DEVELOPMENT STANDARDIZATION: ITS ORIGINS, IMPLEMENTATION AND EFFECT ON THE RESIDENTIAL ENVIRONMENT

by

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A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS
in
THE FACULTY OF GRADUATE STUDIES
School of Community and Regional Planning

We accept this thesis as conforming
to the required standard

THE UNIVERSITY OF BRITISH COLUMBIA

October 1987

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ABSTRACT

The built environment has evolved through a layering process of both human needs and aspirations. We as a society 'worship' the remnants of these richly varied and complex environments. In the previous 100 years, however, our environment has become a battleground for survival on many levels: environmental health, societal boundaries and quality of life. The so-called haphazard mode of environmental development was proceeding so quickly that 'MAN', through organization and control, sought to harness rampant growth by providing a mechanism to, in essence, protect us from ourselves. This mechanism was development standardization.

Zoning and subdivision standards initially had a very positive effect on residential districts. They achieved the desired objective of improving the health, safety and welfare of local citizens. To remain a successful regulatory mechanism, however, requires frequent review. (Generally government regulations are continually reviewed because of a need to respond to current reality - a typical example is tax reform laws). This is especially true for development regulation, which necessarily must respond to the rapidly changing and dynamic evolution of the North American city and its peoples.

In the case of residential development standards, however, there has been a lack of policy review resulting in a back-water of no change to the standard. Development standards, that were a direct response to mass housing development in the early nineteen hundreds, in many instances are still in place in municipalities in the Greater Vancouver area and likely throughout many other North American cities as well.

It is apparent that the very standards that were invoked to ensure residential quality are now preventing development from creating that quality. At the core of the issue of planning and design standards is the lack of understanding of these two disciplines - by each other and by the public. As a result, in many instances both planners and the public equate design with a simple problem solving process according to explicit rules - the standards. Herein lies the core of the problem. This misrepresentation of design and what it stands for in terms of environmental quality. This misunderstanding has greatly influenced the world we live in and this influence as of late is not of the positive nature.
The thrust of this thesis is an exploration of the issue of design in the context of residential development standards. What are the standards which influence/impact residential development? What were the objectives for which these standards were originally implemented? How do the standards currently support the implementation of recognized design principles which lead to high quality environments? What kind of residential world is created by adherence to the standards and what opportunities are lost?

It is evident from this study that while the mechanism and often the mathematical formula of development standardization have remained relatively constant during the past half century, the city and the city dweller have not. Most new neighborhoods in today's North American city lack identity, character and quality environment due to a set of zoning and subdivision standards that are antiquated and often based on arbitrary numbers. The case study examples of Village Homes in California and Ashcroft subdivision in Richmond, illustrate that conventional development standards prevent adherence to established residential design principles and that the nature of development standards is such that they are unable to contend with important and often basic design issues that are not amenable to simple arithmetic formula and measurement. It is also clear that standards not only adversely effect the physical condition of the residential environment, but also the people involved in the process of designing, constructing and regulating residential development. The designer is disillusioned, the developer confused, and the planner misfocused. The result is poor design, poor development, and poor planning. The failure to adopt and implement consistent and up-to-date policies and objectives for residential development standards has lead to the creation of stale, un-inviting, un-interesting and characterless living environments. The lesson to be learned here is that planners must first become more in tune with the issues and principles of design and second they must not be afraid to question established planning mechanisms. We therefore must ensure that a) the best mechanism is being employed and b) that it is based on appropriate and current policies and objectives that are leading to a better residential environment.
The occupied landscape may be richer by far in all the subtle amenities of the original land if only the designs we apply are...becoming to the form as well as to the complexion of the meadows, woods and slopes we presume to compliment...Landscape character should be intensified, not obliterated; and the ultimate harmony should emerge as a blend in which the native quality of the region and the spot still prevails after the inevitable mutilation of the construction undertaken to produce needed roads, buildings and other works of civility and comfort. These "humanized" landscapes are to us the most inviting and beloved, and we are pleased and inspired largely insofar as the whole structure and sentiment of the landscape can be preserved.

There can be no deviation from the rule that the newly prepared landscape must be...a distillate or sublimation of the original myriad forms if it is to be a work of art in the sense of a high art form, timeless and historical.

Stanley White
# DEVELOPMENT STANDARDIZATION: ITS ORIGINS, IMPLEMENTATION AND EFFECT ON THE RESIDENTIAL ENVIRONMENT

## ABSTRACT


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ACKNOWLEDGEMENTS

I would like to acknowledge and thank the following people for their direct and indirect contributions to this thesis: Canada Mortgage and Housing for their financial support during the previous year; Moura Quayle and Brahm Wiesman, whose critiques and advice were well balanced and ultimately had a very positive influence on the outcome of this study; Douglas Paterson and Shelagh Lindsey, for attempting to convey to me, throughout the previous four years, a little of their understanding of landscape architecture and design; my wife Terri, for providing much appreciated support on every level during the previous five years; and finally my parents, whose guidance, encouragement and values have provided me with the tools necessary to pursue a happy and meaningful life.
The City's improvement and further development must be started with the problems of the houses and their environment, and in these very homes the seeds of satisfactory living and healthy environment must be planted and must grow to transform the whole city's physical organization into a total spirit of satisfactory living and healthy environment.

Eljel Saarinen, *The City*
INTRODUCTION

The organization of dwellings is as old as the need for artificial shelter. In pre-industrial society technological and cultural limitations secured the unity and aesthetic dignity of the dwelling groupings. Anonymity and 'pre-cast' monotony had no place in the evolution of a small grouping of community dwelling units. The yet primitive state of technology 'forced' man to integrate his settlements more closely with the natural environment. The limitations of locally available materials for building allowed for subtle individuality while maintaining the overall visual order and integrity of the settlement.

The repetition of roof materials such as clay tile or straw dictated certain roof angles and provided a dominant order of shape, color and texture. Climate and local materials, by dictating certain structural techniques and hence certain visual forms in one region also provided for significant differences between regions. Tightly knit groups of craftsmen, whose values were those of the entire community guarded high standards of professional excellence. Committed participation in religious and social ritual gave everyone a measure of aesthetic education within the deep stream of tradition. Capricious self-expression by the individual outside the visual discipline of his time and place was unthinkable (Tunnard, Pushkarev, 1981, 55).

With the advance of technology came a new freedom from 'old age' limitations and objectives. Site, climate and the use of local materials become irrelevant with the advent of the bulldozer, the air-conditioner and mass-produced and easily transportable building elements. Concurrent with technological advancements, the building process was revolutionized as designer-craftsman lost their design decision making power to real estate speculators and other economic variables. Tangible cultural and aesthetic values lost out to the new omnipotent concept of financial profit maximization. The results did not favor the aesthetic integrity of the residential environment.

The complexity of the industrial city and the lack of built-in cultural restraints forced the public authority to impose upon builders and developers external legal controls in the form of building codes, zoning ordinances and subdivision regulations in addition to various property standards applied in an indirect way through government and private channels. The importance and use of these regulations gained impetus in the early twentieth century as the North American city burst from its high density confines to spill out over huge areas of formerly rural land. The urban dweller fled the atrocious conditions of the industrial city with its heat, noise, dirt and overcrowding to find a single family house on a private lot of its own.
Many years have elapsed since the first major exodus from the city core to the suburbs and undoubtedly the residential areas constructed under present day planning regulations are safer and healthier places to live than those of the early industrial city. The inability of these planning regulations to respond to basic design issues and the subsequent lack of design sensitivity for existing site characteristics in residential development, is raising questions about the proper use of landscape.* The visual quality of the resulting residential development lags far behind its utilitarian amenities.

Christopher Tunnard and Boris Pushkarev in *Man-Made America: Chaos or Control?* claim that it is accepted doctrine in North American life that it is unconstitutional to use community government power to accomplish purely aesthetic objectives. They go on to state that:

the relative premise that aesthetics are a matter of personal taste and not subject to objective evaluation has hampered not only the development of aesthetic controls but also the adoption of comprehensive design ideas in large scale housing and the refinement of public attitudes towards it as well (Tunnard, Pushkarev, 1981, 56).

Although views have changed since Tunnard and Pushkarev’s writing and in some instances aesthetic’s are accepted as a legitimate exercise of public power, it is still likely that an overdose of the heterogeneous visual stimuli of modern suburban development has created a public eye that has difficulty distinguishing between good and bad design.

On the scale of the macro landscape, physical design obviously cannot be entirely a matter of individual prerogative. It must reflect the collective will and self-restraint of the community as expressed by the local avenues of social control. The aesthetic and social conscience of a community are the inner controls. Particularly critical are those groups to whom land development is a matter of professional concern: architects, site planners, landscape architects, engineers and enlightened developers. It is these professionals who can exercise their leadership both through education and demonstration-producing examples of creative design which kindles the imagination of others and leads to a better overall aesthetic. It is their task to make the creation of significant form, and functional beauty, a deliberate goal of the local community in shaping their physical environment.

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*Landscape is an important word which is increasingly used to encompass an ensemble of ordinary features which constitute an extraordinarily rich exhibit of the course and character of any society (Meinig, 1979). See definitions for Landscape.*
While unable to substitute for creativity and innovation, development restrictions in the form of legal regulations are an essential ingredient of current planning practice. Zoning, subdivision, housing and land development standards can all be written to achieve aesthetic goals as well as safety and health. The objective should not be to rigidly control design style or design details which makes designers indignant, but to establish legitimate grounds for response to basic design issues thereby facilitating neighborhoods of unique identity and character.

Concern for the quality of residential design is nothing new. Critics have long inveighed against speculative housing and development (Robinson, 1916; Adams, 1934; Nolen, 1916; Shurtleff, 1911). In more recent years, much has been written on the lack of identity displayed by much new residential development. The themes are well known: a reliance on standard house-types, the blind application of over-generous road standards, the arbitrary application of regulations and a failure to recognize either site qualities or local building styles. These attitudes have led to anonymity and the engineered monotony of the residential district.

There has also been renewed disquiet in recent years, by both the public and by design professionals, about the quality of design in residential buildings and layout that emerges from the control of private sector development by municipal planning departments. This disquiet stems from the belief that the planning system with its discretionary powers should be capable of supporting improvement in the design of new development. Yet in many instances "the system" poses restrictions to any such improvement.

Regulations and design standards are intended to promote sound land use and create attractive, safe, and environmentally sensitive communities. But in many cases such standards have become constraints for public officials, developers and design professionals who plan and design residential communities. Rather than encouraging innovation and variety in project designs, conformance to many ordinances creates inefficient, uninteresting and more costly residential environments.

The kinds of development standards directly impacting physical design include: height of the building; the amount of land (lot) covered by a building; the front, rear and side yard set-backs; the minimum house size; the minimum lot size; use of the building; color of the exterior; location and size of
auxiliary buildings; height of fences; and 'quality' of construction. Other regulations or standards governing the characteristics of the access street include: right-of-way clearing; street widths and building set-backs from the right-of-way. The implementation of these planning regulations and standards has a significant effect upon the quality of design in residential districts.

STUDY OBJECTIVES

The purpose of this study is twofold: first to investigate the history of urban development standardization and trace the events which lead up to the implementation of specific present day development standards; and second, to substantiate the hypothesis that current development standards adversely effect the quality of physical design of the residential environment based on a set of accepted design principles. This study will therefore pursue the following questions:

1. How has the design standardization of the 'low density' and 'detached dwelling' residential area developed historically? How have development standards developed historically in the Greater Vancouver Area to become what they are today? Are the original objectives of current standards still relevant and are the standards still applicable today?

2. How is development control, through the use of standards, used to effect residential form? What is the purpose of residential development regulation? How are development standards legislated and applied in British Columbia? To what extent do the residential development standards, employed by the local municipalities, differ from each other and for what reasons?

3. What costs are associated with development standardization? What is the aesthetic cost? What are some established principles upon which to evaluate the aesthetic cost of standardization on the quality of the residential environment?

4. How does the implementation of development standards, both in zoning and subdivision regulation, influence or effect the quality of residential environment?

The study contains five distinct parts: first, an historical perspective on the development of standardization at a general and local level; second, an analysis of the workings of zoning and subdivision regulations; third, an evaluation of the costs of standardization; fourth, the establishment of a set of visual principles to evaluate the quality of residential space; and fifth, an analysis of how current residential development standards effects the quality of residential environment. With this in mind, the hypothesis established for this study is as follows:
that antiquated and arbitrary residential development standards based on outdated policies and objectives adversely effect the quality of the residential environment as they are unable to address important design issues that are not responsive to simple arithmetic formula and legal measurement.
SCOPE AND LIMITATIONS

In evaluating the effects of development standards on the residential environment, both the types of standards and the density of the residential district have to be limited. Standards, in this study, refer to the bulk and density standards of zoning regulations and the lot size, street and right-of-way width standards of subdivision regulations. The nature and exact meaning of these standards are elaborated in Chapter Two.

The spectrum of residential living environment is very great thus residential environment refers to typical single-family dwelling neighborhoods with an average lot size of 6000 square feet. The principles of residential design, discussed in Chapter Three, are directed toward this type and scale of residential environment.

The Greater Vancouver Area refers to the municipalities of Vancouver, Burnaby, Richmond, District of North Vancouver, City of North Vancouver, Delta, Surrey, New Westminster, Coquitlam, Port Coquitlam, Maple Ridge and Langley. The development standards of these municipalities are listed in Tables 2-1 and 2-2.

There are many residential design principles by many 'authoritative' sources (Robinson, 1916; Adams, 1936; Lynch, 1971). Christopher Tunnard's and Boris Pushkarev's "Visual Principles of Small House Grouping" in Man-Made America: Chaos or Control, best outlines a series of criteria by which residential design can be evaluated. These principles were selected for their simplicity and thoroughness. It is important to establish these criteria as a baseline from which to refer questions relating to the quality of design.
ORGANIZATION OF THESIS

Many scholars (Lasserre, Oberlander, 1963) believe that it was only after the Great Fire of London in 1666 that the public authority realized a necessity to exercise control over the development of the urban pattern, and the development and use of the private property within that pattern. This study examines the urban development standards that have evolved from these two levels of control.

The control over the development of urban form is the ordered layout of streets and blocks, street widths and right-of-way standards which is based almost entirely on the rectilinear grid pattern in North America. Chapter One examines the history of the rectangular grid system and how it influenced the development of urban form in the North American city. It develops the case that the grid became the basis for urban development standardization and that standards, some of which still stand as law today, were set in place over one hundred years ago based on arbitrary formula and sometimes questionable objectives. The use of the grid in the 'old world' is briefly described only as an historic base from which the North American system evolved. This is by no means a detailed historic account of the grid pattern used in early European city design.

The control over the development of private property is the mechanism of zoning and subdivision regulations typically in the nature of bulk and density standards. Chapter Two describes these development regulations in terms of their control over the building envelope and the property containing that building envelope. This chapter describes the concept of zoning and subdivision standards in general as well as their adoption in Vancouver with the implementation of the 1928 Vancouver Plan. It also outlines the existing legislation for development regulation in British Columbia followed by a summary of some of the current municipal development standards in the Greater Vancouver Area.

Chapter Three describes the economic and aesthetic cost of strict adherence to current development standards. Section 3.1 briefly traces the monetary costs that are associated with development standards. The goal of this section is to identify that there is in fact a substantial economic impact as a result of standardization and not to prove this case. Many books and articles have been written which prove this idea quite adequately (Butler, Sanders, Gretzels and Mosena, 1984; Sanders, Mosena, 1982; Seidel, 1978; Weitz, 1982).
Section 3.2 describes the effects of aesthetic standardization on the residential environment. In order to fully grasp the significance of the aesthetic issues it is important to first establish a framework of residential design principles as a basis for evaluating the effects of development standards. Chapter Three also outlines a set of accepted and established principles from Tunnard and Pushkarev's Visual Principles of Small House Grouping, which is used to evaluate the quality of a residential environment.

Finally, Chapter Four examines in greater detail a variety of the adverse effects that development standardization has on residential design. These effects are assessed within the context of the accepted principles established in Chapter Three.

The Summary pulls together the findings of each chapter and attempts to synthesize the arguments which support the hypothesis. It furthermore describes the need to re-examine the objectives on which the implementation of development standardization is based.

The Conclusion takes a brief and subjective look at the planners role in the formation of policies and objectives that apply to development standardization. The Conclusion reveals the author's personal view regarding development standardization and suggest ways in which planning for better designed residential environments can be accomplished.
1. DEVELOPMENT STANDARDIZATION OF THE URBAN PATTERN

2. DEVELOPMENT STANDARDIZATION OF THE PRIVATE PROPERTY

3. STREETS AND LOT SIZE REGULATION

4. BUILDING ENVELOPE REGULATION

3. CURRENT ZONING/SUBDIVISION STANDARDS

4. DESIGN PRINCIPLES FOR SMALL SCALE RESIDENTIAL ENVIRONMENT

5. EFFECT [ECONOMIC, AESTHETIC]

4. DESIGN ISSUE CONSIDERATION

5. RESIDENTIAL ENVIRONMENT
A grid pattern of streets...may have a more depressing effect on the appearance of a city than any provision in the bylaw. The grid pattern of streets is at least as old as Hippodamus, said by Aristotle to be the inventor of town planning, and the grid is frequently followed as a fashion although it is almost never a functionally or aesthetically satisfying system. On the other hand, a Radburn style plan, if sprinkled indiscriminently throughout the suburbs, might become just as tiresome and monotonous as the grid.

*Report of the Zoning Study Committee of the Royal Architecture Institute of Canada*
1.0 STANDARDIZATION OF THE URBAN PATTERN

To develop an understanding about standardization in urban residential areas one must look back to the early North American city to discover what forces influenced its form. The form of a city is primarily dictated by the form of its streets and with few exceptions the early cities of North America were gigantic rectangular wonders.

Theoretically a rectangular street system does not require standardization in the size of the blocks or the widths of the streets. It is possible to have right-angled streets of various widths and at various distances apart but this seldom happens except by mistake. Rectilinear streets distinctively foster standardization. It is therefore important to understand the history of the grid and its impact on the pattern of the North American city.

1.1 RECTILINEAR STREET PLATTING: AN HISTORIC PERSPECTIVE

The history of the gridiron pattern is briefly examined first, in terms of the old world, second, in relation to its use in the United States and third, in the more local context of Canadian experience.

1.1.1 THE OLD WORLD

According to Kenneth Lindley, rectangular planning originated in the Biblical lands of the Tigris and Euphrates Rivers. It was here that a clay tablet was found on which was inscribed the oldest known city plan for Sumeria. It shows the main features of a walled town from which it is apparent that the land must have been surveyed and laid out according to preconceived ideas of design rather than by haphazard development. The further fact that the plan was drawn accurately to scale indicates that the Sumerians possessed the mathematical knowledge necessary for the task (Lindley, 1971, 11).

Herodotus states that Babylon was built foursquare, with straight streets that were either parallel or at right angles to one another. Some Chinese towns that are presumably two or three thousand years old also show rectangular platting (Robinson, 1916, 15). The ancient Egyptians planned and also laid out settlements according to complex mathematical rules. The Grecian architects, under the famous Greek
city planner Hippodamus, made extensive use of the rectangular method when plotting the streets of Pirenne, Piraeus, Alexandria, Antioch and Miletus.

Miletus was one of the more spectacular early city plans. Edmund Bacon in *Design of Cities* states that the plan "shows how it is possible to develop forms of tremendously dynamic quality as counterpoint to the rigid discipline of the gridiron plan" (Bacon, 1967, 75). In Miletus the residential quarters of the city were divided by a rectangular network of streets into large sections of equal size which formed the framework for the entire city plan. See Figure 1-1.

By the time of the Roman empire the idea of town planning was generally accepted and the necessary skills to accomplish rectilinear street planning had developed. The Romans elaborated on these and built their towns to a grid plan which can still be traced in many European cities of Roman origin.

The basis of a typical Roman city plan was a cross formed by two main thoroughfares crossing at right angles. Other roads were built parallel to these thus forming rectangular plots which were occupied as the need arose. As many Roman settlements were founded primarily for military purposes it was customary to build the city walls before filling in the land which they enclosed, thus defining the area to be occupied (Lindley, 1971, 11).

Enough Roman cities remain in semblances of their original state to allow a clear idea of what a grid plan was like at street level and it appears to be reasonably well suited to the conditions of the time. Monotony was avoided by the varying scale and design of the buildings and a number of rectangular plots formed by intersecting thoroughfares could be linked to form a public square around which the more important buildings would be grouped as seen in Trier in Figure 1-2. This allowed for open spaces in which people could gather, as well as for shaded roadways between buildings and the simplified provision of water and drainage. 'Vehicular' traffic was confined to the wider roads which formed the axes of the plan and which were frequently aligned on a north-south, east-west direction. Such a plan had the merit of being simple to impose upon almost any site and "it commended itself to an empire building nation" (Lindley, 1971, 11). Natural features such as rivers and hillsides could be accommodated into the plan without destroying it.

During the Middle Ages the few towns built were generally quite small but according to Inigo Triggs, in the thirteenth century,
Figure 1-1: Greek Gridiron Town of Miletus

Figure 1-2: Roman Gridiron Town of Trier
no less than fifty towns were founded by the English in Aquitaine and Guienne, within the same number of years, all of which were laid out, wherever practicable, upon a definite system and formed an essential part of the wise and farsighted policy of Edward I...These towns were regular and symmetrical; the streets were wide, open and straight, crossing each other at right angles only...By this means each plot of ground was of uniform size and shape, a parallelogram with one end facing a principal street and another a lane (Robinson, 1916, 16).

As a result of the demonstrative use of the road in urban construction its main functions were completely lost - namely acting as a condition for the parcelling of house plots and providing access to residential houses. Thus the rectangular principle became a basic system of road layout in residential areas (Kirschenmann, Muschalek, 1980, 27). This method was also used in renovating and extending towns and in building new towns. Due to the destruction of towns by war and by fire, the use of town rebuilding plans became more and more common. As a result of the Great Fire of London in 1666, half of the developed area in the city was totally destroyed. Although government regulations existed as far back as the Roman era of Julius and Augustus Caesar, Lasserre and Oberlander (1963) claim that it was only after the Great Fire that the local government realized the necessity to exercise control over the development of the urban pattern and the development of private property. The initial control took the form of the ordered layout of streets in a rectilinear pattern. The latter controls evolved to cover development regulations and standards (to be discussed in Chapter Two). The 'checker board' system of road layout both with and without radial roads, was suggested as the planning principal best able to accommodate the reconstruction of large areas of London after the fire (Kirschenmann, Muschalek, 1980, 27).

Kirschenmann and Muschalek claim that "in the European cities of Paris, Berlin and Edinburgh a several-storey high structure is a necessary part of the rectilinear street to give the street an effective space". The same geometric road systems were established in the colonization of North America but here were used primarily as a method of providing access to land. The 'checker board' pattern, which the Spanish had introduced to Latin America as a result of the colonization order of Karl V, was used in North America as a simple means of dividing up new settlement areas into parcels of land (Kirschenmann, Muschalek, 1980, 27).
1.1.2 UNITED STATES

It was in North America then that the persistence of uniform right-angled streets has been most marked. Here the universality of the plan's adoption, and the rigidity of adherence to it, has been such that Europeans have forgotten their long history of rectangular street planning, and dubbed it as "the American method" (Robinson, 1916, 16).

