Study of Subdivision Requirements as a Regulatory Barrier

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Disclaimer

Executive Summary

Introduction

Local subdivision regulations represent a major tool by which local governments manage and shape the housing development process. In addition to laying land plats or site plans, these regulations establish infrastructure or site requirements to support new residential development, i.e., they establish specifications for streets, sidewalks, water and sewer, drainage, curbs and gutters, street signs, landscaping. In many cases, subdivision regulations also provide for trees, utility easements, and dedications of land or fees for recreational and/or school facilities. Subdivision regulations are intended to ensure that proposed housing developments are cost-effective (i.e., reduce extensive long-term maintenance by the locality), meet health and safety requirements, are properly designed, and have a favorable impact on the community.

The cost of these requirements represents a significant share of the cost of producing new housing. Such requirements can reasonably be considered "regulatory barriers" to affordable housing if the locally determined requirements are greater (and hence, more costly) than those necessary to achieve health and safety requirements in the community. This has been a concern for many years, and has been identified in the report, Not in My Backyard (prepared by the President's Commission on Regulatory Barriers to Affordable Housing) as a potential major contributor in raising the cost of housing and limiting the supply of affordable housing in communities.

To determine whether subdivision requirements exceed what is necessary to meet health and safety requirements, and hence likely to become a regulatory barrier, the Department of Housing and Urban Development commissioned a nationwide study. The key objective of the study was to develop a national estimate of the cost of excessive land and site development standards on single-family detached housing built in subdivisions. This is the type of housing most closely associated with the idea of homeownership in America. In order to measure which local standards are in fact excessive, the study commissioned nationally recognized land development experts to devise benchmark subdivision standards. Benchmark standards are standards necessary to achieve minimum acceptable health and safety benefit for the community. Such standards, and their corresponding monetary values, were devised for the most important development standards: lot size, floor space requirements, lot width, roadway width, sidewalk requirements, and curb & gutter drainage. The expert group in land and housing development consisted of residential land developers, architects, civil engineers, and land planners and was asked to develop benchmark standards for this study. Based on the

responses from this group, consensus benchmark standards were developed and used in this study as the basis for determining whether existing local standards were excessive.

METHODOLOGY: The study used a four-step methodology for developing the national cost estimates for those subdivision rules that constitute regulatory barriers: (1) collect regulatory standards from a nationally representative sample of jurisdictions for the selected subdivision and related zoning rules; (2) establish benchmark values and unit costs for each requirement; (3) produce a cost estimate for excessive regulation based on the application of the benchmark values and costs to the regulatory standards from the national sample of jurisdictions; and (4) create a national estimate of the costs of excessive regulations. For practical reasons, this study focused on only one type of zoning district- those that allowed the densest single-family residential development. If the study had examined all zoning districts in all jurisdictions, which would have included lower density districts, greater levels of regulatory cost barriers most likely would have been found.

SUMMARY OF FINDINGS

The overwhelming majority of communities in the study—94%-- mandate one or more land development standards for residential subdivisions. The most common regulatory standards were for lot size, front setbacks, off-street parking, and lot width. The least common requirements were for floor area and open space.

Ninety-one percent (91%) of all the communities had one or more regulatory standards that exceeded the benchmarks. Jurisdictions exceeded the benchmarks most frequently for off-street parking, front setbacks, lot width, and lot size. Jurisdictions exceeded the benchmarks least frequently for floor area, sidewalk requirements, open space, and sidewalk width requirements.

Lot size, lot width, and floor area accounted for the largest percentage of total costs for a variety of reasons:

Excessive lot size regulations accounted for the largest percentage of cost (65%). The cost of land is a major component of the cost of housing, so it should not be surprising that regulations mandating excessive lot sizes results in such a finding. Coincidentally, sixty-five percent of jurisdictions in the sample exceeded the lot size benchmark. On average, jurisdictions with excessive lot size requirements exceeded the benchmarks by 6,573 square feet (or more than one-seventh of an acre). The frequency and magnitude of lot size requirements greater than the benchmarks, combined with the cost of land, resulted in the regulatory cost barrier for lot size accounting for the majority of total costs of the regulatory cost barriers for all the land and site development variables considered in this study.

Excessive lot width requirements account for a moderate share of costs (9%), with 63 percent of jurisdictions containing lot width regulations exceeding the benchmarks. Excessive lot widths also have clear secondary cost impacts, i.e., they increase costing for land, sanitary sewer main, water main, street paving, curb and gutter, sidewalk construction, landscaping, and storm sewer.

Floor area had a disproportionately large impact on total regulatory barrier costs in proportion to the number of jurisdictions with excessive floor area requirements. While only 8 percent of jurisdictions had excessive floor area requirements, the regulatory cost barriers for floor area for those jurisdictions accounted for 17 percent of the total regulatory cost barriers for all land development variables for all the jurisdictions in the study. This resulted from the relatively high cost per square foot of required floor area and the fact that the mean differential between required floor area and benchmark floor areas was 354 square feet (or more than $26,000 per dwelling unit).

Key Findings

The average cost of excessive regulation resulting from subdivision standards for one dwelling unit was about 5 percent of the average cost of a new home. For the land development standards studied, the average regulatory barrier cost for one dwelling unit was $11,910. In comparison with the average cost for a new single-family dwelling in the United States in 2004 ($244,000), the average per-unit regulatory cost barrier is 4.8 percent of that average selling price.

The regulatory barriers cost varied. The regulatory barriers cost varied considerably across communities, as well as across regions and Metropolitan Statistical Area (MSA) status. Given that the sample is representative of all jurisdictions in the nation, the national regulatory cost barriers will vary by region and whether the jurisdiction is part of an MSA. The actual regulatory barrier cost for any given jurisdiction of course, depends on actual local regulations and costs of development.

Of the two types of "models" used to make the national estimates—aggregated and disaggregated--the disaggregated model provides the best national estimate of the land development regulatory barrier costs. The disaggregated model accounts for variations in regulatory standards and costs among the Census regions and MSA status better than the aggregated model. The total mean regulatory cost barriers for land and site development standards in the disaggregated model was about $14.6 billion for the nation in 2004.

Conclusion

This study is the first effort to quantify, on a nationwide basis, the costs of excessive site development regulation on affordable housing. The common rationale for such requirements is

that they enhance the soundness, livability, and sustainability of a community. The purpose of this study, however, has not been to deny that such standards have important benefits for the community, but to broaden the perspective of what other values and goals can and should be embodied in the housing development regulatory process, and to call attention to the impacts that excessive requirements have upon affordable housing. The additional cost pressures such standards impose on new housing may also help increase the prices of existing housing.

The findings themselves are not surprising; but they confirm and quantify, through an empirical study, what has been well-known, but unverified, throughout the workforce housing community—that large lot zoning and various site development requirements—limit or prevent the development of affordable housing. Such requirements, then, can harm a community's ability to provide what is, or ought to be, a high priority community goal.

The $14.6 billion national estimate for the land development regulatory barriers costs is a very conservative estimate. For practical reasons, this study focused on only on one type of zoning district, i.e., one that allowed the densest single-family residential development. If the study had examined all zoning districts in all jurisdictions, which most likely would have included lower density districts, far greater levels of regulatory barriers cost would have been found. For example, in medium-density residential zoned districts typically found next to the dense zoning districts, required minimum lot areas are generally larger. One would expect to find greater regulatory barrier costs in such neighborhoods *vis* a vis. high-density areas. Hence, the regulatory barriers cost resulting from required lot sizes greater than the benchmark lot areas would have been larger if these medium-density residential zoned districts had been included in the regulatory barrier cost analysis. Also, the estimate of housing construction costs on a square foot basis associated with excessive floor area standards was relatively conservative. Further, in lower density areas experiencing high housing construction, regulatory cost barriers based on average land costs and total housing construction starts for the Census region may underestimate the actual regulatory cost barrier from lot size requirements within that region.

The results presented here can serve as an opportunity and an invitation for communities as part of their commitment to affordable housing, to review and assess their own land and site development requirements. In order for local and state policies to have the greatest impact on the reduction of regulatory cost barriers associated with land and site development standards, efforts should focus on the most significant land and site development regulatory barriers identified in this study: excessive zoning regulations and excessive house size requirements.

