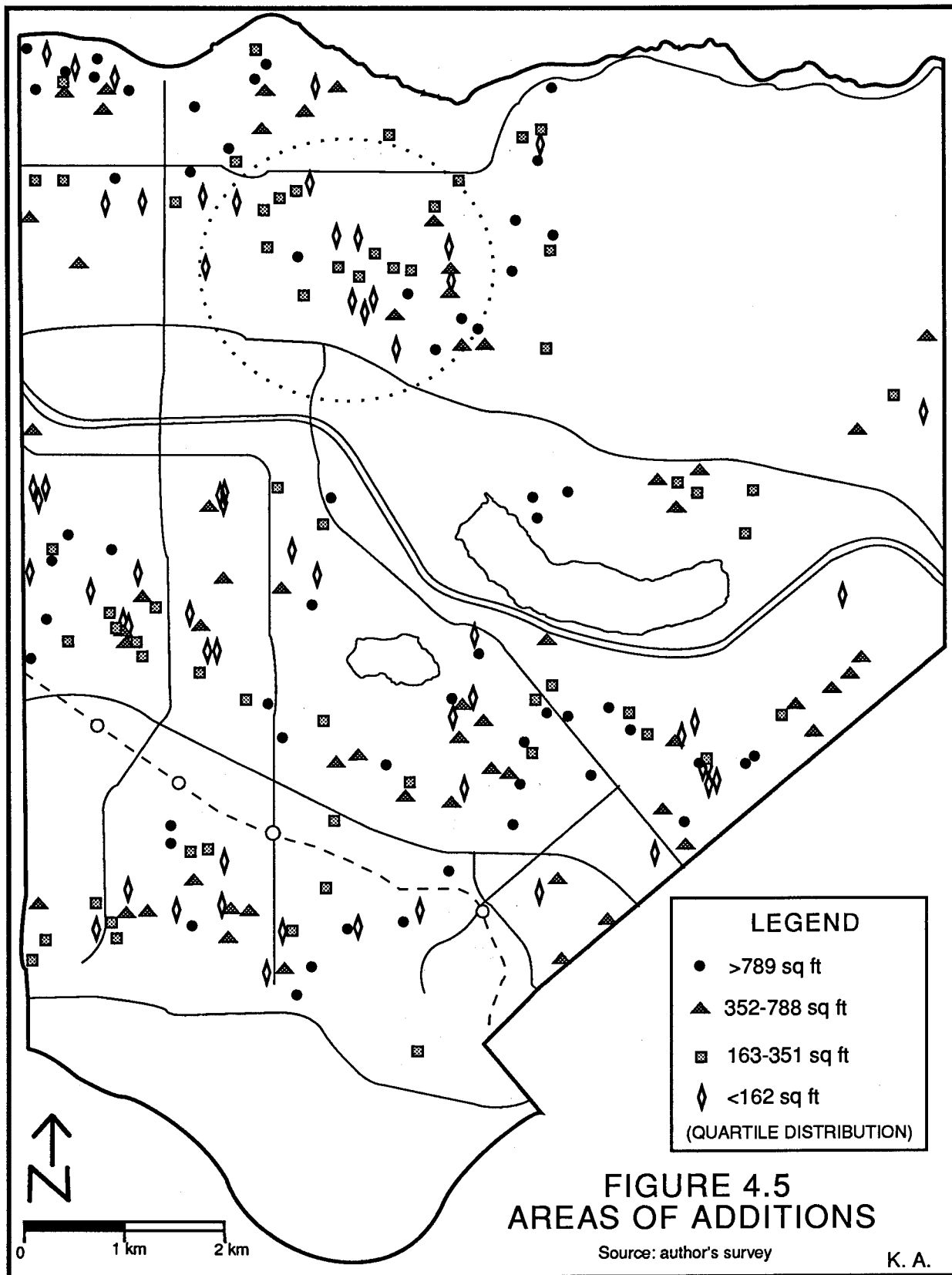
All ratios are shown on figure 4.6. Figures 4.7 to 4.9 display large (over 0.19), medium (0.09 to 0.44) and small (under 0.18) ratios to better identify groupings within areas. Figure 4.7 indicates a group of houses with large ratios (> 0.19) in the areas of Burnaby Heights and Capitol Hill. (Refer to figure 3.1 for neighborhood locations.) This indicates small to medium sized houses with large additions. Other areas which have large ratios are around Canada Way and South Burnaby.

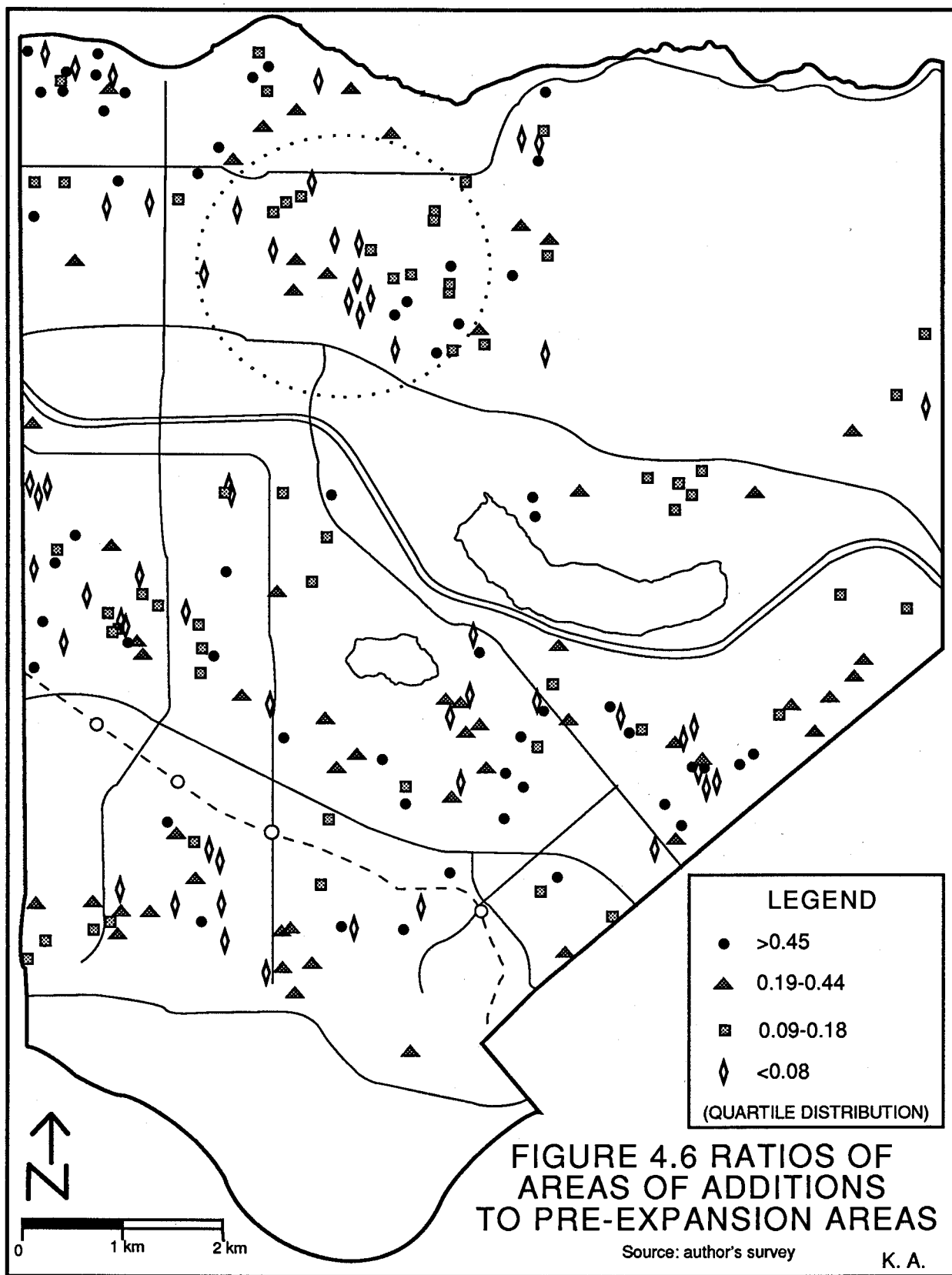
Figure 4.8 shows those houses with medium ratios (0.09-0.44). These are large houses with medium-sized additions, and medium-sized houses with medium-sized additions. A large cluster is located near the dotted line, north central area, the Garden Village neighborhood and in southwestern Burnaby.

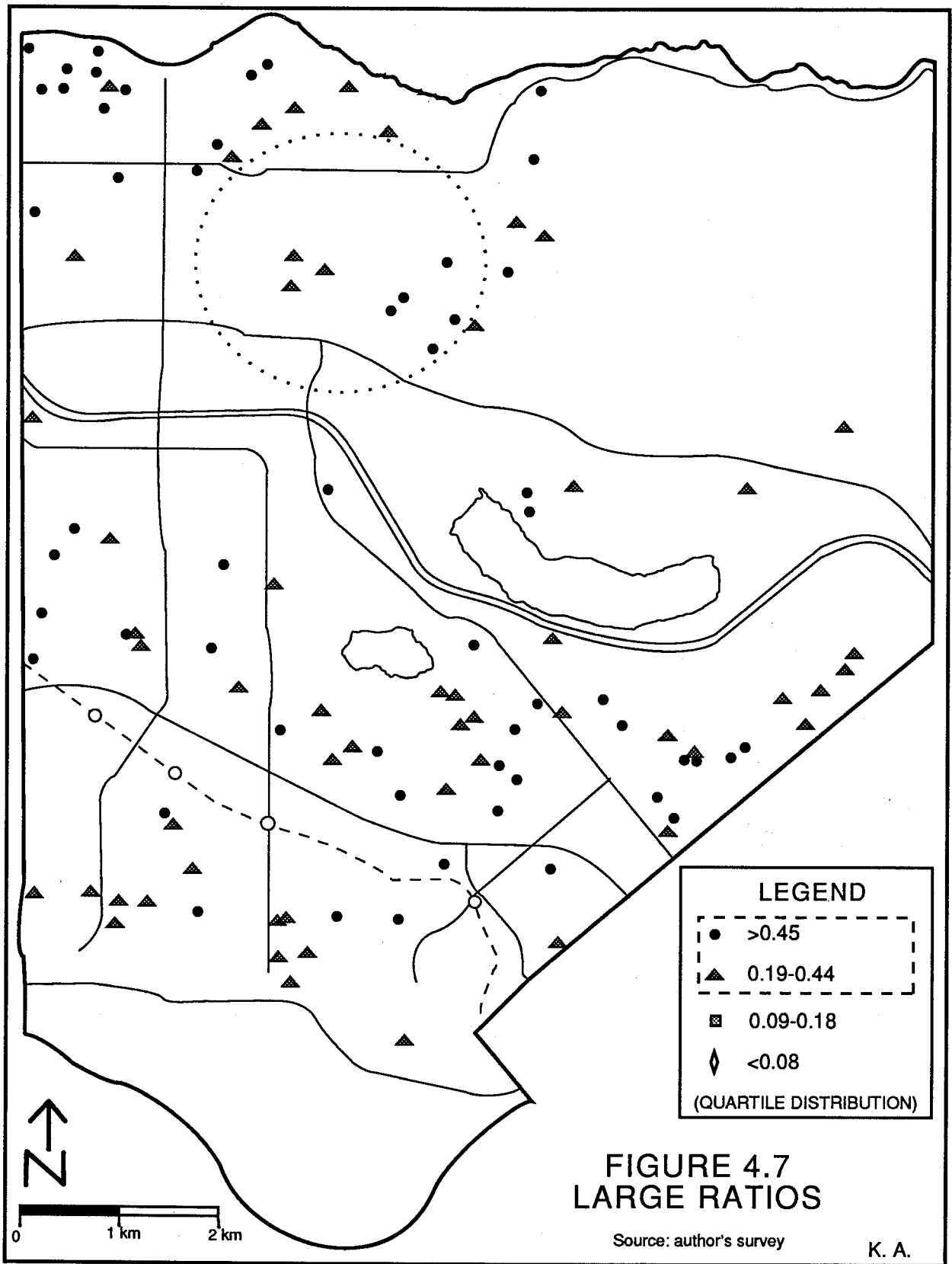
A final map (figure 4.9) shows the distribution of houses with small ratios. These are large houses with small additions and medium-sized houses with small additions. Clusters are seen around Brentwood Park, Lochdale, Cascade Heights and Suncrest. Within the dotted circle area, referred to above, small additions predominate.