Most North American towns, old and new, were the product of a deliberate foundation and during the nineteenth century most developed on the basis of a single grid or a cluster of grids (Nolen, 1916, 5-6; Reps, 1965, 295-324). Outside the eastern seaboard, town settlements were established in virgin areas and were initially subdivided and planned for rural settlement. The Land Survey Ordinance passed by American Congress in 1785 and based on the suggestions of Thomas Jefferson, imposed a rigid checkerboard pattern on the vast and then undeveloped area lying north and west of the Ohio River and had considerable influence in determining the plans of the towns and cities that later developed there (Robinson, 1916, 20-12).

Because the federal government was yet weak and in need of money they decided to use the public domain as a source of revenue rather than to dispose of it freely to prospective settlers (Fish, 1979, 48). The Land Ordinance thus determined land policy until the Homestead Act in 1862. The Land Ordinance called for a rectangular survey of lands which specified how new settlements were to be measured: a grid was arranged parallel to the longitudinal and transverse sides which measured six miles by six miles. See Figure 1-3. A township was to be built on one area of the grid. This area of land was to be divided up into 36 sections (36 square miles) which were then further sub-divided into 4 parcels of 160 acres. See Figure 1-4. The minimum unit of sale was one section which the purchaser could subdivide privately. Four sections in each township were reserved by the federal government and one section set aside to maintain schools. No settlements were to be founded until the land had been surveyed, and no surveys were to be made until title to the land had been obtained from the Indians. The policy of surveying before selling assured a clear title to the land purchaser (Morison & Commager, 1942, 261-262).
Figure 1-3: Rectangular Survey System Guide Meridians
Figure 1-4: Township and Range System
The first fields of the 'checker board' townships were set out to the west of the Ohio River. These became the starting point for a comprehensive settlement strategy for the even distribution of small rural towns before groups of farmhouses were able to become densely established at points where paths and roads crossed (Kirschenmann, Muschalek, 1980, 28).

Travelling by air it is easy enough to see the effects of this national super-grid, "regardless of contours and relentless as fate", upon the countryside with its long roads a mile apart running straight as a die until they meet some immovable obstacle, then shifting course only to start again on a line as direct as the surveyor's chain* could make them. The two dimensional pattern became fixed and the third dimension was left to chance only rarely shaping into quality space.

The lost opportunities of creating beauty in American towns are endless; that is why we exclaim at the accidental effect and the picturesque skyline on the rare occasions when we find them, or take what pleasure we may in variations in color and detail. But beauty by accident has not been an adequate substitute for beauty by design (Tunnard, 1953, 121).

The use of the gridiron plan for America's two largest cities of New York and Philadelphia supported its advantages for implementation in frontier towns. The rejection by New York of an 'elaborate design', such as L'Enfant's plan for Washington, D.C., added another incentive to keep the planning of the new frontier cities simple (Fish, 1979, 84). Philadelphia developed an original checkerboard plan which divided square city blocks by narrow streets as can be seen in Figure 1-5 (Reps, 1969, 203, 221).

*Gunter's chain had considerable influence on the urban land pattern of North America. Streets usually had a sixty-six foot length - the length of the surveyor's chain (Holmes, Jones, 1948, 452).
In regards to the urban design of New York City, in an appeal of state legislature in 1807, the Common Council of the City requested that a state commission be appointed "with absolute authority to lay out the undeveloped areas of Manhattan Island." The request acknowledged that the "laying out of streets and roads" and "projecting them in such a manner as to unite regularity and order with the public convenience and benefit and in particular to promote the health of the city", was indeed a municipal function. The state commission appointed in response to this appeal was given "the absolute authority" requested with respect to the laying out of public streets and parks (McGoldrick, Graubard, Horowitz, 1944, 67). The plan that eventually was laid out for the city provided a dozen north-south avenues of equal width, crossed at right angles every 200 feet by east-west streets. See Figures 1-6 and 1-7. Their justification for the simplicity of the design expresses what seems to have been the prevailing view of the day: the conception of a city as merely a physical system of streets and buildings to be arranged for convenience and utility of movement and the development of real estate (Fish, 1979, 85). Reps describes their consideration of the scheme which would best meet these objectives:

...that is to say, whether they should confine themselves to rectilinear and rectangular streets, or whether they should adopt some of those supposed improvements, by circles, ovals, and stars, which certainly embellish a plan, whatever may be their effects as to convenience and utility. In considering that subject, they could not but bear in mind that a city is to be composed principally of the habitations of men, and that strait sided and right angled houses are the most cheap to build, and the most convenient to live in. The effect of these plain and simple reflections was decisive (Reps, 1965, 297).
Figure 1-7: Plan of New York City in 1797
The new cities that arose as the frontier moved westward seldom were the result of spontaneous growth. Nearly all of them were expected to become centers of thriving regions and were thus grandiloquently named "new Philadelphias" or "new Athens". The city projected as a speculation was relatively easy to lay out in a "grid plan set about a square or on both sides of a main street." The plan of towns along important rivers varied somewhat from this simple scheme by having "a wide street going down to the dock or wharf at the river's edge" (Tunnard, Reed, 1956, 69-70.). In many instances, however, the grid simply ignored the existing natural features such as in the Chicago plan seen in Figure 1-8.

As Francis Baily* passed through the United States in the late 1700's he truly admired the orderly plans of the cities he visited using the term "perfect regularity" to describe Philadelphia and for Baltimore: "a plan of which the Americans are very fond, and I think with reason, as it is by far the best way of laying out a city" (Baily, 1856, 105). However, what may have first seemed like a vision of a new urban world of order, regularity and simplicity all too quickly blurred into an impression of dullness and rigidity. By the time Baily arrived in Cincinnati, the image of the regular gridiron cities was no longer a novelty and the apparent lack of imagination in American planning became apparent when he commented on both the aesthetic and functional shortcomings of the grid plan:

I have taken occasion to express my approbation of the American mode of laying out their new towns, in a general way, in straight lines; but I think that oftentimes it is a sacrifice of beauty to prejudice, particularly when they persevere in making all their streets cross each other at right angles, without any regard to the situation of the ground, or the face of the surrounding country: whereas, these ought certainly to be taken into consideration, in order that a town may unite both utility and beauty; and, with a little attention to this, a town might still preserve the straight line, and yet avoid that disgusting appearance which many of the new towns of America make. For it not unfrequently happens that a hill opposes itself in the middle of a street, or that a rivulet crosses it three or four times, thereby rendering its passage very inconvenient..." (Baily, 1856, 226-227).

Peter Wolf in Land in America: Its Value, Use and Control summarizes the use of the grid system in North America as follows:

With few exceptions, the cities of America are gigantic grid subdivisions. They reveal streets laid out by surveyors in advance of intense subdivision. More often than not, these are streets delineated so that a large landowner or group of landowners could sell subdivided land with a minimum of effort at maximum prices. They are subdivisions of terrain which ignore the picturesque, which ignore the character and the quality of the land (Wolf, 1981, 209).

Figure 1-8: Plan of Chicago in 1834
1.1.3 CANADA

The history of the settlement of western Canadian lands began with the transfer of ownership from the Hudson's Bay Company to the Dominion of Canada. Lt. Col. J.S. Dennis received orders from the Crown to devise and recommend to the government some system of survey suitable to the vast plains of the west - "a system which would parcel out that tremendous area into small units each of which could be allotted to one of the host of eager farming-minded immigrants who were bound to start flocking in" (MacGregor, 1981, 1).

Col. Dennis "consulted some outstanding American land surveyors" and brushed up his knowledge of the system of survey used on their plains. On August 28, 1869 he submitted his proposed system of survey which was "very much the same" as the American surveyors were using south of the 49th parallel (MacGregor, 1981). Dennis advocated townships of thirty-six sections (six square miles) with road allowances one and one half chains wide (99 feet) in some instances and one chain wide (66 feet) in others. Dennis furthermore issued a Manual of Surveys in 1870 "based on a similar American publication" which explained the Dominion Lands Survey system to the men who were to parcel the prairies into farm-sized quarter sections. See Figure 1-9.

Figure 1-9: Plan Showing Township, Range, Meridian, and Base Line
The objective of the survey was to divide one vast area of some 200 million acres of arable land into some 1,250,000 quarter sections (homestead units) of 160 acres each. Its essential components were townships of six miles square containing thirty-six sections each a mile square, which in turn were subdivided into quarter sections each composed of approximately 160 acres (MacGregor, 1981, 9).

The units of measurement as established in the Manual of Surveys were as follows:

1 link = 7.92 inches
100 links = 1 chain = 66 feet
10 chains = 1 furlong
80 chains = 1 mile
3 miles = 1 league
8 furlongs = 1 mile = 1,760 yards
16 1/2 ft. = 1 rod, 1 perch, 1 pole
4 rods = 1 chain
10 sq. chains = 1 acre

The accuracy of chaining was essential in those days for it was by the use of the chain that almost all land survey was accomplished. It was done with what is known as a Gunter's chain in which a hundred links, each approximately two-thirds of a foot long, were interlinked so as to fold back upon each other and when thus bundled up could easily be held in the hand. When stretched out it measured sixty-six feet and it was "because of its length that sixty-six foot road allowances were suggested" (MacGregor, 1981, 13). Subdivisions in New Westminster can still be seen to have street widths, block sizes and lot widths all determined as derivatives of the chaining distance. See Figures 1-10 and 1-11.

The rectilinear subdivision of land for speculative purposes began in Canada with the formation of the first western townsites. In 1872 Donald A. Smith, the Chief Commissioner to oversee the Hudson Bay Company's affairs in the management and sale of land, employed a Winnipeg surveyor, A.H. Vaughan, to prepare a subdivision plan for Fort Garry Reserve in Manitoba. Vaughan's plans were closely patterned after Dennis's design and based on a simple grid as seen in Figure 1-12. "Principal streets were given a substantial two-chain allowance with the remainder one chain in width. Building lot dimensions were 120 by 50 feet" (Artibise, 1981, 65).

In 1881, C.J. Brydges, Smith's predecessor in the post of Lord Commissioner of the Hudson's Bay Company began to survey the townsite of Edmonton. The Edmonton townsite plan, another subdivision of the Hudson's Bay Company, was also laid out as a simple rectangular grid. Figure 1-13 illustrates this
Figure 1-10: Subdivision by Chain

NOTE: ALL STREET WIDTH AND LOT MEASUREMENTS BY CHAIN.
totally unimaginative plan which took little account of existing development and less still of the topography.

Although other townsite plans had been expanded and modified, they gave little evidence of any concern for design. Like most plans for the era, they were produced with the sole objective of making land available for sale as speedily and cheaply as possible. To call them town plans was "euphemistic". They were strictly plans of subdivision and speculation (Artibise, 1981, 75).
Figure 1-13: Edmonton Subdivision in 1881  Figure 1-12: Fort Garry Subdivision in 1872
1.1.4 BRITISH COLUMBIA

The gold rush in the Cariboo in 1858 attracted the attention of the Imperial authorities and the mainland of British Columbia was organized as a separate colony under the control of Sir James Douglas, the Governor of Vancouver Island. His commission instructed him to "select and survey lands in those parts of the colony which might be eligible for settlement, to fix the conditions upon which land could be acquired by private individuals, to mark out allotments of land for public purposes, to select sites for the seat of government and for a seaport town" (Morley, 1961). Douglas was informed on July 31, 1858 that a detachment of Royal Engineers under the control of Colonel Moody would arrive to facilitate this operation.

In February, 1863, surveyor Corporal George Turner of the Royal Engineers laid out the south shore of what was to eventually become Vancouver "from the Second Narrows west, District Lots 181, 182, 183, 184, two Townsite Reserves and Lot 185, the last being the Brickmakers claim" (Morley, 1961, 24). As can be seen in Figure 1-14, the survey system was consistent with the township and range system advocated by the Dominion Land Survey. In the final railway settlement of 1884, the Dominion government conceded to the demands of the Canadian Pacific Railway (CPR) vice-president William Van Horne and transferred the title for approximately 6,275 acres of land including the Granville townsite (seen in Figures 1-15 and 1-16) and the north half of the Hastings Reserve. "The government donated all of its 39 lots at Granville plus 5,795 acres in District Lot 526 and 480 acres in District Lot 541 (Roy, 1980, 14). The agreement included the provision for an immediate survey and Van Horne commissioned L.A. Hamilton who in 1885 laid out Vancouver on the approximate lines it retains today. See Figure 1-17. Hamilton, as CPR land commissioner, also named the streets - those downtown after CPR officials and those in the West End largely from Admiralty charts and provincial dignitaries (Morley, 1961, 82).

The subdivision of land for speculative purposes began in Vancouver in 1882. Pethick in his book Vancouver: The Pioneer Years 1774-1886 notes that:

March 1882 saw a remarkable scheme initiated by the "three greenhorns". They decided that their extensive pieces of property might profitably be subdivided into building lots and in collaboration with David Oppenheimer, prepared an elaborate plan to illustrate their proposal, naming the envisioned community "The City of Liverpool". The plan was officially registered in Victoria on March 15, 1982 (Pethick, 1984, 120-121).
Figure 1-14: Survey of Granville (Vancouver) in 1863
Figure 1-15: Subdivision of the Town of Granville in 1885
The desire to create a continuous gridiron environment in the newly forming township of Vancouver is illustrated by L.A. Hamilton's frustration when his survey lines did not directly meet up with those proposed by the new subdivision plot. As Hamilton proceeded with his survey of the townsite, Morley notes that he complained that the original layout of Granville made it impossible to avoid some 'irregular' corners downtown and that the sale of some "City of Liverpool" lots forced a jog in Hastings at Burrard (Morley, 1961, 71).

On July 21, 1873 surveyors in New Westminster subdivided townships into sections of one square mile each. "Under this system, which had already been adopted by the dominion government and used in Manitoba, and was currently employed in the United States, each township contained thirty-six sections, four quarter sections of 160-acres each could be obtained" (Cail, 1974, 62). It was a simple system which had the advantage of conforming with surveys elsewhere on the continent, of making it easy for settlers to
Figure 1-17: Vancouver in 1886

Plan of the City of Vancouver
Western Terminus of the Canadian Pacific Railway

English Bay

Burrard Inlet

Coal Harbour

G.P.R. D. P. F. R.
locate their lands, and of reducing by its simplicity, the cost of surveying and the possibility of mistakes (Call, 1974).

In 1886 the Canadian Pacific Railway Company filed its official townsite plan (Figure 1-17) for Vancouver which subdivided the lands between Glen Drive and Stanley Park; and from approximately 16th Avenue to Burrard Inlet.

While reference is made to the subdivision of all of these lands, it must not be accepted that the townsite was actually surveyed. All these subdivisions were what is known as paper subdivisions, which were prepared by taking for granted that the original survey under which the Crown Grant was issued was correct and prepared a map according to scale which would fit into this envelope. There were not stakes, nor were any of the roads laid out on the ground (Bartholomew, 1928a, 22).

1.2 STANDARDIZATION: AN ASSUMPTION OF THE GRID

From the above description of the surveying of land for settlement in both the United States and Canada it is evident that most land, especially to the west of the seaboard settlements, was surveyed and eventually bought and sold in rectangular plots, whether it was a homestead unit of 160 acres or a subdivision of that unit into smaller rectilinear lots. It is further evident that a landowner, whatever his inclinations, would find it difficult to break away from a rectangular plotting and if his roads were to be direct extensions of those plotted in adjoining tracts, he was almost certainly compelled to adopt such an arrangement.

...it is not a lack of imagination, nor failure to appreciate the advantages of an adjustment of plan to contour, nor insensitivity to beauties of nature or to the charm of the picturesque which is responsible for the fidelity of the typical (North) American town to rectangular planning. Law and custom have entrenched a plan which by its own simplicity invited adoption (Robinson, 1916, 21).

The six mile square grid system of the Land Survey Ordinance and the Dominion Lands Survey, was thus overlaid across North America, becoming a reference for the further sub-division of lands into rectilinear patterns. With the advent of urbanization the pre-established rectilinear patterns became subdivided into blocks separated by streets, typically a logical mathematical reduction of the original six mile square grid system. Figures 1-18 and 1-19 illustrate how typical Chicago subdivisions of five-acre tracts were plotted into streets and lots. Although the uniformity of the block size often differed from city to city
Figures 1-18 & 1-19: Chicago Subdivision of 66 and 60 Foot Streets

(New York with its 200 x 800 blocks or Chicago with its 300 x 600 blocks) the use of the grid to subdivide land occurred in almost all cases.

Due to the speculative nature of the land 'planning' in those days the grid design made perfect sense. A glance at a grid plan explains this. When the parcels of land are backed up to one another, and front with their narrow dimension upon the street, road access is made available to the maximum number of individual pieces of land for a given length of road. Figure 1-20 illustrates this concept for a residential district in Richmond, B.C. Additional advantages of the grid are a) the rectangle is easily described by a surveyor and repeated at the scale of the block, b) constitutes the basis for a most efficient and simply designed town plan and, c) can be extended indefinitely in all four directions.
Figure 1-20: The Subdivision Grid
Wolf states that the street grid with its rectilinear lots and narrow street frontage accomplishes three objectives with perfection:

First, the larger property is broken down into the maximum number of smaller parcels that can be individually sold. This almost always adds to the overall market value of the original property. Second, the length of the road system per lot is minimized. Third, it is possible to justify the interconnected road system as a public expense, for all roads line up, link up. One of the most desired goals of land subdividers is to obtain access to private land at public expense (Wolf, 1981).

As was often the case the measurement of streets, alleys, lot widths and depths and block sizes was furthermore accomplished with the surveyors chain. Figure 1-10 illustrates this situation in an early New Westminster subdivision. Thus not only were the street patterns irresponsible of the local site conditions but the lengths and widths of streets and blocks which describe the urban form were based on the arbitrary mathematical distance determined by the surveyors chain.

The above description of the grid's history points out that although a rectangular street system does not theoretically require standardization in the size of blocks, in the width of streets or in the manner of their development, it distinctively fosters standardization so that where the former exists the latter almost always follows.

It is probable that, strongly encouraged by rectangular street planning, urban standardization received much of its impetus as a result of the checkerboard and gridiron plans. Those plans in essence assumed standardization.

...basing their chief claims on their regularity, consistency requires a belief that the more regular they are, the better they are. To improve a stereotyped pattern by varying it, is to confess inadequacy in the pattern and so to destroy the reason for making it stereotyped (Robinson, 1916, 27).

In most North American cities rectilinear plotting almost always established a standard from which the city, in time, developed. It appears primarily in two distinct forms: in the uniformity of the block size and in the width of the streets. Charles Mumford Robinson in *City Planning with Special Reference to the Planning of Streets and Lots* claims that the standardization of streets and blocks deserves credit for implying a recognition of a need for regulation. It is the thesis of this study, however, that standardization, in fact, destroys this claim to credit by imposing a regulation (both in layout and in space requirements) that is mathematically arbitrary, unrelated to important design issues and therefore, in many cases illogical.
It is my belief that to impose a gridiron street plan "spread like an eruption over hill and valley, regardless of gradient, site or of strategic lines of communication, oblivious of monotony and blind to topographical opportunity" (Shurtleff, 1911) prevents the desired quality of suburban appropriateness and aesthetic quality except in those very rare occasions of chance.

SUMMARY

Chapter one provides an introduction to urban standardization by revealing an historic account of the unquestioning acceptance of the grid pattern in North America and its cities. The result of these happenings is visually evident in the urban fabric of North American cities and legally evident in the issuance of many development standards that were based on the implementation of the grid in the development of the residential area.

This account further illustrates the nature of land survey by arbitrary distances which appear to have evolved into standards. The chain length is merely a divisible distance of the mile, which in itself is also an arbitrary distance. Yet the influence of the chain's length on the visual quality of the urban pattern is immeasurable.

Many of the residential development standards currently in use in the Greater Vancouver Area can be traced to the policies and factors of the early North American city. By most accounts these objectives are no longer relevant and should be re-evaluated prior to the continuance of traditional development standards. The needs of the urban dweller have changed drastically in the previous half-century. The technology is vastly different. The landscape is in much more need of protection and the social and cultural changes are immeasurable.

Most importantly, the concept of urban living is in a very new phase, with new requirements based on modern attitudes. There is a need to re-evaluate and understand the antiquated and sometimes arbitrary policies and factors of previous days and to move forward with new innovative approaches in urban design which respond to the current issues relevant to current city residential living conditions.
REFERENCES (CHAPTER ONE)


Therefore, let us build houses that restore to man the life-giving, life-enhancing elements of nature. This means an architecture that begins with the nature of the site. Which means taking the first great step toward assuring a worthy architecture, for in the rightness of a house on the land we sense a fitness we call beauty.

Frank Lloyd Wright
2.0 STANDARDIZATION OF THE PRIVATE PROPERTY ENVELOPE

Further to the standardization of the layout of streets and blocks, the regulation of the private property envelope came into being in North America through zoning. Modern zoning originated in Germany in the late nineteenth century (Nelson, 1977, 8). The concept of government control on the development of private property, however, has been in place since early times. Two types of control methods were established. Following the Great Fire of London in 1666, the Redevelopment of London Act established regulations/standards which governed the materials of construction. This was intended to achieve the protection of the city from conflagration, by requiring minimum standards of materials and building construction (Robertson, 1961).

The second type of control over the development of private property was the imposition of limiting dimensions on the building envelope and the streets which accessed that envelope. As far back as the Roman era of Julius and Augustus Caesar, the height of buildings was limited to 60 feet to protect the community against the dangers of structural failure (Robertson, 1961).

Both of these forms of development control are exercised today, but it is the effect of the latter which is relevant to this study. Development standards were derived to control the building envelope and the fronting streets.

The first such comprehensive land-use control in North America made its debut in New York City in 1916, although by that time Los Angeles had already had a regulatory system for seven years that divided the city into residential and industrial use districts. The New York City Ordinance, however, was the most comprehensive up to that time, and it represented a landmark in the history of land-use regulation in North America. Under the original New York City Ordinance, the city was divided into residential, commercial and un-restricted use districts. Districts were mapped out in which building height was regulated as well as 'area' (court and yard) controls on all buildings (Nelson, 1977, 9). In 1924, the U.S. Department of Commerce designed a Standard Zoning Enabling Act to encourage the states to adopt zoning laws. In 1926, the Supreme Court declared zoning to be a valid exercise of police power in the case of Village of Enclid vs Ambler Realty Co. (272 U.S. 365). Today, most cities in Canada and the United States employ zoning regulations, which in one form or another are derivatives of the original New York City Ordinance.
Two kinds of regulations exist to control the development of residential space. First are the regulations that apply to the development of individual parcels of land. These are zoning laws, housing laws, health and building codes, and sanitation laws. Second are regulations which apply to the division of a property into separate parcels, each of which is to be separately sold. These are subdivision regulations. Zoning regulations evolved to control the intensity and type of land use permitted in a particular district of a community. Subdivision regulations on the other hand evolved to control the physical pattern of the re-parcelization of land.

