

HOUSING AND TRANSPORTATION AFFORDABILITY IN CARRBORO, NORTH CAROLINA

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Executive Summary

In an effort to contribute to the on-going discussion of housing affordability in the Town of Carrboro, our class -- a graduate level capstone course in the Department of City and Regional Planning at the University of North Carolina at Chapel Hill -- conducted a housing and transportation affordability assessment of the Town of Carrboro and researched the impact of local land use policies on affordability. The intersection of housing and transportation costs in Carrboro was a frequently mentioned topic at recent meetings of the Board of Alderman's Affordable Housing Task Force and the Town Planning Board's Affordable Housing dialogues in the Fall of 2012.

We defined housing affordability as households spending less than 30% of their income on housing costs based on the U.S. Department of Housing and Urban Development's definition. Another method of looking at affordability is to combine housing and transportation costs. Todd Litman of the Victoria Transport Policy Institute suggests that a household should spend less than 45% of their income on these combined costs. Additionally, we used Area Median Income (AMI) as a benchmark in our analysis, which in Carrboro was \$43,276 in 2010.

According to 2010 Census data, about 51% of the Town's renters were spending more than 30% of their income on housing. Because Census data includes the student population, we surveyed 16 apartment complexes in Carrboro to assess rental costs and the subsequent affordability of rental units in the area. Average rents ranged from \$741 for a one-bedroom unit to \$1,035 for a three-bedroom unit. The average one-bedroom apartment is affordable for households making 69% of AMI or higher; the average two-bedroom apartment is affordable for households making 74% of AMI; and the average three-bedroom apartment is affordable for households making 96% of AMI or higher.

The second part of the housing assessment was an analysis of homeowner affordability. According to Census data, about 35% of homeowners with a mortgage in Carrboro are living in "unaffordable housing." To better understand this figure, we collected recent housing sales figures on attached and detached single family homes for Carrboro from August 2012 to February 2013. The housing costs were calculated using monthly mortgage payments (based on a 10% down payment and 30-year fixed rate mortgage with a 3.38% interest rate), taxes and insurance. Our calculations found that based on the average recent sales, a two-bedroom attached unit is affordable for those making 88% of the AMI or higher; a two-bedroom single family unit is affordable for those making 123% of the AMI or higher; a three-bedroom unit is affordable for those making 144% of AMI or higher; and a four-bedroom unit is affordable for those making 176% of AMI or higher.

The housing assessment shows that housing is affordable for many Carrboro residents, particularly those making 70-90% of AMI or higher. However, it is essential to consider the tradeoff between housing costs and transportation access. Many Carrboro residents have access to an affordable transportation option: public transit. However, while it is possible to not own a car, automobile owners have greater access to more locations in the region in a shorter amount of time than transit riders. Until the transit network and efficiency is improved in the region, the best affordability strategy the Town can implement is to increase affordable housing options near transit.

Two town-controlled land use policies could be adjusted to increase affordable housing options with transit access. The first, Carrboro's 40% Open Space Requirement, is a policy that was discussed during recent conversations on housing affordability. The policy mandates that 40% of residential developments be preserved as open space. This requirement may have both positive and negative impacts on transportation and housing affordability, with the potential to both exacerbate and address the problem of affordability depending on the nuances of implementation. When implemented incorrectly, the policy can be detrimental to affordability for the following reasons: it may increase home values and push low-income households farther away from amenities and transit; it reduces the number of units near amenities; and it can increase maintenance costs.

However, when the Open Space Requirement is implemented appropriately, as guided by the North Carolina Conservation Subdivision Handbook, it can increase the stock of affordable homes that have access to amenities and transit. With a focus on natural, contiguous open space, this policy may reduce construction and maintenance costs for new developments. The Open Space Requirement also provides an added incentive to apply the affordable housing density bonus, which directly results in an increase in the stock of affordable housing. In addition to the effective implementation of the 40% open space policy, this report recommends a reduced 20% open space requirement within one mile of the downtown core in order to bring more people closer to amenities and transit access.

The second town-controlled policy is the Town's presumptive parking standards, and our evaluation addresses the issue of housing affordability by analyzing parking policies, parking supply and parking demand in the town of Carrboro. The need for parking in most communities is undeniable, but excess parking increases the cost of development, increases the cost of housing for consumers, and decreases the amount of buildable area available in the town. Even with this knowledge, parking is often over-supplied due in large part to difficulties in projecting parking demand.

To determine the relationship between parking supply and demand in Carrboro, we explored the presumptive parking standards for multifamily developments set forth by the Town of Carrboro and national parking recommendations from the Institute of Transportation Engineers (ITE). We also studied the parking rates at peak hours for four multifamily developments in the Town, all of which showed varying degrees of over-supplied parking. To remedy these results, we recommend expanding the zones in which reduced parking minimums are applied, instituting parking maximums rather than minimums in focused areas of town, and reassessing Carrboro's presumptive standards to better match demand. The town could also encourage the unbundling of parking and housing costs in future development.

Introduction

This report presents detailed information about housing and transportation costs in Carrboro, and explores two local policies that impact these costs. The information in this report is based on a thorough assessment of the Town's housing supply and labor force characteristics, a detailed analysis of the 40% Open Space Requirement policy, and a case study designed to evaluate current parking policy in Carrboro. The next chapter provides more detailed information about housing and transportation costs in Carrboro and the results of our assessment. The following two chapters focus on the two local land use policies we examine in more detail: the 40% Open Space requirement and the Town's presumptive parking standards.

Summary of Findings

- **Housing Assessment:** Housing and transportation costs should be considered together to fully understand affordability in Carrboro. Locating housing near transit can provide more affordable transportation options, but the trade-off between cost and access still exists.
- **Open Space Policy:** The 40% open space requirement may be adjusted to increase affordability and enhance housing options near downtown, but does not necessarily need to be repealed.
- **Parking Policy:** Decreasing parking standards and expanding reduced parking zones has the potential for increasing affordability in Carrboro.

Background

Carrboro is a small town of 19,582 residents in central North Carolina. Carrboro's population is closely connected to the University of North Carolina at Chapel Hill (UNC), with 907 UNC faculty and staff and 1,693 students as residents in 2009. Additionally, there has been an influx of foreign-born residents in the Town. As a result of these two trends, the population of Carrboro has grown and diversified since 1970. Carrboro has attempted to meet the needs of the growing population while regulating the development of the Town. The result of recent population changes and the Town's growth pattern has been an emerging housing affordability issue in Carrboro (Affordable Housing Dialogues 2012).

Factors Impacting Housing Affordability in Carrboro

The housing affordability issue in Carrboro is compounded by the following factors:

- Strong demand for the area due to proximity to UNC, access to transit, and quality schools
- Low supply of designated affordable housing units that meet the diverse needs of renters or homeowners
- Flat wages and rising housing costs
- Major rental management companies driving up cost for renters
- Supplemental costs of transportation (Affordable Housing Dialogues 2012)
- Local land use requirements' impact on affordable housing development

The last two factors, transportation costs for residents and local land use policy, constitute the focus of our research on housing affordability. First, transportation costs contribute to the affordability or unaffordability of housing options. A demand-side analysis of how housing and transportation costs impact Carrboro residents will provide insight into how local agencies can better understand the issue of affordability in order to develop effective policies to address the issue. Second, local land use policy directly impacts housing affordability because it has the capacity to encourage or discourage affordable housing development. An analysis of two specific policies, the 40% open space requirement and the parking standards, will provide a supply-side perspective of the housing affordability problem in Carrboro.

Transportation Costs' Impact on Housing Affordability

Housing and transportation costs are inextricably linked. The idea behind “bid rent” theory is that one’s residential location choices are based on a tradeoff between the increasing costs of commuting to work and the decreasing unit costs of housing and land that are associated with living further from the Central Business District (CBD) or other central areas of employment. However, housing costs are often much more visible and transparent to many prospective homebuyers and renters than transportation costs. People who do consider total living costs (including both transportation and housing) must balance transportation cost increases and decreased housing costs from living further out from the center. Transportation investments can alter the cost of transportation, making bid-rent curves flatter in areas where there is better transportation access and lower transportation costs (Forkenbrock, Mathur and Schweitzer 2001).

Housing Affordability

Housing affordability has been a challenge for growing cities. As cities grow, demand for space increases and housing prices and rents increase, as land becomes scarce (Voith and Wachter 2009). This phenomenon is more visible in the city center. With increasing suburbanization and sprawl, population disperses to outlying areas, which then increases transportation costs to employment centers. Housing affordability is a complex issue; however, a threshold of “affordability” is defined by the United States Census, whereby housing costs should not exceed 30% of a household’s income. This definition originates in the United States National Housing Act of 1937, and is a generally accepted threshold that persists to the present day. Recently, the U.S. Department of Housing and Urban Development (HUD) and the think tank Center for Neighborhood Technology (CNT) have been promoting the idea of taking into account both housing and transportation costs when discussing affordability.

Transportation Affordability

Transportation costs are the second largest household costs after housing. Todd Litman of the Victoria Transport Policy Institute looks at transportation affordability more broadly, which he defines as households spending less than 20% of their budget on transportation, and less than 45% of their budget on housing and transportation combined. Transportation affordability analyses are tricky, as people’s transportation needs, preferences and abilities vary. Litman suggests accounting for the following factors in an affordability analysis of a jurisdiction: income, household responsibilities, physical/mental abilities, ability to understand and read the local language, and ability to drive and access to a car. In considering transportation costs, Litman suggests incorporating vehicle costs and fees, fuel prices, tolls, parking fees, transit and taxi fares, and telecommunication and delivery services. Ultimately, he believes that the analysis

should be based on total housing and transportation costs and should account for indirect costs (Litman, *Transportation Affordability: Evaluation and Improvement Strategies* 2013).

The Nexus of Housing and Transportation

Contextualizing housing costs with transportation costs provides a more comprehensive understanding of housing affordability. There is a basic tradeoff between paying more for housing, or enduring a longer commute and higher transportation costs. The commonly accepted distribution of income on housing, food and transportation has shifted over time according to the absolute costs of these items, their costs relative to each other, and the necessary quantity required of this good. For example, in 1920, food comprised 41% of household expenditures, housing 27%, and transportation 3%. These numbers have shifted dramatically over time, particularly with increased transportation costs as people travel farther distances: Today, food represents 16% of household expenditures, housing 25-35%, and transportation 15-35% (Bernstein 2009).

Low income households are particularly challenged by the high costs of housing and transportation. While housing costs are obviously restrictive, transportation costs can pose barriers to employment access and economic independence. Seeking cheaper housing farther away from employment and other resources increases transportation costs, almost to an unaffordable level. The Center for Housing Policy attempted to quantify this tradeoff, finding that for every dollar saved on housing, households ended up spending an additional 77 cents on transportation (note that this is in 2005, before the dramatic gas price increases of 2008) (Center for Transit Oriented Development 2009). In addition, a 2006 report by the Center for Housing Policy and Center for Neighborhood Technology found that working families (annual income between \$20,000 and \$50,000) spent more on transportation than on housing in 17 out of 28 metropolitan areas (Center for Transit Oriented Development 2009).

Parking also plays a significant role in the cost of housing. First, the common practice of bundling parking costs with housing costs – providing “free parking” included with rent rather than pricing it separately from housing units – serves to increase housing unit prices. One parking spot can increase the cost of housing by approximately 12.5% (Litman 2012). Another study demonstrated that the increased cost of parking is higher to the developer than it would be to the renter (Jung 2009), indicating that developers must therefore charge more per unit to make up for this financial loss. Since this extra cost cannot be fully recovered, the developer provides fewer housing units overall and at higher market-clearing costs. Furthermore, since parking is a fixed expense, the bundled costs of parking and housing have a disproportionate impact on lower income households.

Second, minimum parking requirements impact the supply of parking and ultimately the supply and cost of housing. The more parking spaces that developers must build, the less space they have for residential units, and the higher rents they charge (Furman Center for Real Estate & Urban Policy 2012). A study conducted by Rachel Weinberger in New York City found that when households had guaranteed parking at home, there was a greater propensity to use the automobile for work trips, even if the two destinations are well-served by transit. Thus, when minimum parking requirements are high, they encourage more driving (Jaffe 2012).

