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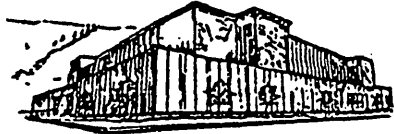
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THE EFFECTS OF RESIDENTIAL ZONING DENSITY ON HOUSING PRICE:

A STUDY OF MISSOULA, MONTANA

by

Elizabeth B. Mullins

B.A. Mount Holyoke College, Massachusetts, 1995

presented in partial fulfillment of the requirements

for the degree of

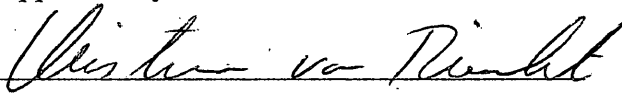
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with a Major in Geography

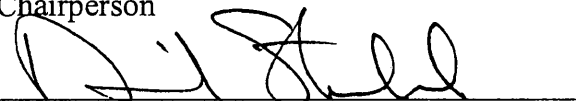
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ABSTRACT

Mullins, Elizabeth B., M.A., May 2001

Geography

The Effects of Residential Zoning Density on Housing Price: A Study of Missoula, Montana

Director: Christiane von Reichert

CoR

This thesis research investigates the effects of residential zoning density and lot size on housing price in Missoula, Montana. Zoning density regulations establish minimum lot size standards. Housing in higher-density zones is expected to be lower priced than housing in low-density zones because of lower land costs. Additionally, in small lot developments, the infrastructure costs are spread out to a larger number of units. This study tests whether increased residential density results in lower housing prices.

The data were acquired from multiple listing housing sales from the Missoula County Association of Realtors. The housing database consisted of 2088 housing units sold in Missoula, Montana, between 1996 and 1999. The residential zoning database was obtained from the Office of Planning and Grants. An Arc-View GIS point to polygon application determined each housing unit's zoning type and minimum lot size. Zoning densities were categorized into high-density, medium-density, low-density and very low-density. Several regression models, (simple and multiple) test for the effects of zoning density and/or lot size on housing price. A more inclusive regression model statistically tested for the effects of zoning density and lot size on housing price while taking into account several housing characteristics such as the number of bedrooms, bathrooms, approximate age, and main floor square footage. Additionally, the extent of the minimum lot size permitted by zoning type was correlated with the actual lot size. Results found that a correlation between minimum lot size and actual lot size exists, but it is relatively weak. Techniques should therefore be encouraged which would bring actual lot size closer to minimum lot size.

Zoning is an important tool in land use policy through which local governments could achieve affordable housing by allowing increased density development. This research statistically tested if higher zoning density is effective in lowering housing prices in Missoula, Montana. Results found that zoning density is a significant predictor of housing price: housing in high- and medium-density zones is significantly lower priced than housing in low-density zones. Thus, higher-density and smaller lot size development would increase the availability of affordable housing.

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CHAPTER I

INTRODUCTION

Housing affordability, an essential need to American households, is rapidly declining because a larger proportion of household income is being used for housing payments. The term 'affordable housing' has replaced the term 'low-income housing', because many middle-income households now find it difficult to afford a home. The standard affordable housing indicator is defined by public policy as housing payments being less than or equal to 30 percent of the household's income. In 1999, recent homebuyers in the United States paid 33 percent of their income on housing, up from 24 percent in 1976 (U.S. Bureau of the Census 2000, 718). In 1984, 31.4 percent of families could not afford a medium priced home and by 1995, 35.1 percent of families could not afford a medium priced home (Savage 1999, 3). Affordable housing, which commands 30 percent or less of incomes, has become scarce.

The declining housing affordability results from the income inequality between the low to middle-income households and the high-income households. Rising housing prices are attributed to rising housing quality. Because housing quality has improved, households are paying a larger portion of their income on it. In addition, there is a widening gap in the income distribution, which contributes to the escalating housing costs. For instance, real income in the bottom quintile has declined by three percent between 1976 and 1998, while the top quintile has gained 30 percent during this interval

(Andrews 1998, 2). For many Americans, economic growth in the 1990s has created a shortage of affordable housing and worsened the affordable housing crisis.

When people enjoy higher incomes, they want new better housing--which raises the housing price. Affluent people with capital gains in stocks can also put some of that new wealth into bigger, better houses; demand is outpacing supply (Kuttner 1999, 11).

As housing quality rise and housing prices rise, those with the low and stagnating incomes benefit little from the economic prosperity.

Housing prices have risen dramatically. Housing market prices rose at more than twice the rate of inflation over the 1997-1999 period (Kuttner 1999, 1). The existing one-family housing median sales price in 1970 was only \$23,000, and in 1980 it was \$62,200 (U.S. Census Bureau 2000, 716). By 1990, it rose to \$92,000 as compared to \$128,400 in 1998 (U.S. Census Bureau 2000, 716). In other words, in eight years alone, housing prices rose by nearly 40 percent. The gap between housing prices and household income has widened. For instance, the median income for all households in 1988 was \$37,512 and in 1998, it was \$38,885, only a 5.4 percent increase (U.S. Census Bureau 2000, 466). Income levels are not increasing sufficiently to keep up with the inflating housing prices, thus increasing a shortage of affordable housing. Although, homeownership rates have risen slightly, from 63.9 percent in 1985 to 66.3 percent in 1998 (U.S. Census Bureau 2000, 722), households are paying a larger portion of their incomes on housing costs.

Local governments have the ability to influence lower housing prices, and therefore increase the availability of affordable housing by the use of local zoning ordinances. Many affordable housing techniques use high or increased residential density that allow for smaller minimum lot sizes, and therefore provide more housing units per

acre. This is expected to lower housing prices. Generally, land values account for between eight to 25 percent of the total housing unit's cost (Yukubousky 1992, 9). The reduction in land costs due to smaller lot size development may be the most significant tool local governments have for improving housing affordability in a community.

In Missoula, Montana, the study area of this research, the average cost of a home in 1996 was \$124,942, a 75 percent increase since 1990. The average household income in 1996 was \$21,814, only a 33 percent increase from 1990 (Missoula City Council Subcommittee 1997, 1). In Missoula, the increase in housing prices is driven by the high price of land. During this past decade alone, the median sales price of a home has increased 79 percent, while the cost of the lot beneath it has increased 145 percent. These cost increases are driven by supply and demand. In Missoula, an insufficient supply of developable land is tightening the housing supply and raising the price of land.

Increased density allows for the reduction of land and site development costs, spreading infrastructure costs over a larger number of units. Another proponent of high-density is that it aids in the preservation of open space by reducing the demand for residential land. It may also reduce congestion from traffic by providing accessible housing (Yukubousky 1992, 17). Increased density decreases per unit costs through reduced frontage and front-yard setbacks, less pavement, sidewalk, and gutters, and shorter utility runs that contribute to the "reduced material costs associated with small lots, and smaller homes due to the smaller lot that are more affordable" (Yukubousky 1992, 35). This research addresses how local government zoning through land-use density standards may lower housing prices. Can zoning for higher density and smaller lots increase the availability of affordable housing?

Purpose Statements

The purpose of this study is to determine if local land-use zoning regulations favorably affect housing prices. In particular, does zoning for high residential density and smaller minimum lot sizes result in lower land costs and therefore lower housing prices. The research question is, how do the residential zoning densities, namely high-density, medium-density, low-density, and very-low density affect housing price? The effects of zoning restrictions (measured by minimum lot sizes) on housing price would be evident if housing prices in the low-density zones were higher and housing prices in the high-density zones were lower. However, while testing for the effects of zoning density on housing price, housing quality and additional housing characteristics will need to be taken into account because they also affect housing price. Therefore, in the subsequent analysis of zoning density and housing price, other housing characteristics will be included as control variables to examine the effects of zoning density on comparable homes.

In addition, several factors pertain to the relationship between minimum lot size determined by zoning and the actual lot size observed in reality. Are actual lot sizes representative of their zoning type's minimum lot sizes? The strength of the relationship between the housing unit's actual lot size and the zoning type's minimum lot size is examined, as well as the effect of actual lot size on housing price.

The principle hypothesis of this research states that as zoning becomes less restrictive and the allowable density increases, the housing price declines. Conversely, as zoning becomes more restrictive and the allowable density decreases, the housing price rises. More specifically, this research will test whether high-density zoning is more

closely associated with lower housing prices for Missoula, Montana. If, for comparable properties, the low zoning density is a significant predictor of high housing prices, then the zoning may hinder the supply of affordable housing. If high-density zoning is a significant predictor of lower housing prices, then zoning may promote affordable housing.

CHAPTER II

CONCEPTUAL BACKGROUND

This research explores the effects of residential zoning density on housing price. It examines, in particular, if higher density zoning lowers housing price. Lower priced housing is more affordable housing and the research presented here has been sparked by a concern for affordable housing. Housing prices have increased considerably, while incomes rose slowly. This implies a decline in the availability of affordable housing. Low-income households at the bottom of the housing market are facing rising housing costs while their incomes have stagnated. Even though housing quality has improved for most low-income households, these households continue to pay a larger portion of their income on housing payments (Malpezzi and Green 1996, 1). For example, low-income households spent 30 percent of their income on housing in 1970, and by 1995 they spent 58 percent of their income on housing (Andrews 1998, 1).

This chapter provides the conceptual background for the research by drawing on several bodies of literature concerning housing and the impact of local government zoning on housing availability and housing price. The first section, *Urban Theory and Affordable Housing*, discusses the theory of the urban housing market that attempts to explain the many sub-markets that produces a heterogeneous housing commodity. Another sub-section addresses the classical urban theory of the filtering process that describes a mechanism through which housing is made available to middle and low-

income households. The second section is on *Planning and Zoning for Residential Land Uses*. This section focuses on concepts pertaining to residential and hierarchical zoning. It also examines the effects of zoning on housing supply and demand, as well as zoning objectives and property values. The relationship between zoning regulations and housing prices is particularly relevant to the purpose of this research. The third section is titled *Zoning Barriers to Affordable Housing*. It discusses downzoning and exclusionary zoning practices, the 'not in my backyard' (NIMBY) response to unfavorable land-uses, and the smart growth and urban growth boundaries that limit the available land supply. The fourth section on *Determinants of Housing Prices* discusses property values, residential density and land costs, as well as the importance of the location and the neighborhood. The sub-section on *Residential Density and Land Costs* is critical to this research because it conveys how zoning density through land costs can lower housing prices. The last section, *Empirical Research on Zoning and Housing Prices* moves on from the conceptual background to the methodology of the hedonic price equation and results from several related studies on how zoning influences housing prices.

Urban Theory and Affordable Housing

Two central urban housing theories are concerned with housing prices: sub-markets, and filtering (Galster 1996, 1). They provide a theoretical framework for understanding the dynamics of the urban housing market. First, the housing commodity itself will be discussed as well as the complex nature of the urban housing market and its many sub-markets. Filtering will then be described as a process for providing lower quality housing to the lower end of the housing market.

The Urban Housing Market and Sub-Markets

Many complex forces produce an assortment of dwellings or what is known as a 'housing commodity' that is generally defined by quality and price. As Galster (1996,2) states, "Housing is a spatially immobile, highly durable, highly expensive, multidimensional heterogeneous and physical modifiable commodity".

In the above statement, the term 'spatially immobile' refers to the actual location of the housing unit which is often characterized by neighborhood qualities. The location becomes "an important determinant of housing quality, housing market value and household welfare" (Galster 1996, 2). The location is desired for its economic status, accessibility, and the availability of public goods (Galster 1996, 2).

Housing is a 'highly durable' commodity, apparent by the reality that the majority of current occupancies are provided by the existing housing stock. Annually, new construction accounts for only two percent of the total housing stock (Galster 1996, 2).

Housing is also 'highly expensive'. It is one of the few commodities that consistently escalates in price (Andrews 1998, 1). Due to its high cost, housing is an important capital asset.

Housing is also extremely 'heterogeneous'. This is evident by the differences in housing characteristics. For example, housing characteristics can include an array of features: "structural characteristics, lot features, neighborhood characteristics, local public services, and access to desired destinations" (Galster 1996, 2).

A portion of the existing housing stock has undergone physical changes in terms of quality, condition, structural features, and size to accommodate changing housing demands (Galster 1996, 2). Therefore, the existing housing stock may be 'physically

modifiable'. Housing can be divided into three categories: unchanged existing dwellings, changed existing dwellings, and newly constructed dwellings (Galster 1996, 2).

Housing consists of several sub-markets that formulate a complex commodity. Thus, the urban housing market is a set of inter-related sub-markets that are aggregated into the total housing market (Galster 1996, 3). An example of a major division among the urban housing market is the sub-market of renters and the sub-market of owners (So 1988, 374). Sub-markets may be based on structural or locational attributes that contribute to the formation of the housing market's demand (Galster 1996, 3). In the context to this thesis the single-family homeowner's sub-market is considered. Additionally, sub-markets are considered in this research pertaining to the structural and locational attributes for each housing unit.

The Filtering Process

Filtering is a classic urban theory that describes how housing is passed down an economic ladder where it will ultimately reach low-income households. The concept of filtering states that as the housing deteriorates by age, style, and quality, it will provide less desirable housing for the high-income households (Brueckner 1983, 7). Therefore, as the housing becomes undesirable, it also devalues. Eventually, the housing becomes unwanted to the higher-income households and becomes available to low-income households. Filtering refers to the "differential change in real rent, or relative price, of units at various quality levels" (Melpezzi and Green 1996, 6). The main idea is that as the quality of the housing stock declines, housing prices will also decline (Brueckner 1983, 7).

The rapid growth of high-income households has produced a strong market for high quality housing. The “differences in the amount and location of land used, differences in initial construction quality, and differences in age and maintenance quality” (Melpezzi and Green 1996, 4) characterize the housing quality. These differences should be large enough that the existing low quality housing price should be sufficiently less than that of the typical new high quality housing price. The low-income households will benefit only if the upper end of the market for which the new construction occurs is “more modest”, meaning smaller homes (Brueckner 1983, 12). New construction should be associated with an increased supply of low-income housing in the existing housing stock. Hence, high rates of construction would be accompanied by lower housing prices. The result is a decrease in the demand for lower quality housing as a response to new construction (Weicher and Thibodeau 1985, 21). Research suggests that if the quality is too high, the housing will not be able to sufficiently filter down to the middle and low-income households.

The premise of this study is that the higher quality homes are often located in low-density zoning districts where there are larger lot sizes and typically larger homes. This research assesses the “differences in the amount and location of land used” and “differences in age and maintenance quality” (Melpezzi and Green 1996, 4). This research is not looking at whether new construction results in lower housing prices, but rather if there are differences in housing price of the entire housing stock based on zoning density after taking other characteristics, such as size, age, and location into account.

Planning and Zoning for Residential Land-Uses

This research is concerned with how planning and zoning for residential land-uses impact housing price. The concept of zoning designates specific districts for certain uses that affect the supply of each land-use. This relationship must be defined for an understanding of the relationship between the residential land-use supply and housing price. The following sections will define zoning, residential zoning, and hierarchical zoning and then discuss the effects of zoning on supply and demand, and the objectives of zoning.

Zoning Defined

Zoning is the basic means of land use control employed by local governments in the United States today. Zoning divides the community into districts (zones) and imposes different land use controls on each district, specifying the allowed uses of land and buildings, the intensity or density of such uses, and the bulk of buildings on the land (So 1988, 251).

Traditional zoning consists of residential, commercial, industrial, and agricultural categories (So 1988, 251). Within each category, there may be various districts classified according to use, height, and area restrictions. However, there are allowable exceptions to the zoning ordinance restrictions, which may be granted in the form of a variance from the local government (Crecine 1967, 80).

Residential Zoning

There are classifications of residential zoning uses that include three main principle housing types: single-family detached, single-family attached and multi-family housing (So 1988, 269). The zoning ordinance controls the residential density by establishing regulations on the number of housing units per acre, minimum lot sizes,

setbacks, and frontage requirements. The minimum lot sizes or the maximum number of dwelling units per acre regulates the maximum density in residential zones (So 1988, 251). The lowest-density districts are generally comprised of the single-family detached housing type that requires the largest minimum lot sizes. This is referred to as the 'highest' residential zoning district. Additional housing types become allowable in certain zoning districts when the minimum lot size decreases and the intensity of residential use increases allowing for several multi-family housing types: townhouses, duplexes, triplexes and four-plexes.. The minimum lot size becomes progressively smaller until the residential district reaches the most intense form of residential land-use, multi-family housing (So 1988, 269).

According to the American Housing Survey (2000), approximately 61 percent of the total housing units were single-family detached in 1997 (Yukubousky 1992, 30). It is often contended in that "the low density, single-family detached home is, and will remain, the most popular choice in the housing market" (Yukubousky 1992, 30). The main concern is whether buyers can afford the single-family low-density housing type. Multi-family housing, manufactured housing, and accessory dwelling units are typically the most affordable types of housing. Yet, in many residential zoning districts, these housing types are not allowed, and are considered 'incompatible' (Horowitz 1991, 5), while the single family detached house is permitted in all residential zones.

Hierarchical Zoning

The hierarchical order places the 'higher' and more desirable residential zoning uses at the top of the hierarchy.

Hierarchical (also referred to as pyramid and cumulative) zoning ranks land uses according to their need for protection. Pyramid zoning is based on the idea that a hierarchy of land uses can be designed according to the relative desirability of each use. Under cumulative zoning, only land uses that are less desirable than the designated use are excluded from any zone; more desirable uses are allowed (So 1988, 269).

Hierarchical zoning protects the highest land use zones by prohibiting uses that are beneath it, while the highest uses are allowed in any zone. In this sense, the highest zone is the most restrictive and the most protected from incompatible and non-conforming uses. For example, certain housing types and certain densities used for denser development are excluded within the higher zones.

In this thesis, the focus is on the single-family home housing type according to differing zoning density restrictions that exhibit a hierarchy based on the minimum lot sizes or maximum density. This study determines how the zoning density affects the housing price for single-family homes. The measurement considered is the minimum lot size of either the single-family home or the condominium. Condominiums have been included in the study as single-family homes. Condominiums are typically owner-occupied dwellings and are considered single-family housing by realtors.

Effects of Zoning on Housing Supply and Demand

Zoning affects the price of homes in several prominent ways. It controls the supply of sites for land uses and influences the price of land classified for different

residential purposes. This cost is reflected in the price paid by the consumer as one of the components of the cost of a house. Zoning influences price when it “operates directly or indirectly to reduce or enlarge the supply of multiple or single-family accommodations” (Siegan 1972, 96). Zoning may have requirements that add to the costs of the land and the costs of construction (Siegan 1972, 96). In addition, zoning has been contended as one of the most important elements in determining land prices. In the absence of zoning, supply and demand would control the price of land and housing. When a zoning ordinance is imposed on the supply, new price relationships are created. The zoning ordinance can influence housing costs by controlling the supply of sites for certain uses. The price of land is influenced by its placement, and by reducing or enlarging the supply of residential multiple or single-family dwellings (Parnell 2000, 5).

