The Impact of Multifamily Development on Single Family Home Prices in the Greater Boston Area

By

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B.S. Biology
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Submitted to the Center for Real Estate and the Department of Urban Studies and Planning on May 19, 2005 in Partial Fulfillment of the Requirements for the Degrees of

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ABSTRACT

The impact of large, multifamily developments on nearby single-family home prices was tested in five towns in the Greater Boston Area. Case studies that had recent multifamily developments built near transit nodes or town centers were chosen. For each town, a conservative impact zone around the multifamily development was established, and sales prices in this area were compared to those in the rest of the town.

Using data on the sales of single-family homes from 1987 until 2005, regression analyses were used to construct hedonic price models for the impact and control areas. This model was used to create a sales price index over time. The trend in the index of the impact zone and the control area was compared in the years immediately preceding the permitting of the multifamily development and the years following completion of the development in order to determine if the multifamily development affected sales prices in the impact zone.

In the four cases for which there was appropriate data, no negative effects in the impact zone were found.

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CHAPTER 1: INTRODUCTION

Thesis Purpose and Organization

In this thesis, I investigate the effect of multifamily development on the prices of nearby single-family homes in five towns in the Greater Boston Area. In the suburban towns that surround Boston there is strong community opposition to development, specifically the development of multifamily projects. One of the root causes of this opposition is local homeowners' fear that new development will depress the value of their houses. In order to test the validity of these concerns, I measure the single-family house prices in towns where at least one multifamily development was planned, permitted, and built. I consider sales prices in the periods before, during and after the multifamily project was erected in order to determine if the development had an effect on the trajectory of sales prices of homes around it as compared to the rest of the town.

This research builds upon previous studies looking at the effect of housing developments on surrounding single-family homes. Specifically, this thesis extends the work of David Ritchay and Zoë Weinrobe,[1] who studied the impact of large, affordable projects built under Massachusetts' Comprehensive Permit Law, commonly known as Chapter 40B. Ritchay and Weinrobe's work was the first of its kind to focus on Massachusetts, and in this thesis I seek to extend their findings to a different type of development. While Ritchay and Weinrobe selected cases in which large developments were built in low-density, single-family neighborhoods, I address cases of multifamily developments that have been built near transit nodes, areas with commercial development, or town centers. I sought case studies that embody certain elements of Smart Growth planning, such as building near transit and other infrastructure and incorporating a diversity of housing options within a community. Smart Growth is a relatively new and often nebulously defined term, but it is an important movement in contemporary land use planning, and has been championed by state-level officials in Massachusetts as the preferred model for future development. While assessing the success of Smart Growth principles is beyond the scope of this thesis, I wanted to use case studies that address this movement.

My thesis is organized into six chapters: the introduction in which I introduce some key theories and ideas, a literature review that examines previous research on the impacts of affordable and multifamily housing on nearby single-family homes, a description of the case study developments that I have chosen and the towns that they are in, an explanation of the methodology that I use for the quantitative analysis, a review of the results of the quantitative analysis, and a conclusion that addresses both this research and ideas for additional studies on the topic.

Introduction to the Issues

The Massachusetts Housing Crisis

Housing availability and affordability are among the most pressing issues facing the Commonwealth of Massachusetts today and the situation in the Greater Boston area is particularly severe. A 2004 study by the National Low Income Housing Coalition[2] determined that Massachusetts had the second least affordable rents of any state, and the Boston metropolitan area had the eighth least affordable rents of any U.S. city. According to the 2003 Greater Boston Housing Report Card, rents are increasingly unaffordable[3] in the Boston metropolitan area, with 43.3% of households paying more than 30% of their income for rent, and 21.5% paying more than half of their income.[4]

Buying a home is little better. In 2002, Massachusetts had the third highest median home price of any state,[5] and despite relatively high incomes, had the third highest housing affordability burden as well.[6] The median price of a single-family home in the Greater Boston area exceeded $400,000 in 2003.[7] Again, declining affordability is the trend – in 2003, a household at the median income could only afford to buy a median priced house in only 70 of the 161 Greater Boston communities, a decrease from 95 communities in 2001 and 149 in 1998.[8] The cost of housing is breaking household budgets, changing neighborhoods, and displacing lower-income and young families. Governor Romney has voiced concerns that high housing costs may even begin to impact the Commonwealth's economic competitiveness, as firms consider relocating to areas with more affordable housing for their workers.

In the most basic economic sense, the skyrocketing housing costs are caused by an imbalance in housing supply and demand for housing. A relatively strong and diverse economy, high wages, and quality of life continue to attract households to the Greater Boston Area, resulting in a strong demand for housing. Between 1990 and 2000 the number of households in Boston increased by almost 130,000, or 7.7%.[9] While the recession has slowed this growth in the past three years, it is expected that as the economy recovers, and demographic trends such as immigration and decreasing household size persists, the Greater Boston Area will continue to see a growth in households. In fact, in 2000 the Census Bureau projected that the Greater Boston area would see an increase of 100,000 households by the year 2010.[10]

Meanwhile, the supply of housing, particularly multifamily housing and housing that is affordable to moderate and low-income households, has not kept pace with this demand. In the same ten years, from 1990 to 2000, the housing supply only increased by 5%, or 91,567 units,[11] a shortfall of almost 40,000 units. Construction starts, particularly for multifamily housing, are far below the level needed to balance demand. Permits for multifamily units fell from 1970s highs of about 14,000 units per year to an average of less than 1,500 units per year in the 1990s.[12] Land use statistics reinforce this story. Across the Greater Boston Area, land is being developed seven times faster than the population is growing.[13] Residential density is declining across the state, with persons per acre decreasing from 11.19 in 1950 to 4.97 in 2000.[14] These figures confirm what is visually evident in many of the towns in the Greater Boston area. The new housing that is being developed is primarily large single-family homes on even larger lots, expensive, low-density housing that is largely unaffordable to moderate and lower income households.

The slow pace of multifamily building is not due to a lack of demand – the housing shortage in the state is widely acknowledged and well documented – but rather by local reluctance to permit and build multifamily developments. In 2000, Massachusetts ranked 46th among the 50 states in number of building permits issued. Multifamily permits represented less than 15% of the total, well below the national average. According to Massachusetts Housing Partnership, only 28 towns in Massachusetts approved multifamily developments of five or more units between 2000 and 2002,[15] meaning that 90 percent of towns across the state did not approve a single multifamily development. As of 2001, 45 Massachusetts communities had implemented growth-rate bylaws that essentially curtailed new construction altogether.[16] It is this widespread resistance to development that exacerbates the housing shortage and drives housing prices higher and higher.

The Homevoter Hypothesis

Behind an alphabet soup of NIMBYs, NOPErs, and BANANAs[17] is the disturbing reality that very little development is occurring in Massachusetts. Indeed, beyond a select few urban areas, almost no new multifamily housing is being built in the state. As noted above, zoning and other local land use controls have created this effective development moratorium across the Greater Boston Area. In many towns, the zoning ordinance prohibits higher-density housing, and in many cases land use controls effectively rule out all new development.

William Fischel has extended the Homevoter Hypothesis as a means of understanding this local resistance to development. Land use regulation is a local responsibility, and zoning is one of the most powerful ways that a town and its residents can control its physical and financial destiny. Since its earliest days, zoning has been designed to favor the single-family home, and what Fischel has dubbed the "the primacy of homeownership"[18] can be observed from the position of single-family homes at the top of the use pyramid in most zoning regulations. In Massachusetts, towns have increasingly favored the single-family designation, and in many localities, zoning has become a powerful and often-utilized tool for those who seek to restrict development in their community.

As Fischel details in his book The Homevoter Hypothesis,[19] the popularization of the automobile facilitated a spatial separation of work and live areas, allowing people to drive from their job to their home, and resulting in the rise of purely residential suburban areas dominated by single-family homes. The owners of these houses developed into "homevoters;" active community members who influenced municipal decision making to reflect their own interests. In the field of land use, homevoters frequently pushed for local regulations and zoning that restricted development to single-family homes. This has created a self-perpetuating cycle –

residential communities ruled by the majority interests of homeowners, who restrict non-residential development, making the power of homeowners even more concentrated – to the point where communities are so anti-growth that development has all but halted.

Fischel explains that the homevoters' anti-development mentality is fundamentally rational economic decision making. For most people, a home is the largest (and in many cases, the only) asset that they own. People are ferociously defensive about the value of this asset, since it represents not only a place to live, but also their personal wealth, their retirement, and their children's education and inheritance. However, a home is a high-risk investment. There is no insurance system for home prices, so homeowners can only protect the value of their asset by undertaking value maximizing activities, such as home improvement, and resisting value-minimizing ones.

It is commonly accepted that home values are affected by external factors, including the amenities and disamenities of the neighborhood and actions, such as tax rate changes, that the local government takes. In the past thirty years, the dispersion of employment from center cities to the suburbs has reduced the importance of distance to the central business district in home prices. Meanwhile, "quality of life," as measured by such factors as school performance, and community character, has become a greater factor.

New development brings the potential for many negative impacts on quality of life, including poor aesthetic design, increased traffic and congestion, burden on schools and public infrastructure, and a threat to neighborhood character. Homevoters fear this risk of negative impacts, and worry that new development will decrease their property value, resulting in a capital loss in their largest asset. In other words, homeowners are aware that if the neighborhood goes downhill, their home will lose value, so they do everything they can to minimize the chance that their neighborhood will change. Homevoters "…have staked their savings in their communities' character"[20] and protect it via the blunt but powerful tool of zoning. Thus, the prevalence of anti-development zoning in many towns can be explained by homevoters' financial incentive to protect the value of their homes and their aversion to the risk inherent in change.

Chapter 40B

The most successful tool that Massachusetts has used to overcome community opposition to development and to expand the housing supply is a powerful and controversial statute, Chapter 40B. 40B has been in effect for 36 years and is responsible for the majority of multifamily and affordable housing in many non-urban communities in the Greater Boston area. A brief review of the law follows, for more detailed information about Chapters 40B and 40R, please see the resources listed in the bibliography.

Chapter 40B of the Massachusetts General Law was enacted in 1955. The Comprehensive Permit Law (Sections 20-23), what is commonly referred to as "40B," or the "anti-snob zoning law," was added in 1969 as a means of encouraging the development of more affordable housing. This statute created two provisions to facilitate development. First, developers of projects that include a substantial portion of affordable units can apply to the local Zoning Board of Appeals (ZBA) for a single comprehensive permit for their project rather than multiple projects from multiple municipal bodies. Second, in communities where less than ten percent of the housing stock is deemed affordable, developers whose projects are turned down at the local level can appeal the decision to a state Housing Appeals Committee, which can overrule local opposition and approve the project. In practice, the Appeals Committee has supported the development in most cases and Chapter 40B has allowed developers to build large, multifamily low- or mixed-income projects in many towns with exclusive zoning rules.

Chapter 40B has been the single most successful mechanism in spurring the production of multifamily housing across the state. In the vast majority of appeals since the enactment of 40B, the state Housing Appeals Committee has found in favor of the developer, and over half of the developments appealed have been constructed. Since 1969, over 500 developments with over 35,000 units have been constructed under 40B. In many cases, Chapter 40B is the only way that these units are being produced. In fact, since 2000, in towns with less than ten percent affordable units, the comprehensive permit process accounted for almost half the total production and more than 96 percent of the affordable units produced.[21]

Chapter 40B has become an increasingly important tool in the production of new housing. According to the Citizens Housing and Planning Association (CHAPA), the percent of new units that have been built under 40B has increased from 15% in the early 1970s to 81% in the mid-1990s. In the past five years, 83% of all affordable units added to the state's inventory used the 40B process.[22] These statistics highlight the mounting difficulty of building multifamily, low- or mixed-income developments in non-urban areas, and the importance of Chapter 40B in encouraging housing production. Additionally, it is evidence that in looking for larger multifamily developments in towns in the Greater Boston Area, the vast majority of examples are projects built under 40B.

Recent changes to 40B have encouraged towns to take a more progressive approach to planning for housing diversity. For example, a town can now submit a "Planned Production" plan to the state Department of Housing and Community Development outlining how it will achieve a minimum 0.75% growth in affordable units each year for five years. If this plan is approved, and the town continues to meet its goals, that town is exempted from state overrides on 40B projects.

Community Opposition in Massachusetts

Despite its successes, 40B has not had a smooth history. Massachusetts is a home rule state, with every power not explicitly designated to the Commonwealth reserved for its 361 towns and municipalities. Zoning and land use are among the most cherished of these local powers, and Chapter 40B has been a particularly passionate subject. The law allows developers, often viewed as greedy, out-of-town, big-city builders, to surpass local zoning and build developments that would often not be allowed under the local zoning ordinance. Since its passage, hundreds of bills proposing to repeal, gut, or weaken Chapter 40B have been filed. There are innumerable websites dedicated to voicing objections to specific 40B projects or to the statute itself. The state's history of multifamily development, low- and mixed-income housing and 40B projects in particular has been one of intense community opposition.

In public forums such as Town Meeting and ZBA hearings, development is opposed for its impact on municipal services, school budgets, traffic, and the vague "community character." However, in private, motivations are much more aligned with Fischel's Homevoter Hypothesis. The anonymous responses to a survey of residents of the town of Dartmouth, Massachusetts provides compelling evidence to the entrenched antigrowth sentiments in one town. Over half of the responses to the question "What most threatens the quality of life in Dartmouth?" referred to development, with such strongly-stated responses as: "I hope you will respond to the need to slow/stop growth in our beautiful town… No low-income housing… Keep housing developments out... No more development anywhere in town." Other responses speak to the fear for home values that is the foundation of the Homevoter Hypothesis:

> "Well-defined zoning laws are important along with the protection of property values... If affordable housing is coming, it should be in a rural area not around people whose property values will decrease… I recently moved to Dartmouth and I love it but now there are low income families living in the Capri Motel and that they may be making low-income units in our really good neighborhoods. Things are great right now so why allow people that "may" destroy this? Property values will go down... Zoning for single-family houses to protect property values so as to make the town a desirable community to live in... No low-income housing. It brings property values down… Development of apartment complexes which will lower property values and change Dartmouth from a friendly town into a city environment..."[23]

If these concerns that residents are voicing are common, then this is evidence that the fear of property value erosion contributes significantly to the antidevelopment nature of most towns in the Greater Boston area.

Smart Growth and Chapter 40R

In the summer of 2004, the Massachusetts legislature passed the first new statute since 40B to address the stagnant supply of housing. This law, known as Chapter 40R, attempts to use a carrot rather than the stick of 40B to encourage new housing development. 40R encourages municipalities to enact "Smart Growth" overlay districts, and offers financial incentives from the state for those towns that do create the new districts. Positioned as providing a positive incentive for development, the statute is intended to not only spur building, but also to encourage Smart Growth type development rather than the low-density sprawl that has become common in many towns in the greater Boston area. The overlay districts must have minimum densities that encourage multifamily development, and are meant to be located around transit nodes, town centers, and in abandoned industrial areas. Towns that enact these overlay zones will receive a payment of up to $5,000 per unit zoned and permitted in the new district, and priority on future disbursement of state funds for municipal services. While 40R is very new, and as of early 2005, no towns had enacted the new overlay district, the statute demonstrates the state government's purported commitment to increasing the supply of housing in Smart Growth development patterns.

Whether or not Chapter 40R will be successful in both jumpstarting and changing the nature of housing development in Massachusetts is not yet known. However, in acknowledgement of the state's focus on higher-density, multifamily development, I chose to focus this research on existing developments that demonstrate some of the characteristics favored in Chapter 40R. Planners and developers promote Smart Growth as the obvious and correct way to develop going forward, but the economic impacts of this type of development have not been studied extensively. By investigating the effects of developments with certain Smart Growth characteristics on single-family homes in the surrounding community, I hope to spur this conversation.

[1] Ritchay, David, and Weinrobe, Zoë, Fear and Loathing in Massachusetts: Chapter 40B, Community Opposition, and Residential Property Values, MIT Masters Thesis, 2004.
[2] National Low Income Housing Coalition, "Out of reach 2004," http://www.nlihc.org/oor2004/
[3] In general, housing costs are considered affordable if they consume 30% or less of household income.
[4] Citizens Housing and Planning Association, "The Greater Boston Housing Report Card 2003," http://www.chapa.org/HousingRCard2003.pdf
[5] Massachusetts Institute for a New Commonwealth, "Home Ownership in Massachusetts: A New Assessment," http://www.massinc.org/handler.cfm?type=2&target=PolicyBrief3/policy_brief3.html
[6] Housing affordability burden is defined as the median house price / median income ratio. According to MassINC, in 2000 Massachusetts' ratio was 2.92.
[7] The Boston Foundation, "Growth: Time to Play an Inside Game," http://www.tbf.org/tbfgen1.asp?id=1910
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[17] Not In My Back Yard, Nowhere On Planet Earth, Build Absolutely Nothing Anywhere Near Anyone
[18] Fischel, William A. (2004), An Economic History of Zoning and a Cure for Its Exclusionary Effects, Urban Studies, Volume 41, Number 2, 317-340.
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[21] Citizens Housing and Planning Association, "The Greater Boston Housing Report Card 2003," http://www.chapa.org/HousingRCard2003.pdf
[22] Citizens Housing and Planning Association, "The Record on 40B," 2003, http://www.chapa.org/TheRecordon40B.pdf
[23] Town of Dartmouth planning survey, http://www.town.dartmouth.ma.us/SURVEY%20QUESTION%20NO%2021.doc

CHAPTER 2: LITERATURE REVIEW

Although many studies have examined the impact of externalities on nearby house values, few have focused specifically on the issue of density or large multifamily developments. Within the body of literature that addresses affordable or subsidized housing and neighboring property values, few studies have used a strong, reliable methodology that provides trustworthy results or that can serve as a model for this study. Since the 1960s, there have been numerous studies regarding the impact of various types of affordable housing, including public housing, Section 8 housing, federally subsidized housing, and non-profit built housing, on surrounding home values. These studies have reached a variety of often-conflicting conclusions. They have relied on many variations in methodology, many of which draw into question the validity of their conclusions. I have reviewed a subset of the strongest studies here; see the bibliography for additional research.

The majority of these studies use home sales data as a measure of house values. There are two main ways to perform home sales price studies: through repeat sales and through hedonic regression. I have divided the cases reviewed by these methods. In general, the hedonic method is more rigorous, as it allows for the inclusion of factors, including both house and neighborhood characteristics, that might contribute to the observed prices. However, many studies use the repeat sales technique either because of data limitations or because they attempt to correct for other influences in a different manner. Even studies that use a hedonic model to explain prices often leave out what seem to be fairly obvious influences on prices, such as demographic or socioeconomic factors of the neighborhood, thus potentially overstating the impact of other factors, such as the presence of an affordable development.

Another major difference within the literature is that some studies capture sales prices at a moment in time and attempt to explain variation in prices by the influence of a specific factor, such as proximity to an affordable housing development, while others use trends in sales prices to measure the impact of a development. The second method is the more accurate way to measure the causal relationship between a specific event, such as the planning and construction of an affordable housing development, and the impact on surrounding house prices. This method takes into account trends in sales prices and trends in the impact zone prior to the development, and answers the question what (if any) was the specific effect on prices caused by the planning and construction of that development? Without this before and after analysis, it is impossible to isolate the cause of any price changes.

Finally, all of the studies attempt to assess impact by using some measure of proximity to a particular development. Many different methods have been used to measure this distance, including basic linear distance, a gravity-weighted distance that takes into account a non-linear curve for impact and nearness, and the division of data into a designated impact zone (considered to be affected by the development) and a control area (the remainder of the study area). The reality of neighborhoods is that distance may or may not be a good proxy for impact – in some neighborhoods, physical or psychological barriers, street patterns, or other features may define impact zones better than pure distance. However, only a few of the studies reviewed undertook a rigorous definition of its impact zone.

Repeat Sales Price Studies

While studies that utilize repeat sales prices have flaws, there are several important studies of this type that should be mentioned. Green, Malpezzi and Seah (2002) undertook a study to determine the impact of developments that used Low Income Housing Tax Credits (LIHTC) on surrounding property values throughout Wisconsin. They used countywide repeat sales data and an inventory of Section 42 LIHTC buildings to determine the impact of proximity to LIHTC developments on surrounding house prices. The study's conclusion, that there is no evidence that LIHTC developments have a negative impact on property values, is unfortunately undermined by the methodological weaknesses of the study.

The authors chose repeat sales method because it does not require a great deal of details about the homes – something they acknowledged was unavailable for their sample. The shortcomings of repeat sales data include the assumption that the home is in the same condition from sale to sale, i.e.: that the prices are comparing apples to apples. In the Green, et al. study, same-house sales up to 11 years apart were used without any attempt to ascertain whether homes had changed over that time.

The authors also oversimplify several factors of the study, including geographic boundaries and neighborhood effect, which could disguise or skew the results. Although they use a gravity measure of distance in order to correct some weakness with linear distance, this approach still misrepresent true impacts. For example, natural neighborhood boundaries may define the perceived distance to the development better than actual "as the crow flies" distance. Additionally, this reliance on distance to the development discounts many other potential impacts on prices, such as neighborhood characteristics, that the authors do not account for. The authors do try to incorporate some overarching social characteristics into their study. For example, they investigate zip code-level demographic data. While demographic and other data is easy to gather at this level, I question whether neighborhood externalities are best measured at this gross scale.

In a second LIHTC study (Maxfield Research, 2000), the trend in house prices is examined over time to see if the construction of tax credit developments in the Twin Cities caused any impact on surrounding home prices. In this study, the authors used both pre- and post- construction measures to determine the effects of the development in impact areas and control areas. They used sales of "similar homes" (defined by age and square footage, in the same community and school district) in twelve neighborhoods across the metropolitan areas. They measure three sales trends - price per square foot, sales price compared to list price, and time on the market - and found no negative impact of the LIHTC developments. They also found that the subject areas had similar or stronger market performance that the rest of the city, that subject areas had higher appreciation after construction than before. In fact, though the subject groups had slower growth than Twin Cities metro overall, they found that after construction of the LIHTC project this gap narrowed. The authors imply that the LIHTC developments might have helped property values in those subject neighborhoods.

There are obvious shortcomings of the similar homes approach. As discussed above, there are many more elements to a house sales price than the ones measured in this study, and simply finding homes in the same school district that are of similar size and age does not account for this complexity. While attempting to measure trends and the impact of the developments on those trends is a good approach, I question the conclusions of the study. The authors use gross geographic comparisons with little effort to quantify other neighborhood dynamics. This raises more questions than it answers. While they show that the subject areas had higher appreciation after construction than before, did the whole neighborhood? Couldn't the change in price trends as easily be explained by other (neighborhood) factors that were unaccounted for, such as gentrification of the subject neighborhood?

Grier Partnership (2001) studied the effect of affordable units on repeat sales prices in subdivisions in two affluent areas in Virginia. They measured median sales prices in communities with affordable units and compared them to the median sales price in the subdivision's zip code. They also compared sales prices of units immediately adjacent to an affordable unit to other sales in the subdivision. In both cases, the study concluded that there were no negative effects on house prices. There are several major flaws with this study. The use of median sales price is a very crude measure of house prices that doesn't take into account differences in houses in the samples or changes in either house or neighborhood qualities that affect the data. In addition, the measure of effect was simply whether prices in the impact zone changed differently (appreciated less or depreciated more) than in the control. If the majority of data points did not, the test was considered to have "no effect." In fact, the individual results were varied – many of the study sales did do worse than the control sales, but the crudeness of the method did not allow for any more detailed analysis or reasoning of the results.

Hedonic Studies

Another group of studies uses the hedonic theory of house prices to build an economic model for the price of homes in the study area. They then use various methods to assess the impact of specific phenomena on this model. Edward Goetz et al (1996) used a hedonic model to measure the impact of proximity to subsidized housing on nearby homes, as reflected in assessment values. The study found that being close to CDC-developed subsidized housing increased property values, while the presence of public housing or privately owned publicly subsidized housing decreases value. This seemingly contradictory finding was dismissed in a rather tortured and unlikely explanation about the local preference for community-based developers.

It is possible that it is methodological flaws that caused the results. The study uses assessed values for home prices, which makes the assumption that assessed value and market value are the same. While some assessment data reflect the latest sales price, some are calculated using comparable homes, and others (such as multifamily properties) are done using an income method. Thus assessed value may not be a very good proxy for actual sales price. Additionally, the study does not carefully define impact areas or divide neighborhoods by characteristics. Thus, other effects that were not calculated might have clouded the impacts of the subsidized developments.