The origin of minimum parking requirements is unclear. A 1996 survey of 144 planning directors found that many of these requirements were based off of nearby cities or the Institute of Transportation Engineers (ITE) Parking Generation manual. The ITE manual essentially uses the

peak parking occupancy in an area that has free parking to define the minimum number of parking spaces that a developer needs to build (Shoup 1999). Much of the ITE manual is based off of suburban samples – sometimes dated back to the 1970s and 1980s – that are not necessarily representative of many communities, particularly for areas served by transit. Thus, the minimum requirement is not truly reflective of the actual market for parking.

Addressing Housing and Transportation Affordability

Scholars and policymakers have attempted to measure the true affordability of a place by accounting for the transportation burden that accompanies housing. In 2006, CNT conducted a survey of 28 metropolitan areas and found that the housing-transportation cost burden is similar for working families making between \$20,000 and \$50,000 across the metro areas, ranging from 54% in Pittsburgh to 63% in San Francisco, with an average of 57% (Center for Neighborhood Technology 2010). CNT's innovative Housing and Transportation (H+T) Affordability Index is one tool that demonstrates the impact of transportation costs on "true" home affordability, and the limited range of homes that can actually be considered affordable. Homes that are more accessible to transportation infrastructure, services, and activity centers carry lower transportation costs, and are also more likely to hold their value in periods of economic uncertainty than homes in the urban fringe.

Location Efficient Development is one way to reduce the transportation costs associated with housing. Such development maximizes accessibility and affordability through proximity to public transit, public services, and walkable and bikeable infrastructure, in order to mitigate automobile dependency (Litman 2010). The Location Efficient Mortgage is a proposed tool that aims to capture these savings in transportation costs. A location efficient mortgage accounts for the potential savings in transport costs and increases the buying power of homebuyers who wish to purchase a home in particularly accessible areas. In theory, this tool makes location efficient homes more affordable, and incentivizes the purchase of location efficient homes. The Center for Transit Oriented Development (CTOD) estimated that those living in auto-dependent locations spend on average 25% of their income on transportation, while those located in more transportation efficient locations can save an additional 9% of their income (Center for Transit Oriented Development 2008). Their assessment is based on categorizing transportation costs in three ways: the cost of automobile ownership, automobile usage, and transit costs.

Housing and Transportation Affordability Assessment

Introduction

Because housing and transportation affordability should be considered together, we conducted a detailed housing and transportation affordability assessment of Carrboro. We examined federal and local data to gain insight into Carrboro's economic profile, the cost of housing, the cost of transportation, and the supply and demand of housing in the area. To assess housing affordability, we collected information on the housing market for renters and homeowners. Based on the cost of housing, we quantify the income levels needed to be able to afford housing in the Town of Carrboro.

We then assess the cost of transportation for Carrboro households for different types of commuters. Using combined housing and transportation costs, we discovered what household income level is needed to be able to afford various housing and transportation options in Carrboro.

Finally, we present case studies of four sample households in Carrboro. Based on their lifestyles and occupations, we calculate their housing and transportation costs and assess what percentage of their monthly income such costs comprise.

Economic Profile of Carrboro

Federal statistics provide a high-level economic and housing affordability profile of Carrboro. Carrboro is part of the Durham-Chapel Hill Metropolitan Statistical Area (MSA). The MSA's area median income (AMI) is \$51,632. The AMI for the Town of Carrboro is lower, at \$43,276 (American Community Survey 2007-2011). Occupational salary information is collected by the Bureau of Labor Statistics for the MSA. As of May 2012, the hourly mean wage for the MSA is \$26.20. Table 1 outlines a sample of MSA occupations, their median annual salary, and how the salary figure relates to Carrboro's AMI (Statistics 2012).

Table 1: Sample of Durham-Chapel Hill MSA Occupations and Salaries, 2012

Profession	Median Annual Salary	Percentage of Carrboro's AMI
Fast Food Cooks	\$18,300	42%
Retail Salesperson	\$21,010	49%
Construction Laborers	\$29,730	69%
Administrative Assistants	\$31,870	74%
Child, Family, and School Social Workers	\$40,680	94%
Police Officers	\$54,230	125%
Librarians	\$55,300	128%
Accountants & Auditors	\$62,850	145%
Chemists	\$69,760	161%
Postsecondary Education Administrators	\$84,280	195%
Computer and Information Systems Managers	\$118,010	273%

Source: Bureau of Labor Statistics

Given the number of students in Carrboro, we are interested in looking at the workforce in Carrboro to gain a better understanding of the permanent residents and what kind of jobs they might hold.

Out of the 11,596 members of the civilian population who are 16 and over that are employed in Carrboro, the majority of workers are in the “management, business, science, and arts” occupation, and the predominant industry is educational services, health care, and social assistance, with just over 40% of the population.

Table 2: Occupation and Industry Categories of Carrboro residents

Occupation	Employees	Percent
Management, business, science, and arts occupations	6,370	54.9%
Service occupations	2,317	20.0%
Sales and office occupations	1,623	14.0%
Natural resources, construction, and maintenance occupations	700	6.0%
Production, transportation, and material moving occupations	586	5.1%
Industry	Employees	Percent
Educational services, and health care and social assistance	4,907	42.3%
Professional, scientific, and management, and administrative and waste management services	1,582	13.6%
Arts, entertainment, and recreation, and accommodation and food services	1,179	10.2%
Construction	810	7.0%
Retail trade	703	6.1%
Manufacturing	654	5.6%
Other services, except public administration	613	5.3%
Finance and insurance, and real estate and rental and leasing	351	3.0%
Public administration	316	2.7%
Information	290	2.5%
Wholesale trade	105	0.9%
Transportation and warehousing, and utilities	66	0.6%
Agriculture, forestry, fishing and hunting, and mining	20	0.2%

Source: American Community Survey, 2007-2011

Housing Profile of Carrboro

Carrboro has a very high renter population, most likely attributed to the high student population from UNC-Chapel Hill, which is nearby. Tenure statistics for Carrboro are almost exactly the opposite of state and national figures: 65% of Carrboro households are renter-occupied, while 35% are owner-occupied. Both single-family and multifamily homes are in high demand in Carrboro. 68% of all housing units in structure are single-family detached or attached units. 25% of all housing units in structure are multifamily, with the remaining units are mobile homes, boats, RVs, or vans. Carrboro’s housing stock has only a 5.7% vacancy rate, lower than North Carolina’s 14.5% and the United States’ 12.4% vacancy rate (2011 UNC Campus Commuting Survey 2011).

Home values are high in Carrboro. According to the ACS, the median home value for owner-occupied housing units in Carrboro is \$345,700, significantly higher than the state’s median of \$152,700 and the national median of \$186,200. The median gross rent for Carrboro is \$797, slightly higher than the state’s figure but lower than the national median rent. The value of owner-occupied homes and the cost of rents directly impact affordability in Carrboro. According to federal data, about 51% of the Town’s renters were spending more than 30% of their income

on housing, while 25% of homeowners with a mortgage were paying more than this threshold (American Community Survey 2007-2011).

Transportation Profile of Carrboro

To assess the situation of how housing and transportation costs might be linked, we use Longitudinal Employer Household Dynamics (LEHD) OntheMap's 2010 data to determine the commuting patterns of both Carrboro workers and Carrboro residents, for primary jobs only. Out of the 1,049 workers who are earning \$1,250 a month or less that are employed in Carrboro, 872 live outside of Carrboro, and 177 live in Carrboro. There are 1,511 workers who are earning \$1,250 a month or less that live in Carrboro, and 1,334 of those live in the area but work outside. Looking at the higher income brackets, there are 1,840 workers that are employed in Carrboro that earn between \$1,251 and \$3,333 per month. Out of these, 1,618 are living outside the area, and 222 are employed and living in Carrboro. There are 2,837 workers in this income bracket that live in Carrboro, and 2,615 of them work outside of Carrboro. The highest income bracket reported in the LEHD OntheMap report is workers who are earning over \$3,333 per month. There are 1,264 such workers, who are employed in Carrboro, and 1,120 of them live outside Carrboro and 144 live inside the boundary. Out of the 3,710 workers who live in Carrboro in that income bracket, 3,566 of them work outside Carrboro.

In looking at the lowest income bracket, workers who are earning under \$1,250 per month are travelling primarily eastward for their jobs. 771 (51%) of these workers are travelling less than 10 miles to their job, 270 (17.9%) are traveling 10 to 24 miles, and 201 (13.3%) are travelling 25 to 50 miles. Finally, 269 (17.8%) are travelling more than 50 miles.

Flipping this around and looking at the workers that are actually employed in Carrboro, there are 1,049 workers that work in Carrboro who earn \$1,250 or less per month. Out of these, 461 (43.9%) live less than 10 miles away, 202 (19.3%) live 10 to 24 miles away, 139 (13.3%) live 25 to 50 miles away, and 247 (23.5%) live more than 50 miles away.

It appears as if workers in the lowest income bracket who are earning under \$1,250 a month are primarily traveling less than 10 miles to their job. As UNC is quite close to Carrboro and a large employer in the area, it is possible that many workers are going to UNC, and that graduate and professional students are captured in the lowest income bracket. From the 2011 UNC Commuter Survey, it appears as if 7.4% of the UNC employees are coming from Carrboro and 23% of all students are coming from Carrboro, but it is not possible to break this out by income (2011 UNC Campus Commuting Survey 2011)

In terms of mode split for commuting, the vast majority of Carrboro residents (70% in 2010) commute by car to work. However, public transit has become an increasingly popular transportation option over the past decade, with 16.3% of commuters in 2010 compared to 9.1% using transit in 2000 (5-Year American Community Survey 2010). The Chapel Hill Transit system, which serves Carrboro, went fare-free in 2003, which might have influenced the increasing transit mode share. However, given the average commuting distance and employment locations of those living in Carrboro, many Carrboro residents require a car.

Carrboro Housing Supply & Demand

The cost of homes and rents is directly linked to the supply and demand of those goods. It is crucial to understand the local housing market to assess affordability issues and to determine local policy responses. We utilize analysis of building permits and vacancy rates to determine housing supply and demand.

As of April 2013, housing development was quite active in the Town of Carrboro. According to City records, 11 residential development projects are currently in the pipeline (Table 3). These developments will produce between 312 and 387 single-family homes, between 166 and 267 multifamily units, between 125 and 152 condos, and up to 27 apartments. At present, four of the developments were taking advantage of the Town's affordable housing density bonus. A total of 79 affordable housing units are planned or under construction right now, and three other developments are still considering whether to include affordable housing (Town of Carrboro 2013).

Table 3: Current Developments in Carrboro as of April 2013

Name	# of Single Family Homes	# of Townhomes or Duplexes	# of Condos	# of Apartments	# of Affordable Units	Location	Status
Ballentine	60	36	0	0	0	North of Harmony Farms E of Old NC 86	Under Construction, 38 COs issued
Winmore VMU	98	66	68	0	58	1318 Homestead Road	Under Construction, 150 COs Issued
Litchfield AIS	31	0	0	0	7	900 Homestead Road	Planned
Claremont AIS	75		0	0	12	1018 Homestead Rd	Under Construction, 62 COs issued
Claremont South	68	26	0	0	Unsure	1001 Homestead Road	Planned
Veridia	39	0	0	0	Unsure	810 Fayetteville Road	Planned
Lloyd Harbor AIS	16	0	0	0	2	201 Quail Roost Drive	Under Construction, 0 COs issued
Shelton Station	Not specified yet					410 N Greensboro St	Planned
The Butler	0	0	57	0	0	120 Brewers Lane	Planned
The Alberta	0	0	27		Unsure	201 Maple Avenue	Planned
Roses Walk at University Lake	0	64	0	0	0	Old Fayetteville Road	Planned, 58 COs issued
TOTAL	Between 312-387	Between 166-267	Between 125-152	Between 0-27	At least 79		

Source: Town of Carrboro Building Permits

To assess housing demand for the Carrboro rental market further, we contacted multifamily apartment complexes in Carrboro to obtain information on their current vacancies. We obtained this information from 16 complexes, but there were others whom we could not reach or that would not disclose this information to us. Five complexes in Carrboro had no vacancies. Five of the complexes had fewer than 10 vacant units, and three complexes had between 10 and 20 vacant units.