Local advocates for reduction in regulatory cost barriers may wish to use the regulatory barrier costing tool, described in section 4.2.1.1 (and presented in Appendix G) to determine the regulatory barriers costs that apply in specific locations. This computer-based tool incorporates the benchmark standards used in this study as the baseline for judging a community's regulatory

standards. A community's calculation would be based on local land costs and on the cost of land development standards adopted by the local land planning jurisdiction or jurisdictions.

Communities committing to this self-assessment exercise, will not only be contributing to our understanding of a significant dimension of regulatory barriers costs, but will also be advancing their own efforts to expand affordable housing opportunities.

Table of Contents

List of Tables

List of Figures

1. Introduction

This study addresses the characterization on a national basis of the regulatory cost barriers associated with land subdivision, specifically barriers to the subdivision of land that can be developed with single-family detached (SFD) dwellings. Previously, this issue has been addressed only on a very small geographic scale. Previous approaches have not been used to examine regulatory cost barriers at the national level.

As discussed in the Executive Summary, there are two distinguishable types of regulatory barriers for the subdivision of land to construct single family detached dwellings: — a) barriers which lengthen the time for approval of a subdivision and b) land development and site development standards which are more costly than a set of minimum "benchmark" standards selected to provide for public health and safety. Benchmark standards are intended to be appropriate for affordable single-family detached dwellings without adding costs that would not bring commensurate public health and safety benefits. There are added costs when land is developed according to standards larger than the benchmark standards and there may also be benefits associated with those larger standards. The question of whether the added benefits are commensurate with the added costs is dependent upon many considerations. The evaluation of whether some of the benefits may be commensurate with the costs is an area that merits considerable investigation but is outside the scope of this study.

Land development standards investigated by the research team included standards associated with zoning requirements such as lot size as well as standards associated with subdivision rules such as lot width, interior floor space, building setbacks from the street, rear and side property lines, street widths, requirements for sidewalks and requirements for open space. This specific set of land development standards was selected for study by the research team based on our literature review. These specific standards have been identified as having the potential to significantly increase the costs of residential building lots. Based on existing research approaches, measuring the costs which are attributable to the differences between the existing land development standards and the benchmark standards require:

1. Knowledge and analysis of existing local requirements or standards
2. A set of alternative standards (the benchmark standards) which provide for public health and safety and could apply to a broad range of jurisdictions across the county
3. A methodology for costing the existing and the benchmark standards
4. A methodology for projecting the implications of the cost differences, if any, to the price of housing
5. A methodology to estimate the number of families affected by the cost differential between the existing standards and the "benchmark" standards

Measuring administrative and process costs in a quantitative approach was outside of the scope of this study. A quantitative approach to these costs would require extensive knowledge of the local administrative review process, the out-of-pocket costs associated with the local review process, assumptions about time and opportunity costs, a methodology for measuring such costs, and a benchmark review process, either actual or model, against which to compare actual administrative and process costs.

The present study examined the standards that are currently enforced in subdivision controls and zoning ordinances. Toward that end, the research team developed and executed a plan to systematically collect and analyze, via a Microsoft Access database, a nationally-representative sample of the land development and site development standards contained in subdivision rules and zoning ordinances.

A set of benchmark standards was developed using a survey of land development professionals in both the private and public sectors. The benchmark standards represent "best professional judgment" of the respondents to the survey. All such surveys are open to criticism with respect to the selection of the group being surveyed and the possible bias present in the individuals responding to the survey as compared with those individuals who did not respond to the survey. The research team reviewed the benchmark standards as compared with published model standards by several organizations. Where applicable, the benchmark standards were also reviewed with respect to median or the average values for the standards contained in our nationally representative database of existing land development regulations and with the median or average values of dwelling and house lot characteristics from the 2005 U.S. Census of Residential Construction.

The currently enforceable land and site development standards were then compared with the benchmark standards that would promote public health and safety. The research team also used engineering construction cost estimating methods to establish the incremental cost differences between the land development standards contained in the nationally representative database and the benchmark standards. This approach allowed the team to estimate the regulatory cost barriers due to land or site development standards greater than the benchmark standards for each of the planning jurisdictions recorded in the database.

Where the standards of a given jurisdiction were found to be the same or less expensive that the benchmark standards, there were no cost barriers related to land or site development standards in that planning jurisdiction. Conversely, if the standards of the jurisdiction were greater and more costly than the benchmark standards, the team assigned quantifiable regulatory cost barriers due to the standards enforceable in that jurisdiction.

A data weighting method was developed using the cost barrier estimates from the study's nationally representative sampling of planning jurisdictions to estimate the cost barriers existing in the general population of all planning jurisdictions in the United States.

2. Background

Since the early 20th century, there has been concern about the impact of regulations on housing costs, and whether certain regulations are too complex or have excessive standards. Many studies have been conducted to address these issues. One of the missions of the U.S. Department of Housing and Urban Development (HUD) is to promote policies which lead to a sufficient amount of affordable housing nationwide. In support of that mission, HUD maintains the "Regulatory Barriers Clearinghouse" for issues and information relevant to the promotion of affordable housing.[i] Ratios of median house prices to median household incomes are currently at a 25-year high in more than half the evaluated metropolitan areas in the United States (Harvard, 2005).

Most previous research on the regulatory cost barriers to affordable housing considered the effects of whole categories of regulations, of non-subdivision regulations (such as building codes), or of general development patterns. Few studies have focused on individual, subdivision rules or zoning ordinances, or have analyzed them on a national scale. One reason for this, as noted by the U.S. President's Commission on Urban Housing (1969), has been "the lack of a comprehensive, up-to-date survey on the provision of ordinances throughout the nation…" For the purpose of the present study, a regulatory barrier is a public regulatory requirement or process that increases the cost of single-family detached dwellings with respect to benchmark standards that are intended to protect public health and safety.

One seminal study in Waukesha County, Wisconsin, used a cost barrier evaluation method based on estimated construction costs for various infrastructure standards. This study compared the costs for the range of land development standards present within that county.

According to government definitions of affordable housing, families should devote no more than 30 percent of their income to rent or mortgage payments and utilities. [ii] "Affordable housing" often simply means housing whose residents do not pay too large a share of their income on rent or mortgage. In the context of this study, "affordable means affordable to families earning less than four-fifths (80%) of the area's median income." [iii] These families are officially "lower income" households. The median family income in the United States is approximately $60,000 per year.[iv] Based on the guideline of the 30 percent of income for housing and 80 percent of median income standards, affordable housing on a national average would cost no more than $1,200 per month for rent or mortgage plus real estate taxes.

While often motivated by the intention to preserve existing property values within the community, subdivision rules and zoning ordinances may, as a side effect, increase the cost to build new single-family dwellings. The goal of this research project was to quantify the

regulatory cost barriers crated by planning jurisdiction requirements that are greater than benchmark standards for house square foot floor area, lot size, road width, etc.

This study also qualitatively characterized the reasons for delays that occur during the interactive process between a land developer and a planning jurisdiction during the approval of a proposed residential land subdivision. According to a developer in Phoenix, Arizona, who participated in a regulatory cost barrier focus group managed by the research team, the delay of one year in obtaining a subdivision approval for a typical subdivision of 40 acres and 160 homes would add about $2,250 to the cost of each home for interest charges alone. [v]

2.1 Subdivision Regulations and Zoning Ordinances

Local subdivision regulations represent a major tool by which local governments shape and control the housing development process. Subdivision regulations establish infrastructure (land development) and site (building lot development) requirements to support new residential development—i.e., they establish specifications for streets, sidewalks, water and sewer, drainage, curbs and gutters, street signs, landscaping, trees, utility easements, and dedications of land or fees for recreational and/or school facilities. Subdivision regulations are intended to ensure that proposed housing developments are cost-effective (i.e., reduce long-term maintenance), meet health and safety requirements, are properly designed, and have a favorable impact on the community.

