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Effect of Suburban Transit Oriented Developments on Residential Property Values

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MINETA TRANSPORTATION INSTITUTE

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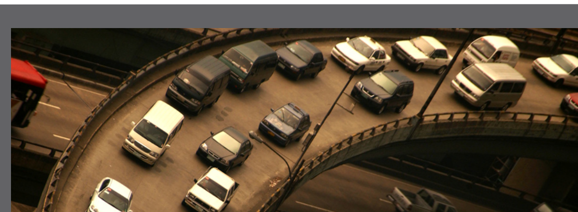
MTI Report 08-07



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MTI REPORT 08-07

EFFECT OF SUBURBAN TRANSIT ORIENTED DEVELOPMENTS ON RESIDENTIAL PROPERTY VALUES

June 2009

Dr. Shishir Mathur
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16. Abstract

The development of successful TODs often encounters several barriers. These barriers include: a lack of inter-jurisdictional cooperation, auto-oriented design that favors park and ride lot over ridership generating uses, and community opposition. The community opposition may be more vocal in suburban areas where residents of predominately single-family neighborhoods may feel that the proposed high-density, mixed-use TOD will bring noise, air pollution, increased congestion and crime into their area. Community opposition has been instrumental in stopping many TOD projects in the San Francisco Bay Area.

While community opposition to TODs has been pronounced, very little empirical research exists that indicates whether this opposition is well-founded. Economic theory suggests that if a TOD has a negative effect on the surrounding residential neighborhoods, then that effect should lower land prices and in turn, the housing prices in these neighborhoods. Similarly, an increase in the housing prices would mean a positive effect of TODs on the surrounding neighborhoods. This study empirically estimates the impact of four San Francisco Bay Area sub-urban TODs on single-family home sale prices. The study finds that the case study suburban TODs either had no impact or had a positive impact on the surrounding single-family home sale prices.

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OVERVIEW

Public transit systems are most effective in the presence of high volume of potential ridership. This ridership generally requires high density development at the ends of the system and along transit corridors. The development of Transit Oriented Developments (TODs) is increasingly being used to increase transit ridership. TOD has been defined by the California State Department of Transportation as "… moderate to higher-density development, located within an easy walk of a major transit stop, generally with a mix of residential, employment and shopping opportunities designed for pedestrians without excluding the auto. TOD can be new development or reconstruction of one or more buildings whose design and orientation facilitate transit use."[1] TOD, apart from providing the transit ridership, has also gained popularity as a "smart growth" tool that addresses the problems of traffic congestion, pollution, and other ills of auto-oriented sprawl-like development. TOD's increasing popularity is evidenced in efforts at all levels of government to promote the coordination of transportation and land use.

The Federal government, through ISTEA, TEA-21 and most recently, SAFETEA, has reinforced the need to integrate land use and transportation planning, and provide public transit. Other federal programs like the "Livable Communities Program" and the "New Starts Program" have given additional impetus to the development of public transit coordinated with land use.

At the state and regional level too, the last three decades have seen a dramatic increase in the number of new rail-based public transit systems. There are three general categories of rail transit systems: Heavy rail (for example, Bay Area Rapid Transit—BART), commuter rail (for example, METRA in the Chicago area) and light rail transit (for example, Santa Clara VTA, and Portland TRI-MET).

While the development of TOD is a desirable planning goal, the development of successful TODs often encounters several barriers. These barriers include: a lack of inter-jurisdictional cooperation; auto-oriented design that favors park and ride lot over ridership generating uses;[2] and community opposition.[3, 4] Like any new high-density development, TODs are likely to face community opposition. This opposition may be more vocal in suburban areas where residents of predominantly single-family neighborhoods may feel that the proposed high-density, mixed-use development will bring noise, air pollution, increased congestion and crime into their area. Cervero, Ferrell and Murphy[5] note that community opposition has been instrumental in stopping many TOD projects in the San Francisco Bay Area. These include plans for Rockridge, Ashby, North Berkeley, and Pleasant Hill Stations of the BART system. While the community opposition to TODs has been pronounced, very little research exists that indicates whether this opposition is well-founded. Economic theory suggests that if a TOD has a negative effect on the surrounding residential neighborhoods then that effect should lower the housing prices in these neighborhoods. Similarly an increase in the housing prices would mean a positive effect of TOD on the surrounding neighborhoods.

This study empirically estimates the impact of four San Francisco Bay Area suburban TODs on single-family home sale prices. If the study finds that suburban TODs have positively impacted prices of existing single-family homes, then it can help in educating people about the positive impacts of TODs. If the study finds that suburban TODs have negatively impacted single-family homes, then future research could identify TOD design elements that might soften or eliminate this negative impact.

Existing studies estimate the effect of proximity to transit lines or stations on property values,[6,7,8,8,10,11,12,11,14] but they do not measure the effect of the TOD on residential property values. Cervero, Ferrell and Murphy[15] note that "while there is substantial literature on how proximity to transit influences land values, no studies could be located that gauged real estate benefits associated with TODs themselves." This study aims to fill this major gap in the field of transportation planning and policy.

This study will be of interest to the following audiences: local, regional, state and national transportation policy makers as they plan, advocate, and allocate funding for TODs; and the technical staff of the jurisdiction and the transit agencies as they measure the benefits of the TODs

All levels of public officials and professional staff can use the study results as they educate the existing residents about the potential impacts of TODs. Furthermore, accurate estimation of the monetary benefits of the TODs will help in assessing the use of these developments as an economic development tool.

EMPIRICAL FRAMEWORK

The estimation of the effect of various factors on the price of housing has long been studied using a hedonic analysis framework pioneered by Rosen.[16] This theory asserts that the price of the house is the sum of the implicit prices of the components of the bundle of housing services rendered by a housing unit. Thus the price of a house depends upon several factors. They include: a) structural attributes of the house (square feet of living space, lot size, number of bedrooms, number of bathrooms, and so on); b) locational attributes of the house (transportation accessibility, traffic noise, air quality, proximity to the TOD, and so on); c) quality of the neighborhood and the jurisdiction; and d) regional and national demand and supply of housing.

This study chooses several suburban TODs along the transit lines in the San Francisco Bay Area and estimates the effect of these TODs on the surrounding single-family residential neighborhoods using the hedonic regression method.

The empirical model is of the form:

$$P_i = f(S_i, L_i, J_k)$$

where:

P_i is the selling price of the i^{th} house.

S_i is a vector of structural attributes of the i^{th} house.

L_i is a vector of locational attributes of the i^{th} house, including proximity to TOD.

J_k is a vector of jurisdictional / regional attributes.

CASE STUDY TRANSIT ORIENTED DEVELOPMENTS

This study aims to empirically estimate the impact of suburban TODs on surrounding single-family residential neighborhoods. Economic theory suggests that the positive impacts of the TOD should increase the price of single-family homes in the surrounding neighborhoods, while negative impacts should depress the home prices. Moreover, it can be safely assumed that the impacts of the TOD would be more strongly felt on single-family homes that are relatively close to a TOD – we suggest roughly within one-half mile — with the impact likely to dissipate after that. The study objectives and the economic theory suggest following TOD selection criteria:

- Suburban location
- Substantial single-family residences within one-half mile radius of the TOD
- Good mix of uses, including residential, office and/or commercial uses within the TOD
- All or major portion of the TOD built

Based upon these criteria four TODs – Ohlone Chnyoweth TOD in San Jose, Pleasant Hill TOD in Contra Costa County, Downtown Hayward TOD in the City of Hayward in Alameda County, and Bay Meadows TOD in the City of San Mateo in San Mateo County – were chosen.

STUDY FINDINGS

This study finds that the Ohlone Chynoweth TOD positively impacts the surrounding single-family residences with every 100 feet decrease in distance of a single-family home to the TOD increasing the home sale price on average by $10,150. As the average single-family home price for this distance band is approximately $660,000, this translates into a 1.5 percent increase in home prices. However, the remaining three TODs do not have any effect – positive or negative – on the prices of surrounding single-family homes.

LITERATURE REVIEW

There is a substantial body of research on the effects of neighborhood quality and amenities on property values – primarily conducted using hedonic price regression models. One of the most well-researched neighborhood amenities are the effects of rail transit stations and lines on residential property values. However, the literature review did not find any empirical study estimating the effect of TODs on property values.

RAIL TRANSIT INFLUENCES ON PROPERTY VALUES

Starting in the early 1980s, a surge in studies on the influences of (primarily) rail transit stations on surrounding neighborhood property values occurred. It became clear early-on that while rail transit systems often increase nearby property values by improving accessibility, they can also depress values due to the nuisances they bring to their neighborhoods. Bajic[17] performed one of the earliest of these studies using a hedonic price regression model to measure the capitalization of Toronto subway (heavy rail) stations into residential property values. He concluded that the commuting time-cost savings of the rail system was measurably capitalized into nearby home values. In reviewing the research to-date on this subject, Parsons Brinkerhoff[18] concluded that while the varied approaches to measurement make comparisons difficult, and while there have been studies with contradictory results, in general, rail systems have a beneficial effect on property values and there is little support for the suggestion that they have a negative impact.

Nevertheless, it soon became apparent that the design of the transit system plays an important role in determining whether it will have a positive or negative effect on nearby property values. In a similar vein, Nelson[19] studied how proximity to Atlanta, Georgia's elevated heavy rail stations affect single-family house prices. Here, the line had a negative price effect on high-income neighborhood properties due to the nuisances associated with the elevated heavy rail system, while they had a positive effect on low-income neighborhood properties due to their accessibility benefits. Hess and Almeida[20] used hedonic price regression method to study property values surrounding Buffalo, New York's light rail stations. They found that for every foot closer to a station, property values increased by $2.31 for straight-line distance and $0.99 for network distance per square foot, or two to five percent of the city's median home value. In contrast to the findings of Nelson,[21] they also found that the proximity benefits of rail stations were positive for high-income neighborhood property values and negative for low-income neighborhoods. These counter-indicative findings are possibly the result of several factors including differences in the economic conditions in Buffalo versus Atlanta (i.e., Buffalo's population and economy are stagnant or in decline while Atlanta is a hub of the booming sun belt), the different effects of light versus heavy rail on property values, and the different effects of an elevated rail system versus an at-grade one. Benjamin and Sirmans[22] studied the effects of distance to Washington D.C. Metrorail stations on apartment rents and property values. They found that every tenth-mile increase in distance would reduce apartment rents (and by implication, apartment property values) by 2.5 percent.

Timing is an important factor as well. Real estate values are determined by the collective perceptions of market conditions by buyers and sellers. Conceivably, market perceptions are influenced not only when a transit line opens for service, but also (and perhaps more importantly) when the line is first publicly announced as a project in the planning stages, when the real estate is purchased, when the project clears environmental review, and various other development “milestones” that reach public consciousness. A number of studies have found evidence of significant influences of rail transit systems on property values prior to a system’s opening day of service. Gatzlaff and Smith[23] studied residential property values around Miami Metrorail (heavy rail) stations and found a weak effect that was caused by the announcement of the new rail system. Ferrell[24] used a hedonic price regression model to identify the proximity benefits to single-family house prices in neighborhoods surrounding San Jose’s light rail stations. This analysis included price and property sales data for the years prior to and after the announcement of the light rail system’s construction as well as after the inception of service. He found a statistically significant price premium for properties near the system’s proposed stations for the year following the announcement of the system’s construction (1988) but for no other years following, suggesting that the price benefits of light rail are early and fleeting. The author concludes that homeowners and purchasers may have originally have had high expectations for how light rail would affect their property values but may have been disappointed when they saw how the system was developing.

A number of studies performed during this period sought to distinguish between the accessibility benefits of rail and other transportation services. Langley[25]studied properties in proximity to the Washington D.C. beltway and found that properties in close proximity increased in value at a significantly slower rate than those further away, suggesting a disamenity effect of the freeway right-of-way (ROW) but an amenity effect of increased accessibility. Cervero and Landis[26] compared office rents in areas surrounding rail stations in Washington D.C. and Atlanta with properties in freeway-oriented areas. Comparisons suggest that rail station areas enjoy a small rent premium over freeway-oriented offices, although there were notable exceptions. The authors conclude that while rail stations may generate benefits for surrounding commercial properties, these benefits are small. Landis, Guhathukaurta and Zhang[27] studied the capitalization of freeway interchanges as well as five California rail transit systems on residential property values in six counties. They found that while BART (heavy rail) stations in Alameda and Contra Costa counties increased property values by roughly two dollars per square foot for every meter closer to a station, proximity to freeways tended to depress property values. Strand and Vågnes[28]studied the effects of Oslo, Norway rail stations on nearby property values and found a significant disamenity effect for properties within 100 meters of a rail station – property prices increase by 10 percent by doubling the distance from a station (within 100 meters). Armstrong and Rodríguez[29]studied the property value influence of commuter rail systems in eastern Massachusetts. They found a 10 percent price premium for residential property values within a one-half mile distance from stations when compared to properties beyond a half-mile. They also found a significant disamenity effect for proximity to the rail ROW, where every 1,000 feet from the ROW increased values by between $732 and $2,897.

These findings suggest proximity to regional transportation facilities (both high-capacity transit systems and highways) is a double-edged sword, with accessibility benefits tending to increase property values but negative externalities of the facilities themselves tending to depress them. For rail stations, the accessibility benefits appear to outweigh the noise, traffic and visual blight effects of the rail facilities. For freeways, proximity tends to depress values due to the negative externalities, overwhelming any capitalization benefits from regional accessibility. These studies suggest that any modeling of transportation capitalization needs to comprehensively measure the proximity effects of all nearby regional transportation facilities since different transportation modes and facilities have different effects on property values.

Variations in the capacity and performance of various rail transit modes are similarly important factors determining the degree of property value influence. Lewis-Workman and Brod[30]used hedonic price regression method with a measure of walking distance from properties to stations to compare the effects of light rail and heavy rail stations on surrounding property sales prices. While Portland's light rail system stations conferred minimal benefits on surrounding property values, Bay Area Rapid Transit system and New York Metropolitan Transportation Authority heavy rail stations showed significant price premiums. These findings suggest that the higher capacity and speeds of heavy rail compared to light rail systems translate into a larger effect on surrounding property values. Cervero and Duncan[31]studied sales price data for properties surrounding Santa Clara County's light rail and commuter rail stations using hedonic price regression methods. They found that while stations in both systems—commuter and light rail—produced measurable property value premiums, some of the largest premiums were found for large apartments within a quarter-mile of light rail stations which commanded land value premiums of up to 45 percent. In a meta-analysis of the effects of Dutch rail stations on commercial and residential property values, Debrezion, Pels and Riebtveld[32] found that commercial properties enjoy a larger proximity benefit from rail stations than residential properties. Different transit modes also tend to have different effects, with commuter rail apparently enjoying a higher capitalization effect than light and heavy rail.

MEASUREMENT TECHNIQUES

Often, the variables included in hedonic price regression models are determined by data availability, the resources available for collecting original data, theoretical concerns, and the unique concerns of the study's focus. Often, data availability and ease of measurement have led researchers to use purely quantitative, proxy measures of neighborhood amenities rather than more subjective, qualitative indicators. Lang and Jones[33] were concerned that the use of these proxy variables had degraded the accuracy of hedonic models. They tested this proposition by comparing a hedonic model using qualitative measures of neighborhood amenities to a model using proxy (i.e., quantitative) measures instead. They found that qualitative measures only modestly improved price prediction and concluded that in cases where large study areas would make the collection of qualitative variables cost-prohibitive, proxy quantitative variables are acceptable.

Li and Brown[34]studied the importance of neighborhood descriptive variables in hedonic models and found a positive effect for accessibility and negative effects for congestion, air pollution, and unsightliness. By including these factors in their hedonic models, they found that the impact of some aggregate neighborhood variables typically employed in these models, such as median household income, were eliminated. In contrast to Li and

Brown,[35] Dubin[36] reviewed the research literature on measuring the effect of neighborhood quality and accessibility factors on property values using hedonic price modeling techniques and found that there were very few examples of capitalization of neighborhood quality and accessibility qualities into property values. They hypothesized that this was due to the inadequacy of neighborhood quality and accessibility measures. To test this hypothesis, they omitted these variables from their hedonic models and instead measured the resulting autocorrelation in the model error term. Their study of Baltimore property values showed housing price variations consistent with expectations based on neighborhood quality and accessibility factors. However, confirming the findings of Li and Brown,[37] Haurin and Brasington[38] studied housing values in several metropolitan statistical areas (MSAs) and found the most important neighborhood determinants of home prices are public school quality, distance to the central business district, neighborhood crime rates, and the presence of arts and recreational facilities. Since several of these variables are measured differently than those used in Dubin,[39]we can conclude that measurement techniques are an important aspect of measuring neighborhood factors for hedonic price regression models.

IMPACT OF OTHER NEIGHBORHOOD-LEVEL AMENITIES ON PROPERTY VALUES

Studies of neighborhood amenity influences on property values can be broken down into several categories. Neighborhood quality variables studied include school quality and proximity, the influence of non-residential and non-single-family residential land uses, infrastructure presence and quality, crime, the presence of visual amenities (e.g., views of water bodies or mountains), environmental qualities (e.g., air and water quality, noise pollution, etc.) and neighborhood socio-demographic qualities (e.g., racial composition, income, etc.).

Neighborhood School Quality and Proximity

Another rich area of hedonic price research has investigated the influence of school quality and proximity on property values. Brasington[40] studied the effects of public school quality on property values. School quality was measured by a combination of proficiency test results, expeditures per pupil, and pupil/teacher ratios. All these three variables were consistently capitalized into housing prices, while graduation rates and teachers' education levels were not consistently related to housing values. Therefore the researchers recommend avoiding the use of the last two variables in hedonic models. In a hedonic price model study of accessibility and residential property values in King County, Washington, Franklin and Waddell[41]found that access to commercial and university uses increased property values while access to K-12 educational and industrial uses decreased them. Chin and Foong[42]used a hedonic price model to measure the influence of proximity to prestigious schools on residential property values in Singapore. They found that variations in property values in Singapore can be explained using a prestigious school accessibility measure, but the influences of neighborhood prestige and property tenure were stronger. Clearly, the selection of a proper neighborhood school quality variable is an important element in creating a hedonic price regression model that effectively controls for neighborhood factors in line with theoretical expectations.

Infrastructure, Activity Centers and Non-Residential Land Uses

Occasionally, researchers have found that while neighborhood qualities may appear to be a positive benefit to property values, they can actually serve to reduce them. For example, while we might assume that neighborhood churches would enhance a sense of community, and therefore, have a positive influence on property values, research by Do, Wilbur and Short[43] found that the effects of church proximity on sales prices was negative up to a distance of roughly 850 feet. Seemingly negative neighborhood qualities can also be a benefit to property values, as in the case of high-voltage transmission wires. Des Rosiers[44] found that while proximity to a transmission tower or conductors will depress property values from five to 20 percent, proximity to the transmission line easement corridors can result in net increase in property values. Presumably, proximity to open space provided by the transmission easement is a substantial amenity while proximity to the transmission line structures depress or negate these benefits.

Song and Knaap[45] studied how new urbanist neighborhood design qualities affect property values. Specifically, they found that home buyers are willing to pay a premium for properties in neighborhoods with high levels of street connectivity, more streets, shorter dead-end streets, better pedestrian accessibility to commercial uses, more evenly distributed mixed-uses, and proximity to light rail stations. However, they also found that some new urbanist qualities such as neighborhoods with higher densities, and high amounts of commercial, multi-family and public uses were considered disamenities and tended to lower property values. Overall, the authors conclude that new urbanist neighborhoods command a considerable price premium, but the quality of neighborhood design is important, suggesting that poorly conceived, planned, and designed neighborhoods – new urbanist or not – will depress property values.

Mathur[46] studied the differential impacts of infrastructure and urban services on residential property values and found that the effects differ depending on the quality and age of the house. A decrease in travel time to the central business district is likely to primarily benefit high-quality housing, while a decrease in violent crime rate is likely to equally benefit high- and low-quality housing. The increase in accessibility to retail jobs is valued by the residents of low-quality houses, while it may be considered a nuisance by the residents of high-quality houses. The findings on school quality suggest that the residents of high-quality houses are likely to value school quality more than the residents of low-quality houses. The per-person municipal expenditure is likely to benefit new housing two times as much as it would benefit existing housing.

Espey and Owusu-Edusei[47] studied how proximity to neighborhood parks affects property values in Greenville, South Carolina. They found that the effects differ by park type and size, with the greatest impacts due to proximity to small neighborhood parks. Property values were as much as 13 percent higher for homes between 300 and 500 feet from a small neighborhood park, and six-and-a-half percent higher for those between 500 and 1,500 feet away.

Mathur, Waddell and Blanco[48] found that impact fees raised new home property sales prices by 166 percent of the fee value, suggesting that while these fees increase sales prices, they also add a price premium to residential property values reflecting the neighborhood amenities these fees pay for.

Mehay[49] studied the effects of municipal public service provision methods on property values as a means to measure their effectiveness. He found that cities that provided their services directly had measurably higher property values (controlling for spending and other tax differences) than cities that provided its services through contracting arrangements. Based on these results, he suggests that contracting services are not as effective as direct methods, but might be improved using output-oriented, performance-based contracting methods.

Social and Natural Environmental Factors

Harrison and Rubinfeld[50] developed a hedonic price regression model of the Boston area to test whether air quality is capitalized into residential property values. They found that marginal air pollution damages to property values increased with the level of air pollution and with household income. Benson, Hansen, Schwartz and Smersh[51] used a hedonic price regression model to measure the value of view amenities on residential property values in Bellingham, Washington. They found that high quality ocean views increased values by nearly 60 percent, while the lowest-quality ocean views added roughly eight percent. Disamenities are important as well. Nelson, Genereux and Genereux[52] studied the effects of proximity to landfill facilities and found that adjacent property values were depressed by roughly 12 percent while those one mile away were depressed six percent. There were negligible effects to properties beyond two miles.

Schwartz, Susin and Voicu[53] studied the effects of New York City's falling crime rates since 1994 on residential property values. They found that while their hedonic and repeat-sales models suggested that roughly a third of the price increases during this period were attributable to lower crime rates, they cautioned that their methods did not account for the revitalization of and investments in New York's poorer neighborhoods.

Finally, in a survey of studies done on the impacts of environmental externalities on housing prices, Boyle and Kiel[54] found that air quality coefficients were often insignificant, and their signs were sensitive to the inclusion of other variables in the hedonic models. Their review of water quality studies found more promising results, with their signs generally consistent with theoretical expectations and statistically significant. Studies that measured the influence of the presence of hazardous waste sites on property values generally had the correct signs and were statistically significant, though the dollar value effects varied wildly. Interestingly, a number of studies found that housing prices were affected by the changes in information available about the site, indicating public perceptions were more important that quantitative measures of distance or contamination levels.

CASE STUDY TRANSIT-ORIENTED DEVELOPMENTS

INTRODUCTION

Based upon their primary mode of transportation, the public transit systems in the San Francisco Bay Area can be divided into five broad categories, namely ferry, heavy rail, light rail, commuter rail and bus. The ferry-based public transit systems include Alameda-Harbor Bay Ferry, Alameda-Oakland Ferry and Angel Island-Tiburon Ferry. BART (Bay Area Rapid Transit) is the only heavy rail-based system serving the Bay Area. Commuter rail lines include Amtrak, Caltrain, Capitol Corridor Intercity Rail, and the Altamont Commuter Express (ACE). Light rail-based systems include the San Francisco Muni, and the Santa Clara Valley Transportation Authority (VTA). The major bus-based systems include AC Transit, San Francisco Muni, Santa Clara VTA, and SamTrans.

By the year 2006, several TODs had been developed, or were in advanced stages of construction along these transit system lines. Figure 1 shows the status of the Bay Area TODs as of year 2006. The list of the completed TODs, along with their location (urban versus suburban), and the proximate transit systems are provided in Table 1.