An earlier study by Paul Cummings and John Landis (1993) used a similar methodology to measure the impact of CDC-developed subsidized housing around the San Francisco Bay Area. They used actual sales prices, and built a hedonic model using incremental distance from the closest development as dependant variables. The study reported results that ranged dramatically, valuing proximity to a development anywhere from -$47,000 to +$78,700. Again, these varied results could be explained by the fact that important neighborhood characteristics were not taken into account. They could also be explained by the small sample size – in some cases, as few as two sales were used to build the model.

An interesting 1993 study, by Robert F. Lyons and Scott Loveridge utilizes economic utility theory and hedonic modeling to attempt to quantify how much less property owners are willing to pay if subsidized housing is near them. This study acknowledges the limitations on previous studies, such as small sample sizes and lack of inclusion of neighborhood effects, and incorporates a long list of variables, including house and neighborhood characteristics, as well as characteristics about subsidized housing and its tenants, into a regression analysis. The study concludes that proximity to subsidized housing has a negative impact on price that diminishes as distance increases. The study also looks at subsets of the 25,000 data points to conclude that single-family homes are more affected than multifamily buildings. Interestingly, the study also attempts to quantify the impact by type of project (elderly, handicapped, etc) and subsidy (Section 8, Section 202, public housing, etc.), although finds no real interpretable conclusions.

Although this study is an interesting contribution to how subsidized housing might contribute to the hedonic formula of house prices in an area, it was not really designed to show actual impacts of real developments. As the study acknowledges, the time that a development came into a neighborhood was not taken into account, making it impossible to pinpoint any change in perceived utility of specific characteristics to the introduction of subsidized housing. Additionally, the incremental price change caused by an additional unit of housing that is implied by the regression coefficient does not realistically scale to a multiunit subsidized development, and thus may not reflect how surrounding house prices actually behave in the presence of that development. Finally, while the study uses a meticulous method for attempting to measure not only distance but special pattern of subsidized housing, this method relies entirely on math and theory rather than actual observations of the neighborhood. This measure may thus over or under represent the importance of proximity to subsidized housing.

Lee, Culhane, and Wachter (1999) use regression analysis to determine the impact of several kinds of subsidized housing on surrounding property values in Philadelphia. They conclude that public housing developments have the most significant negative impact while scattered site rental programs like Section 8 have a modest negative impact. However, they find that new construction LIHTC projects and home ownership developments have a positive impact on prices. While this study does not attempt to look at house prices over time, it does draw interesting conclusions about the presence of different types of subsidized housing and its impact on neighborhood house values.

In her 2002 Masters thesis, Emily Weinstein uses a regression analysis and hedonic model to build a temporal price index and investigate the specific impact of subsidized housing developments on single-family homes in the area. This study used a carefully designed methodology that addressed many of the critiques of the above studies. The thesis used a hedonic model and descriptive statistics to build price indices over time in both the impact and control areas. The study looked at sales prices during the period before, during, and after the project was introduced in order to isolate the effect of the development on prices in the impact zone as much as possible. This thesis concluded that the subsidized developments did not cause any significant negative impact on prices of nearby single-family homes.

In their 2004 Masters thesis, David Ritchay and Zoë Weinrobe investigated the impact of nine high-density, mixed-income developments built under Massachusetts Chapter 40B statute on surrounding single-family home values. In addition to using a similar methodology to Weinstein's study, the researchers took extensive measures to define their impact zones accurately, using aerial photos and site visits to determine the realistic impact zone for each project. This study found no significant negative impact of large-scale 40B projects on surrounding single-family home prices.

Other Studies

There have been few studies worth mentioning that look beyond affordability to investigate the impacts of multifamily developments on surrounding home prices. At the very crude end of the spectrum is a 2004 impact study undertaken at the behest of the developer of a proposed multifamily project in Mountain View, California (Strategic Economics). The report was commissioned to address (and assuage) property value concerns raised by the community abutting the new development. In the study, roughly equivalent existing multifamily developments in the area were chosen as case studies, and the trend in median sales prices (per square foot) of single family homes in an impact zone around the multifamily project before and after it was built were measured. In all cases, the impact zone showed an appreciation in sales prices that continued during and after construction of the multifamily project.

The obvious weaknesses were identified by the City of Mountain View, which noted that the report lacked information about property value changes citywide. Obviously, without this comparison, it is impossible to determine if prices in the impact zone were affected *relative* to prices elsewhere in the city. I would add to the critique the simplicity of using median sales prices as a measure. This discounts all other characteristics of the house and the neighborhood that might make prices rise or fall and fails to isolate the development as the cause of the sales trends. There is simply no evidence in this report that the trend in sales prices had anything to do with the development.

Nonetheless, this study did do two things well. First of all, the study tracked price trend before and after the development was built, in order to assess the impact of the development on the surrounding area. Secondly, the authors seem to have thought about the "impact zone" chosen for each case. Every case had a different area identified by precise geographic borders determined by neighborhood definitions. This study also provides an interesting lesson in using econometric measures as a way to persuade a community.

CHAPTER 3: METHODOLOGY

In this thesis, I utilized a rigorous process to identify appropriate case developments for the research and to determine accurate impact zones for each case study. I then used a thorough quantitative methodology established in previous studies to create a hedonic price model and build a sales price index for each case study. By comparing the price trend in the impact and control areas in each case, I could assess the effect of the multifamily development on prices of nearby single-family homes.

Case Selection Criteria and Resources

I used several criteria in order to narrow down and select the developments that I chose as case studies. Of the hundreds of towns and thousands of potential developments in the Greater Boston Area, I expected to have a bounty of appropriate case studies from which to choose. In fact, over the course of my research, I found no examples of developments that met all of my criteria. Rather than having to narrow my search, I actually had to expand it, digging through many lists of subsidized, transit-oriented, and controversial residential projects. At the end of the process, I found five developments that represent some of my criteria and are imperfect though interesting examples.

The purpose of my thesis is to extend the knowledge about housing in the Greater Boston Area so I started with a geographic restriction. I only considered towns within the Interstate 495 loop. This area is generally considered to be the Greater Boston Area, and has many towns that are bedroom communities for Boston. Additionally, the Metropolitan Boston Transit Authority (MBTA) commuter rail system covers much of this area, making the option for development near mass transit as likely as possible. Finally, this geographic area is influenced by a largely similar real estate market and similar demographic and macroeconomic trends.

Beyond geography, I had several other criteria for potential case studies. First of all, as I explained in the introduction, because of anti-development zoning and community opposition, larger-scale multifamily residential building has all but stopped in many towns in the Greater Boston Area. Therefore, I wanted to focus on relatively large multifamily developments that were noticeably distinct in size and density than the rest of the housing in the town. For example, the smallest case study development, Oak Hill, in Ipswich, contains 33 units. In a rural town with almost exclusively single-family homes, this development represents something noticeably different. In addition, I wanted to find developments that had been built with an intentional affordability component, whether by a statutory requirement (such as 40B) or not. Finally, because of the temporal coverage of the data that I used, I restricted the search for developments completed between 1989 and 2004.

I also wanted to use developments that reflect some of the principles that are currently in vogue in planning literature and touted by officials at the state level. In their 2004 Masters thesis, David Ritchay and Zoë Weinrobe undertook a similar study of large 40B developments. They found that more often than not, these large-scale, heavily subsidized developments were situated in isolated areas far from existing infrastructure, transit, and other development. They were found in the shadow of the highway, next to the train tracks (but not the train station), and in other areas with as little other development as possible. I set out to find examples of Smart Growth developments - dense, multifamily, mixed-income, mixed-use housing projects built in town centers and close to mass transit. I was looking for developments that are within walking distance of a commuter rail or rapid transit node and close to retail or commercial development.

With these criteria, I expected to find developments that mirrored not only currently popular planning principles, but also the typology of the traditional New England compact town center.

I used several resources to find cases. I started out with the Citizen's Housing and Planning Association (CHAPA)'s most recent list of 40B developments,[1] over 500 developments around the state that were built through the comprehensive permit process and contain subsidized units. All of these contain at least 20 percent affordable units, and most are large-scale projects. Unfortunately, as mentioned before, the vast majority of these developments were constructed before my cut off of 1988, and were in inappropriate locations. In looking through this list, I eliminated any developments that were in towns without a commuter rail station or that were more than a ten-minute walk from a transit station and from a commercial area. I also used lists of subsidized apartment complexes around the state,[2] another 500 or so developments that contain income-restricted units. Again, almost all of these were built before 1985 with federal programs that are long gone. I also used examples from a 2004 paper by James O'Connell.[3] In his paper, O'Connell profiled several towns in the Greater Boston Area and their progress in the area of transit-oriented development. He mentioned many developments that had been built around MBTA transit stations. By comparing these to other resources I narrowed down the list to developments around transit that met my other criteria. In the end, I found five case studies that tell three different tales of multifamily development in the Greater Boston Area.

As part of the case selection process, I visited about 50 developments in order to assess their appropriateness as a case study. In each case that I chose, I conducted interviews with municipal employees familiar with the development. In most cases this was a town planner, although I also spoke to volunteer town committee members and retired employees. The focus of these interviews was to gather information about the development and the nature of the permitting process. In each case, I researched the town's response to 40B and its planning efforts around housing. I also interviewed the developer of each case project. Finally, I made repeated visits to each case site in order to collect visual information, investigate the development, and determine impact zones. During each visit, I attempted (with limited success) to canvass neighbors and town residents about the impact of the development on the community,

Impact Zones

The fundamental question of my thesis is whether multifamily residential developments affect the prices of nearby single-family homes. However, the term "nearby" is a simplification of my question and of the nature of neighborhoods, particularly in smaller towns. Simple distance from the development is rarely an accurate proxy for impact area. In reality, neighborhoods are determined by street patterns, topography and sight lines, and natural and manmade edges, such as rivers, train tracks, and highways. Residents may be more significantly impacted by a development a half-mile away on a previously virgin hillside than by one two lots away behind a large commercial building. A larger development will have a different impact zone than a smaller one, and a neighborhood with an existing mix of uses, including other multifamily projects would probably have a different definition of impact than a homogeneous area of freestanding single-family homes.

I used several criteria, listed in Table 3.1, to identify the impact zone of each development and to make sure that the zone was defined conservatively and accurately. Homes that met at least one of my basic criteria were considered to be in the impact zone. The criteria include: if the development is visually obvious from a home, if a single-family home shares roads or other pathways with the development, or if the development is on the way to the town center or commuter rail stop from a home. Often natural or manmade physical barriers such as train tracks, rivers, or highways defined edges of the impact zone, while in other cases, distance or street patterns created the border of the zone. In each case, the criteria for the impact zone was slightly different, and each zone is described in more detail in the Chapter 5.

Table 3.1: Impact zone assessment criteria

Criteria	**Include if**
Distance	- No set distance, although maximum case is about 800 meters
Visual	- Home has direct site line to development - Development is in visually obvious point in neighborhood, like on a hill
Traffic Patterns	- Development is between house and main road, town center, or other main destination - Development is on pedestrian access point, for example, contiguous to local park
Edges	- Natural barrier such as river, forest, hill blocks sight lines or traffic flow - Manmade barrier such as another large development - Large roads, train tracks, other edges

I found that trying to quantify the impact zone for developments with proximity to train stations or town centers is particularly difficult. As opposed to a large residential 40B development that is built in the middle of an entirely single-family neighborhood, the cases that I found were all in fairly heterogeneous areas. In all of my cases, I found that the impact zones were smaller than I expected due to preexisting non-residential uses in the neighborhood. For example, the examples at transit nodes were in neighborhoods already impacted by the train tracks, while the cases that are close to mixed-use areas are surrounded by single-family homes that are already near other traditionally "incompatible uses."

I finalized the impact zone for each development through examination of maps and aerial photos of the towns, visits to the site, and discussion with local residents and town officials.

Quantitative Analysis

My initial task was to use sales transaction records to build a strong hedonic price model that incorporates house characteristics and transaction dates to explain the observed sales prices. After that, I used this model to examine the price trend of a theoretical "average house" over time. Finally, I compared the house price index in the area impacted by the case study development to the rest of the town in the time immediately around the completion of the project to see what, if any, impact on prices the development had. By using a strict impact and control area, and building a price model over time, this method allows the impact of the development to be isolated as clearly as possible as the cause of any change in sales prices.

Data

For my analysis, I used single-family home sales transaction data collected by The Warren Group.[4] The data set includes all of the transactions in a town from 1988 through early 2005, and has information in each record such as the seller and buyer, sales price, mortgage amount, and date of sale. The data set also contains information about the house, such as square footage, lot size, number of bedrooms, bathrooms, fireplaces, etc. For each case study, I analyzed all of the single-family sales transactions in the town from 1988 to the present.

The quality of the Warren Group's data is only as good as the public record, and in some cases, the data sets included quite a few imperfect or suspicious records. In each data set, I found records with incomplete information, such as missing values for square footage or year that the house was built. I eliminated all incomplete records from the analysis. In addition, the majority of the records in the data set for Canton contained a "0" value for the number of bedrooms. As I explain in my analysis, I decided to use the "Total Rooms" values in Canton instead of the number of bedrooms.

In order to make sure that I was using as accurate a data set as possible, I endeavored to remove suspicious data from each set before running my analyses. In each case, I excluded records that did not seem to be legitimate arms-length transactions, for example those with sales prices of $1 or properties that changed hands twice in one day. I also removed transactions that had extreme values that I interpreted as outliers (for example a $57 million sales price), records that indicated mortgage amounts higher than the sales price, and records with other suspicious data that I investigated through The Warren Group's full property information online database. After an initial cleaning of the records, I ran descriptive statistics and created scatter plots to visually represent each data set and look for outliers or other suspicious records. This occasionally led to the elimination of other suspicious transactions, for example, lot sizes listed as several hundred acres or huge homes on impossibly small lots. Appendix 3.1 shows the total number of records used and eliminated for each case. In most of the data sets, the total number of outlying or suspicious records was between 0.1 and 4.9 percent.

Hedonic Model

The process of hedonic modeling of house prices has been described in great detail in other places, including in several papers referenced in the bibliography and in the 2004 thesis by David Ritchay and Zoë Weinrobe. Therefore, I will limit my discussion here to a brief overview.

The theory of hedonic modeling for home prices assumes that consumers value houses as a "bundle of goods" that includes attributes about the home itself (such as house size, lot size, number of bedrooms, etc.) and characteristics of the neighborhood (such as real and perceived crime rates, tax rates, and quality of the local schools). By identifying these attributes and their contribution to the overall price, we can build a model that explains the house price (or dependant variable) as a constant (α) added to a series of components:

$$\textbf{Price} = \alpha + \beta_1(\textbf{characteristic 1}) + \beta_2(\textbf{characteristic 2}) + \beta_3(\textbf{characteristic 3}) \ldots$$

In each component, the coefficient (βx) explains the influence of that particular characteristic on the overall price of the house. For example, if the coefficient for a characteristic like "garage" is 8%, then a house with a garage would cost 8% more than a house without a garage, *assuming all other characteristics about the house are the same.*

There are two types of attributes, or variables: continuous and discrete. Continuous variables can have any one of a range of values. For example, the interior square footage of a house can be anything from a few hundred square feet to tens of thousands of square feet. Discrete variables can only have a yes/no definition. For example, a house either has a pool or it doesn't. In order to express discrete characteristics of the houses in the model, I created a series of dummy variables that were either turned on (a 1 value) or off (a 0 value). For example, for the characteristic "number of bedrooms," I could create a series of dummy variables, "1BR," "2BR," "3BR," 4+BR." Each record would be assigned a "1" value for the appropriate dummy variable, and "0" values for the other dummy variables. In each group of dummy variables, the lowest, or base case is left out of the model. In my models, the base case represents the minimum scenario, and the coefficients in the model describe the increase in price caused by the add-on represented by the other dummy variables. For example, it is assumed that a house with no garage is the base case, and the dummy variables of "1-car," "2-car," etc. can be used to describe garage configurations. The coefficients related to these dummy variables would explain the positive (or possibly negative) impact that different garage types has on sales prices, *assuming all other characteristics about the house are the same.* Although we sometimes assume that with houses more is more, by looking at the coefficients of the model we can quickly see the positive or negative tradeoffs that different characteristics have on house prices.

In addition, some attributes, such as having a garage, might be highly valued by potential buyers and therefore have a large impact on sales price, while others, such as the type of heat system, might have a negligible impact. A good hedonic model includes as many of the strongly determinative factors as possible, but does not clutter the results with factors that do not significantly affect the price. The strength of the model is indicated by the R-squared value, which indicates approximately what amount of the dependent variable (sales price) is being explained by the independent variables (attributes of the house). The higher model's R-squared value, the better the explanatory power of the model.

In this thesis, I focus on attributes of the house and its lot. Typical neighborhood characteristics should not be important in my model, since all of the homes are in the same town (thus are similarly affected by local factors such as property tax rate and school quality, as well as macroeconomic real estate trends). Thus the main factors that will determine sales prices are the attributes of the house and lot that are available in The Warren Group data.

Sales Price Index

In order to measure the impact of the case study development on surrounding single-family house prices, I created a house price index for both the impact area and the control (the rest of the town). For each case study, I examined descriptive statistics about the data set to determine the attributes of a theoretical "average house."[5] This average house differs between the impact and control areas, as determined by the types of houses in each data set. An equation, using coefficients derived from the hedonic model, is employed to price the theoretical average house at the base time (1987 or 1987-88 for all of my cases). The coefficient for each non-base sales year(s) is then added to the base year sales price to create a price index of this average house over time. This method uses the power of the hedonic model, which explains how actual prices from the data sample were affected by year of sale, to apply to the theoretical average house as if it had sold in each year. Thus I could compare the price movement of an average house in the impact zone to an average house elsewhere in the town from 1988 to the present.

In each town, I was particularly interested in looking at the years during and after the permitting and construction of the case study development. Therefore, though I measured a sales price index for the duration of the available data, it is the years around each project on which I focus. This method assumes that news about real estate development becomes public knowledge during the permitting process, and that the development continues to impact sales prices as it is constructed and leased up/sold. Any impact to surrounding home prices might begin as early as when the neighbors first heard about the development and decide to sell their home, and continue as long as the development is seen as having an impact on the community. Though these are the general parameters that I used, I argue that like physical impact zones, this time window differs by the size and type of development. The specific justification for each time window is described in the results for each case study.

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[1] Partial lists of 40B projects were obtained from both the Citizen's Housing and Planning Association and from the Massachusetts Department of Housing and Community Development. Although both organizations have the responsibility to oversee units restricted by federal subsidies and monitor expiring use projects, amazingly neither seems to have a complete list of all projects permitted through the 40B process.

[2] Massachusetts Projects with Subsidized Mortgages or HUD Project-Based Rental Assistance, Citizen's Housing and Planning Association, 2004, http://www.chapa.org/expiringuse2004.pdf and Affordable Housing Online, website of apartment complexes that include subsidized units, http://www.affordablehousingonline.com/apartments.asp?mnuState=MA.

[3] O'Connell, James C. Ahead or Behind the Curve?: Compact, Mixed-Use Development in Suburban Boston, August, 2004, http://www.massapa.org/pdf/report_aheadbehindcurve.pdf

[4] A complete description of the data can be found on The Warren Group's website. "About our Data," The Warren Group, http://rers.thewarrengroup.com/sor/help/aboutourdata.asp

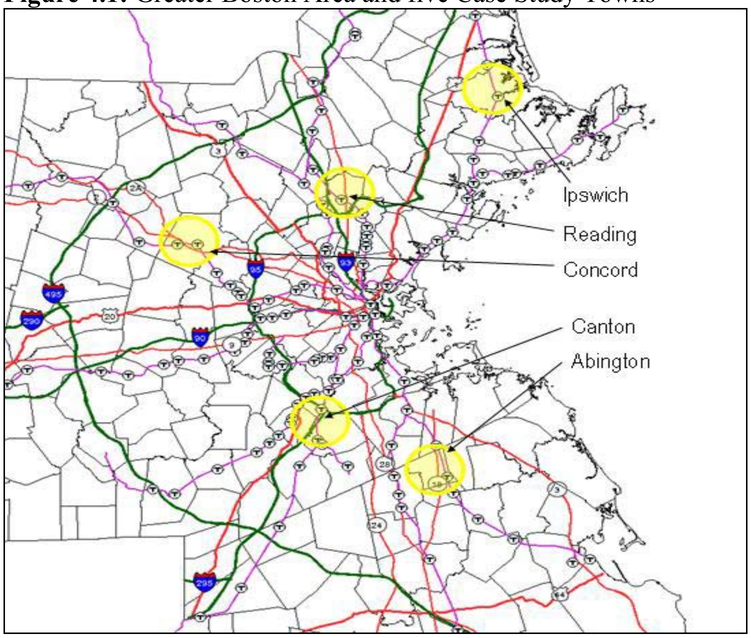
[5] The equation for the average house includes all of the variables that were used to build the hedonic model and looks something like:

> Price = constant + β1(average lot size for the sample) + β2(average interior square footage for the sample) + β3(% of houses with 2BR) + β4(% of houses with 3BR) + β5(% of houses with 4+BR) +…+ βx-1(% of houses built from 1980-1991) + βx(% of houses built after 1991)

CHAPTER 4: CASE STUDY PROFILES

I chose five developments in towns around the Boston area as case studies. The cases represent different strategies that towns have used to provide housing options: age- restricted developments, 40B mixed-income developments, and rezoning to allow for more housing production. Although no case met all of the criteria that I initially established, each has key characteristics. See Appendix 4.1 for statistics about the five towns and Appendix 4.2 for general information about the five case study developments.

Figure 4.1: Greater Boston Area and five Case Study Towns



Scenario 1: Age-restricted Residential Projects

In the course of investigating potential case studies I discovered one boom area of residential construction: age-restricted housing. Elderly developments pose little threat of additional school children to add to the local school system and drivers to add to traffic and parking burdens. Accordingly, towns see age-restricted housing as a relatively painless way for them to meet their ten percent 40B requirement. Many towns are encouraging larger, mixed-income or affordable elderly projects within their boundaries, even rezoning parts of town for age-restricted development or cooperating with developers who want to use the comprehensive permit process for age-restricted projects.

I decided to acknowledge the age-restricted housing trend by choosing two senior developments as case studies. Both of these were completed with the cooperation of the municipality, and to all accounts met with little objection from town residents. One (Ipswich) used the 40B process while the other (Reading) went through the local permitting process. Both developments are located near retail areas and relatively close to the commuter rail.

Case 1: Longwood Place at Reading

Town Profile

With a population of almost 24,000, Reading is a relatively large town. Only 12 miles north of Boston, Reading lies on both Interstate 93 and 95 and has an MBTA commuter rail station. Reading is undergoing changes, with two large residential and mixed-use developments under construction in the area adjacent to the commuter rail station. However, these projects have come to Reading through the 40B process, and it is only now that the town is acknowledging its potential for transit-oriented development.

Reading's residential zoning primarily requires single-family development on minimum lot sizes from 15,000 square feet to an acre. The current zoning ordinance does incorporate inclusionary requirements in its municipal reuse district and its planned unit development (PUD) and planned residential development (PRD) bylaws.[1] In one particularly Machiavellian section of the PRD bylaw, the zoning requires at least ten percent of the units are affordable, 15% if the site is within 300 feet of the town line. Currently, Reading has about 7.9% of its units counted as affordable, and is about 450 units short of the ten percent 40B requirement.

Planning Efforts

Reading's new Community Development Plan begins with the objective: "Preserve the architectural heritage and the traditional village character of the Town" and follows with an ominous first goal: "Preserve the Town as a primarily single-family, owner-occupied residential community.[2]" However, the recent approval of several 40B projects comprising over 500 units throughout Reading has forced the town to undertake proactive housing planning. The new Community Development plan includes a list of housing initiatives from adopting inclusionary zoning to reforming a housing committee, to hiring a housing staff person. The plan also includes a specific proposal to rezone downtown districts for mixed-use development. However, the town's lack of staff and financial resources make concrete progress difficult. According to a member of the planning staff, the town has been in the position of reacting to 40B developments instead of having the ability to control the development process from the outset.

Development Profile

Longwood Place at Reading is a privately-owned, for-profit assisted living facility that is age restricted to residents 55 and older. The facility consists of 86 units, 80% of which are market rate and 20% of which are restricted to residents at or below 50% of area median income. The development has a mixed-use component, with a dance school and civic space within the building. The development includes the

Figure 3.2: Longwood Place at Reading

Photo by Stephen Sette-Ducati, courtesy of Longwood Place

Figure 3.3: Aerial view surrounded by single-family homes

reuse of an existing building and new construction that more than doubled the built square footage on the site.