The current development data tells us that real estate developers believe the market demands more housing, especially single family and townhome/duplex units. Further, it shows that the affordable housing density bonus is being utilized but it is only impacting about 11% of new residential development. The low number of vacant units for most of the apartment complexes in Carrboro further demonstrates the high demand for multifamily units. Our analysis reveals an ample amount of single-family, townhome, duplex, and condo housing supply in the pipeline. There may be more opportunity for apartment development considering the high levels of occupancy in most of the existing developments.

Housing Assessment of Carrboro

Though federal and local statistics provide a foundation for our understanding of housing affordability in Carrboro, a deeper study of the housing market in Carrboro is necessary to fully understand the affordability issue. Federal data includes the student population, and the Town is particularly interested in understanding how housing & transportation costs impact their permanent residents. In considering affordability in the subsequent sections, we use the definition purported by the U.S. Census and HUD, stating that a household should spend no more than 30% of its monthly income on housing costs.

Renter Affordability

As part of the renter affordability analysis, we surveyed 16 apartment complexes in Carrboro to assess rental costs and the subsequent affordability of rental units in the area. We collected rents and vacancies for each type of unit. The multifamily rental market in Carrboro offers studio, one-bedroom, two-bedroom, and three-bedroom units. Average rents ranged from \$741 for a one-bedroom to \$1,032 for a three-bedroom unit. The average one-bedroom apartment is affordable for households making 69% of AMI or higher, comparable to what a construction worker makes in the MSA. The average two-bedroom apartment is affordable for households making 74% of AMI, comparable to what an administrative assistant makes in the MSA. The average three-bedroom apartment is affordable for households making 96% of AMI or higher, comparable to what a social worker makes in the area (Table 4).

Table 4: Rental Housing Costs in Carrboro, 2013

Rental Type	Sample Size	Range of Rents	Average Monthly Rent	Minimum Annual Income Needed	Percentage of Carrboro AMI
1 Bedroom	13	\$523-\$1,060	\$767	\$29,646	69%
2 Bedroom	11	\$615-\$1,046	\$801	\$32,061	74%
3 Bedroom	4	\$975-\$1,410	\$1,035	\$41,400	96%

Homeowner Affordability

To gather information about homeownership, we used Zillow.com, a real estate information website, to gather information about all single-family, condominium, and townhouse properties sold in Carrboro from August 2012 to February 2013. Over these six months, there were ten 2-bedroom townhome or condominium units, one 2-bedroom single family home, fourteen 3-bedroom single family homes, and seven 4-bedroom single family homes sold.

Figure 1 displays the location of these properties by number of bedrooms. The most expensive property sold was a 4 bedroom, 3 bathroom single-family home, which sold for \$395,000. The average price per square foot of these 32 properties is \$147.01 per square foot. We also calculated the estimated monthly payment for each property, based upon a 10% down payment and 30-year fixed term mortgage, with an interest rate of 3.38% (Primary Mortgage Market Survey Results April). We factored in the tax rate of 0.016358 per dollar which includes the Carrboro city tax, the Orange County tax, and the school district tax, and an annual insurance fee of \$481 (CNN). The mortgage estimator we use suggests including PMI (private mortgage insurance) of \$80 per month for having a down payment of less than 20% (CNN).¹

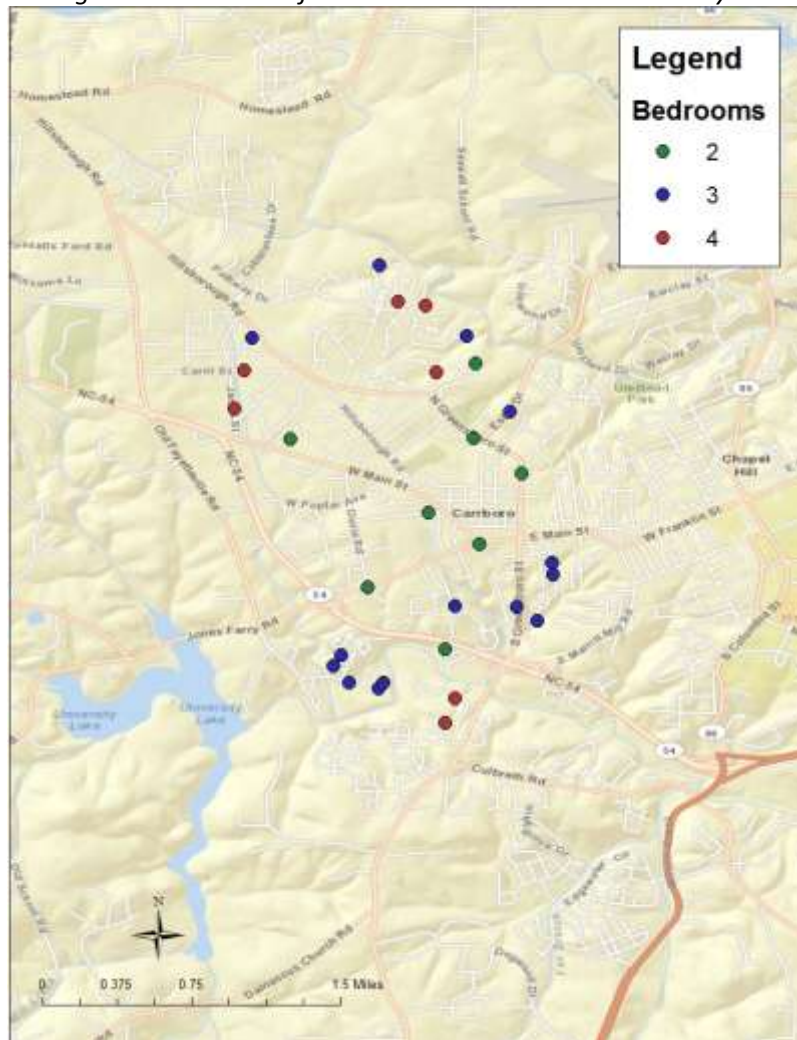
Table 5 below displays the range and average sale price of units in Carrboro, monthly mortgage payment by the number of bedrooms in each unit, the minimum annual income needed for it to be affordable, and what percentage of AMI that would be.

Table 5: Home Sale Prices in Carrboro, 8/2012-2/2013

House Type	Sample Size	Range of Sale Prices	Average Sale Price	Average Monthly Costs	Minimum Annual Income Needed	Percentage of Carrboro AMI
2 bedroom (condo)	10	\$30,000-\$255,000	\$144,110	\$954	\$38,151	99%
2 bedroom (single family)	1	\$210,000	\$210,000	\$1,335	\$53,412	123%
3 bedroom	14	\$160,000-\$395,000	\$248,571	\$1,561	\$62,441	144%
4 bedroom	7	\$230,000-\$395,000	\$309,214	\$1,909	\$76,378	176%

¹ Note: Average PMI ranges from \$50 to \$80 per month based on a median priced home of \$159,000. To keep calculations simple, we keep it \$80 for each unit.

Figure 1: Locations of home sales considered in the analysis



Source: Zillow, ESRI

Transportation Affordability

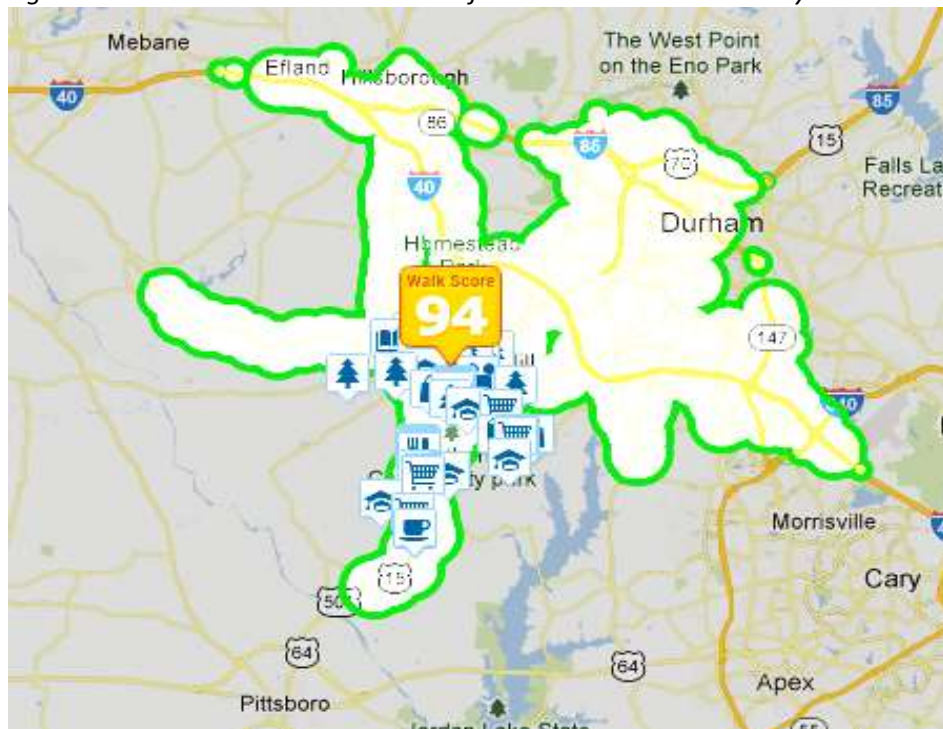
Quantifying transportation costs is a tricky endeavor; there are many factors that affect transportation costs. In considering the costs associated with owning a car, there are fixed costs, such as registration fees and insurance. Other expenses, such as taxes and depreciation, vary greatly based on the type of car. Finally, expenses such as maintenance and fuel are dependent on the usage of the car. In this analysis, we use the 2013 federal reimbursement rate of 0.565 cents per mile, which accounts for fixed and variable operating expenses.

We created three different transportation scenarios to portray the range of transportation costs borne by Carrboro residents. One such scenario comprises using transit only, and would involve one person purchasing a monthly Triangle Transit express bus pass, which costs \$85 per month and allows for unlimited rides on all Triangle Transit routes, Capital Area Transit (CAT) routes, and Durham Area Transit Authority (DATA) routes. The Chapel Hill-Carrboro transit system is fare-free, so travel on this bus system would not incur additional costs. The second scenario involves a household that owns a car, but drives it very little. This assumes that the car is used

every weekday for a 5-mile commute trip each way, plus an additional 50 miles per week. Based on a total of 4,800 miles, this would cost \$2,712 for the year. A second car usage scenario assumes that the car is driven about 24,000 miles per year. This scenario assumes a 35-mile commute each way (i.e. to Raleigh and back) and an additional 150 miles per week. This would cost a household \$13,560 per year. In reality, we would assume that if a household owns a car, the average use probably falls somewhere between these two scenarios, and transportation costs would fall in this range.

Inherently, there is a tradeoff between housing costs and transportation access. These two maps below show the distances that can be reached in 45 minutes from downtown Carrboro by automobile vs. by transit. Although it is possible to go “car-free” in Carrboro and rely on transit, there is a limit on accessibility of certain areas. Accessibility decreases on the weekends and off-peak hours, given the schedules of the transit systems.

Figure 2. Area reachable in 45 minutes from downtown Carrboro by automobile



Source: WalkScore

Figure 3. Area reachable in 45 minutes from downtown Carrboro by transit (weekday service)



Source: WalkScore

Housing and Transportation Affordability

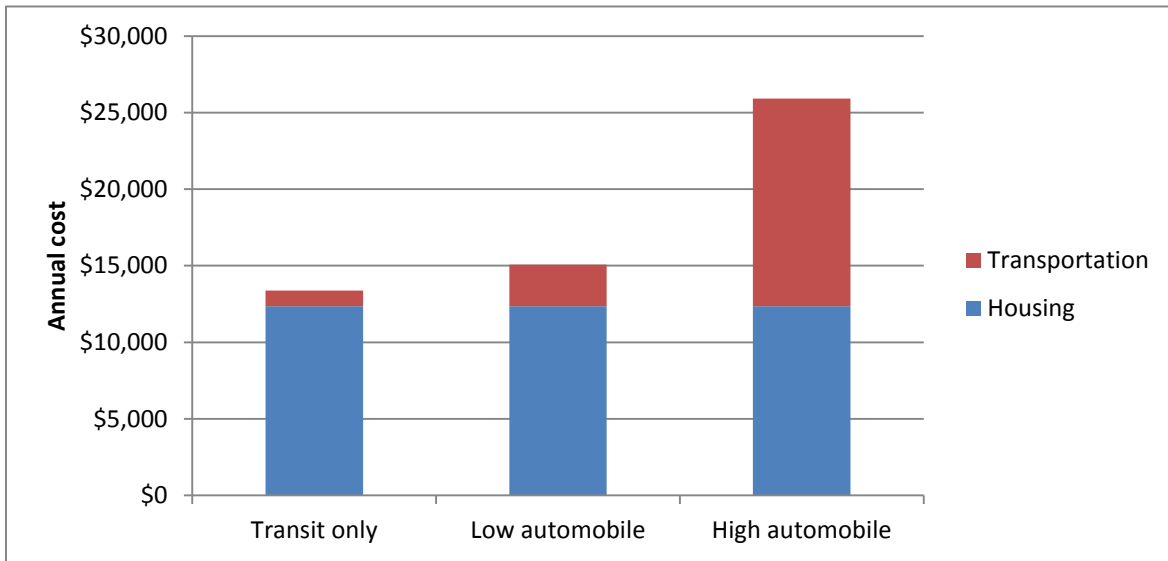
To consider housing and transportation affordability together, we consider the three transportation scenarios combined with the average costs of a two-bedroom unit in Carrboro. As cited in the background section, housing and transportation affordability is defined by Todd Litman as a household not spending more than 45% of its monthly income on housing and transportation costs combined.