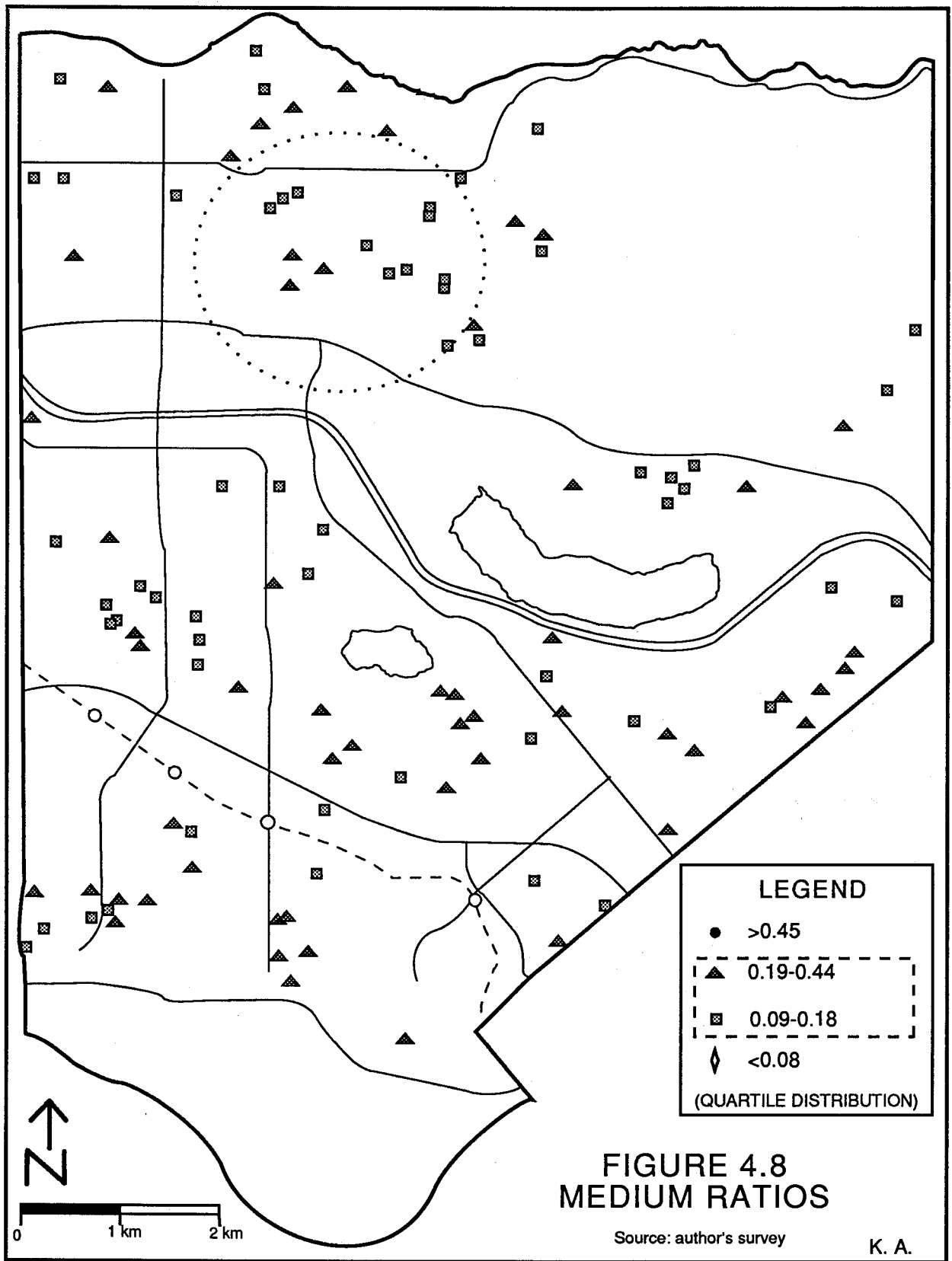
The level on which the addition was made is another way in which space can be analyzed. Most house expansions occur on the main living level (53%). Basement level is next (37%) and upstairs last (16%). There were houses with additions to more than one level, and in the case of split level homes, this classification scheme was difficult. On the North Shore the respective figures are 58%, 14%, and 28%. More homeowners on the North Shore added more space

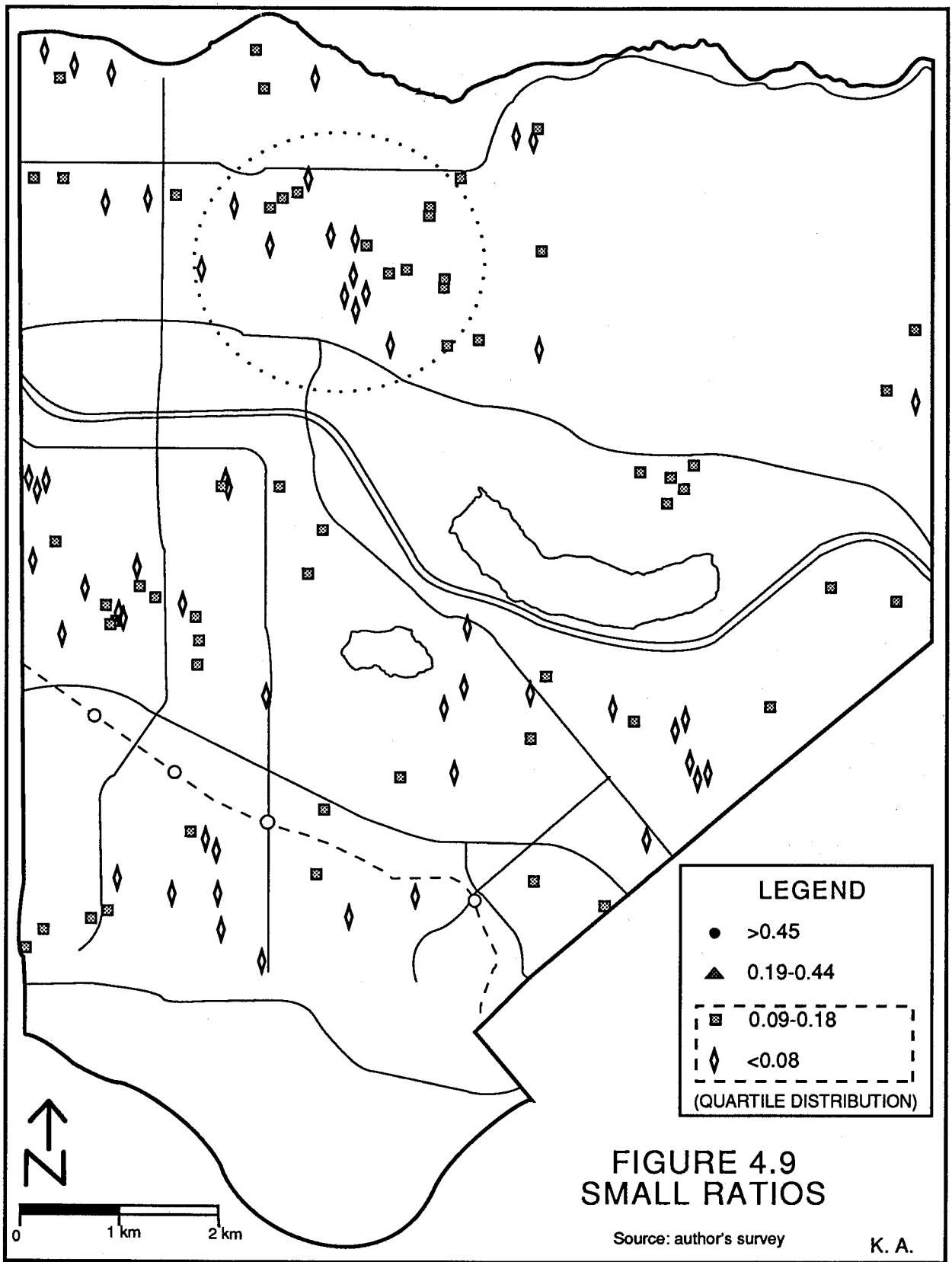












upstairs and less in basements. The underlying reasons for level of expansion decisions are more fully explored in chapter six.

C. Partitioned Space

Dwellings comprise not only aggregate space but also partitioned space. Houses may tend to open plans or may be internally characterized by rooms which can be closed off. The utility trade-off would seem to be between flexibility and privacy. Each household must design the space which best suits its needs and desires.

The idea of expanding the house to create more space stands in contrast to the idea of subdividing space. Yet the two are not completely separate in the expansion project. The addition of a room accomplishes a private space while an extension to an existing room only adds to the existing space. Table 4.5 illustrates partitioned space for Burnaby, as a whole, those Burnaby households with children and those without children and the North Shore.

Partitioned space describes how rooms are arranged in the expansion project and as related to pre-existing spaces. Table 4.5 shows that households in Burnaby added slightly more rooms per project than those households on the North Shore. However, they extended the same number of rooms per project. Fewer households with children added one room projects, and more added several rooms, bringing the number of rooms added per project for this group to 3.8, in contrast to 2.8 for households without children. Similarly, the households with children extended more single rooms than did

	Burnaby	With Children	Without Children	North Shore
Rooms Added				
Total	541	174	79	502
Projects adding rooms:				
Number	182	46	28	195
Percentage	80*	81	74	79
Mean Number of rooms per project	3.0	3.8	2.8	2.6
Rooms Extended				
Total	133	33	21	133
Projects extending rooms:				
Number	83	19	15	83
Percentage	36	33	39	34
Mean number per project	1.6	1.7	1.4	1.6
Projects Both Adding And Extending Rooms				
Total number	37	8	5	35
Percentage	16	14	13	14

Table 4.5 Partitioned Space - A Comparison Among Burnaby Households, Those With Children and Those Without, and the North Shore

* Calculated-Number of projects adding rooms (182), divided by the total sample number in Burnaby (227) and multiplied by 100. The total sample number for those households with children is 57 and for those without children, 38. The total sample number in the North Shore is 247.

the households without children. Young couples usually add rooms in order to get more space and privacy. For older couples without children, extending a room seems to be an attractive way to increase space while enhancing flexibility of current rooms and maintaining the same degree of privacy as before the expansion.

D. Functional Space

Spaces are added for different uses. Some may be quite flexible and change over time, such as when a bedroom is converted to an office. Others, such as bathrooms and kitchens, generally remain functionally stable, their special fixtures making any change costly and impractical. The use of a room is reflected in its name. Sometimes the name indicates that the household feels quite ambiguous towards certain rooms in the house (Giuliani 1987). There were 53 terms used by householders to describe rooms in this sample (a full list is given in appendix C). This number was classified according to the list of eight categories used in the North Shore study (table 4.6).

Bedrooms, general activity family rooms, bathrooms and public rooms together comprised almost 70 percent of all additions. Additions of bedrooms were overwhelmingly the most popular both in Burnaby in total, those households with children, and the North Shore. Only those households without children built another room more often than bedrooms or general activity family rooms.

Usually the master bedroom in the modern house has an 'ensuite bathroom' while the other bedrooms share a second bathroom. Thus the construction of new bathrooms and the remodelling of existing ones commonly accompanies the addition of new bedrooms. For Burnaby, one new bathroom was built, or an existing one expanded for the addition of every 1.7 bedrooms. This figure was higher for the North Shore, at 2.3. For those households with children, one new bathroom was built for every 2.2 bedrooms,

while for those households without children one new bathroom was built for every 0.9 bedrooms.

	Burnaby	With Children	Without Children	North Shore
Bedroom	25	28	18	30
G. A. F. R.*	17	16	13	15
Bathroom	15	13	21	13
Public Room	12	13	11	12
Kitchen	9	9	12	8
Utility Room	7	6	11	9
Unfinished/unknown	6	6	6	1
Hallway/entrance	5	5	6	7
S. A. F. R.#	5	5	3	5
Total	101(691)	101(205)	101(104)	100(645)

Table 4.6 Functional Space - A Comparison Among Burnaby Households, Those With Children and Those Without, and the North Shore

* General activity family room

#Specialized activity family room

The sharing of bedrooms by children in the household and the perceived need for privacy accounts for the increase in bedrooms additions. Table 4.7 indicates that over half of children in this survey have never shared bedrooms. Cultural norms in our society cause households to perceive the need for every child to have his or her own bedroom by a certain age (Gladhart 1973). Cultural pressures of this kind appear to be evident in Burnaby, in that 89 per cent of children have separate bedrooms, now, and over half (53%) never had to share a bedroom in this house. Rising affluence and

house standards and decreasing household size is making this possible for more families.

	Burnaby	Households With Children	Households Without Children	North Shore
Children Separate Bedrooms	89%	88%	-	89%
Children Never Shared Bedrooms	53%	53%	52%	57%

Table 4.7 Sharing Bedrooms - A Comparison among Burnaby Households, Those With children and Those Without, and The North Shore

General activity family rooms such as dens, family rooms, recreation rooms, and sun rooms comprised the next most popular addition for Burnaby, those households with children, and the North Shore. These are all-purpose common rooms and usually the television is located in one of them. Public rooms, including the living and dining rooms, refer to areas where guests would be entertained. There were more dining rooms added and extended than living rooms. While everyday family eating may be done in the kitchen, there is an urge to create a space for formal dining, or as one person called it "more gracious living".

As well as being enlarged, kitchens and bathrooms are usually remodelled in order to renew appliances and fixtures. A number of kitchen expansions contained the addition of eating areas, or nooks. Storage space for varied and sophisticated pieces of kitchen

equipment is also at a premium, and expansion projects commonly included more storage space for these items.