Longwood Place was conceived in 1993, permitted in 1994, and opened in 1996. The developer did not utilize the 40B comprehensive permit option, but went through the local permitting process. At 86 units and a density of almost 18 units per acre, Longwood Place stands out in Reading and particularly in its neighborhood, which is primarily single-family homes. Longwood Place is just over a kilometer from Reading's commuter rail station, and about 300 meters from the closest commercial district.

The developer of Longwood Place specializes in senior living facilities and has been involved with seven 40B developments around the state. In Reading, the developer recognized that seniors were being priced out of their homes and realized that assisted living facilities could help this population stay local as they aged. There were several reasons that the developer chose to go through the local permitting process rather than via a comprehensive permit. At the time the process was started the site was located in a Municipal Building Reuse overlay district, a designation that allows for significant dimensional flexibility. Reading also had a clearly defined process for acquiring the required permits to build in the zone. As a result, the developers did not have to go to Town Meeting to seek a rezoning of the site, an arduous and high-risk task. Additionally, the developers were willing to meet several other requirements of the town, including surpassing the inclusionary zoning requirement of the Municipal Building Reuse district,[3] retaining a commercial tenant (the dance school) on site, and incorporating civic uses both within the building and on the property.

The developers did require three variances for the project: a reduction of minimum parking spaces, relief from side-yard setback requirements, and an exception to the requirements regarding overall building size and massing.[4] Two of these permits were appealed: the side yard variance by an abutter and the special permit by the Reading Housing Authority. The developers negotiated with the abutter and changed the design of the building slightly, whereupon the appeal was dropped. The Reading Housing Authority appealed over the supervision of the affordable units, a responsibility they believed the zoning bylaws designated to them. The situation was resolved when the Housing Authority, the Board of Selectmen, and the developer signed a three-way agreement requiring the owners of Longwood Place to certify that at least half of the affordable units would be rented to residents with Reading ties in perpetuity.

Although the Reading permitting process was straightforward, the developer wonders if Longwood Place would have been smoother as a 40B project. However, the developer remembers that the Reading Board of Selectmen made it clear that they strongly preferred that the project go through town channels. As a result, 40B helped the process because both the developer and the town knew that it could be used if necessary, and both parties were encouraged to support and move Longwood Place forward.

Case 2: Oak Hill

Town Profile

Ipswich is a small rural town of about 12,000 people on the North Shore of Massachusetts about 28 miles northeast of Boston. It is known for its extensive protected open space and its large, well-preserved collection of historic homes.[5] The town has a compact center with an MBTA commuter rail stop. Originally a working mill town, Ipswich became a summer retreat for families from Boston and its environs. Today, Ipswich is primarily a bedroom community to Boston. In the 2000 census, the median household income of Ipswich was $57,284, slightly lower than the Boston metropolitan area median. Although not particularly affluent, household incomes have increased considerably in Ipswich over the last decade, indicating that the wealthy population is growing in the town. Simultaneously, the demographics of Ipswich have shifted, with middle-aged families replacing young adults and the elderly.[6] These trends might in part be explained by the town's booming real estate market. In the last decade, the sales price of the median single-family home in Ipswich increased by 175%.[7] In addition, many homes that were being used as second or vacation homes have changed to primary residences, indicating Ipswich's growing popularity as a place to call home.

Construction trends in town have favored the single-family home, with the number of single-family units growing between 1990 and 2000. As elsewhere in Massachusetts, houses are getting larger in Ipswich, and new eight and nine-room homes are common. Meanwhile, the number of multifamily structures (with three or more units) fell as a percent of total housing units in Ipswich over the same decade. The construction of rental housing has been particularly sluggish. In fact, the town had fewer rental units in 2000 than it did in 1990.[8] As of early 2005, 7.8% of the town's housing units were considered affordable, just over 100 units short of the 40B ten percent goal.[9] According to CHAPA, this number changed by less than 1% since 1997.[10]

Ipswich's zoning reflects its rural nature. Approximately 93% of the land in Ipswich is designated as one of three "Rural Residential Zones" (RRZ), which have a minimum lot size of two acres. These zones allow single-family homes by right and two-family homes by special permit. Around the town center, approximately 2.2% of the town's land is zoned as "Intown Residential" (IR), where single- and two-family homes are allowed by right, multifamily is allowed by special permit, and minimum lot sizes are 10,000 square feet and up.[11] The town's recent efforts to promote housing development have focused on this IR district.

Planning Efforts

Ipswich's zoning bylaw and its housing plan are oriented toward protecting open space and preserving the rural character of the town, but planning officials maintain that the town is committed to increasing the production of affordable housing. Ipswich has recently taken several steps to encourage housing starts. The 2003 Housing Action Plan outlines four policy areas and thirteen distinct actions to move Ipswich closer to the ten percent goal. The plan suggests creating a new Village Incentive District (VI), to encourage higher densities in developed areas and to take advantage of existing infrastructure. Under this proposal, up to four-unit residential buildings could be built in the VI district on smaller lots than currently allowed in the zoning ordinance. The plan suggests using a transfer of development rights to increase allowable densities in this district while preserving undeveloped land in rural districts.

Although many of the proposals in the plan, including the VI district, have yet to be passed, Ipswich has been able to take a few concrete actions. For example, zoning has twice been amended (in 1999 and in 2001) to allow for the creation of small accessory units in preexisting residential buildings or in secondary structures on residential lots. In 2003, Town Meeting passed an amendment to the zoning bylaw that allows infill development of housing on non-conforming (too small) lots in the Intown Residence district. The town has also enacted an inclusionary zoning provision that grants developers density bonuses by special permit if they make a minimum of ten percent of the units affordable (to households at 70% of area median income). Planning staff explain that the provision is intended to encourage more projects to go through the local process instead of the comprehensive permit alternative, and notes that three projects have been approved in the year and a half since the provision was enacted.

The town has participated in three recent comprehensive permit projects that are described as amicable and that were done with the cooperation of the town and minimal opposition from abutters and residents.

Development Profile

Oak Hill is a 33-unit rental housing development that is 100% affordable to residents at up to 80% of area median income. It was built as congregate housing and is age-restricted to elderly members of the community. The project was developed by the Immanuel Baptist Church, which donated the land and raised the majority of the money for development. The development is situated in the heart of downtown Ipswich, on one of the main commercial streets, less than a half a mile from the MBTA commuter rail station. One member of Immanuel involved with the development of Oak Hill remembers that the needs of the elderly residents were a critical factor in situating the project. While seniors were less likely to utilize proximity

Figure 3.4: The Oak Hill development

Figure 3.5: Central Street, Ipswich

Figure 3.6: Aerial view surrounded by single-family homes

to the commuter rail, they could access retail easily and did not need to drive to get out and take care of their daily needs. The development is surrounded on three sides with single-family residences. Oak Hill was one of the first larger multifamily projects in town, and it is still one of the densest.

Oak Hill did require and receive a comprehensive permit. The church went through the 40B process because the project needed a variance and relief from the density restrictions of the Ipswich zoning ordinance, something that the town's Zoning Board of Appeals had not previously encountered. There was little community opposition to the project. In fact, many community leaders joined the Oak Hill Board during the development process. The project progressed smoothly, and was approved in 1988 and completed in late 1989.

In 2004, Oak Hill added another seven units in an adjacent city-owned building, the Memorial Hall. The Memorial Hall project also sought a comprehensive permit in order to get relief from density limits. Ipswich planning staff referred to the process as a “friendly 40B” and stressed that the expansion received little community opposition.

Scenario 2: Recent 40B Residential Projects

In the past few years, the number of 40B projects completed in the Greater Boston Area has picked up after a decade of sluggish activity. In fact, the total number of 40B developments approved has increased by almost 15% since the beginning of 2003.[12] According to CHAPA, this upsurge has been fueled by the area’s skyrocketing real estate market. Developers are finding that residential development in the suburbs is extremely lucrative, even with the affordability requirements of 40B. The comprehensive permit process has proven to be a reliable alternative to the messy local process, and developers are turning to it in increasing numbers.

In many recent 40B projects, the permitting process is more of a negotiation between the town and the developer than a hostile course of action. With the state Housing Appeals Committee’s record of ruling in the developer’s favor in two-thirds of 40B appeals,[13] perhaps towns realize that their best chance of maintaining control of the project is through an active dialogue with the developer. Two of the case studies that I chose are just such developments. Though both are large projects that probably would not have been built without 40B, both were developed with the cooperation of the town.

Case 3: The Woodlands at Abington Station

Town Profile

Originally a manufacturing community, today Abington describes itself as a small bedroom community to Boston. Abington is not a particularly wealthy suburb, with a median household income slightly below the Boston metropolitan area median. However, this town of 12,000 has seen astronomical real estate appreciation, with the median single-family home price increasing over 250% in the last decade. This boom, spurred in part by the new commuter rail stop, which opened in 1997, has left residents worried about growth and local officials scrambling to proactively plan for the community's future development.

Abington's housing production has followed state trends, with a decrease in building permits issued of over 30% in the 1990s. At an average of 42 permits per year, new production was not able to keep up with demand.[14] However, Abington has seen increased multifamily permitting in the past three years, and has been the location of several recent large 40B projects. Because of this, the town been able to greatly increase its inventory of affordable units. According to DHCD, in 2002 Abington had 4.7% affordable units. In 2003, Abington added 32 affordable ownership and 181 affordable rental units to its inventory,[15] leaving the town just 535 units short of ten percent goal.[16]

Planning Efforts

Like many towns, Abington has been focused on relieving the requirements of 40B, and the town has been aggressive in proactively planning for housing production in recent years. The town has focused its efforts on getting a Planned Production Plan (PPP) approved by the Department of Housing and Community Development. The PPP outlines how the town will produce the minimum requirement of three-quarters of a percent of affordable units per year for the next five years. As of 2005, Abington is one of only 29 towns that has a PPP approved by the DHCD. The plan counts two 40B projects, including The Woodlands, as contributing to its annual addition of affordable units. At 40 units per year, the 192 units at The Woodlands alone nearly achieves Abington's 0.75% goal.

Abington has also been proactive in its outlook for future development, and the town has been repeatedly recognized for its approach to growth. In 2003, Abington Town Meeting voted to rezone two areas to encourage multi-family residential development. The first, the Central Business District (CBD), allows for both the creation of accessory units and higher-density multifamily structures. The second, the Transit Oriented Development (TOD) Zone, won the Governor's Smart Growth Leadership Award in December of 2004.[17] The district, which comprises 30 acres around the commuter rail station, encourages mixed-use development and incorporates features such as reduced parking ratios and required pedestrian connections to the train station. In a 2004 audit, Abington was recognized by the Massachusetts Vision 2020 as one of only three communities out of the 42 studied that are currently "growing smartly.[18]"

According to Abington planning staff, The Woodlands development was the impetus for the rezoning proposals. The town wanted to be able to control the rate and form of development in these areas, and the rezoning was an attempt to do that. While the original intent of the TOD district was to encourage business development around the train station, planning staff points to The Woodlands as an example of the success of dense residential development in that area.

Development Profile

The Woodlands at Abington Station is a 192-unit rental property developed by Beacon Residential Properties. The project was permitted through the comprehensive permit process and includes 20 percent (39 units) affordable to households at or below 50% of area median income. The development is unique for Abington in its scale, its mix of one-bedroom and two-bedroom apartments, and its density of 9.6 units per buildable acre. The development was permitted in 2001 and completed in early 2003.

Figure 3.7: The Woodlands at Abington Station

Figure 3.8: Aerial view with nearby single-family homes

While The Woodlands is not in the town center of Abington, it is adjacent to the commuter rail station. This proximity was used by Beacon in both selling the development to the town and in subsequent marketing of the units to potential residents. It was also promoted by the town, which submitted the project for a Smart Growth award in 2004.[19] The Woodlands was built on a redeveloped paintball course site and utilized existing water and sewer infrastructure.

Beacon intended to go through 40B from the outset of the project, realizing that the comprehensive permit process was the most straightforward way to proceed. At that time, the property was zoned for industrial use, and Beacon would have been required to request a rezoning in Town Meeting. A former Beacon employee involved in the development notes that it would have been very difficult getting public support for a residential project of that size and adds that going to Town Meeting for the rezoning would have been an extremely expensive and high-risk process.

Abington worked with Beacon throughout the project, trying to negotiate the best deal possible for the town while ensuring that the permitting process moved forward. The town was particularly motivated to ensure the permit approval for The Woodlands because the 192 rental units would get Abington to the ten percent 40B requirement. Although the scale and tenure of the project and its traffic impacts were of some concern to the neighbors, as was water supply and sewage capacity, public resistance to the project was never very great. This was in part because the residential development was an improvement over the former industrial use. Overall, The Woodlands permitting process was non-adversarial and successful largely due to the negotiation between the developer and the town. The former Beacon employee concluded that without 40B, they wouldn't have had a chance of getting a development of that size approved in Abington, or in any other town in the area.

Case 4: Fairhaven Garden

Town Profile

One of the wealthiest and most expensive towns in the Greater Boston Area, Concord had a 2004 average single-family home value of $898,455.[20] At almost $100,000, the town's median household income is 167% of the Greater Boston Area's.

Concord suffers from the anti-development trend that is facing towns in the region. Construction of new homes is almost non-existent in the town. In the past ten years, Concord has granted just 306 residential building permits, with only two of these (both 40B projects) for multifamily structures.[21] Even the trickle of new single-family permits cannot truly be considered new construction, since an average of two-thirds of the single-family permits every year are for teardowns.[22] In practice, teardowns are used to replace smaller homes with large new houses, often combining lots (and thus reducing overall density) in the process. Concord's housing stock reflects this trend, with the average size of a new house increasing from 3,123 square feet in 1980 to 8,995 square feet in 2000.[23]

Over half of Concord's land is designated as preserved open space, and the town's remaining developable land is almost entirely zoned for single-family homes with one- or two-acre minimum lot sizes. Ironically, much of Concord's appeal is its traditional New England town feel, with businesses and residences crowded around the town common, a typology that is found around the West Concord town center. However, this traditional form is impossible to recreate under Concord's current zoning and building trends.

As of August of 2004, Concord had only reached 4.92% affordable units, far short of the 40B ten percent requirement and the lowest of any of the case study towns.[24] The town has seen only four developments with an affordability component since 2000. Two were small (a total of 17 homes) single-family home ownership projects undertaken by the Concord Housing Trust and a non-profit developer, and two were 40B rental projects.[25] The town submitted a Planned Production plan to the DHCD in 2004 and is waiting for it to be approved.

Planning Efforts

A review of Concord's pertinent planning documents indicates that affordable housing is not a high priority for the town. While affordable housing is mentioned repeatedly in Concord's zoning bylaws, there is no specific requirement or incentive for developers to incorporate an affordability component. The town's 2004 Affordable Housing Fact sheet points out (perhaps ironically?[26]) that Concord is "somewhat unique" in including households with up to 150% of the area median income (currently almost $125,000 for a family of four) in its affordable housing designation. In fact, the town's zoning includes two levels of affordability, "starter units," for households up to 110% of area median income, and "moderately priced units," for households up to 150%.[27] Both the Planned Residential Bylaw and the Residential Cluster Development sections of the town's zoning ordinance[28] allow a density bonus for developments that include units at or below these affordability levels. However, in both cases, the bonus is undefined and is granted at the discretion of the Planning Board.

In 1992, Concord passed an Inclusionary Housing Bylaw that requires all large subdivisions to set aside land for the construction of affordable units or to donate funds for the offsite production of affordable units. This has not proven to be efficacious in actually getting units constructed, as the market rate for units is so high in the area that developers can easily contribute the cash equivalent and avoid incorporating affordability into their project. An example of this is Concord Crossing, a new mixed-use redevelopment of an industrial site across from the Concord Center commuter rail station. The project includes 20 rental units, and was granted a special permit and density variance. Although the developer initially planned to include two affordable units in the project, he decided to take the offsite payment option instead after realizing that market rents were very high.

There is no required inclusionary zoning in Concord, but town planners list efforts to promote affordable housing development including asking developers to include an affordability component and working with developers on proposed 40B projects. Concord is not considering adopting the new Smart Growth overlay district of Chapter 40R because it requires too much density for the town. As an alternative, a proposed mixed-use village center overlay outlined in the new Comprehensive Long Range Plan would allow higher densities and second-floor residential development over retail in specified village center areas. However, a specific zoning amendment has yet to be proposed or passed.

Development Profile

Fairhaven Garden is a 42-unit rental development in six buildings. Eleven of the units are affordable to households at 80% of area median income. The development is situated on six acres of land along the Concord Turnpike near the commuter rail station and Concord Center. The project received a comprehensive permit in 2003 and was completed in 2004.

The development has an interesting and contentious history. Originally a working farm, the owners proposed a daycare center on the property in the late 1990s and requested that the land be converted from agricultural to institutional use. This plan was vehemently opposed by neighborhood residents, who were concerned about the traffic impacts of the proposal. Both the town and the neighbors sued the landowners to stop the use change, and the developers entered into mediated negotiation with the town. Through this process, multifamily housing was agreed on as an alternative to the daycare center. Both the developer and the town wanted the project to be rental and to use the 40B process. The developer realized that the project would require multiple variances that would be very difficult to get, and believed that the comprehensive permit process would go more quickly. The town wanted to be able

Figure 3.9: Fairhaven Gardens

Figure 3.10: Aerial view in single-family neighborhood

to count all of the units towards its ten percent goal.

Although the neighborhood accepted Fairhaven Gardens as a compromise in mediation, nearby residents were still concerned about impacts of the project and there was ongoing confrontation throughout the year-and-a-half permitting process. There was no organized opposition or formal appeals to the comprehensive permit, but many concerns were raised at public meetings including noise, size, landscape issues, and lighting issues. The neighborhood remains concerned about the project's impacts and still complains to the town about issues such as screening, lighting and trash removal.

Scenario 3: Creating Affordability by Increasing Supply

Underlying the "carrot" logic of Chapter 40R and other recent state initiatives is Governor Romney's conviction that the housing affordability issue is primarily caused by an artificially constrained supply of units. Romney has argued that by encouraging housing production and increasing the number of units, the Massachusetts housing market can be brought into equilibrium and the affordability crisis resolved.

With the lack of residential construction in the suburbs of the Greater Boston Area, it is hard to find a location to test this basic tenant of supply and demand. However, Canton represents one of the most active building markets in the region, and contains an area that has recently added a significant number of units and been revitalized as a mixed-use, transit oriented town center. Even though the new developments in Canton Center were not built with a specific affordability component, I chose to include the town as a case study because of the scope of the transformation of the area and the large number of new residential developments built in the last five years.

Case 5: Canton Center

Town Profile

The town of Canton lies 18 miles southwest of Boston. Though the town is primarily residential, several parts of Canton, including the area around the Canton Center commuter rail station, have a mix of residential, commercial, and industrial uses. Canton's current zoning includes many types of residential areas, and has several inclusionary zoning provisions with affordability requirements from five to fifteen percent. As of 2005, Canton is the only town of the five case studies that has reached the ten percent 40B requirement.

Planning efforts

With a central commuter rail stop, a mixed-use main street, and a number of large, relatively dense residential projects, Canton Center is an example of many of the principles of Smart Growth development. However, a local developer recalls that in the late 1990s, Canton Center was a disaster, with dilapidated buildings, run-down retail, and many abandoned or underutilized parcels. The turning point for Canton Center was the establishment of the Canton Center Economic Opportunity District (CCEOD) in 2000. At the time the economic revitalization of the area was one of the primary goals of the planning department. The CCEOD zoning bylaw was the result of a two-year public process in which the town and consultants from the Metropolitan Area Planning Council gathered ideas and requirements from town officials, residents, and local businesses, created the bylaw, and built support for the rezoning. Many people were nervous about the rezoning and central points of contention included density, the spread of commercial uses, and the concern that Canton still look like a town and not become a city. In response, the boundaries of the CCEOD zone were reduced to keep the higher-density zone to the downtown area and restrict commercial uses to Washington Street and design guidelines were included in the bylaw to reflect the style of the traditional New England town center. Local planners spent two years in meetings and charrettes, and were able to get widespread support for the amendment. In 2000, the CCEOD bylaw passed Town Meeting by a unanimous vote.

The overlay district encourages mixed-use development with relatively flexible density and dimensional requirements. Although the CCEOD District was not conceived as a way to increase the production of affordable housing, in 2004, an inclusionary zoning provision was added to the CCEOD overlay zone.[29] This amendment requires a minimum of 15 percent of affordable units be included in residential projects in the overlay area. When the CCEOD was passed, the town was unwilling to commit any public funds to the revitalization effort and town planners were not certain that the new district could attract private money to Canton Center. As projects in the zone have proven economically successful and the residential real estate market has appreciated, the town decided to require an affordable component for new developments. The new provision has not slowed development in the area, and several new projects with an affordability component are currently under construction.

Development Profile

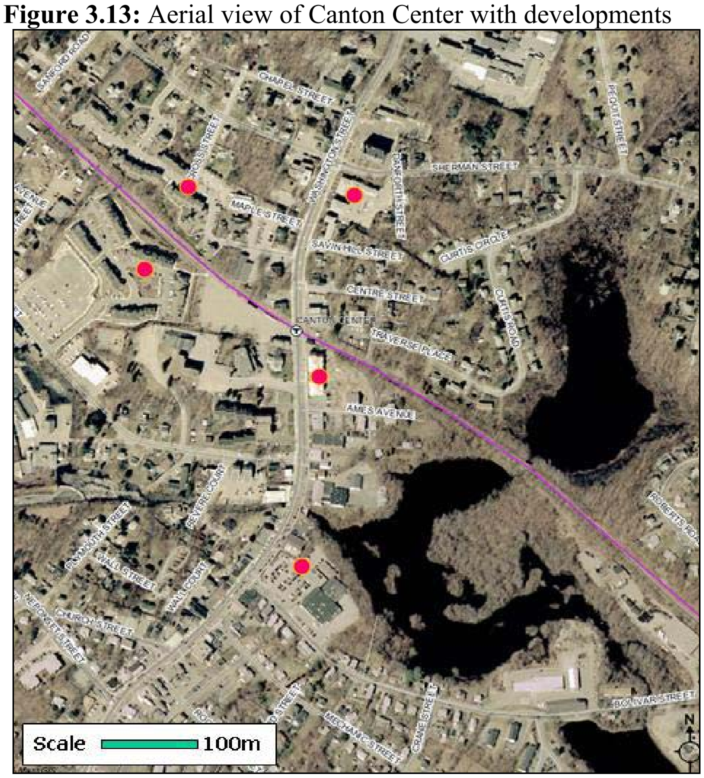
In the past five years, John Marini has developed over 200 units of housing under the CCEOD bylaw[30] and he currently has more projects underway. Figure 3.11 shows a summary of Marini's developments around Canton Center. Marini started his career as a house builder, and by the late 1990s had developed thousands of units of single- and multifamily homes in the area around Boston. Marini, who lives in Canton, built many apartments in the area, and had developed a reputation with the town and residents as a good developer and a positive local influence. He describes the typical residents of his projects as young singles and couples that work in Boston or are elderly. He believes that there are very few families living in his projects, and claims that there are only six children living in the 200+ units that he has developed. He maintains that repeated traffic studies have shown no impact on parking or traffic levels from his developments in Canton Center, and notes that on average, the developments are only using 75 percent of the parking spaces that were built. He attributes this to the fact that when housing is close to transit, many households go from a two-car family to a one-car family.

Chart 3.11: John Marini's Canton Center Developments

Development Name	Washington Place	Forge Pond	Canton Commons / Paul Revere Village	Grover Estates
Permitted/Completed	2001/2001	2002/2003	2003/2004	2004/2006
Total Units	47	38	206	45 (2 affordable)
Tenure	Rental	Condo	Condo	Condo
Retail Component	10,000sf	8,000sf	None	6,500sf

Figure 3.12: Canton Commons, Village at Forge Pond, Grover Estates, Washington St

Figure 3.13: Aerial view of Canton Center with developments



It is clear that Marini's reputation and long history with the town has allowed him to be extremely active in Canton Center. Marini acknowledges that his good rapport with the town has allowed him to be as successful as he has been, and notes that although Canton is relatively progressive and not the type of town to give in to NIMBYism, the density levels of his projects in Canton Center are nearly impossible to achieve in any town. Though Marini chose to avoid public subsidies and develop within the conventional market, he also acknowledges that if it wasn't for 40B, there wouldn't be any multifamily built anywhere in Massachusetts. Marini, who once served on the Board of Directors of the Massachusetts Housing Finance Authority, believes that affordable housing will come without anyone trying and that the building of apartments in Massachusetts will eventually result in a softening of the market.