Zoning Objectives and Property Values

A commonly mentioned objective of the zoning ordinance is to regulate property uses by restricting certain uses to specific districts in order to protect property values (Asabere and Huffman 1997, 1; Stull 1975, 535). Such ordinances are designed to control unfavorable land-uses and are capable of providing property protection only if there is some relationship between the value of the typical piece of urban property and the assemblage of land-uses which surround it (Stull 1975, 535). This acknowledges that relationships between property values and externalities do exist and are significant (Stull 1975, 535).

The existence of externalities has been a major reason for the implementation of zoning (Chressanthisis 1986, 52). This notion claims, “that the neighborhood or environment around a given piece of property is important” (Crecine 1967, 82). The

protection of property values is achieved by the exclusion of elements that are perceived to depress land values (Chressanthisis 1986, 52). In order to prevent these negative effects, offensive uses are grouped together in specific areas where they will have minimal effects on other uses (Maser, Riker, and Rosett 1977, 112). Particular significance has been placed on the single family detached dwelling unit and the need to isolate it from incompatible uses that may lower its value (Stull 1975, 535). Mainstream zoning theory infers that all land uses beneath a particular land use cause external costs when adjacent to single-family homes (Maser, Riker, and Rosett 1977, 112).

Zoning Barriers to Affordable Housing

In this thesis, the ability of zoning to favorably affect housing prices will be examined. Housing prices are expected to be lower in high-density zones that have smaller lot sizes. It has also been shown that zoning acts in a hierarchical manner, thus protecting the highest land-uses from unfavorable surrounding land-uses. The protection of property values may exclude affordable housing. Zoning may consequently increase housing prices, and therefore may become a barrier to affordable housing.

Exclusionary and Downzoning Zoning

The intent of exclusionary zoning is restrictive by nature in that it may exclude low to moderate-income housing. This is evident in two ways. First, it may not permit or prohibit “certain construction by location, area, and density requirements” (Siegan 1973, 88). Second, it establishes requirements that increase the costs, and limits the number of potential buyers.

Exclusionary zoning is a doctrine defined by the New Jersey and Pennsylvania state courts (So 1988, 282). These courts ‘struck down’ certain types of zoning that were

found to be exclusionary toward a specific group of people, generally low-income households by restrictions prohibiting typical low-income housing types (So 1988, 282). Zoning ordinances have been very effective in controlling growth, but they have gained opposition for the exclusionary effects on certain income groups of the population (Parnell 2000, 2). Zoning and land use control is exclusionary because while certain uses are permitted in a zoning district, other uses are prohibited. This is also evident by large minimum lot restrictions and zoning regulations that may exclude moderate to lower income individuals from purchasing property in a particular municipality.

Zoning ordinances may prohibit or exclude certain housing types and high-densities such as apartments, manufactured homes, dwellings with certain design modifications, high-density residential dwellings per acre, and lot frontages shorter than a certain minimum (Horowitz, 1991, 5). “Techniques used for exclusionary purposes include overly large minimum lot size requirements (often 1 acre or more), bans or severe limitations on apartments, expensive amenity and site-improvement requirements, and other techniques that directly or indirectly increase the cost or decrease the feasibility of housing development” (So 1988, 282). Regulations requiring large minimum lot sizes and large building set backs, and those that prohibit multi-family housing, are referred to as downzoning (Reamer 1989, 6) or low-density development.

‘Not in My Backyard’ Response

“In theory, zoning is a way of separating incompatible land uses to protect health and safety, and has become a device for screening new development to ensure that it does not depress community property values” (Ashley 1991, 5). The ‘not in my backyard’ (NIMBY) response is often assumed as an upper to middle class phenomenon where the

more affluent households oppose ‘undesirable’ land uses that are unfavorable to the communities because they are believed to lower property values. The NIMBY response often arises from the fear of declining property values. It is characterized by the resistance toward certain types of development, caused by the close proximity to certain undesirable facilities. The ‘geographical proximity rule’ observes that the nearer residents are to a proposed undesired land-use, the more likely they are to confront it (Dear 1992, 7). Developments that produce opposition include: human service facilities, landfill sites, hazardous waste facilities, low-income housing, nuclear facilities, and airports (Dear 1992, 2).

In addition, new housing developments may be viewed as harmful to property values. Many homeowners resist changes in their neighborhoods, thus creating opposition to new housing development. Localized zoning and subdivision ordinances, building codes, and permitted uses that prohibit affordable housing (Ashley 1991, 3) are often in the form of low-density development or downzoning. This is encouraged by the NIMBY phenomenon. Many single-family homeowners perceive that certain housing types found in high-density zoning, such as small-detached houses, town homes, and apartments will decrease their property values. The opposition limits the acceptance of high-density zoning as a tool for providing affordable housing.

Smart Growth and Urban Growth Boundaries

A common technique promoted by ‘smart growth’ proponents is the implementation of an urban growth boundary designed to “curb sprawl, protect open space, or encourage the redevelopment of inner-city neighborhoods” (Staley 2000, 1). “Smart growth represents promising ideas about how to preserve and develop specific

kinds of community quality over the long run, while contending more effectively with the pressures of growth” (Missoula County 1999, 1). One of the important issues at hand is sprawl, and urban growth boundaries have been proposed to limit sprawl.

The urban growth boundary can be visualized as an urban-limit line that stops growth beyond a politically designated boundary (Staley 2000, 4). Development beyond the urban growth boundary is “prevented or highly discouraged” (Staley 2000, 6). The purpose of an urban growth boundary is to “minimize the use of land generally by reducing lot sizes and increasing residential densities; reduce infrastructure costs by encouraging urban revitalization, infill, and compact development” (Staley 2000, 6). In theory, this preserves farmland and open space.

Growth boundaries are used to encourage higher densities; yet, the reduction in the land supply results in higher land costs and housing prices. The available land becomes scarce near the urban growth boundary. This decrease in the available land supply will increase housing prices, thus reducing affordable housing (Staley 2000, 5). Housing investments are redirected into higher densities and housing prices appreciate (Staley 2000, 20). The prices of existing homes and the prices of vacant lots for development will increase (Horowitz 1991, 5). The concept of smart growth is intended to result in concentrated growth by increasing density and to “stop the spread of low-density residential development in suburban and rural areas” (Staley 2000, 6).

The effects of the urban growth boundary pertain to this research because the housing units examined in this research are located within the urban area and city boundary of Missoula (Missoula Housing Coordinator 1999, 5). There is a shortage of developable land because of the implementation of an urban growth boundary. This is an

important concern when the local government attempts to limit urban sprawl and at the same time attempts to provide affordable housing. It becomes difficult to find inexpensive land, because the available land supply has lessened. The urban growth boundary may raise prices of existing housing and new development by limiting the available land supply (Missoula Housing Coordinator 1999, 5). If the housing demand surpasses the supply, high residential density alone may not be successful in lowering housing prices.

Determinants of Housing Prices

Property Values

The determinants of property values found in William J. Stull's study are described as a bundle of characteristics for the single-family parcel. It includes the house, the lot, and four "mutually exclusive and exhaustive categories" (Stull 1975, 536). They are the physical characteristics, accessibility characteristics, public sector characteristics, and environmental characteristics. The physical characteristics include housing quality factors such as the age and condition of the house, number of bedrooms, and the lot size. Physical characteristics are among the most important variables for determinants in housing costs and are reflected in the housing prices (Stull 1975, 536). The accessibility characteristics refer to the location of the parcel and the proximity to amenities defined in the location and neighborhood section below. The real property tax rate and the quality of public services define the public sector characteristics. Lastly, the environmental characteristics pertain to the surrounding land uses. The land uses of neighboring parcels are important considerations of housing prices, defined as externalities in the literature (Stull 1975, 535; Maser, Riker, and Rosett 1977, 112).

Adjacent zoning districts possess certain external land-use characteristics that could either raise or lower property values.

This research will use a modified framework of Stull's determinants of property values. In addition to physical characteristics, it will also refer to accessibility characteristics. The land-use environmental characteristic is modified so that zoning density regulations are used instead of adjacent zoning types. The effect of residential density on housing price is examined rather than the effect of neighboring externalities on housing price. The following is a discussion of the environmental land-use variable, specifically residential density, and the accessibility characteristic, namely location and neighborhood.

Residential Density and Land Costs

Local governments "exercise clear control in setting local land use and development regulations, which can, and do, have significant impacts on housing development and construction costs, most notably in the areas of land acquisition, site development, and construction costs" (Yukubousky 1992, 9). High or increased residential density is promoted as an important affordable housing technique. (These issues will be discussed in further detail in the concluding chapter.) Certain residential areas are zoned or rezoned to allow for greater density, which is measured by the number of housing units that can be placed per acre of land. High-density can aid in the preservation of open space by reducing the amount of land needed for residential development, if indeed, the local government is attempting to preserve open space. Furthermore, high residential density may reduce traffic congestion. If higher density takes place near employment centers, it provides residents with the option of living closer

to their jobs. Upzoning results in a more efficient use of the existing infrastructure because of the decreased lot sizes (Yukubousky 1992, 17).

In *Affordable Housing Techniques*, Yukubousky explains the benefits of higher density as follows:

Increasing allowable density generally has the effect of reducing land and site development costs for developers, letting them spread these costs over a large number of units, and therefore, reducing purchase prices for homes and rents for apartments. Site development costs include the labor, material, and equipment expenses for the construction of roads, sidewalks, water and sewer lines, drainage, landscaping, and other on-site work (Yukubousky 1992, 17).

These reduced costs, in turn, are reflected in lower housing prices (Yukubousky 1992, 9). Higher density zoning is achieved by zoning types that allow for smaller minimum lot sizes and therefore, more housing units per acre. According to a study by the U.S. Department of Housing and Urban Development, the cost of raw land may range from eight to 25 percent of the cost of a new housing unit, depending on the local market (Ladd 1992, 3). The reduction of land costs through increased density is perceived as the most influential tool for providing housing affordability to the community (Yukubousky 1992, 17). Density standards are directly related to land costs. Land values, in turn, are a central component of housing costs. When density standards are especially restrictive, defined as low-density zoning, housing prices are expected to be high (Weitz 1982, 9). Where density standards are less restrictive, meaning high-density zoning, housing prices are expected to be lower.

This thesis examines whether cost reductions from smaller lot sizes and lower land costs from higher densities are reflected in the housing prices. Specifically, this

research assesses whether high-density zoning is associated with lower housing prices in Missoula, Montana. Increased density decreases land costs because lot sizes are typically smaller. Small lot development additionally results in lower infrastructure costs, as these costs are spread out over more units, improving the availability of housing affordability.

Location and Neighborhood

The land cost is an important determinant of housing price. Yet, the location and neighborhood may affect the land value, thereby interfering with the ability of lowering housing prices from increased density and smaller lot size development. High-density may not be as influential in lowering housing prices, as higher land values are often a result of the location and the neighborhood.

The location of the land is considered one of the most important factors because it provides accessibility to certain amenities (Maser, Riker, and Rosett 1977, 115). Alonso (1964) developed the theory that urban land prices are predicted by size of parcel and distance to the city center. Land values generally rise with close proximity to employment centers or the central business district (CBD), where access is considered the greatest. This creates higher land prices for even “conventional market-rate housing at typical densities” (Dunphy 1998, 3). There have been several empirical studies that support the hypothesis that land prices decline with the distance from the CBD (Dunphy 1998; Branas 1999; Maser, Riker and Rosett 1977). This literature suggests that the highest land values are found within the city center, and then decline with distance from the CBD because of the increased transportation costs (Dunphy 1998, 2). Distance is used as a variable to explain housing demand. “The shorter the distance, the greater the

demand for housing, and the higher the price" (Branas 1999, 4). This pattern of land values means that households choose between location and price (Dunphy 1998, 2). Interestingly, the highest densities are found near downtown and decrease with distance from city center where there are lower densities and lower land values. Although high-density should lower housing prices, the location and neighborhood may raise the housing price.

Distance is only one choice when considering the location. The neighborhood and quality of neighborhood is another extremely important determinant of housing price. According to Branäs (1999), each neighborhood occurs at different periods of time and different services are offered. Each successive neighborhood offers better quality services than previous neighborhoods. It could undermine the importance of the CBD as the only factor in determining price by location (Branäs 1999, 5). The "quality of the neighborhood, housing, schools and personal security" (Dunphy 1998, 3) act as additional factors for the locational preference. The externalities, the surrounding land-uses of the neighborhood, play an important role pertaining to the accessibility of the location.

The distance from the CBD is not used in this research. Instead, this research is using the neighborhood as the location variable. The location assesses the differences in housing price by neighborhood, irrespective of the distance to the CBD.

Empirical Research on Zoning and Housing Prices

The conceptual literature has been reviewed above. The next section describes some of the empirical research on zoning and housing price. It begins with an explanation of the hedonic equation. This methodology has been employed by several of

the empirical studies summarized below. The hedonic price equation is also used in this research.

Hedonic Price Equation

The hedonic price equation is a popular method used to describe the influence of various housing characteristics on the implicit market price for the specific study area at a particular point in time (Stull 1975, 551). The procedure regresses the market price against the housing characteristics. Each regression coefficient reflects the influence of a housing characteristic on the market price. It is often contended that physical and accessibility characteristics have the strongest effect on market price (Stull 1975, 542). Other relationships that may predict housing prices are not as evident. One such relationship, the relationship between local zoning ordinances and housing prices is being tested in this research.

The hedonic price equation is estimated by obtaining the observations with several characteristics such as structural characteristics and neighborhood characteristics. (Maples 1998, 2). Residential market sales are collected for a specific time-period that is relatively short, usually one year. Data requirements include locations of the residential properties, and property characteristics that affect selling prices, such as lot size, number and size of rooms, and number of bathrooms (Ecosystem Evaluation 2000, 2).

Once the data are compiled, they are statistically analyzed using a function that measures “the portion of the property price that is attributable to each characteristic” (Maser, Riker, and Rosett 1972, 114). The hedonic price equation is used in this research by regressing various housing variables against housing price. It will identify the part of

the property price attributable to each housing characteristic. Of importance here are the implicit prices of the zoning density and actual lot size.

Related Studies on How Zoning Influences Housing

The empirical studies reviewed below examine relationships between zoning and land prices and/or housing prices. Several studies research the surrounding land-uses and the negative externalities, hypothesized to decrease property values. Several empirical studies have addressed the potential effects of zoning on land values and housing prices. Many conflicting hypotheses and results suggest each market is unique. Overall, the general results suggest short-term implications for housing prices. The urban housing market's complexity will continually undergo changes that affect the supply and demand. For example, if because of zoning the number of houses produced were lower than the free market would allow, the housing price would rise. If the housing density is too low, the housing supply tightens, and the developable land supply is constrained. As a result, housing and land price will escalate. "The implicit prices themselves are determined by supply and demand relationships which may remain hidden from view" (Stull 1975, 551). The characteristics are only "attached to the relative market commodity characteristics at a particular point in time" (Stull 1975, 551).

William J. Stull's (1975) empirical research supports the notion that there is a relationship between certain land uses and the market value of single-family homes. The hypothesis stated by Stull (1975) is that "there is a relationship between the land-use environments of the single-family homes in different communities and their market prices" (Stull 1975, 543). If the objective of the zoning ordinance is indeed the protection of property values, then there most likely is a relationship between property values and its

surrounding land-uses. Furthermore, there has been little statistical support for the conventional position that certain land-uses (non-single family uses) have an unfavorable effect on the market value of single-family homes.

The sample used in Stull's study consisted of 40 suburban cities and towns in the Boston metropolitan area. The tool of analysis was the hedonic price equation in regression modeling. The median value of single-family homes of each city or town was the dependent variable. It was regressed against the determinants of property values: physical characteristics, accessibility characteristics, public sector characteristics and environmental characteristics. The hypothesis tested for the effects of environmental characteristics, which are the surrounding land-uses on housing price. They were divided into proportions of differing land-use districts: multiple-family residential use, local or general commercial use, and light or heavy industrial use. Institutional uses (churches, schools, etc.) and vacant land was also included. The results provided evidence that the value of single-family homes depends on its surrounding land-uses. The sum of all proportions of the non-single family uses had a negative impact on housing values. The second model in Stull's (1975) research tested for each land-use proportion. The findings support his hypothesis that certain proportions of land uses negatively affect single-family housing values such as multiple-family or commercial, industrial and vacant land-uses.

Other land uses positively affect housing values such as light commercial uses because of shopping access and the presence of institutions such as churches and schools. Two studies by Crecine, Davis, and Jackson (1967) and by Reuter (1973) "test directly for neighboring land use configurations on property values" (Stull 1975, 539). According

to Stull, these two studies have shown the relationship of zoning on price effects to be “weak and nonexistent” (Stull 1975, 539). The results in both studies did not support the conventional position that a parcel’s ‘land use environment’ (determined by the zoning) affects its value and therefore the market price (Stull 1975, 539).

A study by Ohls, Weisberg, and White (1974) found that zoning has the effect of lowering land values in many U.S cities. They examined the “effects of large-lot zoning on land values” (Courant 1976, 88) and found that hierarchical zoning could either raise or lower values. Courant states that zoning lowers land and housing values. Asabere and Huffman (1991) hypothesized that rents are lower in non-conforming zones and rents are higher in conforming zones, the most restrictive and protected zones. Conforming zones are the highest zones, the most protected and restrictive of zones equal to or above apartment zoning, and the non-conforming zones consist of all the classifications below apartment zoning. They determined that price discounts existed in the non-conforming zones.

The research by George A. Chressanthis (1986) tests for the effects of zoning changes on housing prices. The market sales price of single-family homes in Lafayette, Indiana from 1960 to 1980 was obtained from the Lafayette Board of Realtors multiple listings database. A time-series analysis determined the direction of impacts of these zoning changes on housing price. The study compared pre-event and post-event zoning changes on housing prices (Chressanthis 1986, 49). The zoning change variable consisted of three zoning changes from 1960 to 1980. The hypothesis states that major zoning changes significantly affect housing price, that is, the more restrictive the zoning

changes, the higher the housing price. It was found that major zoning changes significantly affect housing prices (Chressanthis 1986, 49).

Steven M. Maser, William H. Riker, and Richard N. Rosett (1972) tested the hypothesis that zoning has an effect on land prices in Rochester, New York. They employed regression analysis to estimate a hedonic price equation, one that attributes the price of various characteristics to the price of land (Maser, Riker, and Rosett 1977, 114). The dependent variable used in this study was sales price per acre of land plus the structure. The independent variables included zoning categories, and characteristics that affect the price of land. Maser and others discuss the determinants of land prices and conclude that the location of the parcel and access to amenities is perhaps the most important variable for determining housing price. Neighboring land-uses are another important factor for determining housing prices, hypothesized in this study. The effects of neighborhood quality characteristics were measured by presence of externalities, defined as "any adjacent or visible use of land other than single-family homes" (Maser, Riker, and Rosett 1977, 115). These results indicated that zoning has no effect on housing prices. This study concluded "zoning does not influence prices by altering the total supply of land available for various uses" (Maser, Riker, and Rosett 1977, 128).