The remaining categories are less frequently represented. They refer, for example to a new trend toward 'health rooms' or 'spas', or office space in the home (sometimes to house the newly acquired home computer), or 'indoor gardening'. Other public spaces such as entrances and hallways may have been underbuilt in the first construction, and are often expanded with other rooms in the house. The first priority for the household seems to be enlarging the basic and common rooms before adding specialized rooms.

This chapter outlined the physical characteristics of house expansion. The addition was characterized in terms of its positioning within the building envelope, the quantity of space added, its partitioning and its use. The next chapter is a discussion of the characteristics of the households which built the additions and expansions.

Chapter 5

The Behavioral Characteristics of Households

This chapter considers the behavioral characteristics of the households in relation to their decisions to expand their dwellings. The information drawn from questionnaires refers to house characteristics, family characteristics, household tenure, journey to work and expansion decisions. Data from the questionnaire are grouped together into life-cycle stages to compare households with children and those without to determine whether these two groups make different types of additions to their houses. A final part looks in depth at the older folk without children (stage six in the life cycle).

The age structure is fundamental to the examination of the life cycle and table 5.1 gives some demographic characteristics of sample households. The number of persons in a house is presumed to have some bearing upon the need to expand the house. For those households sampled, in Burnaby, the mean number of persons in a house was 3.8. The different average household sizes is accentuated in the middle two columns, with those households with children having 4.2 persons and those households without children having on average 3.1 persons.

The mean number of adults is 2.4 per household. However those households with children had on average 2.2 adults while the other had on average 2.8 adults, the figures being influenced by adult children still living at home. The average age of adult was the mid-forties while a decade ago on the North Shore they were in their

	Burnaby	With Children Under 18 Yrs	Eldest Child Over 18 Yrs	North Shore
Mean Number of Persons in Household	3.8	4.2	3.1	3.9
Mean Number of Adults	2.4	2.2	2.8	2.4
Mean Age of Adult-male	47 yrs	43 yrs	55 yrs	44 yrs
-female	44 yrs	37 yrs	52 yrs	42 yrs
Mean Number of Children	1.2	2.1	0.3	1.6

Table 5.1 Demographic Characteristics - A Comparison Among Burnaby Households, those With children and Those Without, and the North Shore

early forties. The mean number of children was a little less in Burnaby than in the North Shore. Big differences emerged when the Burnaby results were divided into those households with children under 18 years old, 2.1 children per household and those with the eldest child over 18 years old, 0.3 per household.

Most households in the sample had moved a relatively short distance from their previous dwelling to the present one. Table 5.2 gives the previous locations of households.

Burnaby	36%
Vancouver	43%
Other Lower Mainland	7%
Rest of B.C.	4%
<u>Out of Province/Country</u>	<u>10%</u>
Total	100%

Table 5.2 Previous Locations of Households

Vancouver was the most important previous location (43%), representing a suburbanizing tendency. Given the travel times and distances in Vancouver and Burnaby, it can be seen that people in this group could switch residence without changing access to jobs and city amenities. Moreover, over one third of the households moved from another location within Burnaby. Ten percent moved to Burnaby from out of the province or country. (A full listing of all previous locations is given in appendix B).

A multiple choice question was used to elicit responses to the question "Why did you choose to live in this house?" The respondent could pick as many answers as applicable and add other reasons as comments. Table 5.3 indicates how frequently each answer was chosen.

	Burnaby	With Children	Without Children
a) you liked the house	19%	20%	22%
b) you liked the neighborhood	28%	29%	31%
c) there was good house market potential	4%	5%	4%
d) the journey to work was convenient	20%	22%	20%
e) the price was right	20%	22%	22%
f) other/comments	8%	3%	1%
Total	99%	101%	100%

Table 5.3 Reasons Given For House Choice - A Comparison Among Burnaby Households With Children and Those Without

The most frequent reason given for the choice of house was neighborhood characteristics. The next three reasons given are

grouped fairly closely in priority for Burnaby as a whole and by those households with children and those without. The reasons are: they liked the house, the journey to work was convenient and the price was right. The houses' market potential did not emerge as a conscious choice for choosing the house. This means that households were for the most part looking for a place to reside for a number of years and not looking just for an investment. Other reasons for house choice mentioned in the comments section were: "close to relatives", "large yard", and the "view". Four of the five who mentioned views lived in North Burnaby with vistas of the North Shore mountains. The other one overlooked Burnaby Lake.

The journey to work is important to the choice of a residence. A recent article by Doorne and van Rietbergen (1990) stresses interrelationships among labour mobility, residential mobility and home-work travel behavior. Kipnis and Mansfield (1986:160) put "labour at the very heart of the decision making process and argue that selecting a place of work, occurring only a few times in an individual's lifetime, determines the family's place of residence, life-style and socio-economic status." Further research in this area could prove extremely useful.

In this study 57 people (54%) indicated that they picked their houses because of the journey to work convenience. It is not known if a job change occurred after the house was bought. Of the 57 people, 49 percent said the journey to work was convenient for the man, 5 percent said convenient for the woman only and 46 percent said convenient for both. Thus it seems that more and more families

must weigh the destinations of both parents' work when choosing a home. Table 5.4 indicates work destinations.

	Burnaby		With Children		Without Children	
	M	F	M	F	M	F
Burnaby	35%	55%	37%	49%	34%	60%
Vancouver	17%	18%	17%	20%	32%	23%
Downtown Vanc.	12%	13%	18%	18%	3%	3%
New West.	6%	4%	5%	6%	8%	0
Retired	6%	5%	0	0	13%	13%
Other	24%	6%	23%	8%	11%	0
Totals	100%(102)101%(84)		100%(60)101%(50)		101%(38) 99%(30)	

Table 5.4 Work Destinations - A Comparison Among Burnaby Households With Children and Those Without, for Males and Females

According to table 5.4, more women than men work in Burnaby, although Burnaby is the most popular work destination for both sexes. This generally would allow women to be closer to home and in the case of those households with children, where this is important, closer to schools. It is not known how many women work part-time as opposed to full-time. Significantly less of the population from this sample works in Downtown Vancouver than was originally thought. New Westminster was not a big employer for the people in this group, even though New Westminster has been one of Burnaby's key shaping urban forces. An important proportion of those households without children is retired. (A full listing of all work destinations is given in appendix B).

Commuting time is another variable in the home-work journey. There has been considerable work in recent years highlighting gender and class differences in work journeys (Rutherford and Werkerle 1988, Villeneuve and Rose 1988). Hanson and Pratt (1988) also suggest looking at commuting distance, especially when different modes of travel are involved. For example, it could take 20 minutes to walk and only 5 minutes to drive the same distance. However, in this study, most people travelled by car (85% of males, 77% of females). The time spent in commuting varied between the sexes. Men average more time commuting, with a one way trip lasting 23 minutes. Women's average commuting time was three minutes shorter. Although this sample population refers only to those expanding houses, these findings on commuting times are consistent with those reported in the studies cited.

Decisions associated with initiating and developing the expansion project are the subject of the next part. Table 5.5 displays the average addition timetable and some expansion decisions.

The average length of time a household had occupied a house before this expansion was fairly similar for Burnaby as a whole and the North Shore at 13.3 years and 12 years respectively. Twenty-three percent of the sample, for Burnaby as a whole, intended to expand their house. More households with children intended to expand (29%) and did so after a shorter period of time (8 years). Conversely, fewer households without children intended to expand their houses (15%) and did so after a prolonged period of time (18 years). The average length of time to plan the expansion was five to six weeks

	Burnaby	With Children	Without Children	North Shore
Mean Length of Time Living in House Before Expansion	12.3 yrs	8 yrs	18 yrs	12 yrs
Moved in with Future Intention to Expand	23%	29%	15%	-
Time to Finish Expansion-mean	16 mo.	12 mo.	14 mo.	13 mo.
-median	5 mo.	6 mo.	4 mo.	
Considered Moving Instead of Addition	49%	59%	25%	44%

Table 5.5 Addition Timetable for Expansion Projects - A Comparison Among Burnaby Households, Those With Children and Those Without, and the North Shore

whereas the average length of time to finish the expansion was, for Burnaby as a whole, 16 months. Those households without children took slightly less time, 14 months. Households on the North Shore took on average a little over a year to finish and those Burnaby households with children finished on average in one year. The median length of time for households to finish expansion is considerably less, not unexpectedly so. This indicates a skewed distribution since some households take years to complete all finishing work, and in some cases people are nonplussed in trying to decide when a project was actually finished.

Table 5.6 indicates the preparation of blueprints. More households with children than without children had friends or a member of their own household draw the plans rather than architects or professional draughtsmen. In those households without children more draughtsmen drew the plans and thus it would

	Burnaby	With Children	Without Children
a) an architect	27%	35%	15%
b) builder/contractor or builder's draughtsman	28%	17%	44%
c) member of your own household or friend	45%	48%	41%
Totals	100%	100%	100%

Table 5.6 Preparation of the Blueprints - A Comparison Among Burnaby Households With children and Those Without

appear that simple functional space needs drive the expansion projects of the younger families with children whereas a sense of design and a more self-conscious process of thinking about living space would appear to become more important at middle age. At the same time, the preponderance of builder designs, as against architect commissions would seem to point to a prosaic and frugal approach to house expansion by those without children.

As far as doing the actual expansion work is concerned, both groups participated in their expansion projects. Table 5.7 shows the participation in the additions.

Seventy percent of the expanding households intended to do the work themselves while 14 percent intended to hire contractors. In reality, more work than intended was done by contractors. Most householders were actively involved in some way with the work of building their additions. The table shows that householders without children more often assumed the role of coordinator; perhaps they have more time to devote to such projects, but may be less able or willing, physically, to do the work, knowing what the project

	Burnaby	With Children	Without Children
a) general contractor who did everything	27%	30%	24%
b) several sub-trades coordinated by the homeowner	31%	28%	36%
c) several sub-trades coordinated by an independent project manager	3%	3%	2%
d) homeowner	29%	32%	31%
e) other	9%	7%	7%
Total	99%	100%	100%

Table 5.7 Participation in Additions - A Comparison Among Burnaby Households With Children and Those Without

involves. Conversely, households with children perhaps, could do the work but may not have the time. This could explain why households with children used more contractors and households without children coordinated the sub-trades but did not do the actual work. However, about 30 percent of homeowners from both groups, who have some applicable skills and who perhaps enjoy such work, completed the addition themselves. Others undertook the finishing work at a pace determined by household living. A few indicated that there was still finishing work to be done.

Just under 50 percent of the respondents for the whole of Burnaby considered moving, but few went so far as to put their houses up for sale. Significantly more households with children considered moving (59%) than those without children (25%). Those without children have lived in their houses the longest and have probably paid off the mortgages. They are now expanding because they have the time and/or money. Most are not considering moving in the near future, although in the more distant future, a move is

probably inevitable. Thus extra work now may reap capital gains benefits later.

Most projects stayed within budgets. Those that did not claimed inaccurate contractors' estimates or admitted that once the work started they decided to do more than first planned - not an uncommon development. Only six percent had expanded their houses again since 1986.

I. A Closer Look at Stage Six

It was unexpected that so many households in the later life cycle stage were making expansions to their houses. Previous studies have shown that their housing space needs should be in the contracting phase (Seek 1983, Prior 1986). In an effort to determine whether the large percentage (37) of households in stage six made the same decisions with regard to their expansion projects, the stage is divided into four sub-groups, by decade, according to the age of the head of the family. These were:

STAGE 6	Number
A-couple, age of head 35-44 years, no children.	5
B-couple, age of head 45-54 years, no children.	10
C-couple, age of head 55-64 years, no children.	13
D-couple, age of head over 64 years, no children.	7
	35

Table 5.8 Number of Households in Reclassified Stage Six

Table 5.8 shows that two-thirds of the heads of households in the sixth stage were between the ages of 45 and 64 (68%). The sample size was fairly small but nonetheless some interesting

differences emerged among the four groups as indicated in tables 5.9 and 5.10.

	A	B	C	D
Pre-expansion area (square feet)				
Total	8288	18893	28258	13837
Mean	1658	1889	2174	1977
Median	2074	1894	2472	2106
Range	638-2392	816-2835	1008-2754	815-3413
N	5	10	13	7
Addition area (square feet)				
Total	5572	5446	4395	1488
Mean	1114	545	338	213
Median	1310	314	216	240
Range	187-1946	56-1684	8-1303	79-325
N	5	10	13	7
Post-expansion area (square feet)				
Total	13860	24339	32653	15325
Mean	2772	2434	2512	2189
Median	2798	2702	2490	2346
Range	1948-3797	1507-3086	1642-3421	995-3492
N	5	10	13	7

Table 5.9 Aggregate Space - A Comparison Among Stage Six Groups

The four groups of stage six are compared according to aggregate space. The four groups began with fairly similar sized houses. However, as noted in the bold type, the size of the additions became smaller with increasing age of the household head. Thus, the post expansion areas were larger for the younger household heads. The older households obviously did not need or want so much space.