Table 1 Completed TODs in the San Francisco Bay Area

Name of the TOD	Transit System Serving the TOD	Location of the TOD
Downtown Berkeley	BART, BUS, Future Rapid Bus	Urban
Downtown Hayward	BART, Bus, Amtrak	Sub-Urban
BAY Meadows TOD, San Mateo	Caltrain, Bus	Sub-Urban
Emeryville Amtrak Station	Amtrak, Bus, Emery Go Round	Sub-Urban
Fruitvale Transit Village, Oakland	BART, Bus	Urban
Ohlone Chynoweth, San Jose	Light Rail	Sub-Urban
Pleasant Hill - Contra Costa Center Transit Village [a]	BART, Bus	Sub-Urban
The Crossings, Mountain View	Caltrain, Bus	Sub-Urban
Whisman Station, Mountain View	Light Rail	Sub-Urban
Source: New Place, New Choices: Transit-Oriented Development in the San Francisco By Area, November 2006, pg 34		

a. New Places, New Choices: Transit-Oriented Development in the San Francisco Bay Area, November 2006, indicates its status as "coming soon." However, after review of the TOD history and site visit, the research team decided that the TOD can be considered complete for the purposes of this study.

CASE STUDY TOD SELECTION PROCESS

This study aims to empirically estimate the impact of suburban TODs on the surrounding singe family neighborhoods. Economic theory suggests that positive impact of the TOD should increase the price of single-family homes in the surrounding neighborhoods, while a negative impact should depress the home prices. Moreover, it can be safely assumed that the impact of the TOD would be more strongly felt on single-family homes within one-half mile of the TOD, with the impact likely to dissipate after that. The study objectives and the economic theory suggest following TOD selection criteria:

1. Suburban Location.

The TODs located in the suburban locations have up until now faced strongest opposition from the existing single-family residents, thereby making the suburban location of the TOD important for the case study TOD.

2. Substantial single-family residences within one-half mile radius of the TOD.

Since the study uses a hedonic regression method to tease out the effect of the TOD on the single-family home prices, the presence of substantial single-family homes in the near vicinity of the TOD is critical.

3. Good mix of uses, including residential, office and/or commercial uses within the TOD.

A well-designed TOD that provides residential, office, and retail uses is likely to be more successful than a single-use TOD. Indeed, several recently developed TODs across the San Francisco Bay Area are mixed-use TODs. For example Ohlone Chynoweth TOD in south San Jose has a retail component in addition to the predominant residential use. Further, the California State Department of Transportation also calls for a TOD to have mix of uses. TODs with even a slight industrial component are not selected, because industrial use is likely to significantly depress home values.

Table 2 Case Study TOD Selection Process

Name	Suburban Location?	Substantial single family development within 1/2 mile of the TOD?	Mix of uses, including office and/or commercial within the TOD?	Candidate for selection for this report?
Downtown Berkeley	No	Yes	Yes	No
Downtown Hayward	Yes	Yes	Yes	Yes
Bay Meadows TOD, San Mateo	Yes	Yes	Yes	Yes
Emeryville Amtrak Station	Yes	No	Yes	No
Fruitvale Transit Village, Oakland	No	Yes	Yes	No
Ohlone Chynoweth, San Jose	Yes	Yes	Yes	Yes
Pleasant Hill - Contra Costa Center Transit Village	Yes	Yes	Yes	Yes
The Crossings, Mountain View	Yes	No	No	No
Whisman Station, Mountain View	Yes	No	No	No

Based upon the above mentioned criteria, four TODs—Ohlone Chynoweth, Pleasant Hill, Bay Meadows, and Downtown Hayward—were chosen for further study. See Table 2 for the TOD selection process. These four TODs are also ideal for this study because a large proportion, if not all, of each of the case study TODs was fully developed by the year 2003, allowing enough time to capture the full effect of the TOD on the single-family home sale price. Further, the transit systems near which these TODs are located represent the kinds of transit systems along which TODs in the San Francisco Bay Area and across the nation are usually located. Ohlone Chynoweth is near the Santa Clara VTA light rail line. Bay Meadows TOD is served by Caltrain (commuter rail service), while the Downtown Hayward and Pleasant Hill TODs are served by BART (heavy rail service). Figure 1 shows the location of the four case study TODs.

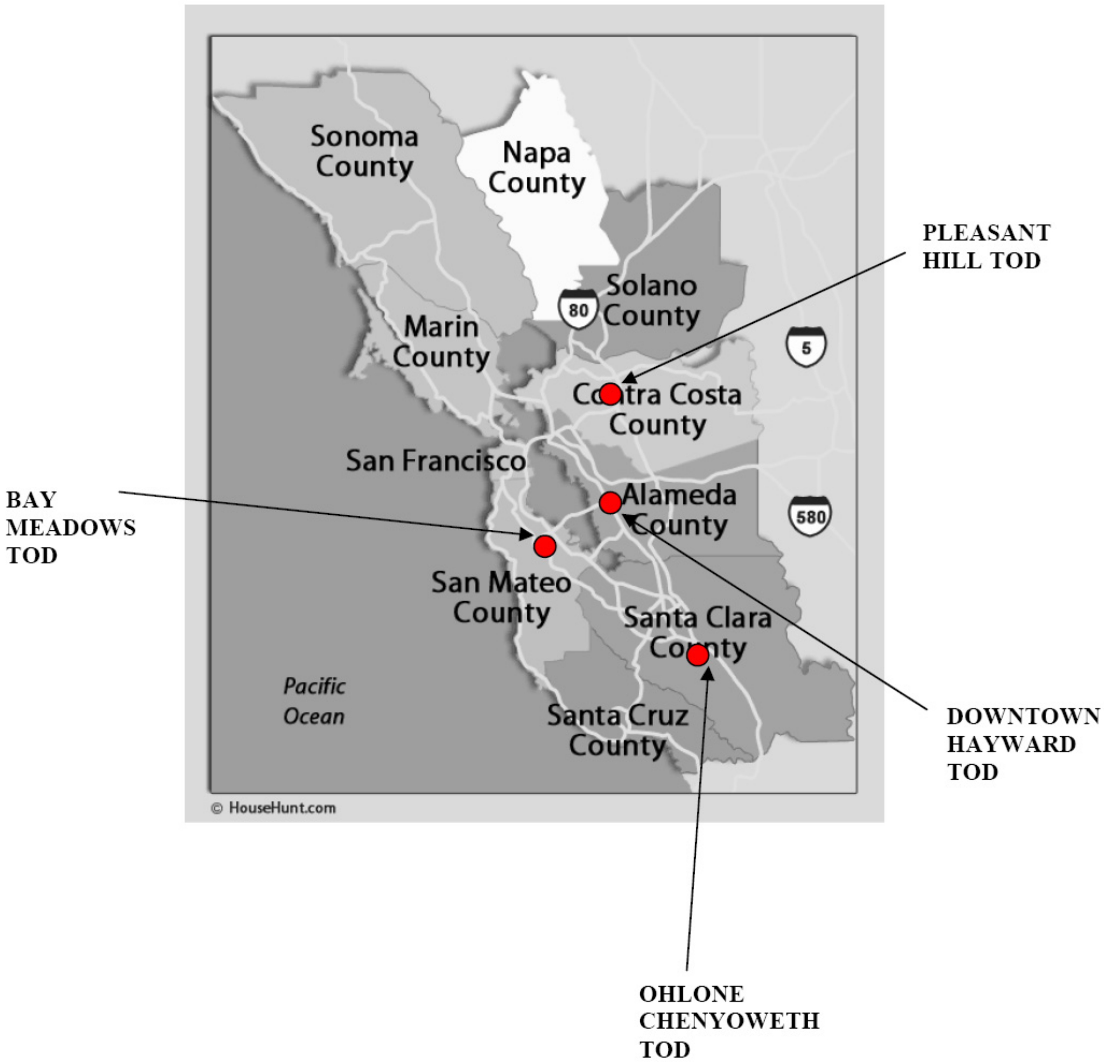


Figure 1 Case Study TOD Sites

Below, each of the four case study TODs are described in greater detail.

PLEASANT HILL TOD

Location

The Pleasant Hill TOD is located approximately 30 miles to the east of San Francisco. It is in the unincorporated Contra Costa County land that exists between the cities of Pleasant Hill and Walnut Creek. The City of Pleasant Hill in 2008 had a population of 33,377[55] and an area of 7.1 square miles.[56] Pleasant Hill is a typical Contra Costa County suburb, predominantly white with an average to above-average median income, and a low percentage of families living at or below the poverty level. The station is located near the Treat Boulevard exit of Interstate 680. See Figure 3 for the vicinity map of the Pleasant Hill TOD. The map shows the major land use within one-mile radius of the TOD.

Transit Service

BART service to Pleasant Hill Station started in May 1973 with the inauguration of the Oakland-Concord line. This was the second BART line to start service after BART's first day of service in September 1972 on the Richmond-Fremont line. In December 1996, the Concord line was extended eight miles to Pittsburg/Bay Point. Thus, the Pleasant Hill BART station is on what is now typically called the Pittsburg/Bay Point Line. The location of Pleasant Hill BART Station is shown in Figure 2.

The local bus service agency is The County Connection. It started service in 1980 when it took over routes which were previously operated by AC Transit.[57] The County Connection operates six bus routes to and from Pleasant Hill BART station. The Benicia Breeze, Fairfield-Suisun Transit and Livermore Amador Valley Transit also operate bus service or shuttle services to the station.

History of the TOD

BART planners for stations in suburban settings like Pleasant Hill envisioned development at and around them that would take advantage of BART and its location.[58] However, in the late seventies and early eighties, growth around the Pleasant Hill station continued to be low-density suburban sprawl. Therefore officials of Contra Costa County, BART, and the cities of Pleasant Hill and Walnut Creek gathered to develop a plan that would encourage commercial, office and residential development in the immediate vicinity of the station. Today, this first-generation TOD is considered a mixed success. While it boasts 1.5 million square feet of commercial office space and some 1,200 units of housing,[59] an automobile orientation persists as the station is dominated by large parking lots in the immediate vicinity, and is surrounded by major arterial streets. The auto-orientation has resulted in a lack of "village" sensibility, or pedestrian orientation; considered today to be two critical elements of successful TODs.

The protesting voice of nearby homeowners has had an influence in the development around the transit station as they have not always welcomed the increasing density at the station. The planning process continues still as the community works to adopt the benefits of transit-oriented development.

Source: *BART MAP*, http://commons.wikimedia.org/wiki/Image:Bart-map.png (accessed 07/17/2008)

Figure 2 BART Map

In 1981, County Supervisor Sunne McPeak convened a gathering of representatives of the City of Pleasant Hill, Walnut Creek and BART to discuss a plan for development at the Pleasant Hill BART station. Until that time the area around the station had slowly been changing from its historic agricultural style to typical suburban low-density development. Supervisor McPeak and other county planning officials saw an opportunity to encourage development at a transit station which would serve as a model of TOD. As the station area was mostly county land, development would generate income for the county and provide additional housing. Supervisor McPeak became a champion of this development, and spearheaded its progress.

The Pleasant Hill BART Station Area Specific Plan was produced in 1982 with land use provisions that described a "Station Core Area for greater land intensification within approximately 700 feet walking distance to the BART Station entrance," and a decreased intensity of land use further away from the station.[60] The Specific Plan also outlined the regulatory process of declaring the Station Area as a redevelopment area so that tax increment funding could be utilized, and land parcels could be acquired and assembled in preparation for larger development projects.[61]

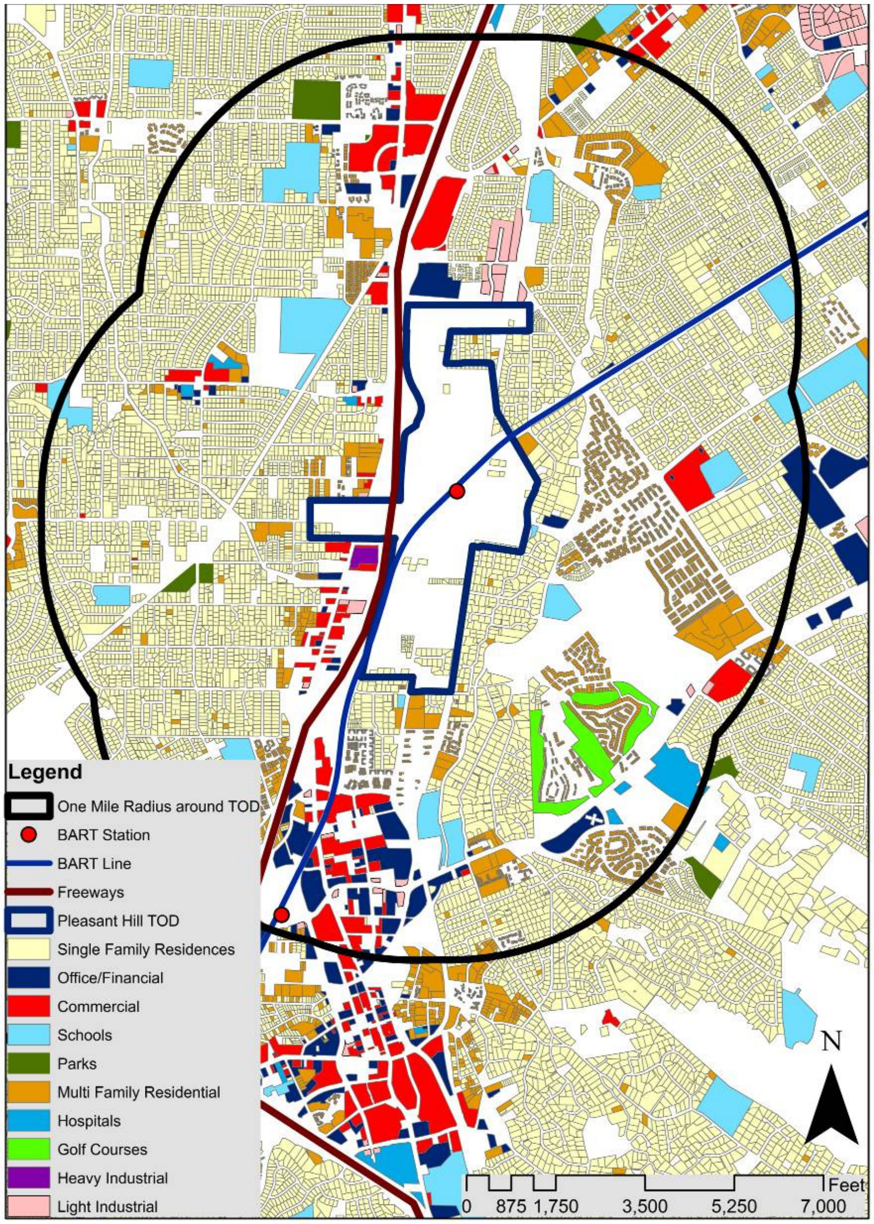
By 1985, residential and commercial construction had begun. Between 1985 and 1992, 1,840 units of rental and ownership housing were built within the station area.[62] Between 1985 and 1997, 1.3 million square feet of commercial office space was built.[63]

In 1995, a Request for Proposals (RFP) was issued by BART for building on 11.4 acres of parking area. The Millennium Partners project for an entertainment center was selected for development. The project included a 12-screen movie complex, a large scale bookstore and a music store. However community opposition to this project caused the developer to withdraw this plan. Based on this experience and the community process that followed, the Specific Plan was amended in 1998 to prohibit large entertainment uses and to limit the size of commercial uses.[64]

Bernick and Cervero[65] describe a contentious community process that impeded the development envisioned in the 1982 Specific Plan. The Walden Homeowners Association had a representative on the Station Area Steering Committee, but opposed station-area plans out of fear of increased automobile traffic. The cities of Walnut Creek and Pleasant Hill opposed station-area development out of concern that commercial development there would have a negative impact on commercial development in their cities. Walnut Creek successfully sued in the mid-1980s to stop the development of a shopping center at the BART station. The City of Pleasant Hill also threatened legal action against development at the station which would “compete” with revitalization efforts in Downtown Pleasant Hill.[66]

Design charettes and community meetings have continued since 1998 to educate the community on New Urbanite principles. Throughout 2001, Contra Costa County Redevelopment staff conducted a series of workshops and presentations for the community to gather feedback on future developments. These meetings were extensively documented and made available online at the Contra Costa County Redevelopment site.[67]

In 2003, the Contra Costa Board of Supervisors established a Municipal Advisory Council for the Pleasant Hill BART Station Vicinity. This Council is mandated to provide input on discretionary land use issues. Also in 2003, the process began for establishing a “Shortcut and Wayfinding Project” for increasing the biking and pedestrian access to the Pleasant Hill BART Station in response to community input. At the time of this writing, the community is considering signage and path alignment options.[68]



Data Source: CD-DATA; Map created by the Study Team

Figure 3 Pleasant Hill BART TOD Vicinity Map

A timeline of the station area development and the related planning processes:[69]

- September 1972: BART's Opening Day—Oakland to Fremont line
- May 1973: BART Opens Oakland to Concord Line—Pleasant Hill BART Station opens for service.
- July 1981: Contra Costa County, City of Pleasant Hill, City of Walnut Creek and BART officials meet to discuss plans for Pleasant Hill BART Station Area.
- 1983: Pleasant Hill BART Station Area Specific Plan developed.

- 1984: Pleasant Hill BART Redevelopment Plan developed.
- 1985: Construction begins at the station for housing and commercial uses.
- 1995: BART issues RFP for building on 11.4 acres of surface parking lots.
- 1996-1997: Community opposes project for movie theatre and large shopping complex.
- 1998: Pleasant Hill BART Specific Plan Amendment limits size of commercial buildings
- 2001: Year-long charrette process gathers community input.
- 2002: Pleasant Hill BART Station Property Regulating Plan developed.
- 2003: Municipal Advisory Council (MAC) established for Pleasant Hill BART Station Vicinity.
- 2003: MAC responds to community input and begins exploring options for the development of bike and pedestrian pathways to the station.
- 2005: Pleasant Hill BART Final Development Plan prepared.
- 2007: Community meetings held regarding bike and pedestrian pathways or "shortcuts."

For the purposes of estimating the impact of the TOD on the surrounding property values, the TOD timeline is divided into the following three time periods: the 1983–1995 period of plan development and TOD construction; the 1996–2001 period of first community opposition, then initiation of community involvement; and the 2002–2006 period of formal community involvement. The time period stops at the year 2006, as the dataset available for estimating the regression models is incomplete thereafter.

DOWNTOWN HAYWARD TOD

Location

Hayward, an inner-ring suburb in Alameda County has an estimated population of 149,205 (City of Hayward website). The TOD is located around the Downtown Hayward BART station along the Oakland-Fremont BART line. Figure 2 provides the BART system map. Figure 4 provides the vicinity map of the TOD. The map shows the major land uses within a one-mile radius of the TOD.

Transit Service

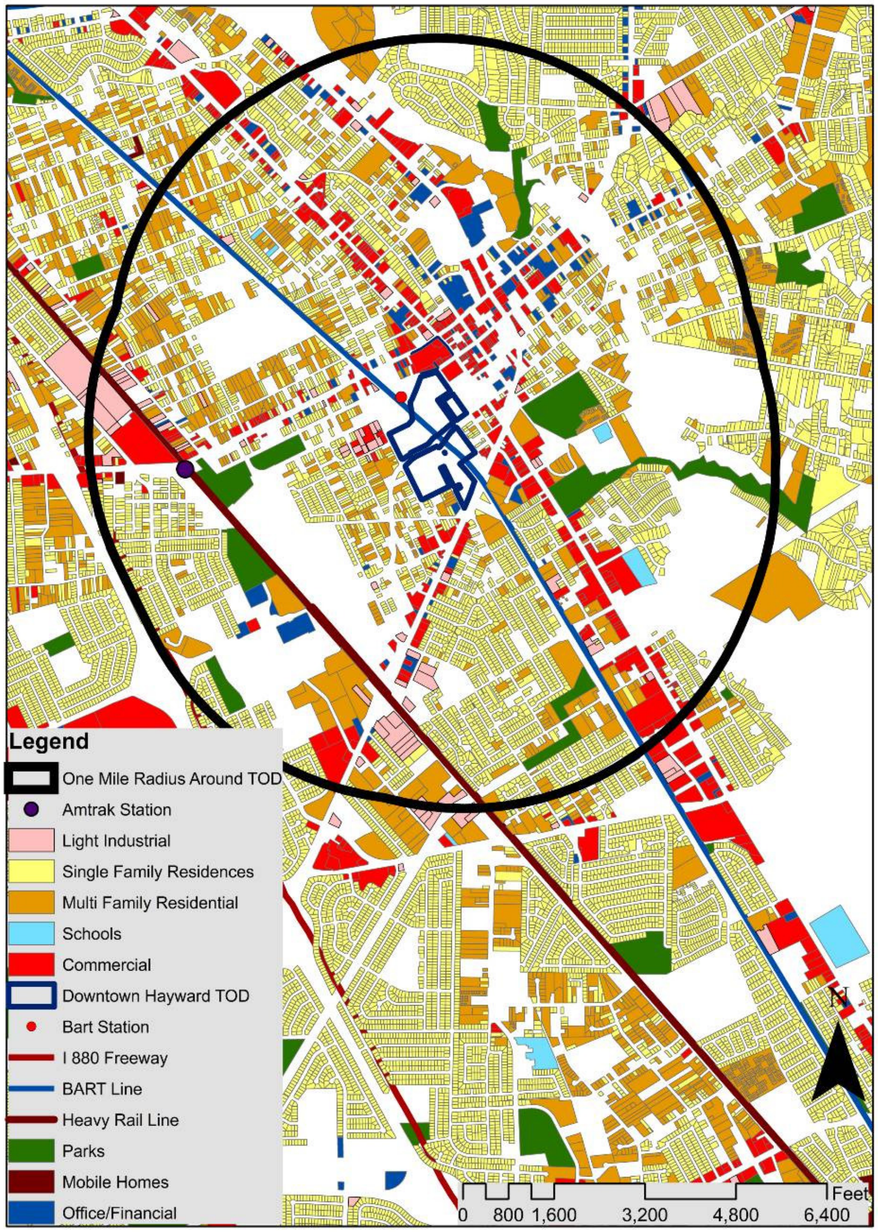
BART service to Downtown Hayward started in 1972. It was among the first BART stations with the train service to the station beginning on BART's first day of service in September 1972 when BART opened the Richmond-Fremont line.

History of the TOD

The Downtown Hayward Redevelopment Project Area was created in 1975, and the original area included the Downtown BART station. However, a lack of funds prevented any meaningful implementation of the planned developments during the early years. In the late 1980s, the City/Redevelopment Agency began acquiring some properties near the BART station. In 1987 the Downtown Hayward Design Plan was adopted, setting the zoning/height/density standards in the downtown by creating three Central City zoning designations, namely, CC-Commercial, CC-Residential, and CC-Plaza. The historic B Street area was originally thought of and planned to be an urban “semi-mall,” and the planners originally wanted to close off or greatly restrict through traffic — but the retailers opposed the street closure. The Focal Point Master Plan was adopted in 1991 for the site where the City Hall now stands, and it was thought that there should be a large civic building at this location. Then the Core Area Plan was adopted in 1992, which laid out a comprehensive redevelopment plan with the implementation of the Focal Point plan as its centerpiece. With its civic building and pedestrian connection between the BART station and B Street, this plan would introduce more high density housing into downtown, and spark retail revitalization along B Street.