A thesis by Amy Fugal of Brigham Young University titled "The Effects of Local Land Use Zoning on the Provision of Affordable Housing" (1998), hypothesizes that zoning changes by a local government would help increase the availability of affordable housing. The influence of zoning on affordable housing was not statistically significant when housing constraints were held constant. The author concluded that the

findings did not support her hypothesis that zoning changes could increase the supply of affordable housing.

A study conducted by Lisa Parnell titled “Do Zoning Ordinances make a Difference in Housing Prices? A Case Study of Lincoln, Nebraska”, hypothesized zoning ordinances effect housing price. This work concludes that restrictive zoning is a significant factor in the lack of affordable housing. The zoning standards were regressed on housing sales prices to test for the effects of differing zoning standards on housing prices. The results of the quantitative analysis show that when comparing sample house prices by the severity of restrictions across zoning types, the percentage of increase in housing costs in the most restrictive zone was greater than the housing prices within the least restrictive zone (Parnell 2000, 1). The study concluded that an increase in housing costs took place due to zoning restriction severity.

Conclusion

Generally, it is expected that as the density increases (the higher number of housing units per acre), housing prices decrease, thereby increasing the availability of affordable housing. Local governments view high-density zoning as an important tool that influences the availability of affordable housing to the community. This research hypothesis states that zoning density and actual lot size have an effect on housing price. As the zoning's minimum lot size decreases allowing for a greater maximum density, the housing prices will decrease. Conversely, as zoning's minimum lot size increases and the maximum density decreases, housing prices will increase.

CHAPTER III

METHODOLOGY

The Missoula Consolidated Plan asks, “How does density (number of houses per acre) affect the average sales price of a single-family home in Missoula?” (Missoula Housing Coordinator 1999, 63). This question will be answered with this research. Planners are particularly interested in knowing whether density affects housing price, because planners can use zoning regulations to establish density standards. The purpose of this empirical research is to examine the influence of zoning density on housing price in Missoula, Montana. It has been hypothesized that higher density zoning and smaller lot size development will lower housing price.

In order to answer the question posed, information about housing price and zoning density must be collected. The *Missoula County Association of Realtors* (MCAR) provided housing price data, and the *Missoula Office of Planning and Grants* supplied zoning information. The zoning data needed for this research consists of two parts: spatial data in the form of CAD line drawings, and attribute data from the *Zoning Ordinance Regulations*. Zoning regulations include minimum lot size requirements, which are density standards.

Two GIS packages were used to build the database that contained both housing price and zoning regulations. ArcInfo was needed to convert zoning CAD drawings to a usable format. GIS applications in ArcView3.2. were necessary in order to identify each

housing unit's zoning density. This was accomplished through address-matching.

Once the database on housing was linked with the zoning information through address-matching, statistical procedures using SPSS10.0 software were employed to examine the relationship between zoning density and housing price.

The following sections offer a discussion of these steps in greater detail. The *Database* section describes the specifics of the MCAR database on housing price and the zoning database. The section on *GIS Applications* explains in detail the steps necessary to prepare the zoning data and link them to the housing data. The *Procedures* section outlines the statistical procedures employed, namely regression analyses, using housing price as the dependent variable and zoning density as the independent variable. This is followed by a section on the *Variables* that includes a short sub-section on the *Dependent Variable*, housing price. The last sub-section explains in depth the *Independent Variables*, namely zoning as well as additional housing characteristics, which are known to affect housing price. It is necessary to include these control variables to properly identify whether zoning density affects housing price.

The Database

In order to examine the effects of zoning density on housing price, two databases were used: one for housing price and one for zoning density. The database for housing price consists of housing units sold by real estate firms in Missoula, Montana. All housing units sold between January 1, 1996 and December 31, 1999 and located in residentially zoned areas are considered. Housing units that existed within commercial and industrial zoning types were excluded from the analysis because this research examines only housing prices among residential zoning. Within the city limits, there

were 2088 single-family homes sold in these residential zones. The housing unit database were acquired from the *Missoula County Association of Realtors* (MCAR) multiple listings service residential forms. They are shown in the Appendix. Information collected for each housing unit included the address, sales price, lot size, and other housing characteristics such as number of bedrooms, number of bathrooms, presence of basement, presence and size of a garage, condominium, main floor square footage, approximate age, and the neighborhood. The study area consists of thirteen neighborhoods that were created by the MCAR found in the Appendix.

The city zoning information were obtained from the *Missoula Office of Planning and Grants*. This information consists of the zoning CAD drawing and each residential zoning ordinance description (Missoula Office Planning and Grants, Title 19, September 1999). Each zoning type has several regulations. They include: general information, height, front yard, rear yard, side yard, maximum residential density, minimum lot size, permitted uses, and conditional uses. Minimum lot size is the zoning standard that is being studied by this research. The minimum lot size is used as the zoning density measurement.

GIS Applications for Housing Prices by Zoning Density

By using ArcView GIS 3.2, the housing units of the MCAR database were address-matched to the Missoula 1995 Census Bureau TIGER line road map. This allowed for the attribution of each housing unit to its zoning type.

Address-matching is performed when:

a column of street addresses in the attribute database is matched with several columns of data in the geographic database which contain such things as house number ranges, street names, street type (avenue, street, road, etc.), and prefix or suffix designations. In this manner, existing databases which contain address information can be linked to the map being created by the GIS program (Wilson 1999, 1).

In order to properly address-match the two databases, address formats such as position of house number ranges, street names, street types, prefix or suffix designations, need to be compatible. However, the MCAR database and the 1995 TIGER line spatial database frequently had different address formats. Additionally, the 1995 TIGER line files did not include newer street developments. The process of updating and revising the databases for address-matching turned out to be very time-consuming.

Through address-matching, the housing units were placed as points on their street location. The zoning CAD drawings were converted in ArcInfo into zoning polygons to perform GIS applications in ArcView 3.2. The zoning map was added to the housing unit coverage. The 'select by theme' function selected housing units for each zoning type. This 'point to polygon' analysis assigned the residential zoning type to each housing unit.

There is a minimum lot size regulation for each residential zoning type. Zoning types were ranked according to their minimum lot size creating the following four density categories: high-density, medium-density, low-density and very low-density. They are shown in column one of Table 3.1. Column two shows the corresponding zoning types which are also displayed in Map 3.1. The housing units sold from 1996 to 1999 are also displayed in this map in order to show where the housing units analyzed are located.

The minimum lot size square footage of each zoning type is found in the third column.

The last column displays the number of housing unit for each zoning type and the housing units sub-total for each density zone.

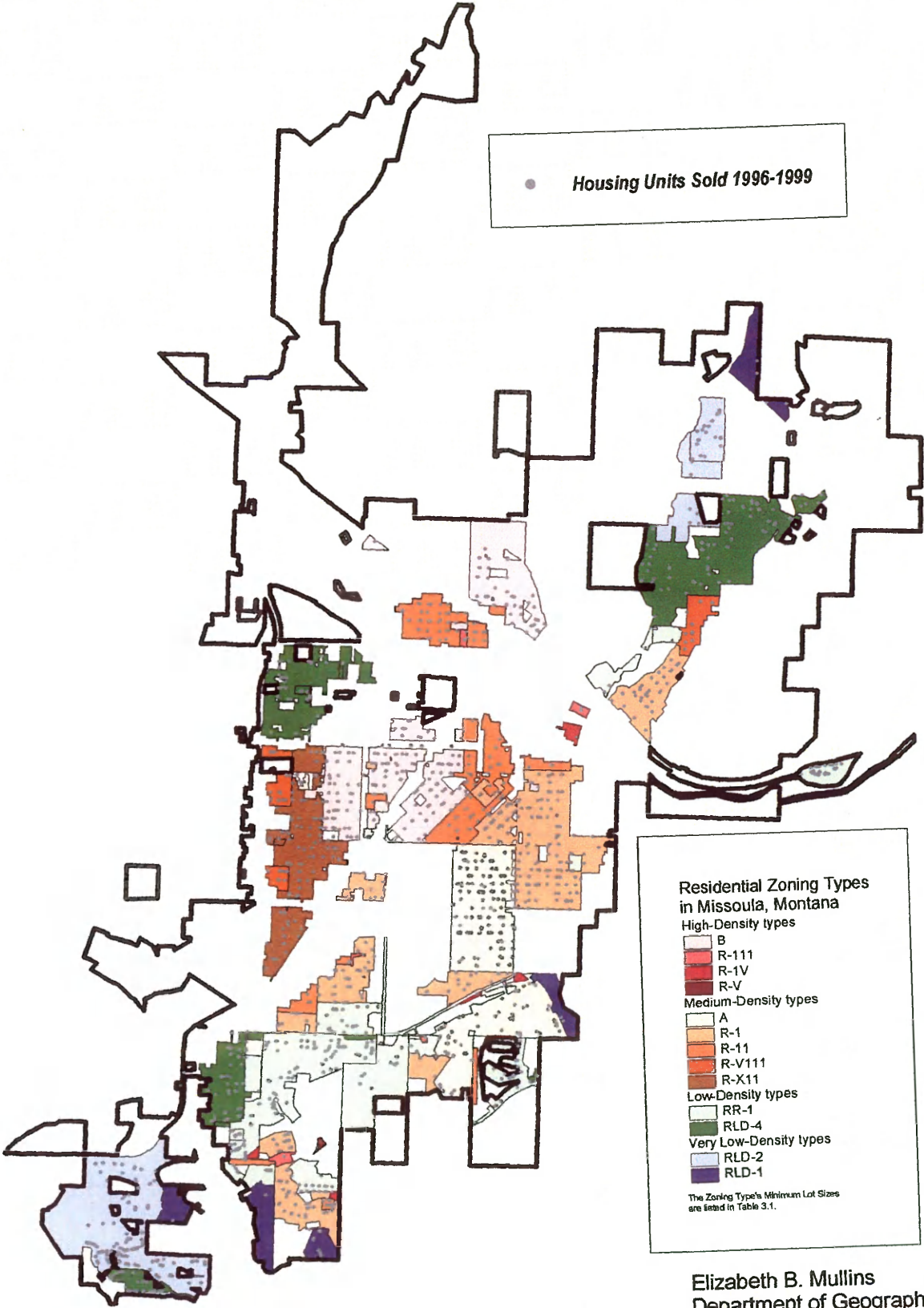
Table 3.1 Zoning Density Categories

Zoning Densities	Zoning Types	Minimum Lot Sizes	Number of Housing Units Sold 1996-1999
High-Density	B	3,500	240
	R-111	3,600	16
	R-1V	3,600	17
	R-V	3,600	16
			289
Medium-Density	A	5,400	267
	R-1	5,400	404
	R-11	5,400	149
	R-V111	5,400	44
	R-X11	5,400	102
		966	
Low-Density	RR-1	8,000	339
	RLD-4	10,000	247
			586
Very Low-Density	RLD-2	20,000	176
	RLD-1	40,000	20
			196
Missing			51
Total			2088

The high-density category includes zoning types B, R-111, R-1V, and R-V.

There are two minimum lot sizes: 3,500 square feet and 3,600 square feet. The high-density category contains 289 housing units. The medium-density category contains

Map 3.1: Residential Zoning Types



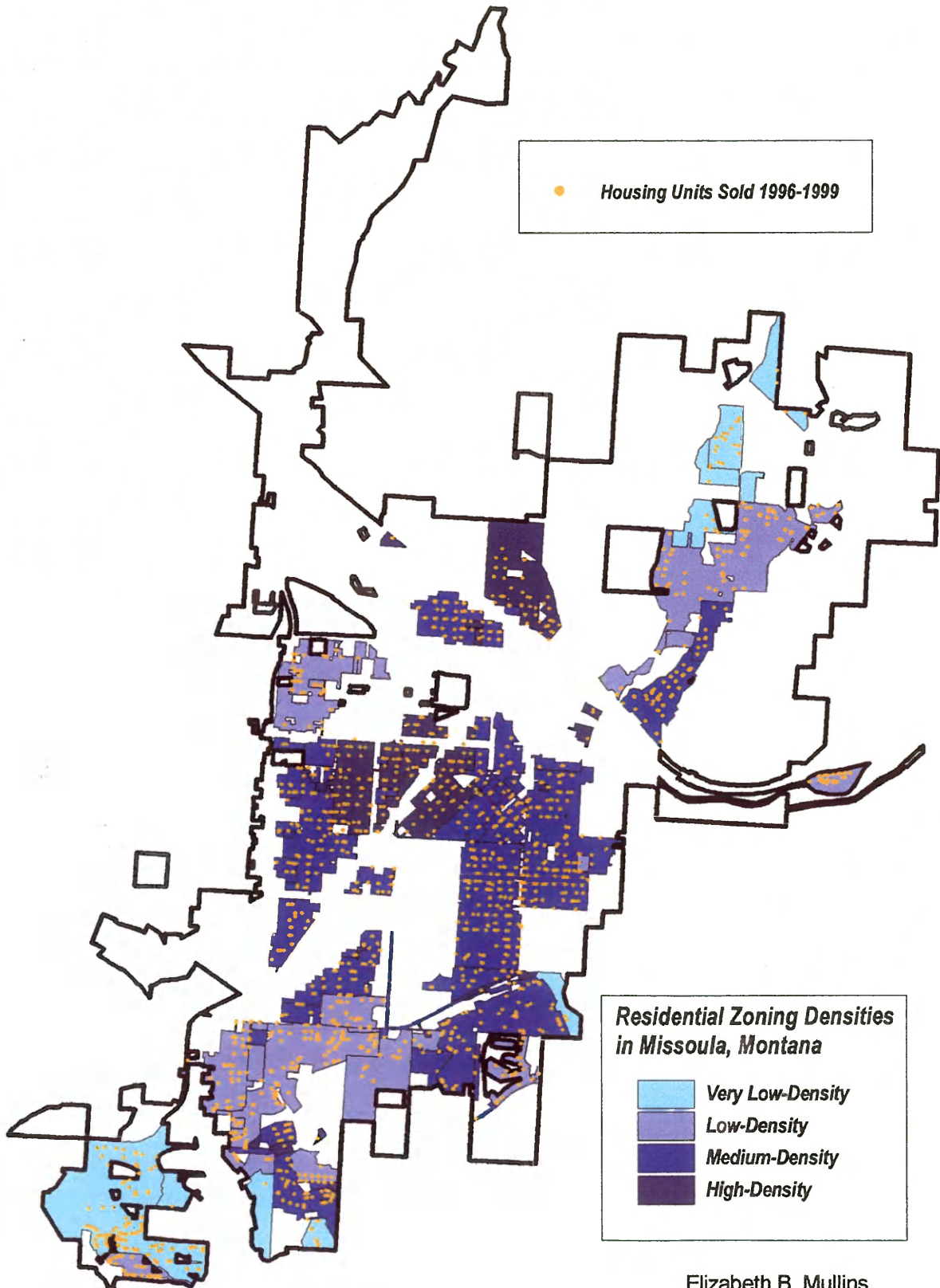
Based on CAD drawing from Office of Planning and Grants and TIGER line files

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types A, R-V111, R-X11, R-1, and R-11; they all have the same minimum lot size requirement of 5,400 square feet. The medium-density category contains 966 housing units. The low-density category contains zoning types RR-1 (8,000 square feet) and RLD-4 (10,000 square feet). The low-density category accounts for 586 housing units. The very low-density category consists of RLD-2 (20,000 square feet), and RLD-1 (40,000 square feet). The very low-density category has 196 housing units. The zoning types grouped into zoning density are displayed in Map 3.2. Each zoning type regulation listed above can be found in the Appendix.

Procedure

At the core of this research is the multiple regression analysis which tests for significant effects of zoning density and actual lot size on housing price while controlling for housing characteristics. The software for social statistics, SPSS 10.0 is used for this analysis. Housing prices are expected to change for differing zoning densities after statistically controlling for housing quality characteristics that also influence housing price. These characteristics are: number of bedrooms, number of bathrooms, and presence of basement, presence and size of a garage, condominium, main floor square footage, approximate age, year of sale, and the location. Zoning density and housing attributes will be regressed against the housing market price. Additionally, actual lot sizes are included because minimum lot size that determines the zoning density and actual lot size may differ. The implicit price relationships are expressed by the coefficients in the hedonic price equation (Stull 1975, 551). The coefficients will reflect the importance of each independent variable's effect on housing price.



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Several other procedures are used as well to show housing price relationships. These are bi-variate analyses of housing price and each independent variable. In addition, the relationship between zoning density and actual lot size is examined by using a correlation coefficient. Simple regression models of zoning density or actual lot size effects on housing prices will be analyzed prior to the multiple regression model that takes into account other housing characteristics.

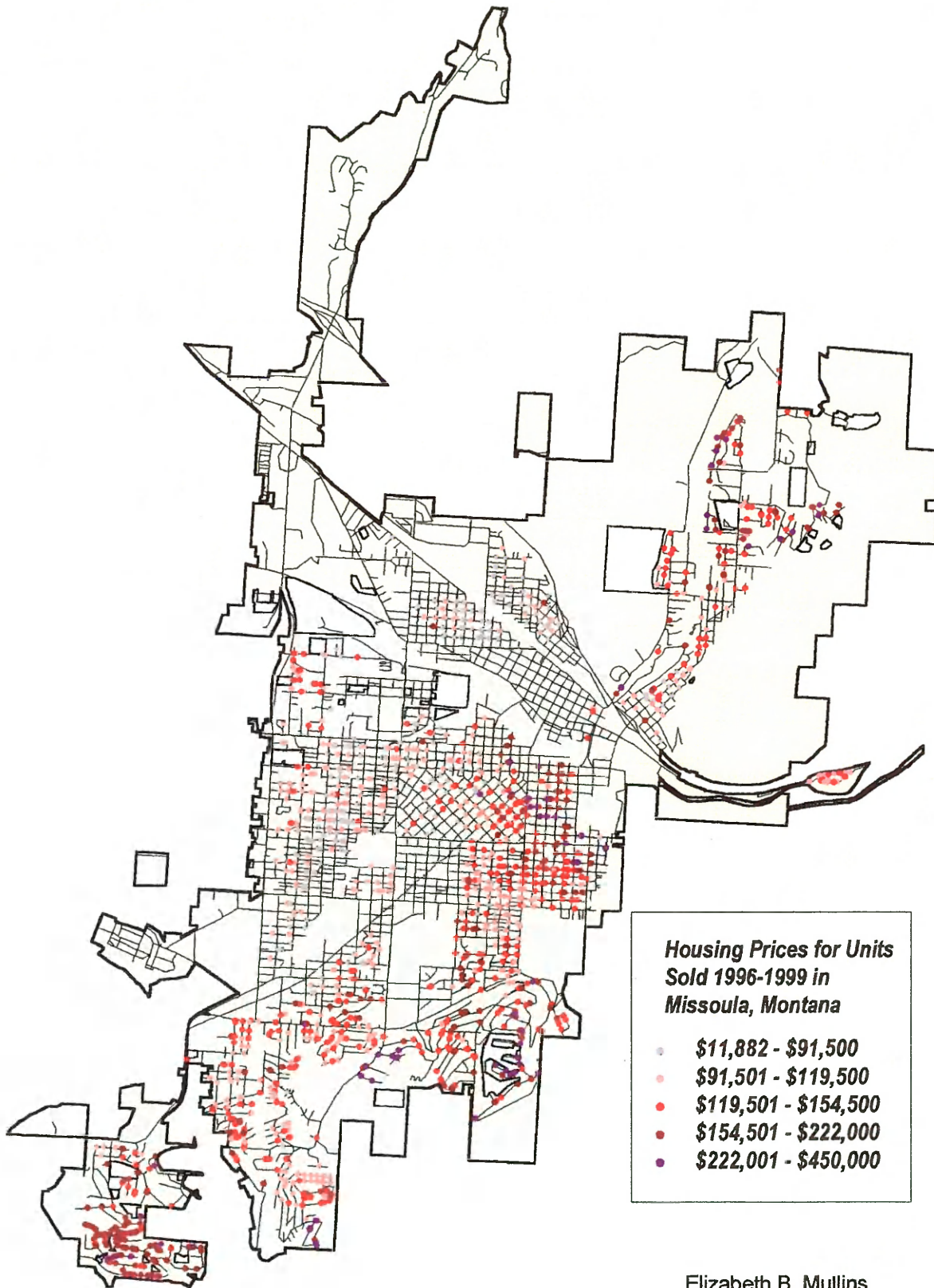
Variables

Dependent Variable: Housing Unit Price

The unit of analysis is the housing unit and the dependent variable is the sales price of a home. The housing units sales prices from the years 1996 to 1999 in Missoula, Montana are shown in Map 3.3. The prices have been classified by five natural breaks in ArcView 3.2. In this thesis, four models are used for the prediction of housing price, described below.