	A	B	C	D
Rooms Added				
Total	5	6	9	6
Projects adding rooms:				
Number	28	19	22	7
Percentage	100	60	69	86
Mean Number of rooms per project	5.6	3.2	2.4	1.2
Rooms Extended				
Total	0	6	6	2
Projects extending rooms:				
Number	0	12	6	2
Percentage	0	60	46	29
Mean number per project	0	2.0	1.0	1.0
Projects Adding and Extending Rooms				
Total number	0	2	2	1
Percentage	0	20	15	8

Table 5.10 Partitioned Space - A Comparison Among Stage Six Groups

The mean number of rooms added for group A was 5.6, group B, 3.2, group C, 2.4, and group D 1.2 as shown on table 5.10. Group A, the younger people in group six, added more rooms per project than any other group. Perhaps they felt that they would still be residing in their home for a significant number of years so an addition would be economical. Too few projects were room extensions to show any patterns within the data. There was really little difference among the groups in aspect and orientation. Most added to the back of the house in a variety of shapes and designs.

There was some difference in the type of room that was added as revealed by table 5.11.

	A	B	C	D	Number
G.A.F.R*	14	19	23	50	21
Bedroom	32	16	13	12.5	19
Bathroom	21	16	10	0	14
Kitchen	0	22	13	0	11
Utility Room	14	6	13	0	10
Public Room	4	9	13	12.5	9
Hallway/entrance	4	6	6	12.5	6
S.A.F.R#	7	0	10	12.5	6
Unfinished/unknown	4	6	0	0	3
Total	100%(28)	100%(32)	101%(31)	100%(8)	99

Table 5.11 Functional Space - A Comparison Among Stage Six Groups

*General Activity Family Room
#Specialized Activity Family Room

Group A added or expanded bedrooms and bathrooms while group B added or expanded kitchens and general activity family rooms. Group C and D added or expanded general activity family rooms.

It was thought that the household heads over sixty-five years of age might hire contractors more often to complete the addition rather than do the work themselves. However, there was no dominant pattern of work completion by either homeowners or contractors in any of the groups.

Table 5.12 summarizes some expansion decisions and household traits.

	A	B	C	D
Mean Number of Years in House	22	22	27	30
Mean length of time after moving in before this expansion took place (in years)	16	15	21	24
Mean number of months actively planning to expand house	9	12	15	9
Consider moving to a larger house percent answering "yes"	40	54	1	0

Table 5.12 Expansion Decisions - A Comparison Among Stage Six Groups

The mean number of years households have lived in a house suggests a very stable population. Half of the households in groups A & B had considered moving to a larger house while almost none of the households in groups C & D, a generally older group, had considered moving. This could be due to the fact that groups A & B were pondering larger additions than groups C & D, and wondering whether it might be more feasible to move to a larger place. Groups C & D had been living in the house for longer and thus may have had emotional ties to the house and neighborhood (Huff and Clark 1978).

Only group A had any serious plans to expand the house in the future. Some households in this category have expanded more than

once. However, the average length of time it took a household to expand after moving in gradually increased as the number of years in the house increased. Groups A & B considered the journey to work for both males and females, while groups C & D considered the journey mainly for the males. There was no significant difference among the groups for where they worked, either by the length of the trip or the method of travel.

Most households took at least six months to finish the expansion project, whether it was big or small, and some took considerably longer. Households in all the groups generally stayed within budget, and few have engaged in expansion projects since those considered in this study were completed.

This chapter has explored the behavioral characteristics of those households which expanded their houses as set in relation to the expansion projects and building types. Family composition, work patterns and decisions regarding the addition were considered. Moreover, households with children were compared to those without, to see if differences existed in the type and size of additions. The general results will be augmented in the next chapter by reference to case studies.

Chapter 6

Case Studies

There are four case studies discussed in this chapter. Households were chosen because they represented different stages of the life cycle, fitting into different categories of Duvall's stages (discussed in chapter four). The household in the first case study expanded their premises when in stage two, that is, with no children. The household in the second case study added space when in stage three, with preschool children present. High school children were present in the stage five household in the third case study, while the fourth case study involved a household in stage six, making an addition once the children had left. Each house was enlarged in a different manner to satisfy the needs for space in that household. Such case studies as these provide understanding beyond the 'cross-sectional' analysis based on questionnaire returns, providing an integrative focus on how particular households resolve the issues of needing and providing more space. The particular places have been selected because they are inherently interesting, as well as representing certain life cycle stages.

Case Study #1

The first case study is an addition to the top floor over part of the house (figures 6.1 and 6.5). Approximately 970 square feet was added to a house that already had 2685 square feet. This gives a ratio of addition to pre-expansion area of 0.37. The original house

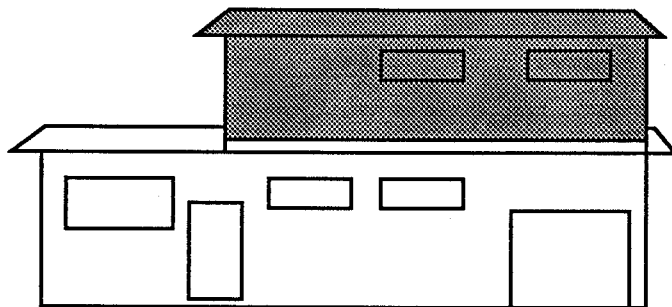
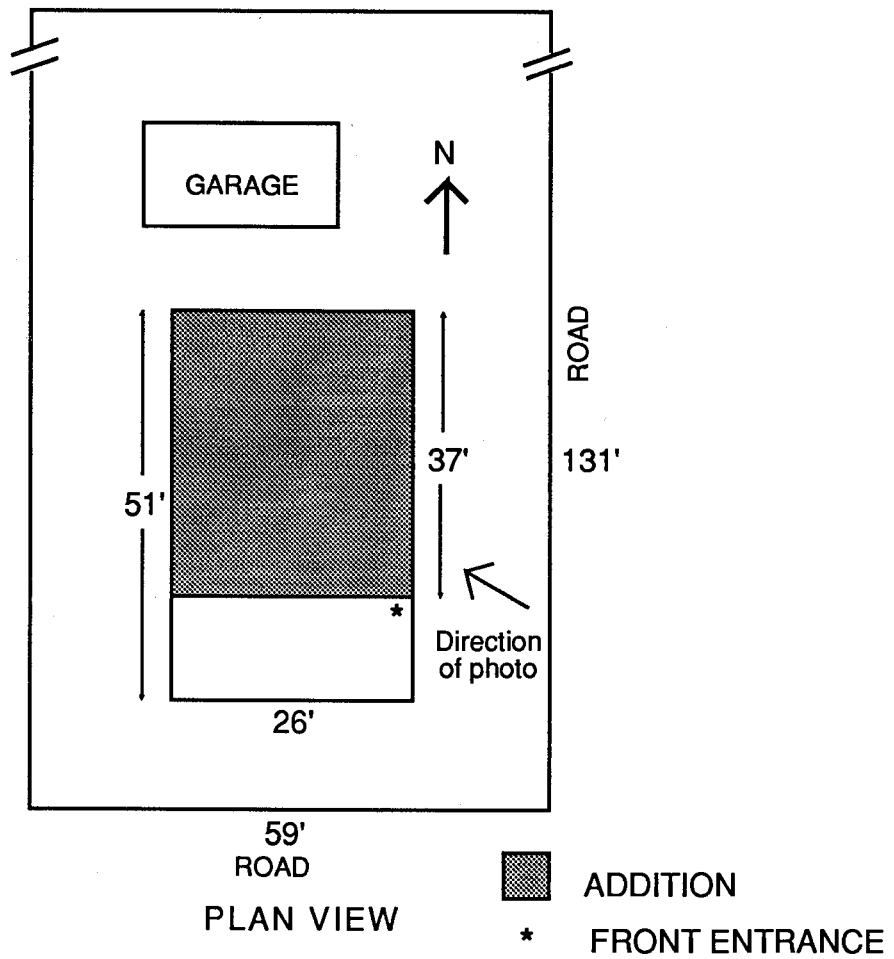


FIGURE 6.1 PLAN VIEW AND EAST ELEVATION OF HOUSE IN CASE STUDY #1

was built in 1954 and stands on a 59' X 131' lot, zoned R5. The addition was started in 1981 and completed over the next four years.

For this couple, location was the key factor. They liked this location and neighborhood and waited over a year for a house to be put up for sale which they liked and could afford.

They bought the house when they had no children, but they planned to have children someday. They both wanted to work once they had children so they wanted space for a live-in nanny. With the house as it was they thought it would be too small to accommodate children and a live-in nanny so they decided to expand. This motive was clearly related to their idea of how their lives and marriage would develop.

Since the house and detached garage take up a lot of space on this corner lot, the only direction to expand was up. The upstairs floor was built above two-thirds of the house, since they did not want to change the chimney and build around it. Now they regret not having added over the whole house, although at the time, they were concerned that house would look too 'boxy' if the top storey were built all the way across the original house.

The new addition has four bedrooms and two bathrooms. The two boys, now in elementary school, have separate bedrooms and one bedroom is prepared for a baby soon to arrive. The master bedroom is quite big compared to the other three bedrooms, and is situated in one corner of the upstairs with windows looking to the north and east. It has an ensuite bathroom.

Along with the addition, built by the homeowner, some renovations occurred. A bedroom downstairs was remodelled,

yeilding a coat closet and space for the stairs leading up to the new addition. Because of this, the stairs leading down to the nanny suite in the basement were changed to a better location. The living room, dining room and kitchen on the main floor remained unchanged.

This household is not planning to move or expand again in the foreseeable future. The house and location is suitable on several counts. The couple takes the skytrain to work and the location in regards to their journey to work is ideal. In fact, at this time, they do not even own a car. Thus the wider spatial relations of the household and the internal space provision and organization have been resolved.

Case Study #2

The second case study concerns a very interesting and unique house. The original house, built in 1953, comprised only 700 square feet. Almost immediately after the couple bought it in 1953, they added to the east side of the house so they could have "space to eat in and space to live in." The house was still small, about 800 square feet, but it was adequate for two people and they were quite happy with it.

As the couple started to think about starting a family they realized that they would need more space. Since they had put about \$15,000 into the house already with the first addition, they decided to investigate the option of further enlarging it. They went to an architect and asked him to design an addition that would cost about \$50,000 to build. When they saw the grandiose plan they felt certain that it would cost much more than the stipulated cost, but the

architect kept insisting that it could be done within budget. They agreed to have the working plans made and then submitted them to several contractors. Not one came back with a bid under \$125,000 to build the addition. So they put the plans away.

At this point they went looking for a house to move into that would better suit their needs of space for children. However, at that time, the late 1970s and early 1980s, the economy was booming and houses were being bought and sold very quickly. They never found what they could afford.

So, almost two years later, they went back to the original plans to expand the house. By this time, 1981, they had one child and another was expected in 1982. They decided they could build the addition more cheaply if the husband did as much as he could and coordinated the other subtrades, instead of having a general contractor build everything.

The parts of the original house that remained were the foundation, plumbing for the bathroom and bathtub fixture. The first addition was left as it was. It became the family room. Figure 6.2 shows lot plan and west elevation, while figure 6.6 is a photo of the house as it now stands. Just over 1000 square feet of new space was added making the ratio of addition area to pre-expansion area, 1.59.