The downtown property owners not only supported the creation of the Core Area Plan, but were an organizing force behind it. Downtown Hayward, which had been a very successful regional retail area before the 1970s—particularly along Foothill Boulevard, also known as “The Strip”—had gone into decline. This was the real impetus for redevelopment in downtown Hayward. As a result, there was not really an outcry among local residents about density as seen in the case of the Pleasant Hill BART TOD. In fact, the City/ Redevelopment Agency in their earliest efforts to build housing around the BART station had to push developers to achieve the desired densities.[70]

The first residential development/redevelopment effort, Atherton Place, was under construction by 1996. That same year, the Redevelopment Agency and BART undertook a series of land exchanges to reconfigure the seven-acre area in front of the station to encourage development consistent with the Focal Point and Core Area Plans. Development of the Hayward City Hall started in the fall of 1996, and was completed in December 1997. The City Hall parking structure and B Street Marketplace (a 12,000 square feet strip retail center which is attached to the parking garage and fronts onto B Street), was completed in 1999. The Lucky/Albertson's Shopping Center and associated retail followed in 2000–2001, as did the City Walk residential development adjacent to the City Hall which was completed in 2002–03, and the Renaissance Walk residential development completed in 2006.



Source: CD-DATA; Map created by the Study Team

Figure 4 Downtown Hayward TOD Vicinity Map

Based on this development history, the periods of study will be 1991–2000 and 2001–2006. Even though the area was declared a redevelopment zone in 1975, no new development took place on the TOD site until 1991. In 1991, the policies that encouraged the development that followed were put in place. These include the Focal Point Master Plan, which was adopted in 1991 for the site where City Hall now stands, and in 1992, the Core Area Plan, which described the complete redevelopment plan based on the idea of implementing the Focal Point Master Plan. The Core Area Plan described the civic building and pedestrian connection between BART and B Street, and introduced more high density housing into downtown, and retail revitalization along B Street.

From 1993 through 1996 no significant development occurred in the study area. In 1997, the City Hall and Atherton Place projects were completed. Several smaller development projects came online in 1999, and the Albertsons/Lucky's and Pinnacle Apartments were completed in 2000. This is the end of the first major period of redevelopment. Therefore, we have designated the first study period as 1991–2000.

The second study period has been identified as 2001–2006. During this period, over 200 housing units, mostly townhomes, were built around the Downtown Hayward BART station. These include Grand Terrace, City Walk, Renaissance Walk and Studio Walk. The time period stops at the year 2006, as the dataset available for estimating the regression models is incomplete thereafter.

OHLONE CHYNOWETH TOD, SAN JOSE

Ohlone Chynoweth TOD is located in the primarily single-family residential neighborhood in the southern part of City of San Jose. With an estimated population of 989,500,[71] San Jose is the third largest city in California after Los Angeles and San Diego, and the tenth largest in the country. The TOD is located along the light rail line operated by the Santa Clara Valley Transportation Authority (VTA).

Transit Service

The VTA was created in 1972 as a Santa Clara County department with the mandate to manage the county's bus and light rail service. In 1995, VTA was given the additional task of reducing congestion and improving air quality when it was designated as the Santa Clara County's Congestion Management Agency.[72] Currently VTA owns 42.2-mile of light rail line along two major corridors. The first corridor connects the Winchester neighborhood of San Jose with downtown Mountain View, and the second connects two San Jose neighborhoods of Santa Teresa and Alum Rock (see Figure 5).

The Ohlone Chynoweth Station is on the Alum-Rock–Santa Teresa corridor of the VTA light rail (see Figure 5). It connects south and east San Jose with downtown San Jose, and further with the neighboring cities of Campbell, Milpitas, Mountain View, Santa Clara, and Sunnyvale. The station lies at the junction of two major freeways, CA-87 and CA-85. The light rail service to this station began in 1991. Currently, 67 trains on the weekday and 62 on the weekend serve this station at 15-minute intervals.

History of the TOD

Historically the sites for the Ohlone Chynoweth station and the CA-85/87 interchange were owned by Bill Clicker, Sr., however, by the 1980s most of the land was acquired by the California Department of Transportation (Cal Trans) and VTA for the construction of the interchange, the station and the light rail line. Thus by the early 1990s the VTA owned 11.6 acres of land to the west of the station, and Bill Clicker, Sr. owned another 10.5 acres. At the same time, the City of San Jose, through its Housing Initiative, identified Ohlone Chynoweth as promising for the development of high-density housing. In 1995, the City, VTA and the Clickers collaboratively worked on a joint development framework for this area.[73] As a result, the 135 affordable housing-unit Ohlone Court was developed on the Clickers-owned 10.5 acres. By 2001, a 200-car parking lot, and the Ohlone Chynoweth Commons development was built on the 11.6 acre VTA-owned land. Ohlone Chynoweth Commons includes 4,400 square feet of retail and 194 affordable housing units. Both Ohlone Court and Ohlone Chynoweth Commons are award winning projects. By 2002, the Clickers began developing One Pearl Place, a 182-unit market-rate apartment complex to the west of the Ohlone Chenywoth Commons (Transit Towns book). The development was complete by 2003. Thus, the Ohlone Chynoweth TOD consists of three projects—Ohlone Court, Ohlone Chynoweth Commons, and One Pearl Place.

The development of these TOD projects was not without community opposition, which began with the first proposed project: the Ohlone Court Apartments. Furthermore, the 1995 joint development framework did not solicit community input. Nevertheless, it appears that for the most part, the community was satisfied with the project once it was completed.[74] However, community opposition resurfaced when the community found that more high-density affordable housing in the form of Ohlone Chynoweth Commons was being planned in their neighborhood. This time the opposition was more structured with the VEP association representing the surrounding neighborhoods of Vista park, Encore and Parkview, raising concerns about increased traffic congestion, parking problems and negative impact on the local schools (transit towns book). The VEP-led community opposition lasted two years, and at the end the project won the City Council approval even though VEP, the council member representing the district in which the station falls, and the council member representing the adjacent district voted against the project.[75]

A timeline for the station area development and the related planning processes:

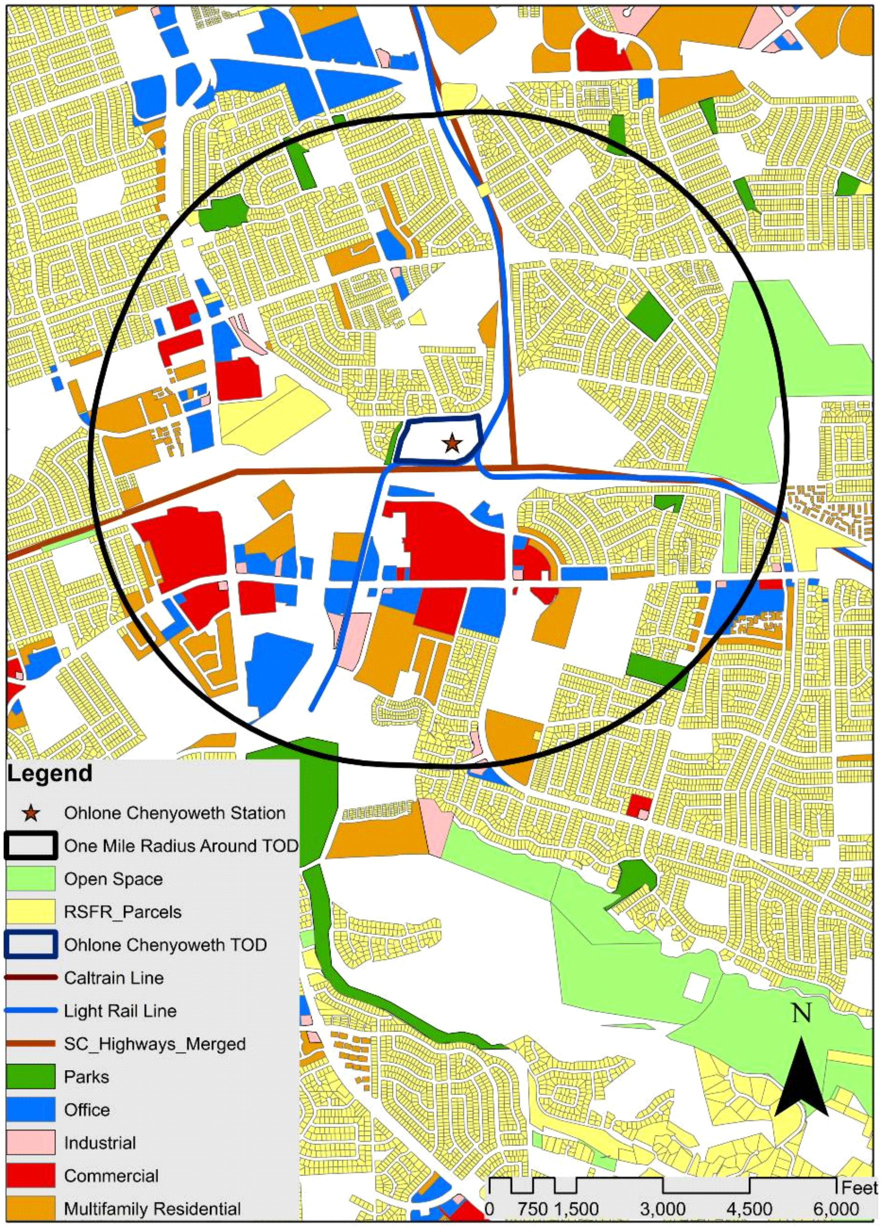
- 1991: Light rail service to this station began.
- 1995: Joint development framework for the station area developed.
- 1996: Construction of the Ohlone Court Apartments began.
- 1997: Construction of the Ohlone Court Apartments ended.
- 1998-2000: Community opposition to the proposed Ohlone Chynoweth Commons.
- 2000: Construction of the Ohlone Chynoweth Commons began.
- 2001: Construction of the Ohlone Chynoweth Commons ended.
- 2002: Construction of One Pearl Place began.
- 2003: Construction of One Peal Place ended.

For the purposes of estimating the impact of the TOD on the surrounding property values, the TOD timeline is divided into three periods: the 1991–1995 period after the station went into service but before the construction of the TOD began, the 1996–2003 period of the TOD construction, and the 2003–2006 post-TOD period. The time period stops at the year 2006, as the dataset available for estimating the regression models is incomplete thereafter.

Source: *Light Rail: Ohlone/Chynoweth – Almaden*,

http://www.vta.org/schedules/SC_900.html (accessed 06/26/2008)

Figure 5 VTA Light Rail Map



Source: DataQuick; Santa Clara County Information Services Department; Map created by the Study Team

Figure 6 Ohlone Chenyoweth TOD Map

BAY MEADOWS TOD, SAN MATEO

Location

The Bay Meadows TOD is located in the city of San Mateo, approximately 20 miles south of San Francisco, and 30 miles north of San Jose. San Mateo has been a suburb of San Francisco since the late 1700s, the days of the Missions, when it was an outpost or *asistencia* to Mission Dolores in San Francisco. This outpost was surrounded by fertile farmland which provided food and supplies to San Francisco. Since the beginning of the

Gold Rush in 1849, a stagecoach stop was established at this outpost, a midway resting place along the popular route between San Francisco and San Jose.[76]

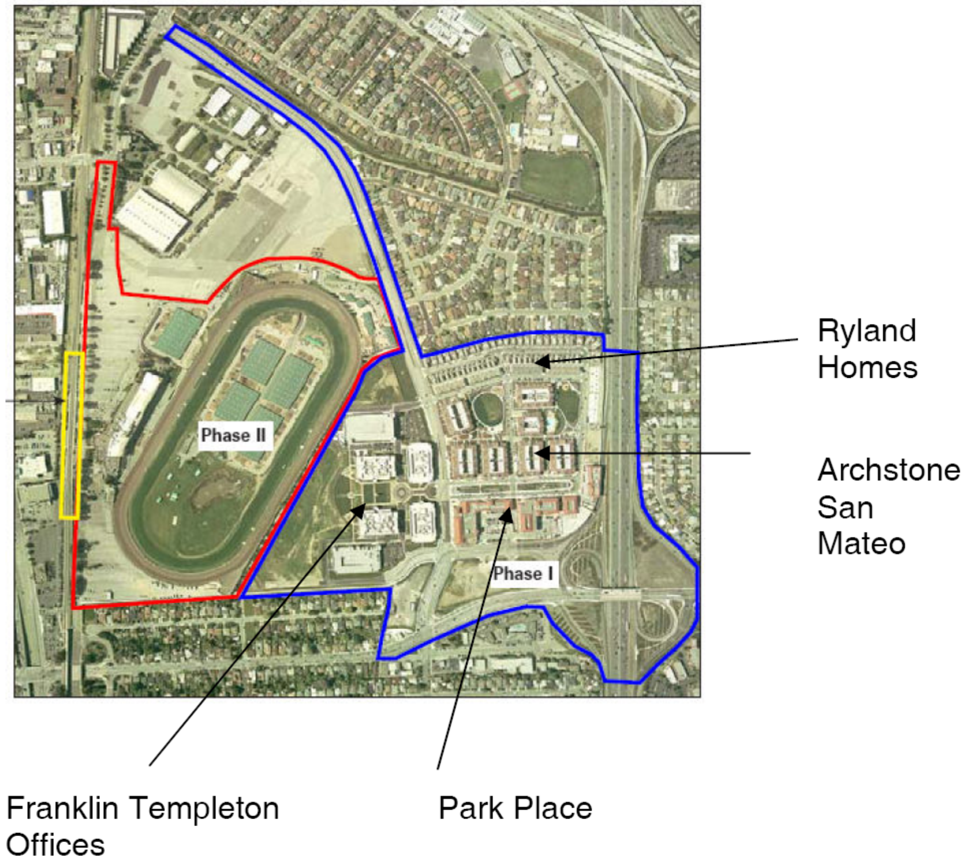
In 1860, voters in San Francisco, San Mateo and Santa Clara Counties passed bond measures for over $2 million to fund a railroad line between the two cities. The stagecoach stop became a whistle stop along the Southern Pacific Railroad.[77] This train station became the heart of the business district of the City of San Mateo, and continues as such today. Commuter rail service on the Caltrain system operates over 70 daily weekday northbound and southbound trains. Thirty-seven northbound and 37 southbound trains stop at the Downtown San Mateo train station Monday to Friday. In the mornings, three trains are express trains, or Baby Bullet trains, to San Francisco.

Today, the Downtown Core at Third Street in San Mateo is a bustling shopping district with restaurants, retail and entertainment. But this district is not the site designated for higher density transit-oriented development. The focus of this study is the high-density development on the Bay Meadows site described in the 2005 San Mateo Rail Corridor Transit-Oriented Development Plan and the 2005 Bay Meadows Specific Plan Amendment.

Redevelopment related to Bay Meadows is being planned around the Hillsdale Caltrain station. This train station is 2.5 miles from the Downtown San Mateo train station. Hillsdale Station has two more trains in each direction than San Mateo, 39 northbound and 39 southbound, Monday to Friday. Hillsdale has three northbound Baby Bullet trains. Plans in the Bay Meadows Specific Plan Amendment call for the Hillsdale Station to be moved a few hundred feet north to be better aligned with the new development which will occur at the Phase II site (see Figure 7).

History of the TOD

The original Bay Meadows Specific Plan—developed in 1995 and approved in 1997—described development for approximately 170 acres between El Camino Real and Highway 101 in two phases (see Figure 7). It was during this period that the public became aware of the development and community opposition was strongest. The Fiesta Garden area, a 1950's single-family community immediately to the north of the TOD, wanted no connectivity to the new development. The community feared increased pass-through traffic. They also wanted a sound wall separating them from the new development. The wall was built and today separates this single-family community from the new TOD. Today many of the original homeowners are gone, and the new homeowners complain about the lack of connectivity.[78]



Source: 2005 Bay Meadows Specific Plan Amendment

Figure 7 Major Developments in the Bay Meadows TOD

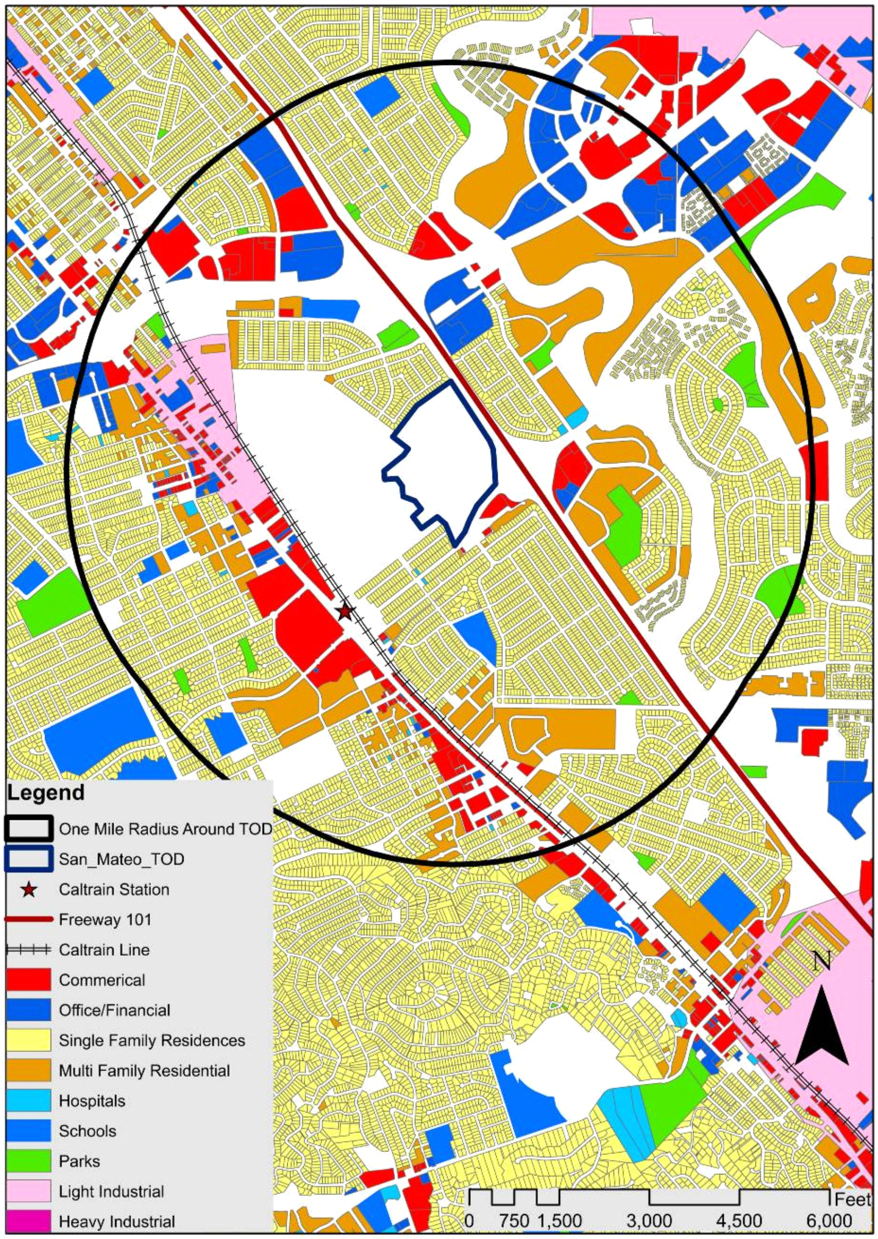
Phase I is a 75-acre Redevelopment Area which includes four major developments: a) the 560,000 square feet Franklin Templeton Office Complex completed in 2001;[79] b) the Archstone San Mateo, a 575-unit apartment complex (formerly called Jefferson at Bay Meadows) completed in 2003; c) Ryland Homes, a 154 single-family and town homes development built during the period 2000–2001 (as per San Mateo County Assessors data); and d) Park Place, a 300,000 square feet award winning mixed-use development containing grocery store, gymnasium, offices, condominiums, park and library (source: http://www.baymeadowslandcompany.com/Aerials/) completed in 2003. In all, a new mixed-use neighborhood has been developed here such that retail services and job opportunities are within walking distance of the new residential developments. Phase I was built during the period from 1999 to 2003 and is the focus of this study.

The 83.34-acre Phase II portion of the TOD project will be built on the parcel where the Bay Meadows Horse Race Track currently stands. The original 1997 Bay Meadows Specific Plan did not propose a new development here but the 2005 plan amendment established that the Main Track area, like Phase I, would be redeveloped as a mixed-use site. In spite of strong community opposition to the cultural and economic loss of the historic race track, plans have been approved to close the race track after the 2008 season.

A timeline for the station area development and the related planning processes:

- 1860s: Rail service begins
- 1995: Preparation of the Bay Meadows Specific Plan begins. The Plan identifies development on the TOD site.
- 1997: Bay Meadows Specific Plan approved.
- 1999: Franklin Templeton Office Complex construction begins.
- 2003: Almost all major developments constructed on the TOD site.

For the purposes of estimating the impact of the TOD on the surrounding property values, the TOD timeline is divided into the following three periods: the 1995–1998 period when the Bay Meadows Specific Plan was developed and approved and before the actual construction began (also the period of strong community opposition to the proposed TOD), the 1999–2003 period of the TOD construction, and the 2004–2006 post-TOD period. The study time periods stop at the year 2006, as the dataset available for estimating the regression models is incomplete thereafter.



Source: CD-DATA; Map created by the Study Team

Figure 8 Bay Meadows TOD Vicinity Map

RESEARCH METHOD, MODEL STRUCTURE AND DATA DESCRIPTION

RESEARCH METHOD

Previous studies estimate the effect of proximity to transit lines or stations on property values,[80,81,82,83,84,85,86,87,88] but they do not specifically measure the effect of the TOD on residential property values. Cervero, Ferrell and Murphy[89] note that "while there is substantial literature on how proximity to transit influences land values, no studies could be located that gauged real estate benefits associated with TODs themselves." This study is intended to fill this major gap in TOD research.

The estimation of the effect of various factors on housing prices has long been theoretically and empirically discussed within a hedonic analysis framework pioneered by Rosen.[89] In this analysis, the price of the house is the sum of the implicit prices of the components of the bundle of housing services rendered by a housing unit. Thus the price of a house depends upon several factors. They include: a) structural attributes of the house (square feet of living space, lot size, number of bedrooms, number of bathrooms, etc.); b) locational attributes of the house (transportation accessibility, traffic noise, air quality, proximity to the TOD, etc.; c) quality of the neighborhood and the jurisdiction; and d) regional and national demand and supply of housing.

This study empirically estimates the impact of four suburban TODs—Ohlone Chnyoweth, Pleasant Hill, Downtown Hayward and Bay Meadows—on residential single-family property values using the hedonic regression method. The hedonic regression method, controlling for other factors, "teases out" the effect of the TOD on housing prices.

The empirical model is of the form:

$$P_i = f(S_i, L_i, J_k)$$

where:

P_i is the selling price of the i^{th} house.

S_i is a vector of structural attributes of the i^{th} house.

L_i is a vector of locational attributes of the i^{th} house, including proximity to TOD.

J_k is a vector of jurisdictional / regional attributes.

MODEL STRUCTURE

Since the study TOD sites are dispersed throughout the San Francisco Bay Area, a separate set of hedonic regression models are run for each TOD and its surrounding neighborhood. Furthermore, it is assumed that the impact of the TOD would be most strongly felt within one-half mile of the TOD. Hence each set of models are further divided into two sub-models. The first sub-model estimates the effect of the TOD within zero to one-half mile of the TOD, and the second sub-model estimates the effect of the TOD within one-half to one mile of the TOD. The second distance band of one-half to one mile also serves as a control group, as it can be safely assumed that in a typical single-family suburban environment the housing market is not likely to change within such a short distance. Moreover, other neighborhood and locational effects such as race/ethnicity and income distribution are not likely to differ significantly between the two distance bands. This study hypothesizes that if the TOD positively impacts the surrounding single-family homes, the effects should be reflected in the increase in home sale prices in the zero to one-half mile distance bands, and not in the one-half to one mile distance bands. Furthermore, we hypothesize that if the TODs have a positive influence on single-family home values, sale prices within the zero to one-half mile distance band, controlling for other factors, should increase as the proximity to the TOD increases.