Independent Housing Variables

Independent housing variables are used to explain and predict housing prices. Independent variables have been grouped according to land-use environmental characteristics, physical characteristics, time-period, and the location characteristics. The land-use environment variables are each used individually for the simple regression analyses for the prediction of housing price. The multiple regression analysis uses both land-use variables as predictors of housing price. The final multiple regression model uses additional independent variables. The complete multiple regression model uses the



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physical characteristics, time-period, and the location characteristics in addition to the land-use environment variables.

Land-Use Environment Variables: Zoning Density and Actual Lot Size

Zoning Density

Thirteen residential zoning types have been categorized according to their minimum lot sizes into four categories ranging from high-density to very low-density. Zoning density is an ordinal variable meaning that it is rank-ordered but the intervals between the values are not interpretable. Dummy variables were constructed for each zoning density to account for changes in the land-use regulations. Dummy variables represent sub-groups, for which the variable takes on a value of zero or one, depending on whether a particular characteristic exists. For instance, if the variable is high-density, it was assigned a value of one and if the variable was another zoning density dummy variable, it was assigned a zero. A reference category was needed for each dummy variable. The coefficients derived from the regression analyses for each zoning density dummy variable show the housing price differences in comparison to the reference category. Each dummy variable constructed is referenced to the very-lowest zoning density. This is typically considered the most expensive housing because of the large lot sizes that accompany large homes. The coefficient estimates are anticipated to be negative. This means they show reductions in housing price for a given zone when compared to the very low-density zones. The high-density zone is expected to have the highest reduction in housing price, evident by the expected largest negative coefficient, followed by decreasing negative coefficient values for medium-density and low-density zones.

Actual Lot Size

The housing unit's actual lot size is an important variable in this research. It is restricted by the zoning ordinance, which determines the minimum lot size and therefore the maximum density. However, the actual lot size may not be developed at the minimum lot size, and there could be a difference between the actual lot size and minimum lot size. The difference in actual lot size would most likely be positive (larger) because the zoning type sets the lowest parameter of the lot size. The lot size was originally formatted in the MCAR database by several dimensions, most commonly shown by acreage and square footage. They were converted in Excel to square footage in order to have the same unit of measurement. Lot size is a continuous variable, meaning that the distances between the values are meaningful for regression analysis. If the lot size field had missing data for a particular housing unit, then the second measurement of categorical lot size variable on the multiple listing residential service form was used (Appendix). The median lot size square footage of the range were then assigned to the housing unit.

Physical Variables

The physical characteristics of housing units are among the most important determinants of housing prices (Stull 1975, 542). Physical characteristics considered here are the number of bedrooms, number of bathrooms, presence of basement, presence and size of garage, main floor square footage, and approximate age. Additionally, a distinction is made between single-family homes and condominiums. In order to properly control for the effects of zoning density and actual lot size on housing price, the model must control for other housing attributes that contribute to housing price. The

physical attributes are measures of housing quality for each housing unit. By including them, housing quality is controlled for and the effects of zoning density and actual lot size on housing price can be tested. This examines the relationship between zoning density and actual lot size on housing price for comparable houses because the additional housing characteristics are being held constant.

Bedrooms, Bathrooms, Basement, Garage

The number of bedrooms affects housing prices. This variable is representative of the number of people who are able to live in the specific dwelling unit. As the number of bedrooms increase, the housing price is expected to increase. This also pertains to the number of bathrooms. Again, as the number of bathrooms increases, the housing price is expected to increase. Similarly, the presence of a basement is a feature that generally commands a higher housing price. Additionally, the presence of a garage is expected to increase housing prices. Housing price is also affected by the size of the garage, as a single, double, or triple car garage.

Condominium

Of single-family homes sold, 93 units were labeled as condominiums. They are included in the realtor's single-family database because they represent owner-occupied housing units. Condominiums are properties that do not encompass land. Compared to that of single-family detached homes, condominiums are considered a denser housing type. In context to this thesis research that hypothesizes that lower housing prices are found on smaller lots and in denser housing environments, one would expect lower housing prices. To test whether condominiums are significantly lower priced than single-family homes, a dummy variable was constructed. Although condominiums represent a

small portion of the database, they are used to test for the effects of the absence of the lot as significant predictors that lower housing price.

Main Floor Square Footage

Main floor square footage is an extremely important variable for the purpose of this study. The size of the home is dependent upon the zoning type. Large homes are usually on large lots because of the zoning regulations that pertain to the size of the structure relative to the size of the lot. Larger main floor square footage is expected to increase housing prices. Main floor square footage, a continuous variable in nature, is an ordinal variable in the MCAR database. The main floor square footage categories are: under 599', 600' to 799', 800' to 999', 1000' to 1249', 1250 to 1499', 1500' to 1749', 1750' to 1999', 2000' to 2499', and over 2500'. Each main floor square footage category was dummy-coded in the database. The largest main floor square footage category, over 2500 square feet is the reference variable. The largest main floor square footage most likely commands the highest housing prices. The main floor square footage dummy variables are all of lesser value, and therefore are expected to have larger negative coefficients as main floor square footage decreases.

Approximate Age

Newer homes are expected to have higher housing prices. Older homes cost more to maintain, and therefore they are expected to have lower housing prices. Yet, older homes may be more expensive than newer homes. The expected coefficient in the approximate age variable is more difficult to anticipate, as other control variables, such as location, may have an additional impact on housing price. The age of the house is typically a continuous variable, but it has been treated as an ordinal variable in the

MCAR database. The categories are: new and never occupied, less than 5 years, 5 to 10 years, 10 to 20 years, 20 to 35 years, 35 to 50 years and 50 years or older. Dummy variables were constructed using the newest, never occupied housing units as the reference variable because it is likely the most expensive housing. The coefficients for age dummy variables are expected to be negative and increase with age, indicating that the older the home, the lower the price.

Time-Period Variable

Year Sold

The year sold was determined by the closing date. Over time, housing prices are expected to increase, and therefore the year of sale was included in this analysis. The years range from 1996 to 1999. The 'year sold' variable controls for the effect of inflation on housing price. Although it is a short period, it was included as a variable to properly assess for the appreciation of housing prices. It is not a time-series analysis but rather it controls for the differences in housing prices during a four year period.

Location Variable

Neighborhood

The neighborhood is an important consideration for the prediction of housing prices because it refers to location and access to amenities. Access is believed to raise the price of housing; the closer the access to the Central Business District or employment centers, the higher the price. In addition, there are neighborhood amenities such as schools and churches that tend to raise prices while other uses, usually industrial or heavy commercial uses, tend to lower prices. The *Missoula County Association of Realtors*

created neighborhood codes that divided the Missoula urban growth area into neighborhoods, of which thirteen neighborhoods are used in this research.

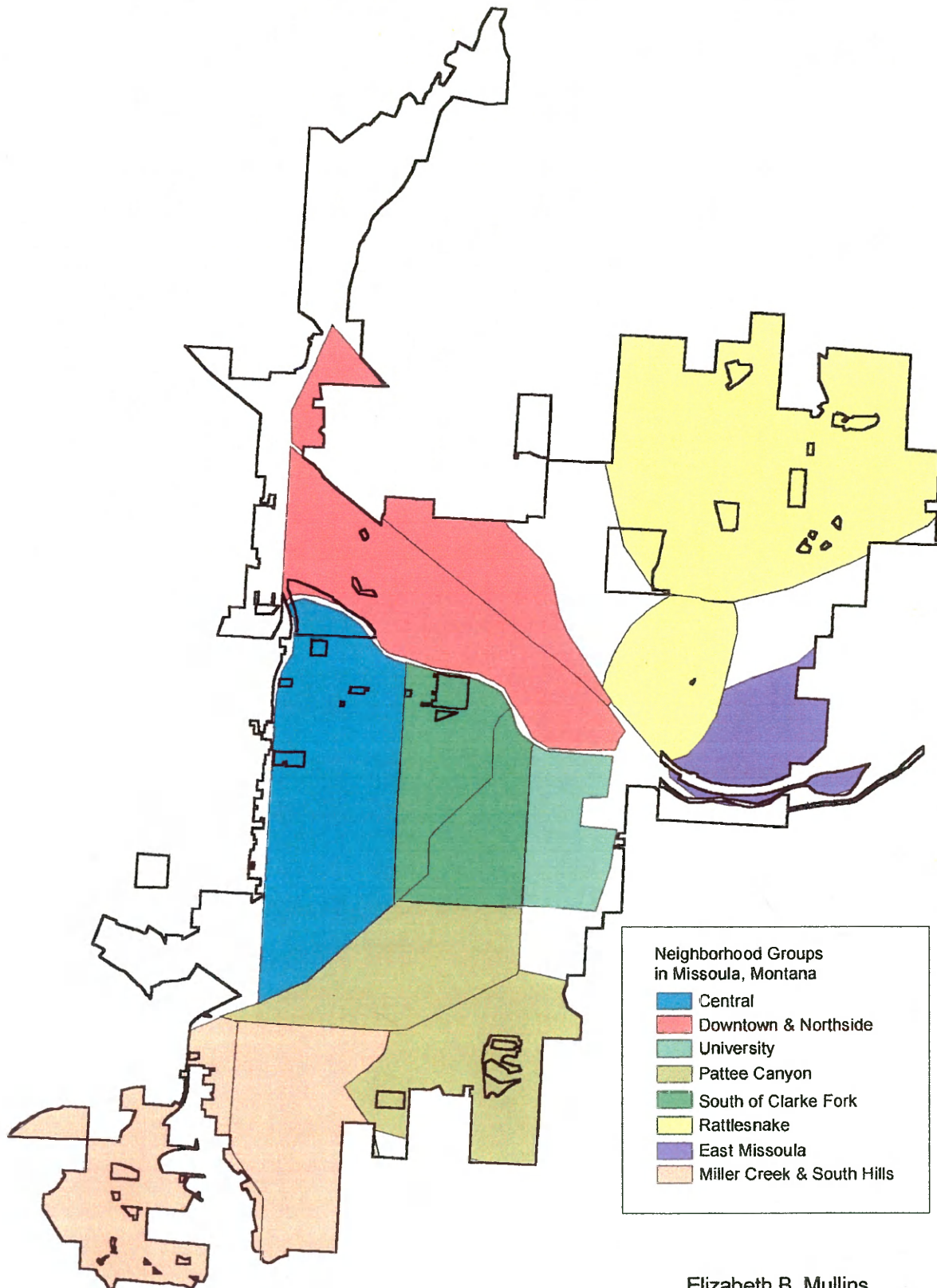
In this study, similar and adjacent neighborhoods have been grouped for a total of nine groups, eight of which are used, within Missoula City. Neighborhood group 50AD of Target Range was excluded from the map and from regression analysis because the addresses of all housing units within this area were missing. The following table 3.2 displays the neighborhoods groups that accompany the housing units database. They are also shown in map 3.4.

The neighborhood category is a nominal variable. Dummy variables were constructed for this analysis to capture the importance of neighborhood characteristics such as location and accessibility on housing prices. The reference neighborhood used is 20A, the area adjacent to the University of Montana. Homes in neighborhood 20A have the highest mean housing price. Other neighborhoods are expected to have negative coefficients because they are compared to the most expensive neighborhood. Therefore, housing prices are expected to be lower in other neighborhoods.

Table 3.2 Neighborhood Groups

Area		
ID	Name	Neighborhood Description
10A	Central	South of Clark Fork, North of Brooks, East of Reserve.
10B/ 10C	Downtown & Northside	South of Railroad tracks, North of Clark Fork River, East of Reserve/South of I-90, North of Railroad tracks, East of Reserve, West of Madison.
20A	University	South of Clark Fork River, North of South Ave, East of Higgins.
20B/ 20C	Pattee Canyon	South of South Ave, North of SW Higgins and 39 th , East of Brooks, West of Higgins/ South of SW Higgins, East of Hillview, All of Pattee Canyon.
20D/ 20E	South of Clark Fork	South of Clark Fork River, North Of South Ave, East of Stephens and Orange, West of Higgins/ South of Clarke Fork River, North of South Ave, East of Russell, West of Stephens and Orange.
30A/ 30B	Lower & Upper Rattlesnake	Lower Rattlesnake North of I-90 to Lolo St./ Upper Rattlesnake North of Lolo St.
30C	East Missoula	East Missoula, Cobblestone, Ben Hughes Addition.
40A/ 40B	Miller Creek & South Hills	South of 39 th , South Hills to Gharrett/ West of Gharret East of Bitterroot, Includes Lower Miller Creek, Linda Vista, Ravenwood, Lorraine.

Map 3.4: Neighborhood Groups



Neighborhood Groups
in Missoula, Montana

- Central
- Downtown & Northside
- University
- Pattee Canyon
- South of Clarke Fork
- Rattlesnake
- East Missoula
- Miller Creek & South Hills

Based on Missoula County Association
of Realtors Neighborhood ID Map

Elizabeth B. Mullins
Department of Geography
The University of Montana

Summary and Outlook

In summary, there were two databases obtained for this study, that of housing price and that of zoning information. The housing unit database were linked with its zoning density by using GIS applications. The dependent variable, housing price, can be predicted by the independent variable, zoning density. Several housing characteristics are included in the analysis as well in order to control for the physical, time-period, and location characteristics of the housing units.

In Chapter 4, the findings of analysis are discussed. The first section deals with the relationship between minimum lot size and actual lot size. The correlation coefficient between actual lot size and minimum lot size will establish the strength of the relationship between maximum density regulations and actual density. In the second section, bi-variate relationships between the dependent variable, housing price, and each independent variable is examined using descriptive statistics such as the mean, range, (minimum and maximum) and standard deviation. The last section consists of a series of regression models. The principle hypothesis tested here states that zoning density has an effect on housing price. There are two simple regression models for each land-use variable, zoning density and actual lot size, and a multiple regression model using both land-use variables as predictors of housing price. Finally, a multiple regression model takes into account the land-use variables along with the control variables of the physical, time-period, and location characteristics. This more inclusive model is the preferred model for capturing the effects of zoning density and actual lot size on housing price.

CHAPTER IV

FINDINGS OF ANALYSIS

This empirical study tests for the effect of zoning density on housing price. In order to properly test for the effect of zoning density on housing price, one needs to also consider how the actual lot size and other variables affect housing price. The methodology used is the hedonic price equation, a regression analysis that measures the impact of each independent variable on housing price (Stull 1975, 551; Maser 1977, 114). Additional housing characteristics featuring physical, time-period, and location variables are therefore included in the housing price equation. This will assess if the zoning density and actual lot size act as predictors of housing price while taking the entire 'housing bundle' into consideration. It is expected that housing prices in high-density zones, with smaller minimum lot sizes and more housing units per acre will cost less than comparable homes in lower-density zones, with larger minimum lot sizes and fewer housing units per acre.

This research will also address the question of whether the actual lot size is in correspondence with its zoning type's minimum lot size. Actual lot size may not be representative of the minimum lot size and the allowable zoned maximum density. If actual lot size and minimum lot size differ, the actual lot size must be included as an independent variable in the regression equation which tests for the effects of zoning density on housing price.

The first section will assess this relationship between the actual lot size and the zoning type's minimum lot size by determining the correlation coefficient. More in depth, actual lot sizes will be examined for each density zone. Actual lot sizes for each density zone are compared to the range of minimum lot sizes for each density zone. The second section shows the descriptive statistics of housing price. It analyzes the bi-variate relationships between the dependent variable, housing price, and the various independent variables. The third section outlines the regression analyses consisting of simple and multiple regression models for a total of four regression equations. The regression results are presented. The chapter concludes with a discussion of findings, in particular whether higher density zoning results in lower housing price.

Correlation Coefficient

The relationship between the actual lot sizes and the minimum sizes is important when attempting to determine the effects of zoning density on housing price. The influence of the zoning type's minimum lot sizes on the actual lot sizes must be established. Each actual lot size has a minimum lot size parameter set by its zoning type. The property may be developed at a much larger size than its minimum lot size. Although the zoning type regulates and controls the minimum lot size and therefore housing units per acre, it does not necessarily determine the actual lot size and observed residential density. Therefore, there are two measurements for the density.

If the actual lot size were developed at the minimum lot size permitted by its zoning type, the actual lot size and minimum lot size would be highly correlated. For instance, if it were a perfect relationship, then the correlation coefficient would be a positive one. The correlation coefficient between actual lot size and minimum lot size is

.419. It is significant at the .01 level but the strength of the relationship is moderately low.

The weak correlation suggests that both zoning density and actual lot size should be treated as separate, independent density variables in the models. There may be two different effects of lot size on housing prices; one being the actual lot size effect, and the other being the minimum lot size permitted by the zoning density effect. High significance levels for either variable, that of actual lot size or of zoning density, would support the hypothesis that increased density lowers housing price.

Actual Lot Sizes and Zoning Density

The actual lot sizes in each density zone are important because lots may not be representative of the minimum lot sizes. The intent here is to compare the range of actual lot sizes to the minimum lot sizes in each density zone. This provides for further explanation of the low correlation coefficient. Table 4.1 displays the mean, minimum, maximum actual lot sizes for all the housing units by density zone.

Table 4.1 Actual Lot Sizes by Zoning Density

Housing Units Actual Lot Sizes	Mean (sq.ft.)	Minimum (sq.ft)	Maximum (sq.ft)	Minimum lot sizes (sq.ft)	N
Zoning Densities	10,813	0	159,804	3,500 to 40,000	2017
Missing					71
High-Density	6,970	0	20,800	3,500 & 3,600	282
Medium-Density	9,108	0	63,500	5,400	954
Low-Density	11,878	0	159,804	8,000 & 10,000	585
Very Low-Density	20,081	2036	86,902	20,000 & 40,000	196
Missing					71

For all housing units, the actual lot sizes range from zero square feet to 159,804 square feet. The zero square footage represents condominiums without lots. The mean

lot size of a housing unit in Missoula, Montana is 10,813 square feet. The zoning type's minimum lot sizes range from 3,500 square feet to 40,000 square feet.