The average cost of a two-bedroom unit is \$12,362 per year: this includes the average monthly cost of renting a 2-bedroom unit, owning a 2-bedroom condo or townhouse, and owning a 2-bedroom single family home. The cost of each transportation option is combined with housing costs, and the minimum annual income is based on the 45% affordability threshold. Living in a two-bedroom unit and high automobile usage is affordable only for those who make above the AMI. Table 6 displays these costs below. Figure 4 shows the three scenarios graphically.

Table 6: Annual Housing and Transportation Costs for a 2-bedroom unit

Transportation Type	Annual costs	Minimum Annual Income	Percentage of Carrboro AMI
Transit	\$13,382	\$29,739	69%
Low automobile usage	\$15,074	\$33,499	77%
High automobile usage	\$25,922	\$57,605	133%

Figure 4: Annual Housing and Transportation Costs for a 2-bedroom unit in Carrboro



Affordability Profiles

The four profiles are meant to depict households in Carrboro and how they must balance their transportation and housing costs.

Renter Profile 1: Margot and Kevin

Unit: 3 bedrooms and 2 bathrooms

Base Rent: \$975

Estimated Additional Housing Costs (utilities): \$150

Estimated Transportation Costs: \$904

Margot, a full-time customer service representative, and Kevin, a full-time firefighter, live in a 3-bedroom, 2-bathroom unit in Carrboro with their three children. The monthly rental fee is \$975. Their combined monthly wages are \$6,337.07 before taxes. After basic federal and state taxes are withheld, their combined monthly income is \$4,843.33.

Looking at just the flat rental rate and the monthly income, Margot and Kevin pay 20% of their monthly income on housing – below the 30% affordability threshold. They own one car, which they drive approximately 1,600 miles per month for commuting and recreational trips. When additional housing costs and transportation costs are added, the percentage of monthly income spent on housing and transportation costs increases to \$2,004: 41% of their income.

Renter Profile 2: Ryan

Unit: 2 bedrooms and 1 bathroom

Base Rent: \$660

Estimated Additional Housing Costs (utilities): \$100

Estimated Transportation Costs: \$994

Ryan, a full-time librarian, lives in a 2-bedroom, 1-bathroom unit in Carrboro with his child. The monthly rental fee is \$660 per month. As a librarian, Ryan makes 128% of Area Median Income (AMI). After basic federal and state taxes are withheld from his income, his monthly income is \$1,900.73. Ryan works in Raleigh, and commutes 35 miles each way.

Looking at just the flat rental rate and the monthly income, Ryan pays 20% of his monthly income. When additional housing costs and transportation costs are added, the percentage of monthly income spent shoots up to 56%.

Homeowner Profile 1: Kathie and Jacob

Unit/Neighborhood: 3-bedroom, 3-bathroom house south of Route 54 in Carrboro

Average Monthly Cost: \$1,364

Estimated Additional Housing Costs (utilities): \$150

Estimated Transportation Costs: \$859

Kathie is a chemist and her husband Jacob is a social worker, and they have two young daughters. They just purchased a 3-bedroom, 3-bathroom unit for \$215,000 in Carrboro, south of Route 54. Their combined monthly wage is \$9,204, before taxes. Their after tax income is about \$6,560. After saving up, they were able to put a 10% down payment on their house, and their mortgage costs, along with taxes and insurance cost them \$1,364 per month. Including utilities, housing costs alone comprise about 21% of the family's income.

They own two cars—one is used for daily commuting trips to RTP, and the other is used for a local commuting trip of two miles each day. Including other recreational and non-commuting trips, the two cars are driven a total of 1,720 miles per month, which costs about \$859 dollars.

Adding in transportation costs, they spend a total of 36% of their monthly income on housing and transportation costs combined.

Homeowner Profile 2: Brian and Andrew

Unit: 2-bedroom, 1.5-bath condo just north of downtown Carrboro

Average Monthly Cost: \$861

Estimated Additional Housing Costs (utilities): \$120

Estimated Transportation Costs: \$170

Housing and Transportation Affordability Assessment Conclusion

The housing and transportation affordability assessment shows that housing is affordable for a good portion of the population in Carrboro, although there are some that will not be able to afford renting and/or home buying. According to our assessment, rental housing is affordable for those making 69% and 96% AMI or higher. Home ownership, however, is less affordable than renting in Carrboro, and those who wish to own a home would need to make at least 77% of AMI.

When transportation costs are assessed with housing costs, the restraints on low- and middle-income households become stronger. Many Carrboro residents have access to an affordable transportation option: public transit. However, while it is possible to not own a car and live in Carrboro, automobile owners have greater access to more locations in the region in shorter amounts of time than transit riders. At present, there is a significant tradeoff between the cost of transportation and access. Until the transit network and efficiency is improved in the region, many residents will be forced into the most expensive transportation option, car ownership. The best affordability strategy the Town can implement at this point is to increase the number of diverse housing options near transit.

40% Open Space Requirement

Introduction

In their final report on the Affordable Housing Dialogue Sessions, the Planning Board and Transportation Advisory Board recommended that the 40% Open Space Requirement be reviewed further to understand its potential contribution to the housing affordability problem in Carrboro. This requirement may have impacts on transportation and housing affordability, as well as the number of dwelling units with reasonable access to urban amenities and transit. This section will present an overview of the open space policy, perceived and real benefits of open space in terms of affordability, and the perceived and real detriments to affordability that may arise from open space requirements. The data on the actual impacts to affordability can effectively support all sides of the argument: that the requirement makes Carrboro more unaffordable, that the policy has a neutral effect, and that it can increase affordability. This report will present these arguments and then make recommendations for how to proceed.

Background: The Open Space Ordinance

The 40% Open Space policy mandates that, for most residential zones, 40% of the development area must be preserved as open space that is accessible to the public. This ordinance is found in Section 15-198 of the zoning code, which describes the intention, implementation, and exceptions of this policy. The ordinance is introduced with the Planning Board's finding that open space within residential areas has benefits in the realm of safety, public health, and social welfare. The ordinance states that the primary objectives of the policy are:

- (1) Preservation of open vistas, providing relief from an urban landscape;
- (2) Preservation of environmentally sensitive lands;
- (3) Preservation of habitat for wildlife;
- (4) Preservation of historically or archaeologically significant areas; and
- (5) Provision of areas for passive recreation, such as walking or jogging (Carrboro Land Use Ordinance 2013).

Open space areas include land that:

- a. Is not encumbered with any substantial structure;
- b. Is not devoted to use as a roadway, parking area, or sidewalk;
- c. Is not part of any privately owned lot that is used or intended for use for residential purposes;
- d. Is legally and practicably accessible to the general public or to the residents of the development where the open space is located (Carrboro Land Use Ordinance Article XIII§15-198b).

Developments with a certain number of dwelling units must have playing fields accessible to their residents as part of the 40% requirement.

Developers must leave primary conservation areas as open space, which are detailed in the ordinance, but are essentially environmentally sensitive areas, such as wetlands or areas with steep slopes. If the primary conservation areas and the required play fields equal less than 40% of the parcel, then the town prioritizes secondary conservation areas. These areas include land with less steep slopes than the primary conservation areas, wooded areas, and environmentally

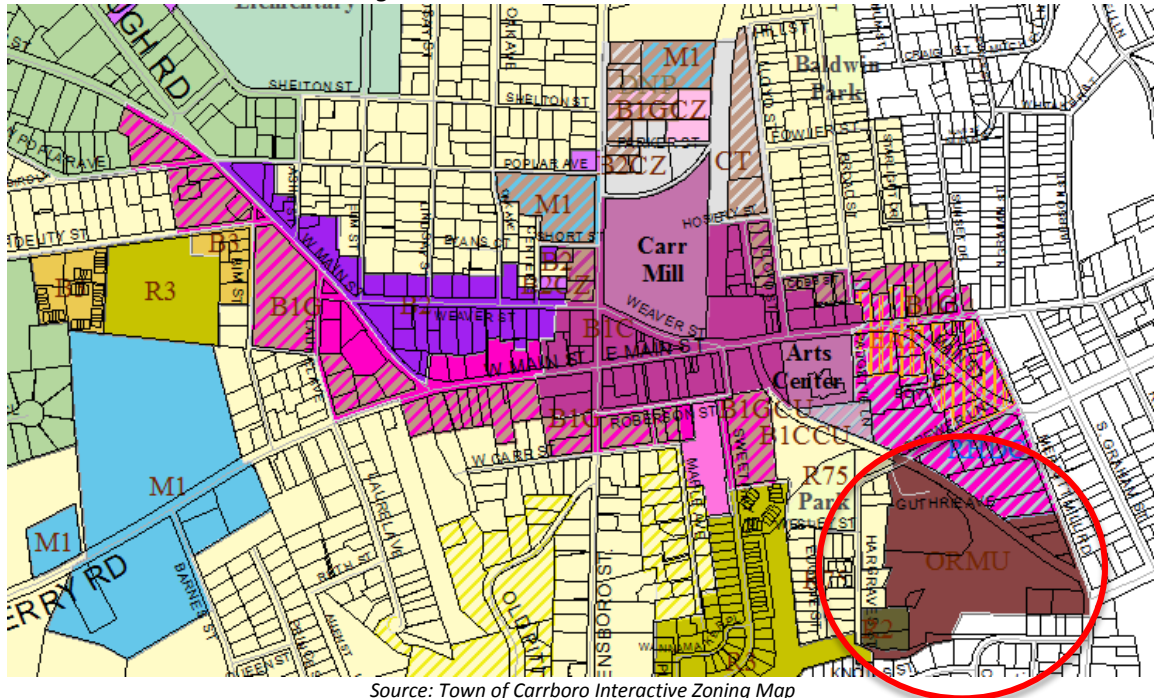
sensitive or aesthetically pleasing areas that are less of a priority than primary conservation areas (Carrboro Land Use Ordinance Article XIII§15-198b (4),(5)).

After these priorities of the Town have been met, the developer can decide what land to leave as open space.

Exemptions

This 40% requirement is not uniform for all developments. Zones R-2 and ORMU are both allowed a 20% open space requirement (Carrboro Land Use Ordinance Article XIII§15-198c. These zones are located near the downtown core, but cover a relatively small geographic area.

Figure 5: Zones in downtown Carrboro



Source: Town of Carrboro Interactive Zoning Map

In all zones, there is the opportunity to apply an affordable housing density bonus. The ordinance states that the open space requirement for any development with affordable housing “may be reduced by an amount equal to twice the land area consumed by all such affordable housing units or lots, except in no case may the required percentage of open space be less than 20% (10% in the ORMU and R-2 districts)” (Article XXII 2(e)). This means that developments with affordable housing, as defined by the town, may have a lower open space requirement, which could allow for the construction of additional units.

Another way to increase units on the property is to secure an “architecturally integrated subdivision” designation, which allows for reduced lot sizes, and thus increased density in the developed portion of the parcel, as long as the amount of land saved from this allowance goes towards the open space requirement (Article XIII §15-187). Under this designation, developments would not need to reduce the number of units constructed in order to adhere to the open space requirement.