The models are further sub-divided based upon the sale year. The time periods were arrived based upon the policy- and development-related history of the TOD. For example, three time periods are identified in the case of Ohlone Chynoweth TOD. The first time period is 1991–1995. During this time period one part of the TOD site was an under-utilized parking lot and the other part was a vacant lot. Hence we hypothesize that the TOD site would either have no effect or would have negative effect on the surrounding homes. The second time period is 1996–2003. During this time the TOD was under construction, and there was substantial opposition to the project in the surrounding community. Therefore, we hypothesize that proximity to the TOD site would decrease home sale prices during this period. The last time period is 2004–2006. During this post-TOD period we hypothesize that the generally positive public perception of this TOD would have translated into a positive impact on the surrounding community. Thus, during this period the home sale prices should increase as proximity to the TOD increases.

In summary, six separate hedonic regression models are run for the Ohlone Chynoweth TOD. These six models are grouped into three groups of two models each (see Figure 9). The first group consists of two models, Model 1.1 and Model 1.2. Model 1.1 includes data for those homes that were sold during the period 1991–1995 and are within zero to one-half mile of the TOD. Model 1.2 includes data for those homes that were sold during the period 1991–1995 and are within one-half to one mile of the TOD. The second group consists of two models, Model 2.1 and Model 2.2. Model 2.1 includes data for those homes that were sold during the period 1996–2003 and are within zero to one-half mile of the TOD. Model 2.2 includes data for those homes that were sold during the period 1996–2003 and are within one-half to one mile of the TOD. The third group consists of two models, Model 3.1 and Model 3.2. Model 3.1 includes data for those homes that were sold during the period 2004–2006 and are within zero to one-half mile of the TOD. Model 3.2 includes data for those homes that were sold during the period 2004–2006 and are within one-half to one mile of the TOD.

Similarly, four models each are estimated for the Pleasant Hill TOD and Downtown Hayward TOD, and six models are estimated for the Bay Meadows TOD.

OHLONE CHENYOWEITH TOD	**Model 1.1** 1991–1995 0–0.5 mile of TOD N = 39	**Model 2.1** 1996–2003 0–0.5 mile of TOD N = 159	**Model 3.1** 2004–2006 0–0.5 mile of TOD N = 83
	Model 1.2 1991–1995 0.5–1 mile of TOD N = 91	**Model 2.2** 1996–2003 0.5–1 mile of TOD N = 260	**Model 3.2** 2004–2006 0.5–1 mile of TOD N - 143
PLEASANT HILL TOD	**Model 1.1** 1996–2001 0–0.5 mile of TOD N = 387	**Model 2.1** 2002–2006 0–0.5 mile of TOD N = 422	
	Model 1.2 1996–2001 0.5–1 mile of TOD N = 673	**Model 2.2** 2002–2006 0.5–1 mile of TOD N = 756	
DOWNTOWN HAYWARD TOD	**Model 1.1** 1991–2000 0–0.5 mile of TOD N = 229	**Model 2.1** 2001–2006 0–0.5 mile of TOD N = 300	
	Model 1.2 1991–2000 0.5–1 mile of TOD N = 537	**Model 2.2** 2001–2006 0,5–1 mile of TOD N = 637	
BAY MEADOWS TOD	**Model 1.1** 1995–1998 0–0.5 mile of TOD N = 83	**Model 2.1** 1999–2003 0–0.5 mile of TOD N = 146	**Model 3.1** 2004–2006 0–0.5 mile of TOD N = 109
	Model 1.2 1995–1998 0.5–1 mile of TOD N = 279	**Model 2.2** 1999–2003 0.5–1 mile of TOD N = 476	**Model 3.2** 2004–2006 0.5–1 mile of TOD N = 425

Figure 9 Model Structure

DATA DESCRIPTION

This section describes the data gathering process, outlines the major decisions made during the data cleaning process, and describes the resulting dataset by providing descriptive statistics (minimum, maximum, mean and standard deviation) for the continuous variables and frequency distributions for the categorical variables used in the final models. The entire data gathering, cleaning and description process is described in the four sub-sections below, with each sub-section focusing on one TOD.

Data Gathering Process

The primary dataset is the single-family parcel and building characteristics data recorded by the County Assessors Office. Since the four case study TODs are in four different counties—Ohlone Chynoweth TOD in Santa Clara County, Pleasant Hill TOD in Contra Costa County, Bay Meadows TOD in San Mateo County and Downtown Hayward TOD in Alameda County—data had to be collected for these four counties. For all the four counties, the County Assessor's Office did not have the data in a readily usable form. Hence for three counties—Contra Costa, San Mateo and Alameda—the data was obtained from a private vendor, CD-DATA. For the Santa Clara County it was obtained from DataQuick. For the first three counties data was obtained for the entire county. For the Santa Clara County, due to the extremely high cost of data, the data was requested for single-family homes within the four-mile radius of the Ohlone Chynoweth TOD.

For all the four counties the data included single-family home characteristics such as the number of bedrooms, the number of bathrooms, the square footage of the Total Living Space, lot size, the most recent sale date, the year of construction and the APN number. The APN number is the unique parcel identifier. In this case the APN number was used to join the home characteristics dataset with a Geographical Information System (GIS) file. The GIS file contained the single-family residential parcel centroids along with the associated APN numbers. Additional spatial data was joined to this dataset using the ArcGIS software. This data included neighborhood-level characteristics such as the percentage of White households, the change in median income between 1990 and 2000, and the change in population between 1990 and 2000. This data was collected at the census block group level. Further, GIS was used to measure distance of each single-family home to the TOD, the rail line, the station, the nearest bus stop, major nearby arterial and collector streets and freeways, and various land uses such as industrial, office, parks, commercial and multi-family residential. Finally, data was collected to account for other factors that can impact home sale prices. These factors include the season of sale (winter, spring, summer and fall), the year of sale, and mortgage rates at the time of sale.

Data Cleaning Process

Once the dataset was put together using the steps identified in the above section, it was cleaned to ensure that the model results are not biased due to data inaccuracies and the presence of outliers. The following steps were taken to clean the data. Only those observations were included in the dataset where the homes had between one and six bathrooms and one and six bedrooms, and were sold after the year 1990. To make a fair comparison between the homes sold at different time periods, the sale price of the house was normalized using the non-housing Consumer Price Index (CPI) for the San Francisco-Oakland-San Jose Area. The data was obtained from the U.S. Department of Labor, Bureau of Labor Statistics. Further, to remove the effect of outliers, homes in the bottom and top one percentile for lot size, and square footage of the Total Living Space were removed. Further, for the Bay Meadows TOD homes in the top and bottom one percentile for the sale price were removed; for the Pleasant Hill TOD homes with sale prices outside of one standard deviation from the mean sale price were removed; and for the Ohlone Chynoweth TOD and the Downtown Hayward TOD homes with sale prices outside of two standard deviations from the mean sale price were removed from the dataset.

Data Description - Ohlone Chynoweth TOD

Tables 3 through 14 provide descriptive statistics for the continuous variables, and frequency distribution of the categorical-level data for the six Ohlone Chynoweth TOD models.

Tables 3 and 4, respectively, provide the descriptive statistics and frequency distributions for the Model 1.1. The average sale price of the house is $316,320 in 2006 constant dollar terms. The average square footage of the Total Living Space and the average lot size are 1,809 square feet and 6,271 square feet, respectively. The average age of the house is 36 years. The dataset for Model 1.1 contains 39 observations.

Table 3 Descriptive Statistics for Continuous Variables for Model 1.1: Ohlone Chynoweth TOD; 1991-1995; 0-0.5 mile of the TOD

	Descriptive Statistics			
	Minimum	**Maximum**	**Mean**	**Standard Deviation**
Sale Price in 2006 Dollars ($)	$235,154	$419,501	$316,320	$41,712
Age of the House (years)	30	43	36	3
Total Living Space (sq feet)	1,056	2,380	1,809	393
Lot Size (sq feet)	3,280	11,610	6,271	1,546
Number of Bathrooms	1.50	2.50	2.23	0.28
Number of Bedrooms	2.00	5.00	3.90	0.85
Change in Median Income of the Census Block Group from 1990 to 2000 ($)	$9,321	$35,929	$23,648	$13,438
Distance to the TOD (feet)	287	2,563	1,406	695
Distance to the LRT line (feet)	405	2,970	1,681	712
Distance to the LRT station (feet)	703	3,050	2,004	604
Distance to the nearest Office (feet)	161	1,774	1,164	440
Mortgage Rates (%)	6.83%	9.47%	8.25%	0.68%
N=39				

Table 4 Frequency Distribution of Categorical-level Variables for Model 1.1: Ohlone Chynoweth TOD; 1991-1995; 0-0.5 mile of the TOD

Winter	4
Spring	12
Fall	10
Summer	13
1991	6
1992	11
1993	5
1994	9
1995	8
N=39	

Tables 5 and 6, respectively, provide the descriptive statistics and frequency distributions for the Model 1.2. The average sale price of the house is $326,969, very similar to the average sale price of $316,320 for Model 1.1. The average square footage of the Total Living Space and the average lot size are 1,716 square feet and 6,574 square feet, respectively. The average age of the house is 35 years. The dataset for Model 1.2 contains 92 observations

Table 5 Descriptive Statistics for Continuous Variables for Model 1.2: Ohlone Chynoweth TOD; 1991-1995; 0.5-1 mile of the TOD

	Descriptive Statistics			
	Minimum	**Maximum**	**Mean**	**Standard Deviation**
Sale Price in 2006 Dollars ($)	$238,090	$441,432	$328,969	$42,904
Age of the House (years)	23	43	35	5
Total Living Space (sq feet)	1,188	2,413	1,716	271
Lot Size (sq feet)	4,400	14,500	6,574	1,236
Number of Bathrooms	2.00	3.50	2.21	0.32
Number of Bedrooms	2.00	6.00	3.64	0.69
Percent White Households (%)	63.78%	79.17%	72.14%	6.49%
Change in Median Income of the Census Block Group from 1990 to 2000 ($)	$11,304	$39,981	$25,226	$8,016
Change in Population of the Census Block Group from 1990 to 2000	-121	55	-49	41
Distance to the TOD (feet)	2,732	5,270	4,102	690
Distance to the LRT line (feet)	522	5,210	2,790	1,404
Distance to the LRT station (feet)	573	5,377	3,078	1,286
Distance to Almaden/Vine Street (feet)	217	4,724	2,341	1,291
Distance to Branham Street (feet)	78	2,398	1,088	639
Distance to Capitol Expressway/Hillsdale Blvd (feet)	951	6,600	2,843	1,046
Distance to Freeway CA-85 (feet)	522	5,964	4,159	984
Distance to the nearest Office (feet)	99	1,669	909	397
Distance to the nearest Park (feet)	97	4,479	1,131	818
Distance to the nearest Bus Stop (feet)	56	2,302	1,014	486
Distance to the nearest Industrial Parcel (feet)	297	2,308	1,372	434
Distance to the nearest Multi Family Parcel (feet)	50	1,519	730	358
Distance to the nearest Commercial Parcel (feet)	289	3,985	2,244	1,136
Mortgage Rates (%)	6.83%	9.62%	8.14%	0.80%
N = 92				

Table 6 Frequency Distribution of Categorical-level Variables for Model 1.2: Ohlone Chynoweth TOD; 1991-1995; 0.5-1 mile of the TOD

Winter	16
Spring	27
Fall	26
Summer	23
1991	17
1992	14
1993	24
1994	20
1995	17
N=92	

Table 7 Descriptive Statistics for Continuous Variables for Model 2.1: Ohlone Chynoweth TOD; 1996-2003; 0-0.5 mile of the TOD

	Descriptive Statistics			
	Minimum	**Maximum**	**Mean**	**Standard Deviation**
Sale Price in 2006 Dollars ($)	$143,101	$737,409	$458,401	$132,644
Age of the House (years)	7	43	29	12
Total Living Space (sq feet)	1,056	2,629	1,736	393
Lot size (sq feet)	3,049	10,735	5,540	1,912
Number of Bathrooms	1.50	3.50	2.23	0.37
Number of Bedrooms	2.00	6.00	3.62	0.91
Percent White Households (%)	0.56	0.73	0.62	0.08
Change in Median Income of the Census Block Group from 1990 to 2000 ($)	$9,321	$35,929	$18,800	$12,782
Change in Population of The Census Block Group from 1990 To 2000	55	738	495	328
Distance to the TOD (feet)	158	2,625	1,644	784
Distance to the LRT line (feet)	231	3,145	1,820	768
Distance to the LRT Station (feet)	503	3,291	2,113	587
Distance to Almaden/Vine Street (feet)	1,330	4,822	2,956	804
Distance to Branham Street (feet)	117	3,158	1,202	824
Distance to Capitol Expressway/Hillsdale Blvd (feet)	3,355	6,634	4,661	781
Distance to Freeway CA-85 (feet)	234	3,462	2,235	799
Distance to the nearest Office (feet)	42	1,891	1,002	521
Distance to the nearest Park (feet)	48	2,401	1,576	572
Distance to the nearest Bus Stop (feet)	133	1,565	743	347
Distance to the nearest Industrial Parcel (feet)($)	67	2,609	1,199	713
Distance to the nearest Multi Family Parcel (feet)	52	1,823	625	422
Distance to the nearest Commercial Parcel (feet)	513	3,197	1,944	556
Mortage Rates (%)	5.23 %	8.52 %	7.10 %	0.84 %
N=160				

Table 8 Frequency Distribution of Categorical-level Variables for Model 2.1: Ohlone Chynoweth TOD; 1996-2003; 0-0.5 mile of the TOD

Winter	31
Spring	46
Fall	60
Summer	23
1996	19
1997	9
1998	22
1999	31
2000	17
2001	13
2002	19
2003	30
N=160	

Tables 7 and 8, respectively, provide the descriptive statistics and frequency distributions for the Model 2.1. The average sale price of the house is $458,401 in 2006 constant dollar terms. The average square footage of the Total Living Space and the average lot size are 1,736 square feet and 5,540 square feet, respectively. The average age of the house is 29 years. The dataset for Model 2.1 contains 160 observations.

Tables 9 and 10, respectively, provide the descriptive statistics and frequency distributions for the Model 2.2. The average sale price of the house is $488,968, very similar to the average sale price of $458,401 for Model 2.1. The average square footage of the Total Living Space and the average lot size are 1,750 square feet and 6,320 square feet, respectively. The average age of the house is 35 years. The dataset for Model 2.2 contains 261 observations.

Table 9 Descriptive Statistics for Continuous Variables for Model 2.2: Ohlone Chynoweth TOD; 1996-2003; 0.5-1 mile of the TOD

	Descriptive Statistics			
	Minimum	**Maximum**	**Mean**	**Standard Deviation**
Sale Price in 2006 Dollars ($)	$176,818	$738,491	$488,968	$119,020
Age of the House (years)	7	43	35	7
Total Living Space (sq feet)	1,188	2,728	1,750	30
Lot Size (sq feet)	3,484	11,305	6,319	832
Number of Bathrooms	2.00	3.00	2.22	0.29
Number of Bedrooms	2.00	5.00	3.62	0.65
Percent White Households (%)	56.01%	80.42%	71.84%	6.88%
Change in Median Income of the Census Block Group from 1990 to 2000 ($)	$9,321	$40,628	$25,314	$8,854
Change in Population of the Census Block Group from 1990 to 2000	-121	738	-30	123
Distance to the TOD (feet)	2,641	5,280	4,213	780
Distance to the LRT line (feet)	150	5,431	2,790	1,505
Distance to the LRT Station (feet)	256	5,514	3,043	1,395
Distance to Almaden/Vine Street (feet)	122	5,075	2,371	1,354
Distance to Branham Street (feet)	67	2,617	1,184	736
Distance to Capitol Expressway/Hillsdale Blvd (feet)	867	7,052	2,832	1,203
Distance to Freeway CA-85 (feet)	68	5,993	4,166	1,152
Distance to the nearest Office (feet)	102	1,617	861	342
Distance to the nearest Park (feet)	31	4,603	1,232	944
Distance to the nearest Bus Stop (feet)	47	2,369	1,044	557
Distance to the nearest Industrial Parcel (feet)	151	2,647	1,417	537
Distance to the nearest Multi Family Parcel (feet)	33	1,904	778	437
Distance to the nearest Commercial Parcel (feet)	87	3,937	2,238	1,156
Mortgage Rates (%)	5.23%	8.52%	7.09%	0.79%
N = 261				

Table 10 Frequency Distribution of Categorical-level Variables for Model 2.2: Ohlone Chynoweth TOD; 1996-2003; 0.5-1 mile of the TOD

Winter	55
Spring	68
Fall	67
Summer	71
1996	24
1997	24
1998	34
1999	41
2000	32
2001	25
2002	39
2003	42
N=261	

Table 11 Descriptive Statistics for Continuous Variables for Model 3.1: Ohlone Chynoweth TOD; 2004-2006; 0-0.5 mile of the TOD

	Descriptive Statistics			
	Minimum	Maximum	Mean	Standard Deviation
Sale Price in 2006 Dollars ($)	$267,885	$851,418	$664,478	$108,761
Age of the House (years)	7	43	31	10
Total Living Space (sq feet)	1,056	2,377	1,747	379
Lot Size (sq feet)	3,049	10,019	5,462	1,827
Number of Bathrooms	1.50	3.50	2.22	0.38
Number of Bedrooms	2.00	6.00	3.53	0.89
Percent Asian Households (%)	10.69%	17.19%	15.39%	2.92%
Change in Median Income of the Census Block Group from 1990 to 2000 ($)	$9,321	$35,929	$16,694	$11,981
Change in Population of the Census Block Group from 1990 to 2000	55	738	549	308
Distance to the TOD (feet)	151	2,627	1,624	825
Distance to the LRT line (feet)	289	2,923	1,867	697
Distance to the LRT Station (feet)	740	3,088	2,105	591
Distance to Almaden/Vine Street (feet)	1,153	4,783	2,878	755
Distance to Branham Street (feet)	122	2,880	1,231	830
Distance to Freeway CA-85 (feet)	453	3,472	2,198	804
Distance to the nearest Office (feet)	39	1,912	980	490
Distance to the nearest Park (feet)	280	2,420	1,548	664
Distance to the nearest Bus Stop (feet)	93	1,564	690	355
Distance to the nearest Industrial Parcel (feet)	68	2,588	1,172	719
Distance to the nearest Multi Family Parcel (feet)	66	1,685	691	481
Distance to the nearest Commercial Parcel (feet)	414	3,318	1,893	616
Mortgage Rates (%)	5.45%	6.68%	5.95%	0.30%
N = 83				

Table 12 Frequency Distribution of Categorical-level Variables for Model 3.1: Ohlone Chynoweth TOD; 2004-2006; 0-0.5 mile of the TOD

Winter	24
Spring	17
Fall	16
Summer	26
2004	29
2005	39
2006	15
N=83	

Tables 11 and 12, respectively, provide the descriptive statistics and frequency distributions for the Model 3.1. The average sale price of the house is $664,478 in 2006 constant dollar terms. The average square footage of the Total Living Space and the average lot size are 1,747 square feet and 5,462 square feet, respectively. The average age of the house is 31 years. The dataset for Model 3.1 contains 83 observations.

Tables 13 and 14, respectively, provide the descriptive statistics and frequency distributions for the Model 3.2. The average sale price of the house is $690,689, very similar to the average sale price of $664,478 for Model 3.1. The average square footage of the Total Living Space and the average lot size are 1,687 square feet and 6,336 square feet, respectively. The average age of the house is 36 years. The dataset for Model 3.2 contains 144 observations.

Table 13 Descriptive Statistics for Continuous Variables for Model 3.2: Ohlone Chynoweth TOD; 2004-2006; 0.5-1 mile of the TOD

	Descriptive Statistics			
	Minimum	Maximum	Mean	Standard Deviation
Sale Price in 2006 Dollars ($)	$539,102	$872,184	$690,689	$75,269
Age of the House (years)	7	43	36	6
Total Living Space (sq feet)	1,080	2,560	1,687	296
Lot Size (sq feet)	3,485	9,600	6,336	820
Number of Bathrooms	1.00	3.00	2.16	0.30
Number of Bedrooms	3.00	5.00	3.59	0.67
Percent Asian Households (%)	7.32%	17.19%	11.90%	1.81%
Change in Median Income of the Census Block Group from 1990 to 2000 ($)	$9,321	$40,628	$25,495	$8,522
Change in Population of the Census Block Group from 1990 to 2000	-121	738	-29	118
Distance to the TOD (feet)	2654	5278	4097	782
Distance to the LRT line (feet)	169	5369	2834	1421
Distance to the LRT Station (feet)	175	5520	3086	1318
Distance to Almaden/Vine Street (feet)	138	5047	2371	1253
Distance to Branham Street (feet)	83	2617	1120	710
Distance to Freeway CA-85 (feet)	66	6107	3999	1228
Distance to the nearest Office (feet)	125	1637	912	377
Distance to the nearest Park (feet)	89	4613	1303	1026
Distance to the nearest Bus Stop (feet)	91	2280	1026	562
Distance to the nearest Industrial Parcel (feet)	241	2491	1387	525
Distance to the nearest Multi Family Parcel (feet)	25	1843	707	432
Distance to the nearest Commercial Parcel (feet)	141	3810	2200	1109
Mortgage Rates (%)	5.45%	6.76%	6.02%	0.35%
N = 144				

Table 14 Frequency Distribution of Categorical-level Variables for Model 3.2: Ohlone Chynoweth TOD; 2004-2006; 0.5-1 mile of the TOD

Winter	22
Spring	42
Fall	31
Summer	49
2004	58
2005	50
2006	36
N=144	

Data Description – Pleasant Hill TOD

Tables 15 through 22 provide descriptive statistics of the continuous variables, and frequency distribution of the categorical-level data for the four Pleasant Hill TOD models.

Tables 15 and 16, respectively, provide the descriptive statistics and frequency distributions for the Model 1.1. The average sale price of the house is $371,484 in 2006 constant dollar terms. The average square footage of the Total Living Space and the average lot size are 1,743 square feet and 10,214 square feet, respectively. The average age of the house is 43 years. The dataset for Model 1.1 contains 388 observations.