The actual lot sizes for high-density zones range from zero to 20,800 square feet. The mean is 6,970 square feet. The minimum lot sizes in the high-density zoning types are 3,500 square feet and 3,600 square feet. There is a substantial difference between the mean actual lot size and the minimum lot sizes. The actual lots are not developed at the allowable potential density. Instead, they are developed at lot sizes above their minimum lot sizes, especially obvious among the high-density and medium-density zones.

The actual lot sizes found in medium-density zones have a minimum of zero square feet and a maximum of 63,500 square feet. The mean is 9,108 square feet. The zoning types in the medium-density category have a minimum lot size of 5,400 square feet. The mean actual lot size is roughly twice as large as the minimum lot size in both high-density and medium-density zones.

The actual lot sizes in low-density zones have a minimum of zero square feet and a maximum of 159,804 square feet. The mean is 11,878 square feet. The minimum lot sizes are 8,000 square feet and 10,000 square feet. The mean actual lot size is larger than both minimum lot sizes, but the difference is relatively small.

In the very low-density, the minimum actual lot size is 2,036 square feet and the maximum actual lot size is 86,902 square feet. There are two minimum lot sizes set for very low-density zoning. They are 20,000 square feet and 40,000 square feet. The mean actual lot size in very low-density zoning districts is 20,081 square feet. The mean actual lot size of 20,081 is slightly above the minimum lot size of 20,000 square feet and a great amount below the minimum lot size of 40,000 square feet. This suggests that actual lot

sizes are similar to the minimum lot sizes. Actual lot sizes are representative of the maximum density permitted, because it is low-density development.

Low-density zoning seems the most representative of the minimum lot sizes as actual lot size is relatively close to its minimum lot size, whereas the medium-density and high-density are less representative of the zoning densities. As zoning density increases, the actual lot sizes becomes progressively less representative of the minimum lot size. Properties in the high and medium density zones are developed at approximately one half of their potential density. This explains the weak correlation discussed earlier.

Overall, differences in the mean actual lot sizes exist accordingly to zoning density: actual lot sizes are, on average, smaller in high-density zones than in lower density zones.

Descriptive Statistics

Descriptive statistics show the bi-variate relationships between the dependent variable, housing price, and each independent variable. Displayed are the mean, minimum, maximum, standard deviation, and N, the number of observations. The bi-variate analysis illustrates the relationship of a particular independent variable and housing price, but without taking into account the effects of other variables. This is different from the multi-variate approach underlying the regression analysis discussed in the *Regression Analyses* section.

Housing Price and Zoning Density

Housing prices are presented by their various zoning densities. Table 4.2 presents the price ranges for all housing units, the very low-density units, low-density units, medium-density units, and high-density units. Shown are the mean housing prices, which

are a measurement of the central tendency. Table 4.2 also displays the following measures of variability of housing price: minimum and maximum housing price, and standard deviation. The number of observations and the number of missing data are included as well.

Table 4.2 Housing Prices by Zoning Density

Density Zones	Mean	Minimum	Maximum	Std. Deviation	N
Zoning Densities	\$125,517	\$11,882	\$450,000	\$45,883	2023
Missing					65
High-Density	\$93,287	\$37,000	\$199,000	\$21,205	287
Medium-Density	\$119,780	\$39,000	\$414,000	\$38,432	960
Low-Density	\$131,226	\$11,882	\$358,000	\$45,407	583
Very Low-Density	\$175,571	\$93,000	\$450,000	\$50,810	193
Missing					65

The mean housing price for all residentially zoned housing units sold between 1996 and 1999 in Missoula, Montana is \$125,517. The mean housing price in high-density zones is \$93,287. In medium-density zones, the mean housing price is \$119,780 while in low-density zones it is \$131,226. The mean housing price in very low-density zones is \$175,571. This provides support for the hypothesis that as the zoning density increases, the mean housing price decreases. The differences in the range of housing prices by density zones are apparent. For instance, high-density prices range from \$37,000 to \$199,000, while the very low-density prices range from \$93,000 to \$450,000. The standard deviation is the highest for the very low-density category, meaning that the very low-density category has the most diverse housing prices. The least diverse housing prices are found within high-density zones as shown by the lowest standard deviation.

Housing Prices and Physical, Time-Period & Location Characteristics

A series of tables for the dependent variable, housing price, and the independent variables of physical, time-period, and location characteristics are shown below. They express how prices vary with different characteristics.

Housing Price and Physical Characteristics

Among the most important determinants of housing price are the physical attributes, which represent the quality of the home. Table 4.3 displays the housing price for different physical housing characteristics. The physical attributes are number of bedrooms, number of bathrooms, presence of a basement, and the presence and size of a garage (single, double or triple garage). The mean, minimum, maximum, standard deviation of the housing price, and N are shown for each category of the physical variables.

As the number of bedrooms increases, the mean housing price increases. Additionally, bathrooms greatly add to housing price. Homes with basements have a higher mean housing price than homes without a basement. Housing units without a garage command on average a lower housing price than houses with a garage. The mean housing prices increases with the size of the garage. This means for all physical attributes considered here, housing prices change as expected.

Table 4.3 Housing Prices by Bedrooms, Bathrooms, Basement, and Garage

Housing Prices by Physical Characteristics	Mean	Minimum	Maximum	Std. Deviation	N
<i># Of Bedrooms</i>					
None	\$58,500	\$37,000	\$80,000	\$30,406	2
One	\$86,224	\$45,000	\$158,230	\$22,796	92
Two	\$102,431	\$39,000	\$300,000	\$26,581	705
Three	\$130,146	\$11,882	\$301,000	\$35,730	879
Four	\$158,730	\$76,600	\$450,000	\$54,344	283
Five	\$194,492	\$104,000	\$414,000	\$56,387	74
Six or More	\$213,858	\$119,500	\$450,000	\$95,083	13
Missing					40
<i># Of Bathrooms</i>					
One	\$95,019	\$37,000	\$222,000	\$22,315	739
One and a half	\$109,568	\$69,920	\$145,500	\$22,251	15
Two	\$131,199	\$11,882	\$450,000	\$35,679	967
Two and a half	\$162,870	\$97,000	\$296,916	\$50,568	13
Three	\$172,975	\$85,275	\$365,000	\$48,405	294
Three or more	\$269,804	\$104,000	\$450,000	\$87,209	18
Missing					42
<i>Basement</i>					
No	\$96,424	\$11,882	\$296,916	\$31,315	324
Yes	\$130,814	\$37,000	\$450,000	\$45,698	1717
Missing					47
<i>Garage</i>					
None	\$93,309	\$39,000	\$379,000	\$37,235	288
Single	\$109,122	\$37,000	\$270,000	\$26,619	677
Double	\$138,067	\$11,882	\$414,000	\$39,596	966
More than three	\$194,295	\$60,000	\$450,000	\$75,978	115
Missing					42

The housing price differences between single-family homes and condominiums are important because they represent differences in housing density. Condominiums are a denser type of development than single family housing because condominiums do not include the lot costs. Condominiums as compared to single-family homes are important

factors of housing price because of the land costs. Table 4.4 displays the mean, minimum, maximum, and standard deviation in the housing prices between single-family housing and condominiums.

Table 4.4 Housing Prices by Condominiums and Single-Family Homes

Housing Prices	Mean	Minimum	Maximum	Std. Deviation	N
Single-Family Homes	\$127,686	\$11,882	\$450,000	\$45,728.20	1981
Condominiums	\$79,325	\$57,900	\$125,000	\$13,218.96	93
Missing					14

There are 1981 single-family units and 93 condominiums. The mean housing price for single-family homes is \$127,685 and the mean price for condominiums is \$79,324. Condominiums have lower prices than single-family homes. The single-family housing prices range from \$11,882 to \$450,000, whereas condominium prices range from \$57,900 to \$125,000. The standard deviation for single-family homes is \$45,728 and for condominiums, it is \$13,219. The single-family homes standard deviation is much larger than that of the condominiums. This implies that housing prices of condominiums are more tightly clustered around their mean housing price than housing prices of single-family homes.

The main floor characteristic is an important physical variable because it represents the size of the home. Table 4.5 shows the housing prices for each category of main floor square footage. The mean, minimum, maximum, and standard deviation, and N are displayed.

Table 4.5 Housing Prices by Main Floor Square Footage

Main Floor Sq.Ft.	Mean	Minimum	Maximum	Std. Deviation	N
Under 799'	\$81,475	\$37,000	\$168,000	\$20,625	124
800 to 999'	\$101,595	\$42,500	\$197,400	\$19,809	369
1000 TO 1249'	\$109,423	\$11,882	\$274,112	\$25,756	720
1250 to 1449'	\$132,509	\$71,000	\$365,000	\$31,246	363
1500 to 1749'	\$154,287	\$67,000	\$290,000	\$36,457	238
1750 to 1999'	\$176,330	\$78,000	\$305,000	\$46,573	109
2000 to 2499'	\$200,046	\$101,400	\$450,000	\$61,107	82
Over 2500'	\$199,156	\$46,000	\$450,000	\$90,569	65
Missing					18

As the main floor square footage increases, the mean housing price increases.

The exception is housing with over 2500 square feet that has a lower mean housing price than housing in the 2000 to 2499 square feet category. This is probably due to the large difference in the price of housing with more than 2500 square feet housing prices, which range from a minimum housing price of \$46,000 to a maximum of \$450,000.

The housing price by approximate age is another physical determinant of housing quality. Table 4.6 shows the housing price mean, minimum and maximum range, standard deviation, and N for each approximate age category.

Table 4.6 Housing Prices by Approximate Age

Approximate Age	Mean	Minimum	Maximum	Std. Deviation	N
New, Never Occupied	\$149,779	\$11,882	\$335,000	\$49,453	211
Less than 5 Years	\$163,699	\$69,920	\$365,000	\$54,800	143
6 to 10 Years	\$141,186	\$88,200	\$310,000	\$46,143	59
11 to 20 Years	\$116,808	\$55,000	\$450,000	\$49,672	266
21 to 35 Years	\$123,021	\$39,000	\$314,000	\$32,565	455
36 to 50 Years	\$109,373	\$46,500	\$315,000	\$27,755	432
51 Years or Older	\$116,256	\$37,000	\$414,000	\$47,566	323
Missing					199

For the housing price by age, the relationship is not as obvious as the previously discussed housing characteristics. The most expensive housing price mean is the category of less than 5 years, followed by the new, never occupied housing, the 6 to 10 year category, and the 21 to 35 year category. After that is the 11 to 20 year category and the 51 years or older category. Lastly, the least expensive housing price mean was found in the 36 to 50 year category. The relationship between approximate age and housing price is somewhat ambiguous and not entirely linear, but it can be concluded that older housing, as expected, is generally less expensive than newer housing.

Housing Price and Time-Period

The year sold is the attribute examined and labeled as the time-period variable. Table 4.7 shows the housing prices by year of sale. Shown again are the mean, minimum and maximum, standard deviation, and N size for each year of sale.

Table 4.7 Housing Prices by Year of Sale

Year of Sale	Mean	Minimum	Maximum	Std. Deviation	N
1996	\$123,556	\$42,500	\$136,000	\$43,257	476
1997	\$124,940	\$39,000	\$312,000	\$46,265	483
1998	\$124,095	\$50,000	\$379,000	\$46,071	548
1999	\$129,046	\$11,882	\$450,000	\$47,494	565
Missing					16

The mean housing price gradually increases by year of sale. The standard deviations are relatively large due to the large range of values in minimum and maximum housing prices for each year of sale. Overall, results support the notion that housing prices increase over time.

Housing Price and Location

Housing prices are expected to vary by neighborhood characteristics and accessibility in the location variable that will capture their effects on housing price.

Table 4.8 expresses the differences in housing prices by location. The mean, minimum, maximum, standard deviation, and N for each housing price by neighborhood groups are displayed.

Table 4.8 Housing Prices by Neighborhood Groups

Neighborhood Groups	Name	Mean	Minimum	Maximum	Std. Deviation	N
10A	Central	\$94,859	\$11,882	\$180,000	\$19,710	339
10B, 10C	Downtown & Northside	\$85,958	\$45,000	\$199,000	\$20,459	144
20A	University	\$149,031	\$68,900	\$414,000	\$52,478	218
20B, 20C	Pattee Canyon	\$141,179	\$75,000	\$358,000	\$47,819	310
20D, 20E	South of Clark Fork	\$110,735	\$60,500	\$289,000	\$28,282	192
30A, 30B	Rattlesnake	\$144,429	\$42,500	\$450,000	\$54,750	191
30C	East Missoula	\$118,050	\$89,100	\$255,000	\$33,634	40
40A, 40B	Miller Creek & South Hills	\$133,872	\$46,000	\$365,000	\$42,879	632
Missing						8

The highest mean housing price of \$149,031 is found in Location 20A - the University District. The next highest mean housing price mean is \$144,429 in 30A, 30B - Lower and Upper Rattlesnake, and the mean housing price is \$141,179 in the neighborhood group 20B, 20C - Pattee Canyon area. Location 40A, 40B - Miller Creek & South Hills has a mean housing price of \$133,872, followed by \$118,050 in 30C - East Missoula, and \$110,735 in 20D, 20E - South of Clark Fork. The mean housing price in 10A - Central area is \$94,859, and the lowest mean housing price is \$85,958 in 10B, 10C - Downtown & the Northside neighborhoods.

This bi-variate approach analyses the differences in housing price by the various independent variables. In the next section, *Regression Analyses*, a multi-variate approach, is used. The regression analysis can take into account multiple variables in a single model.

Regression Analyses

Regression analysis is used to estimate the relationship between the independent variables and the dependent variable. This section presents the four regression models used to test for the effects of the land-use environment variables, namely zoning density and actual lot size, and the housing control variables of physical, time-period and location characteristics on housing price. The first two models are simple regression equations and the last two models are multiple regression equations. Simple regression is when the problem involves a single dependent and a single independent variable. Multiple regression analysis is used when the equation involves a single dependent variable and two or more independent variables as predictors. The first model tests the effects of zoning density on housing price. The second model tests the effects of actual lot size on housing price. These simple models provide the general understanding of the individual relationships between the single dependent variable, housing price, and the single independent variable, either zoning density or actual lot size. The third model is a multiple regression that takes into consideration both the effects of zoning density and actual lot size on housing price, before controlling for the additional housing characteristics. Finally, the multiple regression model regresses housing price against zoning density, and actual lot size while controlling for housing characteristics that are known to influence housing price. Of the models tested, this is the most inclusive.

Therefore, it is referred to as the 'complete model'. The regression models equations are shown in the following section.

Regression Equations

- 1) Housing Price = f (land-use variable: zoning density)
- 2) Housing Price = f (land-use variable: actual lot size)
- 3) Housing Price = f (land-use variables: zoning density, actual lot size)
- 4) Housing Price = f (land-use variables: zoning density, actual lot size, plus control variables: physical, time-period, and location)

The zoning density is ranked from the smallest minimum lot sizes to the largest minimum lot sizes. They are divided into four categories: high-density, medium-density, low-density, and very low-density. The actual lot size variable is measured by square footage. The zoning density and actual lot size are the land-use variables. The control variables are the housing characteristics, and they include three types: physical, time-period, and location characteristics. Physical characteristics include number of bedrooms, number of bathrooms, presence of basement, presence and size of garage, condominium, main floor square footage, and approximate age. The time-period variable is the year of sale. The location characteristic is represented by the neighborhood group.

Regression Models

The regression results are shown in Tables 4.9 and 4.10. Each model displays the constant, B-coefficient, and the significance level for each variable. The R-square is shown as well as a measurement of each model's fit. A brief explanation of each value found in the regression tables is necessary.

The constant is where the regression line intercepts the y-axis. This can be interpreted as the value the dependent variable will be, when all independent variables are zero. The significance is defined as the percent that the relationship is due to chance. If the variable is statistically significant, the relationship probably did not occur by chance. At the .05 level, there is a 5% probability that the relationship is due to chance. It is concluded that the relationship exists and the null hypothesis is not accepted. In contrast, if the null hypothesis is accepted, there is no causal effect of the independent variable on the dependent variable. The alpha levels are the values used to accept the findings. This research tests at the significance levels of .001, .01, and .05. If the independent variable is significant at these levels, the variable is considered as a predictor of the dependent variable. If, for a certain independent variable, the observed significance level is higher than the alpha level, the null hypothesis is not rejected, and the variable is considered to not have a significant effect on the dependent variable. The B-coefficient indicates how much of an increase in the value of the dependent variable will accompany an increase of one unit in the independent variable when the values of the other independent variables do not change. If the coefficient is positive, the predicted value of the dependent variable increases when the value of the independent variable increases by one unit of measurement. A negative coefficient means that the predicted value of the dependent variable decreases when the value of the independent variable increases (Norusis 1998, 463). The R-square expresses how well the model fits. The R-Square is the correlation coefficient of the dependent and independent variables squared. It shows the proportion of the variability in the dependent variable explained from the independent variable(s), often expressed as a percentage. For example, the value of 1.0 is 100 percent. This

would mean that the dependent variable is perfectly explained by the independent variable(s).

Model 1 and Model 2 are simple regression models. They show the effects of zoning density on housing price and the effects of actual lot size on housing price. Model 3 is a multiple regression model with the two independent variables, those of the land-use environment. It shows the effects of both zoning density and actual lot size on housing price. Table 4.9 displays Models 1 through 3. (The complete multiple regression model takes into account several other housing attributes as predictors of housing price. Results of this model are shown in Table 4.10.)

Table 4.9 The Effects of Zoning Density and Actual Lot Size on Housing Price

	Model 1 Zoning Density	Model 2 Actual Lot Size	Model 3 Zoning Density and Actual Lot Size
Constant	175,571	101,120.3	142,697
Actual Lot Size	-	2.263 ***	1.639 ***
High-Density (1)	-82,285 ***	-	-61,131 ***
Medium-Density (1)	-55,791 ***	-	-37,663 ***
Low-Density (1)	-44,344 ***	-	-30,988 ***
R-Square	.204	.186	.281

***=Significant at .001 level, **=Significant at .01 level, *=Significant at .05 level.

Dependent Variable: Housing Price.

Dummy-Coded Variable: 1) Based on reference to very low-density zoning.

Model 1 exhibits the effects of zoning density, and therefore the minimum lot size restrictions on housing price. The intent here is to test for only the effects of the various zoning density on housing price. Zoning density is an ordinal variable, not a continuous

variable. For use in linear regression, it needs to be 'dummy coded'. The reference density for the dummy coding is the very low-density zone. This is the most expensive zone, with the highest mean housing price of \$175,571 as shown previously in Table 4.2. The sign of each zoning density coefficient is expected to possess a negative value, indicating a decrease in housing price when a density zone is compared to the very low-density zone with the highest housing prices. Low-density, medium-density, and high-density should progressively, in this order, reach larger negative coefficients when compared to very low-density housing prices.