Land use controls which exceed appropriate requirements, particularly subdivision regulation and zoning, which determine the type and design of development that may be built in a community, is identified in *Not in My Backyard* (HUD, 1991) as a major contributor in raising the cost of housing and limiting the supply of affordable housing in communities. This study stated that regulations (as a group, and not just their excessive elements) add 20-35 percent to the costs of new homes. According to *U.S. Department of Housing and Urban Development (HUD)- sponsored Joint Venture for Affordable Housing demonstration, reducing the cost of the "developed lot" was the greatest single factor in achieving housing affordability.*[vi]

These studies have identified two significant categories of costs associated with subdivision regulation: (1) administrative or process costs, which refer to the costs associated with developing and processing subdivision requests through the local government review process, including the out-of-pocket costs, application costs, and review costs, and costs of delay (time costs, opportunity costs); and (2) costs resulting from land and site development standards

(specified design and materials requirements for infrastructure and site features, such as requirements for rights of way, curbs/gutters, water and drainage systems, and land dedication requirements) which are greater than the standards needed solely to protect public health and safety.

Since the purpose of this study is to probe the link between subdivision regulations/zoning ordinances and housing prices, the research team's review of the literature covers two topics—model regulations and the cost of regulations. The first topic concerns what are considered minimum or typical standards. It can be argued that some regulations that exceed minimum standards add unnecessary costs to the subdivision process, and these costs can show up in the price of housing.

2.1.1 Literature Review

Introduction

The literature review for the most part revealed that very little published work has been done that has direct relevance to the quantification of regulatory cost barriers on a national basis. Few studies have been done examining the costs associated with subdivision regulations in general, much less those analyzing individual regulations or done on a national scale. One relevant study that quantified regulatory cost barriers for a single county in Wisconsin is reviewed in section 2.1.3.

A review of literature related to subdivision regulations could cover numerous topics, such as legal framework, historical rationale, and the actual subdivision process. As the purpose of this study is to probe the link between subdivision regulations and housing prices, this review covers existing land use regulations, model land use regulations, benchmark standards and costs of regulations where the required standard is greater than an applicable benchmark.

The literature of model land use regulations discusses what are considered minimum or typical standards. These standards are generally approached only from a performance perspective, without regard to the cost effectiveness of the proposed or recommended standard. The literature on the second topic, costs of land use regulations, is even more incomplete, because few studies have been done examining the costs associated with subdivision regulations in general, much less those analyzing individual regulations or done on a national scale.

Many codes also address one or more other subdivision issues, such as administrative processes, growth management tools such as fees and exactions, and environmental protection. These are not discussed here, for one or more reasons (such as, their presence varies widely across codes, or it is difficult to assign costs to them).

2.1.2. Regulatory Cost Barriers

Several references on model land use regulations were reviewed as part of the literature review [vii]; however these references were not of significant value in developing our estimates of the regulatory cost barriers associated with land and site development standards.

Nelson et al (2002), *The Link Between Growth Management and Housing Affordability: The Academic Evidence*, is a comparison of the economic impacts on housing prices of two land use regulation categories: traditional zoning and growth management. This paper makes an important point—housing prices are influenced by many factors, not just the costs of development and construction. Luger and Temkin (2000), *Red Tape and Housing Costs: How Regulations Affects New Residential Development*, documents procedural and administrative cost barriers to land development. From interviews of people involved in development in several communities, the authors of this document developed an idea of reasonable versus excessive regulations, and then calculated the costs of those excessive regulations to be $10,000 to $20,000 per unit. In the current context, a significant limitation of this study is the fact that it calculated costs for regulations as a group, not for just subdivision regulations and not for individual regulations.

Kennedy (2002), in *The Impact of Municipal Governments on Residential Housing: A Case Study of Single-Family Detached Housing, in Cary North Carolina*, identifies five development activities that affect housing costs—impact fees, restrictive zoning interpretation, administrative fees, excessive building codes, and required capital improvements (on- and off-site). The significance of this study's conclusions related to the overall costs of the development activities is limited by the fact that it is a case study of only one town, and the determination of "excessive" was made based on interviews of two employees of a developer.

Reducing Housing Costs Through Regulatory Reform: A Handbook for Colorado Communities (1999) reviews the literature on two issues—the financial impacts of various regulations, and the relative costs of regulations in general. On the first issue, the only study it mentions related to subdivision regulations is by Weitz (1982), *Affordable Housing: How Local Regulatory Improvements Can Help*. That study found the cost of excessive right-of-way widths was $700 per lot. Excessive was defined as the magnitude or quality of the standard exceeding what a developer would provide absent the regulation.

A study by German (1993), *Under Siege: What Regulations Cost Builders and Buyers*, compared the costs of building houses in two jurisdictions with different levels of regulation. The study found that regulations added $20,420 more to housing costs in the more regulated jurisdiction. However, this study only considered fees and building codes.

In 1987, the NAHB Research Center published a paper called "Affordable Residential Land Development: A Guide for Local Government and Developers." This paper reported results from the Joint Venture for Affordable Housing, an effort involving multiple organizations and more than 100 demonstration projects across the country to reform regulations and administration and determine the housing cost savings. Reforms fell into four categories—zoning regulations (primarily related to density), subdivision regulations, building construction innovations, and administration. On average, reforms saved $8,573 per unit, with three-

fourths of this coming from land use regulations, which means at most one-fourth, or $2,143, came from subdivision regulations.

2.1.3 Quantifying Cost Barriers for Specific Land-Use Regulations

As a first step in identifying the land development requirements that were appropriate to examine from the cost barrier perspective, the research team identified those infrastructure elements with standards that are most commonly referenced in subdivision rules and zoning ordinances (see Table B-1, Appendix B) :

- Streets (right-of-way width, grade)
- Street access (block length)
- Sidewalks (width)
- Parking (number of parking spaces required)
- Sanitary sewerage
- Utilities (easement widths)
- Open space (amount required)

However, there is considerable discrepancy across codes on the numerical standards proposed for these infrastructure elements. For some, such as sidewalk surface thickness and minimum number of parking spaces, there seems to be general agreement on standards:

- Sidewalk minimum surface thickness = 4 inches
- Minimum number of parking spaces = 2 per unit

But for most regulations that are commonly covered by subdivision codes, the proposed standards vary significantly. For example the following ranges of land use standards were present in the regulations reviewed:

- Minimum right-of-way width = 47-60 feet
- Vehicle lane width = 9-15 feet
- Maximum grade = 8-15 percent
- Minimum curb radius at intersection = 5-25 feet
- Minimum block length = 125-400 feet
- Sidewalk requirement criteria = from “where appropriate” to “always”
- Minimum amount of open space = 5-10 percent of gross area

One of the few studies to examine the costs of individual regulations is Schuetz and White (1992), *Identifying and Mitigating Local Regulatory Barriers to Affordable Housing in Waukesha County, Wisconsin*. The authors established three ways in which subdivision and zoning regulations can affect housing costs—through land costs, lot improvement costs, and housing construction costs. The effect of subdivision application processing delays and the impact of the delays on interest charges paid by the developer were not explicitly addressed. Schuetz and White collected the subdivision and zoning regulations for several jurisdictions in Waukesha County, and examined the minimum standards for each regulation. Minimum standards were defined by reputable agencies or by using the smallest values found in the County's jurisdictions. They then calculated the costs of County and minimum regulations, and compared these costs to determine which regulations unnecessarily raised housing costs and by how much.

The subdivision regulations that were found to have a significant impact on costs in the Waukesha study were:

- Sidewalk requirements
- Curb and gutter requirements
- Storm sewer requirements
- Impact fees
- Excessive right-of-way widths

Additionally, they found that certain excessive zoning regulations unnecessarily increase the costs of certain subdivision elements, by increasing the amount of materials needed.

- Excessive lot widths increase the costs of sewer mains, water mains, streets, sidewalks, storm sewers, and curbs and gutter.
- Excessive front yard setbacks increase the costs of sewer and water laterals.

The costs associated with these elements of subdivision construction are reported in Table 2.1. Note that these costs are per some unit associated with the material (for example, the street pavement costs are per square foot of pavement), not per housing unit.