Table 15 Descriptive Statistics for Continuous Variables for Model 1.1: Pleasant Hill TOD; 1996-2001; 0-0.5 mile of the TOD

	Descriptive Statistics			
	Minimum	**Maximum**	**Mean**	**Standard Deviation**
Sale Price in 2006 Dollars ($)	$242,493	$536,768	$371,484	$75,626
Age of the House (years)	7	126	43	18
Total Living Space (sq feet)	801	4,197	1,743	499
Lot Size (sq feet)	2,625	35,284	10,214	4,798
Number of Bathrooms	1.00	5.00	1.96	0.61
Number of Bedrooms	1.00	6.00	3.41	0.74
Percent White Households (%)	57.59%	89.57%	78.03%	6.74%
Change in Median Income of the Census Block Group from 1990 to 2000 ($)	$15,363	$33,952	$22,964	$5,635
Change in Population of the Census Block Group from 1990 to 2000	18	1,487	286	365
Distance to the TOD (feet)	46	2,640	1,479	784
Distance to the BART line (feet)	135	5,782	2,431	1,239
Distance to the BART Station (feet)	1,177	6,440	4,193	1,151
Distance to Treat Blvd. and I-680 Junction (feet)	1,285	7,781	4,413	1,672
Distance to I-680 (feet)	271	5,214	2,744	1,196
Distance to the nearest Office/Financial (feet)	46	2,945	1,264	600
Distance to the nearest School (feet)	33	3,169	1,382	798
Distance to the nearest Golf Course (feet)	107	10,156	6,524	2,211
Distance to the nearest Park (feet)	253	6,986	3,642	1,546
Distance to the nearest Urban Center (feet)	3	6,120	3,120	1,412
Distance to the nearest Bus Stop (feet)	81	1,770	768	371
Distance to the nearest Hospital (feet)	146	6,439	3,435	1,615
Distance to the nearest Light Industrial Parcel (feet)	35	4,039	1,780	915
Distance to the nearest Multi Family Parcel (feet)	17	1,139	428	264
Distance to the nearest Commercial Parcel (feet)	80	3,423	1,643	847

N = 388

Table 16 Frequency Distribution of Categorical-level Variables for Model 1.1: Pleasant Hill TOD; 1996-2001; 0-0.5 mile of the TOD

Single family house within 300 feet of a park	1
Single family house within 300 feet of a bus stop	40
Winter	63
Spring	131
Fall	107
Summer	87
1996	39
1997	60
1998	73
1999	94
2000	71
2001	51
Concord	91
County	40
Pleasant Hill	57
Walnut Creek	200
N=388	

Table 17 Descriptive Statistics for Continuous Variables for Model 1.1: Pleasant Hill TOD; 1996-2001; 0-0.5 mile of the TOD

	Descriptive Statistics			
	Minimum	**Maximum**	**Mean**	**Std Deviation**
Sale Price in 2006 Dollars ($)	$228,600	$501,943	$350,392	$71,387
Age of the House (years)	9	96	46	14
Total Living Space (sq feet)	795	4,507	1,696	453
Lot Size (sq feet)	2,523	48,787	10,328	4,759
Number of Bathrooms	1.00	4.00	1.93	0.55
Number of Bedrooms	2.00	6.00	3.33	0.68
Percent White Households (%)	52.48%	93.33%	79.82%	8.16%
Change in Median Income of the Census Block Group from 1990 to 2000 ($)	$5,712	$47,353	$25,314	$10,336
Change in Population of the Census Block Group from 1990 to 2000	-302	662	76	159
Distance to the TOD (feet)	2,650	5,280	4,140	769
Distance to the BART line (feet)	135	8,499	4,269	2,251
Distance to the BART Station (feet)	1,118	9,046	6,357	1,640
Distance to Treat Blvd. and I-680 junction (feet)	3,992	10,423	7,119	1,563
Distance to I-680 (feet)	138	7,872	4,310	1,812
Distance to I-680 and CA-242 junction (feet)	2,538	20,237	11,390	4,891
Distance to the nearest Office/Financial (feet)	64	4,940	1,807	968
Distance to the nearest School (feet)	29	2,972	1,078	581
Distance to the nearest Golf Course (feet)	258	12,000	7,384	2,266
Distance to the nearest park (feet)	46	7,413	3,086	1,680
Distance to the nearest Urban Center (feet)	0	8,843	3,845	2,103
Distance to the nearest Bus Stop (feet)	84	3,110	916	581
Distance to the nearest Hospital (feet)	122	7,964	3,897	1,996
Distance to the nearest Light Industrial Parcel (feet)	124	6,076	2,872	1,160
Distance to the nearest Heavy Industrial Parcel (feet	1,620	9,900	5,727	1,597
Distance to the nearest Multi Family Parcel (feet)	14	1,698	659	393
Distance to the nearest Commercial Parcel (feet)	46	3977	1680	913
N=676				

Table 18 Frequency Distribution of Categorical-level Variables for Model 1.2: Pleasant Hill TOD; 1996-2001; 0.5-1 mile of the TOD

Single family house within 300 feet of a park	9
Single family house within 300 feet of a bus stop	78
Winter	96
Spring	200
Fall	159
Summer	221
1996	91
1997	120
1998	128
1999	157
2000	106
2001	74
Concord	148
County	27
Pleasant Hill	233
Walnut Creek	268
N=676	

Tables 17 and 18, respectively, provide the descriptive statistics and frequency distributions for the Model 1.2. The average sale price of the house is $350,392, very similar to the average sale price of $371,484 for Model 1.1. The average square footage of the Total Living Space and the average lot size are 1,695 square feet and 10,328 square feet, respectively. The average age of the house is 46 years. The dataset for Model 1.2 contains 676 observations.

Tables 19 and 20, respectively, provide the descriptive statistics and frequency distributions for the Model 2.1. The average sale price of the house is $614,400 in 2006 constant dollar terms. The average square footage of the Total Living Space and the average lot size are 1,581 square feet and 9,583 square feet, respectively. The average age of the house is 46 years. The dataset for Model 2.1 contains 432 observations.

Table 19 Descriptive Statistics for Continuous Variables for Model 2.1: Pleasant Hill TOD; 2002-2006; 0-0.5 mile of the TOD

	Descriptive Statistics			
	Minimum	**Maximum**	**Mean**	**Standard Deviation**
Sale Price in 2006 Dollars ($)	$425,511	$840,000	$614,400	$100,437
Age of the House (years)	7	99	46	15
Total Living Space (sq feet)	786	3,233	1,581	413
Lot Size (sq feet)	2,700	43,560	9,583	4,249
Number of Bathrooms	1.00	5.00	1.83	0.59
Number of Bedrooms	2.00	6.00	3.28	0.67
Percent White Households (%)	57.59%	89.57%	78.76%	6.06%
Change in Median Income of the Census Block Group from 1990 to 2000 ($)	$13,951	$33,952	$23,466	$5,414
Change in Population of the Census Block Group from 1990 to 2000	-116	1,487	339	465
Distance to the TOD (feet)	9	2,633	1,492	740
Distance to the BART line (feet)	120	5,895	2,600	1,319
Distance to the BART Station (feet)	1,640	6,313	4,336	1,048
Distance to Treat Blvd. and I-680 junction (feet)	1,278	7,622	4,445	1,602
Distance to I-680 (feet)	273	5,282	2,519	1,167
Distance to I-680 and CA-24 junction (feet)	5,874	18,390	13,461	3,347
Distance to the nearest Office/Financial (feet)	47	2,947	1,214	589
Distance to the nearest School (feet)	37	3,158	1,409	784
Distance to the nearest Golf Course (feet)	712	10,175	7,037	1,923
Distance to the nearest Park (feet)	52	6,973	3,403	1,548
Distance to the nearest Urban Center (feet)	0	6,211	2,820	1,377
Distance to the nearest Bus Stop (feet)	83	1,597	730	354
Distance to the nearest Hospital (feet)	78	6,511	3,319	1,590
Distance to the nearest Light Industrial Parcel (feet)	27	3,954	1,553	904
Distance to the nearest Multi Family Parcel (feet)	22	1,225	459	267
Distance to the nearest Commercial Parcel (feet)	48	3,383	1,468	888
N = 432				

Table 20 Frequency Distribution of Categorical-level Variables for Model 2.1: Pleasant Hill TOD; 2002-2006; 0-0.5 mile of the TOD

Single family house within 300 feet of a park	6
Single family house within 300 feet of a bus stop	48
Winter	81
Spring	134
Fall	102
Summer	115
2002	62
2003	98
2004	102
2005	96
2006	74
Concord	84
County	33
Pleasant Hill	96
Walnut Creek	219
N=432	

Table 21 Descriptive Statistics for Continuous Variables for Model 2.2: Pleasant Hill TOD; 2002-2006; 0.5-1 mile of the TOD

	Descriptive Statistics			
	Minimum	Maximum	Mean	Standard Deviation
Sale Price in 2006 Dollars ($)	$447,934	$807,808	$616,738	$90,107
Age of the House (years)	7	96	48	12
Total Living Space (sq feet)	798	3,559	1,588	420
Lot Size (sq feet)	2,720	49,223	9,975	3,780
Number of Bathrooms	1.00	5.00	1.84	0.57
Number of Bedrooms	1.00	6.00	3.34	0.67
Percent White Households (%)	52.48%	93.33%	79.16%	8.39%
Change in Median Income of the Census Block Group from 1990 to 2000 ($)	$5,712	$47,353	$24,337	$9,838
Change in Population of the Census Block Group from 1990 to 2000	-302	662	83	165
Distance to the TOD (feet)	2,642	5,273	4,155	765
Distance to the BART line (feet)	138	8,535	4,445	2,282
Distance to the BART Station (feet)	1,208	9,049	6,557	1,590
Distance to Treat Blvd. and I-680 junction (feet)	3,934	10,424	7,248	1,620
Distance to I-680 (feet)	172	7,939	4,113	1,917
Distance to I-680 and CA-242 junction (feet)	2,481	20,324	10,524	4,967
Distance to the nearest Office/Financial (feet)	46	4,856	1,716	955
Distance to the nearest School (feet)	29	2,911	1,128	572
Distance to the nearest Golf Course (feet)	497	11,892	7,655	2,179
Distance to the nearest Park (feet)	53	7,566	2,991	1,743
Distance to the nearest Urban Center (feet)	0	8,827	3,699	2,175
Distance to the nearest Bus Stop (feet)	70	3,037	912	565
Distance to the nearest Hospital (feet)	110	7,899	3,810	2,031
Distance to the nearest Light Industrial Parcel (feet)	146	6,191	2,772	1,181
Distance to the nearest Multi Family Parcel (feet)	26	1,731	670	389
Distance to the nearest Commercial Parcel (feet)	38	3,824	1,605	907
N = 759				

Table 22 Frequency Distribution of Categorical-level Variables for Model 2.2: Pleasant Hill TOD; 2002-2006; 0.5-1 mile of the TOD

Single family house within 300 feet of a park	17
Single family house within 300 feet of a bus stop	77
Winter	136
Spring	202
Fall	214
Summer	207
2002	109
2003	151
2004	206
2005	138
2006	155
Concord	161
County	23
Pleasant Hill	303
Walnut Creek	272
N=759	

Tables 21 and 22, respectively, provide the descriptive statistics and frequency distributions for the Model 2.2. The average sale price of the house is $616,738, very similar to the average sale price of $614,400 for Model 2.1. The average square footage of the Total Living Space and the average lot size are 1,588 square feet and 9,975 square feet, respectively. The average age of the house is 48 years. The dataset for Model 2.2 contains 759 observations.

Data Description – Downtown Hayward TOD

Tables 23 through 30 provide descriptive statistics for the continuous variables, and frequency distribution of the categorical-level data for the four Downtown Hayward TOD models.

Tables 23 and 24, respectively, provide the descriptive statistics and frequency distributions for the Model 1.1. The average sale price of the house is $201,401 in 2006 constant dollar terms. The average square footage of the Total Living Space and the average lot size are 1,195 square feet and 6,011 square feet, respectively. The average age of the house is 68 years. The dataset for Model 1.1 contains 230 observations.

Table 23 Descriptive Statistics for Continuous Variables for Model 1.1: Downtown Hayward TOD; 1991-2000; 0-0.5 mile of the TOD

	Descriptive Statistics			
	Minimum	Maximum	Mean	Std Deviation
Sale Price in 2006 Dollars ($)	$101,221	$317,321	$201,401	$41,864
Age of the House (years)	10	121	68	17
Total Living Space (sq feet)	720	2,930	1,195	370
Lot size (sq feet)	2,460	14,300	6,011	1,943
Number of Bathrooms	1.00	5.00	1.21	0.50
Number of Bedrooms	1.00	6.00	2.64	0.71
Percent White Households (%)	0.39	0.61	0.47	0.05
Change in Median Income of the Census Block Group from 1990 to 2000 ($)	$3,809	$26,733	$17,141	$5,750
Change in Population of the Census Block Group from 1990 to 2000	36	733	342	207
Distance to the TOD (feet)	145	2,640	1,656	576
Distance to the BART line (feet)	49	3,681	1,348	783
Distance to the BART Station (feet)	948	4,881	3,010	1,026
Distance to the Hayward Caltrain Station (feet)	1,768	7,707	5,103	1,559
Distance to I-880 (feet)	3,206	9,296	5,730	1,445
Distance to the nearest freeway other than I-880 (feet)	4,000	9,242	6,698	1,104
Distance to the Heavy Rail line (feet)	979	7,272	3,341	1,554
Distance to the nearest Arterial Road (feet)	12	1,629	658	394
Distance to the nearest office/financial (feet)	25	1,809	634	410
Distance to the nearest Park (feet)	23	3,288	1,436	781
Distance to the nearest Bus Stop (feet)	44	1,499	570	281
Distance to the nearest Light Industrial Parcel (feet)	18	1,576	687	347
Distance to the nearest Multi Family Parcel (feet)	12	621	161	123
Distance to the nearest Commercial Parcel (feet)	15	1,367	480	343
Distance to the Mobile Home (feet)	2,742	8,754	5,772	1,579
Mortgage Rates (%)	6.71%	9.64%	7.79%	0.68%
N = 230				

Table 24 Frequency Distribution of Categorical-level Variables for Model 1.1: Downtown Hayward TOD; 1991-2000; 0-0.5 mile of the TOD

Single Family House within 300 feet of a Park	24
Single Family House within 300 feet of a Bus Stop	44
Winter	44
Spring	67
Fall	48
Summer	71
1991	12
1992	12
1993	26
1994	23
1995	16
1996	21
1997	27
1998	33
1999	30
2000	30
N=230	

Table 25 Descriptive Statistics for Continuous Variables for Model 1.2: Downtown Hayward TOD; 1991-2000; 0.5-1 mile of the TOD

	Descriptive Statistics			
	Minimum	**Maximum**	**Mean**	**Standard Deviation**
Sale Price in 2006 Dollars ($)	$107,314	$380,785	$234,804	$55,836
Age of the House (years)	7	116	55	18
Total Living Space (sq feet)	719	3,050	1,316	390
Lot Size (sq feet)	2,720	23,940	6,353	2,399
Number of Bathrooms	1.00	5.00	1.47	0.60
Number of Bedrooms	1.00	6.00	2.83	0.70
Percent White Households (%)	34.04%	69.91%	50.71%	9.10%
Change in Median Income of the Census Block Group from 1990 to 2000 ($)	$3,809	$26,733	$14,781	$5,016
Change in Population of the Census Block Group from 1990 to 2000	93	873	334	182
Distance to the TOD (feet)	2,640	5,279	4,216	729
Distance to the BART line (feet)	78	6,180	2,846	1,605
Distance to the BART Station (feet)	1,695	7,417	4,780	1,348
Distance to the Hayward Caltrain station (feet)	352	10,335	6,230	2,763
Distance to I-880 (feet)	11	11,889	5,632	3,659
Distance to the nearest freeway other than I-880 (feet)	1,182	9,574	4,912	2,014
Distance to the Heavy Rail line (feet)	182	9,798	4,207	3,173
Distance to the nearest Arterial Road (feet)	16	3,456	897	617
Distance to the nearest Office/Financial (feet)	25	3,735	1,180	601
Distance to the nearest Park (feet)	25	3,667	1,136	763
Distance to the nearest Bus Stop (feet)	48	1,609	627	327
Distance to the nearest Light Industrial Parcel (feet)	21	4,109	1,281	768
Distance to the nearest Multi Family Parcel (feet)	20	1,482	348	313
Distance to the nearest Commercial Parcel (feet)	20	3,360	898	564
Mortgage Rates (%)	6.71%	9.64%	7.81%	0.68%
N = 538				

Table 26 Frequency Distribution of Categorical-level Variables for Model 1.2: Downtown Hayward TOD; 1991-2000; 0.5-1 mile of the TOD

Single Family House within 300 feet of a Park	60
Single Family House within 300 feet of a Bus Stop	87
Winter	117
Spring	172
Fall	130
Summer	119
1991	28
1992	39
1993	39
1994	36
1995	46
1996	67
1997	76
1998	60
1999	72
2000	75
N=538	

Tables 25 and 26, respectively, provide the descriptive statistics and frequency distributions for the Model 1.2. The average sale price of the house is $234,804, very similar to the average sale price of $201,401 for Model 1.1. The average square footage of the Total Living Space and the average lot size are 1,316 square feet and 6,353 square feet, respectively. The average age of the house is 55 years. The dataset for Model 1.2 contains 538 observations.

Tables 27 and 28, respectively, provide the descriptive statistics and frequency distributions for the Model 2.1. The average sale price of the house is $436,696 in 2006 constant dollar terms. The average square footage of the Total Living Space and the average lot size are 1,206 square feet and 5,896 square feet, respectively. The average age of the house is 65 years. The dataset for Model 2.1 contains 301 observations.

Table 27 Descriptive Statistics for Continuous Variables for Model 2.1: Downtown Hayward TOD; 2001-2006; 0-0.5 mile of the TOD

	Descriptive Statistics			
	Minimum	**Maximum**	**Mean**	**Standard Deviation**
Sale Price in 2006 Dollars ($)	$170,000	$674,904	$436,696	$114,105
Age of the House (years)	8	111	65	15
Total Living Space (sq feet)	720	3,049	1,206	350
Lot Size (sq feet)	2,300	16,500	5,896	1,815
Number of Bathrooms	1.00	3.00	1.21	0.44
Number of Bedrooms	1.00	6.00	2.68	0.69
Percent White Households (%)	0.39	0.61	0.47	0.05
Change in Median Income of the Census Block Group from 1990 to 2000 ($)	$3,809	$26,733	$16,664	$6,108
Change in Population of the Census Block Group from 1990 to 2000	36	733	339	210
Distance to the TOD (feet)	117	2,637	1,687	626
Distance to the BART line (feet)	50	3,452	1,339	782
Distance to the BART station (feet)	964	4,868	3,060	1,014
Distance to the Hayward Caltrain station (feet)	1,147	7,687	5,089	1,626
Distance to I-880 (feet)	2,776	9,240	5,686	1,493
Distance to the nearest freeway other than I-880 (feet)	4,019	9,275	6,819	1,135
Distance to the Heavy Rail line (feet)	953	7,130	3,255	1,535
Distance to the nearest Arterial Road (feet)	48	1,620	634	392
Distance to the nearest Office/Financial (feet)	24	1,767	620	407
Distance to the nearest Park (feet)	32	3,225	1,342	799
Distance to the nearest Bus Stop (feet)	71	1,420	576	286
Distance to the nearest Light Industrial Parcel (feet)	25	1,611	693	351
Distance to the nearest Multi Family Parcel (feet)	7	567	150	111
Distance to the nearest Commercial Parcel (feet)	15	1,460	483	361
Distance to the Mobile Home (feet)	2,196	8,744	5,791	1,656
Mortgage Rates (%)	5.23%	7.16%	6.20%	0.50%
N = 301				

Table 28 Frequency Distribution of Categorical-level Variables for Model 2.1: Downtown Hayward TOD; 2001-2006; 0-0.5 mile of the TOD

Single Family House within 300 feet of a Park	34
Single Family House within 300 feet of a Bus Stop	62
Winter	69
Spring	67
Fall	91
Summer	74
2001	38
2002	46
2003	61
2004	21
2005	85
2006	50
N=301	

Table 29 Descriptive Statistics for Continuous Variables for Model 2.2: Downtown Hayward TOD; 2001-2006; 0.5-1 mile of the TOD

	Descriptive Statistics			
	Minimum	**Maximum**	**Mean**	**Standard Deviation**
Sale Price in 2006 Dollars ($)	$200,914	$713,841	$459,662	$110,800
Age of the House (years)	7	126	57	14
Total Living Space (sq feet)	720	3,471	1,258	370
Lot Size (sq feet)	2,795	27,231	6,477	2,702
Number of Bathrooms	1.00	5.00	1.36	0.56
Number of Bedrooms	1.00	5.00	2.73	0.62
Percent White Households (%)	0.34	0.67	0.52	0.09
Change in Median Income of the Census Block Group from 1990 to 2000 ($)	$3,809	$26,733	$14,096	$5,229
Change in Population of the Census Block Group from 1990 to 2000	36	873	313	168
Distance to the TOD (feet)	2,642	5,281	4,233	737
Distance to the BART line (feet)	77	6,235	2,770	1,595
Distance to the BART station (feet)	1,676	7,484	4,850	1,341
Distance to the Hayward Caltrain Station (feet)	394	10,349	6,309	2,767
Distance to I-880 (feet)	9	11,795	5,814	3,580
Distance to the nearest freeway other than I-880 (feet)	1,182	9,667	5,049	2,077
Distance to the Heavy Rail Line (feet)	256	9,870	4,346	3,030
Distance to the nearest Arterial Road (feet)	14	3,422	886	646
Distance to the nearest Office/Financial (feet)	25	3,703	1,168	628
Distance to the nearest Park (feet)	25	3,623	1,228	876
Distance to the nearest Bus Stop (feet)	57	1,554	613	319
Distance to the nearest Light Industrial Parcel (feet)	25	4,088	1,295	798
Distance to the nearest Multi Family Parcel (feet)	16	1,491	301	283
Distance to the nearest Commercial Parcel (feet)	24	3,370	881	590
Distance to the Mobile Home (feet)	344	9,992	4,763	2,689
Mortgage Rates (%)	5.23%	7.16%	6.17%	0.50%
N = 638				

Table 30 Frequency Distribution of Categorical-level Variables for Model 2.2: Downtown Hayward TOD; 2001–2006; 0.5-1 Mile of the TOD

Single Family House within 300 feet of a Park	81
Single Family House within 300 feet of a Bus Stop	104
Winter	126
Spring	171
Fall	180
Summer	161
2001	79
2002	94
2003	127
2004	44
2005	190
2006	104
N=638	

Tables 29 and 30, respectively, provide the descriptive statistics and frequency distributions for the Model 2.2. The average sale price of the house is $459,662, very similar to the average sale price of $436,696 for Model 2.1. The average square footage of the Total Living Space and the average lot size are 1,258 square feet and 6,477 square feet, respectively. The average age of the house is 57 years. The dataset for Model 2.2 contains 638 observations.

Data Description – Bay Meadows TOD

Tables 31 through 42 provide descriptive statistics for the continuous variables, and frequency distribution of the categorical-level data for the six Bay Meadows TOD models.

Tables 31 and 32, respectively, provide the descriptive statistics and frequency distributions for the Model 1.1. The average sale price of the house is $371,922 in 2006 constant dollar terms. The average square footage of the Total Living Space and the average lot size are 1,370 square feet and 5,808 square feet, respectively. The average age of the house is 54 years. The dataset for Model 1.1 contains 83 observations.