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[1] Reading's PUD bylaw allows for a height bonus if at least ten percent of the units are affordable at below 80% AMI, and the PRD bylaw includes a density bonus (for PRD-G) or a requirement (for PRD-M) for at least ten percent of affordable units (100% of AMI) or 15% moderately priced units (at 125% AMI). Zoning By-laws, Town of Reading Zoning Board of Appeals, http://www.ci.reading.ma.us/planning/zbahomepage.htm,

[2] Reading Community Development Plan, Reading Master Plan Advisory Committee, http://www.ci.reading.ma.us/planning/finalmapcplan.pdf

[3] The zoning requires a minimum of ten percent of units be set aside for "very-low-income, low-income and moderate-income families and/or elderly households." Zoning By-laws, Town of Reading Zoning Board of Appeals, http://www.ci.reading.ma.us/planning/zbahomepage.htm, p. 29

[4] Longwood Place, like many assisted living facilities, is one large connected structure, allowing senior residents to move around the facility in a protected environment.

[5] And for fried clams – try The Clam Box!

[6] Ipswich Demographic Changes, Chuck Koller's Homepage, http://www.ckollars.org/demographicchanges.html

[7] From The Warren Group's Town Stats (http://rers.thewarrengroup.com/townstats/ts_login.asp). The median single-family home price was $165,500 in 1994 and $455,000 in 2004.

[8] Ipswich Housing Action Plan, p.1 SOURCE

[9] "Not Even the YMCA is Safe from Community Opposition," The NIMBY Report, National Low Income Housing Coalition, October, 2004, http://www.nlihc.org/nimby/102004.htm

[10] Analysis of the 2005 Subsidized Housing Inventory, Citizens' Housing and Planning Association, 2005, http://www.chapa.org/0540banalysis.pdf

[11] Ipswich Housing Action Plan. From the Community Development Plan, Town of Ipswich, 2003, http://www.town.ipswich.ma.us/plandev/pdf/development%20plan/ICDP.htm

[12] 40B Housing Units Built and Proposed, CHAPA, 2005

[13] Chapter 40B Fact Sheet, CHAPA, http://www.chapa.org/40b_fact.html

[14] Regional Policy Plan, Old Colony Regional Planning Council, 1999, http://www.ocpcrpa.org/OCPC%20Reg-Policy-Plan%202000.pdf

[15] Department of Housing and Community Development, Executive Order 418 Housing Certification: Abington, August, 2004, https://www2.massdhcd.com/e418portal/FY05/CommReport02.asp?MNO=1&FY=2005

[16] Abington Affordable Housing Strategy, September, 2003, http://www.mass.gov/dhcd/ToolKit/PProd/apAbing.pdf

[17] Local Heroes and Super Models: Governor's Awards for Smart Growth Leadership, Massachusetts Office of Commonwealth Development, Dec 2004, http://www.mass.gov/ocd/docs/smart/sgacs.pdf

[18] Smart Growth Audit, Vision 2020, July 2004, http://www.srpedd.org/smartgrowthaudit/smartgrowthaudit.pdf

[19] Crane conversation, May 2005.

[20] According to the Town of Concord Assessor's Office

[21] General Obligation Bond Summary Statement, Town of Concord, February, 2005, http://www.concordnet.org/finance/OS022305.pdf

[22] 2004 Concord Annual Town Report, Department of Planning and Land Management, Town of Concord, http://www.concordnet.org/townmgr/2004%20Town%20Report/0408_cd/dplm/nrc.html

[23] Chapter 3 – Housing, Comprehensive Long Range Plan, Comprehensive Long Range Plan Committee, May 2003, http://www.concordvision.org/PDF/Chapter_3.pdf

[24] 2004 Concord Annual Town Report, Town of Concord, Department of Planning and Land Management, 2004, http://www.concordnet.org/townmgr/2004%20Town%20Report/0408_cd/dplm/tpd.html

[25] The 40B projects include the case study development, Fairhaven Garden, and Warner Woods, an 80 unit mixed-income rental project scheduled to be completed in 2006.

[26] The fact sheet goes on to point out that only one employee of the town of Concord (the Finance Director) qualifies as even the median income, and that no employee of the town makes the 150% or even the 110% "starter income" set in the bylaw. Affordable Housing Fact Sheet, Town of Concord, 2004, http://www.concordnet.org/dplm/Affordability%20Fact%20Sheet.pdf

[27] Zoning Bylaw, Town of Concord, http://www.concordnet.org/dplm/2004%20Zoning%20Bylaw.pdf

[28] Sections 9 and 10, Zoning Bylaw, Town of Concord, http://www.concordnet.org/dplm/2004%20Zoning%20Bylaw.pdf

[29] Section 5.66.11, Zoning Bylaw, Town of Canton, http://www.town.canton.ma.us/PDF_files/Zoning-Bylaw.pdf

[30] Zoning Bylaw, Town of Canton, http://www.town.canton.ma.us/PDF_files/Zoning-Bylaw.pdf

CHAPTER 5: QUANTITATIVE ANALYSIS

This chapter details the results of the analysis of house prices in each of the five case studies. For each case study, I used descriptive statistics and regression analysis to build hedonic models that explain the observed house sale prices for both the control and impact data sets. I also build the sales price index for the average home through time using the equation that was constructed with the coefficients from the hedonic model. I then compare the price trend in the impact zone to the rest of the town, paying particular attention to the years during and immediately following permitting and construction of the development. Because the independent variables used to build the model[1] were identical in the control and impact zones and both data sets represent homes in the same town (minimizing the impact of difference in macro-level externalities such as school district and tax rate), differences between the two can be attributed to the introduction of a large new development.

Although each case is slightly different, in general, I compared sales in the years directly before permitting of the development with those in the years directly after the construction and lease-up of the development was concluded. This method assumes that potential negative impacts from a development begin when the project is considered likely to be built (for example, has final approvals in the form of a comprehensive or other permit) and peaks after the construction is finished and occupancy is stabilized. It assumes that the market will react to any negative externalities of the development within that timeframe.

There are arguments that multifamily and mixed-income developments age poorly, become run down and increasingly impact the neighborhood, but the duration of that kind of analysis is outside the scope of this study. However, for some of the older case studies, it is possible to compare the impact and control areas for many years after the development was constructed and see if there is any ongoing or continuing impact on sales prices.

In every case but Abington, I use paired years for the sales period variable to ensure that there were multiple observations for each period. A small sample size increases noise in the results, and incorporating more observations reduces standard error and provides a more accurate estimate of the impact of each sales period on the sales price. Further differences in variables are described in each case below. Details about the variables I used to construct the regression analysis can be reviewed in Appendix 5.1.

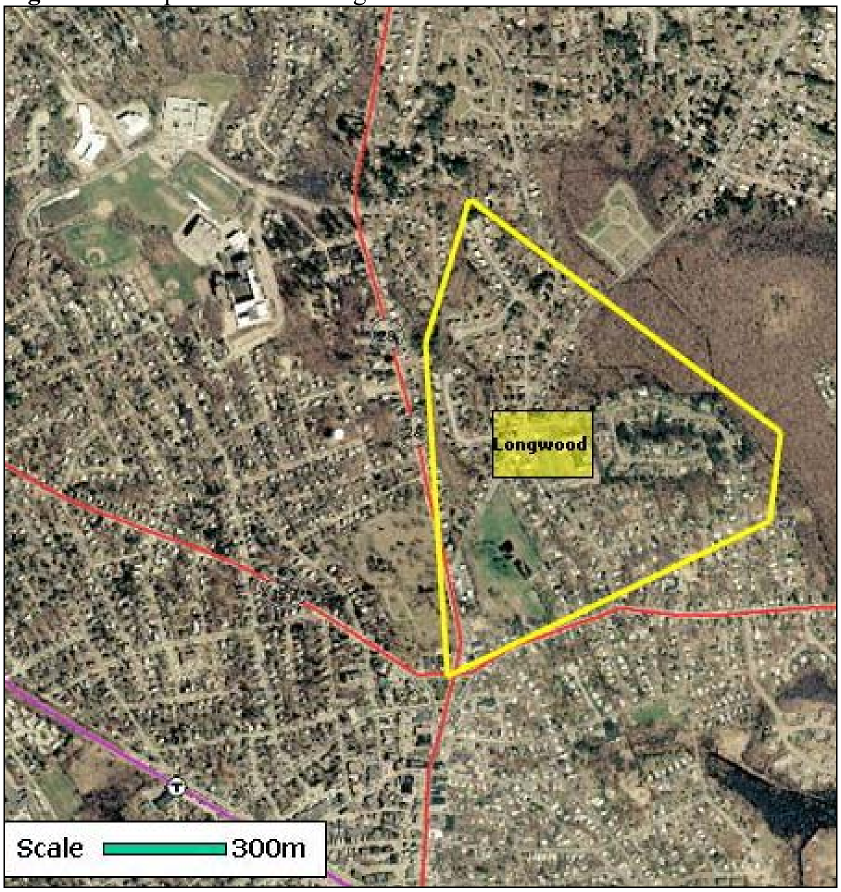
<u>Case 1: Longwood Place at Reading</u>

Location and Impact Zone

Longwood Place is a large age-restricted development situated on an expansive parcel in the middle of a single family neighborhood. There are single-family homes to the east, south, and west, and a forest forms a natural barrier to the northeast. Main Street, the nearest commercial street, is two blocks to the west. This street creates another edge of the impact zone. Longwood Place is very large and its open campus is visible throughout the surrounding neighborhood. In addition, Longwood Place borders Charles Street, a main feeder street from the neighborhood to the north to Main Street.

The impact area for this case comprises about nine streets of homes, and includes single-family homes as far as 500 meters or three streets away from the development. Houses with a direct visual line to the development were included in the impact zone.

Figure 5.1: Impact zone for Longwood Place



Because of Longwood Place's open campus, this visual area proved to be extensive. Houses that were "trapped" by the street pattern of the neighborhood (i.e.: have to pass the development in order to access Main Street) were also included in the impact zone.

Sales Data

The Reading control data set included 5,061 records and the impact zone included 147 records. Table 5.2 gives a summary of the data characteristics, while Appendix 5.2 contains detailed descriptive statistics about the data. There were only minimal differences in control and impact home characteristics, indicating that the housing stock that sold is similar in both areas.

Table 5.2: Descriptive Summary of Reading Data

	Mean		Std. Deviation	
Variable	**Control**	**Impact**	**Control**	**Impact**
# Observations	5,061	147	-	-
Price	$257,348	$280,877	$116,820	$129,346
House sf	1,729	1,881	634	527
Lot size	15,546	15,329	10,340	6,996
Bedrooms	3.20	3.32	0.76	0.68
1-2BR	14.6%	8.2%		
3BR	55.3%	55.8%		
4BR	25.9%	32.0%		
>=5BR	4.1%	4.1%		
Bathrooms	1.82	1.98	0.67	0.61
1bath	24.9%	12.9%		
1.5bath	25.5%	25.2%		
2bath	21.9%	21.1%		
>=2.5bath	27.7%	40.8%		
Year Built	1947	1949	35	38
<=1920	18.3%	28.6%		
1921-1934	9.6%	2.7%		
1935-1948	13.8%	8.8%		
1949-1954	14.5%	4.1%		
1955-1964	14.8%	3.4%		
1965-1981	13.8%	35.4%		
>=1982	15.1%	17.0%		

Bold variables are base cases and are omitted from the Hedonic regression.

Hedonic Models

I will use the model for the control area of Reading shown in Table 5.3 to explain general features about the hedonic models for all of the case studies.

Table 5.3 lists all of the independent variables (house characteristics) and their relationship to the independent variable (natural log of observed prices[2]) as represented by the coefficient values. The first, or constant, value is the base estimate for house price,[3] in this case $113,437. As described in Chapter 3, there are two types of variables, continuous and dummy. The two continuous variables are LOTSIZE (the size of the home's lot, in square feet), and INTERSF (or the interior square footage of the home). The dummy variables include the year the home was built, the number of bedrooms, the number of bathrooms, and the year the house was sold. For each set of dummy variables, the minimum group is considered the base case, with a coefficient of 0, and is left out of the model. Each variable in the model has a coefficient related to it that explains that variable's addition (or subtraction) to the price of the home, assuming all of the other independent variables are held constant. Because I used the natural logarithm of the price, the unstandardized coefficient for each variable is actually describing that variable's contribution to the natural log of the price. In the next column, standardized coefficient, the values are converted to a percentage format that relates to the actual sale price. For example, in the control area of Reading, a home with one and a half baths is worth 11.9% more than the base case house (with one bath), if all other characteristics are held constant. Similarly, a house that sold in 1993-94 was worth 1.9% less than a house that sold in 1987-88 (the base value for year sold).

In general, the coefficients for the Reading control area make intuitive sense. Both house and lot size are positively correlated with prices – the more is more theory of house value. Additional bedrooms and bathrooms add value over the base case, and newer construction is more valuable than homes built before 1921. Finally, the variable describing year sold reflects the regional housing market over the past 18 years: decreasing home prices through the early 1990s, with a recovery in the mid- to late-90s, then rapid appreciation since 2000.

Table 5.3: Hedonic Model for Reading Control Area

READING CONTROL					
Independent Variables	Coefficients		Standard Error	t	Significance
	Unstandardized	Standardized			
(Constant)	11.6390	-	0.0231	503.1286	0.0000
built1921-1934	0.0703	7.3%	0.0167	4.1985	0.0000
built1935-1948	0.0765	7.9%	0.0153	5.0122	0.0000
built1949-1954	0.0685	7.1%	0.0150	4.5709	0.0000
built1955-1964	0.1011	10.6%	0.0150	6.7277	0.0000
built1965-1981	0.2003	22.2%	0.0158	12.6415	0.0000
built>=1982	0.1043	11.0%	0.0165	6.3326	0.0000
sold89-90	-0.0492	-4.8%	0.0183	-2.6933	0.0071
sold91-92	-0.0917	-8.8%	0.0178	-5.1424	0.0000
sold93-94	-0.0192	-1.9%	0.0174	-1.1015	0.2707
sold95-96	0.0736	7.6%	0.0175	4.1986	0.0000
sold97-98	0.1622	17.6%	0.0176	9.2302	0.0000
sold99-00	0.3884	47.5%	0.0180	21.5984	0.0000
sold01-02	0.6585	93.2%	0.0180	36.5921	0.0000
sold03-05	0.8097	124.7%	0.0175	46.2833	0.0000
1.5bath	0.1124	11.9%	0.0124	9.0562	0.0000
2.0bath	0.0929	9.7%	0.0132	7.0142	0.0000
2.5bath	0.1862	20.5%	0.0166	11.2253	0.0000
3BR	0.0641	6.6%	0.0129	4.9672	0.0000
4BR	0.1484	16.0%	0.0163	9.0878	0.0000
>=5BR	0.1307	14.0%	0.0266	4.9143	0.0000
LOTSIZE	0.000001	N/A	0.000000	3.2951	0.0010
INTERSF	0.000126	N/A	0.000010	12.2185	0.0000
Model Summary					
# of Observations	5,961	Adjusted R Square	0.566	Std. Error of the Estimate	0.295519

* omitted: built<=1920, sold87-88, 1.0bath, <=2BR

Similarly, the model for the Reading impact area shows reasonable results for the independent variables. One difference is that in this area, additional bathrooms do not seem to add value to a house. This is not an unusual result for room number variables. The model assumes that all other characteristics of the house, including total interior square footage, stays the same, so the space for an additional half-bath is sacrificed from somewhere else in the base house. The smaller size of this data set is reflected in the higher standard errors in this model, and in general more observations lead to lower standard errors and a more dependable model.

Table 5.4: Hedonic Model for Reading Impact Area

READING IMPACT					
Independent Variables	**Coefficients**		**Standard Error**	**t**	**Significance**
	Unstandardized	**Standardized**			
(Constant)	11.7639	-	0.1551	75.8368	0.0000
built1921-1934	0.1079	11.4%	0.1531	0.7049	0.4822
built1935-1948	0.2177	24.3%	0.0988	2.2031	0.0294
built1949-1954	0.1925	21.2%	0.1324	1.4534	0.1486
built1955-1964	0.1197	12.7%	0.1421	0.8423	0.4012
built1965-1981	0.4022	49.5%	0.0759	5.2992	0.0000
built>=1982	0.3650	44.1%	0.0907	4.0246	0.0001
sold89-90	-0.1829	-16.7%	0.1144	-1.5996	0.1122
sold91-92	-0.0634	-6.1%	0.1149	-0.5518	0.5821
sold93-94	-0.0732	-7.1%	0.1013	-0.7225	0.4713
sold95-96	-0.1060	-10.1%	0.1082	-0.9799	0.3291
sold97-98	0.1344	14.4%	0.1057	1.2709	0.2062
sold99-00	0.4078	50.4%	0.1151	3.5430	0.0006
sold01-02	0.3132	36.8%	0.1593	1.9660	0.0515
sold03-05	0.7377	109.1%	0.1036	7.1195	0.0000
1.5bath	-0.0250	-2.5%	0.0892	-0.2799	0.7800
2.0bath	-0.0407	-4.0%	0.0977	-0.4163	0.6779
2.5bath	0.0612	6.3%	0.1206	0.5077	0.6125
3BR	0.1604	17.4%	0.0952	1.6841	0.0947
4BR	0.3171	37.3%	0.1115	2.8446	0.0052
>=5BR	0.3368	40.1%	0.1610	2.0926	0.0384
LOTSIZE	0.000001	N/A	0.0000	0.2569	0.7977
INTERSF	0.000037	N/A	0.0001	0.4940	0.6222
Model Summary					
# of Observations	147	Adjusted R Square	0.674	Std. Error of the Estimate	0.273887

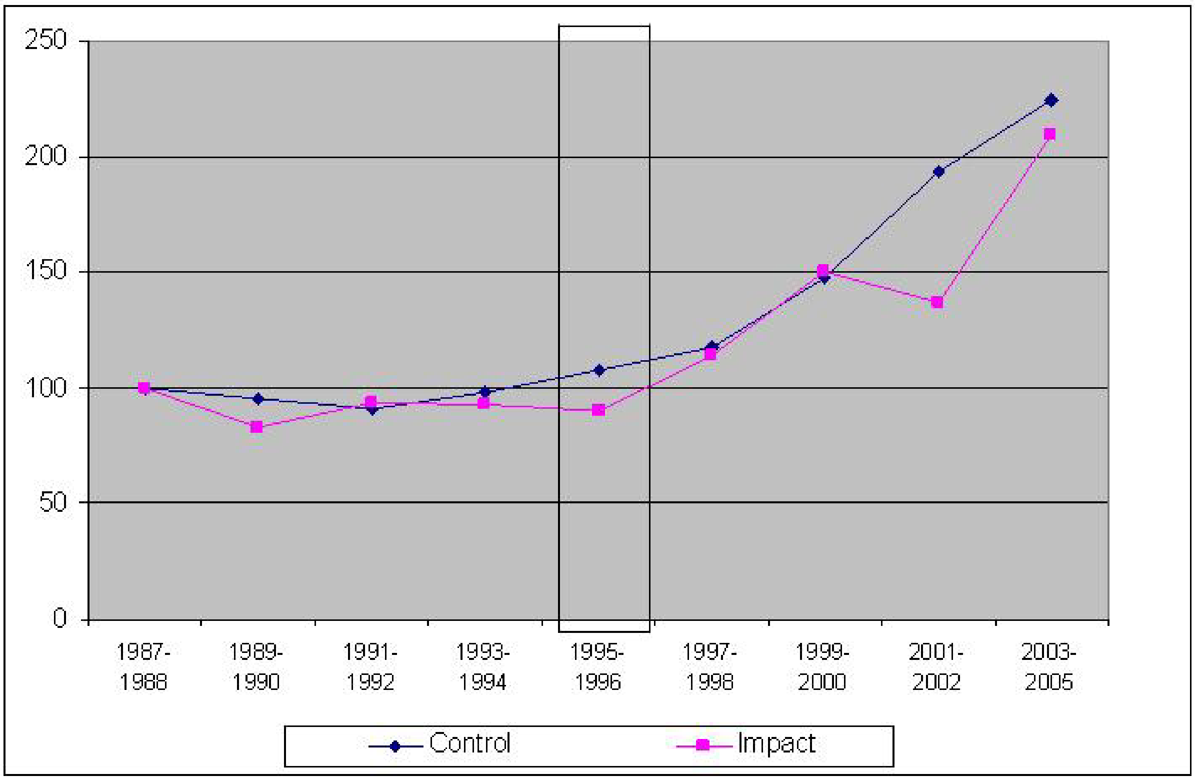
* omitted: built<=1920, sold87-88, 1.0bath, <=2BR

Price Index

Using the models and descriptive statistics above, I was able to price the average house in both the control and impact areas. As explained in the Chapter 3, this average house is a theoretical amalgam of all of the average characteristics of houses in each data sample. For each sample I start with the base price (the constant) and add the average lot size, the average interior square footage, the average impact of all of the possible bedroom configurations, and so on. The year sold variable is not included in this calculation. This equation, which can be seen in Appendix 5.2, produces the natural log of the price of the average house in the base sales year

(1987-88). From there, the impact of each sales year is added, and the result converted back into a true sales price. The result is a sales price index over time for a theoretical average house in both the control and impact areas.

Figure 5.5: Sales Price Index for Reading Control vs. Impact Areas



Longwood Place received its permits in late 1994 and opened for rental in 1996. Thus, the height of the impact of the development is assumed to be during the 1995-1996 sales year pair, as is shown in Figure 5.5. In order to determine the effect of the development, I compared the change from 1993-94 to 1997-98. In this time, the impact area appreciated an annual rate of 4.2%, while the control area appreciated 3.7%.[4] I conclude that in that time, the development did not have any negative impact on single-family house prices in its immediate vicinity.

It is obvious in Figure 5.5 that the value for the impact area price in the 2001-02 years is irregular. In looking back at Table 5.4, this variable shows an unusually high standard error, indicating that at least one data record in this group has unusual or greatly skewed properties. Indeed, in looking back at the data, there is one transaction that has a significantly lower price than the others, although not low enough to be removed from the sample. The impact trend corrects in the 2003-05 sales period, when the price index returns to its previous trajectory. I conclude that the 2001-02 blip was caused by the small data sample for that year pair and one unusual transaction, rather than any real event in the impact zone.

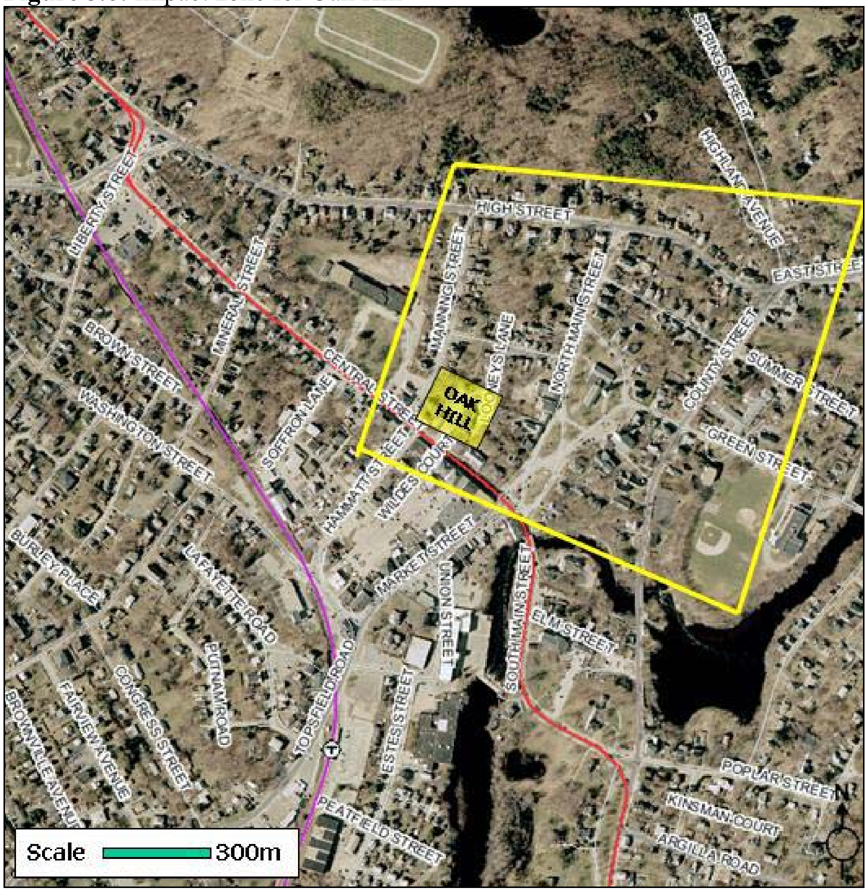
Case 2: Oak Hill

Location and Impact Zone

Oak Hill is located on a mixed-use commercial strip in the town center of Ipswich. Central Street, with a mix of residential, commercial, and small mixed-use buildings, borders the development to the south. To the north, east, and west, the development is surrounded by single-family homes. Oak Hill is significantly larger and denser than other uses in the areas. Additionally, it is set up on a rise, and is quite visible from around the neighborhood.