The results in Model 1 provide evidence of this. The coefficients for each zoning density are negative and statistically significant at the .001 level. The largest negative coefficient is reached in high-density zoning. The B-coefficient suggests that housing prices in this zone are \$82,284 lower than housing prices in the very low-density zone. For medium-density zoning, the housing prices are \$55,791 less than in the very low-density zones. In the low-density zones, the housing prices are shown to be \$44,344 lower when compared to the very low-density zones. The R-square value is .204. Therefore, approximately 20 percent of the variability in housing price can be explained by differences in the zoning density, without considering any additional variables. An increase in zoning density is associated with a decrease in housing price when it is tested as the only predictor of housing price. High-density zoning is associated with significantly lower housing prices.

Model 2 tests for the effects of the actual lot size on housing price at the .001 level. The actual lot size by itself is a significant predictor of housing price. Housing

price increases by \$2.26 with each additional square foot. The actual lot size accounts for .186 or approximately 19 percent of the variation in housing price.

Model 3 contains both zoning density and actual lot size as predictors of housing price. Each independent variable is significant at the .001 level. Housing prices still decrease substantially in high-density zones and decrease less in low-density zones. The high-density coefficient is \$-61,131, the medium-density coefficient is \$-37,663, and the low-density coefficient is \$-30,988. The actual lot size coefficient is \$1.64, down from \$2.26 in Model 2. In the combined Model 3, the coefficients have decreased when compared to the individual relationships in Model 1 and Model 2 because when the variables are combined, they measure a similar phenomenon. Together, zoning density and actual lot size explain approximately 28 percent of the variation in housing price.

In summary, zoning explains 20 percent of housing price variation in Model 1 while actual lot size explains 19 percent of housing price variability in Model 2. In Model 3, zoning density and actual lot size together explain approximately 28 percent of the variation in housing price. This suggests that zoning density and actual lot size exert similar, but separate effects on housing price. The zoning density and actual lot size are statistically significant at the .001 level in the three models. Therefore, they act as predictors of housing price.

Model 4 contains the physical, time-period, and the location characteristics in addition to the land-use environment variables of zoning density and actual lot size. This complete model takes into consideration the most important variables that are expected to influence housing price. It tests for the significance of zoning density and actual lot size on housing price after controlling for variables that are among the important predictors of

housing price. The control variables may alter the results found in Model 1 through 3.

The previous three models were biased because they excluded important determinants of housing price. In the complete model, this bias is eliminated. Results are shown in Table 4.10.

Model 4 explains approximately 73 percent of the variability in housing price. This is a very well fitting model. The zoning density and actual lot size have remained significant when other considerations of housing price are added to build a more complete model. Each dummy variable for zoning density and actual lot size has remained statistically significant at the .001 level. The high density zones reach a negative \$-13,520, medium-density zones lower by \$-12,652, and low-density zones decrease by \$-9,054. Housing price increases by \$0.6 per additional square foot in actual lot size. Zoning density has negative effects on housing price, because they are compared to the very low-density housing price and typically the most expensive housing. Actual lot size has a positive effect on housing price. Each additional square foot in the lot size increases the housing price.

The interpretation of this equation is that some of the control variables have a positive effect on housing price, meaning that housing prices increase, while other variables have a negative effect on housing price and decrease. The number of bedrooms, number of bathrooms, presence of a basement, and presence and size of a garage all have positive effects on housing price. The condominium housing type has a negative effect on housing price. This means that condominiums are lower priced than other single-family homes. Main floor square footage has a negative effect on housing

Table 4.10 The Effects of Zoning Density, Actual Lot Size, and Control Variables on Housing Price

Model 4	Complete Model	Coefficient	Sig.
Constant		-682,983	
Land-Use Characteristics			
<i>Zoning Density (1)</i>	High-Density	-13,520	***
	Medium-Density	-12,652	***
	Low-Density	-9,054	***
<i>Actual Lot Size</i>	Actual Lot Size	.6	***
Physical Characteristics			
	Structural		
	Bedrooms	7,530	***
	Bathrooms	11,941	***
	Basement	12,042	***
	Garage	5,892	***
	Condominium (2)	-7,848	**
Physical Characteristics			
	<u>Main Floor Square Footage (3)</u>		
	Under 799	-74,470	***
	800-999	-67,957	***
	1000-1249	-66,815	***
	1250-1499	-63,084	***
	1500-1749	-51,752	***
	1750-1999	-40,500	***
	2000-2499	-23,230	***
Physical Characteristics			
	<u>Approximate Age (4)</u>		
	Less than 5 years	-1,547	.567
	6 to 10 years	-15,599	***
	11 to 20 years	-20,951	***
	21 to 35 years	-24,323	***
	36 to 50 years	-22,436	***
	51 years +	-18,028	***
Time-Period Variable			
	Year Sold	423	.386
Location Characteristics			
	<u>Neighborhood (5)</u>		
	10A – Central	-37,586	***
	10B, 10C - Downtown & Northside	-18,796	***
	20B, 20C - Pattee Canyon	-21,300	***
	20D, 20E - South of Clark Fork	-23,809	***
	30A, 30B - Lower & Upper Rattlesnake	-16,955	***
	30C - East Missoula	-33,319	***
	40A, 40B - Miller Creek & South Hills	-37,948	***
R-Square		.727	
N-Size		1835	

***=Significant at .001 level, **=Significant at .01 level, *=Significant at .05 level.

Dependent Variable: Housing Price.

Dummy-Coded Variables:

1) Based on comparison to the very low-density.

2) Based on comparison of condominiums (1) to single-family homes (0)

3) Based on comparison to main floor square footage of over 2500'.

4) Based on comparison to new, never occupied homes.

5) Based on comparison to 20A, University Area.

price because it has been compared to the largest main floor square footage and probably the most expensive housing. Age also has negative effects on housing price because they are compared in the direction of older homes having lower housing prices. The time-period has a positive effect, yet it is insignificant. The locations have negative effects because they are compared to the most expensive neighborhood, the University area.

The physical housing characteristics of number of bedrooms, number of bathrooms, presence of a basement, and presence and size of a garage are all statistically significant predictors of housing price at the .001 level. Of these particular physical variables, the largest positive coefficient is associated with the presence of a basement, which raises the housing price by \$12,042. Next, there is the number of bathrooms. The implicit price differential for one bathroom is \$11,941. This is not surprising because the number of bathrooms is often considered one of the most important physical qualities of the home. This is also true for the number of bedrooms. An additional bedroom increases the housing price by \$7,530. The presence and size (single, double or triple) of a garage increases the housing price by \$5,892.

The condominium dummy variable is significant at the .01 probability level. The condominium coefficient is \$-7,848 indicating that condominiums are lower priced than single-family homes. The condominium type is a predictor of housing price, maintained on the foundation that it is a denser housing development and does not have land costs.

The main floor square footage has a statistically significant impact on housing price. The main floor square footage, coded as dummy variables, is referenced to the largest square footage of over 2500 feet. This is most likely the most expensive housing.

Each main square footage category below 2500 square feet is expected to have a negative coefficient, indicating that housing prices are lower if the main floor square footage is smaller. The smallest main floor square footage category of less than 799 square feet has the largest negative coefficient of \$-74,470, showing the largest difference when compared to the largest main floor square footage. The 800 to 999 square footage coefficients is \$-67,957 while the 1000 to 1249 square footage has a coefficient of \$-66,815. Housing with 1250 to 1499 square footage is also roughly \$60,000 cheaper than housing with more than 2500 square feet as shown by the coefficient of \$-63,084. The 1500 to 1749 square footage coefficient is \$-51,752, and the 1750 to 1999 square footage coefficient is \$-40,500. The B-coefficient that decreases the least amount when compared to the largest main floor square footage of over 2500 square feet is \$-23,230, found in the preceding category of 2000 to 2499 main floor square footage. As expected, housing price decreases the least for homes with larger main floor square footage and decreases the most for homes with the smaller main floor square footage, when compared to homes with 2500 square feet or more.

The age of the home is also found to be a significant determinant of housing price. The approximate ages of the home is also represented by dummy coded variables that are compared to the newest, never sold homes. It is hypothesized that the newest homes are more expensive than older homes because of the increased maintenance and lower quality. Generally, it is expected that as housing ages, the housing price will decrease shown by higher negative B-coefficients. The coefficients partly confirm this. The coefficient for houses less than 5 years old is negative \$-1,547. This suggests that relatively new, pre-owned houses are cheaper than new, never occupied houses.

However, the difference is insignificant. For all other age categories, the coefficients are significant at the .001 level with the expected negative signs. For the 6 to 10 year category, the housing price decreases by \$-15,599, and in the 11 to 20 year category, it lowers by \$-20,951. The 21 to 35 year-category decreases by \$-24,323 and the 36 to 50 year category is \$-22,436 less than the newest, never sold homes. This provides evidence that older homes have lower housing prices and newer homes are generally more expensive. However, in the oldest age group of 51 year and over category, the coefficient is only negative \$-18,028. This is not the highest housing price difference when compared to the newest housing. This relatively small difference may be attributed to other housing characteristics, such as location or physical characteristics. Older homes for instance, may be valued for their style.

The time-period variable is an insignificant predictor of housing price. It may not be significant because it is a short time-period. The years of sale were 1996 to 1999. It is not sufficiently long enough to assess the impact of appreciation and/or inflation on housing price.

Finally, the location variables are shown. They are dummy-coded using location 20A, the University area as the reference. It contains the highest housing price mean of \$149,031 in Missoula, Montana, as previously shown in Table 4.8. Thus, it is expected that when each neighborhood group is compared to the University District, housing prices will be lower and coefficients will be negative. Location 40A, 40B - Miller Creek and the South Hills has the highest negative B-coefficient of \$-37,948, making it the least expensive area when compared to the University area. This is followed by 10A-Central area where housing costs are \$-37,586 less than comparable housing in the University

area. Next is 30C - East Missoula, where housing prices decrease by \$-33,319, followed by 20D, 20E - South of Clark Fork with \$-23,809, and 20B, 20C - Pattee Canyon with \$-21,301. The 10B, 10C - Downtown and Northside area has a \$-18,796 coefficient value with \$-16,955, prices of homes in 30A, 30B - Rattlesnake decrease the least when compared to the University neighborhood.

There are discrepancies between Table 4.8, the bi-variate analysis, when compared to the multi-variate analysis in Table 4.10, especially evident among the results for 10B, 10C - Downtown and Northside and 40A, 40B - Miller Creek and South Hills. For example, in the bi-variate analysis, the mean housing price for the 10B, 10C - Downtown and Northside is \$85,958. This is the lowest mean housing price among the neighborhood groups. Yet, in the multi-variate analysis, the coefficient decreases by \$-18,796, and the 2nd lowest coefficient when compared to the most expensive neighborhood. In the 40A, 40B - Miller Creek and South Hills have the fourth highest mean housing price of \$133,872 in the bi-variate analysis. Yet, in the multi-variate analysis, this neighborhood group has the largest negative coefficient. The interpretation is that housing prices in this neighborhood are the lowest when compared to the most expensive neighborhood. The discrepancy between bi-variate and multi-variate results can be attributed to differences in housing characteristics between the neighborhoods. The Northside is an older neighborhood with smaller, more modest homes that are therefore lower priced. Miller Creek and South Hills, on the other hand, are comprised of newer and larger houses, which are typically higher priced as shown in Table 4.8. Results in Table 4.10 take differences of housing characteristics into account. They suggest that a house in the Northside and Downtown is higher priced than a comparable

home in Miller Creek and the South Hills. This can be explained by differences of accessibility. The Northside and Downtown properties have better access to downtown Missoula than Miller Creek and South Hills properties.

Does Higher Density Zoning Result in Lower Housing Prices?

There have been four regression models that have tested for the effects of zoning density and actual lot size on housing price. Model 1 took into account zoning density by high-density, medium-density and low-density. Model 2 looked at the actual lot size effects on housing price. Model 3 examined the effects of zoning density and actual lot size on housing price. Model 4 was the complete model that included zoning density, actual lot size, and the housing attributes of physical, time-period, and location characteristics. The models have analyzed to what extent high-density zoning results in lower housing prices as well as the significance of actual lot size square footage.

Zoning for high-density significantly lowers housing prices in each model. In summary, approximately 20 percent of the variability in housing price is explained by the zoning density in Model 1. Actual lot size explains approximately 19 percent of variation in housing price in Model 2. Together, zoning density and lot size explains approximately 28 percent variation in housing prices in Model 3. When the housing characteristics are included in the Model 4, it explains approximately 73 percent of housing price variability. This is a very well fitting model of housing price. Zoning density and actual lot size continue to be significant factors in explaining housing prices when housing characteristics are controlled for. Housing characteristics, such as number of bedrooms, number of bathrooms, presence of basement and presence and size of a garage, main floor square footage, and approximate age are important predictors of

housing price. Additionally, the location greatly affects housing price. The evidence found in the regression models supports the research hypothesis, which states; as zoning density increases, the housing price declines, or conversely, as zoning density decreases, the housing price rises.

CHAPTER V

SUMMARY & CONCLUSION

The research for this thesis sought to examine the effects of local land use zoning regulations on housing prices, using Missoula, Montana for the study. The study revealed some important findings about the impact of zoning density and actual lot size on housing price through GIS applications and quantitative analysis. High-density and smaller lot developments were expected to lower housing prices by decreasing land costs, while low-density and larger lot size developments were expected to raise housing prices. A series of regression analyses were performed to test for the effects of zoning density and actual lot size on housing price. In the regression procedure, several housing characteristics were also taken into account.

Results showed that, as predicted, zoning density and actual lot size as well as the physical and location attributes significantly influence housing price. This means zoning density and actual lot size act as predictors of housing price. More specifically, higher-density zoning and smaller lot size development exhibit lower housing prices.

The Effect of Zoning Density and Actual Lot Size on Housing Price

By testing the high-density, medium-density, and low-density effects on housing price by comparison to housing prices in the very low-density zones, this research found that the zoning densities were significant predictors of housing price. More importantly,

density zones were significantly cheaper than houses in the low-density zones, when the housing characteristics controlled for an analysis of comparable homes. In addition, medium-density zones had lower housing prices than low-density zones. The evidence supports the hypothesis that zoning for higher density and smaller minimum lot sizes results in lower housing prices, and zoning for lower density and larger minimum lot sizes results in higher housing prices.

The actual lot size was a significant predictor of housing price in the linear model and more importantly in the complete model. The actual lot size should be significant based on the hypothesis that states that zoning density affects housing price by the minimum lot size. Smaller lot size developments are therefore associated with lower land costs and lower housing prices. This is important because the zoning density regulates the minimum lot size, and therefore establishes the smallest parameter of the actual lot size.

The Extent of Zoning Minimum Lot Size on Actual Lot Size

This study also examined if the actual lot sizes were representative of their zoning type's minimum lot size by raising the following question: Is there a relationship between the housing unit's actual lot size and its zoning type's minimum lot size? It was found from the correlation coefficient that the relationship between all of the zoning type's minimum lot sizes and the actual lot sizes were significant, yet weak. Due to these findings, the zoning density and actual lot size were examined as two different, although related, effects on housing price. It became apparent that the zoning's minimum lot size does not necessarily dictate the actual lot size and density; but rather it regulates the

minimum lot size and the maximum density. Yet, it did remain that actual lot sizes were different based on their density zones.

The question that remains is, does the zoning's minimum lot size act as a significant predictor of actual lot size. The correlation attempted to answer this, yet the situation was found to be more complex. The actual lot size is not necessarily developed at its minimum lot size. Perhaps, the density standards should not only include a minimum lot size but also include a parameter for the maximum lot size development.

There are several reasons that could discourage actual lot size development at the minimum lot size. Developers often build for the upper-income households at the higher end of the housing market because it is the more profitable investment. Another explanation is that the homes were developed prior to the zoning ordinance and the regulations did not apply. They are referred to as 'grandfathered' homes and are exempt from the regulations because of their existence prior to the imposed zoning ordinance. Lot size development could be further analyzed by only researching newer developments that are subject to the zoning regulations.

The Extent of the Housing Attributes on Housing Price

The physical, time-period, and location housing characteristics were included in the complete multiple regression model. These predictors of housing price needed to be taken into account in order to properly assess the effects of zoning density and actual lot size on housing price. Results showed that physical characteristics were important determinants of housing price because they represent the quality and size of the home. The time-period variable was not significant in predicting housing price, possibly because it represented a relatively short period of four years. The location variable had a

significant effect on housing price. The neighborhood, by its distance to the Central Business District and its access to amenities, is an extremely important determinant of housing price.

Promoting Higher Density Developments

For local government and planners, understanding the influence of the zoning density on the housing supply in the urban housing market is essential so communities can better meet affordable housing needs. Now inferred that zoning density and actual lot size are significant predictors of housing price and that the actual lot size and minimum lot size have a weak relationship, it is crucial to provide solutions that will aid in increasing density and smaller lot sizes, more similar to the allowable minimum lot sizes. This may contribute to resolving the affordable housing crisis. Density, in particular high-density zoning, has been identified as a technique instrumental for lowering housing price and therefore improving housing affordability. This is especially important in communities where an urban growth boundary exists to discourage sprawl and the land supply is limited for development. Many affordable housing land-use techniques rely on density standards used by planners for the promotion of affordable housing. The actual lot sizes in medium-density and high-density zones are typically larger than corresponding minimum lot sizes, however, there are several planning techniques that encourage smaller lot size development in areas zoned or rezoned for high-density. The following is a discussion of several techniques used for high-density development enhancing the affordable housing supply.

The 'upzoning' technique is the selective rezoning of residential land to allow for greater density, pertaining to both multi-family and single-family housing. Another

technique of ‘small lots and small lot districts’, allows for the reduction of the minimum lot size for single-family detached/attached housing. ‘Infill’ is accomplished by denser development in vacant land that could be utilized because of its surrounding existing facilities. Infill can curb the effects of sprawl by building within the existing urban area. The use of an ‘accessory dwelling unit’ (ADU) provides additional dwelling units by the conversion of either a garage or of extra space on an owner-occupied lot. ‘Cluster housing’ is developed on smaller lots than allowed by the zoning ordinance, using the extra land for open space. It is a concept, similar to that of the ‘PUD’ technique, except that PUD’s allow for mixed uses, and clustering pertains to only residential uses. ‘Inclusionary zoning’ is a technique for which the developer plays an important role. This technique requires a certain portion or percentage of the new housing developments to be set-aside for affordable low to moderate income households. It can be either a mandatory process requiring developers to build a certain number of affordable units, or a voluntary process. Volunteer developers receive implementation of ‘density bonuses’, which allow developers to build at higher densities ‘in exchange for’ building affordable units. ‘Density bonuses’ offer incentives to developers to build at higher density than permitted by the zoning and subdivision regulations if a certain portion is affordable housing.

This thesis showed that planning could effectively influence housing price and therefore housing affordability through zoning. Homes on small lots are more affordable than homes on larger lots. Housing characteristics are also important determinants of housing price. Smaller homes are more affordable, yet most developers build larger homes for the high-income households at the higher end of the housing market. In order

to improve housing affordability, planners should promote techniques that would encourage developers to build affordable housing for the lower end of the housing market.