2.1 ZONING STANDARDS

Zoning is the legal regulation of the use of land. It is an application of the police power to promote (in the words of the traditional formula) the protection of "the health, safety, morals and general welfare" of the community (Delafons, 1969, 32). Zoning is a control mechanism that sets up different standards for different neighborhoods instead of minimum standards for the whole city.* Delafons defines zoning as "the division of jurisdiction into districts within which permissible uses are prescribed and restrictions on building height, bulk, layout and other requirements are defined" (Delafons, 1969, 41).

The traditional zoning ordinance typically includes provisions for the use of property and detailed "dimensional" controls that specify the height, minimum depth of side, front and back yards, minimum lot size and frontage, and percentage of the lot to be left unbuilt. See Figure 2-1. The standards vary according to the use of the district. The by-law comprises two parts: the ordinance in which the regulations are defined, and the zoning map that delineates the districts within which the provisions of the ordinance apply.

Too often zoning is mistaken for planning. The zoning map is incorrectly seen as the "grand plan" for the community when in fact it is a generalization of existing conditions, "freezing them into a format that reflects only the past and too often also the individual desires of influential property owners supported by their political friends" (Gallion, Eisner, 1985, 439).

*This in fact was what some of the early and soundest critics of zoning found hard to justify. How could the objectives of official regulations justify higher standards of density, light and air in some parts of the city than in others. It has always been one of the weaknesses of zoning that it purported to be based on health and welfare considerations when in fact they are aimed at preserving and fostering a wide range of living conditions.
Figure 2-1: Zoning Regulations
The zoning plan is neither a substitute nor an alternative for the comprehensive development plan. The comprehensive plan expresses the basic policies that shape the community character and the general land use while the zoning plan establishes the specific limitations that apply to land use as one of the instruments for achieving the goals set forth in the comprehensive plan. A guide for urban development, the comprehensive plan is typically adopted as a resolution by the municipal council, while the zoning plan is adopted as a legal ordinance with penalties for violation.

A zoning ordinance describes certain categories of uses, called 'district', usually residential, commercial and industrial. For each district the written ordinance includes restrictions on the following:

1. **Use.** The ordinance tells which kinds of uses are permitted in each district. In a typical ordinance, for example an 'R-1' zone might allow only single-family, detached houses.

2. **Lot Area.** This regulates the minimum amount of land needed for each use in the zone; for example, an R-1 zone might require a 5,000 square foot lot for each house.

3. **Height.** This limits the maximum height of any building to be developed on the site; for example, a house in a R-1 district may be no higher than 35 feet of 2 1/2 storeys.

4. **Setback.** This stipulates how close the structure may come to the edge of the property; that is, how wide the front, back and side yards must be. A minimum front yard setback in an R-1 district might be 25 feet.

5. **Site Coverage.** For residential districts, the ordinance stipulates the maximum portion of the lot that may be covered by buildings or paved areas; for example, no building in an R-1 zone may cover more than 45 percent of the site area. (See Figure 2-2).

![Maximum Building Volume](image)

**Figure 2-2:** Maximum Building Volume
(6) **Floor Space Ratio (Bulk).** The bulk restrictions are often in the form of floor to space ratios; for example, the FSR of an R-1 zone might be 0.50. This would permit a one-storey building to cover half the lot of a two storey building to cover one-quarter of the lot. (Figure 2-3 illustrates the difference between Site Coverage and FSR).

![Figure 2-3: Site Coverage and Floor Space Ratio](image)

### 2.2 SUBDIVISION STANDARDS

Second only to zoning as a land use control measure are subdivision regulations. Subdivision is the process whereby vacant land is divided into lots and public rights-of-way, providing sites for future buildings that will occupy those lots when they have been transferred to other developers (Lynch, 1971, 229). Delafons describes subdivision regulations as minimum standards that apply to all new residential development: street design and construction, the arrangement and size of lots, drainage, water supply, sewage and in some cases street signs, tree planting, fire hydrants and street lighting (Delafons, 1969). This transformation of raw acreage into improved urban lots exerts a vital impact upon the community welfare. Many would say that it is to assure the protection of the general welfare that subdivision regulations have been devised, with the knowledge that in the final analysis it is the general welfare that protects sound investment.
Local governments have a long history of regulating the subdivision of land into lots. Many factors spurred the evolution of subdivision regulation as it exists today, among them "the desire to facilitate the recording of plans and deeds in the appropriate courthouse, the desire to have some influence over the design and construction of streets to be dedicated and maintained by the local government and the desire to prevent repetition of the failures of yesterday" (National Association of Home Builders, *Land Development* 2, 1981, 143). Too often in the past, developers have left roads unfinished and streets of insufficient widths. Some areas implemented curbs and sidewalks while others did not. Stormwater and sewage were treated as the common enemy to be disposed of in any way possible.

Subdivision regulations are the controls governing the preliminary stages of development: the layout of streets and lots and the provision of the necessary services. They occupy a somewhat anomalous position between the building code and the zoning ordinance. Subdivision regulations allow a public authority to control the platting and conversion of raw land into building sites and as such they have been said to have a greater impact over a longer period of time on all development than does zoning (O'Mara, 1978, 71).

A city can control the subdivision of real estate by forcing the developer to meet requirements and standards established by the city in return for the privilege of recording a plat and selling off lots... It is through subdivision regulation that the community interest is expressed and protected (Yearwood, 1971, 20).

The use of this system to enforce rational street layouts and more recently, to require reasonable standards of development, came later than the use of zoning controls. It is usually argued that registration of a subdivision is a 'privilege' which the community confers on the developer, in return for which he must comply with the requirements of the regulations. The controls are thus based on the principle that the use and development of land constitute a right bestowed by the community upon the individual, and this right may be withdrawn or withheld when and if the individual violates the conditions upon which it is vested in him. The power of eminent domain, the police power, the power to tax real estate, and the power to regulate the use of land are expressions of this principle, and it provides the structure upon which the development of urban land is built in the United States (Gallion, Eisner, 1985, 480).

Subdivision regulations are mainly concerned with the layout and standards for lot-by-lot development. This is usually taken care of by a plan approval procedure whereby a developer is not
permitted to divide or sell his land until the approving officer has approved the plan of the proposed subdivision and the plan is deposited in the land registry office. Figure 2-4 illustrates a typical subdivision proposal. Approval or denial is based upon conformance to: (a) the development standards set forth in the zoning ordinance; and (b) the development standards for street configurations and lot size set forth in the subdivision ordinance.

In addition to requiring various engineering services, a subdivision ordinance includes restrictions on the following:

(1) **Street Widths and Right-of-Ways.** It is the responsibility of the municipality to adopt adequate and suitable subdivision standards for street widths and right-of-ways; for example, in an R-1 zone the right-of-way width may be 66 feet and the actual pavement width requirements may be 28 feet. See Figure 2-5.

![Figure 2-5: Street Width and Right-of-Way Alignment](image)

(2) **Lot Size.** This standard prescribes a minimum lot dimension for each zone in terms of frontage, width depth and area; for example, in an R-1 zone the minimum standard dimensions may be - frontage: 25 feet, width: 50 feet, depth: 100 feet and area: 5000 feet.
2.3 THE PURPOSE OF DEVELOPMENT REGULATION

2.3.1 THE PURPOSE OF ZONING STANDARDS

Up until the late 19th century, North American cities had no formal land use controls, "apart from building regulations designed to prevent conflagrations in densely settled areas of the city, governments had almost no inclination or capacity to regulate the use of land or to take steps to correct abuses" (Listokin, 1974, 3). The tools available to municipalities, such as property taxation and eminent domain, were ineffective in regulating land use. Landowners and developers enjoyed unrestricted freedom independent of the discretion of the city. The advent of zoning put an end to this real estate laissez-fair attitude and gave credible regulatory power to local governments (Hason, 1977, 3).

In practice, the purpose of zoning and development regulations has been to protect established areas from unwanted land uses and building that threaten, in some way, to reduce the quality of the neighborhood environment. Zoning developed...as a technique to stabilize neighborhoods against undesirable change. Some government intervention became indispensable for this purpose because economic forces might have altered established neighborhoods that embodied the communities' ideas of the good life and so were to be preserved. In this sense, zoning was set up as a barrier to the consequences of a laissez-faire land economy (Franklin, Falk, Levin, 1974, 25).

In this respect zoning provides a public control of land use not unlike the private control possible by restrictive covenants in deeds and by the law of nuisance. In many cases this understanding has been described as intending to prevent the reduction of the overall property value of the neighborhood by strictly controlling the type and image of development. The National Commission on Urban Problems (The Douglas Commission) described the purpose of zoning as: "Keeping anyone from doing something on his lot that would make the neighborhood a less enjoyable place to live or make a buyer less willing to buy" (1969, 219).

In areas of the city that are less intensively developed than those of the inner city, Nelson (1977) claims that the single most important indicator of housing quality is density. Neighborhoods with a low density were generally thought of as having a higher environmental quality. Developers of high density housing, therefore, had a strong incentive to locate these developments in low density neighborhoods. Furthermore, high density housing better economized on land costs, so that prices of land in even the most
desirable neighborhoods were usually affordable. The result was that when development was not controlled there was a natural tendency for high-quality, low density neighborhoods to have an influx of high density development to the extent that the housing market would be a mix of housing densities and similar environmental quality in almost every neighborhood (Nelson, 1977, 12-13).

The means of preventing this 'averaging out' of residential environment was through the use of zoning regulation. Zoning by-laws established minimum lot size, floor space, road frontage setback distance, side and rear yard size and other minimum quality standards for each neighborhood while building codes and subdivision regulations established other types of quality standards for the structures themselves and for the neighborhood as a whole.

The enforcement of regulations to preserve the character and quality of a neighborhood, in the past benefited primarily the better-off members of society. These were people who could afford to live in low density, large lot neighborhoods and whose quality environment was being threatened by the prospect of high density housing occupied by the less privileged. Hugh Pomeroy, a well known planner, clearly described this notion in a 1940 study:

The important thing is to provide protection for the character of the neighborhood...low density neighborhoods occupied by higher income families should not be faced with the danger of intrusion or encroachment by small lot developers which would destroy their character. The danger is always that the less intensive occupancy will be impaired by encroachment by more intensive occupancy...(Pomeroy, 1940, 57).

Robert Anderson, an expert on zoning-law, furthermore stated that "it is feared that less expensive homes than those erected by the first settlers of an area will diminish property values and destroy the atmosphere established by the construction of expensive homes on spacious grounds..." (Anderson, 1968, 48).

The early enabling legislation in Canada makes it clear that "zoning" served a variety of purposes. In British Columbia, prior to World War I, authority was given to local councils to regulate "the location, construction, and use of breweries, stables, sawmills, chemical-works, paint-shops, soap-works, livery stables, piggeries, blacksmith-shops, foundries, laundry and wash-house, will diminish the value of assessable residential buildings and other businesses, or cabins, which may, if unrestricted to location, tend to reduce the value of assessable property" (Reflections on Zoning, 1964, 6). The protective element
of land-use control was even more apparent in the "power to prohibit [dance halls, skating-rinks, and all places of amusement] in certain portions of the city". Another power authorized by-laws "for preventing...the erection and use...of any laundries or wash-house, and for ordering removal of laundries from any particular locality, when in the opinion of the Council such laundries are a nuisance or an eyesore to such locality" (Reflections on Zoning, 1964, 6).

It is evident that these powers were granted to enable a Municipal Council to protect existing property values. As early as 1904 in Ontario cities and towns, residential streets could be 'protected' from irregular setbacks; and in cities only, "the location, erection and use of buildings for laundries, butcher shops, stores and manufacturers" could be controlled (Reflections on Zoning, 1964, 6).

Prior to the repeal of Sections 709 to 733 of the Municipal Act of British Columbia in 1985, it was one of the few Canadian provincial zoning enabling Acts that said anything about the purposes of zoning. Part 21, Section 716 stated:

(2) In making regulations under this section, the council shall have due regard to

(a) the promotion of health, safety, convenience and welfare of the public;

(b) prevention of the over-crowding of land and preservation of the amenities peculiar to any (land-use) zone;

(c) the securing of adequate light, air and access;

(d) the value of the land and the nature of its present and prospective use and occupancy;

(e) the character of each zone, the character of the buildings already erected and the peculiar suitability of the zone for particular uses; and

(f) the conservation of property values (Municipal Act, R.S.B.C. 1979, 201).

2.3.2 THE PURPOSE OF SUBDIVISION STANDARDS

The purpose of subdivision regulation is to coordinate the unrelated plans of individual developers in order to achieve the desired comprehensive plan for the community prior to the construction of homes and to achieve certain servicing standards. For developers, subdivision regulations have been credited as a safeguard against competitors who would drive down the value of a well-planned subdivision with an adjacent shoddy substandard development.
There are many interests involved in the subdivision of land, including those of the original owner, the developer, the prospective buyer, and the city as a whole. Ladislas Segoe stated:

To the land developer the subdividing of land is primarily a matter of profit. He is chiefly interested in realizing as much money as he can from the sale of his land in the shortest possible time. To the community the subdivision of land is a matter of serious public concern. The activities of the developers shape the future of the community and conditions of its inhabitants. Where such activities are uncontrolled or inadequately controlled, they also may place an undue burden on the public treasury by reason of excessive cost of public improvements and maintenance, unnecessarily high operating costs of public services, and through the participation of the community in the financing of improvements in premature subdivisions (Segoe, 1941, 495).

The subdivision of land is the primary method of transforming a city plan into reality. The city plan is either realized or lost in the subdivision of land for development. Highways, streets and alleys are dedicated and/or paved. Sewer and water lines are installed. School and open space park zones are allocated and/or constructed. Transportation lines are extended, and police and fire protection is expanded. The control that a community extends over its land subdivision is the means by which elements of the comprehensive plan come into being and are enforced.

Subdivision regulations can only be effective, however, if they are guided by a comprehensive development plan.

The practical need for conformity between planning and subdivision control is greater than between planning and zoning. While zoning regulates uses, bulk and height, it does so on developed and undeveloped land and can be changed. Subdivision regulations affect undeveloped lands and whatever is permitted initially - street, sewer and water main location, widths and standards for their improvements, park and school site locations, and lot size - will be present for a long time (O'Mara, 1978, 72).

As established above, there are, and have been in the past, purposeful reasons for the use of regulations in both land use control as well as subdivision control. Both these mechanisms are integral parts of modern urban planning systems and unless the municipalities' policies and objectives in respect to them are properly studied and formulated, land use control and expansion of the urban areas may well lack the desired design quality in the residential environment.

2.4 DEVELOPMENT STANDARDS IN BRITISH COLUMBIA

The evolution of current municipal zoning and subdivision standards can be traced primarily to the first major town planning manual in British Columbia - The 1928 Vancouver Plan. There was however a
series of events prior to 1928 that influenced the evolution of development regulation in British Columbia.

David Hulchanski outlines a historical account of zoning in Vancouver in the following manner:

1900  Vancouver City Council adopts the city's first building regulations.

1907  Canadian Pacific Railway begins development of a 250 acre exclusive residential area, Shaughnessy Heights; subdivision plan prepared by Danish engineer L.E. Davick and Montreal landscape architect Fredrick Todd.

1908  Vancouver adopts its first comprehensive building bylaw.

1911  Point Grey adopts a bylaw regulating lot sizes for certain types of buildings.

1917  Vancouver Board of Trade establishes a Civic Bureau, with a City Planning and Housing Committee; begins work on adoption of a B.C. planning act with the assistance of Thomas Adams.

1921  Vancouver City Council, at the request of the Board of Trade, the Architectural Association and the Engineering Association, adopts a motion supporting passage of provincial planning enabling legislation; Council also establishes a Town Planning Committee to study planning.

The B.C. Municipal Act is amended, providing planning and zoning related authority for: fixing building lines; reserving land for future streets; limiting the number of dwellings per acre; establishing residence only districts; and prohibiting noxious trades and industries from any designated district.

Point Grey adopts a zoning bylaw, the first municipality in Canada to do so.

1922  The Shaughnessy Heights Building Restriction Act is adopted by the Legislature, prohibiting construction of anything but single family residences; it is the only residential area in the Province to receive such special treatment.

1924  South Vancouver adopts a zoning bylaw, almost identical to the Point Grey zoning bylaw.

1925  The Town Planning Act is adopted by the legislature, providing all municipalities the authority to prepare and adopt an Official Town Plan, a zoning bylaw, and to establish a Town Planning Commission; (the Planning Act is amended eight times by 1957, when it was repealed and replaced by Part XXI of the Municipal Act).

1927  Vancouver adopts an interim zoning bylaw (#1830) and establishes a Zoning Board of Appeal.

North Vancouver adopts a zoning bylaw; Point Grey replaces its existing zoning bylaw with a new one (Hulchanski, 1983).

2.4.1 THE 1928 VANCOUVER PLAN

In the City of Vancouver, "The British Columbia Metropolis" as Harland Bartholomew called it in 1928, the Vancouver Branch of the Town Planning Institute of Canada passed the Town Planning Act in December of 1925. The following March the firm of Harland Bartholomew and Associates was hired for the
preparation of a Comprehensive Town Plan for the City of Vancouver and Regional Plan of the Contiguous or Adjacent Territory. It was in this plan that zoning standards (specifically residential height and area standards) were introduced in a significant way to British Columbia (See Figure 2-6). It reads:

The following are, in part, the height, yard and density regulations for the various districts (zones):

A. One-family Dwelling Districts

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Heights:</td>
<td>35 feet or 2 1/2 storeys</td>
</tr>
<tr>
<td>Front Yard:</td>
<td>20 feet, except that where 40% of the frontage has been built upon the average front yard shall be maintained.</td>
</tr>
<tr>
<td>Rear Yard:</td>
<td>25 feet, measured from centre line of lane.</td>
</tr>
<tr>
<td>Side Yard:</td>
<td>Two, each 10% of width of lot with a maximum of 5 feet and minimum with windows of 4 feet.</td>
</tr>
<tr>
<td>Site Area:</td>
<td>4,800 square feet per family, except for existing lots of smaller area, or when the City Engineer permits, in conformity with the neighborhood, a subdivision of lots of not less than 3,600 square feet (Bartholomew, 1928a, 226).</td>
</tr>
</tbody>
</table>

In regard to the width of streets and right-of-ways, Figure 2-7 illustrates Bartholomew's desire to increase the 'present' requirements of 66-foot right-of-way and 36-foot pavement to 80-foot right-of-way and 54-foot pavement. In residential areas, he recommends the maintenance of at least a 60-foot right-of-way for "its flexibility to be widened" (Bartholomew, 1928a, 39).

Furthermore, as an appendix to the Vancouver Plan, Bartholomew includes "Rules Regulating the Subdivision of Land" in which he lays out another set of restrictions governing the street widths, block sizes, lots and street layout systems in relation to adjoining streets. They read as follows:

**STREET WIDTHS**

(b) The minimum width for minor streets (right-of-way) shall be fifty (50) feet...

Note - The most satisfactory width for minor streets is 60 feet. When the requirements of the major street plan seem to absorb an unreasonable amount of the owner's land in the view of the Town Planning Commission, they may advise the planning of 50-foot streets as a compensation...In general, however, it should be the aim of the Commission to establish a 60-foot standard for residence streets.

** BLOCKS**

(a) No blocks shall be larger than one thousand (1000) feet between street lines...

(b) In new subdivisions at a distance from property already subdivided, block widths shall be established, except for special reasons, at from two hundred and forty (240) to three hundred (300) feet.
Figure 2-6: 1928 Vancouver Plan Zoning Regulations
PROPOSED DEVELOPMENT OF MAJOR AND MINOR STREETS
GREATER VANCOUVER

HARLAND BARTHOLOMEW & ASSOCIATES
TOWN PLANNING CONSULTANTS

RESIDENTIAL STREETS

EXTREME WIDTH ON PURELY LOCAL RESIDENTIAL STREETS IS UNNECESSARY EXCEPT FOR EFFECT.

A 50 FOOT STREET SHOULD BE USED ONLY IN THOSE DISTRICTS WHERE NO MORE THAN 3 LINES OF VEHICLES WILL EVER BE NECESSARY.

A 60 FOOT WIDTH IS MORE FLEXIBLE AND SHOULD BE THE MINIMUM FOR MOST STREETS. ULTIMATELY IT COULD BE WIDENED TO ACCOMMODATE 4 LINES OF VEHICLES IF NECESSARY.

MAJOR STREETS

STREET AND ROADWAY WIDTHS SHOULD NOT BE ESTABLISHED ARBITRARILY. ROADWAY WIDTHS—THE DISTANCE BETWEEN CURB LINES—SHOULD BE BASED UPON THE NUMBER OF VEHICLES THEY ARE TO ACCOMMODATE, AND STREET WIDTHS—THE SPACE BETWEEN PROPERTY LINES—SHOULD BE DETERMINED BY THE WIDTH OF ROADWAY TOGETHER WITH PROVISION FOR AMPLE SIDEWALK SPACE. HERE ARE SHOWN TYPICAL EXAMPLES OF MODERN STREET DESIGN.

FOUR LINE THOROFARES

INADEQUATE FOR MAJOR STREET PURPOSES. THERE SHOULD BE ROADWAY SPACE FOR AT LEAST ONE FREE MOVING LINE OF VEHICLES ON EACH SIDE OF THE STREET. THIS IS NOT OBTAINABLE ON A 66 FOOT STREET WHICH CARRIES A CAR LINE.

A 66 FOOT STREET IS THE MINIMUM WIDTH FOR A MAJOR STREET WITHOUT CAR LINES. WHERE ADDITIONAL Vehicular Parking Space is Required, the ROADWAY SPACE COULD BE INCREASED 6 FEET and Vehicles PARK AT AN ANGLE OF FIVE DEGREES ON ONE SIDE OF THE STREET.

SIX LINE THOROFARES

THE SHOULD BE THE MINIMUM WIDTH FOR A MAJOR STREET CARRYING STREET CARs IN THE OUTLYING DISTRICTS. WHERE TRAFFIC IS LIGHT THE ROADWAY NEED NOT BE DEVELOPED TO ITS ULTIMATE WIDTH IN THE FIRST INSTANCE.

ALL NEW MAJOR STREETS SHOULD HAVE A MINIMUM WIDTH OF 80 FEET. THE STREET SHOULD BE DEVELOPED SO THAT IT CAN ULTIMATELY BE WIDENED TO A 10 LINE THOROFARE AND PUBLIC UTILITIES SHOULD BE INSTALLED IN ACCORDANCE WITH FINAL DEVELOPMENT.

EIGHT LINE THOROFARES

A 120 FOOT STREET WOULD ACCOMMODATE 6 FREE MOVING LINES OF VEHICLES AND ANGULAR PARKING AT EITHER SIDE OF THE STREET. SIDEWALK SPACE IS ALSO CONSIDERABLY INCREASED.