I determined that the impact area for this case is an area of approximately 0.75 square kilometers. The impact zone includes single-family homes as far as 600 meters or three streets away from Oak Hill. Houses with a direct visual line to the development were included in the impact zone, as were houses that were "trapped" by the street pattern of the neighborhood (i.e.: have to pass the development in order to access Central Street). Additionally, houses on the opposite side of Central Street were included in the impact zone because of the area's topography and the resulting visibility of the development.

Figure 5.6: Impact zone for Oak Hill



Sales Data

Unfortunately, the sales data for Ipswich was not appropriate for analysis by this methodology. Once cleaned, the Ipswich control data set included 2,616 records but the impact zone included only 60 records. Table 5.7 gives a summary of the data characteristics, while Appendix 5.3 contains detailed descriptive statistics about the data. In addition to the small sample size, the data for the Ipswich control and impact zones was very different. Houses that sold in the impact zone were much smaller and were situated on much smaller lots. In addition, 85% of the sales transactions for the impact zone were homes that were built before 1920, thus falling into the base case and out of the predictive model. The town center area that comprises the impact zone includes a much older than average housing stock than the rest of the town.

Table 5.7: Descriptive Summary of Ipswich Data

	Mean		**Std. Deviation**	
Variable	Control	Impact	Control	Impact
# Observations	2,616	60	-	-
Price	$279,311	$226,660	$190,532	$110,996
House sf	2,269	1,744	1,076	679
Lot size	44,606	8,037	116,481	7,135
Bedrooms	3.09	2.98	0.83	0.91
1BR	2.7%	1.7%		
2BR	16.9%	26.7%		
3BR	54.3%	48.3%		
>=4BR	26.2%	23.3%		
Bathrooms	2.09	1.63	0.88	0.62
1bath	22.5%	33.3%		
1.5bath	14.8%	33.3%		
2.0bath	20.3%	15.0%		
2.5bath	25.2%	13.3%		
>=3.0bath	17.3%	5.0%		
Year Built	1952	1834	52	81
<1920	18.2%	85.0%		
1920-1954	19.6%	15.0%		
1955-1969	18.7%	0.0%		
1970-1991	22.4%	0.0%		
>=1992	21.1%	0.0%		

Bold variables are base cases and are omitted from the Hedonic regression.

Price Models

As predicted, the hedonic models for Ipswich, particularly for the impact zone, are seriously flawed. There were no observations for some of "year built" dummy variables in the impact area, which would skew the accuracy of the other variables, as the model attempts to compensate for these missing characteristics with the remaining independent variables. The coefficients are not reasonable, as any additional bathroom capacity results in a reduction in price, and the year sold variables do not reflect the empirical real estate market evidence. The high standard errors of the impact model casts further doubt on its accuracy. Clearly, the available data was not extensive or diverse enough to build a strong predictive model for house prices in the impact zone. I decided to omit Ipswich from the sales index analysis, since any index built on the below model would be inherently inaccurate and misleading.

Table 5.8: Hedonic Model for Ipswich Control Area

IPSWICH CONTROL					
Independent Variables	**Coefficients**		**Standard Error**	**t**	**Significance**
	Unstandardized	**Standardized**			
(Constant)	11.4211	-	0.0689	165.8712	0.0000
sold89-90	0.0773	8.0%	0.0423	1.8284	0.0676
sold91-92	-0.0961	-9.2%	0.0400	-2.4019	0.0164
sold93-94	0.0214	2.2%	0.0381	0.5622	0.5740
sold95-96	0.1860	20.4%	0.0386	4.8249	0.0000
sold97-98	0.2692	30.9%	0.0371	7.2522	0.0000
sold99-00	0.5881	80.1%	0.0374	15.7300	0.0000
sold01-02	0.8213	127.3%	0.0385	21.3231	0.0000
sold03-05	1.0223	177.9%	0.0369	27.7126	0.0000
built1920-1954	0.0038	0.4%	0.0303	0.1256	0.9000
built1955-1969	0.0793	8.3%	0.0304	2.6079	0.0092
built1970-1991	0.1340	14.3%	0.0304	4.4041	0.0000
built>=1992	-0.1191	-11.2%	0.0339	-3.5155	0.0004
1.5bath	0.1093	11.5%	0.0315	3.4729	0.0005
2.0bath	0.0938	9.8%	0.0296	3.1660	0.0016
2.5bath	0.2000	22.1%	0.0345	5.7937	0.0000
>=3.0bath	0.3195	37.6%	0.0447	7.1415	0.0000
2BR	0.0966	10.1%	0.0603	1.6018	0.1093
3BR	0.0387	3.9%	0.0581	0.6660	0.5055
>=4BR	0.0091	0.9%	0.0608	0.1499	0.8808
LOTSIZE	0.0000	N/A	0.0000	2.9409	0.0033
INTERSF	0.0002	N/A	0.0000	11.4054	0.0000

Model Summary					
# of Observations	2,616	Adjusted R Square	0.478	Std. Error of the Estimate	0.46533

* omitted: built<1920, sold87-88, 1.0bath, <3BR

Table 5.9: Hedonic Model for Ipswich Impact Area

IPSWICH IMPACT					
Independent Variables	**Coefficients**		**Standard Error**	**t**	**Significance**
	Unstandardized	**Standardized**			
(Constant)	11.1182	-	0.4422	25.1404	0.0000
sold89-90	-0.2909	-25.2%	0.2723	-1.0683	0.2916
sold91-92	0.1449	15.6%	0.2674	0.5418	0.5909
sold93-94	-0.1204	-11.3%	0.2274	-0.5295	0.5993
sold95-96	-0.1956	-17.8%	0.2427	-0.8059	0.4249
sold97-98	-0.3396	-28.8%	0.2711	-1.2530	0.2173
sold99-00	0.1092	11.5%	0.2269	0.4814	0.6328
sold01-02	0.5330	70.4%	0.2152	2.4771	0.0175
sold03-05	0.7818	118.5%	0.2201	3.5517	0.0010
built1920-1954	0.0254	2.6%	0.1536	0.1655	0.8694
built1955-1969	-	-	-	-	-
built1970-1991	-	-	-	-	-
built>=1992	-	-	-	-	-
1.5bath	-0.0533	-5.2%	0.1421	-0.3751	0.7095
2.0bath	-0.4443	-35.9%	0.1757	-2.5297	0.0154
2.5bath	-0.0326	-3.2%	0.2625	-0.1242	0.9018
>=3.0bath	-0.3122	-26.8%	0.3349	-0.9321	0.3568
2BR	0.0149	1.5%	0.4156	0.0358	0.9716
3BR	0.1690	18.4%	0.4226	0.3999	0.6913
>=4BR	-0.3984	-32.9%	0.4808	-0.8286	0.4121
LOTSIZE	0.00001	N/A	0.00001	1.5582	0.1269
INTERSF	0.00053	N/A	0.00015	3.5554	0.0010

Model Summary					
# of Observations	60	Adjusted R Square	0.532	Std. Error of the Estimate	0.36140

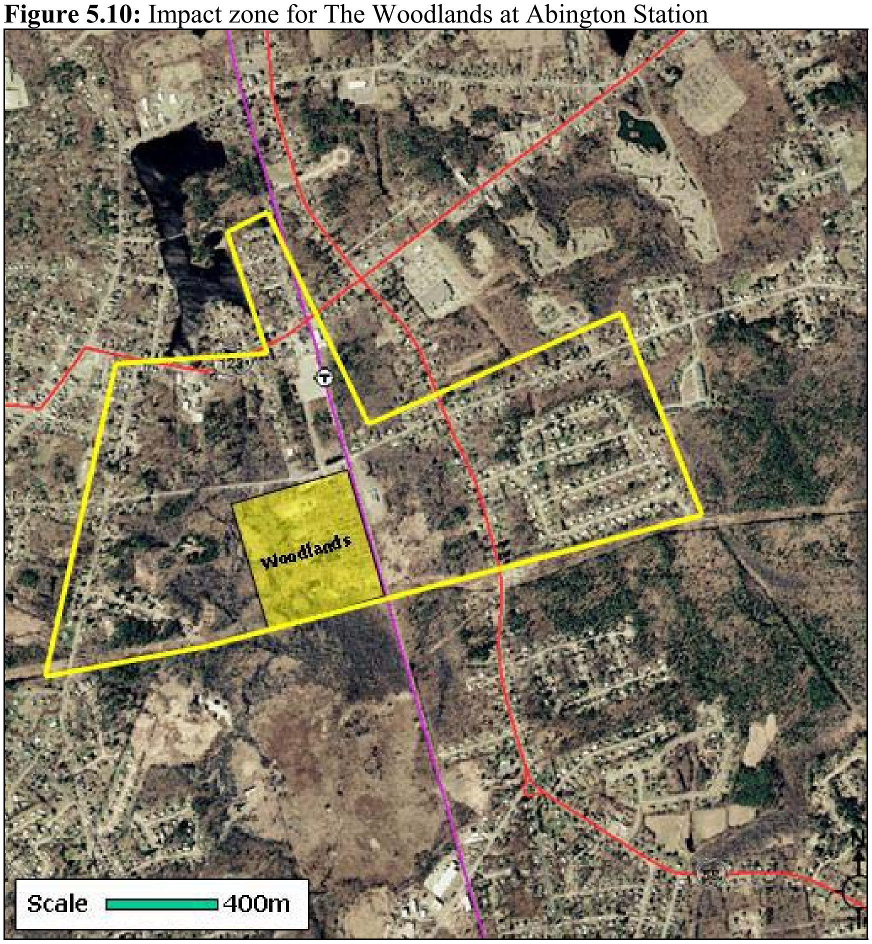
* omitted: built<1920, sold87-88, 1.0bath, <3BR

Case 3: The Woodlands at Abington Station

Location and Impact Zone

The Woodlands at Abington Station is located just a few hundred meters from the MBTA commuter rail station. Although the development is not near the town center of Abington, it was marketed to the town during permitting and to potential residents as "transit-oriented" development. Although the development is isolated visually from all but its closest neighbors, it is so different in scale from the surrounding area that its impact reaches beyond sight lines. One of the primary reasons that abutters give in objecting to development is the impact on traffic and road service levels. The Woodlands, with 192 units and many parking spaces, certainly impacts the surrounding roads. Therefore, I extended the impact area to nearby residential roads that share the same access routes to the commuter rail station and the town center. There is a pond that creates a natural boundary to the north of the development. Overall, the impact zone is about one square kilometer, and includes homes as far as 800 meters away.

Figure 5.10: Impact zone for The Woodlands at Abington Station



Sales Data

There were 2,900 single-family sales transactions in Abington from 1987 until the present. After removing incomplete records and outliers, I analyzed 203 transactions in the impact zone and 2,435 transactions in the control area (the rest of the town). Table 5.11 gives a summary of the data characteristics, while Appendix 5.4 contains detailed descriptive statistics about the data. There were minimal differences in control and impact home characteristics, such as house and lot size, and the impact zone is slightly older than the rest of the town. Overall, there seems to be little difference in the housing stock that has sold in both areas.

Table 5.11: Descriptive Summary of Abington Data

	Mean		**Std. Deviation**	
Variable	Control	Impact	Control	Impact
# Observations	2,435	203	-	-
Price	$194,274	$180,248	$134,225	$83,657
House sf	1,670	1,593	712	557
Lot size	23,526	24,048	16,259	16,681
Bedrooms	3.05	3.04	0.76	0.74
1-2BR	19.3%	16.3%		
3BR	58.9%	64.0%		
>=4BR	21.8%	19.7%		
Bathrooms	1.76	1.61	0.74	0.60
1bath	33.6%	36.9%		
1.5bath	20.3%	23.2%		
2bath	18.6%	24.1%		
>=2.5bath	27.6%	15.8%		
Year Built	1950	1937	40	48
<=1900	17.9%	28.1%		
1901-1945	10.3%	11.8%		
1946-1959	29.4%	9.4%		
1960-1971	9.9%	27.6%		
1972-1990	14.0%	14.3%		
>=1991	18.5%	8.9%		

Bold variables are base cases and are omitted from the Hedonic regression.

Price Models

Both the control and impact models show generally consistent and expected values for the coefficients of the independent variables. Newer structures seem to command a premium in Abington. This might also explain the positive impact of interior square footage and >2.5 bathrooms, both common features in newer homes. By breaking out the sales period into years rather than year pairs, the real estate trends over time are clearer. In both the control and impact areas, the real estate market appreciated until the end of the 1980s, then dipped and did not start to recover until around 1998. The annual breakout also shows that prices have been climbing at ever higher rates for the past five years.

Table 5.12: Hedonic Model for Abington Control Area

ABINGTON CONTROL					
Independent Variables	**Coefficients**		**Standard Error**	**t**	**Significance**
	Unstandardized	**Standardized**			
(Constant)	11.3114	-	0.1307	303.3595	0.0000
built1901-1945	0.0391	4.0%	0.0764	1.5565	0.1197
built1946-1959	0.1199	12.7%	0.0845	6.0905	0.0000
built1960-1971	0.1708	18.6%	0.0573	6.6808	0.0000
built1972-1990	0.2890	33.5%	0.0681	11.5848	0.0000
built<=1991	0.2148	24.0%	0.0815	8.9103	0.0000
3BR	-0.0027	-0.3%	0.0671	-0.1497	0.8810
>=4BR	0.0237	2.4%	0.0891	0.9771	0.3286
1.5Ba	0.0358	3.6%	0.0566	1.8264	0.0679
2Ba	-0.0059	-0.6%	0.0578	-0.2898	0.7720
>=2.5Ba	0.1071	11.3%	0.0795	4.4134	0.0000
sold88	0.0755	7.8%	0.1251	1.9092	0.0564
sold89	0.0087	0.9%	0.1368	0.2012	0.8405
sold90	-0.1553	-14.4%	0.1941	-3.6766	0.0002
sold91	-0.1329	-12.4%	0.1241	-3.3222	0.0009
sold92	-0.1186	-11.2%	0.1323	-3.0771	0.0021
sold93	-0.1858	-17.0%	0.1145	-5.0131	0.0000
sold94	-0.1266	-11.9%	0.1132	-3.3646	0.0008
sold95	-0.1414	-13.2%	0.1146	-3.6801	0.0002
sold96	-0.0697	-6.7%	0.1309	-1.7587	0.0788
sold97	-0.0040	-0.4%	0.1211	-0.1026	0.9183
sold98	0.1134	12.0%	0.1242	2.9896	0.0028
sold99	0.2211	24.7%	0.1161	6.1320	0.0000
sold00	0.3682	44.5%	0.1380	10.1671	0.0000
sold01	0.5038	65.5%	0.1185	13.0469	0.0000
sold02	0.6108	84.2%	0.1192	15.3844	0.0000
sold03	0.7582	113.4%	0.1241	19.9810	0.0000
sold04-05	0.9044	147.0%	0.1050	24.7852	0.0000
LOTSIZE	0.000002	N/A	0.0000	3.8253	0.0001
INTERSF	0.000202	N/A	0.0001	14.9738	0.0000

Model Summary					
# of Observations	2,435	Adjusted R Square	0.631	Std. Error of the Estimate	0.31436

* omitted: built<=1900, sold87, 1.0bath, <=2BR

Table 5.13: Hedonic Model for Reading Control Area

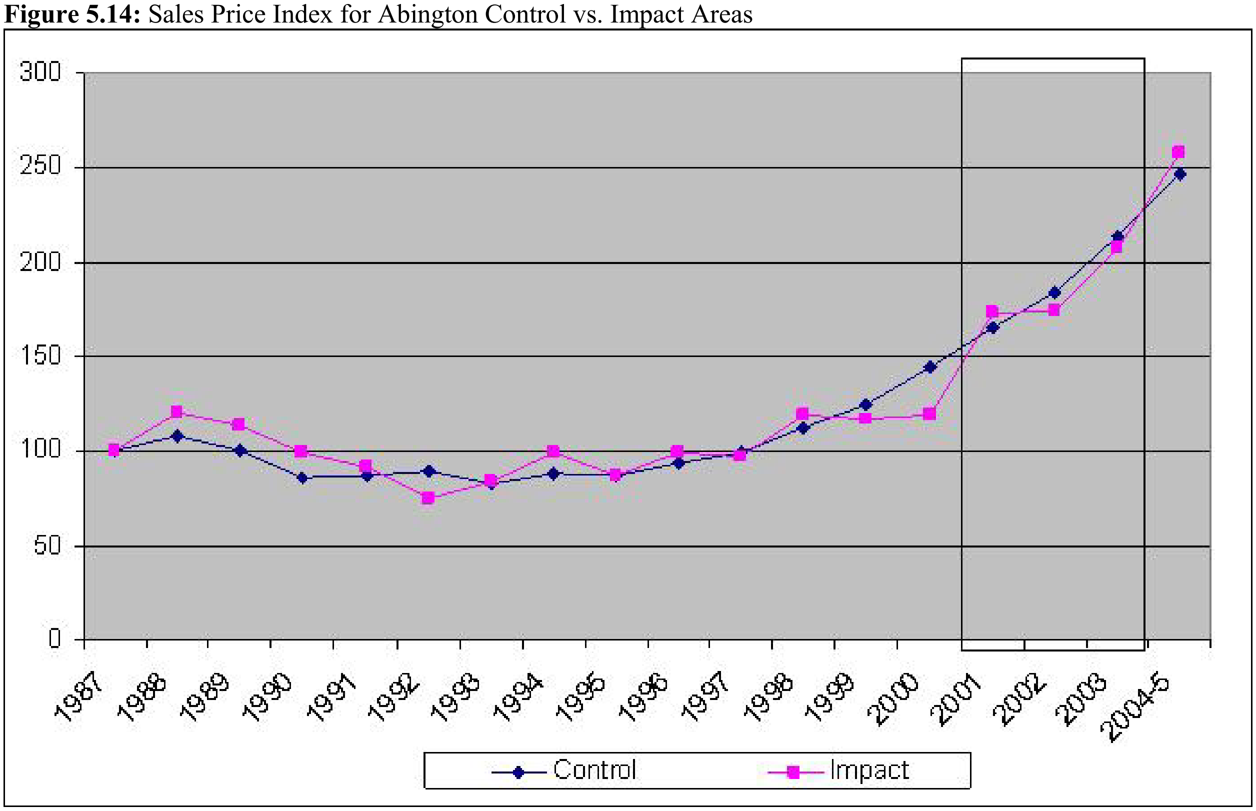
ABINGTON IMPACT					
Independent Variables	**Coefficients**		**Standard Error**	**t**	**Significance**
	Unstandardized	**Standardized**			
(Constant)	11.3326	-		86.6900	0.0000
built1901-1945	-0.1496	-13.9%	-0.1023	-1.9576	0.0519
built1946-1959	0.1243	13.2%	0.0767	1.4712	0.1431
built1960-1971	0.1552	16.8%	0.1469	2.7077	0.0075
built1972-1990	0.2210	24.7%	0.1638	3.2454	0.0014
built<=1991	0.1288	13.7%	0.0775	1.5799	0.1160
3BR	0.0843	8.8%	0.0857	1.2568	0.2105
>=4BR	-0.0945	-9.0%	-0.0796	-1.0604	0.2904
1.5Ba	0.0758	7.9%	0.0677	1.3396	0.1821
2Ba	0.0282	2.9%	0.0256	0.4883	0.6259
>=2.5Ba	0.1136	12.0%	0.0876	1.4287	0.1549
sold88	0.1815	19.9%	0.0832	1.4505	0.1487
sold89	0.1284	13.7%	0.0496	0.9387	0.3492
sold90	-0.0032	-0.3%	-0.0008	-0.0163	0.9870
sold91	-0.0892	-8.5%	-0.0409	-0.7185	0.4734
sold92	-0.2807	-24.5%	-0.1157	-2.1214	0.0353
sold93	-0.1810	-16.6%	-0.1062	-1.5809	0.1157
sold94	-0.0102	-1.0%	-0.0056	-0.0900	0.9284
sold95	-0.1358	-12.7%	-0.0729	-1.1854	0.2375
sold96	-0.0030	-0.3%	-0.0013	-0.0228	0.9818
sold97	-0.0267	-2.6%	-0.0128	-0.2206	0.8256
sold98	0.1776	19.4%	0.0814	1.4295	0.1547
sold99	0.1559	16.9%	0.0837	1.3433	0.1809
sold00	0.1732	18.9%	0.0670	1.2551	0.2111
sold01	0.5491	73.2%	0.2743	4.6316	0.0000
sold02	0.5531	73.9%	0.2763	4.6398	0.0000
sold03	0.7300	107.5%	0.3346	5.8809	0.0000
sold04-05	0.9461	157.6%	0.6352	9.0126	0.0000
LOTSIZE	0.0000	N/A	0.1574	3.4142	0.0008
INTERSF	0.0001	N/A	0.1330	2.1993	0.0292
Model Summary					
# of Observations: 203	Adjusted R Square: 0.658		Std. Error of the Estimate: 0.27695		

* omitted: built<=1900, sold87, 1.0bath, <=2BR

Price Index

In the Abington case study, there were enough observations in both samples to divide the sales year independent variable into annual groups rather than year pairs. This was particularly important for the case of The Woodlands, since the development was not fully leased until the fall of 2003. Thus, the first period after this impact window was 2004-5[5]. With the annual year division, I could break out the timeframe in order to see this impact more clearly. The Woodlands received its comprehensive permit in 2001. Thus, the height of the impact of the development is assumed to be during the 2001-2003 sales years, as is shown in Figure 5.14. In order to determine the effect of the development, I compared the change from 2000 to 2004-5. In this time, the impact area appreciated 21.3%, while the control area appreciated 14.3%. I conclude that the development did not have any negative impact on single-family house prices in its immediate vicinity. It is tempting to speculate that The Woodlands actually had a beneficial impact on neighboring home prices, particularly because the development was a reuse of a blighted former industrial site. It is possible that this higher and better use of the land as well as the TOD rezoning actually helped raise surrounding home prices.

Figure 5.14: Sales Price Index for Abington Control vs. Impact Areas

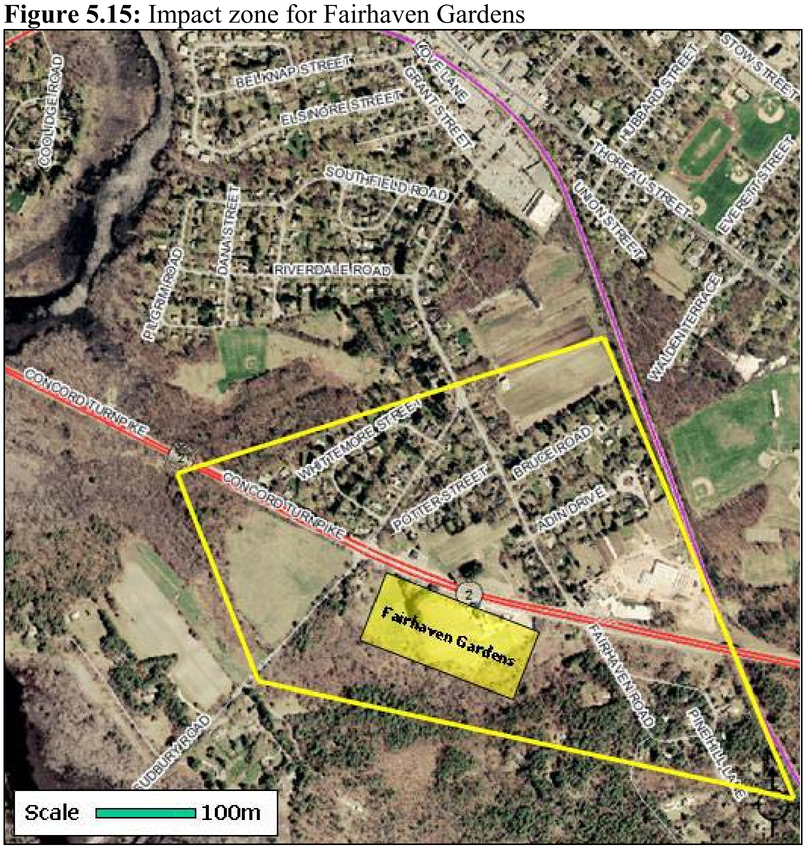


Case 4: Fairhaven Garden

Location and Impact Zone

Fairhaven Garden is located on the Concord Turnpike in the midst of a low-density single-family residential neighborhood. The development is bordered to the south and west by undeveloped land that creates a natural border for the impact zone. There is also undeveloped agricultural land across the turnpike from Fairhaven Garden, but because it is possible to see the development from beyond the farm, I did not treat this land as the end of the impact zone. In addition, all foot and automobile traffic from Fairhaven would have to drive through the residential neighborhood to the north of the project to get to Concord Center. Therefore, I included the edges of this neighborhood in the impact zone. Overall, the impact zone contains only about seven streets, and includes homes up to about 120 meters from the development.