Table 2.1: Average Per-Unit-of-Measure Costs of Selected Land Improvements in Waukesha County, Wisconsin

Selected improvements	Average Cost
Sanitary sewer/front foot (FF)	$25.01
Sanitary sewer laterals/lineal foot (LF)	$23.62
Water main total/FF	$18.80
Water lateral/LF	$16.00
Storm sewer/FF	$18.52
Street without curb and gutter/FF	$18.72
Mountable curb/LF	$5.48
Boulevard curb/LF	$6.23
Concrete sidewalk 4' W x 4" D/FF	$6.00

Source: Village of Menomonee Falls; Mike Mucha, City Engineer, Mequon, WI.; the University of Wisconsin-Milwaukee Urban Research Center, 1992

The Waukesha study estimated the unit costs for infrastructure elements related to the width of the lot based on a tabulation of contractor bids for land development. These unit costs were utilized to estimate the aggregate infrastructure costs for the roads, sidewalks, and utilities associated with the range of lot widths specified in each municipality within the county—from 60 feet, the smallest allowable lot width, to 200 feet, the most restrictive requirement for lot widths within the county (See Table 2.2).

Table 2.2: Lot Improvement Costs for Various Lot Widths in Waukesha County, Wisconsin

Lot Width	Front Setback	Street Width	Curb and Gutter	Sanitary Sewer	Water	Storm Water	Street	Sidewalk	Total Cost of Improvements
60	50	27	$ 328.80	$2,569	$1,788	$ 957	$ 907	$ 360	$ 6,910
66	50	27	$ 361.68	$2,699	$1,884	$1,053	$ 998	$ 396	$ 7,391
80	50	27	$ 438.40	$3,000	$2,110	$1,276	$1,210	$ 480	$ 8,515
100	50	27	$ 548.00	$3,431	$2,433	$1,595	$1,512	$ 600	$10,120
120	50	27	$ 657.60	$3,862	$2,756	$1,914	$1,814	$ 720	$11,724
130	50	27	$ 712.40	$4,078	$2,917	$2,074	$1,966	$ 780	$12,527
180	50	27	$ 986.40	$5,155	$3,724	$2,871	$2,722	$1,080	$16,539
200	50	27	$1,096.00	$5,586	$4,047	$3,190	$3,024	$1,200	$18,144

Source: Minimum zoning regulations adopted by Waukesha County municipalities, average local improvement costs. University of Wisconsin-Milwaukee Urban Research Center, 1992.

Other factors that need to be accounted for in assessing infrastructure costs for wider lots are costs for the extensions in the length of the sidewalks and the planting strips between the edge of the roadway and sidewalks. In addition to the costs to improve the raw land for the roads, sidewalks, and planting strips, there is an additional cost for the purchase of the raw land for these elements of infrastructure. The cost of infrastructure improvements associated with the street length (water supply, sanitary sewer, paving of road, sidewalk construction, and storm drainage) increased from approximately $7,000 to $18,000 per lot as the frontage per lot increased from 60 to 200 feet—equivalent to approximately $80 per linear foot of lot

frontage requirement. To put these on a per dwelling unit basis, you would divide by two assuming that you need to divide the additional cost s between the two facing houses across the street from each other. Also keep in mind these costs are in 1992 dollars.

The *minimum* and the *median* front setback requirements for Waukesha County, Wisconsin were 25 feet and 50 feet, respectively. In the study, the cost for the utility lateral lines plus the cost for driveway paving at the 25-foot setback was $2,000, and the cost at the 50-foot setback was $3,200. The difference in costs for these values of front setbacks was approximately $50 per foot of setback (1992 dollars).

Within Waukesha County, communities which are more urbanized or in high-growth areas allow development of smaller single-family lots than do more rural towns and villages. The smallest lot size approved for SFD homes in Waukesha County, Wisconsin in 1992 was 4,800 square feet. The median value for the minimum lot size for the highest density residential district permitting SFD homes for the 32 communities in Waukesha County was 20,000 square feet. The report did not attribute a specific cost differential to larger lot size requirements, probably due to the high spatial variability of land cost.

Minimum interior floor area requirements were noted as a possible significant contributor to regulatory cost barriers for affordable housing in the Waukesha study. The adopted minimums for the communities ranged from 900 to 1,500 square feet. The median required minimum floor area adopted in Waukesha County for a SFD residence in 1992 was 1,100 square feet; although the most frequently adopted minimum floor area was 1,200 square feet. These values for minimum floor area requirements are near the average values found by the research team for the nationally representative sample of jurisdictions. The study noted that although most of these minimum floor area requirements are considerably smaller than the homes built during the previous decade, the minimums can still be adjusted to allow more affordable housing to be constructed.

Open space requirements in subdivision rules may be stated in one of the principal formulae:

- Percentage of total subdivision land
- Number of square feet per dwelling unit
- Number of square feet per person

Using the applicable minimum lot area for a subdivision and the median household population in the United States—2.69 people per household based on the 2000 U.S. Census—the three measures of open space can be expressed in the same units of number of square feet per dwelling unit.

Open space requirements in Waukesha County at the time of the study ranged from 1,500 to 7,500 square feet per dwelling unit when sewer was available, and from 9,400 to 15,000 square feet in areas without municipal sanitary sewer service. Depending on the costs for additional raw land to provide for subdivision open space requirements, these standards may be a significant contributor to regulatory cost barriers.

Based on a comparison with the minimum development standards adopted in the county which were considered to be reasonable guideline minimums, the Waukesha County study listed the following five items as the most obvious steps to reduce the cost of finished dwellings:

- Decreasing the minimum lot size in the highest density single-family zone
- Reducing required lot width in these zones
- Reducing the front yard setback requirements in these zones
- Reducing the minimum floor area required in these zones
- Reducing the street pavement width in these zones

3. Existing Regulations

For the study detailed in this report, the project team assessed the cost impacts of regulatory barriers to the construction of SFD dwellings within subdivisions. In the quantitative portion of this study, the research team estimated the cost impacts of subdivision rules and zoning ordinances which require land or site development standards in excess of what is needed to protect public health and safety.

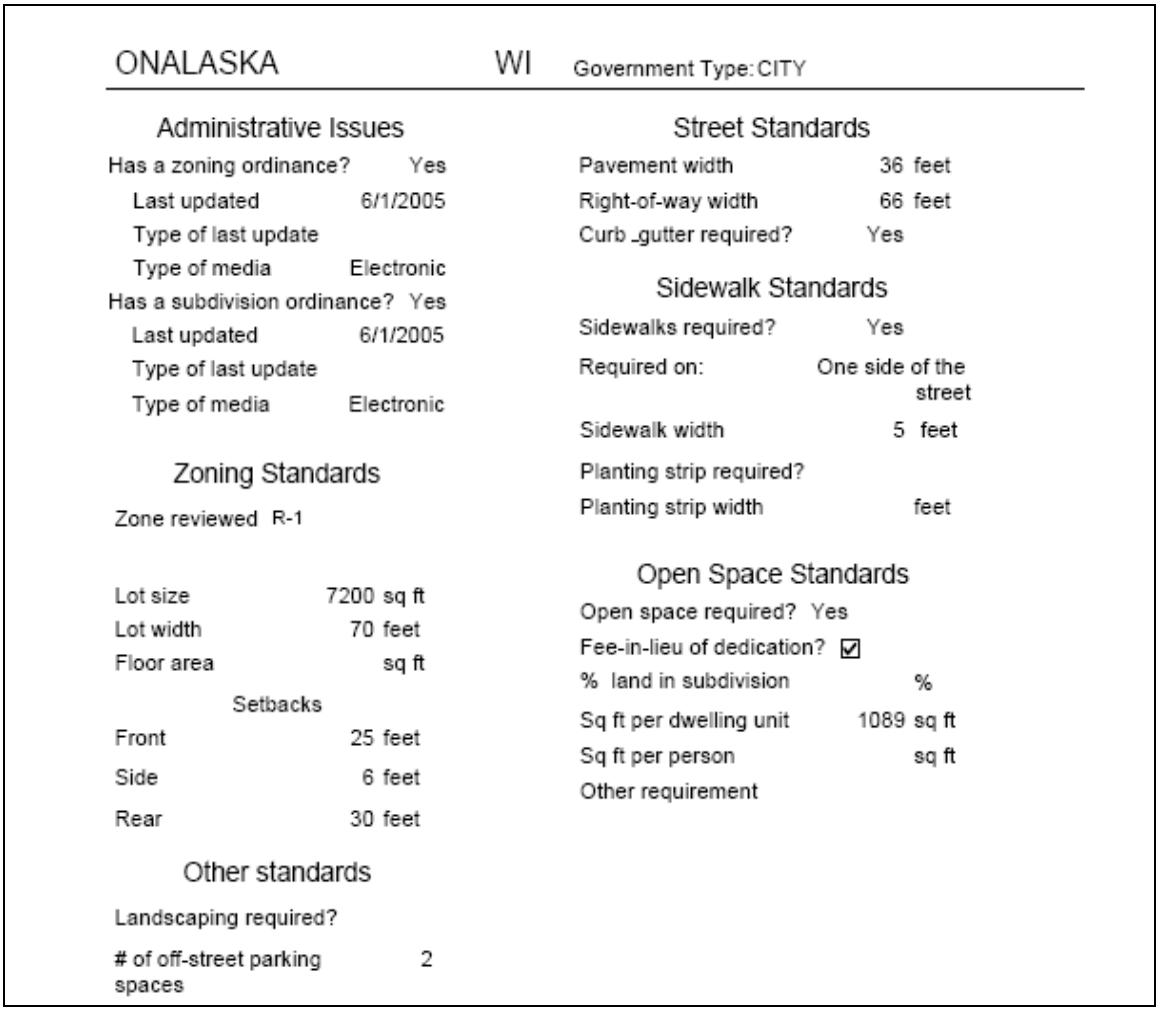
For the quantitative assessment of the cost barriers, the team sampled the land and site development standards in the subdivision rules and zoning ordinances of 469 separate municipal or county level planning jurisdictions. The sample was selected using statistical considerations in order to be representative of planning jurisdictions throughout the United States. Specifically, the team looked at the standards that applied to the subdivision of land for the construction of SFD dwellings. In most jurisdictions there is more than a single zoning district that allows these dwellings. In these cases, the study considered the zoning district that allowed the smallest lot sizes for SFD dwellings.