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APPENDIX



MISSOULA COUNTY BOARD OF REALTORS®
Multiple Listing Service

MLS # _____
(Computer will assign)

CLASS-RE

RESIDENTIAL DATA FORM
Improved Residential on Lot or Acreage

(2) TYPE (Circle one only): 1. Residential 2. Residential with Acreage
(3) AREA _____ (4) PRICE _____ (5) ADDRESS _____
Lock Box Authorization on File at Listing Office Yes ___ No ___ (6) CITY _____
Internet/RIM access No ___

Under the following MANDATORY categories, circle one number only:

(9) BEDROOMS: 0. None, 1. One, 2. Two, 3. Three, 4. Four, 5. Five, 6. Six or more
(10) FULL BATHS (INCL 3/4): 0. None, 1. One, 2. Two, 3. Three, 4. Four or more
(11) HALF BATHS: 0. None, 1. One, 2. Two, 3. Three, 4. Four or more
(12) BASEMENT: 1. Yes, 2. No
(13) GARAGES: 0. None, 1. Single Garage, 2. Double Garage, 3. Three or more
(14) APPROXIMATE AGE: 0. New, never occupied, 1. 1 day to 5 years, 2. 5 to 10 years, 3. 10 to 20 years, 4. 20 to 35 years, 5. 35 to 50 years, 6. 50 years or older
(15) LOT ACREAGE: 1. Lot, 2. .50 to .99 ac, 3. 1.0 to 2.99 ac, 4. 3.0 to 5.99 ac, 5. 6.0 to 9.99 ac, 6. 10 to 19.99 ac, 7. 20+ acres
(16) MAIN FLOOR SQUARE FOOTAGE (Multi-level includes main & upper): 0. Under 599', 1. 600 to 799', 2. 800 to 999', 3. 1000 to 1249', 4. 1250 to 1499', 5. 1500 to 1749', 6. 1750 to 1999', 7. 2000 to 2499', 8. 2500 to 2999', 9. Over 3000'
(17) FIREPLACE/WOODSTOVE: 1. Yes, 2. No

(22) LISTING AGENT _____
(23) S/O COMM: \$ amt or % to: Sub-agent _____ Buyers'-agent _____ Statutory Broker _____
(24) OWNER _____ PHONE _____
(25) OCCUPANT _____ PHONE _____ (26) LISTING DATE _____
(27) EXPIRATION DATE _____ (28) POSSESSION _____
(29) LEGAL _____
(31) SUID # _____ (32) TAXES: YEAR _____ AMT. \$ _____ SID INCL YES ___ NO ___
(33) SID(S): PERP. AMT. \$ _____ ANNUAL AMT. \$ _____ (34) EST. SID(S) TOTAL PAYOFF \$ _____
(35) CITY LIMITS: YES ___ NO ___ COUNTY NAME: _____ (36) ZONING _____
(37) SCHOOLS: ELEM. _____ MIDDLE _____ HIGH _____ (38) SITE SIZE _____
(39) SQ FOOTAGE/UPPER _____ MAIN _____ LOWER _____ LOWER FINISHED _____
(40) UTILITIES: HIGH \$ _____ LOW \$ _____ AVG. \$ _____ (41) FLOOD PLAIN: YES ___ NO ___ PARTIAL ___
CONFIRMED: YES ___ NO ___

(51) ASSUMABLE: YES ___ NO ___ (52) DUE ON SALE: YES ___ NO ___ (53) QUALIFY: YES ___ NO ___
(54) APPROX. CASH TO LOAN \$ _____ (55) PRESENT TOTAL PYMT. \$ _____
(56) P&I \$ _____ (57) T&I \$ _____
(58) ESCROW FEE: YES ___ NO ___ AMT. \$ _____
(59) LOAN BALANCE \$ _____ (60) INTEREST RATE _____ %
(61) LENDER _____
(62) AS OF DATE _____
(63) RESERVE: YES ___ NO ___ BALANCE \$ _____
(64) TYPE OF LOAN _____
(65) 2ND BALANCE \$ _____
(66) 2ND ASSUMABLE: YES ___ NO ___ RATE ___ %
(67) 2ND P&I \$ _____
(68) 2ND PAID TO: _____ FEE AMT. \$ _____
(69) 2ND BALLOON: YES ___ NO ___ DUE DATE _____

**CHAPTER 19.08
B RESIDENTIAL**

Sections:

19.08.010 Generally.	19.08.050 Side yard.
19.08.020 Height.	19.08.060 Lot area.
19.08.030 Front yard.	19.08.070 Permitted uses.
19.08.040 Rear yard.	19.08.080 Conditional uses.

19.08.010 Generally. The provisions of this chapter shall be applicable in the B (Residential) district.

19.08.020 Height. No building shall exceed forty-five (45) feet or three stories in height.

19.08.030 Front yard.

A. There shall be a front yard having a depth of not less than twenty (20) feet. However, where lots comprising forty (40) percent or more of the frontage developed with buildings between cross streets, having an average front yard with a variation in depth of not more than six (6) feet, no building hereafter erected or altered shall project beyond the average front yard line so established; provided, further, that this regulation shall not require a front yard of more than forty (40) feet in depth.

B. Where buildings front on a side street (or a street not parallel to an alley), the front yard shall have a depth of not less than ten (10) feet.

19.08.040 Rear yard. There shall be a rear yard having a depth of not less than twenty (20) feet where the rear lot line coincides with an alley line; otherwise the depth shall not be less than one-half of the height of the building. Where the lot is occupied by other than a residential building, the depth of the rear yard need not exceed six (6) feet.

19.08.050 Side yard.

A. There shall be a side yard on each side of the building, each yard having a width of not less than five (5) feet. The width, however, shall be not less than one-third of the height of the building. No building fronting the street parallel to an alley on a corner lot shall have a side yard on the street side less than ten (10) feet.

B. On corner lots, the side yard regulations shall be the same as for interior lots, except as noted above, but, in the case of reversed frontage, where the corner lot is developed so that the buildings face an intersecting street, there shall be a side yard on the street side of the corner lot of not less than the front yard required on the lots in the rear of such corner lot, and no accessory building on such corner lot shall project beyond the front yard line of the lots in the rear.

C. Where an accessory building, such as a garage, is attached to a building, it shall be not less than five (5) feet from the side line of the lot.

19.08.060 Lot area. Every residence, multiple dwelling or other building used, to be erected, structurally altered or maintained in a B residence district for one or more of the uses permitted in Section 19.08.060 shall provide a lot area of not less than the following:

- A. One thousand (1,000) square feet of land for no bedroom units;
- B. One thousand five hundred (1,500) square feet of land for one bedroom units;
- C. Two thousand (2,000) square feet of land for two bedroom units;
- D. Two thousand five hundred (2,500) square feet of land for three bedroom units. In no event shall the overall lot area be less than three thousand five hundred (3,500) square feet.

19.08.070 Permitted uses. No building, structure or premises shall be used, and no building or structure shall be erected, structurally altered or maintained in a B residence district, unless otherwise provided in this chapter, except for one or more of the following uses:

- Any use permitted in the A district
- Accessory buildings located on the same lot
- Churches and temples
- Community residential facilities serving eight (8) or fewer persons
[Community residential facilities serving nine (9) or more persons: OPN]
- Day-care homes serving twelve (12) or fewer children *[persons of any age: OPN]*
- Day nurseries, *[day care centers serving thirteen (13) or more persons: OPN]*, and kindergartens
- Fraternities and sororities in certain locations
- Libraries
- Multiple dwellings
- One-family dwellings
- Parks and playgrounds
- Public utility installations, where no business office, repair or storage facilities are maintained
- Residential accessory uses
- Schools and colleges
- Two-family dwellings
- Any public fire station and telephone exchange where no public business office and no repair or storage facilities are maintained, or any necessary public utility building

19.08.080 Conditional uses.

- Apartment houses in certain locations (as approved by the Board of Adjustment)
[Nursing homes: OPN]
[Personal Care Facilities: OPN #95-01, as amended]

CHAPTER 19.38
R-III MULTIPLE-DWELLING RESIDENTIAL

Sections:

19.38.010 Generally.	19.38.050 Side yard.
19.38.020 Height.	19.38.060 Lot area.
19.38.030 Front yard.	19.38.070 Permitted uses.
19.38.040 Rear yard.	19.38.080 Conditional uses.

19.38.010 Generally. The provisions of this chapter shall be applicable in the R-III (Multiple-dwelling Residential) district.

19.38.020 Height. No building shall exceed thirty (30) feet or two stories in height.

19.38.030 Front yard.

A. There shall be a front yard having a depth of not less than twenty (20) feet. Where there are lots comprising forty percent or more of the frontage developed with buildings between cross streets, having an average front yard with a variation in depth of not more than six (6) feet, no building hereafter erected or altered shall project beyond the front yard line so established; provided, further, that this regulation shall not require a front yard of more than thirty (30) feet in depth.

B. Where buildings front on a side street (or a street not parallel to an alley), the front yard shall have a depth of not less than ten (10) feet.

19.38.040 Rear yard. There shall be a rear yard having a depth of not less than twenty (20) feet.

19.38.050 Side yard.

A. There shall be a side yard on each side of the building, each yard having a width of not less than five (5) feet. The width, however, shall be not less than one-third of the height of the building. No building fronting the street parallel to an alley on a corner lot shall have a side yard on the street side less than ten (10) feet.

B. On corner lots, the side yard regulations shall be the same as for interior lots, except as noted above, but, in the case of reversed frontage, where the corner lot is developed so that the building faces an intersecting street, there shall be a side yard on the street side of the corner lot of not less than the front yard required on the lots in the rear of such corner lot, and no accessory buildings on such corner lot shall project beyond the front yard line of the lots in the rear.

C. Where an accessory building, such as a garage, is attached to a building, it shall be not less than five feet from the side line of the lot.

D. Accessory buildings incidental to the above uses and located on the same lot shall be not less than five (5) feet from the rear line of the lot.

19.38.060 Lot area. Every residence, multiple dwelling or other building used, to be erected, structurally altered or maintained for one or more of the uses permitted in Section 19.38.070 shall provide a lot area of not less than the following:

- A. One thousand (1,000) square feet of land area for no bedroom units.
- B. One thousand five hundred (1,500) square feet of land area for one bedroom unit.
- C. Two thousand (2,000) square feet of land area for two bedroom units.
- D. Two thousand five hundred (2,500) square feet of land area for three bedroom units.
 In no event shall the overall lot area be less than three thousand six hundred (3,600) square feet.

19.38.070 Permitted uses. No building, structure or premises shall be used and no building or structure shall be erected, structurally altered or maintained unless otherwise provided in this title, except for one or more of the following uses:

Any use permitted in RR-I, R-I and R-II districts

Churches and temples

[Community residential facilities serving eight (8) or fewer persons: OPN]

[Day-care homes serving twelve (12) or fewer persons: OPN]

Fire stations

Libraries

One-family dwellings

Parks and playgrounds

Public and private schools and colleges

Public utilities

Residential accessory buildings and uses

Two-family dwellings

Triplexes and fourplexes

19.38.080 Conditional Uses.

[Community residential facilities serving nine (9) or more persons: OPN]

[Day-care centers serving thirteen (13) or more persons: OPN]

Nursing homes

[Personal Care Facilities: OPN #95-01, as amended]

CHAPTER 19.40
R-IV MULTIPLE-DWELLING RESIDENTIAL

Sections:

19.40.010 Generally.	19.40.050 Side yard.
19.40.020 Height.	19.40.060 Lot area.
19.40.030 Front yard.	19.40.070 Permitted uses.
19.40.040 Rear yard.	

19.40.010 Generally. The provisions of this chapter shall be applicable in the R-IV (Multiple-dwelling Residential) district.

19.40.020 Height. No building shall exceed thirty (30) feet or two stories in height.

19.40.030 Front yard. There shall be a front yard having a depth of not less than twenty (20) feet. However, where there are lots comprising forty (40) percent or more of the frontage developed with buildings between cross streets, having an average front yard with a variation in depth of not more than six (6) feet, no building hereafter erected or altered shall project beyond the front yard line so established; provided further, that this regulation shall not require a front yard of more than thirty (30) feet in depth.

19.40.040 Rear yard. There shall be a rear yard having a depth of not less than twenty (20) feet.

19.40.050 Side yard.

A. There shall be a side yard on each side of the building, each yard having a width of not less than five (5) feet. The width, however, shall be not less than one-third of the height of the building. No building fronting the street parallel to an alley on a corner lot shall have a side yard on the street side less than ten (10) feet.

B. On corner lots, the side yard regulations shall be the same as for interior lots, except as noted above, but, in the case of reversed frontage, where the corner lot is developed so that the building faces an intersecting street, there shall be a side yard on the street side of the corner lot of not less than the front yard required on the lots in the rear of such corner lot, and no accessory building on such corner lot shall project beyond the front yard line of the lots in the rear. Where an accessory building, such as a garage, is attached to a building, it shall be not less than five (5) feet from the side line of the lot.

C. Accessory buildings incidental to the above uses and located on the same lot including one private garage shall be not less than five (5) feet from the rear lot line.

19.40.060 Lot area. Every residence, multiple dwelling or other building used, to be erected, structurally altered or maintained for one or more of the uses permitted in Section 19.40.060 shall provide not less than the following:

A. One thousand (1,000) square feet of land area for no bedroom units.

B. One thousand five hundred (1,500) square feet of land area for one bedroom unit.

C. Two thousand (2,000) square feet of land area for two bedroom units.

D. Two thousand five hundred (2,500) square feet of land area for three bedroom units.
 In no event shall the overall lot area be less than three thousand six hundred (3,600) square feet.

19.40.070 Permitted uses. No building, structure or premises shall be used, and no building or structure shall be erected, structurally altered or maintained unless otherwise provided in this chapter, except for one or more of the following uses:

Any use permitted in RR-I, R-I, R-II and R-III districts	Libraries
Accountants	Multiple dwellings
Barber and beauty shops	Nurseries <i>[and day care centers serving thirteen (13) or more persons: OPN]</i>
Churches and temples	Nursing and convalescent homes
<i>[Community residential facilities serving eight (8) or fewer persons: OPN]</i>	One-family dwellings
<i>[Community residential facilities serving nine (9) or more persons: OPN]</i>	Optician's offices
Convents and monasteries	Optometrist's offices
Credit union offices	Parks and playgrounds
<i>[Day-care homes serving twelve (12) or fewer persons: OPN]</i>	<i>[Personal Care Facilities: OPN #95-01, as amended]</i>
Dental clinics	Public and private schools and colleges
Doctor's offices	Public parking area
Insurance offices	Public utilities
Lawyer's offices	Real estate offices
	Residential accessory buildings and uses
	Two-family dwellings
	<i>[Water testing laboratory, subject to conditions: OPN #97-02]</i>

CHAPTER 19.44
 R-V NEIGHBORHOOD BUSINESS

Sections:

19.44.010 Generally.	19.44.060 Loading and unloading space.
19.44.020 Height.	19.44.070 Permitted uses.
19.44.030 Front yard.	19.44.080 Limitations on uses.
19.44.040 Side yard.	
19.44.050 Lot area.	

19.44.010 Generally. The provisions of this chapter shall be applicable in the R-V (Neighborhood Business) district.

19.44.020 Height. No building shall exceed thirty (30) feet or two stories in height.

19.44.030 Front yard. There shall be a front yard having a depth of not less than twenty-five (25) feet.

19.44.040 Side yard. There shall be a side yard on each side of the building, each yard having a width of not less than ten (10) feet.

19.44.050 Lot area. No minimum lot area or widths are specified for commercial structures. Residential structures shall comply with the provisions of the R-IV (Multiple-dwelling Residential) district.

19.44.060 Loading and unloading space. The loading space where the property is surrounded on all sides by streets shall be within the property so that no part of the vehicle loading or unloading shall protrude onto the street. Where such building borders an alley the loading space shall be along the alley and shall extend not less than fourteen (14) feet in depth back from such alley and no less than twenty-five (25) feet bordering the alley and sufficiently high for clearance of vehicles.

19.44.070 Permitted uses. No building, structure or premises shall be Used and no building or structure shall be erected, structurally altered or maintained unless otherwise provided in this chapter, except for one or more of the following uses:

Any use permitted in RR-I, R-I, R-II, R-III and R-IV districts	Community residential facility serving thirteen (13) or more persons
Bakeries and delicatessens	Drugstores
Banks	Dry cleaning establishments
Cabaret license	Food stores
Cafes	Jewelry store
Clothing stores	Private clubs and lodges
Coin-operated laundry & dry cleaning	Shoe store

CHAPTER 19.06
A RESIDENTIAL

Sections:

19.06.010 Generally.	19.06.050 Side yard.
19.06.020 Height.	19.06.060 Lot area.
19.06.030 Front yard.	19.06.070 Permitted uses.
19.06.040 Rear yard.	19.06.080 Conditional uses.

19.06.010 Generally. The provisions of this chapter shall be applicable in the A (Residential) district.

19.06.020 Height. No building shall exceed forty (40) feet in height.

19.06.030 Front yard. The front yard shall have a depth of not less than twenty (20) feet except in cases where both immediately adjacent lots on the same street frontage are developed at a depth greater than twenty (20) feet. In such an event, the front yard shall have a minimum depth equal to that of the adjacent structure closest to the street line.

19.06.040 Rear yard. The rear yard shall have a depth of not less than twenty (20) feet, and not more than fifty (50) percent of the rear yard shall be covered with the accessory buildings. The zoning officer may eliminate the rear yard and side yard setback for detached accessory structures in the rear yard, provided the applicant demonstrates that such reduction will not encumber maintenance or access and that the applicant furnishes written approval for such reduction from the adjoining property owner.

19.06.050 Side yard. The side yard shall have a width of not less than seven and one-half (7½) feet, or one-third of the building height, whichever is greater.

19.06.060 Lot area. The minimum lot area shall not be less than five thousand four hundred (5,400) square feet.

19.06.070 Permitted uses.

Churches and temples	Public utility installations, where no business office, repair or storage facilities are maintained
Community residential facilities serving eight (8) or fewer persons	Residential accessory buildings and uses
Day-care homes serving twelve (12) or fewer children [<i>persons of any age: OPN</i>]	Schools and colleges
Day nurseries [<i>and day care centers serving thirteen (13) or more persons: OPN</i>]	
Fraternalities and sororities	19.06.080 Conditional uses.
Libraries	[<i>Community residential facilities serving nine (9) or more persons: OPN</i>]
One-family dwellings	Nursing homes
Parks and playgrounds	[<i>Personal Care Facilities: OPN #95-01, as amended</i>]

CHAPTER 19.34
R-I RESIDENTIAL

Sections:

19.34.010 Generally.	19.34.050 Side yard.
19.34.020 Height.	19.34.060 Lot area.
19.34.030 Front yard.	19.34.070 Permitted uses.
19.34.040 Rear yard.	19.34.080 Conditional uses.