Figure 5.15: Impact zone for Fairhaven Gardens



Sales Data

There were 3,514 single-family sales transactions in Concord from 1987 until the present. After removing incomplete records and outliers, I analyzed 100 transactions in the impact zone and 3,360 transactions in the remainder of the town. Table 5.16 provides a summary of the data characteristics, while Appendix 5.5 contains detailed descriptive statistics about the data. While the homes in the impact area were slightly smaller and on marginally smaller lots, overall, there is little difference in the housing stock that has sold in both areas.

Table 5.16: Descriptive Summary of Concord Data

	Mean		**Std. Deviation**	
Variable	Control	Impact	Control	Impact
# Observations	3,360	100	-	-
Price	$522,791	$430,802	$428,048	$274,996
House sf	2,603	2,314	1,364	1,530
Lot size	47,814	39,004	74,206	56,677
Bedrooms	3.76	3.50	0.91	0.84
1-2BR	5.7%	5.0%		
3BR	33.3%	53.0%		
4BR	42.7%	33.0%		
>=5BR	18.3%	9.0%		
Bathrooms	2.79	2.19	1.33	1.10
1bath	7.7%	13.0%		
1.5-2.0bath	28.2%	45.0%		
2.5bath	30.2%	26.0%		
3.0-4.0bath	15.3%	10.0%		
>=4.5bath	18.6%	6.0%		
Year Built	1946	1934	44	46
<=1900	15.2%	11.0%		
1901-1945	14.5%	40.0%		
1946-1954	14.5%	21.0%		
1955-1964	16.1%	9.0%		
1965-1974	17.3%	9.0%		
1975-1984	8.2%	3.0%		
>=1985	14.2%	7.0%		

Bold variables are base cases and are omitted from Hedonic regression.

Price Models

Both the control and impact models show generally consistent and expected values for the coefficients of the independent variables. As opposed to other cases, the Concord real estate market, particularly in the control group, started to grow again in the early 1990s. In both groups, older and newer homes seem to command a premium, while mid-century construction does not. As noted in the Case Studies profile, Concord has been experiencing many teardowns. This trend might explain by the positive coefficient for newer construction.

Table 5.17: Hedonic Model for Concord Control Area

CONCORD CONTROL					
Independent Variables	Coefficients		Standard Error	t	Significance
	Unstandardized	Standardized			
(Constant)	11.8396	-	0.0408	290.2172	0.0000
sold89-90	-0.0302	-3.0%	0.0299	-1.0110	0.3121
sold91-92	-0.0903	-8.6%	0.0275	-3.2816	0.0010
sold93-94	0.0023	0.2%	0.0276	0.0830	0.9339
sold95-96	0.1290	13.8%	0.0275	4.6807	0.0000
sold97-98	0.2792	32.2%	0.0274	10.2032	0.0000
sold99-00	0.4869	62.7%	0.0275	17.7203	0.0000
sold01-02	0.7257	106.6%	0.0294	24.6704	0.0000
sold03-05	0.8759	140.1%	0.0289	30.3017	0.0000
built1901-1945	0.0366	3.7%	0.0235	1.5609	0.1186
built1946-1954	-0.0764	-7.4%	0.0238	-3.2096	0.0013
built1955-1964	-0.0297	-2.9%	0.0234	-1.2655	0.2058
built1965-1974	0.0025	0.3%	0.0234	0.1090	0.9132
built1975-1984	0.0670	6.9%	0.0283	2.3652	0.0181
built>=1985	0.0886	9.3%	0.0254	3.4915	0.0005
1.5-2.0bath	0.1414	15.2%	0.0270	5.2284	0.0000
2.5bath	0.2616	29.9%	0.0298	8.7722	0.0000
3.0-4.0bath	0.3312	39.3%	0.0330	10.0410	0.0000
>=4.5bath	0.4318	54.0%	0.0372	11.6188	0.0000
3BR	0.0467	4.8%	0.0300	1.5576	0.1194
4BR	0.1208	12.8%	0.0318	3.7964	0.0001
>=5BR	0.1323	14.1%	0.0363	3.6471	0.0003
LOTSIZE	0.000001	N/A	0.000000	10.5368	0.0000
INTERSF	0.000175	N/A	0.000008	20.7545	0.0000

Model Summary					
# of Observations	3,360	Adjusted R Square	0.671	Std. Error of the Estimate	0.295519

* omitted: built<=1900, sold87-88, 1.0bath, <=2BR

Table 5.18: Hedonic Model for Concord Impact Area

CONCORD IMPACT					
Independent Variables	**Coefficients**		**Standard Error**	**t**	**Significance**
	Unstandardized	**Standardized**			
(Constant)	11.87460	-	0.21285	55.78855	0.00000
sold89-90	-0.05656	-5.5%	0.12697	-0.44544	0.65727
sold91-92	-0.01869	-1.9%	0.13299	-0.14055	0.88860
sold93-94	-0.12630	-11.9%	0.10657	-1.18510	0.23967
sold95-96	-0.01203	-1.2%	0.11305	-0.10644	0.91551
sold97-98	0.16305	17.7%	0.09852	1.65508	0.10203
sold99-00	0.51202	66.9%	0.11071	4.62484	0.00002
sold01-02	0.69261	99.9%	0.11228	6.16864	0.00000
sold03-05	0.83432	130.3%	0.11889	7.01753	0.00000
built1901-1945	0.07026	7.3%	0.10014	0.70164	0.48505
built1946-1954	-0.02839	-2.8%	0.10423	-0.27238	0.78607
built1955-1964	-0.16423	-15.1%	0.14235	-1.15370	0.25224
built1965-1974	0.09804	10.3%	0.12330	0.79515	0.42901
built1975-1984	0.03812	3.9%	0.18417	0.20696	0.83660
built>=1985	-0.19533	-17.7%	0.16850	-1.15919	0.25001
1.5-2.0bath	0.18808	20.7%	0.08507	2.21095	0.03005
2.5bath	0.30882	36.2%	0.10050	3.07289	0.00294
3.0-4.0bath	0.58041	78.7%	0.18195	3.18995	0.00207
>=4.5bath	-0.17403	-16.0%	0.42629	-0.40824	0.68425
3BR	0.05804	6.0%	0.13358	0.43449	0.66517
4BR	0.10129	10.7%	0.14314	0.70767	0.48132
>=5BR	0.27747	32.0%	0.18999	1.46045	0.14829
LOTSIZE	0.0000044	N/A	0.0000011	4.14968	0.00009
INTERSF	0.0001091	N/A	0.0000011	4.14968	0.00009

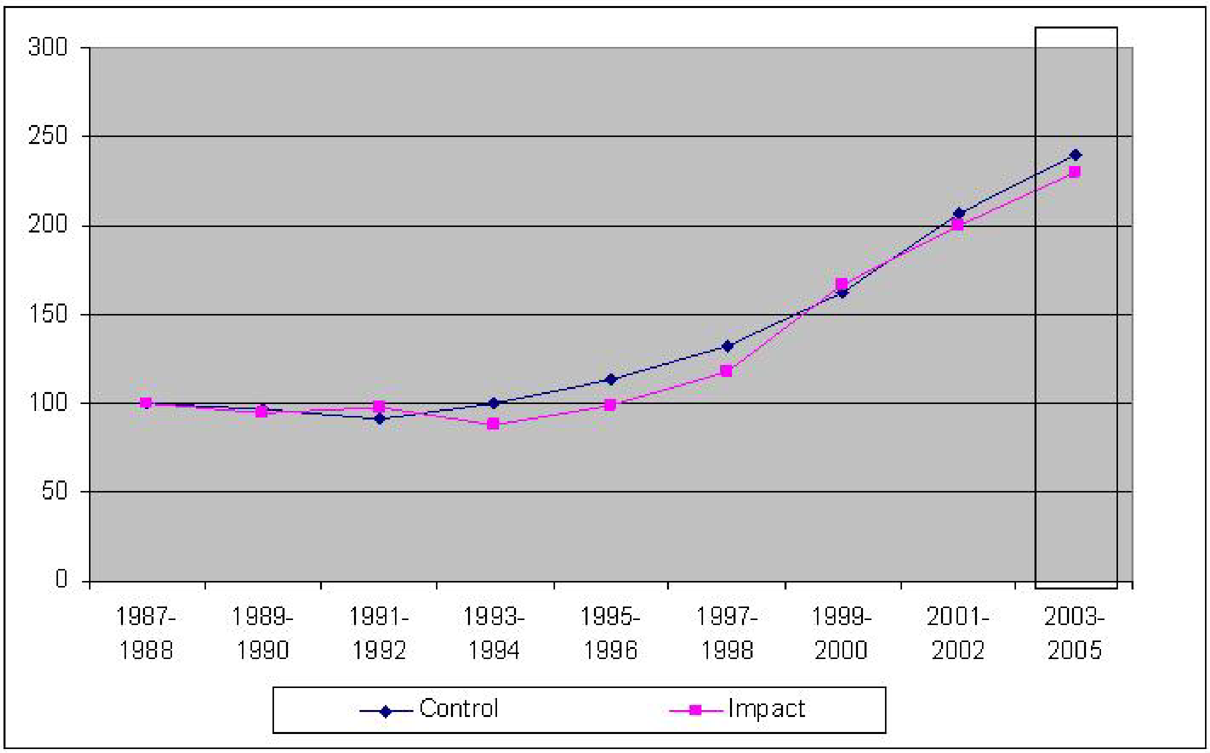
Model Summary					
# of Observations	5,961	Adjusted R Square	0.566	Std. Error of the Estimate	0.295519

* omitted: built<=1900, sold87-88, 1.0bath, <=2BR

Price Index

Fairhaven Garden received its comprehensive permit in 2003 and began leasing in 2004. Thus, the height of the impact of the development is assumed to be during the most recent period, the 2003-5 sales years, as is shown in Figure 5.18. This created a unique situation in which the impact period continues through the present. Unfortunately, there were not enough observations in the Concord impact zone to split the sales variable into annual periods as in the case of Abington. In the latest two sales periods, 2001-02 and 2003-05, the impact area appreciated 4.8%, while the control area appreciated 5.1%. I conclude that to date, the development has not had any negative impact on single-family house prices in its immediate vicinity. Although this conclusion would be strengthened by an additional data analysis for the 2005-06 sales period, it appears that the permitting and construction of Fairhaven Garden has not had an impact on home prices to date.

Table 5.19: Sales Price Index for Concord Control vs. Impact Areas

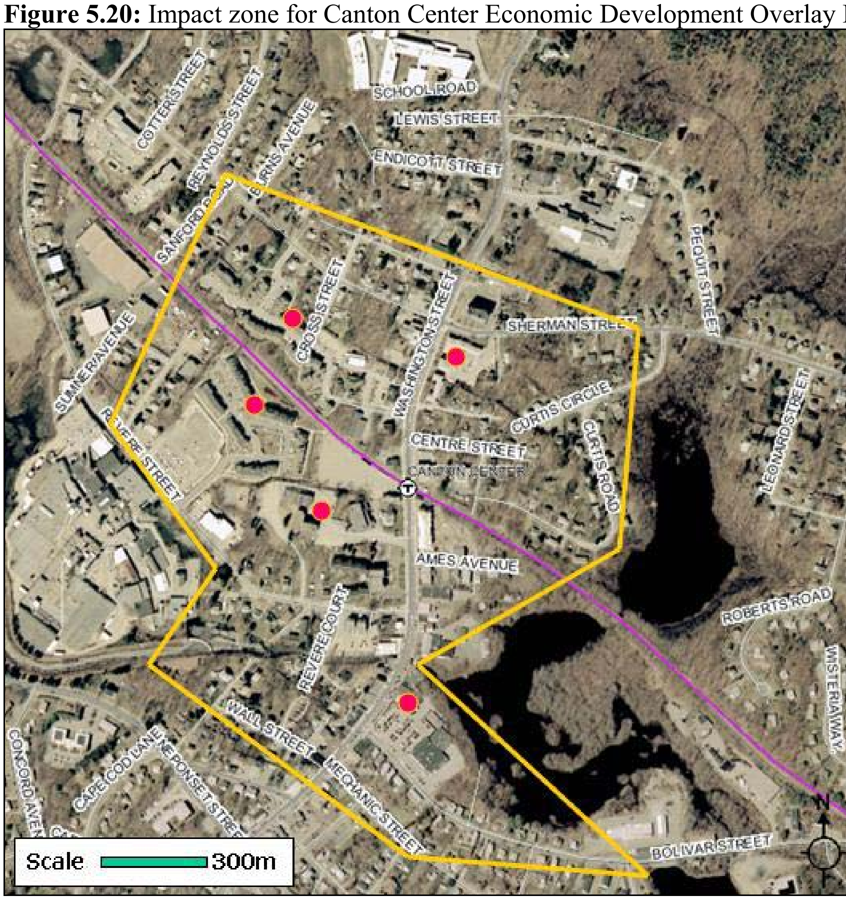


<u>Case 5: Canton Center</u>

Location and Impact Zone

Canton Center represents a very different scenario than the other case studies. In the case of Canton Center, several large developments have been built in just a few years in a compact area around the rail station. These developments have added over 200 units to the neighborhood and from all accounts, completely changed the nature of Canton Center. Therefore, I argue that the impact zone comprises the majority of the single-family homes within the overlay district. This is an oddly-shaped area bordered on the east by Forge Pond and the west and south by commercial/industrial land. Overall, the impact zone is about 800 by 800 meters, and includes homes as far as 300 meters away from one of the developments.

Figure 5.20: Impact zone for Canton Center Economic Development Overlay District



Sales Data

There were 3,754 single-family sales transactions in Canton from 1987 until the present. After removing incomplete records and outliers, I analyzed 96 transactions in the impact zone and 3,102 transactions in the rest of the town. Table 5.21 provides a summary of the data characteristics, while Appendix 5.6 contains detailed descriptive statistics about the data. There were some differences between housing characteristics in the control and impact zones. On average, the houses in the impact zone were smaller and were on much smaller lots. In addition, they were noticeably older.

There was another issue with the data for Canton. Almost two-thirds of the total records included a value of 0 for the number of bedrooms. Upon investigation, I discovered that the Canton municipal record (the source for The Warren Group data) does not capture that information upon sale. In order to replace the bedroom variable that I used in every other case study, I decided to use the total number of rooms instead of the number of bedrooms. Although it is not a perfect substitute, I decided that by adding the total rooms information, I would be able to strengthen the predictive model.

Table 5.21: Descriptive Summary of Canton

	Mean		**Std. Deviation**	
Variable	Control	Impact	Control	Impact
# Observations	3,102	96	-	-
Price	$287,214	$183,522	$164,307	$74,418
House sf	2,029	1,504	979	429
Lot size	25,198	8,490	20,094	3,057
Tot Rooms	7.6	6.3	1.8	1.4
<=5rooms	**9.2%**	**26.0%**		
6rooms	15.3%	29.2%		
7rooms	23.9%	25.0%		
8rooms	23.8%	15.6%		
9+rooms	27.8%	4.2%		
Bathrooms	2.07	1.48	0.84	0.46
1bath	18.0%	36.5%		
1.5bath	23.8%	38.5%		
2bath	14.5%	18.8%		
>=2.5bath	43.7%	6.3%		
Year Built	1959	1921	36	36
<=1920	10.8%	50.0%		
1921-1949	10.2%	15.6%		
1950-1959	22.3%	29.2%		
>=1960	56.7%	5.2%		

Bold variables are base cases and are omitted from Hedonic regression.

Price Models

Both the control and impact models show generally consistent and understandable values for the coefficients of the independent variables. As in Abington, newer homes seem to command higher sales prices. Because there is no variable to describe the number of bedrooms, it is impossible to compare the importance of the total number of rooms with the number of bedrooms. However, it is interesting that in the impact zone, where average house size is smaller, having more than nine rooms actually decreases the price. Given the nature of the population that might be interested in living in the higher-density, transit-oriented impact zone (couples and singles) and that the overall square footage of the dwelling stays the same, perhaps lots of small rooms are not as desirable in this area as fewer, larger rooms.

Table 5.22: Hedonic Model for Canton Control Area

CANTON CONTROL					
Independent Variables	Coefficients		Standard Error	t	Significance
	Unstandardized	Standardized			
Constant	11.4843	-	0.0350	328.5308	0.0000
sold89-90	-0.0449	-4.4%	0.0287	-1.5624	0.1183
sold91-92	-0.0977	-9.3%	0.0274	-3.5609	0.0004
sold93-94	-0.0818	-7.9%	0.0275	-2.9709	0.0030
sold95-96	0.0241	2.4%	0.0264	0.9109	0.3624
sold97-98	0.1323	14.1%	0.0259	5.1177	0.0000
sold99-00	0.3605	43.4%	0.0262	13.7623	0.0000
sold01-02	0.6156	85.1%	0.0271	22.6949	0.0000
sold03-05	0.8548	135.1%	0.0269	31.7343	0.0000
built1921-1949	0.0678	7.0%	0.0274	2.4768	0.0133
built1950-1959	0.1013	10.7%	0.0232	4.3606	0.0000
built>=1960	0.2264	25.4%	0.0228	9.9414	0.0000
1.5bath	0.0782	8.1%	0.0218	3.5900	0.0003
2.0bath	0.0559	5.7%	0.0239	2.3381	0.0194
>=2.5bath	0.1730	18.9%	0.0257	6.7431	0.0000
6 rooms	0.0621	6.4%	0.0264	2.3529	0.0187
7 rooms	0.0981	10.3%	0.0262	3.7355	0.0002
8 rooms	0.1396	15.0%	0.0272	5.1247	0.0000
>=9 rooms	0.1509	16.3%	0.0284	5.3094	0.0000
LOTSIZE	0.000001	N/A	0.0000	3.8701	0.0001
INTERSF	0.000162	N/A	0.0000	16.6929	0.0000

Model Summary					
# of Observations	3,102	Adjusted R Square	0.596	Std. Error of the Estimate	0.344561

* Omitted: built<=1920, <=5 rooms, 1Ba, Sold87-88

Table 5.23: Hedonic Model for Canton Impact Area

CANTON IMPACT					
Independent Variables	Coefficients		Standard Error	t	Significance
	Unstandardized	Standardized			
Constant	11.10751	-	0.17747	62.58893	0.00000
sold89-90	-0.00049	-0.05%	0.15247	-0.00323	0.99743
sold91-92	-0.16390	-15.12%	0.13870	-1.18173	0.24105
sold93-94	-0.25534	-22.53%	0.13669	-1.86795	0.06567
sold95-96	-0.04382	-4.29%	0.14557	-0.30104	0.76422
sold97-98	0.06170	6.36%	0.12668	0.48703	0.62766
sold99-00	0.25687	29.29%	0.16040	1.60144	0.11348
sold01-02	0.51550	67.45%	0.13599	3.79068	0.00030
sold03-05	0.75661	113.10%	0.13247	5.71151	0.00000
built1921-1949	0.15153	16.36%	0.09807	1.54517	0.12651
built1950-1959	0.26673	30.57%	0.08194	3.25518	0.00170
built>=1960	0.31999	37.71%	0.19345	1.65415	0.10228
1.5bath	0.19064	21.00%	0.07116	2.67894	0.00907
2.0bath	0.13008	13.89%	0.08690	1.49697	0.13860
>=2.5bath	0.06613	6.84%	0.17216	0.38410	0.70199
6 rooms	-0.01506	-1.49%	0.07876	-0.19125	0.84885
7 rooms	0.06529	6.75%	0.08843	0.73838	0.46259
8 rooms	0.13057	13.95%	0.11277	1.15785	0.25060
>=9 rooms	-0.09255	-8.84%	0.18385	-0.50338	0.61617
LOTSIZE	0.00003	N/A	0.00001	2.23709	0.02825
INTERSF	0.00023	N/A	0.00010	2.25110	0.02731

Model Summary					
# of Observations	96	Adjusted R Square	0.623	Std. Error of the Estimate	0.256299

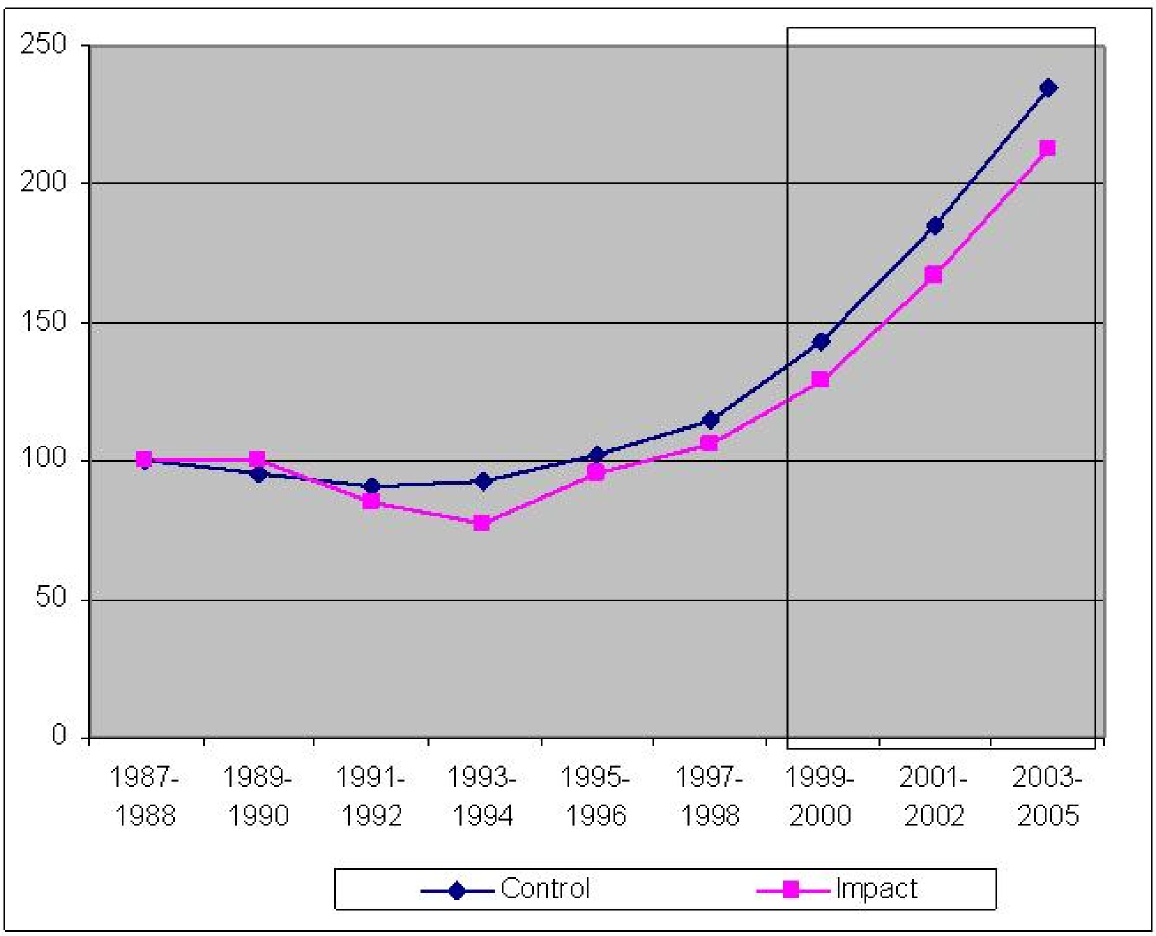
* Omitted: built<=1920, <=5 rooms, 1Ba, Sold87-88

Price Index

In Canton, I examined the impact of a specific planning event, the creation of a pro-development overlay district in the year 2000, and several large residential/mixed-use projects that were built subsequent to the rezoning. This is a different method than in the other case studies, and more appropriate to track the success of the ongoing revitalization impact of the changes, as measured by nearby single family home prices. The CCEOD was passed by Town Meeting in August of 2000, and the first of the developments was permitted and completed by 2001. Therefore, the impact period begins in the 1999-2000 year pair and continues to the present. This is shown in Figure 5.24.