The kitchen and utility room are at the back of the house. Unfortunately the eating area in the kitchen was measured incorrectly and the space is two feet smaller than the drawings called for. The dining room is now where the old kitchen was. The bathroom stayed in the same place and although still quite small, was refitted with new fixtures. Of the two bedrooms in the original

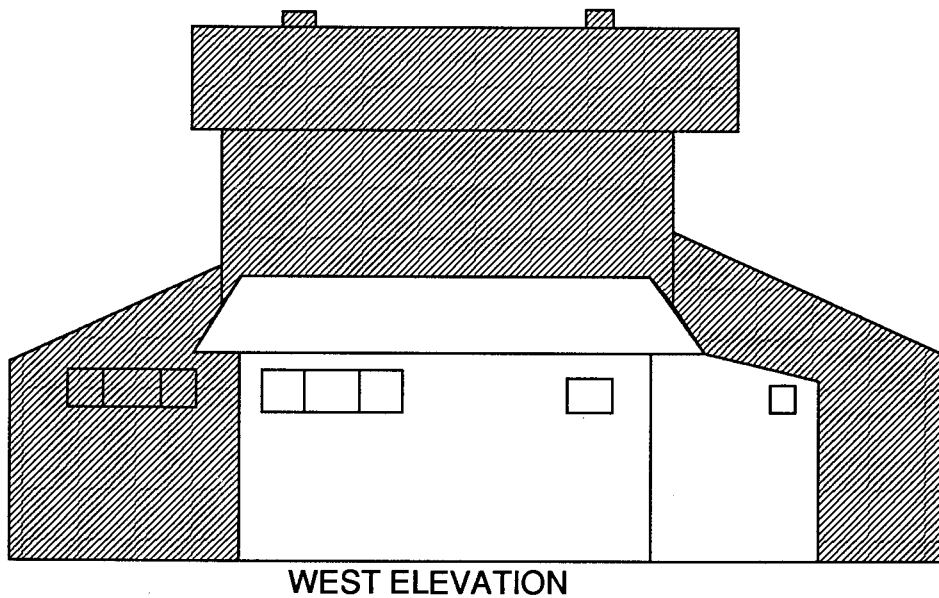
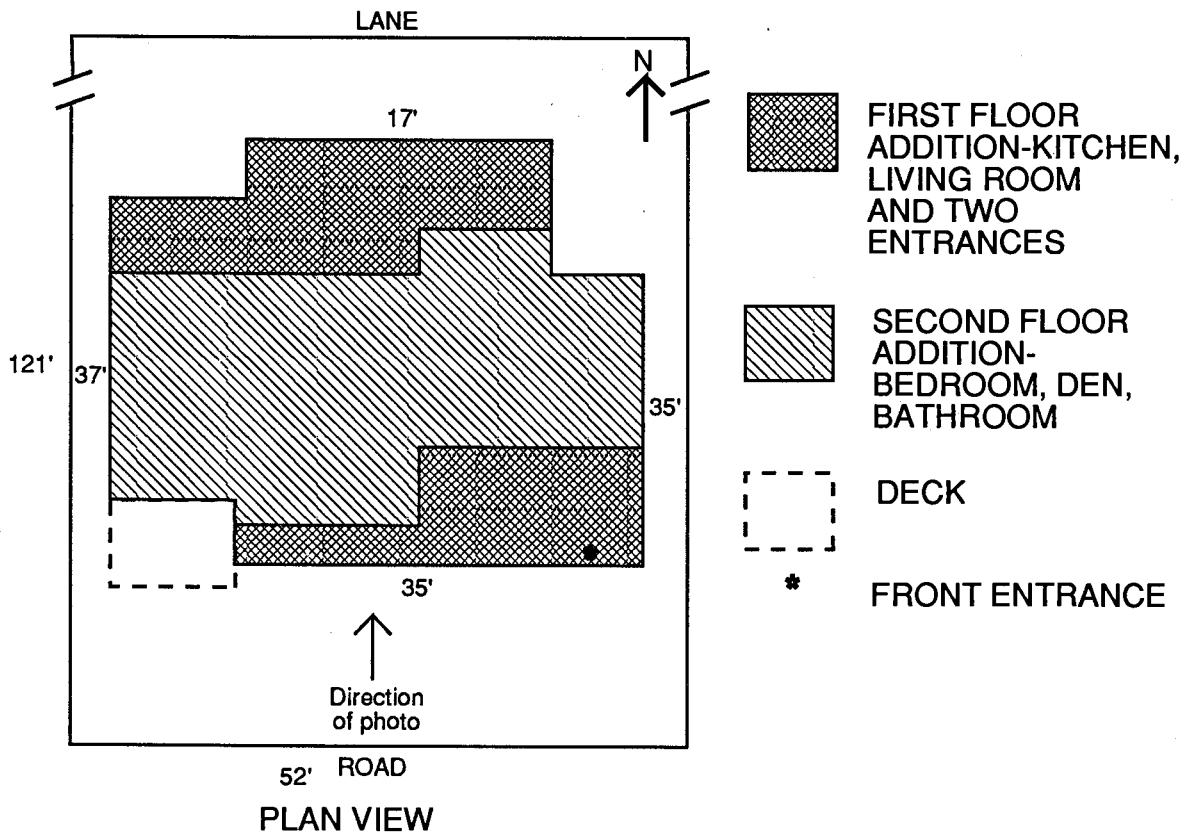


FIGURE 6.2 PLAN VIEW AND WEST ELEVATION OF HOUSE IN CASE STUDY # 2

house, the larger one was made smaller to increase the space for the living room. The entry to the house was enlarged as well as changed from the front, west side of the house to the front, east side of the house, a change which allowed more space in the living room. The original front porch became a small deck.

As well as these changes to the main floor, an upstairs was also added. Since the downstairs part of the house is a very open plan, this upstairs area is where the parents go to "get away from the kids." There is a small office directly up the stairs, but, its disadvantage is that it is open to the downstairs. The master bedroom is located to the front of the house and incorporates a small sitting area with a fireplace. This big room can be closed to noise coming from the rest of the house. A big walk-in closet leads to the ensuite bathroom. This upper floor incorporates the attic with a peaked roof on the inside.

Both adults in this household work outside the home. They both take a car to work and seem prepared to commute in order to stay in this house. At the time of the survey, they were both driving one hour to work each way. The couple has no intentions of moving in the near future. However, at the point of the decision to move or expand, this couple probably would have moved except they got caught in the market squeeze. Once they decided to stay and build, they felt satisfied with the final product, although they felt that they would not repeat the process of house expansion while raising preschool children.

Case Study #3

The household in the third case study bought the house as a 'starter home.' They got a 'good deal' on this 1943 home, which they bought in 1966, recognizing that it needed some work. They never expected to be living there 23 years later!

The two children, a boy and a girl, shared a bedroom in this house for eight years. Then the eldest, at age 10, wanting some privacy, moved down into the basement. However, the basement had a low ceiling and she felt isolated from the rest of the family. Thus the household had to look for another solution to the problem of not enough bedrooms. They had applied earlier to put in the addition of a dormer on the east side of the roof, as a sewing room. But with the bedroom pressures for children remaining unresolved they decided that they needed an extra bedroom more than a sewing room, and the use was changed to the master bedroom.

The addition was 192 square feet added to a house with 1535 square feet, a ratio of 0.13. It was built on a lot 53' X 122', zoned R5. Figure 6.3 shows the house in plan view and south elevation while figure 6.7 is a photo of the house.

The framing of the walls was done on the ground the night before the hole was cut in the roof, then taken apart and all the pieces numbered. The next day, with help from his brother-in-law and family, the homeowner cut a hole in the roof with a chain saw and framed in the numbered pieces. The windows form a large part of the east wall of the addition and are removable. It was through this opening that they got the box spring upstairs as the corner at the

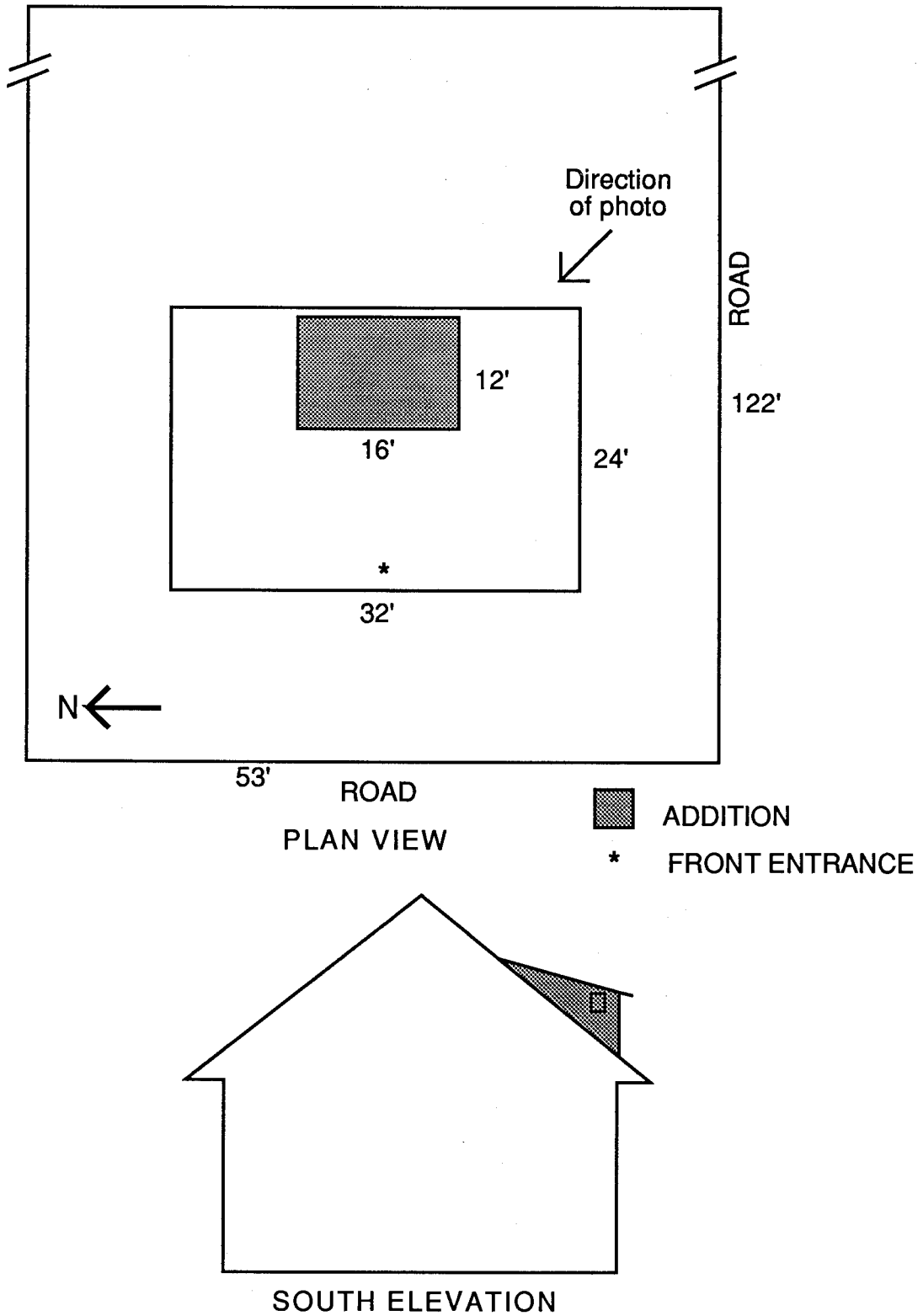


FIGURE 6.3 PLAN VIEW AND SOUTH ELEVATION OF HOUSE IN CASE STUDY #3

bottom of the stairs is too tight to maneuver such a large object up the stairs.

A walk-in closet runs along the wall (the side towards the pitch in the roof) inside the attic. It is 16' long. There is also a built-in dresser. Access to the rest of the attic was retained through a door at either end of the room.

The stairs that lead to the upstairs bedroom are quite narrow and steep. However, they wanted to build a tower of stairs to use existing space effectively. The stairs were passed by an inspector filling in for the regular one who was on vacation. When he came back he was furious and said he would have rejected them because of the steepness and would have made them install a pull down staircase instead. However, since they had already passed inspection, there was nothing he could do.

One of the children, (age 23) will be moving out soon and they are anticipating that her bedroom will be converted to a dining room. Currently there is a nook in the kitchen that seats six, but larger dinners (in the past) have been a problem to host.

The couple is not anticipating moving, at least not until the husband retires. He commutes to Downtown Vancouver by motorcycle in 20 minutes, so this location is perceived to be suitable. With the children apparently beginning to leave home, there seems to be a more relaxed attitude to the issue of space needs and attention now seems to be turning to developing the quality of the existing spaces. Thus, they are considering some renovating and painting to spruce the place up.