A final exemption is for residential developments within the primarily commercial downtown zones. The Urban Livability ordinance replaces the open space requirement in these zones with the requirement that 25% of the parcels include urban amenities, such as walking paths, sculptures, playgrounds, and other features. The intention of this ordinance was to accommodate higher density, while maintaining a pleasurable, urban environment. This exemption applies to zones B-1(C), B-1(G), B-2, or CT, which are mostly commercial properties abutting Main Street, although there are some mixed use properties to which the exemption has been applied (Article XIII §15-204).

Context: The Open Space & Affordability Debate

North Carolina State University developed a Conservation Subdivision Handbook for North Carolina as guidance on how to best design a Conservation Subdivision policy. A conservation subdivision is defined in this handbook as a subdivision that is consolidated with the same number of units, but ideally 50-70% of the land is connected, contiguous open space (North Carolina Cooperative Extension Service 2012, 2). This policy is somewhat different than the Open Space requirement in Carrboro because contiguous open space is not a requirement in Carrboro and the percentage of required open space is higher. However, it does have many of the same objectives including preservation of wildlife, environmental benefits (storm water management), and public welfare.

According to this handbook, conservation subdivisions can reduce development costs through lower utility costs to the developer in the open space area. Theoretically, lower development costs can be passed along to the homebuyer in the form of lower home prices. However, it seems that these types of subdivisions, with large amounts of accessible open space, are very highly valued. A 2006 study by Rayman Mohamed found that subdivisions with open space sold more quickly and at higher values than comparable subdivisions without designated open space. The Claremont subdivision in Carrboro is one example with very high home prices. Because not all of the open space in these properties is contiguous (there are five separate areas designated as open space) it is possible that there was little cost savings to the developer in having these open spaces. However, even if costs were low, this savings was likely not transferred to buyers.

In addition to the savings from construction costs when not building over an entire site, open space that preserves natural amenities can lead to lower maintenance costs, which can be passed on directly to the buyer through lower Homeowner Association (HOA) fees. Much of the open spaces allowed under the Carrboro ordinance may require maintenance, such as manicured park space or ball fields; however, there is a priority in the ordinance for the preservation of environmentally sensitive areas.

Another key issue with the policy is its potential to reduce the total number of dwelling units per development. This appears to have been the main concern in the Housing Affordability Dialogues. However, from conversations with Carrboro's Planning Director, Trish McGuire, it appears that most developers have taken advantage of the architecturally integrated subdivision designation in order to maintain the number of units they intended to build on the site without the 40% open space requirement. Mohamed (R. Mohamed 2006) argued that subdivisions with natural open space amenities can ease concerns about increased density, making it more politically viable to have more units per acre. However, he does not claim that these results are necessarily beneficial for affordable housing, although this phenomenon does

indicate that additional density provided by the affordable housing density bonus would not harm the value of the market rate units in the subdivision.

In addition to designation as an architecturally integrated subdivision, the density bonus that Carrboro permits for constructing affordable units is considered a gold standard by HUD in implementing an open space requirement (HUD PD&R 2009). It creates a true incentive to build more affordable housing, as more affordable housing can reduce the open space requirement by up to half with the direct result being the creation of more units for sale and more proceeds to the developer. Based on a reading of various case studies, it seems that the bonus that Carrboro provides is comparable with best practices. Moreover, HUD supports open space requirements as long as they have an accompanying affordable housing component (HUD PD&R 2009).

Because construction costs are proprietary and very difficult to determine, there does not appear to have been any conclusive studies on the impact of open space requirements and conservation subdivisions on housing costs and affordability. This report acknowledges that the open space policy also has the potential to exacerbate the affordability issue when implementation is not appropriately guided by the town, with the potential for decreasing density, increasing home values, and increasing costs to developers. On the other hand, research on the implementation of open space in Carrboro's peer communities and national best practices reveals that this policy has the potential to increase affordability, mostly through the density bonus, but also through the reduction in maintenance costs. Despite the lack of conclusive evidence, recommendations from the Conservation Subdivision Handbook, along with case studies of best practices allow us to make some recommendations on how to adapt the policy and guide developers in a manner that contributes to housing and transportation affordability.

An Effective Implementation of the 40% Policy

Conservation Subdivision Recommendations

The 40% open space policy can and should contribute positively to the affordability of a variety of housing types throughout town. Though, in order for Carrboro's 40% open space policy to effectively and positively influence the affordability of developments, the open space needs to be incorporated strategically in accordance with the research and case studies on the topic.

According to the Conservation Subdivision Handbook, conservation subdivisions "attempt to preserve undivided, buildable tracts of land as communal open space for residents" (North Carolina Cooperative Extension Service 2012, 2). This concept goes beyond the 40% requirement in its focus on contiguous open space and more concentrated development patterns. Because of Carrboro's architecturally integrated subdivision (AIS) ordinance, which allows flexibility in lot sizes and setbacks, these recommendations from the Handbook can be implemented. The AIS designation also allows the developer to build the same number of units in various configurations in order to facilitate contiguous open space left in its natural state without putting a financial burden on the developer by requiring fewer units. These types of conservation subdivisions reduce both maintenance and construction costs by minimizing the construction of utilities and infrastructure by the developer (North Carolina Cooperative Extension Service 2012).

The Conservation Subdivision Handbook provides recommendations for communities to overcome some of the barriers to conservation subdivisions and to more effectively reap the benefits. The handbook recommends that subdivisions submit two sketch plans, one as a conservation subdivision and a second as a conventional subdivision. This allows the developer to go through the process of considering environmental needs and to dispel any myths regarding additional costs or inconveniences caused by conservation subdivision planning.

A second tactic the town can use is to change the development process to make conservation subdivisions the default, and require a conditional zoning process for conventional subdivisions in order to create more concentrated development in Carrboro with larger conservation areas, as opposed to more conventional development patterns with scattered portions of open space.

Density bonuses in exchange for building affordable housing, which Carrboro currently allows, are also an important tool. By having an open space requirement and allowing the developer to reduce that requirement in exchange for the construction of affordable housing, the ordinance actually provides an incentive to build affordable housing. The town should try to encourage its use as much as possible in order to reap the economic benefits of the existing requirements.

Incorporating public input through charrettes, public hearings and meetings allows a subdivision to be designed in a way that matches the needs and preferences of residents, thus increasing desirability and success. This step also reduces public resistance and dispels any myths by educating all stakeholders on the costs, benefits, and process. Given the strong level of interest and concern on the issue of affordability by Carrboro residents, as demonstrated by the high attendance at the affordable housing dialogue sessions, this public input process is particularly essential in Carrboro. In the past, Carrboro residents have expressed a desire to be more meaningfully involved early in the process through the approval of development in order to ensure participatory development.

More generally, the best practices of the conservation subdivision guidebook provide the town with the guidance to implement the open space policy in a way that increases the number of units and the affordability of those units. The two over-arching themes for Conservation Subdivisions that address this issue are contiguous sections of open space and open space that can be left in its natural state. Contiguous open space means that units are clustered together, allowing for a reduction in the cost of installing utilities and constructing infrastructure. As discussed, a reduction in developer costs may not be automatically passed on to the resident, but the Town should try to explore ways to encourage that this likely cost saving to the developer be passed on in some way. This clustering also addresses the density issue and allows for increased accessibility and a pedestrian-friendly streetscape. Natural open space means a reduction in maintenance costs that would otherwise be set aside for mowing, weeding, and keeping pristine. These cost savings can then be passed on from the developer to the homeowner or renter, making units more affordable.

Implications for Carrboro

Because of the quantity of undeveloped parcels in the outer edge of Carrboro, this reconsideration of how open space is implemented will have a large impact on the shape and land use of town. This outer ring also contains a large quantity of environmentally sensitive space that requires particular consideration when developing this area. The guidance provided

by this report and the North Carolina Conservation Subdivision Manual will help balance dense development with the conservation of valuable open space as Carrboro continues to develop.

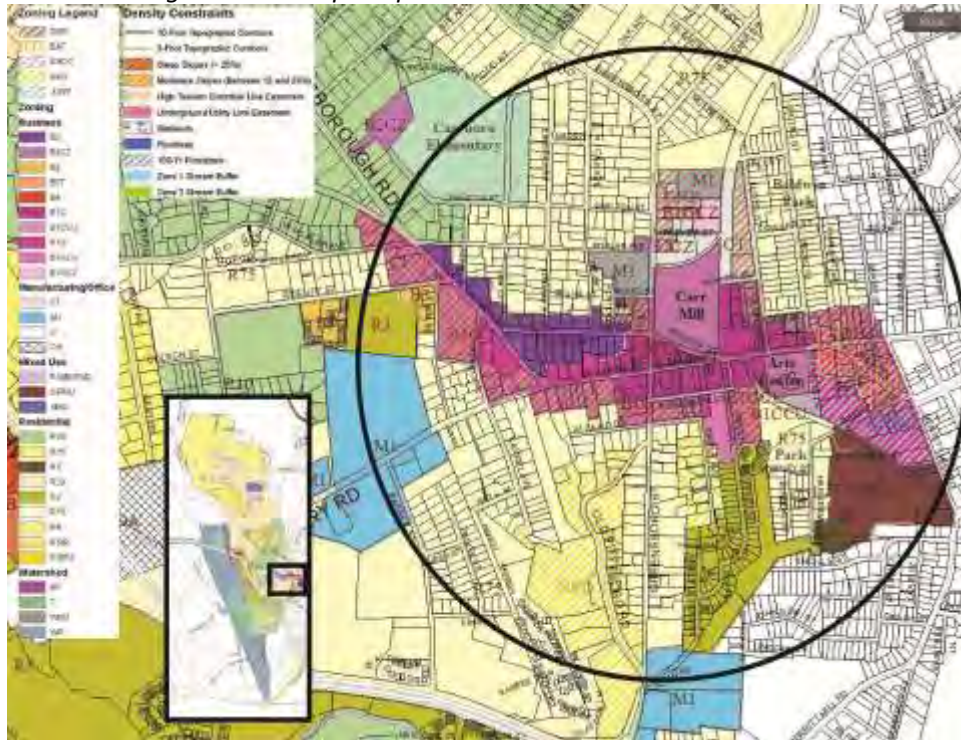
20% Open Space in the Downtown Recommendation

The land within and in proximity to the Central Business District (CBD) is the most valuable, relative to the rest of town. This is due in large part to the increased level of access, with a high level of walkability as well as the most comprehensive transit access in town. Unfortunately, this desirable access translates to an increase in home values. This is in line with the bid-rent curve discussed in this report's Background section: as one gets closer to the CBD, housing costs go up and transportation costs go down. This inherently limits the amount of affordable housing in downtown where transportation costs are lowest.

As discussed above, the Town has replaced the 40% Open Space Requirement in the downtown zones with the Urban Livability requirements. However, based on the findings discussed in this report, we believe that there are benefits to creating a broader exception to residential areas walkable to downtown. Thus, we propose an expansion of the 20% open space requirement that is currently in place in the R-2 and ORMU districts. Although these districts are in the ideal location for this amended policy, they only make up a small fraction of the land area that boasts observable transportation cost savings from its proximity to the CBD and associated transit access. Thus, we propose an expansion of these open space policies to an overlay district defined in the map below, lowering the open space requirement in the one-mile radius of downtown to 20%, where this is an appropriate response.

In making this policy change, it is important to consider a number of elements that make the land use and development of downtown unique. A good portion of downtown is already developed, but as subdivisions age and require redevelopment, having a lower open space requirement may be beneficial. Moreover, the size of protected conservation areas that cannot be built upon within the zone may limit the ability to reach a minimum threshold of 20%, although a reduction from 40% may still allow for more flexibility during development. Going forward, we recommend that a more detailed parcel-level analysis be performed to determine whether and how this open space reduction would affect specific parcels within this defined one-mile radius.

Figure 6: 20% Open Space in the Downtown Recommendation



Source: Town of Carrboro Interactive Zoning Map

Benefits for Affordable Housing

This change in policy can benefit affordable housing in town, allowing for a greater number of units and more affordable units to be located near downtown amenities and transit service. The obvious benefit is that more Carrboro residents, at a range of income levels, will be able to benefit from locating in an area with lower transportation costs and increased access. An additional benefit is that a developer will be able to have a greater percentage of the parcel be income generating, with the ability to develop an additional 20% of the parcel area. With the current 40% open space requirement, the developer does not receive revenue from this portion of the parcel. The maintenance cost savings from less natural space that needs to be maintained and the increased gain for the developer on that plot means that they can sell or rent each unit for less money. If these financial gains by the developer are transferred to the homeowner or renter, then these practices have the potential to make each unit more affordable.