In order to determine the ongoing effect of changes in Canton Center, I compared the change in sales price index 1999-2000 to 2003-05. In this time, the impact area appreciated 10.5%, while the control area appreciated 10.4%. There seems to be almost no distinguishable impact of the rezoning and new development on surrounding single-family home values. However, as more data becomes available and more development occurs in Canton, it would be interesting to continue to track the sales trends. In addition, there may be other benefits (or negative impacts) from the changes in Canton Center that are not addressed by this narrow look at single-family home sales prices.

Table 5.24: Sales Price Index for Canton Control vs. Impact Areas



[1] Appendix 5.1 contains a full list of independent variables that were used.

[2] The natural logarithm of the sales price is defined as $e^n = x$, where $e = 2.71828\ldots$ and x = the numeric sales price. For example, the natural logarithm of \$100,000 is 11.513 ($100{,}000 = 2.71828^{11.513}$). The natural logarithm of the sales price is used as the dependent variable in all of the models in this study because these values reduce the difference between values and thus the weight of any wildly different sales prices. For example, for sales prices of \$100,000 and \$2,100,000, the natural logarithms are 11.513 and 14.557 respectively.

[3] Because the output of the models refers to the natural logarithm of price, we must take the antilog of these numbers to interpret the result as a price. For example, the antilog of the Reading control constant, 11.639, is $e^{11.639}$ = price = \$113,437.

[4] Appreciation is expressed as the Compound Annual Growth Rate, which is calculated as

$$\text{CAGR} = (\text{end value})/(\text{beginning value})^{(1/\#\text{ years})-1)}$$

[5] I kept 2004 and 2005 transactions together because the transaction records only included sales in the first few months of 2005. A 2005 only sample would have been too small and irregular for this study.

CHAPTER 6: CONCLUSIONS

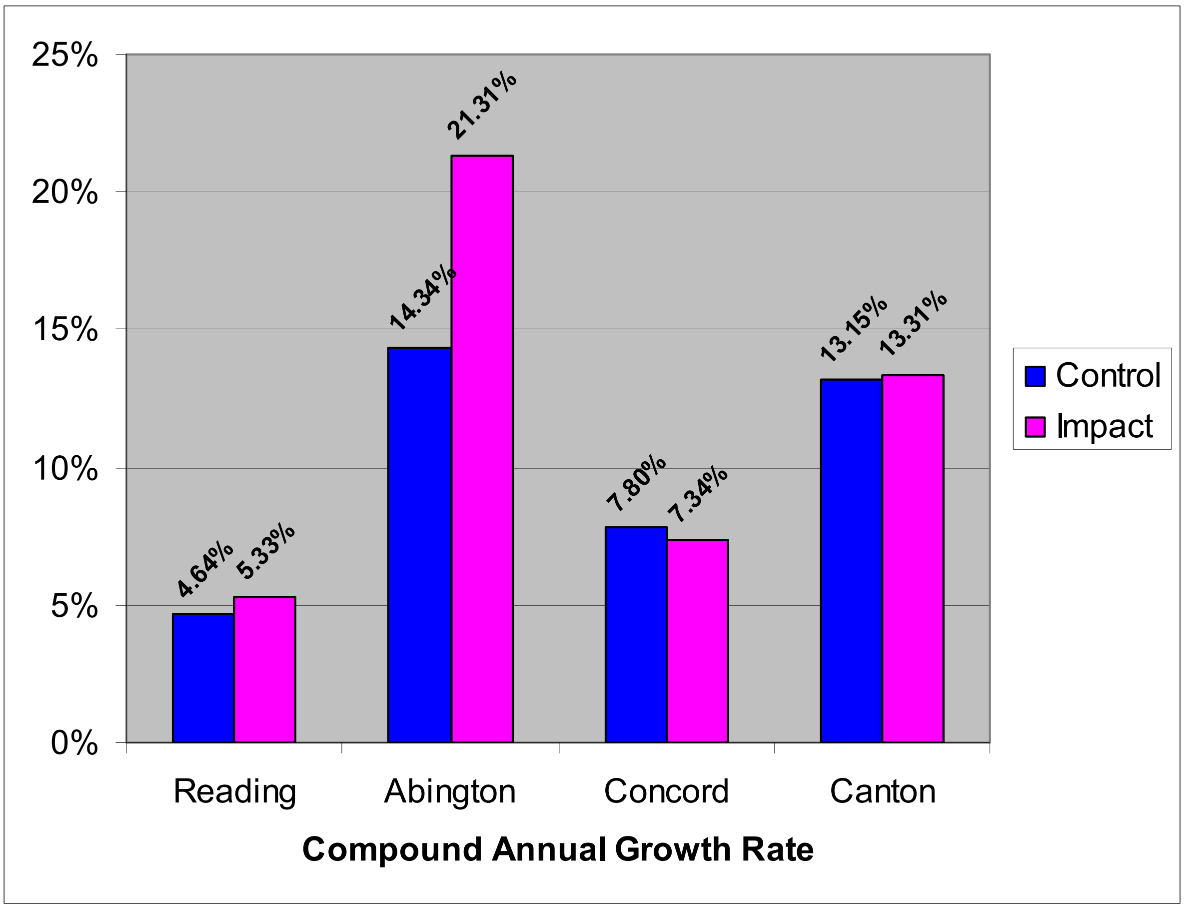
In this thesis, I analyzed five case studies that tell three different tales of multifamily development in the Greater Boston Area. While none of the case studies met all of the criteria that I initially established, the five multifamily developments that I examined do have interesting characteristics such as proximity to transit and commercial areas and mixed-income components. I undertook this study with the intent of measuring the impact of these multifamily developments on surrounding single-family home values. I found that the anticipated negative impacts of multifamily developments are not substantiated by the evidence.

Impact of Multifamily Developments

In most of the towns in the Greater Boston area residents have expressed a distaste and distrust of new development. This opposition is magnified as the perceived impact of the development increases. For example, homeowners are particularly anxious about developments that are significantly larger or denser than the surrounding area, are different in tenure, quality, or character than the rest of the neighborhood, or which might bring the "wrong" kind of people into town. As I outlined in the introduction, one of the key factors motivating homeowners to object to nearby development is a fear that new development will negatively affect the value of their homes.

In the case studies examined in this thesis, the quantitative evidence does not support the theory that large, multifamily developments have a negative impact on the sales price of nearby single-family homes. In fact, this thesis reiterates what several previous studies conclude - there is no evidence that multifamily developments negatively affect the sales prices of single-family homes within the impact area. In each of the four case studies that had solid quantitative results, the only sizable difference between the annual growth in the sales price of the average home in the impact zone and the average home in the rest of the town during and after the permitting and construction of the case development was in Abington, and it was positive in favor of the impact zone.[1]

Figure 6.1: Compound Annual Growth Rate – Impact vs. Control areas of the five case study towns



Community Response and Growth Planning

Despite these conclusions, my interviews indicate that this kind of evidence is but a starting point for a larger process of discourse and education. In discussions with planners, town officials and developers, the overwhelming tale of each development was one of cooperation and collaboration, negotiation and compromise, with the end result a development that turned out to be much better than everyone expected. In both Concord and Abington, town officials claimed that the ease of the comprehensive permit process and the success of the development would make them more likely to proactively seek out similar developments, and in all cases, municipal officials agreed that a successful example development was an extremely effective way to refute NIMBY attitudes.

However, responses from the public were less unequivocal. From discussions with neighbors, it seems that residents see no irony in embracing a completed development at the same time that they condemn the next one. All of the residents surveyed in Canton, were enthusiastic about the changes in Canton Center. One longtime resident said that the proliferation of new businesses "brought her downtown again." Another new Canton resident confirmed that it was her home's proximity to transit that attracted her to Canton Center. In both Ipswich and Reading, the projects were a source of pride for residents. A woman in Reading told me that Longwood Place is a "great resource for the community, and a terrific neighbor." Her only complaint was that her houseguests weren't allowed to park in the Longwood parking lot. One resident of Concord who lives across the road from the Fairhaven Garden project expressed his surprise and pleasure at the development. He stated that, "…once construction was done, I didn't even notice those apartments. Those buildings don't bother me, and I don't notice any additional traffic or problems from the people who live there."

However, he continued that one apartment development is enough and because Concord is "almost developed to capacity," he would have a hard time supporting additional developments like Fairhaven Gardens. In a town that has many acres of undeveloped land, a minimum lot size of two acres and an average density of 0.39 units per acre, his perception of maximum build out is surprising and, I would argue, inaccurate. It seems that despite the presence of successful multifamily developments in town, and despite acknowledgement of these existing successes, public dislike of development continues. One Beacon Residential Properties employee who worked on The Woodlands at Abington Station says it best: "People would rather have woods than any kind of development."

Suggestions for Future Research

It is tempting to conclude that with this addition to previous studies (Ritchay and Weinrobe, 2004 and Weinstein, 2002), the evidence is overwhelming that there is no negative impact of multifamily and mixed-income housing on surrounding home prices. However, I believe that there are limitations to this body of research that invite further investigation and suggest ideas for additional research.

First of all, both this and Ritchay and Weinrobe's 2004 thesis focus on the Eastern Massachusetts residential real estate market in a time of remarkable growth, while Weinstein's (2002) study looks at the San Francisco Bay area in a similarly appreciating market. The residential market has been increasing astronomically in the Greater Boston Area, particularly in the past five years, and I would argue that economic nuances might be revealed in an equilibrium market that are masked in the current market. For example, in a more tepid real estate market, proximity to a negative land use might affect house price more than in a market where everything sells for top dollar, regardless of its location. Conducting this type of study with similar methodology in a slower residential market would be an interesting juxtaposition to this group of studies.

Secondly, in this research, I found it difficult to be confident that I was identifying all of the critical information about a specific case study. Even though I spoke to myriad constituents about some very controversial topics, the fog of memory seems to have blunted their accounts of the history of the permitting process and public reaction. In some cases, the public record cast suspicion on these rosy accounts, but in far more cases, the public record was incomplete or nonexistent. Additionally, in a study that uses interviews and the written record to paint the story of a development, some factors will always be left out. I think that a valuable long-term study would follow one development from cradle to grave, combining a qualitative record of the process and the evolution of public opinion with a quantitative follow-up study of the impacts.

Third, I would suggest that the price trends analyzed in this and Ritchay and Weinrobe's thesis continue to be monitored. There are claims that multifamily developments, particularly those with a mixed-income population are constructed poorly, are not maintained well, and develop into eyesores, becoming a growing negative impact on the neighborhood. To explore this, the price index of the impact and control zones could be tracked on an ongoing basis, with notation of renovations to the development or other major events.

Finally, I think that a more expansive analysis of the changes that have happened in areas like Canton Center is merited. Canton is the only one of my case studies where an intentional zoning change was implemented to create a growth district. I think that a study quantifying the impacts of the CCEDO district in Canton Center could serve as a powerful testimony to this type of growth. I found that it was the most interesting and vibrant of the case studies to visit. An analysis of not only the economic impacts on surrounding property, but also a benefit/cost analysis of the zoning change to the town and a qualitative analysis of perceptions about the area would be interesting.

A well-designed housing price study is complex and time consuming. Freeman and Botein[2] note, "As with most nonexperimental social science research, the most vexing problem is designing methods that can satisfactorily answer the question at hand."[1] Case studies must be chosen carefully and impact areas determined by extensive investigation of actual neighborhood boundaries rather than by mere linear distance or the convenience of census or other divisions. All future research must avoid the methodological pitfalls that plagued earlier studies and they must explicitly deal with the unique design of case study developments and peculiarities of the towns in question.

In a way, conducting studies with the intent of allaying fears about development is a thankless Sisyphean task. To paraphrase one member of the housing community, each time you chip away at one misconception about development, people will find another one to introduce. If and when we ever succeed in "proving" that multifamily developments cause no negative impacts on surrounding single-family home values, another fear will take its place. However, only by adding to the body of evidence well-designed studies with clear conclusions can we begin to refute the fear of negative impacts of development. While this evidence may not completely take away the risk adverse mindset of the NIMBYist, it may begin to persuade homevoters to take a chance on well-designed, well-planned developments.

[1] In Abington, The Woodlands development is a reuse of a previously industrial site and thus might represent a positive improvement to the neighbors.
[2] Lance Freeman and Hilary Botein (2002), Subsidized Housing and Neighborhood Impacts: A Theoretical Discussion and Review of the Evidence, Journal of Planning Literature, 16(3), p.366.

APPENDIX 3.1 – CHARACTERISTICS OF DATA

Location	Total Observations	Incomplete		Suspicious *		# Observations used	
		#	%	#	%	Control	Impact
Abington	2,900	121	4.2%	141	4.9%	2,435	203
Canton	3,754	423	11.3%	133	3.5%	3,102	96
Concord	3,514	43	1.2%	11	0.3%	3,360	100
Ipswich	2,691	13	0.5%	2	0.1%	2,616	60
Reading	5,291	6	0.1%	77	1.5%	5,061	147
TOTAL	**18,150**	**606**	**3.5%**	364	**2.0%**	**16,574**	**606**

* Includes outliers as well as suspicious records such as mortgage higher than sales price, properties that sold two times in one day, and other suspicious transactions reserached through assessor data

APPENDIX 4.1 – TOWN PROFILES

Characteristic	Reading	Ipswich	Abington	Concord	Canton
1990 Households	7,932	4,699	4,817	5,693	6,605
2000 Households	8,688	5,290	5,263	5,948	7,952
% change	9.5%	12.6%	7.9%	4.5%	20.4%
1990 Housing Units	8,104	5,162	4,955	5,917	6,789
2000 Housing Units	8,823	5,601	5,348	6,153	8,163
% Change	8.9%	8.5%	7.9%	4.0%	20.2%
% Single Family Homes*	77.2%	72.1%	69.0%	81.4%	68.0%
Town Median HH Income (2000)	$77,059	$57,284	$57,100	$95,897	$69,260
% of Boston Area Median Income	133.9%	99.6%	99.2%	166.7%	120.4%
1995 Median House Value	$178,000	$175,000	$114,575	$390,000	$149,500
2005 Median House Value	$427,000	$431,750	$405,000	$750,750	$498,750
% change	139.9%	146.7%	253.5%	92.5%	233.6%
Average Density (units/acre)	1.39	0.26	0.84	0.39	0.67
% Subsidized Units*	7.8%	7.8%	8.3%	4.5%	10.2%
% change from 1997-2005**	+3-4%	+<1%	+>5%	+1-2%	+<1%

* attached and detached

All data is from the US Census website (http://factfinder.census.gov), except the subsidized housing units data, which is from the DHCD 2005 Subsidized Inventory (http://www.mass.gov/dhcd/components/hac/HsInvRev.pdf) and CHAPA Analysis of Subsidized Housing (http://www.chapa.org/0540banalysis.pdf).

APPENDIX 4.2 – DEVELOPMENT PROFILES

Case Study Development Profiles					
Location	**Reading**	**Ipswich**	**Abington**	**Concord**	**Canton**
Development	Longwood Place At Reading	Oak Hill	The Woodlands at Abington Station	FairHaven Gardens	Various
Developer	Bill Chase	Oak Hill, Inc. / Immanuel Baptist Church	Beacon Residential Properties	Ryan Development	John Marini/Marini Construction
Type	Rental, Age-restricted	Rental, Age-restricted	Rental	Rental	Rental and Condo
40B	no	yes	yes	yes	no
Year Permitted	1994	1988	2001	2003	2000-2004
Year Completed	1996	1989	2003	2004	2001-2004
Total Units	86	33	192	42	200+
Affordable Units	20%	33	39	11	N/A
Affordability Profile	20% at 50% AMI	100% at up to 80% of AMI	20% at 50% AMI	25% at 80% AMI	market
Density of Development (units per acre)	18	N/A	9.6	7	Various
Average Density of Town (units per acre)	1.39	0.26	0.84	0.39	0.67
Distance to Train	1200m	400m	200m	1200m	50-350m
Distance to Commercial	300m	50m	1400m	850m	0-400m

APPENDIX 5.1 – DESCRIPTION OF VARIABLES

Name	Definition
sold"year"	The year in which the house was sold, for example "sold87-88" is a house sold in the paired years of 1987 and 1988. Years are paired for all cases except Abington, which has annual sales, for example "sold00" for records with 2000 sales
built"year range"	The year in which the house was originally constructed. Can be year range, or before (<) or after (>) a specific year.
"#"bath	Total number of full and half bathrooms. For example, 1.5bath is one full and one half bath.
"#"BR	Total number of bedrooms. Includes less (<) or greater (>) than values.
"#" rooms	Total number of rooms. Includes less (<) or greater (>) than values.
LOTSIZE	Size of the lot that the house is on. Measured in square feet.
INTERSF	Total interior size of the house. Measured in square feet.

APPENDIX 5.2 – READING DESCRIPTIVE STATS AND SALES INDEX

Reading Descriptive Statistics										
	N		**Mean**		**Std. Deviation**		**Minimum**		**Maximum**	
Variable	Control	Impact	Control	Impact	Control	Impact	Control	Impact	Control	Impact
Price	5,061	147	$257,348	$280,877	$116,820	$129,346	$27,000	$27,000	$970,000	$700,000
House sf	5,061	147	1,729	1,881	634	527	560	972	5,767	3,657
Lot size	5,061	147	15,546	15,329	10,340	6,996	2,178	6,970	99,752	45,302
Bedrooms	5,061	147	3.20	3.32	0.76	0.68	1.0	2.0	9.0	5.0
1-2BR	739	12								
3BR	2,801	82								
4BR	1,313	47								
>=5BR	208	6								
Bathrooms	5,061	147	1.82	1.98	0.67	0.61	1.0	1.0	5.0	4.5
1bath	1,261	19								
1.5bath	1,290	37								
2bath	1,109	31								
>=2.5bath	1,401	60								
Year Built	5,061	147	1947	1949	35	38	1670	1850	2002	2002
<=1920	926	42								
1921-1934	487	4								
1935-1948	696	13								
1949-1954	735	6								
1955-1964	751	5								
1965-1981	700	52								
>=1982	766	25								
Year Sold	5,061	147	1996	1996	5.2	5.1	1987	1987	2005	2005
1987-88	550	12								
1989-90	505	14								
1991-92	556	12								
1993-94	604	26								
1995-96	593	20								
1997-98	583	20								
1999-00	533	14								
2001-02	534	5								
2003-05	603	24								

CONSTRUCTION OF THE SALES PRICE INDEX

Step 1: Pricing the average house (results are natural log of price)

CONTROL	Constant	LOTSIZE	INTERSF	1921-1934	1935-1948	1949-1054	1955-1964	1965-1981	>=1982	3BR	4BR	>=5BR	1.5bath	2.0bath	2.5bath
%				0.096	0.138	0.145	0.148	0.138	0.151	0.553	0.259	0.041	0.255	0.219	0.277
coefficient	11.639	0.000	0.000	0.070	0.076	0.069	0.101	0.200	0.104	0.064	0.148	0.131	0.112	0.093	0.186
	11.639	0.022	0.217	0.007	0.011	0.010	0.015	0.028	0.016	0.035	0.039	0.005	0.029	0.020	0.052
SUM	12.144														

IMPACT	Constant	LOTSIZE	INTERSF	1921-1934	1935-1948	1949-1054	1955-1964	1965-1981	>=1982	3BR	>=4BR	>=5BR	1.5bath	2.0bath	2.5bath
%				0.027	0.088	0.041	0.034	0.354	0.170	0.558	0.320	0.041	0.252	0.211	0.408
coefficient	11.764	0.000	0.000	0.108	0.218	0.192	0.120	0.402	0.365	0.160	0.317	0.337	-0.025	-0.041	0.061
	11.764	0.015	0.070	0.003	0.019	0.008	0.004	0.142	0.062	0.089	0.101	0.014	-0.006	-0.009	0.025
SUM	12.301														

Step 2: Pricing the average house over time

CONTROL	Sold87-88	Sold89-90	Sold91-92	Sold93-94	Sold95-96	Sold97-98	Sold99-00	Sold01-02	Sold03-05
	0.0000	-0.04916	-0.09172	-0.01922	0.07357	0.16222	0.38840	0.65854	0.80967
IMPACT	Sold87-88	Sold89-90	Sold91-92	Sold93-94	Sold95-96	Sold97-98	Sold99-00	Sold01-02	Sold03-05
	0.0000	-0.1829	-0.0634	-0.0732	-0.1060	0.1344	0.4078	0.3132	0.7377

Control

SUM	12.14426749	
1987-1988	12.14427	188,013
1989-1990	12.09510	178,993
1991-1992	12.05255	171,536
1993-1994	12.12505	184,434
1995-1996	12.21784	202,367
1997-1998	12.30648	221,125
1999-2000	12.53266	277,247
2001-2002	12.80281	363,237
2003-2005	12.95394	422,496

Impact

SUM	12.30134788	
1987-1988	12.30135	219,992
1989-1990	12.11840	183,213
1991-1992	12.23794	206,476
1993-1994	12.22812	204,459
1995-1996	12.19537	197,871
1997-1998	12.43570	251,627
1999-2000	12.70915	330,761
2001-2002	12.61452	300,897
2003-2005	13.03907	460,041

APPENDIX 5.3 – IPSWICH DESCRIPTIVE STATS

Ipswich Descriptive Statistics										
	N		**Mean**		**Std. Deviation**		**Minimum**		**Maximum**	
Variable	Control	Impact	Control	Impact	Control	Impact	Control	Impact	Control	Impact
Price	2,616	60	$279,311	$226,660	$190,532	$110,996	$17,100	$30,000	$194,500	$595,000
House sf	2,616	60	2,269	1,744	1,076	679	480	824	7,675	3,849
Lot size	2,616	60	44,606	8,037	116,481	7,135	1,307	1,742	2,589,206	43,560
Bedrooms	2,616	60	3.09	2.98	0.83	0.91	1.0	1.0	6.0	7.0
1BR	70	1								
2BR	441	16								
3BR	1,420	29								
>=4BR	685	14								
Bathrooms	2,616	60	2.09	1.63	0.88	0.62	1.0	1.0	5.5	3.5
1bath	588	20								
1.5bath	388	20								
2.0bath	530	9								
2.5bath	658	8								
>=3.0bath	452	3								
Year Built	2,616	60	1952	1834	52	81	1665	1652	2004	1936
<1920	477	51								
1920-1954	514	9								
1955-1969	488	0								
1970-1991	585	0								
>=1992	552	0								
Year Sold	2,616	60	1996	1997	5.2	5.1	1987	1988	2005	2005
1987-88	309	5								
1989-90	201	4								
1991-92	246	4								
1993-94	294	7								
1995-96	281	7								
1997-98	328	5								
1999-00	333	8								
2001-02	287	12								
2003-05	337	8								