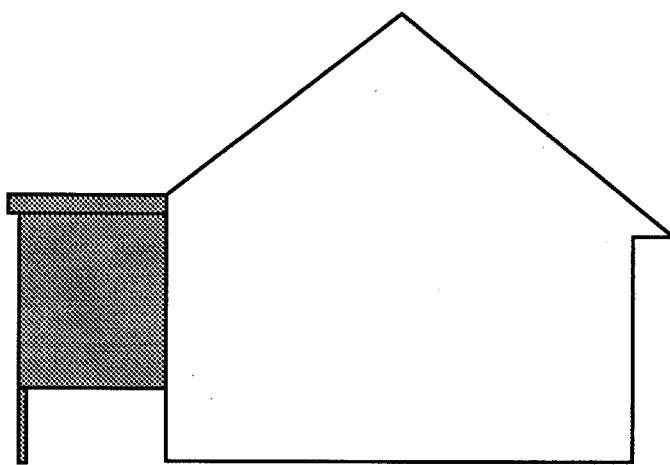
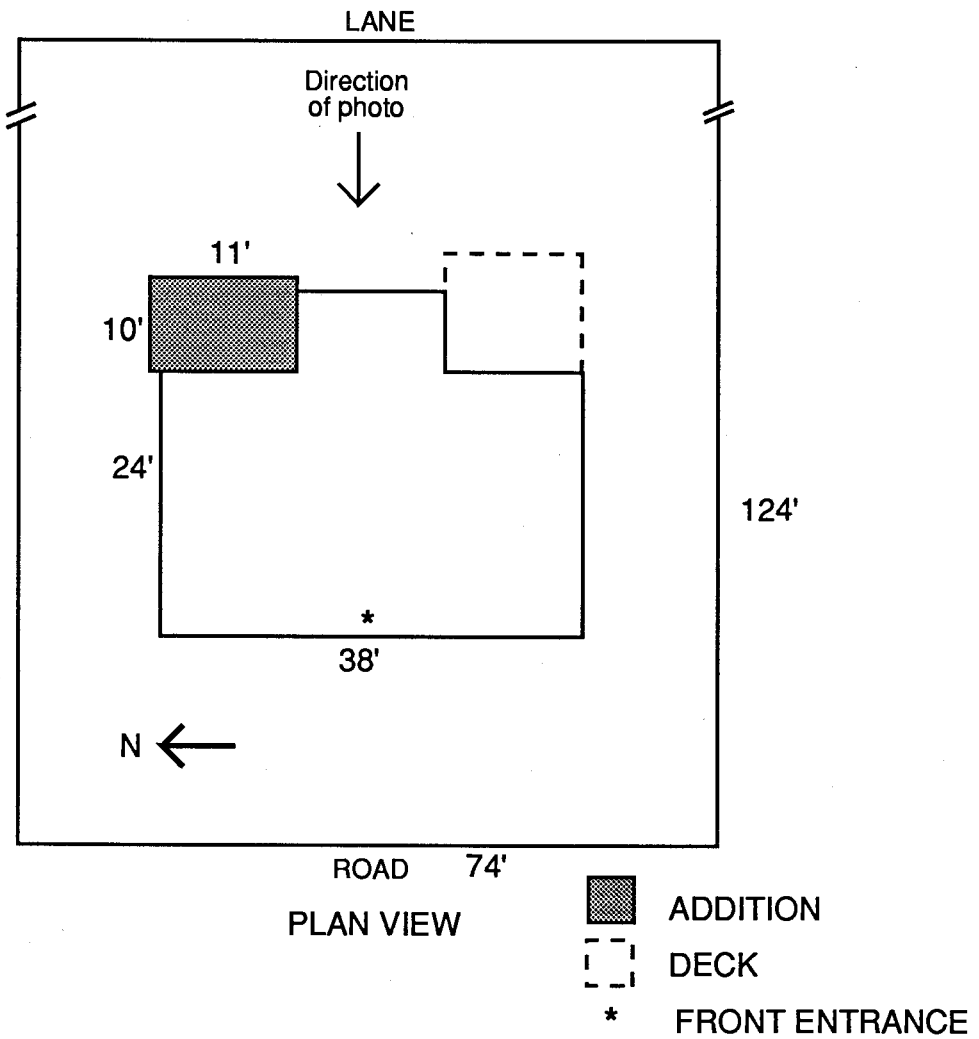
Case Study #4

The fourth case study is an expansion of a dining room. The original house had 1925 square feet, and the dining area was enlarged by 110 square feet, a ratio of 0.06 (figures 6.4 and 6.8). The couple has lived in the 1950 house for 37 years, from 1954 to 1991. All of the four children are married and living in their own homes. There are four grandchildren so when some or all of the children and spouses come for dinner the area in the dining room for a sit-down dinner is too small.

Without the enlargement the dining room table would extend into the living room when it was pulled out to its fullest extent. This was perceived to be unsuitable by the wife, thus the extension was made. The couple would have liked to extend the dining room further into the backyard, but that would have then extended over the basement stairwell. Building codes stipulated that this would not be possible.

At the same time as the dining room extension in 1981, one of the bedrooms was converted to a breakfast/sitting room. The window was replaced by French doors through which one could go out to a small, new deck (dashed line on figure 6.4 A) protruding into the backyard. All work on the 1981 addition and renovation was done by a contractor. It took two months to complete.

The couple do not want to move or expand this house. The kitchen was recently renovated and patio tiles are being installed in the backyard. The bus/skytrain ride to work for the husband is convenient and all needed services are nearby. All of these factors together mean they are hoping to stay as long as physically possible.



NORTH ELEVATION

FIGURE 6.4 PLAN VIEW AND NORTH ELEVATION OF HOUSE IN CASE STUDY #4

Along with case #1, this household seems to have resolved its external and internal spatial arrangements in a particularly satisfying way.

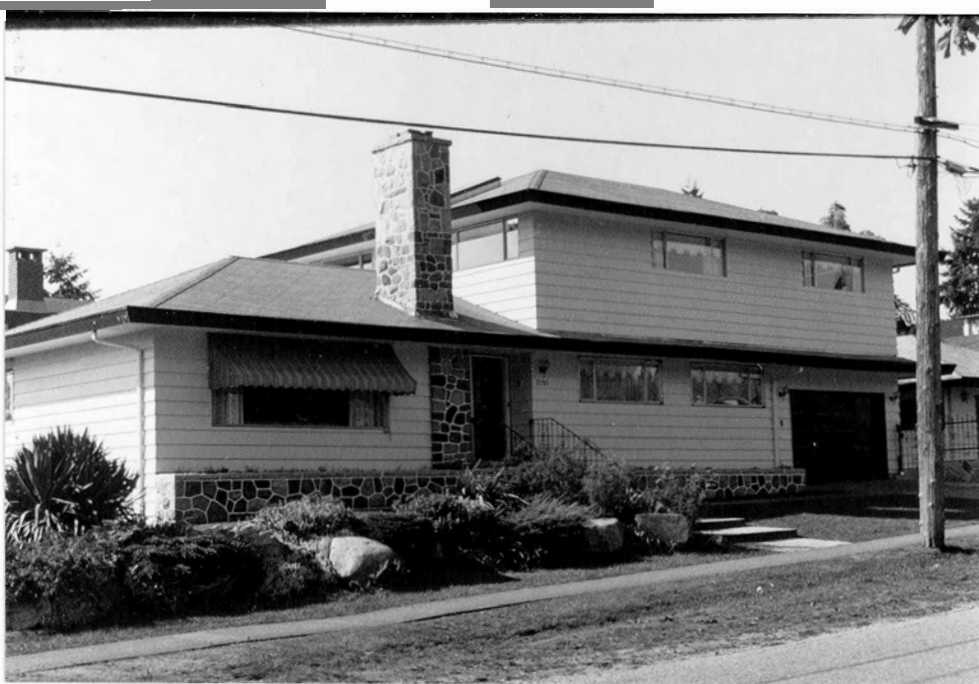


Figure 6.5 Photo of House in Case Study #1



Figure 6.6 Photo of House in Case Study #2



Figure 6.7 Photo of House in Case Study #3



Figure 6.8 Photo of House in Case Study #4

Chapter 7

Conclusion

This thesis enquired into many aspects of house expansion with regards to the physical house structure and the households involved. The three-fold purpose of this thesis was to: first, to examine and summarize the characteristics of additions made to single family dwellings in the municipality of Burnaby between 1980 and 1985; second, to enquire into the characteristics of the households that made the additions with a view to determining the reasons for their efforts to expand their dwellings, and; third, to examine the relationship between the type of addition and housing needs, and life cycle stages of the household.

The results showed that additions made to houses did not particularly show any pattern or relationship to aspect (as defined in chapter one). Expansion did not relate to cardinal direction in a way to provide understanding of household behavior. Instead it was found that the additions were strongly related to zoning bylaws, pre-existing house shapes, lot shapes and sizes. Further work in analyzing additions with regards to window placement may hold significance for unlocking the usefulness of aspect.

Closely related to this concept is the issue of orientation, that is on which side of the house the addition was located. Results showed that additions were most commonly built to the rear of homes and then sides and least often, front. This as well is related to zoning bylaws and lot shapes and sizes.

The space added to houses was analyzed in three different ways. First, aggregate space was summarized. Second, how the areas were divided, partitioned space was analyzed. Third, the function of the space was discussed.

In terms of aggregate space, the mean pre-expansion size of sampled dwellings was just over 2000 square feet while the mean addition area was 550 square feet. Households with children lived in bigger pre-expansion houses and made larger additions than did households without children. This represents a considerable amount of new residential living space added to the municipality of Burnaby over the six year period. Given in terms of mean pre-expansion house sizes, the equivalent of 310 houses had been built during the time period of 1980-1985. However even though this is substantial, house additions are still seen as insignificant and unworthy of comment as compared to new dwelling completions. The considerable amount of construction activity by way of additions is increasing the size of the basic house throughout Burnaby.

The spatial distribution of pre-expansion houses and additions with regards to size differs across different areas of the municipality. Sub-regional patterns of construction emerge. Areas with large ratios (small to medium-sized houses with large additions) are located in the neighborhoods of Burnaby Heights, Capitol Hill and near Canada Way. Areas with medium ratios (large and medium-sized houses with medium-sized additions) were found in large clusters in the north central area of Burnaby, southwestern Burnaby and near the Garden Village neighborhood. Areas of Burnaby with small ratios (large and medium-sized houses with small

additions) seem to be in the neighborhoods of Brentwood Park, Lochdale, Cascade Heights and Suncrest.

The partitioning of space showed differences when the two life cycle groups were compared. Not only did households without children add less space, they also added or extended fewer rooms. However in all cases more rooms were added than extended, representing the need to define space for specific uses which can be closed off from the rest of the house as opposed to just more space and flexibility within the existing rooms.

It was interesting to study the functions of rooms because it was thought that in this aspect there would be differences in the types of rooms added. Indeed there were some differences but they referred only to the number of rooms added. Both households with children and those without children added bedrooms, general activity family rooms and bathrooms most often.

The number of persons in a house reflects on the need to expand the house. The mean number of persons in the household for Burnaby was 3.8 while the number of adults was 2.4 and the number of children was 1.2. The average age of the head was younger for those households with children than for those without.

Households in the survey moved from Vancouver to buy the house which they expanded, indicating a suburbanizing trend. The next most popular origin was Burnaby. They bought the house most often because of the neighborhood characteristics.

The journey to work is an important consideration for households when considering the options to move or expand. The most frequent work destination was Burnaby with Vancouver the

next most popular destination. Most people travelled by car and the average commuting time was just over ten minutes. There was some variation between the sexes on journey to work variables. More information would have been useful in the area of journey to work considerations, as a way of understanding the households in this study which choose the option to stay and build.

The stability of the population which expanded their houses is indicated by the length of time a household had occupied a house before this expansion, an average of 13 years. More households with children intended to expand their houses and did so after a shorter period of time than households without children. The mean length of time for households with children to finish their expansion was shorter than for those without children. However, fewer households with children considered moving as a way of solving the space problem.

The thesis studied in detail the households in stage six of the life cycle, since this was a larger group than expected within the sample. It was thought that households without children would not be as likely to expand their houses since the number of persons in the house would be fewer and therefore the perceived need for space would be less. The main findings of this section were that with increasing age of the household head, the size and number of rooms per project decreases. As well, the mean length of time the household has lived in the house increases with increasing age of the household head. The most frequently built rooms were general activity family rooms, bedrooms, kitchens and bathrooms although

the numbers for this section were small. Few of the households with older household heads considered moving.

The data for chapters four and five on the physical characteristics of the additions and the behavioral characteristics of the households which made the additions showed some patterns and trends within Burnaby over the time period indicated. Households with children added more space to more rooms per project with different uses than households without children. These general results were augmented with case studies, each representing a different stage in the life cycle and a different type of addition. These case studies made specific reference to decisions households made when considering the moving/adding dilemma, as well as specific lifestyle characteristics which determined how they arranged their houses.

This thesis enquired into the spatial distribution of additions to houses at the municipal level and distribution of space in the house at the individual household level. These related aspects give insight into the the overall processes of urban development and the process of residential transformation.

Appendices

- A. Survey Forms and Correspondence**
- B. Summary Data**
- C. Census Tracts**

Appendix A

Survey Forms and Correspondence

House Characteristics Recording Form

NO. _____

Year _____

Permit # _____

Owner _____

Address _____

A. CHARACTERISTICS OF EXPANSION:

1. Aspect _____ 1 _____
2. Orientation _____ 2 _____
3. No. rooms added _____ 3 _____
4. No. rooms extended _____ _____
5. Building Complement _____
6. Uses (by level)

B. SIZE OF HOUSE:(in square feet)

7. No. of stories _____
 8. Pre-exp 1 _____
 2 _____
 3 _____
 9. By level 1 _____
 2 _____
 3 _____
 10. Addition + _____
-

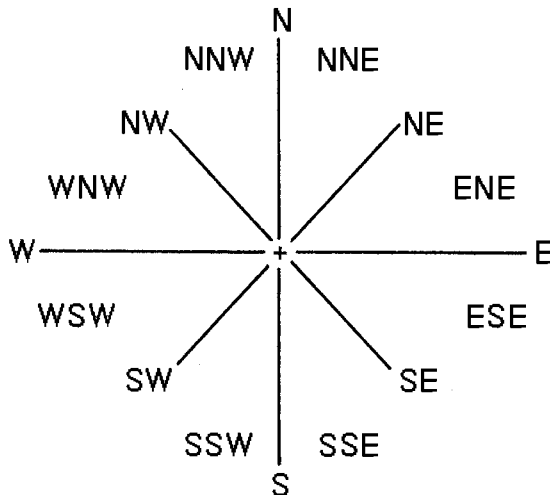
C. GENERAL CHARACTERISTICS

11. Date house built _____
12. Dimensions of lot _____
13. Addition constructed by: (circle one) OWNER CONTRACTOR

D. SKETCH AND COMMENTS (on reverse)

CLASSIFICATION SHEET

Aspect



Orientation

- 1 front
- 2 left side
- 3 rear
- 4 right side

Building Complement (#1-8 from Evenden 1982, #9 added by author)

- 1 storey-basement or upstairs
- 2 wing (2 or more rooms)-to create L shape or corner wing; three outside walls
- 3 room(s) attached-three outside walls
- 4 expansion of existing rooms-former outside wall removed
- 5 corners-inner corner fill-in, two outside walls; outer corner fill-in, two outside walls; outer corner wrap-around, four outer walls; outer corner wrap-around, five sides
- 6 enclosure of previously defined space-sundeck, patio, carport etc.
- 7 roof and side detail-addition of dormer, bay window, etc.
- 8 miscellaneous-connector to outbuilding
- 9 storey and rooms attached-to create vertical L-shape; usually encompasses complements 1 & 3, storey can be top or basement

October 27, 1989

Dear Sir/Madam,

I am a graduate student researcher at Simon Fraser University and I am studying how houses in Burnaby are sometimes expanded by home owners.