Implications for Carrboro

The inner zone of Carrboro that this report recommends shifting from 40% to 20% open space has a different make-up than the outer ring. The segment of Carrboro within a one-mile radius of the CBD is almost fully developed, with only a handful of undeveloped parcels. These undeveloped parcels, near the Libba Cotton Bike Trail, are key pieces of the downtown, where a reduction in open space will greatly facilitate accessibility and density in the densest part of Carrboro. This policy change will also affect redevelopment. As many developments in downtown have been in place since the 1980s, Carrboro should begin to prepare for the redevelopment of many parcels in the 20% open space zone.

North Carolina Case Studies

Below are two case studies that exemplify the application of these two recommendations: a more strategic implementation of the open space policy, and a reduction of the open space requirement in the downtown.

Implementing a range of open space requirements based on proximity to downtown that applies contiguous, natural open space is a national best practice. These concepts and recommendations have been successfully employed by a number of cities and counties throughout the state. The City of Hickory, for example, adopted conservation subdivision regulations and ordinances drafted by a consulting firm following focus groups sessions in 2000. These regulations require 50% open space in rural residential zoning districts and 20% open space elsewhere. This includes density bonuses that allow a 50% reduction in lot size and a 25% reduction in setbacks. This ordinance also specifies that open space be placed in environmentally sensitive areas and preferably ones that require little maintenance. For Hickory, these ordinance revisions were created as a way to direct the rapid growth occurring in the area in order to preserve the rural character, while maintaining affordability with Habitat for Humanity as the developer (North Carolina Cooperative Extension Service 2012), 14)

In response to rapid growth in the mid 1990's, Davidson, North Carolina adopted an open space ordinance in 2001 that balanced density with environmental preservation and maintains the rural character of the town. The town requires that at least 12.5% of a developments' units be affordable, and range in their affordability for to fit the needs of various incomes. Davidson requires 42% open space, while allowing for 90% of the open space to come from off-site locations, allowing for a clustering of homes. The town allows for flexibility of lot size and location in order to meet the needs of the specific area, including public water, sewer, and environmentally sensitive areas and surrounding land uses (North Carolina Cooperative Extension Service 2012, 13)

Conclusion

Carrboro's 40% open space policy has the potential to either serve as a solution to or exacerbate the affordability issue, depending on the nuances of implementation. The policy has the potential to improve affordability by reducing maintenance and construction costs by creating contiguous, natural open space in portions of the parcel that are undevelopable due to environmentally sensitive areas, wetlands or slopes. However, these benefits are not inherent within the policy itself, but with the Town of Carrboro's careful guidance of their implementation, it is possible to reduce housing and transportation costs in subdivisions adhering to the open space requirement. In addition, this section recommends that the town of Carrboro apply a range of open space requirements, by reducing the open space requirement to 20% in the mile radius of downtown. This will allow for more units at a lower price to the renter and homeowner that are accessible to urban amenities and transit hubs. With the adoption of these recommendations, the literature and our research on this ordinance in Carrboro demonstrates that when the open space policy is correctly implemented, it has the potential to increase affordability in the region.

Parking and Housing Affordability in Carrboro

Introduction

Vehicle parking plays a significant role in the development and cost of housing. When parking is provided on-site, it adds to the cost of the housing itself. The benefit of on-site parking is that those with vehicles gain easier access to more resources, including employment and other opportunities throughout a region. However, not every household owns a vehicle. Vehicle ownership can vary significantly by town or even by neighborhood, and depends on a range of both individual and external factors, including individual income or proximity to high-quality transit service.

Parking standards generally do not account for the factors influencing vehicle ownership, and are not tailored to the factors and context of developments. This can impact housing affordability by increasing construction costs unnecessarily (thus increasing rents), charging disproportionately higher rents to non-car-owners (as a result of bundled parking and housing costs), and reducing the quantity of potential housing by allocating space for vehicle parking instead of housing units (the opportunity costs of on-site parking).

As part of our investigation into housing and transportation affordability in Carrboro, we prepared an analysis of the Town's existing parking standards in the context of housing affordability and also compared them with national parking guidelines. We then performed a case study of parking conditions at residential properties in the Town, based on the methodology of Cervero et al.'s research (2010) on parking performance at four multifamily residential properties. We collected data on vehicle occupancy during a peak period, when we presumed that the highest number of residents at home and that the highest number of parking spaces will be occupied. These data points were used to assess whether these properties are over-supplied with vehicle parking. Finally, we identify several policy options for the Town to pursue with regard to residential parking.

Background

Carrboro's Presumptive Standards for Parking

The Town of Carrboro defines standards for parking space provision in Article XVIII of the Town's Land Use Ordinance, with space requirements prescribed by land use. While many jurisdictions provide minimum requirements for parking supply, the Town of Carrboro emphasizes flexibility and provides "presumptive standards" that suggest an appropriate parking supply, rather than requiring a specific minimum amount, based on the needs and context of the proposed development (Town of Carrboro n.d.). While specific numbers of spaces are provided in the ordinance, the law is clear that these standards are "only intended to establish a presumption and should be flexibly administered" (Sec. 15-291 (b)), and that the Town "may permit deviations from the presumptive requirements...whenever it finds that such deviations are more likely to satisfy the standard" (Sec. 15-292 (a)) of providing sufficient parking supply.

For the purposes of our case study, the parking requirements for multifamily housing are provided below. These standards for this particular use were most recently amended in 1983.

Table 7: Town of Carrboro Parking Standards for Multifamily Residences (Use 1.300)

Unit Type	Number of Parking Spaces
One-Bedroom	1.5 per unit
Two or more Bedrooms	2 per unit
Units for Low- to Moderate-Income or Elderly Residents	1 per unit
All Other Units	1 per unit, plus 1 additional for every four units in the development

Source: Land Use Ordinance

The ordinance also provides exceptions, amended most recently in 2004, to parking requirements for multifamily residential properties located in the B-1(C) (Town Center business), B-1(G) (General business), and B-2 (Fringe commercial) zoning districts, in or near the heart of downtown Carrboro. In these zones, the number of parking spaces required is simply 1 space per bedroom, and no more than 2 parking spaces per unit, slightly less than the standard requirements above (Town of Carrboro n.d.). In addition, multifamily residential properties in those same zones may be allowed to further reduce the number of spaces if it is determined that its parking needs can be met without constructing additional parking facilities. In this case, the developer must pay a fee to the Town in lieu of constructing those parking spaces (Town of Carrboro n.d.).

The Town also addresses bicycle parking in addition to vehicle parking. Since 1983, the ordinance has allowed a developer to provide one less vehicle parking space than the standards call for by providing bicycle parking facilities that accommodate at least five bicycles. (Section 15-291(d)) In 2012, the Town amended the standards for bicycle parking, calling for 1.5 bicycle parking spaces per unit at multifamily properties (Town of Carrboro n.d.).

Parking and the Cost of Housing

By crossing these presumptive standards with the demand on parking, we are able to determine the rate of over supplied parking. The oversupply of parking – providing more parking than is actually demanded – has several implications for housing development, including increasing the cost of housing construction and rent, consuming valuable high-access land near transit, and increasing a project’s impervious surface area (Cervero, Adkins and Sullivan 2010). While previous work has been done on commercial parking in downtown Carrboro (DCRP 2008), this work looks specifically at on-site parking at multifamily residential properties. We focus on three key elements of parking’s costs and how they impact the cost of housing.

Firstly, providing on-site parking increases the costs of development by increasing construction costs. The cost of surface parking lots are largely dependent on the cost of the land, but also include engineering and construction costs, as well as environmental costs associated with increased impervious surface area (RSMMeans 2012). Surface lots are also indicative of the opportunity costs associated with parking in lieu of housing, commercial, or other uses. A 2008 survey by the National Parking Association determined that the per-space construction cost for surface parking lots ranged from \$1,000 to \$15,000, with an average cost of \$5,000 per space. For parking garages, the per-space cost ranged from \$2,000 to \$45,000, with an average construction cost of \$19,650 per space (National Parking Association 2008). Unlike the living units themselves, parking spaces do not generate revenue for a developer or property manager (unless the costs are unbundled); in a sense, parking spaces represent a foregone opportunity to provide more living units by increasing the overall construction costs per unit. This, in turn, leads

to increased unit costs for renters/buyers or to fewer units being constructed, so long as parking and housing prices are bundled together into a single rent price (Manville 2010).

Secondly, the bundling of parking costs with housing costs means that parking costs are passed down to residents through rent, whether or not they even have a car. Residents who do not own a car pay the same amount in rent as car-owners. When there is excess supply, then these empty spaces are effectively subsidized by those residents who do not own cars. These residents are ultimately paying disproportionately more for housing, since they are paying a premium on their home without receiving the benefits that come with vehicle access.

Finally, real estate in high-access, high-amenity areas is sold at a premium due to the value of its location. On-site parking reduces the amount of valuable area that can be developed and used to generate revenue. This impacts revenues to developers or property managers, but also affects the potential tax revenues for a municipality. Some on-site parking may be a necessity in order to meet demand. However, excess parking supply represents an unnecessary cost of housing for renters, and a missed opportunity for the Town. In particularly high-access, high-value areas, this opportunity cost is very real and should be considered in the parking policy-making process.

Context

Robert Cervero led a study (2010) of suburban transit-oriented development that sought to evaluate whether these developments were “over-parked”, or over-supplied with parking. The study focused on the parking supply of 31 multifamily rental residential projects close to rail transit stations in the San Francisco Bay Area and in Portland, Oregon. This study evaluates a context that is very different from Carrboro, looking at developments within two-thirds of a mile of a rail transit stop, while the Triangle region does not have a regional rail transit system.

Ultimately, this study found that peak parking demand at most of these developments was 25-30% below parking supply, and also fell below national standards defined by the Institute for Transportation Engineers (ITE) (Institute for Transportation Engineers 2010). The average parking supply for all 31 projects was 1.57 spaces per unit (31% higher than ITE would recommend), but observed parking demand averaged only 1.15 occupied spaces per unit – 27% lower than actual supply and only 4% below ITE standards. Parking demand was generally lower at properties close to stations that had more frequent transit service, and at projects that were less “expansive” (with larger building footprint relative to the whole property area). Further, the parking supply at these developments was actually above even the ITE standards, which have historically faced criticism for encouraging an over-supply of parking without sufficient consideration for local land use, vehicle ownership rates, or transportation context.

While Chapel Hill Transit does serve the Town of Carrboro, the type of service and regional accessibility are not exactly comparable to the Bay Area Rapid Transit system or the Metro Portland MAX system. However, the study does evaluate projects in suburban areas, rather than in core urban areas, and looks at projects that were not specifically designed as transit-oriented development (TOD) projects. Further, evaluating the actual peak demand in relation to parking supply and building standards is a valuable tool for evaluating the performance outcomes of parking policy and assessing the real needs of residents. Thus, we adapted the methodology of the Cervero study for a case study of multifamily residential projects in Carrboro as part of this research paper.

While there is a growing amount of research on parking supply and parking requirements in larger cities such as New York and Los Angeles, there is scant research available about communities that bear a closer resemblance to Carrboro and the Triangle region. As a smaller town with unique local and regional access challenges, an evolving dialogue on how to grow, and a diverse population of students and long-term residents with varying incomes and resources, Carrboro's parking situation is multifaceted and has many different stakeholders. Policies that address any component of parking in Carrboro, including on-site residential parking supply, must be tailored to the local and micro-level context and must be based on carefully documented research of the transportation and housing needs of residents.

Case Project Descriptions

In order to evaluate the performance of residential parking in Carrboro, we measured vehicle parking supply and occupancy at four multifamily residential properties. We collected data on vehicle occupancy during a peak period, when we presumed that all residents would be at home and the highest number of spaces would be occupied. Data collection occurred at all four properties at 6am on the morning of Friday, February 22, 2013.