NOTE—FREE MOVING VEHICLES ARE SHOWN IN SOLID BLACK—PAIRED VEHICLES ARE SHOWN BY OUTLINE.

Figure 2-7: 1928 Vancouver Plan Suggested Street Widths
LOTS
(a) In all rectangular lots and so far as possible all other lots, the side lines shall be at right angles to the street on which the lot faces.
(b) The minimum dimensions for lots shall be forty (40) feet for width and one hundred and twenty (120) for depth, and in no case shall a rectangular or irregular shaped lot contain less than forty-eight hundred (4800) square feet.

RELATION TO ADJOINING STREET SYSTEM
The arrangement of streets in new subdivisions shall make provision for the continuation of the principal existing streets in adjoining additions (or their proper projection where adjoining property is not subdivided) insofar as they may be necessary for public requirements. In general, such streets shall be of a width at least as great as the existing streets. The street and lane arrangement must also be such as to cause no hardship to owners of adjoining property when they subdivide their own land and seek to provide for convenient access to it (Bartholomew, 1928, Appendix II).

These height and area standards were enforced as part of the City of Vancouver Zoning Bylaw in 1930 (Being bylaw 1951) and the subdivision regulations were enforced through the Land Registry Act (See Part VI, Sections 71 to 119, 1926) and the Vancouver Incorporation Act (Section 163, 1921).

The exact sources for these particular standards as they were drawn up by Bartholomew and Associates, are varied and it is difficult to pinpoint which standards were derived from any specific source. It is well known that the standards were not drawn up to be site specific to Vancouver. Harland Bartholomew and Associates, City Plan and Landscape Engineers of St. Louis, Missouri provided their expertise to cities throughout North America. It is evident from an examination of their city plans for other cities (Bartholomew, 1924) that the standards they recommended in Vancouver were commonplace to other North American cities of the day. In 1928, the same year in which the Vancouver Plan was completed, Bartholomew as President of the American City Planning Institute, wrote a manual for the National Conference on City Planning entitled What is Comprehensive Zoning? In this manual he recommends the typical 35-foot or 2 1/2 storey height limit for residential zones, and for the minimum dimensions of side, rear and front yards he states:

the three and four-foot side yards of many zoning ordinances are unscientific compromises with old land subdivision practices. Side yards of five or six feet, with rear yards of twenty-five feet, should be established as a minimum for all new developments. These are the minimum desirable standards for good living conditions for light, air and access and for open space for driveways, yard room and garden. Front yards of at least 25 feet should be provided for purposes of recess from the odors, noise and dirt of the street, for grass and trees, and general amenity (Bartholomew, 1928b, 24).
In one statement, the famous city planner and engineer admits the unscientific nature of the 'old' zoning ordinance of 3 to 4 foot minimum side-yard setbacks and yet further recommends the 'desirable' standard as being a 5 to 6 foot minimum side-yard setback. He does not elaborate further as to the reasoning behind this new particular recommendation.

Bartholomew's standards are merely a new expressed opinion by a professional, unscientific in its mathematical formula, with broad sweeping application to all cities. These standards were in no way site responsive design criteria which allowed an adequate flexibility to adapt to local physical and cultural conditions.

The practice of copying zoning bylaws, originally from some American model, is fairly widespread and that only rarely...can it be said that the zoning bylaw is a conscientious attempt to control development so as to ensure some of the benefits, or the supposed benefits, of a well thought out plan of development for a region, a community or a municipality within the community (Reflections on Zoning, 1964, 7).

These development standards have had a substantial impact on the urban pattern of British Columbia. Many municipalities still hold Bartholomew's standards to be valid. After 60 years, New Westminster, for example, still retains the 25-foot front and rear yard setbacks and a 5-foot side yard setback with lane requirements that Bartholomew recommended back in 1928.

2.4.2 CURRENT GREATER VANCOUVER DEVELOPMENT STANDARDS

The responsibility for development control in British Columbia, lies primarily with the municipalities. The Constitution Act, 1867 (Section 92(8)) gives the Province legislative authority to manage and sell its own lands and in turn delegate portions of this power to local governments through provincial statutes. The Land Registry Act, and the Municipal Act of British Columbia, authorize municipal governments to control the development of roads and the power to regulate the use of land and improvements abutting the street through zoning and subdivision bylaws. In regards to the authorization of a local government to enact zoning regulations, Part 29, Section 963 of the Municipal Act states:

(1) A local government may, by bylaw,  
(a) divide the whole or part of the municipality or regional district, as the case may be, into zones, name each zone and show by map or describe by legal description the boundaries of the zones,  
(b) limit the vertical extent of a zone and provide other zones above or below it, and  
(c) regulate within the zones
(i) the use of land, buildings or structures,
(ii) the density of the use of land, buildings and structures,
(iii) the siting, size and dimensions of buildings and structures, and
(iv) the area, shape and dimensions of all parcels of land that may be created by subdivision under the *Land Title Act* or the *Condominium Act*.

(2) The regulations under subsection (1) may be different for different
(a) zones,
(b) uses within a zone,
(c) standards of works and services provided, and
(d) siting circumstances

Part 27 Section 565 of the *Vancouver Charter*, 1953 (an Act which supersedes the *Vancouver Incorporation Act* of 1921) states in regards to zoning:

565. The Council may make bylaws
(a) dividing the city or any portion thereof into districts or zones of such number, shape, or size as Council may deem fit;
(b) regulating, within any designated district or zone, the use or occupancy of land and land covered by water for or except for such purposes as may be set out in the bylaw;
(c) regulating, within any designated district or zone, the construction, use, or occupancy of buildings for or except for such purposes as may be set out in the bylaw;
(d) regulating the height, bulk, location, size, floor area, spacing, and external design of buildings to be erected within the city or within designated districts or zones;
(e) prescribing, in any district or zone, building lines and the area of yards, courts, and open spaces to be maintained; and regulating in any district or zone the maximum density of population or the maximum floor-space ratio permissible (*Vancouver Charter*, 1953, Chap. 55, 172-173).

Part 29, Section 989 of the *Municipal Act* further outlines the authorization to regulate the subdivision of land:

(1) A local government may by bylaw regulate and require the provision of services in respect of the subdivision of land, and for that purpose may
(a) regulate and prescribe minimum standards for the dimensions, locations, alignment and gradient of highways in connection with subdivisions of land, and may make different regulations for different uses and for different zones in the municipality or regional district,
(b) require that within a subdivision, highways, boulevards, boulevard crossings, transit bays, street lighting or underground wiring be provided, and be located and constructed in accordance with the standards for different zones and highway classifications and for different abutting uses of land, and
(c) require that within a subdivision, a water distribution system, a fire hydrant system, a sewage collection system, a sewage disposal system, a drainage collection system or a drainage disposal system be provided, located and constructed in accordance with the standards prescribed in the bylaw, and the bylaw may prescribe different standards for different zones (*Municipal Act*, R.S.B.C. 1979, 312-313).
The Provincial government therefore entrusts local authorities with the power to adopt regulations, standards and controls appropriate to the municipalities needs.

The Municipal Act does not impose specific standards for street widths or bulk and height dimensions but delegates these responsibilities to the municipal authorities. However, it does state in Part 29 Section 995 that:

(1) A local government may require that the owner of the land being subdivided provide, out of the land that is being subdivided and without compensation, land not exceeding
(a) 20 m in depth, for a highway within the subdivision, or
(b) the lesser of
   (i) 10 m in depth, or
   (ii) the difference between the current width of a local highway and 20 m, to widen an existing local highway that borders or is within the subdivision (Municipal Act, R.S.B.C. 1979, 316).

Therefore, without specifying an actual roadway allowance the Act advocates the implementation of the twenty meter (originally stated as sixty-six feet in the Municipal Act prior to the 1979 Amendment) right-of-way practice which is an arbitrary distance used by early surveyors to plot land holdings. As Tanner states in his Suburban Residential Streetscape,

As it is beyond the budgets of most communities to compensate owners of land for additional rights-of-way area there is a universal tendency to be content with the authorized allotment. In a similar vein, it is customary also for a municipality to acquire the maximum permissible allotment even though it is known to be excessive for road construction purposes (Tanner, 1966, 50).

Tables 2-1 and 2-2 represent a set of development standards for single-family dwelling unit districts in municipalities of the Greater Vancouver Area. As is evident, these standards vary from one municipality to another in some instances and appear consistent in others. The similarities are due in part to a congruent starting point for most municipal standards, typically the 1928 Vancouver Plan. In the case of street right-of-ways there is almost a universal acceptance of the 66 foot or 20 meter standard. Table 2-2 illustrates that 11 out of 12 local municipalities retain at least a 66-foot or 20 meter right-of-way for collector streets in residential areas, and 5 of those 12 maintain that same distance on local streets and cul-de-sacs.
**TABLE 2-1**

**CURRENT GREATER VANCOUVER AREA MUNICIPAL ZONING STANDARDS**

<table>
<thead>
<tr>
<th>Municipality</th>
<th>District</th>
<th>Minimum Yard Distance (ft)</th>
<th>Maximum Site Coverage</th>
<th>Height (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Front</td>
<td>Rear</td>
<td>Side</td>
</tr>
<tr>
<td>Burnaby</td>
<td>R-2</td>
<td>24.6</td>
<td>29.5</td>
<td>4.9*</td>
</tr>
<tr>
<td>Coquitlam (District of)</td>
<td>RS-1</td>
<td>24.9*</td>
<td>19.7</td>
<td>5.9</td>
</tr>
<tr>
<td>Delta</td>
<td>RS-4</td>
<td>19.7</td>
<td>19.7</td>
<td>2.9</td>
</tr>
<tr>
<td>Langley</td>
<td>R1-D</td>
<td>24.6</td>
<td>24.6</td>
<td>4.9</td>
</tr>
<tr>
<td>Maple Ridge</td>
<td>RS-1B</td>
<td>19.7</td>
<td>19.7</td>
<td>4.9</td>
</tr>
<tr>
<td>New Westminster</td>
<td>RS-1</td>
<td>25.0</td>
<td>25.0</td>
<td>5.0</td>
</tr>
<tr>
<td>North Vancouver (City)</td>
<td>RS</td>
<td>25.0*</td>
<td>25.0</td>
<td>5.0</td>
</tr>
<tr>
<td>North Vancouver (District)</td>
<td>RS-4</td>
<td>25.0*</td>
<td>25.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Port Coquitlam</td>
<td>RS-1</td>
<td>24.6</td>
<td>24.6</td>
<td>3.9</td>
</tr>
<tr>
<td>Richmond</td>
<td>GR-1</td>
<td>19.7</td>
<td>25.0</td>
<td>3.9</td>
</tr>
<tr>
<td>Surrey</td>
<td>R-F(R)</td>
<td>24.6</td>
<td>24.6</td>
<td>5.9</td>
</tr>
<tr>
<td>Vancouver</td>
<td>RS-1A</td>
<td>24.0</td>
<td>35.0</td>
<td>5.0</td>
</tr>
</tbody>
</table>

* - subject to conditions
N/A - not applicable
<table>
<thead>
<tr>
<th>Municipality</th>
<th>District</th>
<th>Minimum Lot Dimensions (ft)</th>
<th>Road Allowance Widths **(ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Frontage</td>
<td>Width</td>
</tr>
<tr>
<td>Burnaby</td>
<td>R-2</td>
<td>60.7</td>
<td>N/A</td>
</tr>
<tr>
<td>Coquitlam</td>
<td>RS-1</td>
<td>44.3</td>
<td>N/A</td>
</tr>
<tr>
<td>Delta</td>
<td>RS-4</td>
<td>N/A</td>
<td>65.6</td>
</tr>
<tr>
<td>Langley</td>
<td>R1-D</td>
<td>59.9</td>
<td>N/A</td>
</tr>
<tr>
<td>Maple Ridge</td>
<td>RS-1B</td>
<td>49.2</td>
<td>N/A</td>
</tr>
<tr>
<td>New Westminster</td>
<td>RS-1</td>
<td>32.0*</td>
<td>N/A</td>
</tr>
<tr>
<td>North Vancouver (City)</td>
<td>RS</td>
<td>33.0</td>
<td>N/A</td>
</tr>
<tr>
<td>North Vancouver (District)</td>
<td>RS-4</td>
<td>32.8</td>
<td>49.2</td>
</tr>
<tr>
<td>Port Coquitlam</td>
<td>RS-1</td>
<td>29.5</td>
<td>49.2</td>
</tr>
<tr>
<td>Richmond</td>
<td>GR-1</td>
<td>59.1*</td>
<td>59.1</td>
</tr>
<tr>
<td>Surrey</td>
<td>R-F(R)</td>
<td>N/A</td>
<td>59.1*</td>
</tr>
<tr>
<td>Vancouver</td>
<td>RS-1A</td>
<td>25.0</td>
<td>40.0</td>
</tr>
</tbody>
</table>

* - subject to conditions
** - local/collector
N/A - not applicable
The dissimilarity of many other standards is the result of a variety of influences: the influx of planning professionals to the Greater Vancouver Area from abroad who introduced varied urban standards developed in other cities; the lack of senior government imposed standards resulted in each municipality adopting its own set of standards which subsequently each evolve on their own course.

In discussion with Municipal planners, most are hard pressed to explain the source and/or the evolution of their existing development standards and are predictably slow to admit the possible adverse visual affect of these formula on the residential environment.

There is no evidence that set-back and height standards established under community objectives regarding fire, daylight, air, noise, privacy view and traffic considerations are scientifically sound and not of an arbitrary nature. Tanner inquired locally as to the reasons for retaining set back and height regulations and he states:

the present practice is simply a continuation of the convention that is founded on an inherited desire to avoid the re-occurrence of the drab living conditions of earlier industrial settlements...present absolute and arbitrary set-back regulations prohibit meaningful usage of considerable portions of private property (Tanner, 1966, 67).

There are numerous residential site development standards issued by both federal and provincial levels of government and by private individuals that recommend specific formula's and standards to guide development. Canada Mortgage and Housing Corporation (CMHC), the agency responsible for administering the National Housing Act, sets outs its recommended standards for residential site development in two publications - Site Planning Criteria (NHA 5214, 1977) and Residential Site Development (NHA 5364, 1981). These documents suggest detailed planning and design considerations that developers should take into account and propose minimum site planning requirements "to improve housing quality through the efficient use of land and servicing at costs which the resident can afford" (NHA 5214, 1977, 6).

The 1980 Residential Services and Site Planning Standards issued by the B.C. Ministry of Municipal Affairs developed a set of standards "to promote the adoption of consistent residential site planning standards by B.C. municipalities in order to achieve financial economies, to protect the quality of communities and to simplify and streamline the development approval process" (1980, 1). Figure 2-8 is an extract from the conventional standards
LOT STANDARDS

TYPICAL NET DENSITY (DWELLINGS/HECTARE): 13-22

MINIMUM LOT SIZE (m²): 370

MINIMUM LOT WIDTH (m): 12

SITE STANDARDS

LOT COVERAGE (%): 33

MAXIMUM COVERAGE OF ACCESSORY BUILDINGS (m²): 50
- maximum height (m): 4
- may be up to 2 m from back property line

MINIMUM USABLE OUTDOOR SPACE (m²): 50
- unenclosed parking must be at least 2 m from boundaries of usable outdoor space

PARKING REQUIREMENTS: NO. OF COVERED OR UNCOVERED SPACES: 1
- 2 spaces may be required if on-street parking is unavailable adjacent to the lot

SETBACKS REQUIREMENTS: FRONT (m): 8
SIDE (m): 1.5
BACK (m): 8

DWELLING STANDARDS

MAXIMUM DWELLING FLOOR AREA (FSR): .60
(A Ratio of Total Usable Floor Space Permitted to Lot Area)

BUILDING HEIGHT (m): 8

LANDSCAPING: Not required

Figure 2-8: Example of B.C. Municipal Standards
PUBLIC STREET

2.75 DU/AC

Net Density 8 units on 2.90 acres = 2.75 DU/AC
Gross Density
Average Lot Size 14,000 S.F.

Site Development Costs/DU $14,102

Subcollector Street
Pavement Width 26' 9,100 S.F. 1,138 S.F./DU
R.O.W. Width 40' 14,000 S.F. 1,750 S.F./DU

Setbacks
Front Yard 20'
Side Yard 10'

Building Coverage
Average 1,250 S.F.
Garage 440 S.F.
Total Coverage 1,690 S.F. x 8 = 13,520 S.F.

Driveway Coverage
Average 800 S.F.
Total Coverage 800 S.F. x 8 = 6,400 S.F.
Conventional Lots

Conventional lots for detached, duplex or semi-detached forms of housing shall permit the siting of a range of house types, and provide sufficient space around the dwelling to permit residents to undertake normal day-to-day activities.

Discussion

The subdivision of land requires lots and blocks, services and street layout to be designed and built prior to the selection and siting of individual dwellings. The design of conventional lot housing should take into account the following factors:

- house types common in the area
- sunlight, daylight, and ventilation to penetrate the dwelling; privacy for activities inside the dwelling; and open views out of the dwelling
- fire protection between dwellings and access for the maintenance of the building and the lot
- access to the dwelling from the street, and the storage of cars, recreation vehicles, garden equipment and household garbage
- activities of the resident outside the dwelling such as children's play, gardening and eating outdoors
- future additions at the rear of detached and semi-detached dwellings
- changes in grade
- variations in setback to provide interest in the street appearance.

Requirements

Conventional lots for housing having the following characteristics shall be deemed adequate to meet the Intent statement.

**Internal Lots for Detached or Duplex Housing** with areas not less than 4,000 sq. ft. (370 m²) and widths not less than 40 ft. (12 m).

**Corner Lots for Detached or Duplex Housing** with areas not less than 5,000 sq. ft. (460 m²) and widths not less than 50 ft. (15 m).

**Internal Lots for Semi-Detached forms of Housing** with areas not less than 3,000 sq. ft. (280 m²) per unit and widths not less than 30 ft. (9 m).

**Corner Lots for Semi-Detached forms of Housing** with areas not less than 4,000 sq. ft. (370 m²) per unit and widths not less than 40 ft. (12 m).

- yard space or easements of 4 ft. (1200 mm) for one storey buildings plus 1 ft. (300 mm) for each additional storey along the face of all external walls of the building to ensure there is sufficient space to maintain the building exterior
- a private outdoor space with minimum dimension of 25 ft. (7.5 m)
- spatial separation between buildings, walkways, driveways and parking areas meeting the requirements of the Residential Standards

Lots for detached, duplex and semi-detached forms of housing which are less than the above requirements may still be accepted for subdivision approval purposes on condition that the design and siting of houses on these smaller lots conform to the criteria set down in Part IV of this document.

Figure 2-10: Example of Municipal Standards
proposed for a single-family residential zone in British Columbia municipalities. See also Figures 2-9 and 2-10.

The Ontario Ministry of Housing, Local Planning Policy Branch, issued a series of publications which recommended the re-examination of subdivision standards for economic reasons. They subsequently published *Urban Development Standards: A Demonstration of the Potential for Reducing Costs* (1976), *Urban Development Standards: A Detailed User Survey* (1979), and *Urban Development Standards: A Review* (1982). It is unfortunate that these recommended standards are based on policies which reflect economic considerations alone and do not take into account aesthetics.

The well-known team of Joseph DeChiara and Lee Koppelman have a variety of standards manuals for residential design including *Manual of Housing Planning and Design Criteria* (1975), *Site Planning Standards* (1978) and *Urban Planning and Design Criteria* (1975). More recently, the *Time Saver Standards Series* has replaced these publications. Many other sources for residential development standards also exist, each with their own biases and subsequently their own standards. Tables 2-3 and 2-4 illustrate examples of the standards recommended by some of these sources.

Kevin Lynch, in his discussion on standards for building spacing in *Site Planning* claims that there are numerous handbooks on site design and official subdivision and building regulations which cite standards for building spacing, setbacks and lot sizes. "These standards attempt to ensure adequate light, privacy, fire safety and 'amenity', using mechanical rules that can be applied repeatedly. But the rules result in inflexible layouts and the waste of land" (Lynch, 1971, 304).

The lack of one accepted standard in residential development and the non-existence of senior government imposed standards is, if anything, of benefit to the quality of residential environment in the Greater Vancouver Area. This has at least prevented the creation of a total uniformity in residential design and in some instances certain municipalities have permitted innovative and site responsive design solutions in comprehensive developments contrary to the conventional standard. This occurs in instances where either the street width and right-of-way standards or building bulk and area standards have been relaxed. The necessity to ignore conventional standards in order to respond to basic design issues suggests that there is something wrong with the residential development standards.
TABLE 2-3
VARIOUS 'RECOMMENDED' RESIDENTIAL ZONING STANDARDS

<table>
<thead>
<tr>
<th>Standard Source</th>
<th>Minimum Yard Distance (ft)</th>
<th>Maximum Site Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Front</td>
<td>Rear</td>
</tr>
<tr>
<td>1928 Vancouver Plan Standards(1)</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>B.C. Provincial Standards(2)</td>
<td>26.2</td>
<td>26.2</td>
</tr>
<tr>
<td>C.M.H.C. Federal Standards(3)</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Cost Effective Site Planning (Conventional) Standards(4)</td>
<td>15</td>
<td>N/A</td>
</tr>
<tr>
<td>Cost Effective Site Planning (Proposed) Standards(4)</td>
<td>20</td>
<td>N/A</td>
</tr>
<tr>
<td>Ontario (Conventional) Standards(5)</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Ontario (Proposed) Standards(5)</td>
<td>10*</td>
<td>18*</td>
</tr>
<tr>
<td>Metro Toronto (Conventional) Standards(5)</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>Metro Toronto (Proposed) Standards(5)</td>
<td>10*</td>
<td>18*</td>
</tr>
</tbody>
</table>

* - subject to conditions  
(av) - average  
(fl) - floors  
N/A - not applicable  
1(Source: Bartholomew, 1928a)  
2(Source: Ministry of Municipal Affairs, 1980)  
3(Source: Canada Mortgage and Housing Corporation, 1977)  
4(Source: National Association of Home Builders, 1982)  
5(Source: Ministry of Municipal Affairs and Housing, 1976 and 1979)
# Table 2-4

**VARIous 'RECOMMENDED' RESIDENTIAL SUBDIVISION STANDARDS**

<table>
<thead>
<tr>
<th>Standard Source</th>
<th>Minimum Lot Dimensions (ft)</th>
<th>Road Allowance Widths <strong>(ft)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frontage</td>
<td>Width</td>
</tr>
<tr>
<td>1928 Vancouver Plan Standards (1)</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>B.C. Provincial Standards (2)</td>
<td>N/A</td>
<td>39.4</td>
</tr>
<tr>
<td>C.M.H.C. Federal Standards (3)</td>
<td>N/A</td>
<td>40</td>
</tr>
<tr>
<td>Cost Effective Site Planning (Conventional) Standards (4)</td>
<td>N/A</td>
<td>60</td>
</tr>
<tr>
<td>Cost Effective Site Planning (Proposed) Standards (4)</td>
<td>N/A</td>
<td>72.5</td>
</tr>
<tr>
<td>Ontario (Conventional) Standards (5)</td>
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<td>50</td>
</tr>
<tr>
<td>Ontario (Proposed) Standards (5)</td>
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<tr>
<td>Metro Toronto (Conventional) Standards (5)</td>
<td>N/A</td>
<td>45</td>
</tr>
<tr>
<td>Metro Toronto (Proposed) Standards (5)</td>
<td>N/A</td>
<td>30</td>
</tr>
</tbody>
</table>

* - subject to conditions  
** - local/collector  
N/A - not applicable  
1 (Source: Bartholomew, 1928a)  
2 (Source: Ministry of Municipal Affairs, 1980)  
3 (Source: Canada Mortgage and Housing Corporation, 1977)  
4 (Source: National Association of Home Builders, 1982)  
5 (Source: Ministry of Municipal Affairs and Housing, 1976 and 1979)
SUMMARY

As is evident from an examination and comparison of Tables 2-1 to 2-4, many of the standards, which were implemented as a result of the 1928 Vancouver Plan are in force in the Greater Vancouver Area. Is it possible that in our desire to create order and maintain control over the development of the city, the mechanism and its formulae have become so embedded in the system that its effects have been ignored or deemed irrelevant? Kevin Lynch states that:

standards provide an equitable base for legal control and a way of regularizing production. In conflict and doubt, it is comforting to have an established way of separating right from wrong. The danger lies in this very way of sharply distinguishing good and evil, since the context of a decision will be ignored and side effects neglected (Lynch, 1971, 241).