Land development and site development standards data were entered into a Microsoft Access database where they could be analyzed for a range of statistical measures and to quantify the effect of subcomponents of the sample. The team recorded key characteristics of each planning jurisdiction in the sample to ascertain the role of these characteristics with respect to the requirements for land and site development standards. These subcomponents of the sample included:

- Planning jurisdiction government type
- U.S. Bureau of Census region (Northeast, South, Mid-West, and West)
- Membership in a Metropolitan Statistical Area (MSA)
- Central city or outside central city
- Population separated into quartiles

The research team developed a basic descriptive reporting format for the collected data, which presents the recorded standards for each jurisdiction. An example of this format is presented in Figure 3.1.

Figure 3.1: Sample Database Report Output Format Showing Data Collected for Each Jurisdiction



ONALASKA WI Government Type: CITY

Administrative Issues

Has a zoning ordinance?	Yes
Last updated	6/1/2005
Type of last update	
Type of media	Electronic
Has a subdivision ordinance?	Yes
Last updated	6/1/2005
Type of last update	
Type of media	Electronic

Zoning Standards

Zone reviewed R-1

Lot size	7200	sq ft
Lot width	70	feet
Floor area		sq ft
Setbacks		
Front	25	feet
Side	6	feet
Rear	30	feet

Other standards

Landscaping required?	
# of off-street parking spaces	2

Street Standards

Pavement width	36	feet
Right-of-way width	66	feet
Curb _gutter required?	Yes	

Sidewalk Standards

Sidewalks required?	Yes	
Required on:	One side of the street	
Sidewalk width	5	feet
Planting strip required?		
Planting strip width		feet

Open Space Standards

Open space required?	Yes	
Fee-in-lieu of dedication?	☑	
% land in subdivision		%
Sq ft per dwelling unit	1089	sq ft
Sq ft per person		sq ft
Other requirement		

Source: EcoNorthwest, 2006

3.1 Sampling of Jurisdictions

The foundation of this study is a statistically representative sample of local governments (municipal and county level) in the United States that have the authority to adopt land use regulations. The sampling challenge was to develop a methodology that resulted in a random sample that is representative of the population. The objective of the project was to develop a sample that was: (1) geographically representative; (2) reflected the national distribution of population (including jurisdiction size); (3) reflected both fast and slow growing jurisdictions; and (4) represented a range of government types.

The project team selected jurisdictions based on weighing the sample by population in states and the amount of growth in each local government between 1996 and 2000. This methodology placed emphasis on the amount of population in each state, and ensured that both fast and slow

growing governments were represented. The rationale for the sampling methodology is described in sub-appendix A-2, contained in Appendix A – Survey of Regulatory Standards.

The sampling methodology originally intended to examine subdivision rules from 1,100 jurisdictions. When the project team began evaluating which standards to measure, it found that many of the relevant standards were in zoning ordinances, rather than subdivision rules. After consultation with HUD, the team decided to review both the zoning ordinances and subdivision rules and to reduce the sample size to 500 jurisdictions, reflecting the increased labor required for the collection and analysis of the zoning ordinances. In cases where the ordinances could not be obtained from the jurisdiction, the team employed a substitution method to choose a different jurisdiction. Ultimately 469 separate jurisdictions were included in the sample utilized for the national regulatory barrier cost estimates.

After selecting the sample, the project team collected zoning ordinances for review. The structure of a typical zoning ordinance presents some inherent analytical challenges. A typical zoning ordinance has three or more residential districts. The research team concluded that reviewing every residential district for each jurisdiction in the sample would be infeasible. Thus, the team developed a protocol for gathering ordinances that significantly reduced the data collection effort. The team focused on the "border" zone between low-density single-family development and high-density multifamily development because the land requirements are smaller (e.g., minimum lot sizes are typically smaller), which should result in lower housing costs. The "border" zone was defined based on the following characteristics: it permitted detached single-family houses outright; it had the smallest minimum lot size and setbacks; and, where applicable, it allowed a mixture of detached single-family houses and duplexes or multifamily housing. In cases where it was unclear which zone to choose after evaluating these characteristics, the research team opted for the zone with the smallest minimum lot size where SFD homes are permitted outright.

After collecting ordinances, identifying the appropriate zone for analysis, and inputting data, the research team conducted a statistical analysis of the sample. The analytical approach focused on two types of statistical analysis: (1) basic descriptive analysis; and (2) inferential statistics in the form of means testing. The basic descriptive analysis consisted of the following statistics: mean, median, mode (most frequently reported value), frequencies, range, and standard deviation. The means testing used chi-square and ANOVA with post-hoc testing to determine if the variables varied systematically by class membership within subcomponents of the sample including government type, Census region, membership in a Metropolitan Statistical Area (MSA), central city, and population quartiles.

3.2 Selection of Land Development Standards

The project began with a list of about 75 land or site development standards (referred to as "variables") that were considered for inclusion in this study. The team narrowed the list of variables by reviewing ordinances from 10 jurisdictions to assess whether subdivision ordinances commonly contained the standards on the list. Many site-specific variables on the original list were not in the initial 10 ordinances.

At that point, the team began considering expanding the scope of the project to include some variables from zoning ordinances because the preliminary research indicated that many standards, especially those related to lot size, which have substantial impact on housing costs, are not typically included in subdivision ordinances. The team reduced the number of variables to 15 and conducted a second review of 10 jurisdictions' subdivision and zoning ordinances to determine how frequently these variables occurred in the ordinances. This review showed that the variables on the reduced list were frequently found.

The list of variables was finalized based on the following criteria:

- **Expected impact of the variable on housing cost.** This was a critical factor. Some of the variables initially considered were estimated to have minimal impact on the cost of housing. For example, many of the jurisdictions in the preliminary review contained standards for the angle of street intersections, but, based on the team's expertise in residential construction, it was understood that this factor has little impact on the cost of housing in a subdivision.
- **Likelihood and ease of finding the variables within a zoning or subdivision ordinance.** A number of the variables that the team was originally interested in measuring were not generally found in either subdivision or zoning ordinances. For example, the minimum diameter of a sewer lateral or street pavement surface thickness was not often found in either the zoning or subdivision ordinances.
- **Ease of measuring the variables.** Some of the variables that were considered were difficult to measure. For example, landscaping standards vary substantially among ordinances. The team was unable to find a way to quantify such diverse standards. Instead, the researchers chose to identify whether or not each jurisdiction had landscaping requirements in their zoning or subdivision ordinances.