Figure 7: Map of Carrboro Case Properties



Source: Google Maps

All four properties were multifamily residential properties, with either apartment or townhouse-style homes. The properties varied in size in scale, with anywhere between 28 units and 170 units, and differing distributions of 1-bedroom and 2-bedroom units. Three of the four properties had 100% unit occupancy, while one had an occupancy rate of 95%. Finally, none of the properties were located in the downtown business zones with reduced parking exceptions: all were located in R-3, R-7.5, or RSIR zoning.

Table 8: Characteristics of Carrboro Case Properties

	Ashbrook Apartments	Cedar Court	The Flats	Colonial Village at Highland Hills
Number of Units	170 units (40 1 BR, 130 2BR)	51 units (1 1BR, 50 2BR)	32 units (32 2BR)	28 units (6 1BR, 22 2BR)
Unit Occupancy	94.7%	100%	100%	100%
Zoning	R-3	R-7.5	R-7.5	RSIR
WalkScore (1-100)	54	77	71	17
Transit Access (1-10)	7	5	5	6

The Town of Carrboro chose the four properties studied here for a parking and trip generation study conducted during Spring 2013. Members of the Planning Board, Transportation Advisory Board, and Town staff collaborated to select the properties based on their size, scale, location, and transportation access. The properties represent a range of sizes, locations, transit access, and walkability in the Town of Carrboro. All properties are located in Census tracts with higher than average household vehicle ownership. However, the properties vary by how well they are served by transit and by the walkability of their respective neighborhoods.

Observed Parking Outcomes

Parking Supply

The number of parking spaces at each of the four properties is detailed in the table below. The actual parking supply at all four properties was very similar the supply recommended in the Town's presumptive standards. Actual supply was between two and five parking spaces fewer than Town recommendations.

Table 9: Parking Supply Outcomes (Town Standards versus Observed Supply)

	Ashbrook	Cedar Court	The Flats	Colonial Village at Highland Hills
Town's Presumptive Parking Supply	320	102	64	53
Actual Parking Supply	315	97	60	51
Difference in Spaces (%)	5 (-2%)	5 (-4%)	4 (-6%)	2 (-4%)

The slight variation in parking supply indicates that there is some flexibility in the application of the Town’s parking standards. However, this variation in observed parking supply is very small, with only a two to six percent difference between actual supply and the Town’s recommended supply. Based on this fact, it appears that Carrboro’s presumptive standards for parking had a significant impact on what developers actually built, regardless of the nature of the standards as “presumptive” and the flexibility encouraged in the ordinance itself.

Parking Occupancy

None of the properties we surveyed had 100% parking occupancy. Peak period occupancy at the surveyed properties was between 61% and 75%. At two of the properties, 75% of all parking spaces were occupied. At one property, 66% of all parking spaces were in use, while at the fourth property only 61% of spaces were occupied.

While vacant residential units can be a mitigating factor in parking space occupancy, three of the four properties had 100% occupancy of residential units, while the fourth had a unit occupancy rate of 95%. This affirms that residential vacancy is not enough to explain the relatively low parking occupancy. This indicates an oversupply of parking relative to the needs of residents.

Table 10: Parking Demand Outcomes (Observed Supply versus Observed Demand)

	Ashbrook	Cedar Court	The Flats	Colonial Village at Highland Hills
Actual Parking Supply	315	97	60	51
Occupied Parking Spaces	208	59	45	38
Occupancy Rate	66%	61%	75%	75%

National Standards: The ITE Parking Generation Manual

The ITE publishes national recommendations for parking generation rates in its Parking Generation Manual. The most recent version of the manual was issued in 2010, and we compared the ITE standards to Carrboro’s presumptive standards and to the observed supply and demand outcomes at our case properties.

The Town’s presumptive standards recommend a relatively high amount of parking for multifamily development as compared to ITE’s recommendations. The ITE recommendations for supply at our case properties (based on the parking generation manual) were much lower than what the Town of Carrboro recommends based on its own standards (Institute for Transportation Engineers 2010). In fact, the Town of Carrboro’s guidelines for parking supply recommended between 23% and 63% *more* parking at the four case properties than the ITE standards. Similarly, the observed parking supply was between 17% and 52% higher than ITE would recommend.

Table 11: ITE Recommended Supply versus Observed Supply and Demand

	Ashbrook	Cedar Court	The Flats	Colonial Village at Highland Hills
Town's Suggested Parking Supply	320	102	64	53
ITE Recommended Parking Supply	209	83	39	34
Actual Parking Supply	315	97	60	51
Supply versus ITE Standards	51%	17%	52%	48%
Actual Parking Demand	208	59	45	38
Demand versus ITE Standards	-1%	-29%	14%	10%

Summary of Findings

Parking occupancy at the four case properties ranged from 61% to 75%. This range leaves a lot of room for variation, but even a rate of 75% is relatively low, and demonstrates an excess of parking supply. Unit vacancy is not the explanatory variable, since all four properties are essentially entirely occupied. Therefore, we conclude that car ownership at these properties is lower than the supply would indicate, and that demand for parking supply is much lower than anticipated by the Town's parking standards. At least at these four properties, parking is over-supplied.

One of the key findings from this study is that, while the Town's parking standards are presumptive, the actual amount of parking is very close to the amount recommended by those standards. Carrboro's Land Use Ordinance explicitly identifies these parking standards as presumptive standards, or recommendations for providing adequate parking supply rather than strict requirements. This flexibility, however, is not apparent in practice, as parking supply at each of these properties nearly approximates the amounts set forth in the Town's standards.

The over-supply of on-site parking at these properties has ramifications for their affordability as well. Residents who do not own a vehicle pay the same amount in monthly rent as their neighbors who do own a car. These residents are paying disproportionately more in housing costs, since they are paying a premium for their housing without receiving the commensurate benefits of accessibility that result from having an automobile. Thus, these non-car-owning residents are effectively subsidizing the cost of these empty parking spaces.

Recommendations for Future Development

Review and Update Town Parking Standards

The Town's current parking standards for multifamily housing were last updated in 1983, and do not capture the current reality and variability of residential parking demand in the Town of Carrboro based on our research. While the presumptive standards do emphasize flexibility, the

reality captured in this case study demonstrates that these standards are generally taken to heart by developers, and play a significant role in determining just how much parking is actually built at these properties. Further, we see a significant gap between the supply of parking – recommended in Town standards and constructed at these properties – and the actual demand for parking reflected in occupied spaces.

In light of the disconnect between parking demand and supply, we recommend re-evaluating the Town’s presumptive standards and updating them to better reflect the parking needs of Carrboro’s residential properties.

Create a Flexible, Targeted System for Reduced Parking Requirements

We recommend expanding the area in which residential parking minimums are reduced. There are currently three zoning districts in the downtown core that allow for reduced minimum parking standards at multifamily residential properties; these districts are B-1(C) (Town Center business), B-1(G) (General business), and B-2 (Fringe commercial). Based on the results of our case study, the Town should consider one or more of the following actions:

- Establish a geographic area (for example, a half-mile or one-mile radius from the downtown core) to which reduced parking minimums apply to multifamily residential projects.
- Modify zoning districts to allow for reduced parking minimums at multifamily residential properties (none of the properties in this study were located in the B-1(C), B-1(G), or B-2 zoning districts).
- Adopt a tiered zone system of recommended supply similar to that recommended for applying open space requirements. Tiers of parking requirements may be based on proximity to downtown Carrboro, access to transit facilities, or other location-based factors.

Research Opportunities for Unbundling Parking and Housing Costs

The Town should explore the possibility of unbundling parking and housing costs in future development projects. There is an opportunity to provide efficiently priced parking, and significantly less parking supply than is currently recommended at multifamily properties, through smart, targeted approaches. Unbundling parking costs from housing prices reduces the cost of housing to residents, and would be particularly well-suited to improving the supply and affordability of housing in the heart of downtown, where there is high access to transit and amenities.

The subject of unbundling parking costs has been a recent topic of discussion regarding a new development in Carrboro, and the emerging conversation about Carrboro’s “parking future” is a timely one to pursue. A great next step for the Town would be to explore the legal basis for unbundling parking costs, and to better define the roles of both the Town and developers in this process. For example, the City of San Francisco requires the unbundling of parking and housing costs for new multifamily properties with ten or more dwelling units, and has proactively demonstrated flexibility with parking requirements and unbundling for redevelopment and historic reuse projects (San Francisco Planning Code, City CarShare 2011).

Pursue Expanded Study of Parking and Housing in Carrboro

The Town of Carrboro should perform an expanded study of residential parking that builds off of the case study performed in this report. This broader, more inclusive study would measure and

evaluate parking supply and occupancy at multifamily properties across Carrboro, capturing a diversity of locations, socioeconomic composition, vehicle use, transit access, walkability and bikeability, and other factors.

The Town’s parking standards should ultimately be flexible, just as they are currently intended to be; the goal is to provide the amount of parking that is needed by residents, while still providing adequate supply of housing that is affordable and accessible to the diversity of people who live in Carrboro. Parking standards should be tailored to the needs and context of different properties, which vary in proximity to downtown, access to transit, socioeconomic composition, and ability to offer resources such as space for car-sharing. An in-depth examination of existing conditions and resources throughout Carrboro should inform any effort to review and revise the Town’s parking policy.

Figure 8: Timeline for Recommended Actions

Timeline for Recommended Actions	
<i>Residential Parking in Carrboro</i>	
Short Term	<ul style="list-style-type: none"> ▪ Perform an expanded study of parking supply and occupancy at residential properties across Carrboro. ▪ Assess the legal and policy basis for unbundling parking and housing costs in future residential development projects in Carrboro.
Medium Term	<ul style="list-style-type: none"> ▪ Review the Town’s presumptive parking standards for multifamily residential properties in light of expanded study of existing parking demand and supply. ▪ Identify and assess potential tools for a tiered or location-sensitive system of reduced parking requirements, including the potential for parking maximums. ▪ Define the necessary process for providing housing unbundled from parking costs in Carrboro, and identify the roles of both the Town and developers in this process.
Long Term	<ul style="list-style-type: none"> ▪ Adopt updated parking standards for multifamily residential properties in Carrboro. ▪ Implement a tiered-zone, location-based, or other criteria-based system for reduced parking standards at multifamily properties.

Conclusion

Traditionally, conversations surrounding affordability focus on housing costs. This report maintains that transportation costs, while more difficult to quantify, represent a significant and increasing burden to households and thus should be considered in the assessment of affordability. This report analyzed the affordability of housing and transportation in Carrboro and found that housing is affordable for a significant portion of the population, and there are low-cost public transportation options. However, there is an inherent tradeoff between transportation costs and access.

When it comes to addressing the issue of affordability, the 40% Open Space policy and existing parking standards may be adjusted. By promoting more contiguous space, considering flexible application of open space requirements and reducing the 40% requirement around the CBD, this policy can be leveraged in such a way that reduces the cost of development and thus the cost of housing. This report also found that, although parking at multifamily units in Carrboro is over supplied, the Town is ahead of the curve in its implementation of “presumptive parking standards.” By further reducing these standards or promoting unbundled parking costs, the Town’s parking supply could better reflect demand. The recommendations in this report aim to make Carrboro an affordable option for all those working and living within its borders.