The sixty-six foot street right-of-way and additional 25 foot set back, both, perhaps reasonable in their original intent, are now nationwide and have subsequently had an immense impact on the form of today's residential landscape. Current arbitrary and antiquated front yard and set-back regulations, with their uniform application throughout a district creates monotonous design and eliminates the opportunity to respond to local conditions. There is a need to re-examine these 60 year old regulations whose objectives were suspect even during the time of their implementation. Is it possible that in our desire to standardize and order our environment we have neglected the context and the adverse side effects of these regulations?

Standards are often set arbitrarily. They may be the expressed opinion of some professional, repeated by some others, accepted as the best readily available statement for some legal requirement and eventually codified across the nation. The connection to the original purpose is often glossed over, even forgotten. The relation of standard building setbacks or standard lot frontages to health and welfare is quite obscure. Skilled planners will often violate accepted standards and produce better environments while doing so (Lynch, 1971, 241-242).
REFERENCES (CHAPTER TWO)


Little boxes on the hillside,
Little boxes made of ticky tacky
Little boxes on the hillside,
Little boxes all the same;

There's a green one and a pink one
And a blue one and a yellow one
And they're all made out of ticky tacky
And they all look just the same.

Melvin Reynolds
3.0 THE COST OF DEVELOPMENT STANDARDIZATION

The New Webster Dictionary of the English Language defines standard as "that which is established by competent authority as a rule or measure of quantity; that which is established as a rule or model by public opinion, custom, or general consent - a. Serving as a standard; capable of satisfying certain conditions fixed by competent authority; fixed; settled; - standardize, to accept as a standard; to make certain fixed or standard sizes, quantities, etc." (1970); Chapin in Urban Land Use Planning defines standards as "a set of yardsticks established for measuring the excellence of quality in elements of the communities make-up" (1965, 376). Kevin Lynch’s Site Planning defines standards as "formal statements about the stable characteristics of environmental features that are presumed to make them universally desirable or acceptable" (1971, 241). There are standards for just about everything man-made in the environment: pipe sizes, ground slope, wheelchair grades, playground size, fire access, graphic design and even standards for the layout of this study. Some standards regulate the process of creation and some its subsequent performance; some are legal minimums while others are desirable optimums used as guides in the design process; some refer to established ways of doing things ("good current practice"); and some are simply arbitrary standardizations that limit unwanted variation in form (bolt sizes for example).

The development standards examined in this study are legally enforceable minimums that are presumed to be 'universally' desirable and well established 'yardsticks' to be used in residential design.

Research into the effects of development standards indicates that traditional zoning and subdivision standards have a two-pronged negative effect: (a) they create costly residential environment; and (b) they inadvertently prescribe unaesthetic, monotonous and un-innovative design solutions that do not respect existing site characteristics and design considerations for residential environments.

The goal of this research is to substantiate the second assertion, but it is first important to briefly discuss the effect of standardization on cost.
3.1 ECONOMIC COST OF DEVELOPMENT STANDARDS

The rising cost of new housing has achieved significant attention during the past several years. As the rise in the price of land, labour, materials and capital began to override the rise in medium incomes in the 1970's, the affordability of single family detached housing declined rapidly.

In metropolitan areas with the highest land and development costs, the only way to provide new houses at an affordable price appeared to be either to attach or stack dwelling units. As a result, by 1980, attached and multi-family housing accounted for 40 percent of new housing starts, up from 25 percent in 1975 in the United States. By 1982, 46 percent of new housing starts were for attached housing (Updergrave, 1984, 198).

Regardless of these data, homeowners continue to express a preference for the single family house on its own lot. Such houses accounted for 88 percent of the homes (new and used) purchased in the U.S. in 1983 (Pfister, 1984, 12-13). As one housing expert concluded, "Attached houses might woo buyer's affections when times are tough,...but in the end they will always go back to single family detached" (Updergrave, 1984, 202).

As the 1980's began, homebuilders considered how to cut costs to respond to the unaffordability of single family detached houses. Building downsized houses on smaller lots appeared to be one way to meet the demand, but the development standards of many municipalities seriously restricted the construction of such housing. Standards governing the density of housing; the amount of land required for different types of housing; the specifications for minimum lot size, frontage, setbacks, building orientation, and siting; street and sidewalk widths; curbs and gutter design; as well as requirements for parking, open space and drainage, limited the housing industry's ability to deliver an attractive affordable house on a downsized lot. In many instances, development standards that were intended for an earlier period, remained in effect - often adding what many consider to be unnecessary costs (Seidel, 1978).

While many of these regulations are aimed at positive objectives - preserving the environment, making homes safer, and reducing sprawl - all too frequently, however, these regulations, result in significantly increasing the costs of housing. Stephen Seidel, author of Housing Costs and Government Regulations: Confronting the Regulatory Maze, states that in many cases this result is intentional. "A
community manipulates its regulations to prevent the construction of moderately priced housing" (1978, 1). Even where exclusion is not the intent, to adhere to all the development regulations and standards does significantly raise the final selling price of most new homes built today.

To save costs and conform to the increased demand for single and two-person households, the market pressure exists: to build smaller housing units; to use less land per unit; to convert extra space in existing houses into apartments; to speed up the development approval process; and to make more use of manufactured housing, factory-produced components, and cost-cutting building techniques (Weitz, 1982, 1).

If such market adjustments are to occur, many municipalities will be faced with the need to make changes to their land use and development regulations and standards. The public supports existing regulatory mechanisms because of a belief that they preserve and enhance the livability of their neighborhoods and the value of their properties. Citizens typically oppose changes that threaten to reduce these values and every local politician and planner knows this.

A problem arises, however, when local policies and bylaws inhibit market adjustments that will allow wider access to affordable housing. A HUD Report on Affordable Housing states that, "judging from several case studies and demonstrations, it appears that the initial cost of new housing in some communities might be lowered by as much as 20 to 25 percent if certain policies, standards, fees and procedural requirements are modified" (Weitz, 1982, 1).

Another HUD Report entitled Affordable Housing and Land Supply and Development: The State Role, concludes that "zoning regulations, subdivision standards, dedication and fee requirements, and the construction of public facilities can all greatly affect the availability and price of land for housing" (Sidor, 1984).

The most lucid summary of the effect of Government regulations on the housing industry is written by a homebuilder in his comments to Stephan Seidel's questionnaire on government regulation. He writes:

...I have built over 1,000 homes. These all have been below the average selling price for the time and area. Almost all of my customers were buying their first home. I believe that I have accomplished much by creating the opportunity for these customers to become homeowners and taxpayers. However, the recent trends in over-regulations have made it impossible to build and sell to this market. I realize that all of these minimum requirements and environmental reviews, consumer protections etc., supposedly have the customer's
best interest at heart. But the total cost of this package is astronomical. The result is that decent housing is now denied to the people who need it most. The human costs are very great and the loss of opportunity has hit the same persons that the regulations were supposed to help. Basically, the value received is much less than the cost (Seidel, 1978, 21).

3.2 THE AESTHETIC COST OF DEVELOPMENT STANDARDS

Of more consideration to the welfare of cities than the wealth of their citizens is the aesthetic cost of development control. In relation to the plotting of streets and the establishment of lots fronting onto those streets, standardization has failed to meet the economic test which is ultimately a business proposition (Butler, Sanders, Gretzeis, Mosena, 1984). This effects the business of urban development and ultimately the pocket book of both the developer and buyer. The ultimate purchase, in my mind, is that of a home and not that of an impersonal investment.

When the developer builds a structure he is merely creating a product which he believes will have the potential to trigger an emotional impact in the eventual buyer of the house. At this state the house is merely a commodity and an economic concern of the developer.

Upon the sale of the structure, the building begins to take on cultural characteristics as emotional attachments, psychological associations and a sense of place and belonging develops. The once economic product now becomes a social-psychological product, a home. Thus the social (aesthetic) consequence of development standardization on residential environment appears to match, if not outweigh, the economic consequence.

The assumed blight of the suburbs resulting from the standardization of the residential design was well documented in the early sixties with the publications of The Report of the Committee of Inquiry into the Design of the Residential Environment by the Royal Architectural Institute of Canada in 1960; Performance Standards for Space and Site Planning for Residential Development by F. Lasserre and H.P. Oberlander in 1963; and Reflections on Zoning by the Royal Architectural Institute of Canada in 1964. What is surprising is the lack of policy formation response by municipalities regarding the residential environment. In most cases the standards in existence prior to these critiques are still in force. The reliance on standard height and bulk regulations, over-generous road standards, monotonous width and setback standards and a
failure to recognize either site qualities or local building styles has led to adverse aesthetic consequences, anonymity and lack of identity in residential design.

Development standards have been unduly restrictive, arbitrary and oversimplified preventing imaginative and site sensitive development. Although many terms have been standardized and widely copied so that they appear to represent common experience and understanding, on closer analysis they are difficult to justify. *Reflections on Zoning* comments on the arbitrary nature of a variety of zoning standards:

in particular, yard requirements and height limitations often appear to have little rational basis...that front (and side) yards, though very common (if not universal) requirements, are about as hard to justify as any requirement in a zoning by-law. We are forced to the conclusion that their popularity is due to habit and fashion...although experience has shown that a setback of, say, twenty-five feet, tends to become the universal setback, it often happens that the better looking street would have varying setbacks (1960, 5,18,24).

The community values which currently underlay residential development standards are related to "safety, health and the general welfare of the community". It must be said that the urban residential areas of today are relatively safe and healthy places in which to live, especially in comparison to those of the last century for which standards were originally developed. As F. Lasserre and P. Oberlander state in their study of *Performance Standards for Space and Site Planning for Residential Development*, this has not been entirely the result of site and space regulations. It is the additional result of "better traffic control, smoke abatement programs, and regulations concerning domestic animals", as well as a higher expectation from the home buyer (1963, 8). Although the problems concerning the health and safety of the residential environment seem to have been corrected, a new problem has emerged in residential development. Regulations and standards which control the bulk and density of residential space development have "contributed significantly toward the determination of the visual form of the residential environment" (Lasserre, Oberlander, 1963, 8).

This visual form is unsatisfactory for several reasons: a) the monotonous/repetitious layout of building structures of similar size and shape each conforming to the specific development standards of current bulk and density regulations; and b) the insensitivity of development to the nature and character of the site due to the 'broad-stroking' of the standards. Frustration with development standards and the fact that there is very little profit in residential architecture, has caused most designer's to shy away from the
residential field. Furthermore, neither private or public interests are willing to subsidize pioneering efforts of the scale of early residential experiments such as Radburn.

The design of building groups and ensembles, as distinct from individual structures, continues to be the weak point of American architecture, and most architects have shied away from trying to arrange the nearly identical plywood and plaster boxes that are dotting the landscape in a pattern that would be pleasing, livable and imaginative (Tunnard, Pushkarev, 1981, 67).

Robert Gutman in the Design of American Housing: A Reappraisal of the Architects Role claims that far less than 20% of residential units are architect-designed (Gutman, 1985, 6). The major problem that results from this is that merchant-builders, who produce over 80% of the housing stock, do not produce units that are site specific. Architects, with design training and a regional base, are familiar with the local styles and context and can in most cases better fit the unit to the land and the conditions prevailing in a particular region if the standards will so allow (Gutman, 1985).

Tunnard and Pushkarev claim that for these reasons the physical design of mass residential development is done by people who are not 'qualified' or 'visually trained' - businessmen, contractors, engineers and administrators.

The antipathy between architects and residential developers is quite mutual - while the former accuse the latter of lack of taste, the latter accuses the former of being expensive, impractical, unwilling to understand the public and authoritarian in trying to impose preconceived personal design ideas (Tunnard and Pushkarev, 1981, 67).

The National Association of Home Builders in the United States, reported that only 34% of its members used the services of an architect. These services pertained primarily to the design of the structure itself. The employment of 'visually trained' site planners and landscape architects to establish the road layout and the groupings of homes is even less frequent (Tunnard and Pushkarev, 1981, 67).

In order to fully understand the significance of these problems it is important to establish a set of guiding design principles from which to base an evaluation of the effects of development standards. The following section provides this framework.

3.3 RESIDENTIAL DESIGN QUALITY

According to Walter Bar in his article "A Question of Urban Identity" there is a twofold threat that endangers our cities today.
The faceless mediocrity of much of the new development replacing the old housing in the inner suburbs and mushrooming on the peripheries of our cities, and the destruction of an existing environment in the city centres which, though often obsolete, is sometimes full of character and which is being replaced to an alarming degree by dreary stock solutions (1967, 16).

Neighborhoods inevitably consist of collections of buildings and streets with spaces between them so that one might expect every neighborhood in every town in every country to be relatively similar. Yet many neighborhoods vary to an extent which gives each a separate identity of their own. Amos Rapoport in House Form and Culture states that the building of a house is a cultural phenomena, its form and organization are greatly influenced by the cultural milieu to which it belongs. His hypothesis is that the house form is not simply the result of physical forces or any simple causal factor, but is a consequence of a whole range of physical and socio-cultural factors. Form is in turn modified by the physical environment which makes some things possible and others not, by methods of construction, local materials and local technology (1969, 46-47). The uniqueness and character of a place results from the way the town and its neighborhoods are organized, streets formed, buildings grouped and adapted to micro-climate, national and local traditions absorbed, changes of grade exploited, the spaces landscaped, and peoples habits catered for (Bar, 1967, 16). Every successful and vital residential environment has one thing in common - uniqueness and a sense of place.

The danger of producing endless look-alike neighborhoods is very real considering the powerful forces creating this dreary monotony. Technology has eliminated the 'limitations' of site, climate and the use of local materials in residential design. Cultural and aesthetic values appear to have lost their place in the form of residential districts to standardized forms and spaces.

Most new residential development has little quality, character or sense of identity. Many developers tend to dismiss or ignore those aspects which cannot be measured in terms of quality, economics or efficiency, as irrelevant and architects and planners either do not care or do not know how to enhance existing identity or create new identity in residential design.

It is essential to understand the underlying principles of residential design in order to analyze the effects of development standards on the residential environment. The following section outlines the visual principles for the assessment of the residential environment. Words like 'well defined', 'positive space' and
'satisfactory design' may convey a sense that one informed person might regard something as well
designed and that another would not. This is not the case for in all aspects of design there are well proven
principles to be observed. The following visual design principles have been so long neglected that the
whole question of design is wrongly regarded as a matter of opinion, or taste and the residential
environment has become a visual wasteland.

A full exposition of the principles of design is too complex to cover within the scope of this study.
Therefore it is only possible to consider the fundamentals as they may be applied to the residential
environment.

Many scholars and professionals have documented basic residential design guidelines. These
include such early 'heavy weights' as Charles Mumford Robinson's 1916, *City Planning with special
reference to the Planning of Streets and Lots*; and Thomas Adams' 1934 study, *The Design of Residential
Areas: Basic Considerations, Principles and Methods*. More recently is Kevin Lynch's 1962, *Site Planning.*
Christopher Tunnard's and Boris Pushkarev's "Visual Principles of Small House Grouping" in *Man-Made
America: Chaos or Control*, best outline a series of criteria to assess residential design. They begin by
identifying two basic aesthetic faults in residential design: first, the opposite tendencies toward monotony
or chaos in the arrangement of the individual units, and second, a lack of any harmony between the house
groups and the natural or man-made setting. In essence, they identify an overall concept of 'internal' and
'external' harmony in residential design as summarized in Table 3-1. The internal harmony means
consistent relation of the units to each other in a pattern that provides variety within an overall unity. The
external harmony means integrating the house groups with their natural and cultural environment (Tunnard,

3.3.1 VARIETY WITHIN UNITY (INTERNAL HARMONY)

The unity of variety grows out of a "hierarchically-related superposition of order". This implies the
need for both complexity and order both of which cannot exist alone and succeed in a design sense. A
simple mechanistic order like that of a checkerboard tends toward monotony due to an element of
regularity. And likewise, the absence of order or regularity leads to chaos. If a third dimension is
**TABLE 3-1**

**DESIGN PRINCIPLES FOR QUALITY RESIDENTIAL ENVIRONMENT**

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<tr>
<th><strong>A. VARIETY WITHIN UNITY (INTERNAL HARMONY)</strong></th>
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<th><strong>B. INTEGRATION WITH THE ENVIRONMENT (EXTERNAL HARMONY)</strong></th>
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<td>1. CONTINUITY OF LANDFORM (CONTEXT)</td>
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*Source: (Tunnard and Pushkarev, 1981)*
superimposed upon the checkerboard pattern and creates a slight variation then the concept of unity within variety may be achieved.

Complex orders with well integrated hierarchical relationships, sometimes referred to as "organic", will give the best aesthetic results. It is therefore not in vain that sculptors and engineer-architects lately have been taking a studious look at the structural order of nature (Tunnard, Pushkarev, 1981, 98).

3.3.1.1 ORDER OF PATTERN

The first basic order needed to introduce variety is the order of pattern. The geometric order of a pattern is set by the shape of its component parts similar to the way the texture of a fabric is set by its weave. The best examples are hexagons, circles and rectangles. Hexagons demand a hexagonal pattern, circles can adapt to various free-floating arrangements, while rectangles demand a rectilinear pattern. Since most homes are rectangular this pattern is of the most concern here. As can be seen in Figure 3-1, rectangles set at odd angles to each other create visual conflicts at the corners and implies an element of confusion and disorder.

Figure 3-1: The Order of Pattern
In the design of house groupings, the designer manipulates rectilinear volumes. The crucial element of the end-result is the spaces in between these volumes which should be rectilinear, not angular. This however, does not mean that the space between the house and the street pavement must be rectilinear for the pavement is flat two-dimensional space and therefore does not define a three-dimensional space.

Contrary to what one reads in many subdivision manuals, there is no aesthetic reason why the house should be placed parallel to the street line, so long as the houses themselves are arranged in an orderly system. If the order of the houses is naturally rectilinear and the desirable street pattern under given conditions happens to be curvilinear, we can play these two orders against each other and achieve interesting visual compositions (Tunnard, Pushkarev, 1981, 99).

This notion is best applied and understood for functional reasons. Basic design principles imply one orientation which is best in situating individual structures within a group. Laying out houses with an identical or near identical plan at different angles to conform to the street orientation inevitably produces poor exposure to wind, sun, or views for at least some units. A subdivision plan in Richmond illustrates this concept in Figure 3-2. Here the layout is designed for its plan view symmetrical patterns and not for optimum orientation of each dwelling unit. The alternative independent positioning of structures and street allows the optimum orientation for all units. Figure 3-3 illustrates this concept in a "saw tooth" pattern subdivision in Surrey, B.C. It has a more varied and rich space than the traditional flat line of facades and yet maintains a strong order in pattern.

3.3.1.2 MEANING OF CURVATURE

In subdivision planning the designer must remember that the street serves the housing unit and not vice versa. Likewise on a visual level the structure is the dominant definer of space, not the street. Both these notions imply that in the design of house groupings, one should think primarily about the siting of the house and secondarily about the street alignment to service the housing units. Street alignment can be either straight or curvilinear. Following are some aesthetic principles relating to these two forms.

Tunnard and Pushkarev suggest that a residential street should be straight only if it fulfills one of three following criteria: a) if it is relatively short and bounded by strong rectilinear masses along the sides; b) if it offers a vista or is oriented toward a landmark at its terminus; and c) if it is a major artery, the
Figure 3-2: Orientation to the Street
Figure 3-3: Saw Tooth Pattern of Residential Layout
progress along which is in itself a substitute for a visible feature at its end. For the most part these requirements exist only in high-density residential areas thus indicating that straight streets are not aesthetically acceptable in suburban areas except in the case of short streets like cul-de-sacs.

Unless the suburban street is quite short...single family houses, low and widely spaced, do not allow it to read as a rectangular enclosure in its own right. If it does not read as an enclosure, it will probably offer a vista, but very likely a vista to nowhere (Tunnard, Pushkarev, 1981, ).

To close this vista he suggests the use of curvilinear streets which prevent unnecessarily long views and provide interest by displaying the outer side of the road.

When dealing with sharply curving streets, the "law" of rectilinear units, closely spaced, demanding a rectilinear arrangement, holds true. When the curvature is slight, however, structures can be placed parallel to the street and gently curve with it. See Figure 3-4. The deviation from a rectilinear order in any single space between two three dimensional structures is then so small that it is not visually obtrusive.

It makes both economic and functional sense that the pattern of houses conform to the curving contours of the land. Straight streets in a varied topography result in added grading and an unnatural appearance. Figure 3-5 illustrates the unnatural effect a typical grid pattern has when laid across an area with a varied topography. Figure 3-6 shows the same area as it was developed to better fit the topography.
Figure 3-5: Straight Roads on Varied Topography
THE SAME SECTION OF PHILADELPHIA AS IT ACTUALLY DEVELOPED UP TO 1920.

Figure 3-6: Curved Roads on Varied Topography
Many examples exist of straight streets through undulating topography (typically Greek and Roman town planning) as well as curvilinear streets on flat ground (Olmsteads residential plans). Tunnard suggests two desirable principles in the layout of streets. On very flat ground, curvature in a residential street should, if it is to be introduced at all, be only as flat as necessary to close an uninteresting vista. With relatively short streets reading as enclosed rectilinear spaces, monotony can be avoided. In undulating topography, curvilinear street designs are most appropriate. But unless the curvature is rather flat, independent alignment of house and street should be considered to prevent angular conflicts between units (Tunnard, Pushkarev, 1981, 104-105).