A sample of houses which were expanded between 1980 and 1985 has been randomly selected. Your name came up in this selection process.

The purpose of the inquiry is to try to find out how and why houses are changed and expanded in response to the changing needs of families, and it is in this connection that I am contacting you. The enclosed questionnaire lists the information I am seeking, and I would be very grateful if you could fill it in and return it in the **stamped, self addressed envelope provided**, before **Wednesday, November 22, 1989.**

Please be assured that this information will be treated anonymously. (Please do not put your name on the form.) Further, it will be used only in grouped forms such as averages and totals.

Thank you very much for your cooperation. If you have any questions or would like further information please contact me by telephone at 522-0672 (residence) or at the above address.

Yours sincerely,

Kim Alexis

October 22, 1989

Dear Sir/Madam,

The enclosed letter and questionnaire are being sent to you by Kim Alexis, a registered graduate student in geography at Simon Fraser University.

As part of her thesis studies, Mrs. Alexis has chosen to study how (single family) houses are changed in response to the changing needs of households. Her questionnaire asks for certain information which will help to identify patterns of such activity.

The success of the project depends upon this kind of information, and, as the thesis supervisor, I would be grateful if you could assist by responding to the questions. The information will be used only for the purpose stated here, and in combination with other information from other respondents.

Thank you for your co-operation.

Yours sincerely,

L. J. Evenden
Associate Professor
Urban Studies in Geography

November 27, 1989

Dear Sir/Madam,

I sent to your home a questionnaire concerning your expansion project. It deals with houses expanded during 1980-1985 in Burnaby, B.C.

If you are among the many people who promptly responded, I sincerely thank you for your time and effort. If however you have not yet completed the questionnaire please do so **as soon as possible**. I have enclosed another copy, in case the last one was somehow misplaced. It should only take, at maximum, 15 minutes to complete.

Please be assured that all responses will be considered only in grouped format. Your answers and comments are important.

Thank you for taking the time to complete the questionnaire.

Yours sincerely,

Kim Alexis

SIMON FRASER UNIVERSITY

DEPARTMENT OF GEOGRAPHY

Telephone: (604) 291-3321
Fax: (604) 291-4455



BURNABY, BRITISH COLUMBIA,
CANADA V5A 1S6

April 29th, 1991

To Whom It May Concern:

The bearer of this letter, Mrs. Kim Alexis, is a registered student at Simon Fraser University, studying for her M.A. degree in urban geography. For her thesis she is engaged in a study of single family housing in Burnaby. She is particularly interested in what happens when homeowners decide to build additions onto their homes and has now reached the stage when she needs to ask homeowners how they went about the work of building an addition. To do this she has selected a few cases which seem to have had a lot of thought put into them, and it is in this connection that she has approached you.

As the supervisor of this thesis work, I should be very grateful if you could spend the few minutes needed to discuss the questions that Kim has to ask. The exercise is strictly an academic one - there is no commercial or government involvement whatever.

If there is any further confirmation required, I may be reached at 291-3635, or a message for me to return your call may be left at the Department of Geography at 291-3322.

Thank you very much for your help.

Yours sincerely,

L.J. Evenden
Associate Professor

STUDY OF SINGLE FAMILY HOUSE EXPANSION IN BURNABY

Department of Geography
Simon Fraser University
Kim Alexis

A. HOUSE CHARACTERISTICS

1. Number of rooms in house: _____
2. Full basement: yes _____ no _____
If "no", is there a partial basement?
yes _____ no _____
3. Proportion of basement finished: (circle one)
< 1/4 1/2 3/4
4. Uses of basement rooms: (list) _____

5. What form did your expansion take? (eg. extra bedroom on rear of house, upstairs added, etc.)

B. FAMILY AND HOUSEHOLD CHARACTERISTICS

Please answer section B according to size and age of household at the beginning of the expansion project.

1. Number of persons in household: _____
2. Number of adults: _____
3. Number of pre-school children:
girls _____ boys _____
4. Number of elementary school children:
girls _____ boys _____
5. Number of secondary school children:
girls _____ boys _____
6. Children's years of birth:

7. Decade of adult's births: (eg. 1950's)
_____ M _____ F
8. Do the children have separate bedrooms?
yes _____ no _____

9. Have they ever shared bedrooms while you lived in this house?

yes _____ no _____

If "yes", at what stage did they move into separate bedrooms?

C. HOUSEHOLD TENURE AND JOURNEY TO WORK

1. How long have you lived in this house?

2. Where did you move from? (If outside the present municipality, please indicate town, province, or country; if within the present municipality, please indicate neighborhood eg. Brentwood.)

3. Did you decide to live here mainly because: (circle one or more)

- a) you liked the house
- b) you liked the neighbourhood
- c) there was good house market potential
- d) the journey to work was convenient
- e) the price was right
- f) other (specify)

If you chose (d) from the question above, was the journey to work more convenient for: (circle one)

- a) male b) female c) both

4. Where does each adult work? (eg. downtown Vancouver, North Burnaby, New Westminster, etc.)

M _____

F _____

(continued on page 2)

5. Estimate the time spent commuting each day (one way to work) for each adult who goes to work. _____ M _____ F

6. How do you normally go to work? (eg. by bus, car, skytrain, etc.)

M _____

F _____

D. EXPANSION DECISIONS AND PROJECT

1. Estimate how long you actively planned to expand your house, before actually doing so.

2. Did you consider the alternative of moving to a larger house?

yes _____ no _____

If "yes", did you actually put your house up for sale? yes _____ no _____

3. Why was moving rejected? (circle one or more as appropriate)

- a) cost
- b) lack of another house of equal quality
- c) house did not sell
- d) neighbourhood characteristics
- e) desire to stay with the same school
- f) journey to work considerations
- g) other _____

Comment on choice of answer:

4. When you moved into this house did you intend to expand it?

yes _____ no _____

If "yes", how long was it after you moved in before expansion work actually began?

5. Was your decision to expand connected with your stage of family or household development?

yes _____ no _____

Explain:

6. Were the blueprint plans for the project drawn by: (circle one)

- a) an architect
- b) builder/contractor or builder's draughtsman
- c) member of your own household or friend

7. Was the work carried out mainly by:

- a) general contractor who did everything
- b) several sub-trades co-ordinated by the homeowner
- c) several sub-trades co-ordinated by an independent project manager
- d) home owner
- e) other _____

8. It is common for homeowners to be physically involved in home expansion projects. How would you describe your involvement? (circle one or more)

- a) major participation in certain areas in which we have skills (eg. painting, carpet laying, etc.)
- b) worked with most trades as helper
- c) worked only as co-ordinator but did not do physical work
- d) restricted participation to preparation, clean up, and "being on hand" to answer questions
- e) "threw up hands" in despair, avoided contact with the project to the greatest possible extent
- f) undertook to do the major finishing work at a pace the household could stand

9. How long did project take from start to finish?

10. In the end, would you say the project was reasonably well on budget?

yes _____ no _____

If "no", what went wrong? _____

11. Have you expanded your house again since 1986?

yes _____ no _____

Appendix B

1. List of Rooms Added For Burnaby and the North Shore (from building permits)

ROOMS ADDED	BURNABY		NORTH SHORE
	N	%	%
BEDROOM GROUP			
bedroom	169		
dressing room	1		
guest room	2		
loft	2		
total	174	25%	30%
BATHROOM GROUP			
bathroom	102	15%	13%
HALLWAY AND ENTRANCE GROUP			
entry	22		
foyer	1		
hall	6		
lobby	1		
mud room	4		
stairs	1		
total	35	5%	7%
KITCHEN GROUP			
kitchen	59		
nook	5		
total	64	9%	8%
PUBLIC ROOM GROUP			
buffet	1		
dining room	44		
dinette	3		
living room	32		
total	80	12%	12%
FAMILY ROOM GENERAL ACTIVITY GROUP			
den	11		
family room	59		
games room	2		
playroom	2		

recreation	12		
sitting room	2		
solarium	8		
sunroom	22		
T.V. room	2		
total	120	17%	15%

FAMILY ROOM SPECIALIZED ACTIVITY GROUP

billiard room	1		
canteen	1		
exercise room	1		
gallery	1		
greenhouse	2		
gym	1		
health room	1		
hobby room	1		
hot tub room	1		
hothouse	1		
library	1		
plant room	1		
pool	3		
sauna	4		
sewing room	3		
studio	3		
study	2		
whirlpool	1		
wine room	2		
total	31	5%	5%

UTILITY ROOM GROUP

cooler	1		
furnace room	2		
laundry room	8		
storage	24		
utility room	10		
workshop	2		
total	47	7%	9%

UNFINISHED	30		
UNKNOWN	8		
total	38	6%	1%

GRAND TOTAL	691	100%	100% (N=645)
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2. LIST OF THE USE OF BASEMENT ROOMS (A4)

bathroom	28
bedroom	48
billiard room	1
cold cellar	2
<u>computer room</u>	<u>4</u>
den	4
entry	1
family room	14
freezer	1
<u>furnace room</u>	<u>4</u>
games room	3
guest room	7
gym	2
hot water tank	2
<u>in-law suite</u>	<u>1</u>
kitchen	7
laundry	55
library	2
living room	4
<u>office</u>	<u>6</u>
pantry	1
playroom	7
pool	1
recreation room	35
<u>sauna</u>	<u>4</u>
shop	1
storage	29
studio	1
study	1
<u>suite</u>	<u>1</u>
tack room	1
T. V. room	8
tool room	2
utility room	5
<u>weight room</u>	<u>1</u>
workshop	17
<hr/>	
total	311

3. Was your decision to expand connected with your stage of family or household development? (D5)

- Yes Teenagers need more privacy which they got
- Y
- Y Children were getting older
- Y Expecting children
- Y We bought a second car
- Y Son wanted to build - so moved house to allow for subdivision
- Y Try fitting 4 teenagers into a kitchen 17 X 9 square feet including facilities for eating. Area now 17 X 22 and family area 12 X 12. All of areas open.
- Y Children growing - needed more room
- Y Family grew - ie. inlaw, grandchildren
- Y Needed a family room - enclosed carport
- Y Family was growing up, house was old and needed renovation
- Y Wished extra bedroom and family room on main floor not in basement
- Y Because of family - built inlaw suite for mother-in-law
- Y Kitchen was too small
- Y Our family grew from two children to four children
- Y Two babies would require additional room
- Y
- Y Children - nanny space needed and bedrooms
- Y Rooms too small. Mainly interested in expanding kitchen and dining area
- Y We wanted the expansion finished before we had our children
- Y Second child one years old
- Y I was pregnant with first child
- Y Needed one more bedroom
- Y Needed more space with more children
- Y We had no children when we first bought house. Need more space for play area and storage
- Y Health reason and need for larger kitchen (3 females)
- Y We could afford it
- Y House initially only 2 bedrooms 650 square feet
- Y Children needed more room at that time
- Y Not enough room for 3 children, both in sleeping areas and living space
- Y More room and separate bedrooms for kids
- Y Expansion for reason of larger kitchen, for entertaining
- Y Children grew older and needed own room
- Y Kitchen space was too small - unable to move

- Y Parents sold their home - private living quarters built to accommodate them
- Y Children growing needed room
- Y Planning to have children
- Y Children required play space - we needed bedroom and bathroom for visiting inlaws (occurred frequently)
- Y Married in 1981 - house too small and inconvenient
- Y Household development - more spacious-previously narrow
- Y
- Y Growing business. More children. Not enough space.
- Y Inadequate dining area for buffet and piano
- Y Age differential required separate rooms especially between high school and university
- Y Family size - 3 kids
- Y Young kids like schools and location
- Y Children need separate rooms and formal dining room required
- Y Room to breathe
- Y We decided that if our second child was a 2nd girl we probably wouldn't expand, but it was a boy so we knew eventually we would need a third bedroom.
- Y The house was too small for a family
- Y We have expanded this house 3 times. Once was so the children could have separate bedrooms and extra bathrooms.
- Y With one boy and one girl we needed 3 bedrooms
- Y Bedroom too small
- Y Wanted more room, house too small
- Y
- Y Children and aging inlaws
- Y Close to school and work
- Y We needed more room for children
- Y Adult children left and made it possible to convert upstairs bedrooms into studio space
- Y
- Y House too small
- Y More comfort in sunroom than sundeck, can also be used 12 months a year
- Y Felt a bigger kitchen would be easier when having a family
- Y House was too small
- Y Rooms too small and layout out of date, only 1 bathroom
- Y Wanted garage and additional family room

67 Yes answers

No

N

N Housing bylaw changed to allow us to build. Also we had more funds.