19.34.010 Generally. The provisions of this chapter shall be applicable in the R-I (Residential) district.

19.34.020 Height. No building shall exceed thirty (30) feet in height.

19.34.030 Front yard. The front yard shall have a depth of not less than twenty (20) feet except in cases where both immediately adjacent lots on the same street frontage are developed at a depth greater than twenty (20) feet. In such an event, the front yard shall have a minimum depth equal to that of the adjacent structure closest to the street line.

19.34.040 Rear yard. The rear yard shall have a depth of not less than twenty (20) feet, and not more than fifty (50) percent of the rear yard shall be covered with the accessory buildings. The zoning officer may eliminate the rear yard and side yard setback for detached accessory structures in the rear yard, provided the applicant demonstrates that such reduction will not encumber maintenance or access and that the applicant furnishes written approval for such reduction from the adjoining property owner.

19.34.050 Side yard. The side yard shall have a width of not less than seven and one-half (7½) feet, or one-third the building height, whichever is greater.

19.34.060 Lot area. The minimum lot area shall not be less than five thousand four hundred (5,400) square feet.

19.34.070 Permitted uses.

Community residential facilities serving eight (8) or fewer persons
Day-care homes serving twelve (12) or fewer children [*persons of any age: OPN*]
One-family dwellings
Parks and playgrounds
Residential accessory buildings and uses

19.34.080 Conditional Uses.

Churches
[*Community residential facilities serving nine (9) or more persons: OPN*]
[*Day-care centers serving thirteen (13) or more persons: OPN*]
Nursing homes
[*Personal Care Facilities: OPN #95-01, as amended*]
Public and private elementary schools

CHAPTER 19.36
R-II TWO-FAMILY RESIDENTIAL

Sections:

19.36.010 Generally.	19.36.050 Side yard.
19.36.020 Height.	19.36.060 Lot area.
19.36.030 Front yard.	19.36.070 Permitted uses.
19.36.040 Rear yard.	19.36.080 Conditional uses.

19.36.010 Generally. The provisions of this chapter shall be applicable in the R-II (Two-family Residential) district.

19.36.020 Height. No building shall exceed thirty (30) feet or two stories in height.

19.36.030 Front yard.

A. There shall be a front yard having a depth of not less than twenty (20) feet; provided, however, that where there are lots comprising forty (40) percent or more of the frontage developed with buildings between cross streets, having an average front yard with a variation in depth of not more than six (6) feet, no building hereafter erected or altered shall project beyond the front yard line so established; provided, further, that this regulation shall not require a front yard of more than thirty (30) feet in depth.

B. Where building front is on a side street (or a street not parallel to an alley), the front yard shall have a depth of not less than ten (10) feet.

19.36.040 Rear yard. There shall be a rear yard having a depth of not less than twenty (20) feet.

19.36.050 Side yard.

A. There shall be a side yard on each side of the building, each yard having a width of not less than five (5) feet; the width, however, shall be not less than one third of the height of the building. However, no building fronting the street parallel to an alley on a corner lot shall have a side yard on the street side less than ten (10) feet.

B. On corner lots, the side yard regulations shall be the same as for interior lots, except as noted above, but, in the case of reversed frontage, where the corner lot is developed so that the buildings face an intersecting street, there shall be a side yard on the street side of the corner lot of not less than the front yard required on the lots in the rear of such corner lot, and no accessory building on such corner lot shall project beyond the front yard line of the lots in the rear.

C. Where an accessory building, such as a garage, is attached to a building, it shall be not less than five (5) feet from the side line of the lot.

D. Accessory buildings incidental to the above uses and located on the same lot shall be not less than six (6) feet from the rear line of the lot.

19.36.060 Lot area. Every residence, duplex or other building used, to be erected, structurally altered or maintained for one or more of the uses permitted in Section 19.36.070 shall provide a lot area of not less than two thousand seven hundred square (2,700) feet per dwelling unit, or larger to comply with the comprehensive plan. In no event shall the overall lot area be less than five thousand four hundred (5,400) square feet.

19.36.070 Permitted uses. No building, structure or premises shall be used and no building or structure shall be erected, structurally altered or maintained unless otherwise provided in this title, except for one or more of the following uses:

Any use permitted in RR-I and R-I districts

Churches and temples

Community residential facilities serving eight (8) or fewer persons

Day-care homes serving twelve (12) or fewer children [*persons of any age: OPN*]

Fire stations

Libraries

One-family dwellings

Parks and playgrounds

Public and private schools and colleges

Public utilities

Residential accessory buildings and uses

Two-family dwellings

19.36.080 Conditional Uses.

[Community residential facilities serving nine (9) or more persons: OPN]

[Day-care centers serving thirteen (13) or more persons: OPN]

Nursing homes

[Personal Care Facilities: OPN #95-01, as amended]

CHAPTER 19.91
R-VIII RESIDENTIAL

Sections:

19.91.010 Generally.	19.91.070 Maximum Residential Density.
19.91.020 Height.	19.91.080 Lot Size.
19.91.030 Front Yard.	19.91.090 Permitted Uses.
19.91.040 Rear Yard.	19.91.100 Conditional Uses.
19.91.050 Side Yard.	19.91.110 Accessory Buildings.
19.91.060 Lot Width.	

19.91.010 Generally. The provisions of this chapter shall be applicable in the R-VIII (Residential) district.

19.91.020 Height. No building shall exceed thirty (30) feet in height.

19.91.030 Front yard. There shall be a front yard having a depth of not less than twenty (20) feet.

19.91.040 Rear yard. There shall be a rear yard having a depth of not less than twenty (20) feet.

19.91.050 Side yard. There shall be a side yard on each side of the primary building, each yard having a width of not less than seven and one-half (7½) feet. The width, however, shall be not less than one-third of the height of the building.

19.91.060 Lot Width. The lot width shall be not less than fifty (50) feet.

19.91.070 Maximum Residential Density. The maximum residential density in this residential district shall be eight (8) dwelling units per acre.

19.91.080 Lot Size. The lot area shall be not less than five thousand four hundred (5,400) square feet per single-family dwelling unit or ten thousand eight hundred (10,800) square feet per two-family unit.

19.91.090 Permitted uses. No building, structure or premises shall be used, and no building or structure shall be erected, structurally altered or maintained in this residential district unless otherwise provided in this title, except for one or more of the following uses:

- Community residential facilities serving eight (8) or fewer persons
- Day-care homes serving twelve (12) or fewer children [*persons of any age: OPN*]
- One-family dwellings
- Parks and playgrounds
- Residential accessory buildings and uses
- Two-family dwellings

**CHAPTER 19.92
 R-XII RESIDENTIAL**

Sections:

19.92.010 Generally.	19.92.070 Lot Size.
19.92.020 Height.	19.92.080 Lot Width.
19.92.030 Front Yard.	19.92.090 Permitted Uses.
19.92.040 Rear Yard.	19.92.100 Conditional Uses.
19.92.050 Side Yard.	19.92.110 Accessory Buildings.
19.92.060 Maximum Residential Density.	

19.92.010 Generally. The provisions of this chapter shall be applicable in the R-XII (Residential) district.

19.92.020 Height. No building shall exceed thirty (30) feet in height.

19.92.030 Front yard. There shall be a front yard having a depth of not less than twenty (20) feet.

19.92.040 Rear yard. There shall be a rear yard having a depth of not less than twenty (20) feet.

19.92.050 Side yard. There shall be a side yard on each side of the primary building, each yard having a width of not less than five (5) feet. The width, however, shall be not less than one-third of the height of the building.

19.92.060 Maximum Residential Density. The maximum residential density in this residential district shall be twelve (12) dwelling units per acre, with the following exception: up to sixteen (16) dwelling units per acre shall be permitted if the following neighborhood compatibility design standards are met in addition to the Multi-Family Standards of Chapter 19.74:

1. Landscaping for all areas not covered by structures, driveways and parking areas, and walkways. Landscaping shall consist of grass, trees and shrubs. All landscaping shall be maintained;
2. Parking areas shall provide a buffer screen from adjacent residential properties. The buffer screen shall consist of sixty percent (60%) natural material and forty percent (40%) man-made material, and be to a height of five (5) feet with an opacity of seventy-five percent (75%) at installation. The buffer screen shall be maintained;
3. Boulevard be landscaped with street trees spaced no greater than thirty (30) feet on center;
4. Provide sidewalks, curbs and gutters on all streets fronting the development;
5. Provide and install equipment and space for two (2) bikes for each residential unit within a multi-family development;

6. Be within one-fourth (1/4) mile of a major arterial or existing bus route;

7. Be within one-half (1/2) mile of a neighborhood or community park, or provide a play/open space area within development (approved by City Parks and Recreation as sufficient size and facilities to serve development's population at build-out), or provide a commensurate donation to (Reserve Street Area) park fund.

19.92.070 Lot Size. The lot area for a development at twelve (12) units per acre shall not be less than three thousand six hundred (3,600) square feet per dwelling unit.

The lot area for a development at sixteen (16) units per acre shall not be less than two thousand seven hundred (2,700) square feet per dwelling unit.

In no event shall the overall lot area be less than five thousand four hundred (5,400) square feet per residential structure.

19.92.080 Lot Width. The lot width shall not be less than fifty (50) feet.

19.92.090 Permitted uses. No building, structure or premises shall be used, and no building or structure shall be erected, structurally altered or maintained in this residential district unless otherwise provided in this title, except for one or more of the following uses:

Community residential facilities serving eight (8) or fewer persons
[Community residential facilities serving nine (9) or more persons: OPN]
 Day-care homes serving twelve (12) or fewer persons
[Day-care centers serving thirteen (13) or more persons: OPN]
 Multiple dwellings
 One-family dwellings
 Parks and playgrounds
 Residential accessory buildings and uses
 Two-family dwellings

19.92.100 Conditional Uses.

Churches
 Nursing homes
[Personal Care Facilities: OPN #95-01, as amended]
 Public & private elementary schools
 Residential mini-warehouses

19.92.010 Accessory Buildings. Accessory buildings incidental to the above uses and located on the same lot shall be not less than six (6) feet from the rear line of the lot.

**CHAPTER 19.48
 RR-I RESTRICTED ONE-FAMILY
 RESIDENTIAL**

Sections:

19.48.010 Generally.	19.48.050 Side yard.
19.48.020 Height.	19.48.060 Lot area per family.
19.48.030 Front yard.	19.48.070 Permitted uses.
19.48.040 Rear yard.	19.48.080 Conditional uses.

19.48.010 Generally. The provisions of this chapter shall be applicable in the RR-I (Restricted One-family Residential) district.

19.48.020 Height. No building shall exceed thirty (30) feet or two stories in height.

19.48.030 Front yard.

A. There shall be a front yard having a depth of not less than thirty (30) [twenty (20): *OPN #92-05*] feet. Where there are lots comprising forty (40) percent or more of the frontage developed with buildings between cross streets, having an average front yard with a variation in depth of not more than six (6) feet, no building hereafter erected or altered shall project beyond the average front yard line so established; provided further, that this regulation shall not require a front yard of more than forty (40) feet in depth.

B. Where there are no buildings in a block, the depth of the front yard shall be determined by making it conform to the depth on the same side of the street in the adjoining block.

C. Where buildings front on a side street (or a street not parallel to an alley), the front yard shall have a depth of not less than ten (10) feet.

19.48.040 Rear yard. There shall be a rear yard having a depth of not less than twenty (20) feet.

19.48.050 Side yard.

A. There shall be a side yard on each side of the building, each yard having a width of not less than seven and one-half (7½) feet. The width, however, shall be not less than one-third of the height of the building; and, where a building fronts the street parallel to an alley, or a corner lot, it shall have a side yard on the street side not less than ten feet in width.

B. On corner lots, the side yard regulations shall be the same as for interior lots, except as noted above. In the case of reversed frontage, where the corner lot is developed so that the buildings face an intersecting street, there shall be a side yard on the street side of the corner lot of not less than the front yard required on the lots in the rear of such corner lot. No accessory building on such corner lot shall project beyond the front yard line of the lots in the rear.

C. Where an accessory building, such as a garage, is attached to a building, it shall be not

less than seven and one-half (7½) feet from the side line of the lot.

D. Accessory buildings incidental to the above uses and located on the same lot, including one private garage, shall be not less than six (6) feet from the rear line of the lot.

19.48.060 Lot area per family. Every building hereafter erected, structurally altered or maintained in the RR-I Restricted One-family Residential district, shall provide a lot area of not less than eight thousand (8,000) square feet per house.

19.48.070 Permitted uses. No building, structure or premises shall be used, and no building or structure shall be erected, structurally altered or maintained in the RR-I (Restricted One-family Residential) district unless otherwise provided in this title, except for one or more of the following uses:

Community residential facilities serving eight (8) or fewer persons
 Day-care homes serving twelve (12) or fewer children [*persons of any age: OPN*]
 One-family dwellings
 Parks and playgrounds
 Residential accessory buildings and uses

19.48.080 Conditional uses.

Churches
 [*Community residential facilities serving nine (9) or more persons: OPN*]
 [*Day-care centers serving thirteen (13) or more persons: OPN*]
 Nursing homes
 [*Personal Care Facilities: OPN #95-01, as amended*]
 Public and private elementary schools

**CHAPTER 19.37
RLD-4 RESIDENTIAL LOW DENSITY**

Sections:

19.37.010 Generally.	19.37.060 Lot Width.
19.37.020 Height.	19.37.070 Lot Area.
19.37.030 Front Yard.	19.37.080 Permitted Uses.
19.37.040 Rear Yard.	19.37.090 Conditional Uses.
19.37.050 Side Yard.	

19.37.010 Generally. The provisions of this chapter shall be applicable in the RLD-4 (Residential Low Density) district. Clustered homesites and planned unit developments are encouraged to protect natural resources, enhance environmental amenities found in the area and allow for flexibility in site planning and project design.

19.37.020 Height. No building shall exceed thirty (30) feet or two stories in height.

19.37.030 Front Yard. There shall be a front yard having a depth of not less than twenty (20) feet.

19.37.040 Rear Yard. There shall be a rear yard having a depth of not less than twenty (20) feet.

19.37.050 Side Yard. There shall be a side yard on each side of the building, each yard having a width of not less than seven and one-half (7 1/2) feet. The width, however, shall be not less than one-third of the height of the building. The zoning officer may reduce the required rear and side yard setback to five (5) feet for detached accessory structures in the rear yard, provided that the applicant demonstrate that such reduction will not encumber maintenance or access and that the applicant furnished written approval for such reduction from the adjoining property owner.

19.37.060 Lot Width. Each lot or parcel shall have a minimum lot width of seventy-five (75) feet.

19.37.070 Maximum Residential Density. The maximum residential density in the RLD-4 (Residential Low Density) district shall be four (4) dwelling unit per acre with a minimum lot size of ten thousand (10,000) square feet per dwelling unit. Two-family dwelling units require a minimum lot size of twenty thousand (20,000) square feet. For the purposes of zoning compliance for City subdivision review, minimum lot sizes and lot widths may vary for the purpose of protecting natural resources, conserving open space and enhancing environmental amenities and allowing for flexibility in site planning and project design. Lot standard variations are for subdivision review only and will not increase the maximum residential density for the zoning district or parent parcel.

**CHAPTER 19.35
 RLD-2 RESIDENTIAL LOW DENSITY**

Sections:

19.35.010 Generally.	19.35.060 Lot width.
19.35.020 Height.	19.35.070 Lot area.
19.35.030 Front yard.	19.35.080 Permitted uses.
19.35.040 Rear yard.	19.35.090 Conditional uses.
19.35.050 Side yard.	

19.35.010 Generally. The provisions of this chapter shall be applicable in the RLD-2 (Residential Low Density) district. Clustered homesites and planned unit developments are encouraged to protect natural resources, enhance environmental amenities found in the area and allow for flexibility in site planning and project design.

19.35.020 Height. No building shall exceed thirty (30) feet or two stories in height.

19.35.030 Front yard. There shall be a front yard having a depth of not less than twenty-five (25) feet.

19.35.040 Rear yard. There shall be a rear yard having a depth of not less than twenty-five (25) feet.

19.35.050 Side yard. There shall be a side yard on each side of the building, each yard having a width of not less than fifteen (15) feet. The zoning officer may reduce the required rear and side yard setback to five (5) feet for detached accessory structures in the rear yard, provided that the applicant demonstrate that such reduction will not encumber maintenance or access and that the applicant furnished written approval for such reduction from the adjoining property owner.

19.35.060 Lot width. Each lot or parcel shall have a minimum lot width of one hundred (100) feet.

19.35.070 Maximum residential density. The maximum residential density in the RLD-2 (Residential Low Density) district shall be two (2) dwelling units per acre with a minimum lot size of twenty thousand (20,000) square feet. For the purposes of zoning compliance for City subdivision review, minimum lot sizes and lot widths may vary for the purpose of protecting natural resources, conserving open space and enhancing environmental amenities and allowing for flexibility in site planning and project design. Lot standard variations are for subdivision review only and will not increase the maximum residential density for the zoning district or parent parcel.

19.35.080 Permitted Uses.

Community residential facilities serving eight (8) or fewer persons

Day-care homes serving twelve (12) or fewer persons

One-family dwellings

Parks and playgrounds

Residential accessory buildings and uses

CHAPTER 19.33
RLD-1 RESIDENTIAL LOW DENSITY

Sections:

19.33.010 Generally.	19.33.060 Lot width.
19.33.020 Height.	19.33.070 Lot area.
19.33.030 Front yard.	19.33.080 Permitted uses.
19.33.040 Rear yard.	19.33.090 Conditional uses.
19.33.050 Side yard.	

19.33.010 Generally. The provisions of this chapter shall be applicable in the RLD-1 (Residential Low Density) district. Clustered homesites and planned unit developments are encouraged to protect natural resources, enhance environmental amenities found in the area and allow for flexibility in site planning and project design.

19.33.020 Height. No building shall exceed thirty (30) feet or two stories in height.

19.33.030 Front yard. There shall be a front yard having a depth of not less than twenty-five (25) feet.

19.33.040 Rear yard. There shall be a rear yard having a depth of not less than twenty-five (25) feet.

19.33.050 Side yard. There shall be a side yard on each side of the building, each yard having a width of not less than fifteen (15) feet. The zoning officer may reduce the required rear and side yard setback to five (5) feet for detached accessory structures on the rear yard, provided that the applicant demonstrate that such reduction will not encumber maintenance or access and that the applicant furnished written approval for such reduction from the adjoining property owner.

19.33.060 Lot width. Each lot or parcel shall have a minimum lot width of one-third (1/3) of the average depth of the lot.

19.33.070 Maximum residential density. The maximum residential density in the RLD-1 (Residential Low Density) district shall be one (1) dwelling unit per acre with a minimum lot size of forty thousand (40,000) square feet. For the purposes of zoning compliance for City subdivision review, minimum lot sizes and lot widths may vary for the purpose of protecting natural resources, conserving open space and enhancing environmental amenities and allowing for flexibility in site planning and project design. Lot standard variations are for subdivision review only and will not increase the maximum residential density for the zoning district or parent parcel.

19.33.080 Permitted uses.

Community residential facilities serving eight (8) or fewer persons
 Day-care homes serving twelve (12) or fewer persons
 One-family dwellings
 Parks and playgrounds
 Residential accessory buildings and uses