3.3.1.3 SPACING INTERVALS

As discussed previously, it is not the structures themselves which make up the pattern but the spaces they define. The spacing intervals between structures are crucial in determining the overall aesthetics of the neighborhood. A single house in an open landscape does not by itself create a space - the space is molded by topography and vegetation. Two or more units spaced sufficiently close together to be perceived in one view, begin to create their own space.

Buildings of substantial size, such as row houses or apartments, can enclose well-defined, "positive" architectural spaces that can be proportioned and arranged to create an urban atmosphere. Detached single-family units are much weaker definers of space, so that the main aesthetic reliance has to be on landscaping elements. Nevertheless, they do modulate space, even if the space is free floating or "negative", rather than firmly defined (Tunnard, Pushkarev, 1981, 106).

Tunnard suggests three situations which can occur in the spacing of units, depending on how far

![Figure 3-7: Poor Spacing Variation](image-url)
the units are set apart. First, if two houses are spaced so close that the distance between the units is shorter than their width, the resulting space is visually unpleasant, reading as a constricted slot or an interval rather than a positive useful area. See Figure 3-7. The natural solution is to widen the lot size to accommodate an adequate space between the two units but this is an expensive way to achieve a satisfactory side-yard relationship. Three more innovative solutions exist: pooling side yards by attaching pairs of dwellings (Figure 3-8); placing the house off-center on the lot with the narrow side facing the street (Figure 3-9); and reducing lot coverage by erecting a two-storey house.

Figure 3-8: Spacing Intervals: Pooling Side Yards

Figure 3-9: Spacing Intervals: Off-Centre House

The second situation occurs when the distance between dwelling units is greater than their width. With this intermediate spacing a more spacious single-family development results, yet a firm geometric
relationship must still exist between the units. This problem is intensified if roof patterns and color schemes are discordant in addition to the disjointed arrangement of the homes.

Thirdly, when the distances between structures is very large (i.e. greater than two acre lots), the order of pattern can be disregarded since the landform and vegetation take over as the dominant visual elements.

3.3.1.4 ARTICULATION OF GROUPS

Proper spacing intervals in an ordered pattern can create a harmonious and visually acceptable environment between units. They cannot, however, prevent monotony unless the houses are so far apart that there is no visible pattern. Monotony arises when a large number of housing units are spaced at identical intervals. One method of breaking-up this monotony without destroying the inherent order of spacing is to reduce the number of units perceived in any one view - to create sub-groups within the overall pattern of the development. This visual distinction of groups can be achieved in a variety of ways, the most common is the short street or cul-de-sac. The more innovative is the varied set-back line. These two ideas are illustrated in Figures 3-10 and 3-11.

Figure 3-10: Clustering Units

Under the existing zoning regulations, varying the set-back line is relatively easy to achieve if the lot is deep enough. This rarely occurs however, due to the developer using the minimum front yard set-back regulation to achieve maximum lot coverage.
By pulling back from the building line groups of three to five houses, a progression of wider and narrower spaces in the street can be created to give a more distinct identification to the individual units, which begin to read as "one out of three" or "one out of five" rather than "one out of an indefinite number" (Tunnard & Pushkarev, p. 109).

The implementation of the varying setback must be well thought out for less than three unit "blocks". If individual units are setback at different distances from the street the end result maybe a random line of facades in complete chaos - a visually confusing and un-ordered arrangement (see Figure 3-12).

![Figure 3-11: Varied Setback Line](image1)

![Figure 3-12: Unsuccessful Varied Setback Line](image2)

In the cluster arrangement, not only is the setback varied "creating lateral enclosed spaces along the street" but distances between houses are increased at specific intervals creating a distinct sub-grouping of homes. In theory this can mean that the lot-frontage is reduced and the overall land gained could be used to create open space around the grouping of homes. The concept is to retain the overall conventional density yet provide a greater feeling of openness maintaining some of the landscape in its original state where appropriate.
3.3.1.5 ARCHITECTURAL CONSISTENCY

The final principle of variety within unity has to do with architectural consistency in the shape of the volumes which make up a grouping of homes. To avoid a chaotic appearance, it is imperative that some order and consistency be maintained in any group which can be seen in one view with respect to the following architectural characteristics: roof shape and gable, cornice line, building height, floor line (where the foundation ends and the walls begin), the sill line (window lines), and the head line (ceiling height). See Figures 3-13 and 3-14. Further basic elements are vertical modules (the spacing of columns, panels and

Figure 3-13: Architectural Inconsistency and Imbalance

Figure 3-14: Contrasting Architectural Styles
windows), the choice of exterior materials and their color. Keeping the general order of these elements consistent, variety can be introduced by interchanging parts without destroying the visual logic of the whole grouping.

The way to achieve variety is not in pretending that standardized units are not standardized, but rather in striving toward a unique arrangement of units and toward a distinct relationship to the natural landscape, which is always unique. A measure of similarity between buildings is essential to make them look like parts of a larger design: a house should be similar to other houses in its group with regard to characteristic proportions, materials and shapes. Variations between standardized units in a group can be limited to interchangeable modular elements, the color and texture of panels, the design of outside enclosures such as fenced-in patios, porches and garages. But each group of houses can differ in the way the house shapes are used to form a composition, in the way the group relates to the ground form and to clusters of vegetation; in a rich geometric order each "look-alike" house will have a distinct relationship to every other house.

3.3.2 INTEGRATION WITH THE ENVIRONMENT (EXTERNAL HARMONY)

The previous section describes the visual principles associated with the internal harmony of residential design. Integrating residential units with the natural environment is a concept of external harmony. How can man-made elements at low density successfully be integrated with the natural environment to create an integral design. The important notion here is not one of architectural philosophy, whether a structure should conform or contrast the landscape. It is the notion that a relationship be achieved, whether in conformity or juxtaposition, between the built structure and the character and individuality of the site.

Tunnard sums up this notion quite eloquently when he states:

Much of the movement out of the city seems to be motivated by the desire of people to be closer to trees, meadows, ponds, and brooks, but is exactly these things that are very often destroyed in the process of subdividing. While committed to providing adequate landscaped spaces in the redevelopment of old city slums at enormous expense, our municipalities are, by default, permitting the construction of hundreds of square miles of new residential areas, which, sound as they may be in their elementary structural and public health standards, are lacking in environmental aesthetic features that produce handsome and enduring neighborhoods (Tunnard, Pushkarev, 1981, 121).
3.3.2.1 CONTINUITY OF LAND FORM

The preservation of the natural continuity of land form is the first consideration of external harmony. In a typical detached unit development, only 15 to 35 percent of the land is covered by building and pavement thus leaving the natural land surface as the dominant feature. For this reason the geometric order of pattern in buildings and pavement which is superimposed upon the landscape should mold and conform to the landscape. This provides the development with a sense of context which inherently provides identity to the overall development.

The layout of houses and streets should minimally 'disturb' the natural topography and vegetation. To the extent that the grades have to be changed, they should be reconstructed to the appropriate natural flow of the topography.

The following principles should apply in the layout of streets for residential areas:

Streets should follow ridges and swales; they should not straddle hills perpendicularly to contours, but rather at an oblique angle; they should avoid rollercoaster, broken back, and other discontinuous profiles. Spirals and other refinements of the horizontal alignment are unnecessary, but a clear decision should be made whether the street system is being designed in a "natural" curvilinear style simulating a country road, or whether it represents a modified rectilinear grid. In the first instance, straight lines should definitely be avoided, and in the second emphasized (Tunnard, Pushkarev, 1981, 122).

Figure 3-15 illustrates how a grid layout of subdivisions can totally ignore the existing site

[Diagram of grid layout of subdivisions and topographical map of hilly land]

Figure 3-15: Straight Roads on Hilly Land
topography and vegetation in an attempt to continue the rectilinear pattern. Figure 3-16 alternately shows how streets and lots can be designed to maintain the continuity of landform. Figure 3-17 further illustrates the grade percentage difference that is required by constructing linear roads across hilly terrain.

Figure 3-16: Curved Roads on Hilly Land

Figure 3-17: Straight vs Curved Roads on Hilly Land
3.3.2.2 MODULATION OF SPACE

Another principle to better integrate development with the environment is the modulation of landform and space - elements that can organize and define space between detached houses in residential developments. This includes the retention of the positive elements of existing vegetation and the prevention of negative elements which destroy the continuity of space, such as billboards, utility poles and overhead wiring.

The provision of adequate continuous chunks of land and the careful restriction of cut and fill operations alone do much to preserve the natural flora in a residential development. The reduction of over-zealous standards for curbs, gutters and sidewalks can further this preservation. Subdivision regulations can contain paragraphs requiring the developer to show "due regard for all natural features, such as large trees, natural groves, water courses, scenic points, historic spots and similar community assets which, if preserved, will add attractiveness and value to the subdivision". Others specify in detail a minimum number of trees per lot to be preserved or planted, or else require all trees above a certain size (10" caliper or more), to be preserved, unless they are within 10 feet of a proposed building, or in the street right of way.

Aside from simply providing relief from the dreariness of bare houses on bare ground, planting, whether natural or man-placed, serves the additional purpose of defining and organizing space...it unifies the whole development site; prevents it from falling apart into haphazard agglomeration of individual garden plots; and gives it depth, character, scale and an overall order in a progression of large spaces, into which the order of the housing units and their individual gardens will fit (Tunnard & Pushkarev, 1981, 128).

3.3.2.3 FOCAL ELEMENTS AND LANDMARKS

The third requirement of external harmony is a need for focal elements or landmarks in residential development. A focal element or landmark creates a contrast to the monotony which can result from the evenness of texture. "A landmark lifts a considerable area around itself out of anonymity, giving it identity and visual structure". The opportunity exists for a whole hierarchy of focal elements "organizing the residential texture, from small accents in a street or block to larger landmarks at the neighborhood or community level" (Tunnard & Pushkarev, 1981, 140).

The elements that can be used to create focus are natural features such as bodies of water (streams, rivers, waterfalls, ponds and lakes), river or stream corridors, rock outcrops, large glacial
boulders, stone walls, ruinous or historic landmarks and public open space (similar to "the village green" concept).

Public open space has historically been one of the more permanent focal features a neighborhood can have. In addition to single-family structures, buildings of different function and character can become landmarks within a community. These can be community facilities both public and private; schools, libraries, community centers, municipal structures for fire and police protection; churches, clubs, stores; and recreation facilities such as marinas, swimming pools and skating rinks. These can and should be integrated in a central development which is architecturally consistent with the neighborhood. The important aesthetic consideration here is to consider the differences in scale between the single-family unit and the focal structure.

3.3.2.4 CLARITY OF ORIENTATION

The final principle in the achievement of integration with the environment is clarity of orientation - the ability to understand the overall system which when achieved gives the residential fabric coherence, unity and structure on a macro-level. Tunnard believes that this is accomplished through a comprehensible network of arterial streets and open space.

It is important for planners to express, and users to understand with absolute clarity, the functional hierarchy of the vehicular and pedestrian (if there is one) circulation system. Although typical circulation systems include the four levels of facility (freeway, arterial, collector, local) if these are not clearly understood the clarity of the overall development breaks down and orientation is lost.

A major problem with this lack of differentiation between the hierarchy of streets is the lack of differentiation in their design standards, particularly the right-of-way width. Presently, the right-of-way widths for most streets, whether local, collector or arterial, generally varies between 50 to 80 feet (as specified in a municipal subdivision regulation) and the differences are not sufficient to be considered visually meaningful. See Tables 2-1 to 2-4 for local and collector street right-of-ways in Greater Vancouver. In practice, it appears that the width of local streets is 'over-designed' while arterials lack enough right-of-way to allow for sufficient buffer between house and street.
Tunnard suggests that the right-of-way for local streets should be reduced to 40 feet or less, "to bring them down to a domestic scale". Similarly the right-of-way for arterial streets should be extended to around 200 feet, "to provide for adequate roadside planting areas". If this were to occur, the width of right-of-way would clearly identify the functional importance of each street making the overall neighborhood development more readable.

Similar to a network of roads, a network of green buffer belts and undeveloped landscape is necessary for both functional reasons of separation of non-compatible land uses as well as aesthetic reasons of visually pleasurable space. Tunnard states:

"Green buffers, essentially are slots which separate incompatible elements, whether the incompatibility be functional or visual...we can scarcely visualize an effective densely planted buffer narrower than 30 to 50 feet...some form of open-space separation between uses should be made mandatory by every municipal zoning or subdivision ordinance (Tunnard, Pushkarev, 1981, 53)."

A well-planned pattern of circulation arterials and public open space channels, based on river valleys, hilltops, parkway access to scenic areas or waterfront corridors, provides the planner-designer of residential development zones with two strong tools to shape the overall fabric and create a visually articulated and coherently planned network in which the individual can retain a sufficient degree of freedom and personal choice, knowing the overall fabric will strengthen the clarity of orientation.

**SUMMARY**

The preceding discussion presents the visual principles of residential design. Residential design in the macro-landscape is a requires a partnership between the public designer (planner) and the private designer (the developer, architect, and landscape architect). Together they must solve such questions as the proper ratio of man-made texture to open spaces; ways of confining a texture (whether by a hill, by a valley, or by breaking it up); the spatial delineation between foreground and background; the needed background to unify a residential texture; a treatment of a hill silhouette; and the creation of man-made focal points. To achieve these objectives effectively they must follow the principles of variety within unity to achieve internal harmony, and integration with the environment to achieve external harmony (Tunnard, Pushkarev, 1981).
Chapter Four outlines why prescribed development standards, by their very nature, are unable to respond to these basic design issues. It also describes that these standards inadvertently misdirect the designer/site planner to focus attention on non-site specific and over simplistic design issues. Chapter Four outlines the adverse affects that result from the implementation of zoning and subdivision standards disregarding the above principles and develops the case for reconsideration of these standards and the limitations that they impose on residential design.
REFERENCES (CHAPTER THREE)


Site planning must be thought of as the organization of the total land area and air space of the site for best use by the people who will occupy it. This means an integrated concept in which buildings, engineering construction, open space and natural material are planned together at one time by one thoroughly coordinated team of technicians, to form a complete, balanced, wholesome and pleasant development or community.

Garrett Eckbo
4.0 THE ADVERSE EFFECTS OF STANDARDS ON RESIDENTIAL ENVIRONMENT

The conflict between the need to avoid arbitrariness and the need for flexibility to respond to the subtle and varied demands of different sites is central to the current dilemma about development regulation through standards. Development standards, although deemed in the public interest, have been unable to contend with the important design issues that are not amenable to simple arithmetic and legal measurement. As Toit states in his article Architects, Zoning By-laws and Design Control, "the regulations control too few things too rigidly...creative design is thus restricted, is often replaced by repetitious formula building" (1977, 53).

This formula building is primarily the result of a) the direct adverse effect of the 'mechanism of' bulk and density standards of zoning regulation and the over-all street and lots standards of subdivision regulation; b) the indirect 'influence of' standardization; and c) the adverse effect of the 'perception of' standardization.

4.1 THE ADVERSE EFFECT OF THE 'MECHANISM OF' STANDARDIZATION

The purpose of the mechanism of zoning has been to protect established areas from unwanted land uses. In this respect it provided a public control of land use, not unlike the private control possible by restrictive covenants in deeds and by the law of nuisance. Zoning was a satisfactory instrument in achieving this purpose especially in the residential areas (Reflections on Zoning, 1960, 5).

The other purpose of zoning, however, has not achieved its purpose and has had a very different result than intended. Zoning standards were expected to guide development of yet unestablished areas yet it has proved a far less satisfactory tool for this purpose as its precise standards have been overly restrictive and vastly undersimplified, leading to unimaginative development and unsatisfactory design.

The nature of the land development industry in Canada is such that prior to the construction of housing units, large parcels of land are subdivided into individual lots. The designer of a subdivision has control over the positioning of roads, paths, public facilities and open space in addition to the shape and position of lots. This would seemingly allow sufficient flexibility to be innovative in the creation of desirable
environments. However, a number of problems arise, some of which are a direct result of the mechanism of subdivision standards and others which are indirectly caused by subdivision regulation.

To best understand the adverse effects of zoning and subdivision standards on the outcome of residential design, two alternative methods of analysis are helpful. The first method is to select a successful residential development which follows the basic principles of design and demonstrate how the use of conventional standards would have inhibited or prevented the design from being implemented. The second method is to select a subdivision designed under the limitations of zoning and subdivision standards and then demonstrate how these regulations fail to respond to the previously outlined design principles and ultimately affect the residential environment.

Two such developments have been selected. Village Homes, seen in Figure 4-1, is a successful 240-unit, 70-acre neighborhood community in Davis, California, designed by Michael Corbett and constructed in 1980. The Village Homes neighborhood was developed as a profitable subdivision after years of discussion and design refinement. It is a comprehensively designed development which evolved over the course of eight years of design and imaginative site planning. Michael Corbett stated* that adherence to conventional zoning and subdivision standards would have prevented this development from occurring in its present form for the following reasons. Individual lots are varied in size throughout the development and traditional setbacks and bulk regulations are not followed. Lots varied from 35 to 75-foot widths and from 80 to 90-foot depths. The average lot size is approximately 5000 square feet, although this is deceiving for each unit backs onto an open common green strip. For visual cohesion and fire access a front setback guideline was established of 10 feet for fences, 15 feet for the house, and 20 feet for the garage. The floor space of units ranged from 700 to 2400 square feet with an average size of 1500 square feet. There are 3.5 units/acre in the Village Homes subdivision including common areas, community gardens and a commercial center. Local street widths were reduced from the standard 30-foot width to 20 and 24-foot widths which "proved more than adequate" (Corbett, 1981, 103). Only a 3-foot easement, rather than the standard 13-foot right-of-way on each side of the street, was required for emergency access. Building throughout the development occurs at various setbacks from this easement.

*Telephone conversation with Michael Corbett in Davis, California (916) 756-5941.
creating a flexible building envelope. Streets are curved, allowing the houses to be staggered yet still maintain a universally southern orientation. This meant that lot lines, instead of being perpendicular to the street, are a response to orientation.

The Village Homes subdivision provides a perfect example of how to provide north-south orientation while avoiding the undesirable visual impact of straight rows of houses all facing south. The inclusion of a community building, a commons, community gardens and a commercial centre provides focal areas which are often lacking in conventional subdivisions due to zoning restrictions and perhaps a profit maximization attitude of the developer. In some instances Village Homes reversed the typical neighborhood pattern by encouraging people to put their private yards on the side of the house facing the street thus allowing the yards on the other side to be open to a narrow common strip between the two rows of lots. The neighborhood design includes a number of other innovative ideas and responds well to the previously outlined residential design principles of Tunnard and Pushkarev. A checklist of how well Village Homes responds to these principles is detailed in Table 4-1.

Ashcroft subdivision in Richmond, B.C. is the second development selected for evaluation. It was designed and developed in 1977 under the zoning and subdivision standards of a GR-2 district. The standards prior to and during 1977 were specified in Imperial units and after 1977 were transformed into metric units. Following are the zoning and subdivision standards for the GR-2 district:

<table>
<thead>
<tr>
<th>(Pre-1977)</th>
<th>(Post-1977)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Zoning Standards</strong></td>
<td><strong>Zoning Standards</strong></td>
</tr>
<tr>
<td>Front Yard: 20.0 feet</td>
<td>Front Yard: 19.7 feet</td>
</tr>
<tr>
<td>Rear Yard: 25.0 feet</td>
<td>Rear Yard: 25.0 feet</td>
</tr>
<tr>
<td>Side Yard: 4.0 feet</td>
<td>Side Yard: 3.9 feet</td>
</tr>
<tr>
<td>Building (%): 33%</td>
<td>Building (%): 40%</td>
</tr>
<tr>
<td>FSR: N/A</td>
<td>FSR: N/A</td>
</tr>
<tr>
<td>Heights: 35.0 feet</td>
<td>Heights: 35.0 feet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Subdivision Standards</strong></th>
<th><strong>Subdivision Standards</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lot Area: 7000.0 sf</td>
<td>Lot Area: 6781.5 sf</td>
</tr>
<tr>
<td>Lot Width: 60.0 feet</td>
<td>Lot Width: 59.1 feet</td>
</tr>
<tr>
<td>Lot Depth: N/A</td>
<td>Lot Depth: 78.7 feet</td>
</tr>
<tr>
<td>Local: 30.0 feet</td>
<td>Local: 29.5 feet</td>
</tr>
<tr>
<td>Local ROW: 56.0 feet</td>
<td>Local ROW: 55.8 feet</td>
</tr>
<tr>
<td>Collector: 40.0 feet</td>
<td>Collector: 39.4 feet</td>
</tr>
<tr>
<td>Collector ROW: 66.0 feet</td>
<td>Collector ROW: 65.6 feet</td>
</tr>
</tbody>
</table>
# TABLE 4-1

## VILLAGE HOMES RESIDENTIAL DESIGN PRINCIPLES CHECKLIST

### A. VARIETY WITHIN UNITY: INTERNAL HARMONY

<table>
<thead>
<tr>
<th>1. ORDER OF PATTERN</th>
<th>the independent positioning of units and streets creates a situation of optimum orientation for all structures - strong order in pattern.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. MEANING OF CURVATURE</td>
<td>the street serves the house unit and the structure is the dominant definer of space. House siting is primary. Curvilinear streets close the view and provide interest by displaying the homes themselves.</td>
</tr>
<tr>
<td>3. SPACING INTERVALS</td>
<td>the units are spaced sufficiently close across the narrow roads to create positive space. Side lots in some cases however do read as constricted slots.</td>
</tr>
<tr>
<td>4. ARTICULATION OF GROUPS</td>
<td>sub-groups within the overall pattern of the development are visually distinctive thus augmenting the inherent order of the whole development.</td>
</tr>
<tr>
<td>5. ARCHITECTURAL CONSISTENCY</td>
<td>order and consistency are maintained in regard to the architectural characteristics and size of all units yet overall variety and interest are maintained.</td>
</tr>
</tbody>
</table>

### B. INTEGRATION WITH THE ENVIRONMENT: EXTERNAL HARMONY

<table>
<thead>
<tr>
<th>1. CONTINUITY OF LANDFORM</th>
<th>the geometric order of pattern in buildings and pavements conforms well to to the existing landform with maximum orientation for all structures. Grading change is minimized.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. MODULATION OF SPACE</td>
<td>landform and space is well organized and defined by existing and new vegetation and the restriction of cut and fill operations.</td>
</tr>
<tr>
<td>3. FOCAL ELEMENTS &amp; LANDMARKS</td>
<td>focal landmarks exist in the common areas and community centre to contrast the texture of the residential areas.</td>
</tr>
<tr>
<td>4. CLARITY OF ORIENTATION</td>
<td>the size difference between local (20 ft) and arterial (38 ft) streets provides an ability to understand the overall system and gives the residential fabric conherance</td>
</tr>
</tbody>
</table>
Figure 4-2 shows the 160 acres of Sec. 26, 4-6 of the Township of Richmond. Ashcroft subdivision, the south-east 40 acres, contains 171 lots of approximately 7000 square feet each. Ashcroft subdivision has a slightly higher density of 4.2 units/acre than does the Village Homes 3.5 units/acre. Lots are generally 60 feet (occasionally 61 feet) wide and street rights-of-way are 56 feet with a 30-foot pavement width. This development illustrates the lack of satisfactory design that can result from conventional zoning and subdivision standardization. Standards which are encompassed by zoning regulations and those which are regulated under subdivision bylaws overlap in their adverse effect on the quality of residential environment. Eight specific and inherent limitations in the mechanism of standardization are identified in the following discussion. The Ashcroft Subdivision in Richmond is used to substantiate these claims and to better illustrate the effects of development within standardized limits. These categories are discussed in their order of potential adverse effect. Table 4-2 describes in summary how the standards create the adverse effect in residential environment and Table 4-3 lists the design principles that are violated by all eight adverse effects.