Table 31 Descriptive Statistics for Continuous Variables for Model 1.1: Bay Meadows TOD; 1995-1998; 0-0.5 mile of the TOD

	Descriptive Statistics			
	Minimum	Maximum	Mean	Standard Deviation
Sale Price in 2006 Dollars ($)	$250,960	$519,810	$371,922	$57,759
Age of the House (years)	48	64	54	4
Total Living Space (sq feet)	890	2,810	1,370	372
Lot Size (sq feet)	4,992	10,579	5,808	1,080
Number of Bathrooms	1.00	3.00	1.76	0.58
Percent Hispanic Households (%)	13.46%	18.27%	16.06%	2.03%
Change in Median Income of the Census Block Group from 1990 to 2000 ($)	$7,506	$38,009	$15,295	$9,345
Distance to the TOD (feet)	1,010	2,599	1,907	433
Distance to the nearest Caltrain Bullet Station (feet)	537	5,263	3,268	1,276
Distance to the nearest Caltrain Regular Station (feet)	3,962	8,412	6,945	1,210
Distance to Ralston Avenue (feet)	6,879	12,054	9,073	1,472
Distance to US-101 (feet)	119	3,247	1,228	790
Distance to Caltrain line (feet)	426	4,710	2,718	1,127
Distance to the nearest Office/Financial/Commercial Parcel (feet)	1,400	5,745	3,780	1,364
Distance to the nearest Bus Stop (feet)	93	1,460	699	350
Distance to the nearest Light Industrial Parcel (feet)	1,429	4,764	3,459	880
Distance to the nearest Multi Family Parcel (feet)	23	1,500	601	326
Distance to the nearest Urban Center (feet)	751	5,247	3,164	1,197
Mortgage Rates (%)	6.71%	8.83%	7.46%	0.48%
N = 83				

Table 32 Frequency Distribution of Categorical-level Variables for Model 1.1: Bay Meadows TOD; 1995-1998; 0-0.5 mile of the TOD

Winter	14
Spring	23
Fall	18
Summer	28
1995	16
1996	17
1997	25
1998	25
Dummy variable for single-family homes within 500 feet of US-101	18
N=83	

Table 33 Descriptive Statistics for Continuous Variables for Model 1.2: Bay Meadows TOD; 1995-1998; 0.5-1 mile of the TOD

	Descriptive Statistics			
	Minimum	**Maximum**	**Mean**	**Standard Deviation**
Sale Price in 2006 Dollars ($)	$132,938	$2,084,798	$426,602	$156,259
Age of the House (years)	6	86	50	14
Total Living Space (sq feet)	760	3,130	1,536	480
Lot Size (sq feet)	1,464	11,730	5,217	1,653
Number of Bathrooms	1.00	5.00	1.79	0.61
Percent Hispanic Households (%)	5.00%	33.28%	14.86%	8.41%
Change in Median Income of the Census Block Group from 1990 to 2000 ($)	$887	$39,008	$24,631	$9,946
Distance to the TOD (feet)	2,672	5,268	4,277	721
Distance to the nearest Caltrain Bullet Station (feet)	980	8,095	4,652	1,922
Distance to the nearest Caltrain Regular Station (feet)	1,401	10,204	6,527	1,962
Distance to Ralston Avenue (feet)	4,323	14,660	8,658	2,874
Distance to US-101 (feet)	160	6,205	2,690	1,753
Distance to Caltrain line (feet)	196	7,961	3,257	2,078
Distance to the nearest Office/Financial/Commercial Parcel (feet)	188	6,574	2,874	1,372
Distance to the nearest Bus Stop (feet)	70	1,956	825	420
Distance to the nearest Heavy Industrial Parcel (feet)	660	8,264	4,918	2,072
Distance to the nearest Light Industrial Parcel (feet)	0	6,630	3,756	1,881
Distance to the nearest Multi Family Parcel (feet)	21	1,582	540	357
Distance to the nearest Urban Center (feet)	0	8,310	3,964	2,294
Distance to the nearest Mobile Home Park (feet)	2,920	13,111	7,868	2,994
Mortgage Rates (%)	6.71%	9.15%	7.48%	0.52%
N = 279				

Table 34 Frequency Distribution of Categorical-level Variables for Model 1.2: Bay Meadows TOD; 1995-1998; 0.5-1 mile of the TOD

Winter	40
Spring	79
Fall	65
Summer	79
1995	59
1996	75
1997	53
1998	92
Dummy variable for single-family homes within 500 feet of US-101	19
N=279	

Tables 33 and 34, respectively, provide the descriptive statistics and frequency distributions for the Model 1.2. The average sale price of the house is $426,602, similar to the average sale price of $371,922 for the Model 1.1. The average square footage of the Total Living Space and the average lot size are 1,536 square feet and 5,217 square feet, respectively. The average age of the house is 50 years. The dataset for Model 1.2 contains 279 observations.

Tables 35 and 36 respectively, provide the descriptive statistics and frequency distributions for the Model 2.1. The average sale price of the house is $573,376 in 2006 constant dollar terms. The average square footage of the Total Living Space and the average lot size are 1,345 square feet and 5,644 square feet, respectively. The average age of the house is 54 years. The dataset for Model 2.1 contains 146 observations.

Table 35 Descriptive Statistics for Continuous Variables for Model 2.1: Bay Meadows TOD; 1999-2003; 0-0.5 mile of the TOD

	Descriptive Statistics			
	Minimum	**Maximum**	**Mean**	**Standard Deviation**
Sale Price in 2006 Dollars ($)	$339,388	$788,591	$573,376	$90,831
Age of the House (years)	48	S65	54	5
Total Living Space (sq feet)	780	2,500	1,345	346
Lot Size (sq feet)	4,900	11,309	5,644	878
Number of Bathrooms	1.00	3.00	1.75	0.50
Percent Hispanic Households (%)	13.46%	18.27%	15.93%	2.00%
Change in Median Income of the Census Block Group from 1990 to 2000 ($)	$7,506	$38,009	$14,535	$8,493
Distance to the TOD (feet)	1,014	2,639	1,984	421
Distance to the nearest Caltrain Bullet Station (feet)	593	5,626	3,507	1,317
Distance to US-101 (feet)	120	3,186	1,176	766
Distance to Caltrain line (feet)	487	4,844	2,885	1,183
Distance to the nearest Office/Financial/Commercial Parcel (feet)	881	5,792	3,546	1,388
Distance to the nearest Bus Stop (feet)	101	1,413	704	331
Distance to the nearest Multi Family Parcel (feet)	44	1,572	544	297
Mortgage Rates (%)	5.23%	8.33%	6.80%	0.81%
N = 146				

Table 36 Frequency Distribution of Categorical-level Variables for Model 2.1: Bay Meadows TOD; 1999-2003; 0-0.5 mile of the TOD

Winter	19
Spring	37
Fall	36
Summer	48
1999	26
2000	20
2001	22
2002	37
2003	41
Dummy variable for single-family homes within 500 feet of US-101	27
N=146	

Tables 37 and 38, respectively, provide the descriptive statistics and frequency distributions for the Model 2.2. The average sale price of the house is $616,771, similar to the average sale price of $573,376 for the Model 2.1. The average square footage of the Total Living Space and the average lot size are 1,472 square feet and 5,092 square feet, respectively. The average age of the house is 49 years. The dataset for Model 2.2 contains 476 observations.

Table 37 Descriptive Statistics for Continuous Variables for Model 2.2: Bay Meadows TOD; 1999-2003; 0.5-1 mile of the TOD

	Descriptive Statistics			
	Minimum	**Maximum**	**Mean**	**Standard Deviation**
Sale Price in 2006 Dollars ($)	$259,626	$1,286,937	$616,771	$142,853
Age of the House (years)	8	85	49	13
Total Living Space (sq feet)	740	3,230	1,472	438
Lot size (sq feet)	1,464	10,680	5,092	1,852
Number of Bathrooms	1.00	4.00	1.72	0.62
Percent Hispanic Households (%)	5.00%	33.28%	15.00%	8.92%
Change in Median Income of the Census Block Group from 1990 to 2000 ($)	$887	$39,008	$26,383	$9,384
Distance to the TOD (feet)	2,652	5,279	4,236	683
Distance to the nearest Caltrain Bullet Station (feet)	335	7,984	4,838	2,011
Distance to the nearest Caltrain Regular Station (feet)	1,497	10,125	6,715	1,969
Distance to Ralston Avenue (feet)	4,285	14,688	8,600	2,868
Distance to US-101 (feet)	161	6,217	2,473	1,679
Distance to Caltrain line (feet)	122	7,839	3,541	2,126
Distance to the nearest Office/Financial/Commercial Parcel (feet)	278	6,346	2,915	1,309
Distance to the nearest Bus Stop (feet)	123	1,972	806	420
Distance to the nearest Heavy Industrial Parcel (feet)	606	8,211	5,253	1,902
Distance to the nearest Light Industrial Parcel (feet)	0	6,842	4,027	1,697
Distance to the nearest Multi Family Parcel (feet)	25	1,587	586	363
Distance to the nearest Urban Center (feet)	6	8,196	4,266	2,336
Distance to the nearest Mobile Home Park (feet)	2,875	13,150	7,440	2,867
Mortgage Rates (%)	5.23%	8.52%	6.80%	0.81%
N = 476				

Table 38 Frequency Distribution of Categorical-level Variables for Model 2.2: Bay Meadows TOD; 1999-2003; 0.5-1 mile of the TOD

Winter	83
Spring	114
Fall	128
Summer	131
1999	75
2000	69
2001	95
2002	114
2003	123
Dummy variable for single-family homes within 500 feet of US-101	42
N=476	

Tables 39 and 40 respectively, provide the descriptive statistics and frequency distributions for the Model 3.1. The average sale price of the house is $756,787 in 2006 constant dollar terms. The average square footage of the Total Living Space and the average lot size are 1,315 square feet and 5,674 square feet, respectively. The average age of the house is 54 years. The dataset for Model 3.1 contains 109 observations.

Table 39 Frequency Distribution of Categorical-level Variables for Model 3.1: Bay Meadows TOD; 2004-2006; 0-0.5 mile of the TOD

	Descriptive Statistics			
	Minimum	**Maximum**	**Mean**	**Standard Deviation**
Sale Price in 2006 Dollars ($)	$480,388	$961,000	$756,787	$90,325
Age of the House (years)	48	64	54	4
Total Living Space (sq feet)	780	2,505	1,315	293
Lot Size (sq feet)	4,016	12,300	5,674	1,108
Number of Bathrooms	1.00	4.00	1.72	0.59
Percent Hispanic Households (%)	13.46%	18.27%	16.06%	1.96%
Change in Median Income of the Census Block Group from 1990 to 2000 ($)	$7,506	$38,009	$15,479	$8,930
Distance to the TOD (feet)	964	2,629	1,910	435
Distance to the Nearest Caltrain Bullet Station (feet)	643	5,671	3,394	1,220
Distance to US-101 (feet)	143	3,136	1,124	728
Distance to Caltrain Line (feet)	537	4,867	2,873	1,093
Distance to the Nearest Office/Financial/Commercial Parcel (feet)	903	5,810	3,706	1,353
Distance to the Nearest Bus Stop (feet)	72	1,539	720	366
Distance to the Nearest Multi Family Parcel (feet)	49	1,525	582	365
Mortgage Rates (%)	5.45%	6.76%	6.08%	0.37%
N = 109				

Table 40 Frequency Distribution of Categorical-level Variables for Model 3.1: Bay Meadows TOD; 2004-2006; 0.5-1 mile of the TOD

Winter	18
Spring	26
Fall	21
Summer	40
2004	36
2005	34
2006	39
Dummy variable for single-family homes within 500 feet of US-101	24
N=109	

Tables 41 and 42, respectively, provide the descriptive statistics and frequency distributions for the Model 3.2. The average sale price of the house is $797,592, very similar to the average sale price of $756,787 for the Model 3.1. The average square footage of the Total Living Space and the average lot size are 1,401 square feet and 5,101 square feet, respectively. The average age of the house is 50 years. The dataset for Model 3.2 contains 425 observations.

Table 41 Descriptive Statistics for Continuous Variables for Model 3.2: Bay Meadows TOD; 2004-2006; 0.5-1 mile of the TOD

	Descriptive Statistics			
	Minimum	**Maximum**	**Mean**	**Standard Deviation**
Sale Price in 2006 Dollars ($)	$320,000	$1,650,000	$797,592	$170,661
Age of the House (years)	8	85	50	12
Total Living Space (sq feet)	730	2,870	1,401	424
Lot Size (sq feet)	1,464	18,300	5,101	1,785
Number of Bathrooms	1.00	4.00	1.67	0.58
Percent Hispanic Households (%)	5.00%	33.28%	15.72%	8.69%
Change in Median Income of the Census Block Group from 1990 to 2000 ($)	$887	$39,008	$26,064	$9,695
Distance to the TOD (feet)	2,641	5,276	4,176	732
Distance to the nearest Caltrain Bullet Station (feet)	537	8,128	4,781	1,971
Distance to the nearest Caltrain Regular Station (feet)	1,629	10,290	6,625	1,900
Distance to Ralston Avenue (feet)	4,249	14,624	8,558	2,912
Distance to US-101 (feet)	160	6,215	2,332	1,647
Distance to Caltrain line (feet)	153	7,980	3,419	2,088
Distance to the nearest Office/Financial/Commercial Parcel (feet)	431	6,649	3,002	1,361
Distance to the nearest Bus Stop (feet)	51	1,922	859	421
Distance to the nearest Heavy Industrial Parcel (feet)	628	8,325	5,255	1,845
Distance to the nearest Light Industrial Parcel (feet)	0	6,781	4,062	1,643
Distance to the nearest Multi Family Parcel (feet)	25	1,598	593	362
Distance to the nearest Urban Center (feet)	143	8,344	4,203	2,261
Distance to the nearest Mobile Home Park (feet)	2,730	13,154	7,446	2,709
Mortgage Rates (%)	5.45%	6.76%	6.05%	0.34%
N = 425				

Table 42 Frequency Distribution of Categorical-level Variables for Model 3.2: Bay Meadows TOD; 2004-2006; 0.5-1 mile of the TOD

Winter	73
Spring	112
Fall	114
Summer	112
2004	177
2005	123
2006	125
Dummy variable for single-family homes within 500 feet of US-101	45
N=425	

MODELING RESULTS AND POLICY IMPLICATIONS

As mentioned previously, separate models are estimated for individual TODs. The models are further subdivided based upon the time periods and the distance from single-family homes to the TOD (see Figure 9 for the Model Structure). This chapter first discusses the general modeling issues encountered in this study. It then presents the detailed model findings and discusses their policy implications. Next it summarizes the study findings. Finally, it discusses the contribution of this study to the literature, and the study's limitations and directions for future research.

GENERAL MODELING ISSUES

A variety of factors impact home prices. This study, using hedonic regression method, seeks to estimate the impact of each TOD on home prices in their surrounding neighborhoods controlling for other factors affecting home prices. The impact of the TOD on home prices is operationalized by the variable "distance to the TOD." This variable measures the distance from a single-family home to the TOD.

For all the models, the log of sale price of the house is the dependent variable. A log transformation is used to adjust for non-linear relationships between the dependent and independent variables. The independent variables are categorized into structural attributes of the house, neighborhood-level characteristics, locational attributes of the house, season dummies (to account for the seasonal variations in the housing market), other temporal effects including the mortgage rates, year dummies (to capture the temporal variations in housing prices), and, where applicable, jurisdiction dummies (to capture the jurisdiction-specific effects on housing prices).

Several methodological difficulties had to be overcome in the modeling phase. First, care was taken to not mis-specify the models. For example, how can one be sure that the distance to the TOD variable is capturing the effect of the TOD, and not of the rail line and/or the rail station? Two precautions were taken. First, instead of measuring the distance from the centroid of a single-family parcel to the centroid of the TOD, smallest distance between a single-family parcel centroid to the TOD <u>boundary</u> was measured. This procedure helped to reduce the degree of correlation between the variables measuring the distances to the TOD, to the station and to the rail line. Second, the Variance Inflation Factor (VIF) of the variables was closely monitored to make sure that multicollinearity problems did not influence the statistical significance and coefficient of the distance to the TOD variable. Third, models were estimated both with and without the "distance to the TOD" variable. This procedure helped in testing the independent contribution of the distance to the TOD variable, and in checking whether the statistical significance or the coefficient value of the distance to the station and/or the distance to the rail line variables change. A significant change would have indicated multicollinearity between these three variables.

Second, detailed site visits were conducted and extensive spatial data was reviewed to ensure that the models did not suffer from omitted variable (OV) bias. For example, in the case of the Bay Meadows TOD models, in several instances the non-inclusion of the variable "distance to US-101" made the variable "distance to the TOD" variable significant. Hence, in this case, omitting the “distance to US-101” would have resulted in OV bias.

MODEL RESULTS

Model Results: Ohlone Chynoweth TOD

Six models were run for the Ohlone Chynoweth TOD. For the models run for the period 1991–1995 (pre-TOD period), the adjusted R^2 for the 0–0.5 mile and 0.5–1 mile distance bands are 0.749 and 0.758, respectively (see Table 43). During this period the distance to the TOD variable measures the distance of a single-family home to the distance to the site where the TOD would eventually be constructed. The distance to the TOD variable is statistically insignificant (p-value > 0.10) for both the models, indicating that the effect of the TOD site on housing prices is not statistically distinguishable from zero.

For the models run for the period 1996–2003 (TOD construction period), the adjusted R^2 for the 0–0.5 mile and 0.5–1 mile distance bands are 0.639 and 0.658, respectively (see Table 44). During this period the distance to the TOD variable measures the distance from a single-family home to the TOD site at the time when the TOD was under construction. The distance to the TOD variable is statistically insignificant (p-value > 0.10) for both the models, indicating that during the construction phase the effect of the TOD on housing prices is not statistically distinguishable from zero.

For the models run for the 2004–2006 (post-TOD period), the adjusted R^2 for the 0–0.5 mile and 0.5–1 mile distance bands are 0.394 and 0.772, respectively (see Table 45). During this period the distance to the TOD variable measures the distance of a single-family home to the TOD after the TOD is completely built. The distance to the TOD variable is statistically significant (p-value < 0.10) for the 0–0.5 mile model and is statistically insignificant (p-value > 0.10) for the 0.5–1 mile model, indicating that the Ohlone Chynoweth TOD positively impacts prices of home up to 0.5 mile away for the TOD. However the TOD does not have any effect on the control group—homes more than 0.5 miles from the TOD. These findings are consistent with our stated hypothesis.

The Ohlone Chynoweth TOD model results are significant from policy perspective. First, they indicate that at no time did the TOD negatively influence prices of surrounding single-family homes. Even during the period 1996–2003 when the TOD was under construction and the neighborhood opposition to the TOD was strongest, the proximity to the TOD site did not depress home values. Most encouraging for the advocates of TOD is the finding of the 2004–2006 model. The finding suggests that a well-designed TOD such as Ohlone Chynoweth can positively influence the surrounding neighborhood home prices.

Table 43 Hedonic Regression Results for Ohlone Chynoweth TOD: 1991-1995

Variables	0-0.5 mile		0.5-1.0 mile	
Constant	7.6108	***	6.2869	**
Structural attributes of the house				
Age of the House	0.0018		-0.0010	
Natural Log of The Square Footage of the Total Living Space	0.3422	***	0.3206	***
Natural Log of Lot Size	0.1986	***	0.0058	
Number of Bathrooms	0.0047		0.0901	**
Number of Bedrooms	-0.0204		-0.0148	
Neighborhood-Level Characteristics				
Percent White Households	NA		-0.1864	
Change in Median Income of the Census Block Group from 1990 to 2000	0.0000		0.0000	
Change in Population of the Census Block Group from 1990 to 2000	NA		-0.0003	
Locational Attributes of the House				
Natural Log of Distance to the TOD	-0.0124		0.0106	
Natural Log of Distance to the LRT Line	-0.0783		0.0081	
Natural Log of Distance to the LRT Station	0.1451		-0.0605	
Natural Log of Distance to Almaden/Vine Street	NA		-0.0044	
Natural Log of Distance to Branham Street	NA		0.0047	
Natural Log of Distance to Capitol Expressway/Hillsdale Blvd	NA		0.2225	*
Natural Log of Distance to Freeway CA-85	NA		0.2383	***
Natural Log of Distance to the Nearest Office	0.0135		-0.0540	*
Natural Log of Distance To The Nearest Park	NA		0.0213	
Natural Log of Distance to the Nearest Bus Stop	NA		0.0018	
Natural Log of Distance to the Nearest Industrial Parcel	NA		0.1537	**
Natural Log of Distance to the Nearest Multi Family Parcel	NA		0.0381	**
Natural Log of Distance to the Nearest Commercial Parcel	NA		-0.0576	
Season Dummies				
Winter	0.0526		0.0195	
Spring	-0.0291		0.0193	
Fall	0.0027		-0.0088	
Other Temporal Effects				
Mortgage Rates	0.0224		-0.0066	
1991	0.0714		0.1373	***
1992	0.0616		0.0488	
1993	0.0650		0.0391	
1994	-0.0290		-0.0023	
N	39		91	
Adjusted R^2	0.749		0.758	

Notes:
Dependent variable: log of sale price in 2006 dollars
* = p < 0.10
** = p < 0.05
*** = p < 0.01
N/A - Not applicable

Table 44 Hedonic Regression Results for Ohlone Chynoweth TOD: 1996-2003

Variables	0-0.5 mile		0.5-1.0 mile	
Constant	13.5337	**	7.4275	***
Structural attributes of the house				
Age of the House	-0.0043		-0.0054	*
Natural Log of the Square Footage of the Total Living Space	0.6997	***	0.4667	***
Natural log of Lot Size	0.1901	*	0.2714	**
Number of Bathrooms	-0.1896	*	-0.0065	
Number of Bedrooms	-0.0123		-0.0245	
Neighborhood-Level Characteristics				
Percent White Households	NA		-0.1574	
Change in Median Income of the Census Block Group from 1990 to 2000	0.0000		0.0000	
Change in Population of the Census Block Group from 1990 to 2000	NA		-0.0001	
Locational Attributes of the House				
Natural Log of Distance to the TOD	-0.0983		0.0434	
Natural Log of Distance to the LRT Line	-0.0469		0.0615	
Natural Log of Distance to the LRT Station	-0.0785		-0.0193	
Natural Log of Distance to Almaden/Vine Street	-0.1175		-0.0400	
Natural Log of Distance to Branham Street	NA		-0.0171	
Natural Log of Distance to Capitol Expressway/Hillsdale Blvd	-0.5023		-0.0174	
Natural Log of Distance to Freeway CA-85	NA		NA	
Natural Log of Distance to the Nearest Office	0.0343		0.0065	
Natural Log of Distance to the Nearest Park	0.0075		0.0217	
Natural Log of Distance to the Nearest Bus Stop	NA		NA	
Natural Log of Distance to the Nearest Industrial Parcel	NA		0.0430	
Natural Log of Distance to the Nearest Multi Family Parcel	-0.0443		0.0055	
Natural Log of Distance to the Nearest Commercial Parcel	NA		-0.0091	
Season Dummies				
Winter	-0.1398	**	-0.0591	**
Spring	-0.0607		0.0163	
Fall	-0.0440		-0.0432	
Other Temporal Effects				
Mortgage Rates	0.0527		-0.0231	
1996	-0.7738	***	-0.5909	***
1997	-0.5253	***	-0.4238	***
1998	-0.4855	***	-0.3174	***
1999	-0.3419	***	-0.2024	***
2000	-0.1999		0.0146	
2001	-0.0366		0.0204	
2002	-0.0684		0.0008	
N	159		260	
Adjusted R^2	0.639		0.658	

Notes:
Dependent variable: log of sale price in 2006 dollars
* = p < 0.10
** = p < 0.05
*** = p < 0.01
N/A - Not applicable

Table 45 Hedonic Regression Results for Ohlone Chynoweth TOD: 2004-2006

Variables	0-0.5 mile	0.5-1.0 mile
Constant	14.0664 ***	9.9041 ***
Structural attributes of the house		
Age of the House	-0.0123 ***	-0.0026 *
Natural Log of the Square Footage of the Total Living Space	-0.0879	0.3942 ***
Natural Log of Lot Size	0.0729	0.0385
Number of Bathrooms	0.1163	-0.0379
Number of Bedrooms	0.0044	0.0047
Neighborhood-Level Characteristics		
Percent Asian Households	NA	0.0932
Change in Median Income of the Census Block Group from 1990 to 2000	0.0000 **	0.0000 *
Change in Population of the Census Block Group from 1990 to 2000	NA	0.0000
Locational Attributes of the House		
Natural Log of Distance to the TOD	-0.1404 *	-0.0159
Natural Log of Distance to the LRT Line	-0.1624	0.0382
Natural Log of Distance to the LRT Station	0.5178 ***	0.0031
Natural Log of Distance to Almaden/Vine Street	-0.0716	-0.0099
Natural Log of Distance to Branham Street	NA	0.0609 **
Natural Log of Distance to Freeway CA-85	NA	0.0244
Natural Log of Distance to the Nearest Office	-0.0799	0.0444 ***
Natural Log of Distance to the Nearest Park	-0.1234 *	0.0072
Natural Log of Distance to the Nearest Bus Stop	NA	-0.0447 *
Natural Log of Distance to the Nearest Industrial Parcel	-0.0063	NA
Natural Log of Distance to the Nearest Multi Family Parcel	NA	-0.0179 *
Natural Log of Distance to the Nearest Commercial Parcel	NA	-0.0162
Season Dummies		
Winter	-0.1502 ***	-0.0603 ***
Spring	-0.0090	-0.0149
Fall	0.0369	0.0213
Other Temporal Effects		
Mortgage Rates	-0.0411	0.0032
2004	-0.1568 **	-0.1603 ***
2005	-0.0610	-0.0325
N	82	143
Adjusted R^2	0.394	0.772

Notes:
Dependent variable: log of sale price in 2006 dollars
* = $p < 0.10$
** = $p < 0.05$
*** = $p < 0.01$
N/A - Not applicable

Model Results: Pleasant Hill TOD

Four models were run for the Pleasant Hill TOD. For the models run for the period 1996–2001, the adjusted R^2 for the 0–0.5 mile and 0.5–1 mile distance bands are 0.654 and 0.571, respectively (see Table 46). The distance to the TOD variable is statistically insignificant (p-value > 0.10) for both models, indicating that the effect of the TOD on housing prices is not statistically distinguishable from zero.