APPENDIX 5.4 – ABINGTON DESCRIPTIVE STATS AND SALES INDEX

Abington Descriptive Statistics										
	N		**Mean**		**Std. Deviation**		**Minimum**		**Maximum**	
Variable	Control	Impact	Control	Impact	Control	Impact	Control	Impact	Control	Impact
Price	2,435	203	$194,274	$180,248	$134,225	$83,657	$10,000	$34,000	$2,500,000	$462,000
House sf	2,435	203	1,670	1,593	712	557	504	576	8,052	3,814
Lot size	2,435	203	23,526	24,048	16,259	16,681	2,002	3,822	112,366	108,881
Bedrooms	2,435	203	3.05	3.04	0.76	0.75	1.0	1.0	7.0	6.0
1-2BR	**471**	**33**								
3BR	1,433	130								
>=4BR	531	40								
Bathrooms	2,435	203	1.76	1.61	0.74	0.60	1.0	1.0	7.0	4.5
1bath	**818**	**75**								
1.5bath	494	47								
2bath	452	49								
>=2.5bath	671	32								
Year Built	2,435	203	1950	1937	40	48	1751	1800	2004	2004
<=1900	**435**	**57**								
1901-1945	252	24								
1946-1959	717	19								
1960-1971	240	56								
1972-1990	340	29								
>=1991	451	18								
Year Sold	2,435	203	1996	1996	5.1	5.3	1987	1987	2005	2005
1987	**137**	**11**								
1988	119	10								
1989	86	7								
1990	94	3								
1991	116	10								
1992	137	8								
1993	157	17								
1994	147	15								
1995	136	14								
1996	119	9								
1997	127	11								
1998	144	10								
1999	180	14								
2000	176	7								
2001	132	12								
2002	118	12								
2003	143	10								
2004-5	167	23								

CONSTRUCTION OF THE SALES PRICE INDEX

Step 1: Pricing the average house (results are natural log of price)

CONTROL	Constant	LOTSIZE	INTERSF	1901-1945	1946-1959	1960-1971	1972-1990	>=1991	3BR	>=4BR	1.5Ba	2Ba	>=2.5Ba
%				10.3%	29.4%	9.9%	14.0%	18.5%	58.9%	21.8%	20.3%	18.6%	27.6%
coefficient	11.31143	1.81E-06	0.000202	0.0391	0.1199	0.1708	0.2890	0.2148	-0.0027	0.0237	0.0358	-0.0059	0.1071
	11.31143	0.042612	0.337801	0.0041	0.0353	0.0168	0.0404	0.0398	-0.0016	0.0052	0.0073	-0.0011	0.0295
SUM	11.86745												

IMPACT	Constant	LOTSIZE	INTERSF	1901-1945	1946-1959	1960-1971	1972-1990	>=1991	3BR	>=4BR	1.5Ba	2Ba	>=2.5Ba
%				11.8%	9.4%	27.6%	14.3%	8.9%	64.0%	19.7%	24.1%	24.1%	15.8%
coefficient	11.33257	0.000005	0.000122	-0.1496	0.1243	0.1552	0.2210	0.1288	0.0843	-0.0945	0.0758	0.0282	0.1136
	11.33257	0.110827	0.195025	-0.0177	0.0116	0.0428	0.0316	0.0114	0.0540	-0.0186	0.0183	0.0068	0.0179
SUM	11.79656												

Step 2: Pricing the average house over time

	sold87	sold88	sold89	sold90	sold91	sold92	sold93	sold94	sold95	sold96	sold97	sold98	sold99	sold00	sold01	sold02	sold03	Sold04-05
C	0.000	0.075	0.009	-0.155	-0.133	-0.119	-0.186	-0.127	-0.141	-0.070	-0.004	0.113	0.221	0.368	0.504	0.611	0.758	0.904
	sold87	sold88	sold89	sold90	sold91	sold92	sold93	sold94	sold95	sold96	sold97	sold98	sold99	sold00	sold01	sold02	sold03	sold04-05
I	0.000	0.182	0.128	-0.003	-0.089	-0.281	-0.181	-0.010	-0.136	-0.003	-0.027	0.178	0.156	0.173	0.549	0.553	0.730	0.946

Control

SUM	11.86745467				
SOLD:	**lnPRICE**	**PRICE**	**SOLD:**	**lnPRICE**	**PRICE**
1987	11.86745	$ 142,551	1996	11.79775	$132,952
1988	11.94292	$ 153,725	1997	11.86345	$141,981
1989	11.87617	$ 143,799	1998	11.98090	$159,676
1990	11.71212	$ 122,041	1999	12.08857	$177,828
1991	11.73452	$ 124,807	2000	12.23565	$206,003
1992	11.74889	$ 126,613	2001	12.37128	$235,929
1993	11.68161	$ 118,374	2002	12.47828	$262,572
1994	11.74090	$ 125,606	2003	12.62568	$304,272
1995	11.72609	$ 123,759	2004-5	12.77181	$352,148

Impact

SUM	11.79656204				
SOLD:	**lnPRICE**	**PRICE**	**SOLD:**	**lnPRICE**	**PRICE**
1987	11.79656	$ 132,795	1996	11.79357	$132,399
1988	11.97808	$ 159,225	1997	11.76985	$129,295
1989	11.92500	$ 150,995	1998	11.97415	$158,602
1990	11.79340	$ 132,376	1999	11.95250	$155,204
1991	11.70741	$ 121,469	2000	11.96980	$157,913
1992	11.51585	$ 100,293	2001	12.34563	$229,953
1993	11.61557	$ 110,810	2002	12.34969	$230,889
1994	11.78637	$ 131,449	2003	12.52657	$275,563
1995	11.66072	$ 115,927	2004-5	12.74264	$342,025

APPENDIX 5.5 – CONCORD DESCRIPTIVE STATS AND SALES INDEX

Concord Descriptive Statistics										
	N		Mean		Std. Deviation		Minimum		Maximum	
Variable	Control	Impact	Control	Impact	Control	Impact	Control	Impact	Control	Impact
Price	3,360	100	$522,791	$430,802	$428,048	$274,996	$10,398	$106,000	$6,025,000	$1,800,000
House sf	3,360	100	2,603	2,314	1,364	1,530	321	1,076	14,286	9,276
Lot size	3,360	100	47,814	39,004	74,206	56,677	1,742	5,227	1,241,024	290,545
Bedrooms	3,360	100	3.76	3.50	0.91	0.84	1.0	2.0	8.0	6.0
1-2BR	192	5								
3BR	1,120	53								
4BR	1,434	33								
>=5BR	614	9								
Bathrooms	3,360	100	2.79	2.19	1.33	1.10	1.0	1.0	9.5	6.5
1bath	258	13								
1.5-2.0bath	947	45								
2.5bath	1,015	26								
3.0-4.0bath	514	10								
>=4.5bath	626	6								
Year Built	3,360	100	1946	1934	44	46	1659	1720	2004	1999
<=1900	510	11								
1901-1945	487	40								
1946-1954	487	21								
1955-1964	540	9								
1965-1974	581	9								
1975-1984	277	3								
>=1985	478	7								
Year Sold	3,360	100	1996	1996	5.0	4.9	1987	1987	2005	2005
1987-88	317	11								
1989-90	296	8								
1991-92	418	6								
1993-94	416	13								
1995-96	415	10								
1997-98	428	20								
1999-00	419	11								
2001-02	312	13								
2003-05	339	8								

CONSTRUCTION OF THE SALES PRICE INDEX

Step 1: Pricing the average house (results are natural log of price)

CONTROL	Constant	Lot size	House sf	3BR	4BR	>=5BR	1.5-2.0bath	2.5bath	3.0-4.0bath	>=4.5 bath	1901-1945	1946-1954	1955-1964	1965-1974	1975-1984	>=1985
%				33.3%	42.7%	18.3%	28.2%	30.2%	15.3%	18.6%	14.5%	14.5%	16.1%	17.3%	8.2%	14.2%
coefficient	11.840	0.000	0.000	0.047	0.121	0.132	0.141	0.262	0.331	0.432	0.037	-0.076	-0.030	0.003	0.067	0.089
	11.840	0.052	0.454	0.016	0.052	0.024	0.040	0.079	0.051	0.080	0.005	-0.011	-0.005	0.000	0.006	0.013
SUM	12.69482															

IMPACT	Constant	Lot size	House sf	3BR	4BR	>=5BR	1.5-2.0bath	2.5bath	3.0-4.0bath	>=4.5 bath	1901-1945	1946-1954	1955-1964	1965-1974	1975-1984	>=1985
%				53.0%	33.0%	9.0%	45.0%	26.0%	10.0%	6.0%	40.0%	0.210	9.0%	9.0%	3.0%	7.0%
coefficient	11.875	0.000	0.000	0.058	0.101	0.277	0.188	0.309	0.580	-0.174	0.070	-0.028	-0.164	0.098	0.038	-0.195
	11.875	0.173	0.253	0.031	0.033	0.025	0.085	0.080	0.058	-0.010	0.028	-0.006	-0.015	0.009	0.001	-0.014
SUM	12.60515															

Step 2: Pricing the average house over time

CONTROL	Sold87-88	Sold89-90	Sold91-92	Sold93-94	Sold95-96	Sold97-98	Sold99-00	Sold01-02	Sold03-05
	0.0000	-0.030180	-0.090259	0.002288	0.128954	0.279214	0.486871	0.725713	0.875876
IMPACT	Sold87-88	Sold89-90	Sold91-92	Sold93-94	Sold95-96	Sold97-98	Sold99-00	Sold01-02	Sold03-05
	0.0000	-0.0566	-0.0187	-0.1263	-0.0120	0.1631	0.5120	0.6926	0.8343

Control

SUM	12.69482136	
1987-1988	12.69482	$326,055
1989-1990	12.66464	$316,362
1991-1992	12.60456	$297,915
1993-1994	12.69711	$326,802
1995-1996	12.82378	$370,932
1997-1998	12.97403	$431,074
1999-2000	13.18169	$530,562
2001-2002	13.42053	$673,696
2003-2005	13.57070	$782,851

Impact

SUM	12.60515216	
1987-1988	12.60515	$298,090
1989-1990	12.54859	$281,699
1991-1992	12.58646	$292,570
1993-1994	12.47885	$262,722
1995-1996	12.59312	$294,525
1997-1998	12.76821	$350,882
1999-2000	13.11717	$497,409
2001-2002	13.29776	$595,862
2003-2005	13.43947	$686,574

APPENDIX 5.6 – CANTON DESCRIPTIVE STATS AND SALES INDEX

Canton Descriptive Statistics										
	N		**Mean**		**Std. Deviation**		**Minimum**		**Maximum**	
Variable	Control	Impact	Control	Impact	Control	Impact	Control	Impact	Control	Impact
Price	3,102	96	$287,214	$183,522	$164,307	$74,418	$12,500	$30,000	$2,150,000	$400,900
House sf	3,102	96	2,029	1,504	979	429	480	517	13,263	2,562
Lot size	3,102	96	25,198	8,490	20,094	3,057	3,485	2,178	152,460	14,375
Tot Rooms	3,102	96	7.65	6.33	1.77	1.40	1.0	3.0	17.0	10.0
<=5rooms	**284**	**25**								
6rooms	474	28								
7rooms	742	24								
8rooms	739	15								
9+rooms	863	4								
Bathrooms	3,102	96	2.07	1.48	0.84	0.46	1.0	1.0	8.5	3.0
1bath	**557**	**35**								
1.5bath	738	37								
2bath	450	18								
>=2.5bath	1,357	6								
Year Built	3,102	96	1959	1921	36	36	1700	1850	2002	1999
<=1920	**335**	**48**								
1921-1949	316	15								
1950-1959	692	28								
>=1960	1,759	5								
Year Sold	3,102	96	1996	1996	5.1	4.9	1987	1987	2005	2004
1987-88	**313**	**6**								
1989-90	270	9								
1991-92	321	10								
1993-94	318	11								
1995-96	378	8								
1997-98	419	20								
1999-00	394	7								
2001-02	337	13								
2003-05	352	12								

CONSTRUCTION OF THE SALES PRICE INDEX

Step 1: Pricing the average house (results are natural log of price)

CONTROL	Constant	LOTSIZE	INTERSF	1921-1949	1950-1959	>=1960	1.5bath	2.0bath	>=2.5bath	6 rooms	7 rooms	8 rooms	9+ rooms
%				10.2%	22.3%	56.7%	23.8%	14.5%	43.7%	15.3%	23.9%	23.8%	27.8%
coefficient	11.48427	0.000001	0.000162	0.0678	0.1013	0.2264	0.0782	0.0559	0.1730	0.0621	0.0981	0.1396	0.1509
	11.48427	0.036141	0.328834	0.0069	0.0226	0.1284	0.0186	0.0081	0.0757	0.0095	0.0235	0.0333	0.0420
SUM	12.21766												

IMPACT	Constant	LOTSIZE	INTERSF	1921-1949	1950-1959	>=1960	1.5bath	2.0bath	>=2.5bath	6 rooms	7 rooms	8 rooms	9+ rooms
%				10.2%	22.3%	56.7%	23.8%	14.5%	43.7%	15.3%	23.9%	23.8%	27.8%
coefficient	11.10751	0.000026	0.000226	0.1515	0.2667	0.3200	0.1906	0.1301	0.0661	-0.0151	0.0653	0.1306	-0.0925
	11.10751	0.218987	0.339604	0.0154	0.0595	0.1815	0.0454	0.0189	0.0289	-0.0023	0.0156	0.0311	-0.0257
SUM	12.03432												

Step 2: Pricing the average house over time

Control	Sold87-88	Sold89-90	Sold91-92	Sold93-94	Sold95-96	Sold97-98	Sold99-00	Sold01-02	Sold03-05
	0.0000	-0.0449	-0.0977	-0.0818	0.0241	0.1323	0.3605	0.6156	0.8548
Impact	Sold87-88	Sold89-90	Sold91-92	Sold93-94	Sold95-96	Sold97-98	Sold99-00	Sold01-02	Sold03-05
	0.0000	-0.00049	-0.16390	-0.25534	-0.04382	0.06170	0.25687	0.51550	0.75661

Control

SUM	12.21765891	
SOLD IN:	**lnPRICE**	**PRICE**
1987-1988	12.21766	$ 202,331
1989-1990	12.17275	$ 193,446
1991-1992	12.11998	$ 183,501
1993-1994	12.13589	$ 186,444
1995-1996	12.24172	$ 207,258
1997-1998	12.34996	$ 230,951
1999-2000	12.57819	$ 290,160
2001-2002	12.83323	$ 374,456
2003-2005	13.07247	$ 475,666

Impact

SUM	12.03432366	
SOLD IN:	**lnPRICE**	**PRICE**
1987-1988	12.03432	$ 168,438
1989-1990	12.03383	$ 168,355
1991-1992	11.87042	$ 142,975
1993-1994	11.77898	$ 130,481
1995-1996	11.99050	$ 161,216
1997-1998	12.09602	$ 179,158
1999-2000	12.29119	$ 217,769
2001-2002	12.54982	$ 282,044
2003-2005	12.79094	$ 358,950

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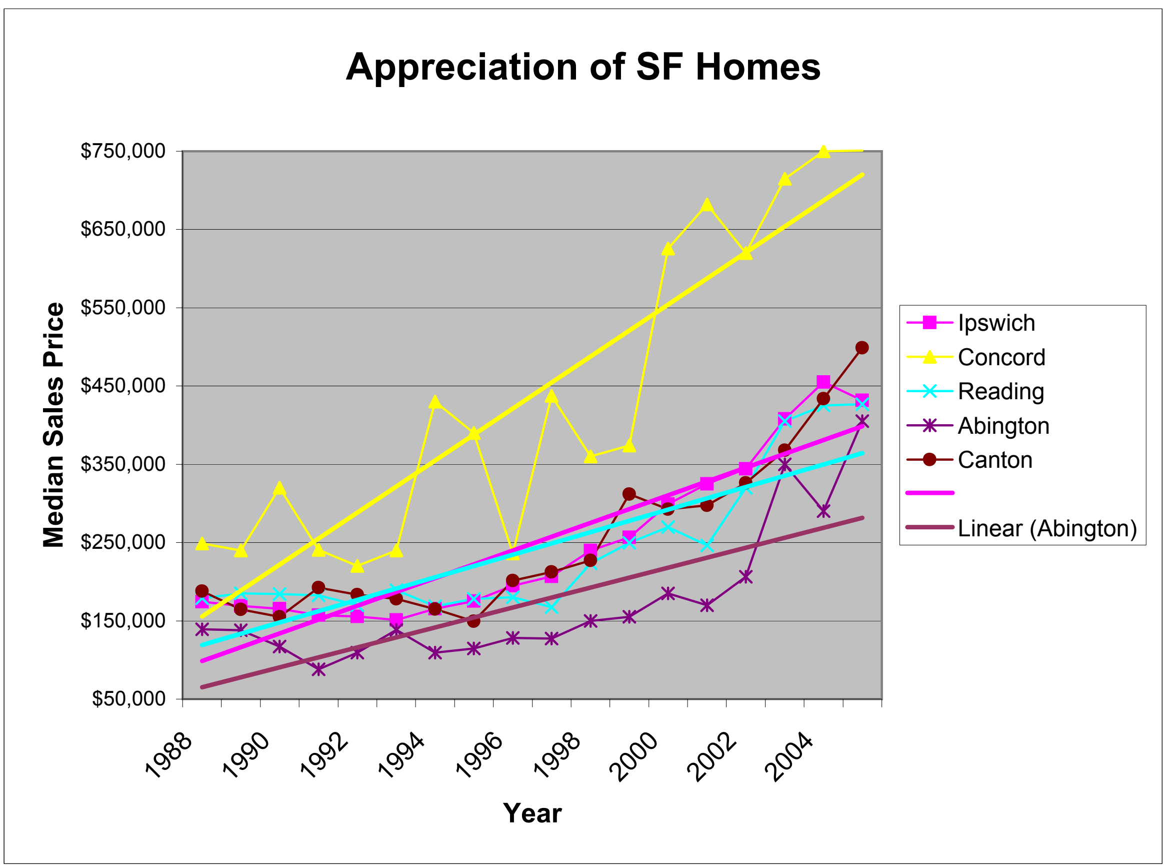
Case Study Development Profiles					
Location	**Reading**	**Ipswich**	**Abington**	**Concord**	**Canton**
Development	Longwood Place At Reading	Oak Hill	The Woodlands at Abington Station	FairHaven Gardens	Various
Developer	Bill Chase	Oak Hill, Inc. / Immanuel Baptist Church	Beacon Residential Properties	Ryan Development	John Marini/Marini Construction
Type	Rental, Age-restricted	Rental, Age-restricted	Rental	Rental	Rental and Condo
40B	no	yes	yes	yes	no
Year Permitted	1994	1988	2001	2003	2000-2004
Year Completed	1996	1989	2003	2004	2001-2004
Total Units	86	33	192	42	200+
Affordable Units	20%	33	39	11	N/A
Affordability Profile	20% at 50% AMI	100% at up to 80% of AMI	20% at 50% AMI	25% at 80% AMI	market
Density of Development (units per acre)	18	N/A	9.6	7	Various
Average Density of Town (units per acre)	1.39	0.26	0.84	0.39	0.67
Distance to Train	1200m	400m	200m	1200m	50-350m
Distance to Commercial	300m	50m	1400m	850m	0-400m

Name	Definition
sold"year"	The year in which the house was sold, for example "sold87-88" is a house sold in the paired years of 1987 and 1988. Years are paired for all cases except Abington, which has annual sales, for example "sold00" for records with 2000 sales
built"year range"	The year in which the house was originally constructed. Can be year range, or before (<) or after (>) a specific year.
"#"bath	Total number of full and half bathrooms. For example, 1.5bath is one full and one half bath.
"#"BR	Total number of bedrooms. Includes less (<) or greater (>) than values.
"#" rooms	Total number of rooms. Includes less (<) or greater (>) than values.
LOTSIZE	Size of the lot that the house is on. Measured in square feet.
INTERSF	Total interior size of the house. Measured in square feet.

	Ipswich	Concord	Abington	Canton	Reading	Manchester by the Sea	Boston (Jamaica Plain)
1988	$ 174,500	$ 249,000	$ 139,000	$ 188,000	$ 179,000		
1989	$ 169,000	$ 240,000	$ 138,000	$ 164,500	$ 185,000		
1990	$ 165,500	$ 320,000	$ 117,250	$ 155,000	$ 184,000		
1991	$ 157,250	$ 240,500	$ 88,000	$ 192,500	$ 182,450		
1992	$ 155,500	$ 220,000	$ 109,300	$ 183,500	$ 170,000		
1993	$ 151,000	$ 240,000	$ 138,500	$ 177,950	$ 189,000		
1994	$ 165,500	$ 430,000	$ 109,400	$ 165,000	$ 168,750		
1995	$ 175,000	$ 390,000	$ 114,575	$ 149,500	$ 178,000		
1996	$ 195,000	$ 236,250	$ 128,000	$ 201,250	$ 180,000		
1997	$ 206,500	$ 437,500	$ 127,200	$ 212,500	$ 167,500		
1998	$ 240,000	$ 360,000	$ 150,000	$ 227,250	$ 223,500		
1999	$ 256,500	$ 374,000	$ 155,000	$ 312,000	$ 249,500		
2000	$ 299,000	$ 625,500	$ 184,950	$ 292,500	$ 269,900		
2001	$ 325,000	$ 682,250	$ 170,000	$ 297,450	$ 246,250		
2002	$ 344,000	$ 620,000	$ 206,200	$ 326,225	$ 320,000		
2003	$ 408,000	$ 715,000	$ 350,000	$ 368,000	$ 405,000		
2004	$ 455,000	$ 750,000	$ 290,000	$ 433,700	$ 425,000		
2005	$ 431,750	$ 750,750	$ 405,000	$ 498,750	$ 427,000		

http://rers.thewarrengroup.com/townstats/search.asp

94-04	175%	74%	165%	163%	152%



Characteristic	Reading	Ipswich	Abington	Concord	Canton
1990 Households	7,932	4,699	4,817	5,693	6,605
2000 Households	8,688	5,290	5,263	5,948	7,952
% change	9.5%	12.6%	7.9%	4.5%	20.4%
1990 Housing Units	8,104	5,162	4,955	5,917	6,789
2000 Housing Units	8,823	5,601	5,348	6,153	8,163
% Change	8.9%	8.5%	7.9%	4.0%	20.2%
% Single Family Homes*	77.2%	72.1%	69.0%	81.4%	68.0%
Town Median HH Income (2000)	$77,059	$57,284	$57,100	$95,897	$69,260
% of Boston Area Median Income	133.9%	99.6%	99.2%	166.7%	120.4%
1995 Median House Value	$178,000	$175,000	$114,575	$390,000	$149,500
2005 Median House Value	$427,000	$431,750	$405,000	$750,750	$498,750
% change	139.9%	146.7%	253.5%	92.5%	233.6%
Average Density (units/acre)	1.39	0.26	0.84	0.39	0.67
% Subsidized Units*	7.8%	7.8%	8.3%	4.5%	10.2%
% change from 1997-2005**	+3-4%	+<1%	+>5%	+1-2%	+<1%

* attached and detached

All data is from the US Census website (http://factfinder.census.gov), except the subsidized housing units data, which is from the DHCD 2005 Subsidized Inventory (http://www.mass.gov/dhcd/components/hac/HsInvRev.pdf) and CHAPA Analysis of Subsidized Housing (http://www.chapa.org/0540banalysis.pdf).

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APPENDIX

Location	Total Observations	Incomplete		Suspicious *		# Observations used	
		#	%	#	%	Control	Impact
Abington	2,900	121	4.2%	141	4.9%	2,435	203
Canton	3,754	423	11.3%	133	3.5%	3,102	96
Concord	3,514	43	1.2%	11	0.3%	3,360	100
Ipswich	2,691	13	0.5%	2	0.1%	2,616	60
Reading	5,291	6	0.1%	77	1.5%	5,061	147
TOTAL	**18,150**	**606**	**3.5%**	364	**2.0%**	**16,574**	**606**

***** Includes outliers as well as suspicious records such as mortgage higher than sales price, properties that sold two times in one day, and other suspicious transactions reserached through assessor data

Figure 5.1

Development Name	**Washington Place**	**Forge Pond**	**Canton Commons / Paul Revere Village**	**Grover Estates**
d	2001	2003	2004	developm
Units	47	38	206	affordable
Tenure	Rental	Condo	Condo	Condo
Compone	10,000sf	8,000sf	None	6,500sf

Case Study Development Profiles					
Location	**Reading**	**Ipswich**	**Abington**	**Concord**	**Canton**
Development	Longwood Place At Reading	Oak Hill	The Woodlands at Abington Station	FairHaven Gardens	Various
Developer	Bill Chase	Oak Hill, Inc. / Immanuel Baptist Church	Beacon Residential Properties	Ryan Development	John Marini/Marini Construction
Type	Rental, Age-restricted	Rental, Age-restricted	Rental	Rental	Rental and Condo
40B	no	yes	yes	yes	no
Year Permitted	1994	1988	2001	2003	2000-2004
Year Completed	1996	1989	2003	2004	2001-2004
Total Units	86	33	192	42	200+
Affordable Units	20%	33	39	11	N/A
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