4.1.1 SPATIAL ORGANIZATION: ILL-DEFINED

There has traditionally been two ways of organizing space and buildings. One system is the low density or rural approach. Here the landscape contains the buildings. Buildings are set in landscaped space. For example, a group of farm buildings in an agricultural setting. The key element is "landscape containing building". The alternative system is the higher density urban approach. Here the previous principle is reversed with buildings containing the space. For example, streets, squares, alleys and courts are contained by built structures. The key element here is "buildings containing space".

What has occurred is that recent housing developments, primarily in the suburbs, have failed to recognize these two basic principles. In the new residential environment there are too many buildings for the landscape to dominate and yet the buildings are too loosely grouped or of insufficient height to enclose space.
Figure 4-2: Ashcroft Subdivision, Richmond, British Columbia
<table>
<thead>
<tr>
<th>ADVERSE EFFECT</th>
<th>HOW THE STANDARD CREATES THE EFFECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. SPATIAL ORIENTATION: ILL-DEFINED</td>
<td>minimum setbacks (particularly side yard) prevent adequate grouping and instead create a constricted 8 foot slot between the sides of the structures. This leads to buildings being too loosely grouped to positively contain space.</td>
</tr>
<tr>
<td>2. SITE CHARACTER: ILL-CONSIDERED</td>
<td>uniform standards in lot size, lot width, height and bulk and street width are inflexible to respond to unique circumstances on the development site. Site character is thus eliminated to accommodate uniformity.</td>
</tr>
<tr>
<td>3. DESIGN FACTORS: IRRESPONSIVE</td>
<td>front and rear yard set-backs can inhibit subdivision design from responding to basic design issues such as orientation. (See Figure 4-4). Street width and row standards also inhibit basic spacial and ecological considerations.</td>
</tr>
<tr>
<td>4. SPATIAL PATTERN: MONOTONOUS</td>
<td>bulk and density standards compartmentalize entire districts into a visual uniformity which prevents the creation of or retention of a sense of identity. Uniform street widths enhance this image.</td>
</tr>
<tr>
<td>5. DESIGN COHERENCE: PIECEMEAL</td>
<td>subdivision standards (street and R.O.W. widths and minimum lot sizes) are not coordinated with (and can only indirectly influence) the planning and siting of buildings. The result is an emphasis on circulation and property boundaries and not overall spatial effect.</td>
</tr>
<tr>
<td>6. DESIGN INNOVATION: RESTRICTIVE</td>
<td>the existence of a building envelope not only restricts the ability of the designer to best fit the structure to the lot but also restricts the ability to design for best spatial organization between structures.</td>
</tr>
<tr>
<td>7. ORIENTATION: CONFUSED</td>
<td>the dedicated R.O.W. allotment and street widths emphasize the street in relation to the structures and prevent a clarity of orientation to the hierarchy of the street.</td>
</tr>
<tr>
<td>8. DEVELOPMENT ATTITUDE: SPECULATIVE</td>
<td>minimum lot areas and maximum site coverage standards are conducive to abuse from speculation developers. If each lot minimum and each structure maximum size this leads to extreme visual uniformity.</td>
</tr>
<tr>
<td>ADVERSE EFFECT</td>
<td>DESIGN PRINCIPLES VIOLATED BY THE EFFECT</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1. SPATIAL ORIENTATION: ILL-DEFINED</td>
<td>*order of pattern  *spacing intervals  *articulation of groups</td>
</tr>
<tr>
<td>2. SITE CHARACTER: ILL-CONSIDERED</td>
<td>*continuity of landform  *modulation of space  *focal elements and landmarks</td>
</tr>
<tr>
<td>3. DESIGN FACTORS: IRRESPONSIVE</td>
<td>*continuity of landform  *modulation of space</td>
</tr>
<tr>
<td>4. SPATIAL PATTERN: MONOTONOUS</td>
<td>*order of pattern  *meaning of curvature  *spacing intervals  *articulation of groups</td>
</tr>
<tr>
<td></td>
<td>*clarity of orientation</td>
</tr>
<tr>
<td>5. DESIGN COHERANCE: PIECEMEAL</td>
<td>*order of pattern  *meaning of curvature  *articulation of groups  *continuity of landform</td>
</tr>
<tr>
<td></td>
<td>*modulation of space</td>
</tr>
<tr>
<td>6. DESIGN INNOVATION: RESTRICTIVE</td>
<td>*variety within unity  *integration with the environment</td>
</tr>
<tr>
<td>7. ORIENTATION: CONFUSED</td>
<td>*order of pattern  *meaning of curvature  *spacing intervals  *continuity of landform</td>
</tr>
<tr>
<td></td>
<td>*clarity of orientation</td>
</tr>
<tr>
<td>8. DEVELOPMENT ATTITUDE: SPECULATIVE</td>
<td>*variety within unity</td>
</tr>
</tbody>
</table>
The apparent increase in density from uninhabited landscape to the urbanity of the city may be viewed as a spectrum. Individual buildings in the landscape forming one extremity and the city centre the other, with all other types of settlement coming in between. One end of this spectrum uses the rural principle of spatial organization. The other uses the urban principle. Towards the centre there are too many buildings to be contained by the landscape and yet buildings are too loosely grouped to satisfactorily contain spaces. This then is suburbia, fragmented architectural compositions set in a beleaguered landscape (source unknown).

The failure to organize dwellings to adequately contain space is primarily the result of minimum street and right-of-way width standards and minimum setback standards. Excess local street rights-of-way in Ashcroft, of 56 feet with an additional 20-foot front yard setback on each side of the street, create a 96-foot two-dimensional space which is too wide to be satisfactorily contained by the volume of the residential buildings. The site coverage standard of 33% and the maximum height standard of 35 feet prevent structures of an adequate size to contain the street. For this 'exterior' space to be adequately contained, either the buildings should be placed nearer to the street or they should be increased in size to visually define the expanse of the street. The zoning and subdivision standards prevent this from occurring. The lack of mature vegetation, a common result of site construction in a new development, accentuates this problem. Adversely however, even though the maturing vegetation may eventually diminish the visual aspects of this problem, the landscape will still be incapable of 'containing the space'. The notion that proper landscaping will accomplish the desired spatial organization, that is unsuccessfully achieved by the buildings themselves, is false. The building is the dominant feature in current residential development and it must contain and define space on its own prior to the addition of landscape otherwise the landscape becomes a 'bandaid approach' to spatial organization.

It is commonly laid down that an access road allowance must be 66 feet from that road line. These provisions sterilize 1000 square feet of land that some family should be allowed to enjoy. They also separate opposite house fronts by something like ten times their height, thus making illegal the grouping of houses for best effect (Report of the Committee of Inquiry into the Design of Residential Environment, 1960, par. 61).

It is unfortunate that so often a sixty-six foot road allowance and two twenty-five foot front yards on each side of it keep one-story detached houses 116 feet apart when for the sake of gracefulness and charm (visual perception) they should probably be fifty or sixty feet apart (Reflections on Zoning, 1964, 18).

The inability to create positive space where the street serves the house and the structure becomes the dominant definer of space is evident in the Richmond example. The uniformity of lot size and the
spacing of structures within those lots (due to minimum lot and setback standards) further creates an even texture throughout the subdivision. The result is constricted space between the sides of the buildings (see Figure 4-3) and an overly expansive space between the opposing faces of the units across the street from each other (see Figure 4-4). This contradicts the principles of spacing intervals and articulation of groups. The order of pattern does not contain any variety and monotony arises due to the identical intervals, the lack of grouping, and the vast number of units that can be perceived in any one view.

4.1.2 SITE CHARACTER: ILL-CONSIDERED

The uniformity of blocks, lots, street widths and bulk and height standards is insensitive to the inherent character and quality of the site. Every subdivision should be planned to suit the topography and character of the site and also to suit the types of buildings appropriate to the locality. The conformance of shapes and sizes of built form to a theoretical geometric and arithmetic requirement in no way responds to the principle of context and continuity of landform in residential design. Lovelace and Weismantle state that the "whole depressing aspect" of subdivision appearance "is enhanced by the fact that trees, if any, are ridiculous, spindly replacements of majestic predecessors who fell victim to the blade and the bulldozer as the developer compounded the crimes in his weary enterprise by substituting through area grading, a flat uniformity of contour in contrast to the more interesting variations in terrain provided by nature" (1961, 29).

Each site is in some measure unique because of a complexity of parts and their intricate patterning together. The inter-relationships and character of the site must be understood by the site designer for two reasons. They must be understood, first, to indicate the practical limits imposed by the site; and second, to reveal the hidden potentials of the place: "the points where design can clarify its character, build new connections, or develop deeper meanings" (Lynch, 1971, 11).

The Report of the Committee of Inquiry into the Design of the Residential Environment states the following condition in respect of the site's individuality:

A condition for good residential development is that there should be emphasis on the inherent natural individuality of the given site. Only in special soil conditions (certain shrinkable clays for heavy forest-floor debris) is wholesale removal of trees warranted from an acceptable housing site. Every piece of undisturbed ground has some slope or undulation; the design can underscore such changes of level, both in fact and in visual impact. Rock outcrops and large boulders lend character to an area, just as does its
Figure 4-3: Constricted 4+4 Foot Combined Side Yard Setbacks

Figure 4-4: 96 Foot Expanse Between Opposing Structures
mantle of verdure. Both can be preserved during the few months of active construction, or restored afterwards. The most efficient and imaginative developers use the bull-dozer with a light hand (1960, par. 108).

It is furthermore necessary to coordinate the design of individual structures with the complexities of the site. The built structure has a pattern of use, circulation and visual form that should mesh with the corresponding patterns of the site.

The internal circulation of the building is an extension of the external site circulation. Interior architectural space is part of the total site space. Visual sequences begin in the hallways of houses; views from windows are significant; building shapes are fundamental elements of the external spatial form. Inside form should fit outside form, but all walls need not be glass, nor must rocks and trees invade every room. The relation of floor level to ground level and the character of the openings in the building envelope are of special importance. For this reason, architectural and site design are ideally done simultaneously, either by a single individual or by a cooperating team (Lynch, 1971, 223).

Although the site quality and character in Richmond’s Ashcroft Subdivision are not unique, it is evident from the nature of the subdivision layout, illustrated in Figure 4-5, that the site characteristics were
not considered in the design. The geometric order of pattern in buildings and streets, which is an indirect result of minimum requirements for lots and streets, in no way gives any clues to the original landform and vegetation patterns. The continuity of landform principle, which provides for a sense of context and ultimately provides identity to the development, is lacking. Natural focal elements and landmarks have been entirely abolished. Existing vegetation with traces of drainage patterns required for the modulation of space is replaced by foreign landscape elements and artificial drainage gutters and stormwater systems required by subdivision standards.

One of the goals to seek is unity in organization without standardization. A design should express unity between topography, plant growth, and buildings, and much of its success will depend on the treatment of details and minor compositions which are difficult, if not impossible, to achieve within the limitations of most subdivision standards. Figure 4-6 illustrates a subdivision where the street layout is responsive to site topography.

Figure 4-6: Street Layout and Topography
4.1.3 DESIGN FACTORS: IRRESPONSIVE

The location and orientation of a house on a lot is extremely important. DeChiara and Koppelman state that if properly situated, "the structure can achieve harmony with the topography, livability is enhanced, drainage problems are minimized, and the buildings functional efficiency is increased" (DeChiara and Koppelman, 1978, 107).

Orientation of the building to the sun, wind and vista and the siting of a building to conform to the topography are basic design considerations. Thomas Adams felt so strongly about the need to adjust development to topography that he wrote:

The word "topography" denotes not only the levels of the land but all the natural features on a given site. The extent and character of such features - simple or complex undulations, watercourses, near and distant views from different points of observation, and individual or massed effects of trees - have varied relations to one another and to all developments that can be foreseen. Every element in topography should be considered as an opportunity to be used even when, as in the case of hilly ground or rivers, it seems to impose obstruction to traffic movement or difficulties of access to buildings. Indeed, one may express it as a sound principle for general application that every natural feature should be looked upon as an opportunity for achieving a purpose in design and only treated as an impediment to be removed as a last resort (Adams, 1934, 107).

The arithmetic nature of zoning standards does not allow the flexibility required to respond to site specific factors affecting design. These factors include the consideration of social, aesthetic, financial, ecological, climatic, spatial, and communication issues. They are issues that arise from the detailed consideration of a site by the designer and which have to be resolved in a very site specific and individualistic manner. These issues are not amenable to arithmetic measurements and inflexible site planning prescriptions. For example, in many developments it is advantageous to orient the buildings toward the mid-day or afternoon sun or to orient the unit towards a view created by the natural topography as in the Village Homes example. Figure 4-7 illustrates that this is both functional and practical. The proposed solution would require varied front and rear yard setbacks according to whether or not a unit was located on the north or south side of the street. If the unit was located on the south, the rear yard would face the street and if on the north the front yard would face the street. Current municipal zoning standards would prevent this opportunity from occurring.

The Ashcroft Subdivision plan illustrates how elementary design considerations can be entirely ignored. Housing units are oriented in all four directions in response to the road patterns. The
consideration of sun angles and 'potential views' required by the principles of modulation of space and continuity of landform are absent in this residential layout. The pattern of street layout appears to be more a consequence of maximizing lot access than a response to aesthetic and climatic site design criteria.

4.1.4 SPATIAL PATTERN: MONOTONOUS

The weakness of much residential design is expressed in terms of "rubber stamped similarity...", "the same house shape repeated over and over", "the same plan used for every exposure", and "monotonous rows of similar houses". The compartmentalization of cities due first of all to zoning districts which limit areas to one type of activity, and second, to zoning regulations which further compartmentalize districts into similar bulk and density lots, is likely the strongest factor contributing to residential uniformity and lack of identity. The outcome too often is visual monotony (Lasserre, Oberlander, 1963, 9).
This sad, yet sometimes almost comical, state of affairs is summarized well by Lovelace and Weismantle:

many communities reveal, as far as the eye can see, an unending procession of little uniform houses, on little uniform lots, all set back equally from the street like well drilled soldiers in a row, with no variation in roof line or height (1961, 29).

In theory, a hierarchy of residential types is implied in zoning regulations which exclude all but single-family dwellings in single-family districts designated for two-family and multi-family units. Regulations therefore, do not prevent combining a variety of residential types in certain districts so that variety can occur. Most land, however, is zoned for single-family residential districts which disallows the integration of a variety of multi-family developments into lower density neighborhoods. The current trend is for developers to build to the maximum allowable site coverage in each district (Richmond Planning Department, 1987), the result is almost complete segregation of residential types accompanied by a loss of diversity, deemed desirable according to most residential design principles. This is especially evident in Richmond.

Visual variety in contemporary residential development further suffers from the combined effect of standard lot sizes, site coverage and building setbacks, maximum site coverage and height standards. The problem with a minimum standard is it tends to become the universal standard. This occurs particularly in regard to minimum building set-backs and lot size. Furthermore, many planners, including Bartholomew in the Vancouver Plan, recommend that the lot should be placed at right angles to the street and the house

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Figure 4-8: Monotonous Building Line due to Front Yard Setback
should be parallel to the street. This arrangement, especially on a straight street, creates a dreary repetition of forms on a consistent building line with all units spaced at identical intervals. As in many recent subdivisions, this scenario is followed in the Ashcroft Subdivision. All the lots are at right angles to the street and all units adhere exactly to the minimum 20-foot front yard setback. In most cases, structures are also built up to the minimum required 4-foot side yard setback. The result is a wall-like effect on each side of the street interrupted every 52 feet for the combined 8-foot building separation. See Figures 4-8 and 4-9. This contradicts the design principles of "variety with unity" especially in order of pattern, spacing intervals and articulation of groups. The result is a lack of 'positive space' and 'internal harmony', which leads to monotony, repetition and lack of individual identity.

![Figure 4-9: Ashcroft 20 Foot Front Yard Setback](image)

Squeezing lots with a mechanical set of front, side, and rear setback lines wastes land and results in uniform building location for each lot. This uniformity gives a monotonous "dentedlated" effect as it is repeated down the street (Lynch, 1971, 231).

The Committee of Inquiry into the Design of Residential Environment proposed "that every possible measure should be taken to encourage diversity among these new dwellings, in size and nature, and mixture of several types in each new urban area, matching the variety of households in the local scene"
(1960, par. 43). The principles of variety and diversity are the qualities that are needed to satisfy the charges of monotony in visual design.

4.1.5 DESIGN COHERENCE: PIECEMEAL

Another problem in subdivision design results from the site designer's inability to directly influence the siting and planning of buildings which occupy the subdivided lots. The site plan is made without simultaneous consideration of architecture, resulting in piecemeal design.

The subdivider can only speculate about how the site and the structure will mold together. Kevin Lynch compares this division of responsibility to "asking one man to set canvas size, the frame, and abstract shapes of a painting, while asking another to paint the picture" (Lynch, 1971, 230). The resulting design, as is evident in the Richmond subdivision, too often emphasizes circulation and property boundaries while spatial effect is neglected. This effects the emergence of a harmonious order of pattern and continuity of landform. The internal and external design do not coordinate with each other and disorder results.

Piecemeal design also limits the ability to properly articulate the grouping of structures and the modulation of space. By integrating the placement of the street with the previously considered optimum housing location it is more likely that the resulting spaces will begin to read as a unit that fits the site, rather than a disjointed and visually incoherent arrangement. The principles of articulation of groups and modulation of space are better accomplished by a coordinated design effort.

To achieve a complete and meaningful solution the art of design requires an integrated approach instead of considering isolated parts outside the site context. Every building inevitably reflects the strength or weakness of its relationship to the site. If the pattern of relationships between all the parts of the design seem complete and self-sufficient, and yet there is only a tenuous link to the context, the finished building will look weak and out of place.

To be successful, the roots of building design are always context and site character which leads to correct orientation and siting of the structure.
4.1.6 DESIGN INNOVATION: RESTRICTED

A conflict exists between designers and planners. The former complain that their aesthetic judgment and innovation is limited by zoning standards and that the "bureaucratic controls are an obstacle to good design" (Smith, 1983, 85). Many designers believe that standardization has placed them into a "zoning straightjacket".

So many architects feel boxed in or limited by prescriptive development standards that there is a widespread feeling among them that good design can only occur by changing or "getting around" the bylaws in some ingenious fashion. Then, of course, "once somebody has sneaked a creative design through the system, to prevent further exceptions to standardized mediocrity, the 'loophole' which enabled the innovation will immediately be plugged by the regulatory agency" (Toit, 1977, 53).

Architect Michael Foster argues for greater freedom to offer new solutions to enrich the built environment in his report "The Good the Bad and the Ugly: Who gets to decide?". He claims that the planner, in the establishment of development standards, "is becoming the arbiter of taste when it comes to aesthetic control and it is at this level that there is a real cause for concern...too often the aesthetic advice offered is short-sighted and inappropriate" (Foster, 1984, 136-137).

Kevin Lynch in *Site Planning* strongly views development standards with suspicion when they are applied to visual form.

Controls are negative and passive measures, as opposed to the positive nature of design. They stifle innovation and restrict individual freedom; in a world of skill and goodwill they would be unnecessary. If not used with restraint, they produce an environment of competent mediocrity (Lynch, 1971, 239).

Not only do standards restrict the creative nature of the designer but they also adversely affect the methods of the developer. Some design professionals who are disappointed with the mediocre residential buildings that are being constructed believe that rather than employ the best designer for the job, developers choose those who best know their way through the planning system and can best satisfy the standard requirements of the planning department.

The end result is that the standards are assuming too prominent a role in the design of residential developments and this adversely affects the creative design process of the development.
The Ashcroft Subdivision illustrates not only a lack of innovative or experimental design but some would say it lacks any element of design at all. The product is a response to a set of lot size standards and street width and right-of-way requirements. The lots are identical in size, each with the minimum 60-foot width. Most structures are built to the minimum setback line in the front and side yards. The street widths, although excessive, meet the minimum requirements as specified in the subdivision ordinance. It can be speculated that this site plan is entirely based on the limitations of the standard while basic design considerations were ignored. The resulting layout appears to be an engineering response to a set of development standards rather than a design response to a set of residential design principles. Figure 4-10 illustrates this engineered response too common in subdivision design.

4.1.7 ORIENTATION: CONFUSED

The dedicated right-of-way widths adversely affect the visual scale of the residential street and prevent a clarity of orientation as to the hierarchy of the street. The right-of-way widths for many residential streets is sixty-six (66) feet or twenty (20) meters (as specified in subdivision standards) and the differences between local, collector and arterial are too often not visually apparent. Table 2-2 in Chapter Two reveals that many municipalities (excluding Richmond) maintain identical right-of-way widths for both local and collector streets.

Generally, the width of local streets is over-designed, while arterials do not have sufficiently wide right-of-way widths...the right-of-way of small residential access streets can be reduced to 40 feet or less (Tunnard, Pushkarev, 1981, 152).

Thomas Adams recognized this problem in his 1934 manual on The Design of Residential Areas:

Street Widths. As a result of ordinary subdivision practices, many streets that have no other reason for their existence and location than to provide for the immediate needs of the buildings fronting on them are given the character and paved to a width requisite only for through traffic streets. The construction of these not only imposes an excessive burden of cost on the community, but attracts unnecessary traffic and takes up open space that is needed for other uses (Adams, 1934, 48).

The right-of-way allowance on Anahim Drive, in Ashcroft, is 56 feet with a street width of 30 feet. Shell Road, the collector street onto which Anahim feeds to the east, has a 66-foot right-of-way and a 40-foot street width. Both on site and in plan view, there is little visual differentiation between these two streets
Figure 4-10: Ashcroft Subdivision 'Engineered Response'
yet their standing in the functional hierarchy of streets is very different. Anahim Drive is strictly a local residential access street while Shell Road is a major collector with arterial traffic volumes. This clarity of orientation is absent and the functional framework of the overall development is confused.