For the models run for the period 2002–2006, the adjusted R^2 for the 0–0.5 mile and 0.5–1 mile distance bands are 0.716 and 0.614, respectively (see Table 47). Once again the distance to the TOD variable is statistically insignificant (p-value > 0.10) for both models, indicating that the effect of the TOD on housing prices is not statistically distinguishable from zero.

The Pleasant Hill TOD model results are significant from a policy perspective. They indicate that at no time did the TOD negatively influence surrounding housing prices, even during the period 1996–2001 when the public was opposed to the several proposed developments on the TOD site.

Model Results: Downtown Hayward TOD

Four models were run for the Downtown Hayward TOD. For the models run for the period 1991–2000, the adjusted R^2 for the 0–0.5 mile and 0.5–1 mile distance bands are 0.442 and 0.713, respectively (see Table 48). The distance to the TOD variable is statistically insignificant (p-value > 0.10) for both models, indicating that the effect of the TOD on housing prices is not statistically distinguishable from zero.

For the models run for the period 2002–2006, the adjusted R^2 for the 0–0.5 mile and 0.5–1 mile distance bands are 0.493 and 0.533, respectively (see Table 49). Once again the distance to the TOD variable is statistically insignificant (p-value > 0.10) for both models, indicating that the effect of the TOD on housing prices is not statistically distinguishable from zero.

The Downtown Hayward TOD model results, like the Pleasant Hill TOD model results indicate that at no time did the TOD negatively influence prices of the surrounding single-family homes.

Model Results: Bay Meadows TOD

Six models were run for the Bay Meadows TOD. For the models run for the period 1995–1998 (pre-TOD period), the adjusted R^2 for the 0–0.5 mile and 0.5–1 mile distance bands are 0.715 and 0.642, respectively (see Table 50). During this period the distance to the TOD variable measures the distance of a single-family home to the distance to the site where the TOD would eventually be constructed. The distance to the TOD variable is statistically insignificant (p-value > 0.10) for both models, indicating that the effect of the TOD site on housing prices is not statistically distinguishable from zero.

For the models run for the period 1999-2003 (TOD construction period), the adjusted R^2 for the 0–0.5 mile and 0.5–1 mile distance bands are 0.658 and 0.708, respectively (see Table 51). During this period the distance to the TOD variable measures the distance of a single-family home to the TOD site when the TOD was under construction. The distance to the TOD variable is statistically insignificant (p-value > 0.10) for both models, indicating that during the construction phase the effect of the TOD on housing prices is not statistically distinguishable from zero.

For the models run for the 2004–2006 (post-TOD period), the adjusted R^2 for the 0–0.5 mile and 0.5–1 mile distance bands are 0.526 and 0.774, respectively (see Table 52). During this period the distance to the TOD variable measures the distance of a single-family home to the TOD after the TOD is completely built. The distance to the TOD variable is statistically insignificant (p-value < 0.10) for both 0–0.5 mile and 0.5–1 mile models, indicating that the effect of the Bay Meadows TOD on housing prices is not statistically distinguishable from zero.

The Bay Meadows TOD model results, like the Pleasant Hill TOD and Downtown Hayward TOD model results indicate that at no time did the TOD negatively influence prices of surrounding single-family homes.

Table 46 Regression Results for Pleasant Hill TOD: 1996-2001

Variables	0-0.5 mile		0.5-1.0 mile	
Constant	8.8473	***	11.2357	***
Structural attributes of the house				
Natural Log of Age of the House	-0.1120	***	-0.1207	***
Natural Log of the Square Footage of the Total Living Space	0.3072	***	0.2213	***
Natural Log of Lot Size	0.1010	***	0.0853	***
Number of Bathrooms	-0.0189		0.0053	
Number of Bedrooms	0.0281	**	0.0143	
Neighborhood-Level Characteristics				
Percentage White Households	0.0372		0.1106	
Change in Median Income of the Census Block Group from 1990 to 2000	0.0000		0.0000	
Change in Population of the Census Block Group from 1990 to 2000	0.0000		0.0000	
Locational Attributes of the House				
Natural Log of Distance to the TOD	-0.0208		0.0535	
Natural Log of Distance to the BART line	0.0199		0.0401	***
Natural Log of Distance to the BART station	0.0781		-0.0718	
Natural Log of Distance to the Treat Blvd. and I-680 junction	NA		-0.0870	
Natural Log of Distance to I-680	0.0099		0.1208	***
Natural Log of Distance to the I-680 and CA-24 junction	NA		NA	
Natural Log of Distance to the I-680 and CA-242 junction	NA		-0.0547	
Natural Log of Distance to the Nearest Office/Financial Parcel	0.0243		0.0243	
Natural Log of Distance to the Nearest School	0.0087		0.0063	
Natural Log of Distance to the Nearest Golf Course	-0.0092		-0.0241	
Natural Log of Distance to the Nearest Park	0.0254		0.0544	***
Natural Log of Distance to the Nearest Urban Center	0.0047		-0.0414	***
Natural Log of Distance to the Nearest Bus Stop	0.0270		-0.0260	*
Natural Log of Distance to the Nearest Hospital	-0.0008		-0.0142	
Natural Log of Distance to the Nearest Light Industrial Parcel	0.0237		-0.0095	
Natural Log of Distance to the Nearest Heavy Industrial Parcel	NA		-0.0033	
Natural Log of Distance to the Nearest Multi Family Parcel	0.0009		0.0015	
Natural Log of Distance to the Nearest Commercial Parcel	0.0248		0.0194	*
Dummy Variable for Single Family Homes within 300 feet of a Park	-0.0977		-0.0134	
Dummy Variable for Single Family Homes within 300 feet of a Bus Stop	-0.0123		-0.0320	
Season Dummies				
Winter	-0.0610	***	-0.0683	***
Spring	-0.0049		-0.0270	**
Fall	0.0307	*	0.0041	
Year Dummies				
1996	-0.4165	***	-0.3912	***
1997	-0.4173	***	-0.3763	***
1998	-0.3209	***	-0.2622	***
1999	-0.2593	***	-0.2067	***
2000	-0.0973	***	-0.0950	***
City Dummies				
Concord	-0.1657	***	-0.1803	***
County	Referent		Referent	
Pleasant Hill	-0.0997	***	-0.1113	***
Walnut Creek	Referent		Referent	
N	387		673	
Adjusted R^2	0.654		0.571	

Dependent variable: log of sale price in 2006 dollars
* = p < 0.10
** = p < 0.05
*** = p < 0.01
N/A - Not applicable

Table 47 Hedonic Regression Results for Pleasant Hill TOD: 2002-2006

Variables	0-0.5 mile		0.5-1.0 mile	
Constant	11.5912	***	10.2109	***
Structural attributes of the house				
Natural Log of Age of the House	-0.0611	***	-0.0662	***
Natural Log of the square Footage of the Total Living Space	0.2171	***	0.2090	***
Natural Log of Lot Size	0.0728	***	0.0565	***
Number of Bathrooms	0.0194	*	0.0066	
Number of Bedrooms	0.0018		0.0147	**
Neighborhood-Level Characteristics				
Percentage White Households	0.2959	**	0.1418	*
Change in Median Income of the Census Block Group from 1990 to 2000	0.0000		0.0000	
Change in Population of the Census Block Group from 1990 to 2000	0.0000		0.0000	
Locational Attributes of the House				
Natural Log of Distance to the TOD	-0.0027		0.0146	
Natural Log of Distance to the BART line	0.0474	*	0.0198	**
Natural Log of Distance to the BART station	-0.1214	**	0.0254	
Natural Log of Distance to the Treat Blvd. and I-680 junction	0.0783	**	NA	
Natural log of Distance to I-680	0.0419		0.0317	**
Natural Log of Distance to the I-680 and CA-24 junction	-0.0930		NA	
Natural Log of Distance to the I-680 and CA-242 junction	NA		0.0489	*
Natural Log of Distance to the Nearest Office/Financial Parcel	0.0081		0.0036	
Natural Log of Distance to the Nearest School	0.0091		0.0052	
Natural Log of Distance to the Nearest Golf Course	-0.0175		0.0240	*
Natural Log of Distance to the Nearest Park	0.0163		0.0413	***
Natural Log of Distance to the Nearest Urban Center	0.0063		-0.0237	**
Natural Log of Distance to the Nearest Bus Stop	-0.0071		-0.0016	
Natural Log of Distance to the Nearest Hospital	-0.0010		-0.0170	**
Natural Log of Distance to the Nearest Light Industrial Parcel	0.0058		0.0000	
Natural Log of Distance to the Nearest Heavy Industrial Parcel	NA		NA	
Natural Log of Distance to the Nearest Multi Family Parcel	-0.0005		-0.0032	
Natural Log of Distance to the Nearest Commercial Parcel	0.0147		0.0056	
Dummy Variable for Singe Family Homes within 300 feet of a Park	-0.0393		0.0500	*
Dummy Variable for Singe Family Homes within 300 feet of a Bus Stop	-0.0495	**	-0.0148	
Season Dummies				
Winter	-0.0571	***	-0.0687	***
Spring	-0.0169		-0.0138	
Fall	0.0012		-0.0136	
Year Dummies				
2002	-0.2770	***	-0.2387	***
2003	-0.2143	***	-0.1768	***
2004	-0.0984	***	-0.0992	***
2005	0.0192		0.0401	***
City Dummies				
Concord	-0.0883	***	-0.1127	***
County	-0.0197		0.0737	***
Pleasant Hill	-0.0334		-0.0478	***
Walnut Creek	Referent		Referent	
N	422		756	
Adjusted R^2	0.716		0.614	

Notes:
Dependent variable: log of sale price in 2006 dollars
* = $p < 0.10$
** = $p < 0.05$
*** = $p < 0.01$
N/A - Not applicable

Table 48 Hedonic Regression Results for Downtown Hayward TOD: 1991-2000

Variables	0-0. 5 mile		0.5-1.0 mile	
Constant	11.1796	***	9.6823	***
Structural Attributes of the House				
Natural Log of Age of the House	-0.1773	***	-0.1347	***
Natural Log of the Square Footage of the Total Living Space	0.2653	***	0.2949	***
Natural Log of Lot Size	0.1213	***	0.1396	***
Number of Bathrooms	-0.0043		0.0240	*
Number of Bedrooms	-0.0070		0.0251	**
Neighborhood-Level Characteristics				
Percentage White Households	-1.2690	**	-0.1512	
Change in Median Income of the Census Block Group from 1990 to 2000	0.0000		0.0000	
Change in Population of the Census Block Group from 1990 to 2000	-0.0003	**	0.0000	
Locational Attributes of the House				
Natural Log of Distance to the TOD	0.0363		0.0148	
Natural Log of Distance to the BART line	0.0275		0.0080	
Natural Log of Distance to the BART station	0.0116		-0.0276	
Natural Log of Distance to the Hayward Caltrain station	0.7104		0.0752	***
Natural Log of Distance to I-880	-1.4688	**	-0.0149	
Natural Log of Distance to Freeway other than I-880	0.3068		-0.0814	***
Natural Log of Distance to the Heavy Rail Line	0.4812	*	0.0083	
Natural Log of Distance to the Nearest Arterial	-0.0043		-0.0082	
Natural Log of Distance to the Nearest Office/Financial Parcel	-0.0026		0.0161	
Natural Log of Distance to the Nearest Park	0.0086		-0.0031	
Natural Log of Distance to the Nearest Bus Stop	0.0433		-0.0035	
Natural Log of Distance to the Nearest Light Industrial Parcel	0.0211		0.0020	
Natural Log of Distance to the Nearest Multi Family Parcel	0.0122		0.0106	
Natural Log of Distance to the Nearest Commercial Parcel	0.0236		0.0067	
Natural Log of Distance to the Nearest Mobile Home Park	-0.1466		NA	
Dummy Variable for Singe Family Homes within 300 feet of a Park	0.0653		0.0141	
Dummy Variable for Single Family Homes within 300 feet of a Bus Stop	0.0243		-0.0096	
Season Dummies				
Winter	-0.0188		-0.0622	***
Spring	-0.0422		-0.0156	
Fall	0.0136		0.0309	*
Other Temporal Effects				
Mortgage Rates	0.0020		0.0157	
1991	-0.1551	**	-0.1565	***
1992	-0.1779	***	-0.2300	***
1993	-0.2264	***	-0.2779	***
1994	-0.3144	***	-0.3538	***
1995	-0.3546	***	-0.3762	***
1996	-0.3812	***	-0.4175	***
1997	-0.3237	***	-0.3889	***
1998	-0.2497	***	-0.2641	***
1999	-0.1519	***	-0.1962	***
N	229		537	
Adjusted R^2	0.442		0.713	

Notes:
Dependent variable: log of sale price in 2006 dollars
* = p < 0.10
** = p < 0.05
*** = p < 0.01
N/A - Not applicable

Table 49 Hedonic Regression Results for Downtown Hayward TOD: 2001-2006

Variables	0-0.5 mile		0.5-1.0 mile		0-1.0 mile	
Constant	10.3783	***	12.7541	***	11.4721	***
Structural Attributes of the House						
Natural Log of Age of the House	-0.0534		-0.1166	***	-0.1104	***
Natural Log of the Square Footage of the Total Living Space	0.1930	***	0.2468	***	0.2471	***
Natural Log of Lot Size	0.0447		0.0385		0.0452	**
Number of Bathrooms	0.0956	***	-0.0018		0.0100	
Number of Bedrooms	-0.0392	*	0.0341	**	0.0090	
Neighborhood-Level Characteristics						
Percentage White Households	-1.0309	*	-0.1195		-0.0796	
Change in Median Income of the Census Block Group from 1990 to 2000	0.0000		0.0000		0.0000	**
Change in Population of the Census Block Group from 1990 to 2000	-0.0002		0.0000		0.0000	
Locational Attributes of the House						
Natural Log of Distance to the TOD	0.0462		-0.0698		0.0241	
Natural Log of Distance to the BART Line	0.0796	***	-0.0132		-0.0036	
Natural Log of Distance to the BART station	0.0619		-0.0243		-0.0126	
Natural Log of Distance to the Hayward Caltrain station	0.5489	**	-0.0018		-0.0505	
Natural Log of Distance to I-880	-1.7312	**	-0.0075		0.0049	
Natural Log of Distance to Freeway other than I-880	0.5769	***	-0.0223		-0.0220	
Natural Log of Distance to the Heavy Rail line	0.6634	***	0.0471	**	0.0492	***
Natural Log of Distance to the Nearest Arterial	0.0564	*	0.0062		0.0033	
Natural Log of Distance to the Nearest Office/financial Parcel	-0.0134		-0.0182		-0.0024	
Natural Log of Distance to the Nearest Park	0.0070		-0.0261	*	-0.0133	
Natural Log of Distance to the Nearest Bus Stop	-0.0196		-0.0081		0.0106	
Natural Log of Distance to the Nearest Light Industrial Parcel	0.0150		0.0010		-0.0037	
Natural Log of Distance to the Nearest Multi Family Parcel	0.0049		0.0058		0.0061	
Natural Log of Distance to the Nearest Commercial Parcel	-0.0010		0.0069		0.0085	
Natural Log of Distance to the Nearest Mobile Home Park	NA		-0.0078		0.0192	
Dummy Variable for Singe Family Homes within 300 feet of a Park	-0.0209		-0.0307		-0.0094	
Dummy Variable for Single Family Homes within 300 feet of a Bus Stop	0.0096		-0.0047		0.0115	
Season Dummies						
Winter	-0.1048	***	-0.0612	***	-0.0785	***
Spring	-0.0178		-0.0170		-0.0292	*
Fall	0.0200		0.0065		0.0094	
Other Temporal Effects						
Mortgage rates	-0.0125		-0.0247		-0.0133	
2001	-0.4022	***	-0.4142	***	-0.4147	***
2002	-0.3558	***	-0.3401	***	-0.3450	***
2003	-0.3009	***	-0.3057	***	-0.3005	***
2004	-0.1150	**	-0.1646	***	-0.1377	***
2005	-0.0320		-0.0336		-0.0240	
N	300		637		933	
Adjusted R^2	0.493		0.533		0.523	

Notes:
Dependent variable: log of sale price in 2006 dollars
* = $p < 0.10$
** = $p < 0.05$
*** = $p < 0.01$
N/A - Not applicable

Table 50 Hedonic Regression Results for Bay Meadows TOD: 1995-1998

Variables	0-0.5 mile		0.5-1.0 mile		0-1.0 mile	
Constant	19.5990	***	9.7453	***	8.2834	***
Structural Attributes of the House						
Natural Log of Age of the House	-1.2688	**	-0.0049		-0.0454	
Natural Log of the Square Footage of the Total Living Space	0.2407		0.3645	***	0.3391	***
Natural Log of lot Size	0.0868	***	0.1610	***	0.1552	***
Number of Bathrooms	-0.0984	***	-0.0268		-0.0421	**
Neighborhood-Level Characteristics						
Percentage Hispanic households	0.9649		-0.4222	**	-0.4544	***
Change in Median Income of the Census Block Group from 1990 to 2000	0.0000		0.0000		0.0000	*
Locational Attributes of the House						
Natural Log of Distance to the TOD	-0.1342		-0.0612		-0.0344	
Distance to the Nearest Caltrain bullet station	0.1152		0.0438		0.1918	**
Distance to the Nearest Caltrain regular station	-0.0352		0.0375		0.0893	
Distance to the Ralston Avenue	-0.8200		-0.2854	***	-0.2662	***
Natural Log of Distance to US-101	0.1176	***	0.1413	***	0.1352	***
Dummy variable for single family homes within 500 feet of US-101	0.0901		0.1200	*	0.1077	**
Natural Log of Distance to the Caltrain line	-0.9546	*	0.0578		0.0266	
Natural log of distance to the Nearest Office/Commercial/Financial Parcel	0.0994		-0.0309		-0.0053	
Distance to the Nearest Bus Stop	0.0404		-0.0145		0.0144	
Natural Log of Distance to the Nearest Heavy Industrial Parcel	NA		-0.0776		-0.1036	
Natural Log of Distance to the Nearest Light Industrial Parcel	0.0510		0.0126		0.0193	
Natural Log of Distance to the Nearest Multi Family Parcel	0.0359		0.0358	***	0.0417	***
Natural Log of Distance to the Nearest Urban Center	1.1241	**	0.0233		-0.0123	
Natural Log of Distance to the Nearest Mobile Home Park	NA		0.0794		0.109235	
Season Dummies						
Winter	-0.0395		-0.0669	**	-0.0599	**
Spring	-0.0145		0.0035		0.0037	
Fall	-0.0143		-0.0301		-0.0286	
Other Temporal Effects						
Mortgage Rates	-0.0325		0.0247		0.0040	
1995	-0.1225	***	-0.3051	***	-0.2654	***
1996	-0.2078	***	-0.3010	***	-0.2675	***
1997	-0.0943	***	-0.2002	***	-0.1783	***
N	83		279		362	
Adjusted R^2	0.715		0.642		0.643	

Notes:
Dependent variable: log of sale price in 2006 dollars
* = $p < 0.10$
** = $p < 0.05$
*** = $p < 0.01$
N/A - Not applicable

Table 51 Hedonic Regression Results for Bay Meadows TOD: 1999-2003

Variables	0-0.5 mile		0.5-1.0 mile	
Constant	15.0507	***	10.73895	***
Structural Attributes of the House				
Natural Log of Age of the House	-0.9896	***	-0.1736	***
Natural Log of Square Footage of the Total Living Space	0.1496	**	0.272485	***
Natural Log of Lot Size	0.0273		0.176592	***
Number of Bathrooms	0.0609	*	0.02439	*
Neighborhood-Level Characteristics				
Percentage Hispanic Households	3.4501	***	-0.00942	
Change in Median Income of the Census Block Group from 1990 to 2000	0.0000	***	1.09E-06	
Locational Attributes of the House				
Natural Log of Distance to the TOD	0.0083		0.020855	
Distance to the Nearest Caltrain bullet station	-0.0019		0.1006	*
Distance to the Nearest Caltrain regular station	NA		-0.01348	
Distance to Ralston Avenue	NA		-0.20494	***
Natural log of distance to US-101	0.0180		0.092297	***
Dummy Variable for Single Family Homes within 500 feet of US-101	-0.0112		0.055794	*
Natural Log of Distance to the Caltrain line	0.0265		0.027937	
Natural Log of Distance to the Nearest Office/Commercial/Financial Parcel	-0.0252		0.047948	**
Distance to the Nearest Bus Stop	-0.0121		-0.00232	
Natural Log of Distance to the Nearest Heavy Industrial Parcel	NA		-0.0809	
Natural Log of Distance to the Nearest Light Industrial Parcel	NA		-0.02147	
Natural Log of Distance to the Nearest Multi Family Parcel	-0.0009		0.02841	***
Natural Log of Distance to the Nearest Urban Center	NA		-0.0164	
Natural Log of Distance to the Nearest Mobile Home Park	NA		0.030861	
Season Dummies				
Winter	-0.0454	*	-0.02984	*
Spring	0.0005		0.014776	
Fall	0.0307		0.012517	
Other Temporal Effects				
Mortgage Rates	0.0082		0.002386	
1999	-0.3253	***	-0.29755	***
2000	-0.1810	***	-0.11744	***
2001	-0.0861	**	-0.11399	***
2002	-0.0618	**	-0.07094	***
N	146		476	
Adjusted R^2	0.658		0.708	

Notes:
Dependent variable: log of sale price in 2006 dollars
* = p < 0.10
** = p < 0.05
*** = p < 0.01
N/A - Not applicable

Table 52 Hedonic Regression Results for Bay Meadows TOD: 2004-2006

Variables	0-0.5 mile		0.5-1.0 mile	
Constant	9.200699	***	9.53805	***
Structural Attributes of the House				
Natural Log of Age of the House	0.175704		-0.14689	***
Natural Log of Square Footage of the Total Living Space	0.198856	*	0.30153	***
Natural Log of Lot Size	0.061375	**	0.208034	***
Number of Bathrooms	0.076095	***	0.014358	
Neighborhood-Level Characteristics				
Percentage Hispanic Households	-1.39932		-0.11025	
Change in Median Income of the Census Block Group from 1990 to 2000	-4.1E-06		1.19E-06	
Locational Attributes of the House				
Natural Log of Distance to the TOD	-0.06012		-0.0131	
Distance to the Nearest Caltrain Bullet Station	0.136713		0.167615	***
Distance to Ralston Avenue	NA		-0.14874	***
Natural Log of Distance to US-101	0.001919		0.064044	***
Dummy Variable for Single Family Homes within 500 feet of US-101	NA		0.06427	***
Distance to US-101 and CA-92 junction	-0.07278		0.0199	
Natural Log of Distance to the Caltrain line	-0.2506		0.0223	
Natural log of Distance to the Nearest Office/Commercial/Financial Parcel	0.161301	*	0.008223	
Distance to the Nearest Bus Stop	0.087347	***	0.01185	
Natural Log of Distance to the Nearest Heavy Industrial Parcel	0.245373		-0.036	
Natural Log of Distance to the Nearest Light Industrial Parcel	-0.0234		-0.0121	
Natural Log of Distance to the Nearest Multi Family Parcel	-0.02459		0.015768	**
Natural Log of Distance to the Nearest Urban Center	NA		-0.0796	***
Natural Log of Distance to the Nearest Mobile Home Park	NA		0.084029	**
Season Dummies				
Winter	-0.00098		-0.05225	***
Spring	0.045588	*	0.001903	
Fall	0.016127		-0.00229	
Other Temporal Effects				
Mortgage Rates	0.030568		-0.00789	
2004	-0.07976	**	-0.08499	***
2005	0.026498		0.039945	**
N	109		425	
Adjusted R^2	0.526		0.774	

Notes:
Dependent variable: log of sale price in 2006 dollars
* = $p < 0.10$
** = $p < 0.05$
*** = $p < 0.01$
N/A - Not applicable

SUMMARY OF FINDINGS

Table 53 provides the summary of the model findings. For each model the table provides the coefficient of the distance to the TOD variable, the number of observations, the adjusted R^2, and indicates the level of significance for the distance to the TOD variable.