The following variables were selected for inclusion in the review of subdivision rules and zoning ordinances for this study:

- Lot width minimums
- Lot size minimums
- Yard set-back minimums (front yard, side yards, rear yard)
- Floor area minimums

- Off-street parking requirements
- Curb and gutter requirements
- Minimum street right-of-way width
- Minimum pavement width
- Sidewalk requirements
- Open space requirements
- Landscaping requirements

3.3 Definitions

This section includes definitions of terms that are used for the statistical analysis.

Means testing. This includes tests that describe the variation with in the sample. Types of means tests include: chi-squared and ANOVA.

Statistically significant. Results are referred to as statistically significant or significant if a statistical test shows a difference that is unlikely to occur by chance.

Chi-square. A statistical procedure used to test for differences between groups of categorical data. This technique makes use of data classified into a contingency table, and the results are based on a comparison of expected frequencies with observed frequencies. (For further details see http://www.statistics.com/content/glossary/c/chisqtest.php.)

ANOVA (Analysis of Variance). Techniques used to determine if differences between two or more groups are significant. This type of test is based on an assessment of the variation between groups relative to variation not associated with differences in group membership. (For further details see http://www.animatedsoftware.com/statglos/sg_anova.htm.)

3.4 Analytical Framework

For this project, the analytical approach focused on two types of analysis—basic descriptive analysis, and means testing. The basic descriptive analysis consisted of the following statistics: mean, median, mode, frequencies, range, and standard deviation. The means testing consisted of using chi-square and ANOVA tests.

The means tests showed statistically significant[1] differences among the jurisdictions. Jurisdictions were separated by certain characteristics, such as population size or whether the jurisdiction belonged to an MSA. These groupings, which represent subcomponents of the sample, allowed the research team to perform the means testing to compare the regulatory standards between regions within the sample, rather than the entire sample. Using these groupings allowed for comparisons that showed regional variation among the subcomponents of the sample. The subcomponents included:

[1] For the remainder of the report, "statistically significant" results will be denoted as "significant."

Government type. Jurisdictions were separated by six government types—county, city, town, township, village, and other government type. Counties and parishes were combined because there are few parishes, and they serve a similar function as counties. All the other government types were combined as well because they made up less than 3 percent of the governments in the study.

Census region. States were grouped into the four regions used by the U.S. Census: Northeast, Midwest, South, and West.[viii]

Part of an MSA. Jurisdictions were grouped by whether they are a part of a Metropolitan Statistical Area (MSA), as defined by the U.S. Census. Jurisdictions belonging to an MSA are more likely to be located in an area where the population is densely distributed.

Central city. Jurisdictions were grouped based on whether they are a central city, as defined by the U.S. Census. A central city is the largest city of a Metropolitan Area (MA) and is a basis for establishment of an MA. Jurisdictions that are a central city are typically more densely populated than jurisdictions that are not a central city.

Population. The sample jurisdictions were grouped into quartiles based on their populations from the 2000 U.S. Census. The groups were as follows: fewer than 5,491 people; 5,492 to 25,176 people; 25,177 to 97,268 people; and more than 97,268 people.[ix]

The means tests indicated whether sample subcomponents, such as government type or Census region, make a difference in the standards that jurisdictions establish. For example, the means testing tells whether a variable such as lot size is likely to be different if the government is a city or county or if it is located in the east or west, etc. The research team used two forms of means testing—chi-square and ANOVA.

The team performed chi-square tests on each variable using the five subcomponents of the sample. The chi-square indicated which variables had significant differences for the subcomponents of the sample. It is likely that significant differences were caused by differences in the variables for the subcomponents. In other words, if the chi-square for lot size by government type is significant, then it is likely that lot size varied in a significant pattern by government type.

The research team then performed an ANOVA test to identify which subcomponents had significant differences. Where the chi-square test can indicate a significant difference among all of the subcomponents, the ANOVA can show the significant differences between each of the subcomponents. For example, this test might show that lot sizes are statistically different in cities than in counties. Researchers performed this test for the government type, Census region, and population subcomponents.

In cases where the team found standards for the variables in fewer than 100 jurisdictions, it did not perform any means testing because there were too few data to produce meaningful results. Appendix A – Survey of Regulatory Standards includes additional details about statistical procedures.

3.5 Summary of Descriptive Analysis of Regulatory Standards

Table 3.1 below and the following general observations on the sample provide summary of descriptive statistics for the variables reviewed in the study.

Table 3.1: Summary of Descriptive Statistics of the Variables Reviewed

	N	Mean	Median	Mode	Standard Deviation	Minimum	Maximum
Lot size	419	9,924	6,000	5,000	16,946	750	217,800
Lot width	342	62	60	50	25	20	250
Front yard	413	25	25	25	13	0	100
Side yard	417	8	8	5	5	0	30
Rear yard	404	21	20	25	9	0	65
Minimum floor area	86	1,060	1,000	1,000	359	500	2,500
Off-street parking	367	2	2	2	1	0	4
Open space requirements							
Percent of total land in subdivision	47	13	10	10	9	3	50
Number of square feet per dwelling unit	18	1,562	795	871	3,447	310	15,246
Number of square feet per person	34	229	218	218	112	87	436
Sidewalk width	153	4	4	4	1	3	10
Planting strip width	37	5	5	5	1	2	8
Street pavement width	192	28	28	30	6	16	45
Street right-of-way width	262	52	50	50	8	20	80

Source: Study of Subdivision Requirements as a Regulatory Barrier to Affordable Housing, Descriptive Analysis, CPW 2006
Units are linear feet except minimum floor are in square feet

The statistical analysis led the research team to the following broad conclusions:

The sample is roughly representative of each state by population and geography. The sampling methodology was designed to draw a sample of jurisdictions based on the states' populations proportionate to the U.S. population. It was also designed to ensure geographic diversity by including a minimum of two jurisdictions per state, regardless of population. Jurisdictions in the sample represent 26 percent of the entire U.S. population.

Most of the 469 jurisdictions reviewed had zoning and subdivision ordinances. Ninety percent of the jurisdictions had a zoning ordinance and 86 percent had a subdivision ordinance. Six percent of the jurisdictions had neither a subdivision nor a zoning ordinance.

Lot size requirements were highly variable among jurisdictions. The smallest minimum lot size in the study was 750 square feet and the largest was 217,800 square feet (5 acres).

Forty-one percent of the jurisdictions in the sample had minimum lot sizes between 5,000 and 6,999 square feet. Statistical testing showed significant differences in lot size requirements for each subcomponent of the sample. For example, there were significant differences in minimum lot sizes for each of the four Census regions (one of the subcomponents of the sample), with larger minimum lot sizes in the Northeast than in the other three regions.

Lot widths varied across jurisdictions. The smallest lot width requirement was 20 feet, the largest was 250 feet, and the median was 60 feet. Fifty-five percent of jurisdictions required minimum lot widths of 50 to 69 feet. As with lot sizes, statistical testing showed significant differences in lot width requirements for each subcomponent of the sample.

The mean front set-back requirement was 25 feet. Fifty-six percent of jurisdictions had front setbacks between 20 and 29 feet. Like lot size and width, front setbacks differ in a significant way for each subcomponent of the sample.

The mean side set-back requirement was 8 feet per side. Fifty-eight percent of jurisdictions required minimum side yard setbacks of between 5 to 9 feet. Side setbacks differed in significant ways for each subcomponent of the sample.

The mean rear set-back was 21 feet. The smallest requirement for a rear set-back was zero feet and the largest was 65 feet. Fifty-five percent of jurisdictions required rear set-back of between 20 and 29 feet. Rear yard setbacks differed in significant ways for each of the five subcomponents of the sample, except for population quartiles.

Fewer than 20 percent of jurisdictions had minimum floor area requirements. For those jurisdictions that have such requirements, the mean floor area was 1,060 square feet and the median 1,000 square feet. The smallest floor area requirement was 500 square feet per dwelling unit and the largest 2,500 square feet.