N Lived in a townhouse - wanted a house in town

N Sundeck not practical but family room takes wear off living room - laundry room moved up from downstairs, gives good "mud room" entrance and provides workshop down.

N

N

N Just decided wanted more space and cupboards in kitchen

N

N Desired larger house of sufficient size and layout. Previous house (original house on property) too small for needs. Also did not like layout.

N

N

N Built sunroom with greenhouse under for retirement leisure

N Family room desirable

N Just wanted more room in kitchen

N Husband artist needed more studio space. Wife wanted office space. Needed space for collections - love of pottery and kitchen garden.

N Desire for more space

N We wanted to install a spa

N We needed a new sundeck and thought why not make the laundry room and storage below it?

N

N We needed an extra bathroom and guest room

N More actual living space

N

N

N Just a desire to have sundeck which is now covered, too much problem with water

N Expanded with new and larger enclosed porch in lieu of repairing

N Decided we were going to stay here for as long as we could

N Needed larger greenhouse and workshop

N Addition made to improve comfort

N

N We wanted more room for more gracious living

N

- N Had always planned to move to a larger home, used the excuse that we would wait for the boys to change schools eg. junior to senior - never got around to moving - boys graduated and ready to move out on their own. We renovated
- N
- N Just wanted bigger kitchen
- N
- N One extra room added upstairs which can be used as either a family room or formal dining room 12' X 20' in area
- N Wanted a leisure area

38 No answers

Total answers-105

4. LIST OF PREVIOUS LOCATIONS OF HOUSEHOLDS (C2)

19th & Rupert	Surrey - (2)
4600 Frances St. Burnaby	V. G. H. area
Bahamas	Vancouver - (20)
Brentwood - (3)	Vancouver - Collingwood
Burnaby - (5)	Vancouver - Kerrisdale
Burnaby Heights - (2)	Vancouver - Mt. Pleasant
Calgary	Vancouver - West End - (4)
Capitol Hill	Vancouver - Westridge
Cascades	Vancouver Heights - (2)
Central Park - (2)	Vancouver Island
Downtown Vancouver	West Vancouver
East Vancouver - (4)	Willingdon Heights
Edmonds & Canada Way	
Edmonds area - (2)	
Halifax / Montecito	
Kamloops	
Kelowna	
Kingsway & Nelson	
Malaysia	
Marpole	
Metrotown	
Middlegate	
Mission	
Montecito	
Montreal	
Moose Jaw, Saskatchewan	
New Westminster	
North Burnaby - (3)	
North Vancouver	
Nova Scotia	
Oakland & Baffin	
Oakridge	
Old Orchard - (2)	
Ontario	
Ottawa	
Port Moody - (2)	
Prince George	
Royal Oak & Kingsway - (2)	
South Burnaby - (9)	
South Slope	
South Vancouver - (2)	

5. LIST OF WORK DESTINATIONS (C4)

<u>Male</u>	<u>Females</u>
all over	Burnaby - (12)
Annacis Island	Burnaby - self employed
B. C. Coast	Central Burnaby - (5)
Boundary & Canada Way	Downtown Vancouver - (11)
Burnaby - (11)	East Vancouver - (3)
Burnaby - self employed	Home - (9)
Central Burnaby - (4)	Metrotown - (2)
Coquitlam - (2)	New Westminster - (3)
Downtown Vancouver - (12)	North Burnaby- (9)
East Vancouver - (4)	North Vancouver
Films - no location	Oakridge
Granville & Broadway	Retired - (4)
Home	Richmond - (3)
Lower Mainland - (4)	South Burnaby - (7)
New Westminster - (6)	St. Paul's Hospital
North Burnaby - (13)	Surrey
North Vancouver - (5)	V. G. H.
Port Coquitlam	Vancouver - (10)
Port Moody	Willingdon & Canada Way
Province wide	
Retired - (6)	
Richmond - (3)	
S. F. U.	
South Burnaby - (6)	
Surrey - (2)	
U. B. C.	
Vancouver - (9)	
West Vancouver	

Appendix C

Census Tract	Population	% Non-Movers ¹	% Movers ²	Dwellings ³	% Owned ⁴	% Rented ⁵	% Single Family ⁶
220	959	50	50	305	62	36	75
221	7,962	69	31	2,740	83	17	86
222	4,390	57	43	1,570	80	21	81
223	6,017	44	56	2,150	42	57	45
224	6,541	42	58	3,425	23	77	18
225	6,330	56	44	2,355	57	43	60
226	6,784	42	58	3,535	27	73	25
227	6,516	20	80	4,100	16	84	1
228	9,008	48	52	4,255	42	58	27
229	5,037	55	45	1,730	60	40	59
230	6,827	56	44	2,450	64	36	51
231	3,584	64	35	1,155	79	21	74
232	2,187	62	38	690	78	22	87
233	4,935	60	40	1,730	71	29	80
234	3,105	66	34	1,010	82	19	86
235	11,348	30	70	5,560	33	67	7
236	3,542	73	27	1,025	93	6	96
237	5,953	47	53	2,300	54	46	38
238	8,783	67	33	2,890	75	24	71
239	6,413	57	43	2,575	55	45	55
240	6,670	55	45	2,555	58	42	66
241	6,042	56	44	2,365	56	43	58
242	6,305	61	38	2,530	65	35	68
243	9,974	37	63	3,350	52	47	43
BBY	145,161	51	49	58,350	52	48	46

Table A Summary of Population, Movers and Dwelling Characteristics for Census Tracts in Burnaby, B.C. for 1986 Census Year.

Census Definitions

¹ The percentage of people over the age of five who reside in the same dwelling as at the time of the 1981 census.

² The percentage of people over the age of five who reside in a different dwelling than in the 1981 census.

³ Occupied private dwelling - a private dwelling where a person or group of people permanently reside. It must be a separate set of living quarters although it may have a common lobby or hall. The classes of dwellings are: Single Family dwelling, Apartments over 5 storeys, Movable Dwellings and Other Dwellings (semi-detached house, row-house, other single attached house, apartment or flat in detached duplex and apartment in a building that has fewer than 5 storeys).

⁴ Owned - a dwelling is classified as owned even if it is not fully paid for, such as one which has a mortgage or some other claim on it. The dwelling may be situated on rented or leased land or be part of a condominium.

⁵ Rented - a dwelling is classified as rented even if it is provided without cash rent or at a reduced rent or if the dwelling is part of a co-operative.

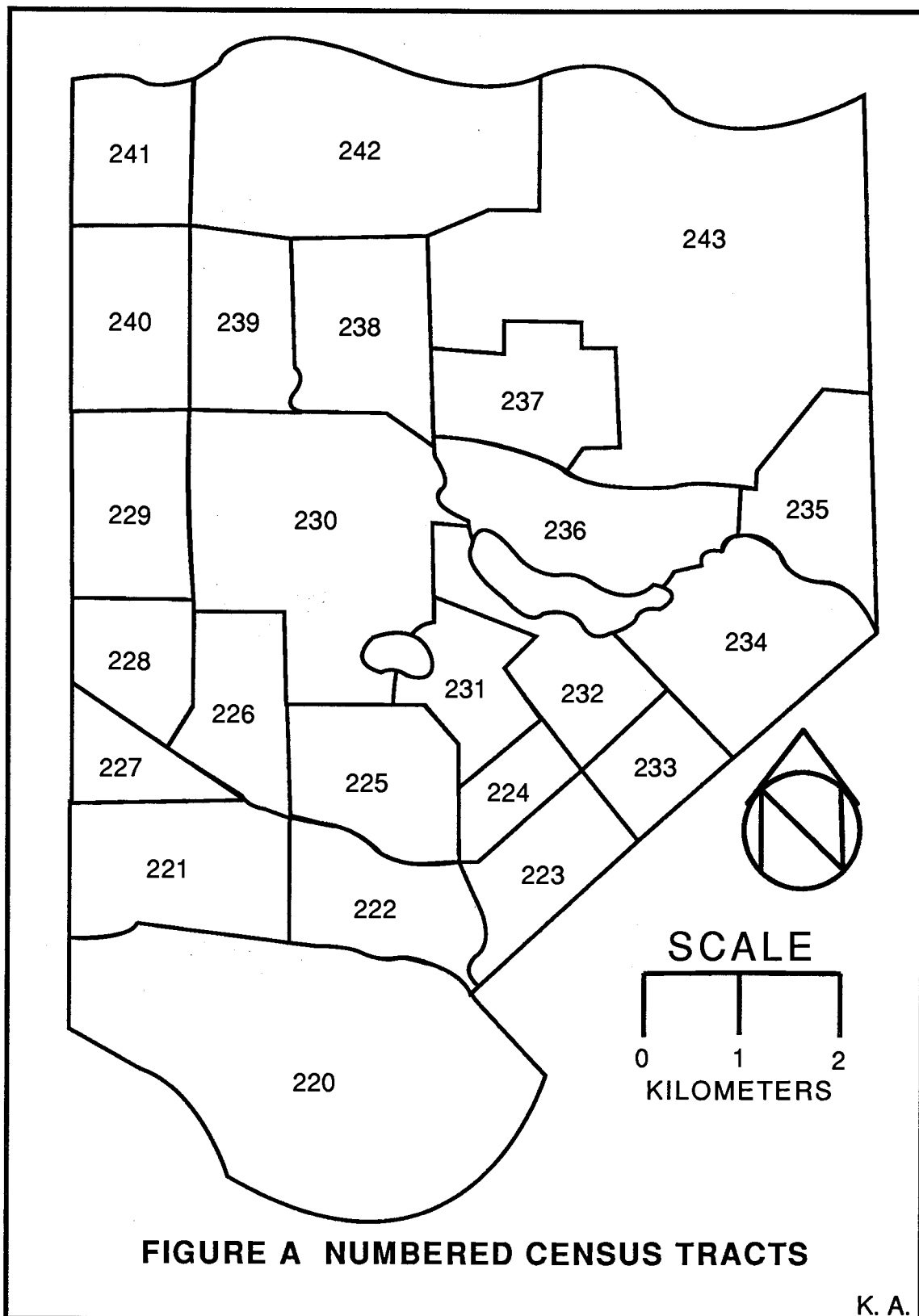
6 Single family dwelling - a single dwelling not attached to any other dwelling or structure (except its own garage or shed). A single detached house has open space on all sides and has no dwelling either above or below it.

Census Tract	Number of Persons ¹ Per Hshld	Number of Census ² Families	% of ³ CF with H&W	H&W ⁴ with No Children	H&W ⁵ with Children	Total # ⁶ Children at Home	# Children Per Family
220	3.03	240	88	35	52	320	1.33
221	2.83	2,325	91	42	49	2,340	1.01
222	2.75	1,290	89	42	47	1,305	1.01
223	2.78	1,610	76	30	47	2,050	1.27
224	1.77	1,460	87	59	28	970	0.66
225	2.68	1,805	86	41	45	1,875	1.04
226	1.91	1,740	87	59	29	1140	0.66
227	1.59	1,570	82	70	12	645	0.41
228	2.06	2,360	88	52	36	1,880	0.80
229	2.49	1,210	88	45	43	1,200	0.99
230	2.64	1,745	88	36	54	2,040	1.17
231	3.10	1,030	91	35	55	1,235	1.20
232	3.13	615	89	33	57	770	1.25
233	2.77	1,335	88	35	52	1,585	1.19
234	2.93	870	87	37	52	1,015	1.17
235	2.04	3,075	83	51	32	2,335	0.76
236	3.47	985	93	28	65	1,415	1.44
237	2.56	1,625	88	39	49	1,750	1.08
238	3.00	2,470	88	33	55	3,045	1.23
239	2.47	1,805	89	46	42	1,685	0.93
240	2.59	1,810	88	41	46	1,920	1.06
241	2.44	1,520	88	43	44	1,520	1.00
242	2.48	1,715	87	41	47	1,785	1.04
243	2.95	2,760	86	29	57	3,540	1.28
BBY	2.43	38,970	87	43	45	39,365	1.01

Table B Summary of Census Family Characteristics and Number of Children from 1986 Census

Census Definitions

- 1 Household - refers to a person or group of persons who occupy a private dwelling and do not have a usual place of residence elsewhere in Canada.
- 2 Census Family - refers to a husband and a wife (with or without children who have never married, regardless of age), or a lone parent of any marital status, with one or more children who have never married, regardless of age, living in the same dwelling. For census purposes, persons living in a common-law type arrangement are considered as now married regardless of their legal marital status.
- 3 The percentage of census families with husband and wife.
- 4 The percentage of census families with husband and wife and no children at home.
- 5 The percentage of census families with husband and wife and children at home (any unmarried children, regardless of age)
- 6 Any unmarried children regardless of age.



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