Table 53 Summary of Findings

TOD	Time Period/ Distance Bands					
Ohlone Chenyoweth TOD	**1991-1995**		**1996-2003**		**2004-2006**	
	0-0.5 mile	0.5-1 mile	0-0.5 mile	0.5-1 mile	0-0.5 mile	0.5-1 mile
	-0.0124	0.0106	-0.0983	0.0434	**- 0.000233 ****	-0.0159
	N = 39	N = 91	N = 159	N = 260	N = 83	N = 143
	Adj R^2 = 0.749	Adj R^2 = 0.750	Adj R^2 = 0.639	Adj R^2 = 0.658	Adj R^2 = 0.409	Adj R^2 = 0.772
Pleasant Hill TOD	**1996-2001**		**2002-2006**			
	0-0.5 mile	0.5-1 mile	0-0.5 mile	0.5-1 mile		
	-0.0208	0.0535	-0.0027	0.0146		
	N = 387	N = 673	N = 422	N = 756		
	Adj R2 = 0.654	Adj R2 = 0.571	Adj R2 = 0.654	Adj R2 = 0.571		
Downtown Hayward TOD	**1991-2000**		**2001-2006**			
	0-0.5 mile	0.5-1 mile	0-0.5 mile	0.5-1 mile		
	0.0363	0.0148	0.0462	-0.0698		
	N = 229	N = 537	N = 300	N = 637		
	Adj R2 = 0.442	Adj R2 = 0.731	Adj R2 = 0.493	Adj R2 = 0.533		
Bay Meadows TOD	**1995-1998**		**1999-2003**		**2004-2006**	
	0-0.5 mile	0.5-1 mile	0-0.5 mile	0.5-1 mile	0-0.5 mile	0.5-1 mile
	-0.1342	-0.061	0.0083	0.0209	-0.0601	-0.0131
	N = 83	N = 279	N = 146	N = 476	N = 109	N = 425
	Adj R^2 = 0.715	Adj R^2 = 0.680	Adj R^2 = 0.658	Adj R^2 = 0.708	Adj R^2 = 0.526	Adj R^2 = 0.774

**** Significant at p=0.05 level**

(Blue highlight) Variable measures distance to TOD in linear feet

The distance to the TOD is measured as the natural log of the distance of the home to the TOD measured in linear feet. However, for the model where the distance to the TOD was found to have a statistically significant impact on home prices,[91] the distance to the TOD variable was also measured without the log transformation. The coefficient highlighted in blue in Table 53 denotes this. The coefficient for this model suggests that for those homes within 0.5 mile radius of the TOD, every 100 feet decrease in distance to the Ohlone Chynoweth TOD on average increases the single family home sale price by $10,150 – indicating the monetary value of the benefit attributable to the TOD. As the average single-family home price for this distance band is approximately $660,000 (see Table 11), this translates into a 1.5 percent increase in home prices. For all other models the impact of the TOD was statistically insignificant thereby indicating that those TODs did not have any – either positive or negative – effect on surrounding single-family home sale prices.

CONTRIBUTION TO THE LITERATURE, STUDY LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

The extant literature has estimated the benefits of several transportation investments, for example, rail line, rail stations, and freeways. However published literature has not estimated the impact of TODs on surrounding communities. This study fills this significant research gap by estimating the impact of four San Francisco Bay Area suburban TODs on surrounding home prices. However, the development of TODs, especially suburban TODs, is a national phenomenon. Future research can examine the impact of suburban TODs outside the San Francisco Bay Area. This would further the research in two important ways. First, as the number of TODs examined increases, the generalizability of the findings would increase. For example, if several studies conducted across the nation find that the suburban TODs in general do not negatively impact the surrounding home prices, this will go a long way toward garnering support for the development of the suburban TODs. Second, once the number of TODs studied reaches a critical mass, the next step could be to identify the design- and/or policy-features that determine the effect of the TOD on the surrounding community. We hope this study is a significant, albeit small, step in that direction.

ENDNOTES

Executive Summary

1. California Department of Transportation, “Statewide Transit-Oriented Development Study Factors for Success in California,” http://www.dot.ca.gov/hq/MassTrans/Docs-Pdfs/TOD-Study-Final-Rpt.pdf (accessed 08/08/2008).
2. Douglas Porter, *Transit Focused Development: A Synthesis of Practice*, (Washington, D.C.: Transportation Research Board, National Research Council, 1997).
3. Robert Cervero, Christopher Ferrell and Steven Murphy, *Transit Oriented Development and Joint Development in the United States: A Literature Review*, (Washington, D.C.: Transportation Research Board, Transit Cooperative Research Program: Research Results Digest, 2002): 52.
4. Melvin Webber, “The BART Experience: What Have We Learned?” *Public Interest* 12:3 (1976): 79–108.
5. Cervero, Ferrell and Murphy.
6. Richard Voith, “Changing Capitalization of CBD-Oriented Transportation Systems: Evidence from Philadelphia, 1970–1988.” *Journal of Urban Economics* 13 (1993): 361–376.
7. John Landis, Subhrajit Guhathakurta and Ming Zhang, “Capitalization of Transportation Investments into Single-Family Home Prices: A Comparative Analysis of Five California Rail Transit Systems,” (Berkeley, CA: University of California Transportation Center, 1994).
8. Christopher Ferrell, *The Effects of Light Rail Transit on Land Use and Property Values*, (San Jose, CA: Master’s Planning Report, San Jose State University, Urban and Regional Planning Department, 1995).
9. Robert Cervero and Michael Duncan, “Benefits of Proximity to Rail on Housing Markets: Experiences in Santa Clara County,” *Journal of Public Transportation* 5:1 (2002): 1–18.
10. Dean Gatzlaff and Marc Smith, “The Impact of the Miami Metrorail on the Value of Residences Near Station Locations,” *Land Economics* 69:1 (1993): 54–66.
11. Arthur Nelson, “Effects of Elevated Heavy Rail Transit Stations on House Prices with Respet to Neighborhood Income,” *Transportation Research Record* 1359 (1992): 127–132.
12. Steven Lewis-Workman and Daniel Brod, “Measuring the Neighborhood Benefits of Rail Transit Accessibility,” *Transportation Research Record* 1576 (1997): 147–153.
13. Robert Cervero and John Landis, “Twenty-Years of the Bay Area Rapid Transit System: Land Use and Development Impacts,” *Transportation Research A* 31:4 (1997): 309–333.

14. Rachel Weinberger, “Commercial Property Values and Proximity to Light Rail: Calculating Benefits with a Hedonic Price Model.” *79th Annual Meeting of the Transportation Research Board*. (Washington DC: National Research Council, 2000).
15. Cervero, Ferrell and Murphy, 59.
16. Sherwin Rosen, “Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition,” *Journal of Political Economy* 82:1 (1974): 34–55.

Literature Review

17. Vladimir Bajic, “The Effects of a New Subway Line on Housing Prices in Metropolitan Toronto,” *Urban Studies* 20:2 (1983): 147–158.
18. Parsons Brinkerhoff, “The Effect of Rail Transit on Property Values: A Summary of Studies,” http://www.reconnectingamerica.org/public/download/bestpractice162 (accessed 08/08/2008).
19. Nelson.
20. Daniel Hess and Tangerine Almeida, “Impact of Proximity to Light Rail Rapid Transit on Station-area Property Values in Buffalo, New York,” *Urban Studies* 44:5/6 (2007): 1041–1068.
21. Nelson.
22. John Benjamin and Stacy Sirmans, “Mass Transportation, Apartment Rent and Property Values,” *Journal of Real Estate Research* 12:1 (1996): 1–8.
23. Gatzlaff and Smith.
24. Ferrell.
25. John Langley, “Adverse impacts of the Washington beltway on residential property values,” *Land Economics* 52:1 (1976): 42–53.
26. Cervero and Landis.
27. Landis, Guhathukaurta and Zhang.
28. Jon Strand and Mette Vågnes, “The relationship between property values and railroad proximity: a study based on hedonic prices and real estate brokers' appraisals,” *Transportation* 28:2 (2001): 137–156.
29. Robert Armstrong and Daniel Rodríguez, “An Evaluation of the Accessibility Benefits of Commuter Rail in Eastern Massachusetts using Spatial Hedonic Price Functions,” *Transportation* 33:1 (2006): 21–43.
30. Lewis-Workman and Brod.
31. Cervero and Duncan.
32. Ghebreegziabiher Debrezion, Eric Pels and Piet Rietveld, *The Impact of Railway Stations on Residential and Commercial Property Value: a Meta Analysis*, (Amsterdam: Tinbergen Institute, 2003).
33. James Lang and Wesley Jones, “Hedonic Property Valuation Models: Are Subjective Measures of Neighborhood Amenities Needed?” *Real Estate Economics* 7:4 (1979): 451–465.

34. Mingche Li and James Brown, "Micro-Neighborhood Externalities and Hedonic Housing Prices," *Land Economics* 56:2 (1980): 125–141.

35. Ibid.

36. Robin Dubin, "Spatial Autocorrelation and Neighborhood Quality," *Regional Science and Urban Economics* 22:3 (1992): 433–452.

37. Li and Brown.

38. Donald Haurin and David Brasington, "The Impact of School Quality on Real House Prices: Interjurisdictional Effects," *Journal of Housing Economics* 5:4 (1996): 351–368.

39. Dubin.

40. David Brasington, "Which Measures of School Quality Does the Housing Market Value? Spatial and Non-Spatial Evidence," *Journal of Real Estate Research* 18:3 (1999): 395–413.

41. Joel Franklin and Paul Waddell, "A Hedonic Regression of Home Prices in King County, Washington, using Activity-Specific Accessibility Measures." *82nd Annual Meeting of the Transportation Research Board* (Washington DC: National Research Council, 2003).

42. Hoong Chor Chin and Kok Wai Foong, "Influence of School Accessibility on Housing Values," *Journal of Urban Planning and Development* 132 (2006): 120–129.

43. Quang Do, Robert Wilbur and James Short, "An empirical examination of the externalities of neighborhood churches on housing values," *The Journal of Real Estate Finance and Economics* 9:2 (1994): 127–136.

44. Francois Rosiers, "Power Lines, Visual Encumbrance and House Values: A Microspatial Approach to Impact Measurement," *Journal of Real Estate Research* 23:(3) (2002): 275–301.

45. Yan Song and Gerrit Knaap, "New urbanism and housing values: a disaggregate assessment," *Journal of Urban Economics* 54:2 (2003): 218–238.

46. Shishir Mathur, "Impact of Transportation and Other Jurisdictional-Level Infrastructure and Services on Housing Prices," *Journal of Urban Planning and Development* 134 (2008): 32–41.

47. Molly Espey and Kwame Owusu-Edusei, "Neighborhood Parks and Residential Property Values in Greenville, South Carolina," *Journal of Agricultural and Applied Economics* 33:3 (2001): 487–492.

48. Mathur Shishir, Paul Waddell and Hilda Blanco, "The effect of impact fees on the price of new single-family housing," *Urban Studies* 41:7 (2004): 1303–1312.

49. Stephen Mehay, "Governmental Structure and Performance: the Effects of the Lakewood Plan on Property Values," *Public Finance Review* 6:3 (1978): 311–325.

50. David Harrison and Daniel Rubinfeld, "Hedonic housing prices and the demand for clean air," *Journal of Environmental Economics and Management* 5:1 (1978): 81–102.

51. Earl Benson, Julie Hansen, Arthur Schwartz and Greg Smersh, "Pricing Residential Amenities: The Value of a View," *The Journal of Real Estate Finance* and Economics 16:1 (1998): 55–73.
52. Arthur Nelson, John Genereux and Michelle Genereux, "Price Effects of Landfills on House Values," *Land Economics* 68:4 (1992): 359–365.
53. Amy Schwartz, Scott Susin and Ioan Voicu, "Has Falling Crime Driven New York City's Real Estate Boom?" *Journal of Housing Research* 14:1 (2003): 101–135.
54. Melissa Boyle and Katherine Kiel, "A survey of house price hedonic studies of the impact of environmental externalities," *Journal of Real Estate Literature* 9:2 (2001): 117–144.

Case Study Transit Oriented Developments

55. State of California, Department of Finance, "E-1 Population Estimates for Cities, Counties and the State with Annual Percent Change — January 1, 2007 and 2008," http://www.dof.ca.gov/research/demographic/reports/estimates/e-1_2006-07/documents/E-1table.xls (accessed 08/10/2008).
56. U.S. Census 2000.
57. Eric Harris, The County Connection, personal communication, 07/09/2007.
58. Michael Bernick and Robert Cervero, *Transit Villages in the 21st Century,* (New York: McGraw-Hill, 1997).
59. Metropolitan Transportation Commission, *New Places, New Choices: Transit Oriented Development in the San Francisco Bay Area* (Oakland, CA: MTC, November 2006), p.19.
60. Sedway Cooke Associates, *Pleasant Hill BART Station Area Specific Plan* (San Francisco, CA: Sedway Cooke Associates, 1982), p. 14.
61. Sedway Cooke Associates, p. 71.
62. Bernick and Cervero, p. 193.
63. Bernick and Cervero, p. 194.
64. Contra Costa County Community Development Department, *Pleasant Hill BART Station Area Summary Report* (Contra Costa County, CA: Community Development Department, 2001), 6, http://www.co.contra-costa.ca.us/depart/cd/charrette/outcome/I%20Introduction.pdf (accessed 08/10/2008).
65. Bernick and Cervero, p. 195.
66. Ibid, 195.
67. Contra Costa County Community Development Department Redevelopment Division, "Pleasant Hill BART Station Design Charrette—Information, News and Links," http://www.co.contra-costa.ca.us/depart/cd/charrette/news_etc.htm (accessed 07/10/2007).

68. Contra Costa County Community Development Department, “Pleasant Hill BART Shortcut Path and Wayfinding Project,” http://www.cocoplans.org/#PHBART (accessed 07/10/2007).
69. Metropolitan Transportation Commission, p.19.
70. Maret Bartlett, City of Hayward Redevelopment Director, personal communication, 05/05/2008.
71. City of San Jose, “About San Jose,” http://www.sanjoseca.gov/about.asp,” (accessed 08/11/2008).
72. VTA, “VTA Board Memorandum,” http://www.vta.org/inside/boards/packets/2003/04_apr/13.html (accessed 08/11/2008).
73. Shanti Breznau, *The San Jose Case Study: Ohlone Chynoweth Station,* in Hank Dittmar and Gloria Ohland (eds) “New Transit Towns: Best Practices in Transit Oriented Development” (Washington, DC: Island Press, 2003).
74. Ibid.
75. Ibid.
76. Mitchell Postel, *San Mateo: A Centennial History*, (San Francisco: CA, Scottwall Associates), p. 9.
77. Mitchell Postel, p. 39.
78. Bill Wanner, City of San Mateo Planner, personal communication, 03/21/2008.
79. Bay Meadows Land Company, “Aerials,” http://www.baymeadowslandcompany.com/Aerials/ (accessed 07/10/2008).

Research Method, Model Structure and Data Description

80. Voith.
81. Landis, Guhathukaurta and Zhang.
82. Ferrell.
83. Cervero and Duncan.
84. Gatzlaff and Smith.
85. Nelson.
86. Lewis-Workman and Brod.
87. Cervero and Landis.
88. Weinberger.
89. Cervero, Ferrell and Murphy.
90. Rosen.
91. The Ohlone Chynoweth TOD model that estimates the impact of the proximity to the TOD for the homes sold during the period 2004–2006 and within 0–0.5 mile from the TOD.

BIBLIOGRAPHY

Armstrong, Robert, and Daniel Rodríguez. “An Evaluation of the Accessibility Benefits of Commuter Rail in Eastern Massachusetts using Spatial Hedonic Price Functions.”*Transportation* 33:1 (2006): 21–43.

Bajic, Vladimir. “The Effects of a New Subway Line on Housing Prices in Metropolitan Toronto.” *Urban Studies* 20:2 (1983): 147–158.

Benjamin, John, and Stacy Sirmans. “Mass Transportation, Apartment Rent and Property Values.” *Journal of Real Estate Research* 12:1 (1996): 1–8.

Benson, Earl, Julie Hansen, Arthur Schwartz, and Greg Smersh. “Pricing Residential Amenities: The Value of a View.” *The Journal of Real Estate Finance and Economics*16:1 (1998): 55–73.

Bernick, Michael, and Robert Cervero. *Transit Villages in the 21st Century*. New York: McGraw-Hill, 1997.

Boyle, Melissa, and Katherine Kiel. “A survey of house price hedonic studies of the impact of environmental externalities.” *Journal of Real Estate Literature* 9:2 (2001):117–144.

Brasington, David. “Which Measures of School Quality Does the Housing Market Value? Spatial and Non-Spatial Evidence.” Journal of Real Estate Research 18:3 (1999):395–413.

Breznau, Shanti. *The San Jose Case Study: Ohlone-Chynoweth Station* in Hank Dittimar and Gloria Ohland (eds) The New Transit Town: Best Practices In Transit-Oriented Development. Washington, D.C.: Island Press, pages 193–211, 2003.

Cervero, Robert, Christopher Ferrell, and Steven Murphy. “Transit Oriented Development and Joint Development in the United States: A Literature Review.” Transit Cooperative Research Program: Research Results Digest, 52, 2002.

Cervero, Robert, and John D. Landis. “Twenty-Years of the Bay Area Rapid Transit System: Land Use and Development Impacts.” *Transportation Research A* 31:4 (1997): 309–333.

Cervero, Robert, and Michael Duncan. “Benefits of Proximity to Rail on Housing Markets: Experiences in Santa Clara County.” *Journal of Public Transportation* 5:1 (2002): 1–18.

Chin, Hoong, and Kok Wai Foong. “Influence of School Accessibility on Housing Values.” *Journal of Urban Planning and Development* 132 (2006): 120–129.

Debrezion, Ghebreegziabiher, Eric Pels, and Piet Rietveld. “The Impact of Railway Stations on Residential and Commercial Property Value: a Meta Analysis.” Amsterdam:Tinbergen Institute, 2003.

Do, Quang, Robert Wilbur, and James Short. “An empirical examination of the externalities of neighborhood churches on housing values.” *The Journal of Real Estate Finance and Economics* 9:2 (1994): 127–136.

Dubin, Robin. “Spatial Autocorrelation and Neighborhood Quality.” *Regional Science and Urban Economics* 22:3 (1992): 433–452.

Espey, Molly, and Kwame Owusu-Edusei. “Neighborhood Parks and Residential Property Values in Greenville, South Carolina.” *Journal of Agricultural and Applied Economics* 33:3 (2001): 487–492.

Ferrell, Christopher. “The Effects of Light Rail Transit on Land Use and Property Values.” Master’s Planning Report, San Jose State University, Urban and Regional Planning Department, 1995.

Franklin, Joel, and Paul Waddell. “A Hedonic Regression of Home Prices in King County, Washington, using Activity–Specific Accessibility Measures, presented at the82nd Annual Meeting of the Transportation Research Board, Washington DC: National Research Council, 2003.

Gatzlaff, Dean, and Marc Smith. “The Impact of the Miami Metrorail on the Value of Residences Near Station Locations.” *Land Economics* 69:1 (1993): 54–66.

Harrison, David, and Daniel Rubinfeld. “Hedonic housing prices and the demand for clean air.” *Journal of Environmental Economics and Management* 5:1 (1978): 81–102.

Haurin, Donald, and David Brasington. “The Impact of School Quality on Real House Prices: Interjurisdictional Effects.” *Journal of Housing Economics* 5:4 (1996):351–368.

Hess, Daniel, and Tangerine Almeida. (2007). “Impact of Proximity to Light Rail Rapid Transit on Station-area Property Values in Buffalo, New York.” *Urban Studies* 44:5/6(2007): 1041–1068.

Landis, John, Subhrajit Guhathakurta, and Ming Zhang. “Capitalization of Transportation Investments into Single-Family Home Prices: A Comparative Analysis of Five California Rail Transit Systems.” Berkeley, CA: University of California Transportation Center, 1994.

Lang, James, and Wesley Jones. “Hedonic Property Valuation Models: Are Subjective Measures of Neighborhood Amenities Needed?” *Real Estate Economics* 7:4 (1979): 451465.

Langley, John. “Adverse impacts of the Washington beltway on residential property values.” *Land Economics* 52:1 (1976): 42–53.

Lewis-Workman, Steven, and Daniel Brod. “Measuring the Neighborhood Benefits of Rail Transit Accessibility.” *Transportation Research Record* 1576 (1997): 147–153.

Li, Mingche, and James Brown. “Micro-Neighborhood Externalities and Hedonic Housing Prices.” *Land Economics* 56:2 (1980): 125–141.

Nelson, Arthur. “Effects of Elevated Heavy Rail Transit Stations on House Prices with Respect to Neighborhood Income.” *Transportation Research Record* 1359 (1992): 127–132.

Mathur, Shishir. “Impact of Transportation and Other Jurisdictional-Level Infrastructure and Services on Housing Prices.” *Journal of Urban Planning and Development* 134(2008): 32–41.

Mathur, Shishir, Paul Waddell, and Hilda Blanco. “The effect of impact fees on the price of new single-family housing.” *Urban Studies* 41:7 (2004): 1303–1312.

Mehay, Stephen. “Governmental Structure and Performance: the Effects of the Lakewood Plan on Property Values.” *Public Finance Review* 6:3 (1978): 311–325.

Nelson, Arthur, John Genereux, and Michelle Genereux. “Price Effects of Landfills on House Values.” *Land Economics* 68:4 (1992): 359–365.

Parsons Brinkerhoff, P. “The Effect of Rail Transit on Property Values: A Summary of Studies.”http://www.reconnectingamerica.org/public/download/bestpractice162(accessed 08/08/2008).

Porter, Douglas R. “Transit Focused Development: A Synthesis of Practice.” Washington, D.C.: Transportation Research Board, National Research Council, 1997.

Postel, Mitchell. *San Mateo: A Centennial History.* San Francisco: CA, Scottwall Associates, 1994.

Rosen, Sherwin. “Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition.” *Journal of Political Economy* 82:1 (1974): 34–55.

Rosiers, Francois. “Power Lines, Visual Encumbrance and House Values: A Micro Spatial Approach to Impact Measurement.” *Journal of Real Estate Research* 23:3 (2002):275–301.

Schwartz, Amy, Scott Susin, and Ioan Voicu. “Has Falling Crime Driven New York City's Real Estate Boom?” *Journal of Housing Research* 14:1 (2003): 101–135.

Song, Yan, and Gerrit Knaap. “New urbanism and housing values: a disaggregate assessment.” *Journal of Urban Economics* 54:2 (2003): 218–238.

Strand, Jon, and Mette Vågnes (2001). “The relationship between property values and railroad proximity: a study based on hedonic prices and real estate brokers' appraisals.”*Transportation* 28:2 (2001): 137–156.

Voith, Richard. “Changing Capitalization of CBD-Oriented Transportation Systems: Evidence from Philadelphia, 1970–1988.” *Journal of Urban Economics* 13 (1993): 361–376.

Webber, Melvin, M. 1976. “The BART Experience: What Have We Learned?” *Public Interest* 12:3 (1976): 79–108.

Weinberger, Rachel. “Commercial Property Values and Proximity to Light Rail: Calculating Benefits with a Hedonic Price Model,” presented at the 79th Annual Meeting of the Transportation Research Board. Washington DC: National Research Council, 2000.

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