More than three-quarters of the jurisdictions required two off-street parking spaces. The mean number of off-street parking spaces required per dwelling unit was 1.88 and the median was 2 parking spaces. Further statistical testing showed that the number of off-street parking spaces required differed in a statistically significant way based on population quartile, as well as between central cities and non-central cities.

Fewer than half of the jurisdictions had landscaping standards. Forty-two percent of the jurisdictions had landscaping standards specifically for subdivisions or the zoning district that were examined for the study. Differences in landscaping requirements are significant for the following subcomponents of the sample: Census region, if the jurisdiction is part of an MSA, and population quartile.

Twenty percent of jurisdictions had quantitative open space requirements. The research team collected three types of requirements for open space: (1) percent of total land in the subdivision; (2) number of square feet per dwelling unit; and (3) number of square feet per person. About 20 percent of the jurisdictions in the sample used at least one of these methods for determining open space requirements.

Fifty-one percent of all jurisdictions n the sample explicitly required sidewalks. Of those jurisdictions, 51 percent (e.g., about one-quarter of all jurisdictions in the sample) required sidewalks on both sides of the street. The average sidewalk width was 4 feet. Requirements for sidewalks varied systematically by the following subcomponents of the sample: government type; membership in an MSA; and the jurisdiction's population. In contrast, sidewalk width requirements did not vary systematically based on any of the subcomponents of the sample.

Relatively few (8%) jurisdictions had requirements for planting strips. The planting strip is a landscaped area between the sidewalk and curb. The mean and median planting strip width was 5 feet.

Curbs and gutters were required by 50 percent of the jurisdictions in the study.

The mean and median pavement width for streets was 28 feet. Most jurisdictions' standards for pavement width were either from 20 to 24 feet wide, from 25 to 29 feet wide, or from 30 to 34 feet wide. Pavement width differed in a statistically significant way for each subcomponent of the sample.

The mean street right-of-way was 52 feet. Fifty-six percent of jurisdictions with right-of-way standards require right-of-ways no smaller than 50 to 54 feet; and 24 percent of jurisdictions require right-of-ways at least 60 to 64 feet wide. Street right-of-way requirements vary systematically by Census region.

3.6 Summary of Means Testing Of Regulatory Standards

The results of means testing, including chi-square and ANOVA tests, are summarized by variable below. Table 3.2 shows a summary of the results of the chi-square tests. Statistically significant results are denoted with a star (*). A significance level of less than 0.05 is considered significant.

A statistically significant result means that it is highly probable that there is a difference within the subcomponent for the variable. For instance, off-street parking requirements are only statistically significant for central city and population. That means that off-street parking requirements are different for jurisdictions that are a central city and jurisdictions that are not a

central city. Likewise, off-street parking standards are different for jurisdictions with different sized populations.

Table 3.2: Summary of Means Testing for Variance within Five Subcomponents of the Sample

	Government type	Census region	Part of MSA	Central city	Population
Lot size	0.000*	0.000*	0.000*	0.000*	0.000*
Lot width	0.000*	0.000*	0.000*	0.000*	0.000*
Front yard	0.000*	0.000*	0.000*	0.000*	0.000*
Side yard	0.000*	0.000*	0.000*	0.000*	0.000*
Rear yard	0.007*	0.000*	0.001*	0.029*	0.055
Off-street parking	0.804	0.556	0.622	0.000*	0.011*
Open space requirement	0.216	0.003*	0.058	0.460	0.200
Landscaping requirement	0.054	0.002*	0.018*	0.783	0.000*
Sidewalk required	0.007*	0.096	0.000*	0.143	0.001*
Sidewalk width	0.841	0.060	0.565	0.156	0.251
Street pavement width	0.001*	0.000*	0.050*	0.046*	0.021*
Street right-of-way width	0.903	0.000*	0.233	0.323	0.387

Source: Study of Subdivision Requirements as a Regulatory Barrier to Affordable Housing, Descriptive Analysis, CPW 2006. Calculations by ECONorthwest.

Note: Statistically significant results are noted with an star (*) for p < .05.

The means tests led the research team to the following broad conclusions:

Lot size requirements were statistically significant for all subcomponents of the sample. Table 3.2 shows that lot size requirements were significantly different for each subcomponent of the sample. For example, lot size requirements were different based on the jurisdiction's type of government or whether the jurisdictions was within an MSA.

Further statistical testing showed the differences in lot sizes among subcomponents of the sample.[2] Lot size varied within each subcomponent in the following ways:

Government type: City lot sizes were significantly smaller than county, town, and township lot sizes.

Census region: Lot sizes in the Northeast were statistically larger than lot sizes in the other three regions.

Population: Lot sizes in the first quartile, jurisdictions with the fewest people, were statistically larger than lot sizes in other quartiles.

[2] This form of statistical testing, an ANOVA, required a minimum of three groups within the subcomponent. The project team conducted this test for the government type, Census region, and population subcomponents.

The differences observed within both types of means testing reinforce the conclusion that statistical differences resulted from differences in lot size within the subcomponents.

Lot width requirements were statistically significant for all subcomponents of the sample. Table 3.2 shows that lot width requirements were significantly different for each subcomponent of the sample. For example, jurisdictions located in different Census regions had significantly different lot width requirements. Further statistical testing showed that lot width varied in the following ways:

> **Government type:** Lot widths were statistically different between the following groups—cities had smaller average lot widths than villages, towns, or townships; and counties had larger average lot widths than towns or townships.
>
> **Census region:** Lot widths were statistically different between the Northeast and all other regions. The Northeast had larger average lot widths than any other region. Lot widths in the Midwest were statistically larger than those in the West.
>
> **Population:** Lot widths were statistically different between the first population quartile, jurisdictions with the fewest people, and the other quartiles. The first quartile had larger average lot widths than the other quartiles. In addition, the second quartile had significantly larger lot widths than the fourth quartile.

The differences observed within both types of means testing reinforce the conclusion that statistical differences resulted from differences in lot width within the subcomponents.

Front yard requirements were statistically significant for all subcomponents of the sample. Table 3.2 shows that front yard requirements were significantly different for each subcomponent of the sample. Further statistical testing showed that front yard requirements varied in the following ways:

> **Government type:** Front setbacks were statistically different for the following groups—counties had smaller average front setbacks than townships; and cities had smaller average front setbacks than towns, townships, and villages.
>
> **Census region:** The West had statistically smaller average front setbacks than any other region. The South had statistically smaller average front setbacks than the Midwest and Northeast.

The differences observed within both types of means testing reinforce the conclusion that the statistical differences result from fundamental differences in front setbacks within the subcomponents.

Side yard requirements were significant for all subcomponents of the sample. Table 3.2 shows that side yard requirements were significantly different for each subcomponent of the sample. Further statistical testing showed that side yard requirements varied in the following ways:

> **Government type:** Side setbacks are statistically different for the following groups—counties have smaller average front setbacks than towns and townships; and cities have smaller average front setbacks than towns, townships, and villages.
>
> **Census region:** The Northeast has larger average side setbacks, a significant difference between the Northeast and the other regions. The West has smaller average side setbacks than any other region, which is also significant.
>
> **Population:** The first population quartile—jurisdictions with the fewest people—have larger average side setbacks, which is significantly different from each other quartile. Likewise, the second population quartile has larger average side setbacks than the third and fourth quartiles, which is also significant.

The differences observed within both types of means testing reinforce the conclusion that the statistical differences resulted from fundamental differences in side yard requirements within the subcomponents.

Rear yard requirements were significantly different for most subcomponents of the sample. Table 3.2 shows that rear yard requirements were statistically significant for each subcomponent except population. Further statistical testing showed that side yard requirements varied in the following ways:

> **Government type:** Rear setbacks were on average smaller in counties than townships, a significant difference. Cities had smaller average rear setbacks than towns and townships.
>
> **Census region:** The West had significantly different re0ar setbacks, which were generally smaller than the other regions. The South's rear setbacks were also statistically different from other regions. The South had larger rear setbacks than the West and smaller rear setbacks than the Northeast or Midwest.
>
> **Population:** Jurisdictions in the fourth quartile of population (having the largest populations) had smaller average setbacks than any other quartile. This difference was significant between the fourth quartile and the first and second quartiles.