4.1.8 DEVELOPMENT ATTITUDE: SPECULATIVE

In subdivision design, housing units are often constructed en mass for profit by a developer to be sold for speculative purposes. As any real estate appraiser will explain, the economic return from a residential lot is roughly proportional to the space enclosed by the structure that occupies that lot. Under this assumption, the building envelope defined by the development standards which establish the maximum permissible building allowance, effectively shapes the structure. The developer, if profit oriented, will in most cases build to the maximum. The layout of streets, lots and houses in the Ashcroft district illustrates this speculative attitude in residential development. In this 40 acre subdivision the vast majority of lots are rectilinear and built to the maximum allowable size under the zoning and subdivision ordinances. The built structures themselves conform to this same trend and typically cover the maximum buildable area on each lot. Standards by their very nature do not encourage the developer to follow this scenario yet they too readily provide the institutional and legal framework for this to occur.

In discussion with the Richmond Planning staff it was stated that almost all current development is occurring in the GR-4 district (usually subsequent to a re-zoning application to down-zone to that level) which allows for the smallest possible lot size. Structure size in "every instance" fits the maximum allowable building site coverage and floor-space ratio thus maximizing the number of units per area of land and square-feet of floor space per lot. The result is maximum profit to the developer for a minimal investment in land. The zoning and subdivision standards in the Richmond GR-4 district are as follows:

<table>
<thead>
<tr>
<th>Zoning Standards</th>
<th>Subdivision Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front Yard:</td>
<td>Lot Area:</td>
</tr>
<tr>
<td></td>
<td>19.7 feet</td>
</tr>
<tr>
<td>Rear Yard:</td>
<td>Lot Width:</td>
</tr>
<tr>
<td></td>
<td>19.7 feet</td>
</tr>
<tr>
<td>Side Yard:</td>
<td>Lot Depth:</td>
</tr>
<tr>
<td></td>
<td>3.9 feet</td>
</tr>
<tr>
<td>Building (%):</td>
<td>Local:</td>
</tr>
<tr>
<td></td>
<td>45%</td>
</tr>
<tr>
<td>FSR:</td>
<td>Local ROW:</td>
</tr>
<tr>
<td></td>
<td>0.60</td>
</tr>
<tr>
<td>Heights:</td>
<td>Collector:</td>
</tr>
<tr>
<td></td>
<td>32.8 feet</td>
</tr>
<tr>
<td></td>
<td>Collector ROW:</td>
</tr>
</tbody>
</table>
Figure 4-11 illustrates the layout of a typical GR-4 subdivision to the minimum lot size and width. Figures 4-12 and 4-13 portray the visual result of these 3875 square foot lots and houses that fully utilize the 45% site coverage and the 0.6 FSR. It is situations like these that reveal how the development standard is in fact effectively shaping the structure and ultimately overall residential development. The minimum standards, in the above GR-4 example, are no longer 'minimum standards', but have in effect become the 'universal criteria' upon which residential development is designed. For all practical purposes the units in the GR-4 district might as well be attached in townhouse units, for their side yards of 4+4 feet contradict both aesthetic and functional spatial design principles.

In cases where economics are secondary to the design, the nature of the standards often does not permit adequate flexibility to achieve imaginative site responsive design. The R.A.I.C. Committee of Inquiry into the Design of the Residential Environment had this to say about the subdivision of land:
Figure 4-12: Visual Result of Building to the Standard

Figure 4-13: Visual Result of Building to the Standard
The developer decides what plot dimensions he can sell to prospective dwelling owners. He shows the tract of land to technical advisers: salaried or consultant surveyors, site planners, utility engineers. About a third of his land will have to be dedicated for thoroughfares and public open space. The remainder of his tract he will ask to be divided for the optimum sale of plots of the chosen size. It is possible, and not uncommon, for a whole township to be reduced to little pieces of identical dimensions; on each plot only one sort and size of house can be built (Report of the Committee of Inquiry into the Design of the Residential Environment, 1960, par. 57).

Thomas Adams discussed the problem of subdivision in his 1934 manual on The Design of Residential Areas:

**Block and Lot Sizes.** The methods of land subdivision that have been followed in the past have produced a certain uniformity in the arrangement, sizes, and shapes of blocks and lots. These sizes and shapes, and the degree of uniformity they possess, have been dictated to a large extent by the financial interest of the subdividers as a primary consideration, although qualified in varying degree in different communities by such general economic and social considerations as the needs of traffic and the requirements of health and public welfare (Adams, 1934, 48).

### 4.2 THE ADVERSE EFFECT OF THE 'INFLUENCE OF' STANDARDIZATION

An ever present indirect effect of standardization is the 'influence of' the grid system on residential layout. The fact that most residential layout in North American cities is based on an overall uniform rectilinear grid pattern, subsequently guides further development to occur as an extension to a pre-existing, often ill-conceived, street design. This does not infer that all residential layout is rectilinear. It means that even where street patterns take on a curvilinear form, this usually occurs within the larger context of a grid system thus requiring the streets to make connections to a surrounding network of rectilinear arterials. Figure 4-14 shows the block and range system incorporated in the Township of Richmond. Each unit is 160 acres and each 36 units constitutes a three (3) by three (3) mile square macro-unit. This diagram illustrates how a detailed rectilinear road system provides the general framework in Richmond from which all other roads must interconnect. Figure 4-15 illustrates a situation where curvilinear roads are bounded by an overall rectilinear half-mile grid. Too often there is little opportunity for designers to plan innovative and complete circulation networks due to a need to link-up to the pre-existing uniformity of dedicated rights-of-way and block patterns. This situation creates a general uniformity throughout the municipality which is unconducive to a sense of character and identity in differing districts. The grid disregards the character and quality of the ground plane and inhibits the design principle of continuity of landform.
Figure 4-15: Curvilinear Roads Within Rectilinear Grids
4.3 THE ADVERSE EFFECT OF THE 'PERCEPTION OF' STANDARDIZATION

Philip Booth's study entitled "Development Control and Design Quality" stresses that standards also constrain the thinking of the development planner, the developer and the site user about the nature of design. He implies that standards misrepresent the design process which consequently not only affects the quality of the built environment but also the design perception of the players in the development game. This furthermore has a negative influence on peoples ability to differentiate between good and bad design (Booth, 1983).

Anne Beer in her article "Development Control and Design Quality: Attitudes to Design" found out that many people involved in development regulation interpret the standard as being the design issue. Her study of the development control process shows that a very large number of people are involved in making the design decisions which relate to the building of a new environment and that few of these people have had a formal training in design. There are the trained professional designers like the architects, landscape architects and urban designers who have had a thorough education in the aesthetic aspects of design, as well as its functional and technological aspects. However, the development control process operates in such a way that they are not involved and indeed were not in a very high proportion of the cases studied during Beer's research project (Beer, 1983).

The problem is exacerbated by the communication difficulties about design which exist between the different groups of people involved in the process. The concerns of the trained designer are apparently incomprehensible to most councilors and developers (Beer, 1983). That this is so must be seen in terms of the individuals comprehension of the word design. For the untrained person, design in relation to the built residential environment is too often a word which connotes the development standards laid out in the zoning and subdivision bylaws (Beer, 1983).

To an untrained person the act of designing is likely to appear as a relatively simple process of identifying a built environment problem and providing a solution which adheres to the standard requirements. In contrast, the trained designer thinking about the act of designing a built environment will perceive it as complicated and carrying many connotations of the need to solve conflicting issues. These issues, as stated earlier, can include the problems created by the social, aesthetic, financial, ecological,
climatic, spatial, and communication considerations as well as many other aspects of the design problem. They are issues that arise from the detailed consideration of a site by the designer and which have to be resolved before a design can be finalized. The designer in this context sees the act of designing as a thought process which allows the handling of a number of physical elements in relation to a particular site and the needs of the people who will use the site (Beer, 1983). The development standard is merely an additional consideration to the designer, yet often it comes to the forefront of design due to the unrightful attention it receives from the unskilled person implementing regulations.

SUMMARY

The direct and indirect effect of development standardization on the residential environment is substantial and generally negative. The discussion above outlines only the primary cause-effect relationships that occur from standardization. The disparity between the principles of residential design and the effects of standardization on residential design is quite obvious and depressing. The nature of development standards is such that they are inherently unable to contend with important design issues that are not amenable to simple arithmetic formula and measurement.

Standards are adversely affecting not only the physical condition of the residential environment but also the people involved in the process of designing, constructing and regulating residential development. The designer is disillusioned, the developer confused and the planner mis-focused. The result has been poor design, poor development and poor planning. Is it time at last to reconsider standardization of low density residential form based on its adverse affects to the design quality in single family residential neighborhoods?
REFERENCES (CHAPTER FOUR)


Chapter One outlines an historic account of the unquestioning acceptance of the grid pattern and how this inadvertently leads to the standardization of controls. It describes the inability of the grid to respond to site quality and character and how subsequent implementation in many cities destroyed identity and contributed to a sense of monotony. This chapter further substantiates the hypothesis that residential development standards, in forming the urban pattern (the layout of street widths, block and lot sizes), were in many instances based on arbitrary mathematical numbers. The continued implementation of these standards, based on policies and objectives of another era, and, in some instances, the exact initial mathematic measurement, substantiates their antiquated nature.

Chapter Two presents bulk and height regulations and street and lot size regulations imposed by zoning and subdivision bylaws. This reveals, not only the arbitrary and antiquated nature of the standards, but also the outdated policies and factors upon which these standards are based. Too often these standards appear to be merely statements which have become accepted over time due to their repetition. Current standards are thus out of context and have adverse effects. Sources like Kevin Lynch and the Royal Architectural Institute of Canada question not only the current objectives for the continuance of the standard but also the original purpose of these formulae.

Chapter Three outlines the economic and aesthetic costs of development standards and documents a set of established and accepted residential design principles from which the effect of these standards can be evaluated. It becomes evident that arithmetic measurements are unable to respond positively to the basic principles of design. They have the further negative impact of misdirecting designer's efforts towards the non-design issues of development standardization.

Chapter Four takes this notion one step further and details the adverse effects of standard regulations on the quality of the residential environment. The case study examples of Village Homes in Davis and Ashcroft subdivision in Richmond, illustrate that conventional development standards prevent adherence to established residential design principles and that the nature of development standards is such that they are unable to contend with important and often basic design issues that are not amenable to simple arithmetic formula and measurement. It is discovered that the adverse effects are not limited to
physical environment but include a negative psychological influence on those involved in the development, design and planning fields. This chapter further reveals that the use of specific bulk and area standards and street width and right-of-way standards, needs to be re-evaluated and assessed to determine what objectives are being met and whether or not the objectives are outweighed by the adverse effect on the design quality of the residential environment.

It is evident from this study that while the mechanism and often the mathematical formula of development standardization have remained relatively constant during the past half century, the city and the city dweller have changed. Building technology and the means and ability to access transportation are different. The family unit and attitudes towards and about living accommodation are different. The influx of worldwide culture into the North American city and the resulting implications on living environment are different. Attitudes towards the conservation of land and sensitivity to the natural environment are different. The exodus of the wealthy to the city outskirts has been reversed and the concept of gentrification is now at the forefront. Yet, the standards and the mechanism somehow have remained constant.

It is apparent that vast areas of our cities have been adversely affected by residential development standardization. The reason for the loss of identity, character and quality environment in most neighborhoods is a failure to adopt and implement consistent and up-to-date design policies and objectives in concert with residential development guidelines. There is little, if any, overall conception of the city's landscape. Need this continue, or is now the time to begin a re-evaluation and questioning of the objectives that have lead to the creation of stale, un-inviting, un-interesting and characterless residential areas. The lesson to be learned is that planners must first become more in tune with the issues and principles of design and second, they must not be afraid to question established planning mechanisms. This will ensure that the best mechanism is consistently being employed and that it is based on appropriate and current policies and objectives that are leading to a better overall residential environment.
CONCLUSION

When structures are grouped together in an attempt to create an overall cohesive neighborhood unit, architects and builders are forced to consider many influences upon design and construction which may not be apparent when dealing with individual buildings. In Kenneth Lindley's *Landscape and Buildings* he stresses that: "just as individuals behave differently when they become part of a crowd, so their needs will vary and the demands of the community as a whole impinge upon the freedom of activity of each member of that community" (Lindley, 1971, 3).

This implies that a crucial balance occurs in the design and building of residential environment, between individual freedom and communal welfare. Two extremes can occur. The first can lead to the complete subordination of individual requirements and individual expression. The second, a policy of laissez-faire, allows the notion of community and cohesiveness to disintegrate all together. Whether the problems of reconciling individual freedom with communal requirements are solved by strictly imposed standards or a discretionary response to each particular situation, will depend on the current attitudes of the government in power. The balance that occurs in design between the individual versus the community is a problem that Lindley believes has occurred since people first gathered together to form settlements.

It must have concerned the inhabitants of the English Iron Age hill-forest such as Maida Castle, Dorset, as much as it did the Babylonians who devised rules to deal with it. Writers, artists and philosophers have seen its solution in terms of an 'ideal' city. A fifteenth century English poet described a 'comly Castell shynyng bryght' in which visual beauty was obviously considered to be far more important than personal comfort, or individual freedom of action (Lindley, 1971, 3).

Lindley continues to state his case by saying that "it is easy to decry the primitive sanitation and comfortless halls of the medieval castle but it may be argued that what we have gained in hygiene we may have lost in visual delight and that the balance may not, after all, show in favor of the twentieth century" (Lindley, 1971, 3).

For all unattainable ideals of past artists and philosophers in terms of the "ideal cityscape" there remains a vision in human consciousness which is obviously and quite sadly missing from most contemporary residential schemes. Instead of beauty being the essence of good life, modern North American planning tends to see it as an added benefit or 'icing on the cake' rather than an essential ingredient of the good life.
William Morris in his concern regarding the quality of life in the city wrote in "How we Live and How we ought to Live":

And again, that word art leads me to my last claim, which is that the material surroundings of my life should be pleasant, generous, and beautiful; that I know is a large claim, but this I will say about it, that if it cannot be satisfied, if every civilized community cannot provide such surroundings for all its members, I do not want the world to go on; it is mere misery that man has ever existed (Morris, date unknown).

Morris' concern for a full and balanced life, conditioned by a pleasant environment, should not be dismissed as wishful thinking and unrealistic based on other 'more pressing' social and economic needs. It is my concern that the North American city is preoccupied with the satisfaction of individual needs causing an inability to think in terms of a 'civilized' or 'whole' environment.

The modern American city spreads its desolate way over mile upon mile of land, covering the landscape with living units...but the city as a unit disintegrates (Lindley, 1971, 4).

My greatest concern is that although I believe standards at one time played an important role in improving the quality of residential environment, their continued use in an ever-changing North American city is creating a false sense of security on behalf of urban planners. The standard is no longer assuring residential quality, and in many instances it is now preventing it from occurring.

This conclusion is partially based on a relative premise. The standard during its early years assured the "health, welfare and safety" and at the time lead to a relative improvement in the residential living environment of the early North American city. In the late 1950's and early 1960's the benefit of the standard on residential environment lessened as conventional development standards played an ever increasingly dominant role in the sprawl of characterless suburbs. Since this time it is my belief that standards have ceased being a beneficial influence on residential design and have increasingly become a negative one.

The complexity of residential environment is such that over-simplistic development standards preclude quality residential design. It is my conclusion that the basis for residential site planning and design must shift away from the conventional development standards towards one of two solutions. The first option is the establishment of a set of detailed performance standards that respond to design issues. These would be enforced at all levels of residential development from the single lot to the larger combined properties. The drawback of this solution is the extensive nature of regulation that would be required to monitor individual developments by performance criteria. The second option, is to limit residential
development to comprehensive development units of a particular size (i.e. 50 acres) thus insuring that cohesively designed units are being produced. Each development would be regulated individually, based on its own merits and its sensitivity to a pre-existing set of design criteria. Although this appears to be an extreme scenario, based to some extent on a loss of individual freedom, I believe it to be a positive improvement to the existing trends in residential design.

This follows a belief that planners are overly concerned with the standards governing individual buildings and lots, for only by chance or over time do these houses become a cohesive and identifiable unit. Rather, they ought to be more concerned with the entire neighborhood as the unit in which the individual buildings and lots are merely the component parts. By allowing each member of society the freedom to build (yet forcing people’s response to a strict set of mathematical formula), will people be better satisfied by the final result or will individuality be better served by a linking of interests in a more communal effort, in attempt to recapture the lost identity once enjoyed in single-family residential districts?

Planners must look at and regulate the overall picture and thus design for community welfare, in which case the individual will be better served. Standards that relate to such small scale developments as a 50 by 100 foot lot cannot create an aesthetic environment, when these units are joined together individuality is lost anyway due to the regimented nature of the standard.

The balance, therefore, is between individual freedom with strict lot standards to retain some semblance of organization, and community welfare with its associated loss of individual freedom in order to achieve a more overall comprehensive development with aesthetic and economic goals. What is lost in individual freedom is gained in quality environment, character and residential identity.

In addition, I maintain that somehow architects and landscape architects are not educated to really love and understand the contextual landscape they are meant to serve. As a result the passion which drives one to fight for design quality and the preservation of the inherent landscape character is lost or forfeited when one begins to face real world situations and problems. How can this passion better be entrenched initially and how can it be revived once lost?

The current situation of design resolution by verbal mathematics instead of visual language leads to the question of what, in fact, is design? Is it an engineering response of satisfying the standard or is design
site specific with creative effort a response of reading and understanding the landscape. The current emphasis on left brain thinking is resulting in a lack of creative behavior and ultimately despondent residential design.

If one makes the creation of the built environment of high quality and character the aim, and does so with imagination and sensitivity, an enhancement of existing identity or the creation of a new one is likely to result as a matter of course. How this is done, however, depends on the situation and on the range of the designer's vocabulary and the skill with which it is used. It is important to express that every design should be based on some existing feature - be it a building, a group of trees, the slope of the ground, a view. Every situation calls for its own appropriate solution based on site specific criteria and design innovation and imagination. The trend toward standardized buildings, site design and residential layout should be replaced by tailor-made layouts and groupings of buildings.

There should now be a concentrated effort by all concerned with the re-shaping of our cities to raise the quality of residential developments to new heights by clearly defining overall visual policies and objectives and by implementing them locally with imagination and skill. This should begin with the planners and designers themselves initiating a rigorous public and political review of existing standards and the practice of development standardization. It is only by this means that residential areas will recapture a familiar yet strange, comforting yet exciting, and indispensable sense of urban identity.

Thomas Adams understood this principle well and he best summarizes the fundamental requirement in planning for residential environment:

City Planning...may be technically right and yet socially and economically wrong. Sound objectives are thus of first importance to planning. It is the lack of such objectives that is responsible for most of the unsatisfactory results of planning and that permits it to be said that some cities and districts that have been deliberately planned are not so attractive as many that have grown up without conscious planning (1934, 104).
DEFINITIONS

block - A segment of land surrounded by intersecting streets or a circular street and not traversed by any roadway meant for vehicular through traffic. (See superblock).

checkerboard plan - Rectangular pattern in which the blocks are square, as typified by parts of a plan of Philadelphia and Chicago.

cluster development - Grouping or concentrating physical structures (buildings) on lots smaller than permitted by the existing zoning to preserve open space without increasing the allowable density of the development.

covenant - An agreement to a deed restricting certain actions and/or requiring others by the owner of deed.

density - The number of dwelling units of population per acre of land area; net density - The number of dwelling units or persons per net acre covering only the land devoted to building lots.

easement - A right of use or privilege - in land - acquired from an owner without purchase, which at the same time restricts the rights of use or privilege of the owner.

environment - The sum of all external conditions affecting a person, location, or object. Environment is an inherent property of every living thing, it is that which surrounds and sustains; we are always enveloped by an outer world.

exclusionary zoning - Zoning that restricts certain uses so that the net affect is to limit or prohibit the opportunities for certain segments of a population to locate in the community or portions thereof.

floor space ratio (FSR) - The relationship between the gross floor area in a structure and the gross land space of a parcel.

general development plan - The community’s or the builder’s long-range planning documents incorporating proposed physical development in relationship to certain goals and policies and existing uses.

grading - The activity of moving and shaping the land surface to suit desired uses.

gridiron plan - A rectangular pattern in which the blocks are long and narrow, as typified by much of the street system of New York.

home - one’s own abode or dwelling; at home in or about one’s own house or abode; infers emotional attachment and psychological associations establishing notions of sense of place and belonging.

house - a building which serves or is intended to serve as an abode; a building for the use of habitation of man, or for his use or accommodation; infers commodity or product to be bought and sold.

landscape - Landscape is all around us. It is related to, but not identical with, environment. Landscape is less inclusive than environment, more detached, not so directly part of our organic being. landscape is defined by our vision and interpreted by our minds. It is a panorama which continuously changes as we move along any route. Strictly speaking, we are never in it, it lies before our eyes and it becomes real only as we become conscious of it. As Tuan says, “We can think, therefore we are able to see an entity called landscape.” Environment sustains us as creatures; landscape displays us as cultures (Meinig, 1979, 3).

land-use plan - The official formulation of future land including public and private improvements.
lot - The smallest subdivision of land for sale or development. Minimum lot size may vary between localities or within a locality.

municipality - A town, city, or other district having powers of local self-government.

neighborhood - An identifiable geographic area of relatively small size; a collection of units and other land uses that provide a relationship between dwellings, school, religious facilities, minor retail and/or other local facilities.

new town - A large-scale development that provides housing, employment, essential services, and facilities to support the needs of the new residents.

official map - A document adopted by the local legislative body that locates future public and private improvements and land uses.

open space - That portion of the land surface left open to the elements.

ordinance - A law set forth by governmental authority; a municipal regulation adopted by the legislative branch of the locality.

planned unit development - A parcel of land planned as a single unit rather than on the basis of individual lots; the uses of the land are coordinated with each other and flexibility in siting and often allowable density are increased on this basis.

planning - The establishment of goals and the methods for implementing those goals.

plat - A map indicating the boundaries of a parcel of land and/or indicating the boundaries of individual lots within the parcel.

rectilinear - Bounded, formed or characterized by straight lines.

right-of-way - An easement granted or acquired for roads and/or utilities in excess of actual roadway or transit way, or for future location of same.

roadway width - Area between the curbs.

spot zoning - A modification of a zoning plan that affects only the use of a particular piece of property, or a small but specific area of the municipality and that is unrelated to the general plan.

standard - that which is established by competent authority as a rule or measure of quantity; that which is established as a rule or model by public opinion, custom or general consent (see Chapter Three).

street width - space between the property lines.

subdivision - The division of a parcel of land into two or more lots for the purpose of sale or development. A parcel of land that has been divided as above.

subdivision - The process whereby vacant land is divided into lots and public rights-of-way, providing sites for future individual buildings that will occupy those lots when they have been transferred to other developers (Lynch, 1971, 229).
subdivision regulations - specify minimum standards that apply to all new residential development: street design and construction, the arrangement and size of lots, drainage, water supply, sewage and in some cases street signs, tree planting, fire hydrants and street lighting.

zero lot line - The practice of placing the building on one of the side lot lines in order to increase the usable sideyard space by combining the required spaces into one.

zoning - the division of jurisdiction into districts (zones) within which permissible uses are prescribed and restrictions on building height, bulk, layout and other requirements are defined.
SOURCES FOR FIGURES

Figure

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