The differences observed within both types of means testing reinforce the conclusion that the statistical differences resulted from fundamental differences in rear yard requirements within the subcomponents.

Off-street parking requirements varied significantly for two subcomponents of the sample. Table 3.2 shows that off-street parking requirements were significantly different within the central city and population subcomponents. In other words, the number of off-street parking spaces required varied, depending on whether the jurisdiction was a central city and the amount of population the jurisdiction had.

Additional statistical testing showed that off-street parking requirements varied for the population subcomponent. Jurisdictions in the fourth quartile of population (having the largest populations) require less off-street parking than jurisdictions in the second population quartile. This result reinforces the conclusion that the statistical differences resulted from fundamental differences in off-street parking requirements within population quartiles.

Open space requirements varied significantly among Census regions. Table 3.2 shows that open space requirements only varied significantly among Census regions. For example, whether a jurisdiction required open space or not was not significantly different for jurisdictions located in a central city and those not within a central city. The research team did not perform further tests for open space because open space had only two possible values (yes or no) and the ANOVA test requires three or more possible values (i.e., yes, no, maybe).

Landscaping requirements varied significantly for some subcomponents. Landscaping requirements varied significantly for the following subcomponents—Census region, membership in an MSA, and population. For example, landscaping requirements varied significantly based on whether the jurisdiction was part of an MSA or not. The research team did not perform further tests for landscaping because landscaping had only two possible values (yes or no) and the ANOVA test requires three or more possible values (i.e., yes, no, maybe).

Sidewalk requirements varied significantly for some subcomponents but sidewalk width requirements did not vary significantly for any subcomponent. Whether a jurisdiction required a sidewalk varied significantly among the following subcomponents—government type, membership in an MSA, and population. The research team did not perform further tests for sidewalk requirements because it had only two possible values (yes or no) and the ANOVA test requires three or more possible values (i.e., yes, no, maybe).

Sidewalk width requirements did not vary significantly by any subcomponent of the sample, which is consistent with the findings shown in Table 3.2 that sidewalk widths had little variation.

Street pavement width varied significantly for each subcomponent of the sample. Table 3.2 shows that street pavement widths varied significantly for all subcomponents. For instance, street pavement requirements were significantly different for the Census regions, with jurisdictions in some regions requiring wider pavement widths than in other regions.

Additional statistical testing showed differences in pavement widths within subcomponents of the sample. The tests showed differences within government type and Census region, indicating that pavement widths varied significantly by government type and Census region. Although the chi-square statistical test indicated that pavement widths were statistically different among population quartiles, additional statistical testing indicated that there are no significant differences in pavement widths for population quartiles. Pavement widths varied within each subcomponent in the following ways:

> **Government type:** Cities had the largest average pavement widths of any government type. This difference in pavement widths was significant between cities and towns.
>
> **Census region:** Pavement widths were statistically different between the West and the Northeast and South. The West had larger average pavement widths.
>
> **Population:** There were no significant differences in pavement widths when analyzed by population quartiles.

The differences observed within both types of means testing reinforce the conclusion that the statistical differences resulted from fundamental differences in pavement width requirements within the subcomponents.

Street right-of-way width varied significantly among Census regions. Table 3.2 shows that right-of-way widths only varied significantly among Census regions. Additional statistical testing shows that street right-of-way widths were statistically different between the Midwest and all other regions. The Midwest had larger average right-of-way widths than the other regions. This result reinforces the conclusion that the statistical differences resulted from fundamental differences in right-of-way widths within Census regions

4. Standards, Benchmarks, and Unit Costs

The research team assumed that an SFD dwelling developed in conformance with appropriate land and site development standards for the protection of public health and safety would be characterized by a minimum benchmark set of land development standards for lot size, floor space requirements, lot width, etc. The benchmark standards are based on 12 individuals responding to a survey of 25 land development professionals including residential land developers, civil engineers, architects, land planners in private practice, and land planners employed by planning jurisdictions. The individuals solicited in the survey were recommended by the National Association of Home Builders (NAHB) and the National Association of Counties (NACo).

4.1 Benchmarks

The benchmark standards in Tables 4.1 and 4.2 were set at the mean value of the benchmark values suggested by the 12 respondents to the survey described above. The respondents were asked to submit benchmark standards appropriate to geographic areas with "more dense" development. The more dense development scenario was defined as a median lot size of 7,000 square feet or 0.16 acre.

[x] These benchmarks were used for comparison with jurisdiction requirements for Metropolitan Statistical Areas (MSA). Separate standards were solicited for communities with "less dense" development. The "less dense" development scenario was described as a community with a median lot area of 22,000 square feet or 0.50 acre.[xi] These benchmarks were used for comparison with jurisdiction requirements outside Metropolitan Statistical Areas (non-MSA).

Table 4.1: Expert Responses for Land Development Benchmarks for "More Dense" Development, Statistical Summary of Responses Used for Comparison in MSAs (N=12)

Land Development Standard	Mean	Minimum	Maximum
Lot size (feet) [2]	4,250	2,750	7,000
Lot widths (feet)	39	30	60
Front, side, and rear setbacks			
FRONT (feet)	13	0	30
SIDE (feet)	5	3.5	6
REAR (feet)	16	10	30
Floor area minimums (feet) [2]	981	400	1,750
Paved roadway width (feet)			
On-street parking allowed one side only	24	21	28
On-street parking allowed on both sides	27	22.5	32
Width of planting strip required (feet)	5.1	3.5	10
Sidewalk width (feet)	3.94	3	5
Number of off-street parking places required	1.56	1	2
Open space requirements (% of total land in subdivision)	12.9	0	40

Table 4.2: Expert Responses for Land Development Benchmarks for "Less Dense" Development, Statistical Summary of Responses Used for Comparison in MSAs (N=8)

Land Development Standard	Mean	Minimum	Maximum
Lot size (feet) [2]	9,411	3,200	20,000
Lot widths (feet)	54	20.0	90
Front, side, and rear setbacks			
FRONT (feet)	19	0.0	35
SIDE (feet)	8	0.0	20
REAR (feet)	21	10	50
Floor area (feet)[2]	1,481	800	2,500
Paved roadway width (feet)			
On-street parking allowed one side only	23	20	28
On-street parking allowed both sides	28	22.5	36
Width of planting strip required (feet)	6.1	3.5	10
Sidewalk width (feet)	3.93	3	5
Curb and Gutter drainage			7 out of 8 respondents indicate swales/ drainage ditches should be considered for alternate drainage
Number of off-street parking places required	1.6	1	2
Should required parking be under cover?			consensus of 7 out of 8 respondents : No
Open space requirements (% of total land in subdivision)	11.5	4.0	25.0

As expected, the expert survey result for the benchmark lot sizes, lot widths, minimum front, rear, and side setbacks, and for minimum square foot floor areas are all significantly smaller for the "more dense" population scenario as compared with the "less dense" population scenario. This reflects that a more compact development pattern is generally followed in more urbanized locations.

Costs to a homebuyer for developed lots which conform to the benchmark standards will be lower in general as compared to developed lots with larger lot areas, frontage widths, and interior floor space. The cost differential between a lot developed according to the benchmark standards and the more common larger lot sizes and dwelling characteristics seen in existing residential subdivisions are classified as a regulatory cost barrier in this report. Notwithstanding this designation, larger, wider lots with larger interior floor space are considered more desirable single-family homes to many potential homebuyers who would be willing to pay more for these dwellings as compared with a benchmark lot and dwelling. The requirement for large, wide lots and large interior floor space is an actual cost barrier to the home buyer who has the resources to afford a home developed according to the benchmark standards but is less able to afford a home developed according to the larger and more costly standards adopted by many planning jurisdictions.

4.1.1 Lot Size

The average benchmark value for lot size developed by the expert panel was 4,250 square feet for "more dense" communities, and 9,411 square feet for "less dense" communities (see figure 4.1). As can be seen, the "required lot sizes", i.e., the median zoned lot sizes for the "more dense" and the "less dense" communities—7000 square feet and 22,000 square feet, respectively—were both significantly in excess of the benchmarks used for these communities. In the more dense communities, required lot sizes were sixty-five percent (65%) greater than the benchmark standard; in the less dense communities,required lot sizes were over 200% greater than the benchmark standard.