Bibliography

- "2011 UNC Campus Commuting Survey." 2011.
- "5-Year American Community Survey." 2010.
- Affordable Housing Dialogues*. Carrboro: Town of Carrboro, 2012.
- "American Community Survey." 2007-2011.
- Bernstein, Scott. "Using Linked Housing, Banking, and Transportation Policy to Bring Home the Benefits of Livable Communities." *A statement before the Senate Committee on Banking, Housing and Urban Affairs*. Center for Neighborhood Technology, March 26, 2009.
- "Carrboro Land Use Ordinance." Carrboro, 2013.
- Center for Neighborhood Technology. "Pennywide Pound Fuelish: New Measures of Housing and Transportation Affordability." 2010.
- Center for Transit Oriented Development. *Affordability Index Toolbox*. Oakland: Reconnecting America, 2008.
- Center for Transit Oriented Development. "Mixed Income Housing Near Transit: Increasing Affordability with Location Efficiency." 2009.
- Cervero, Robert, Arlie Adkins, and Cathleen Sullivan. "Are TODs Over-Parked?" 2010.
- City CarShare. "Getting More with Less: Managing Residential Parking in Urban Developments with Carsharing and Unbundling - Best Practices." Project funded by Federal Highway Administration, 2011.
- CNN. *What will your mortgage payment be?*. n.d.
<http://cgi.money.cnn.com/tools/mortgagecalc/> (accessed April 23, 2013).
- DCRP. *Carrboro Parking: An Exploratory Study*. Transportation Workshop, Department of City & Regional Planning, University of North Carolina at Chapel Hill., 2008.
- Forkenbrock, David J., Sondip K Mathur, and Lisa Schweitzer. *Transportation Investment and Urban Land Use Patterns*. University of Iowa Public Policy Center, 2001.
- Furman Center for Real Estate & Urban Policy. "Searching for the Right Spot: Minimum Parking Requirements and Housing Affordability in New York City." Policy Brief, 2012.
- HUD PD&R. "Balancing Housing Affordability with Open Space Conservation." *Breakthroughs*. Nov/Dec 2009. http://www.huduser.org/portal/rbc/newsletter/vol8iss6_2.html (accessed April 23, 2013).
- Institute for Transportation Engineers. *Parking Generation, Fourth Edition*. 2010.
- Jaffe, Eric. "Parking Minimums Promote Driving, Even in Transit-Friendly New York." *Atlantic Cities*. February 2012. <http://www.theatlanticcities.com/commute/2012/02/parking-minimums-promote-driving-even-transit-friendly-new-york/1331/> (accessed February 2013).
- Jung, Owen. "Who is Really Paying for Your Parking Space? Estimating the Implicit Value of Off-Street Parking Spaces for Condominiums in Central Edmonton, Canada ." *Department of Economics, University of Alberta*. 2009. www.vtpi.org/jung_parking.pdf. (accessed April 23, 2013).
- Litman, Todd. *Location Efficient Development and Mortgages: Taking Advantage of Consumer and Transportation Benefits at Accessible Locations*. Victoria Transport Policy Institute, 2010.
- Litman, Todd. *Transportation Affordability: Evaluation and Improvement Strategies*. Victoria Transport Policy Institute, 2013.
- Litman, Todd. *Transportation Cost and Benefit Analysis II--Parking Costs*. Victoria Transport Policy Institute, 2012.

- Manville, Michael. *Parking Requirements as a Barrier to Housing Development: Regulation and Reform in Los Angeles*. UCLA Lewis Center Working Paper, University of California, Los Angeles, 2010.
- Mohamed, Rayman. "Economics of Conservation Subdivisions." *Urban Affairs Review*, 2006: 376-399.
- Mohamed, Rayman. "The Economics of Conservation Subdivisions." *Urban Affairs Review*, 2006: 376-398.
- National Parking Association. "Parking in America: The National Parking Association's First Annual Review of Parking Rtes in the United States and Canada." 2008.
- North Carolina Cooperative Extension Service. "Conservation Subdivision Handbook." *NC Cooperative Extension*. 2012. <http://www.ces.ncsu.edu/forestry/pdf/ag/ag742.pdf> (accessed April 23, 2013).
- Primary Mortgage Market Survey Results*. 18 2013, April. <http://www.freddiemac.com/pmms/release.html> (accessed April 19, 2013).
- RSMeans. *Building Construction Cost Data*. 2012.
- San Francisco Planning Code. *Article 1.5, Section 167. Parking Costs Separated from Housing Costs in New Residential Buildings*. n.d.
- Shoup, Donald C. *The Trouble with Minimum Parking Requirements*. Victoria Transport Policy Institute, 1999.
- Statistics, Occupational Employment. Bureau of Labor Statistics, 2012.
- Town of Carrboro. 20 April, 2013. <http://gis02.ci.carrboro.nc.us/ZoningFV/>.
- Town of Carrboro. *Land Use Ordinance: Parking*. Carrboro, n.d.
- Voith, Richard P., and Suan M. Wachter. "Urban Growth and Affordability." *The Annals of the American Academy of Political and Social Science*, 2009.

Appendix

This Appendix provides background on the Center for Neighborhood Technology's Housing and Affordability Index along with some case studies of various agencies using the tool to address housing and transportation affordability. We also discuss how the federal government has been addressing the issue of housing and transportation affordability. Finally, we provide some additional information on affordable housing providers in Orange County and North Carolina, as well as a quick summary of about the dialogue around affordable housing issues in Carrboro.

Center for Neighborhood Technology's Housing and Affordability Index

The Housing and Affordability Index, created by the Center for Neighborhood Technology (CNT), is a groundbreaking tool that incorporates the costs of both housing and transportation. By including both housing and transportation costs in a measure of affordability, the tool accounts for the cost trade-offs that are an inherent part of what makes a housing option affordable. In other words, it demonstrates – both quantitatively and illustratively – the role that transportation plays in the affordability of housing. It emphasizes the contextual nature of affordability by considering transit use, auto ownership, and auto use based on various neighborhoods. According to Brookings, this reframing of housing affordability can “allow low-income households to more easily qualify for homeownership, provide a substantial incentive to the private sector to invest in transit-oriented locations, and support the public sector in making investments that lower household transportation costs.”² This tool can be used at a very practical level to calculate housing in a neighborhood that is most affordable, given housing and transportation costs. This tool is continuing to expand in complexity and geography. In 2008, as gasoline prices reach a record high, the tool incorporated this factor into the model in order to convey the effect of these rising costs on the affordability housing that is not transit-accessible.

Since 2008, CNT has been commissioned by a diverse array of cities, states, and regions to apply their Housing + Transportation Index to their specific jurisdiction using local data. The specific applications have varied, but generally are designed to:

- Illustrate the nature of the housing + transportation affordability burden
- Incorporate the index into criteria for transportation planning
- Understand the T + H affordability status in rural areas
- Council potential homebuyers about true affordability in the neighborhoods they are considering
- Calculate affordability in consumer's jurisdictions
- Track as part of a scenario development tool to see how affordability would be impacted as a result of various growth scenarios
- Advocate for more conscientious planning

Case Study: Chicago Metropolitan Agency for Planning and H+T in 2040 Plan

Most of the applications are in the understanding stages. However, there is a movement to try to use this understanding to increase affordability. The Chicago Metropolitan Agency for Planning (CMAP) has commissioned several studies from CNT and has compared how various

²www.brookings.edu/metro/umi/20060127_affindex.pdf

development scenarios would affect future H+T affordability at the census block level for its seven county region. The CNT 2010 “Driving a Hard Bargain” report claims that CMAP used the H+T criteria to select preferred planning scenarios and has incorporated them into the Go To 2040 regional planning process, which includes the long range transportation plan for the MPO.³

The Driving a Hard Bargain report made several recommendations to municipalities including adoption of the H+T benchmark as a standard to assess development proposals, enactment of zoning overlay districts within a half mile of all stations, and use of inclusionary zoning to create affordable housing around transit stations.

Case Study: Tucson Metropolitan Area, Pima County and Pinal County

As the Chicago case study demonstrated, state and local governments have also taken an interest in mapping the impact of housing and transportation costs on the households in their region. Information detailing the combined housing and transportation costs in Tucson Metropolitan Area, Pima County, and Pinal County households was compiled in a report prepared by the Center for Neighborhood Technology. Though many homebuyers seek the affordability of sprawling suburban parcels, CNT found that housing and transportation costs are lower in compact neighborhoods nearest the urban core. This is due in part to the fact that money saved on housing costs is quickly outweighed by transportation expenses. To complete this picture, the Housing + Transportation Affordability Index is applied to the Pima/Pinal region.

The Index reports the percentage of household income consumed by Housing Costs plus Transportation Costs (H+T).

Figure 1: Affordability Index Formula

$$\text{Affordability Index} = \frac{\text{Housing Costs} + \text{Transportation Costs}}{\text{Income}}$$

The weighted average median income for the Pima/Pinal region is \$39,466. As housing comprises 30% or less of this income, housing in the region is considered affordable. On the other hand, transportation costs comprise as much as 32% of the area median income, making it a greater cost burden than the cost of housing in some areas.⁴ Tucson boasts a lower H+T score due to specific neighborhood characteristics: more homes per acre, high walkability, access to public transit and stores or amenities in close proximity. CNT recommends expansion of public transit systems as the region plans for the future. Diversity of transit options will ease reliance on an ever fluctuating oil market. Also, vanpooling and car sharing are demand responsive services that can adapt to meet the needs of a growing population.

Case Study: Asheville Research in Affordable Housing Investments

In April 2012, the City of Asheville researched affordable housing trends and factors to better understand opportunities for effective siting of affordable housing.⁵ Using the H+T Index, the study found that City has developed into a low density, car dependent community. As a result,

³ <http://www.cnt.org/repository/DAHB.pdf>

⁴ <http://www.cnt.org/repository/FINAL%20H+T%20Report1.pdf>

⁵ http://www.ashevillenc.gov/Portals/0/city-documents/communitydevelopment/Location%20Efficient%20Affordable%20Housing%20for%20a%20More%20Sustainable%20Asheville_FINAL.pdf

the City is concerned about both the environmental impacts and impacts on the livability of the community.

The results of the study confirmed the City's belief that transportation costs can make "affordable" housing unaffordable. The City currently intervenes in the affordable housing development process, indirectly and directly. Using the H+T Index, the report evaluates the efficiency of site selection of subsidized units in Asheville. The study found:

- Transportation costs are high relative to income levels in much of the City, other cities in the County, and rural areas of the County. Still, there are areas that are of relatively location efficient.
- The City of Asheville's Housing Trust Fund sites affordable housing in relatively efficient locations as compared to other affordable housing funders.
- The vast majority (71%) of residents who use Housing Vouchers take on transportation costs that constitute between 29-39% of the household's income.
- Restrictive zoning limits the efficiency of site selection for the City's multifamily rental development grants.

Some of the major recommendations to the City included:

- The City should clearly outline areas that are location efficient and incorporate those definitions into the criteria of funding mechanisms and incentive policies.
- The City should focus redevelopment efforts in "underutilized" areas with high location efficiency.
- The City should educate the public on the benefits of sustainable development in order to lessen political pressures on City Council.

HUD Housing and Transportation Affordability Initiative

The Federal Government is also beginning to get involved in the issue of housing and transportation affordability. The development of the Partnership for Sustainable Communities was the first major demonstration of the Federal government understanding the connection between affordable housing and transit accessibility and acting on it. In 2008, Congress directed HUD to establish a manual of best practices in mixed-income transit oriented developments.⁶

The resulting initiative seeks to address the fact that many Americans are unaware of the sizable draw transportation costs have on a household's income; a draw second only to rent or mortgage payments. To fill this information gap, HUD's Office of Sustainable Housing and Communities has designed a Location Affordability Index as part of a federal Housing and Transportation Affordability Initiative. By calculating the relationship between transit and housing costs on the neighborhood level, this tool allows the user to calculate customized transportation cost estimates.⁷ Increased transparency about these costs can help families and planners make informed decision about where to work or live. The tool also aids analysis by integrating transportation costs into HUD programs, policies and HUD-assisted communities in an effort to promote greater affordability.

Other potential applications of the Location Affordability Index include:

- Regional Planning: Inform regional planning and investments by incorporating housing and transportation cost analysis into planning decisions.
- Affordable Housing Policy: Analyze community investments to support the integration of housing and transportation costs into agency policy.
- Housing Counseling: Inform prospective homebuyers about the potential impact of transportation costs on overall household budget and the variation in costs across the region.

⁶http://huduser.org/portal/publications/better_coordination.pdf

⁷http://portal.hud.gov/hudportal/HUD?src=/program_offices/sustainable_housing_communities/housing_transaffinitative

Local Affordable Housing Providers and Activity

Orange County Affordable Housing Providers

There are numerous affordable housing providers that focus their work in the Orange County region, and work to serve Carrboro. Each of them has a different approach to creating this supply and assisting in the financing and maintenance of homes and apartments.

The Community Home Trust (formerly Orange Community Housing and Land Trust) works to sell and preserve affordable homes for all of Orange County. The Community Home Trust provides only homeownership, and is able to keep homes affordable by preventing appreciation. They target families who earn less than 80% of the AMI. The Home Trust strives to provide homes for at least 20% below the market value. While this price is non-negotiable, they also provide subsidies to qualifying families, considered when costs are approximately 28% of the household's monthly gross income. Potential homeowners must also be a first time homebuyer or not have owned a home within the last three years. The Community Home Trust currently has 200 homes in Chapel Hill and Carrboro. When these homes are sold, they must be sold to another low-income buyer. The average cost of a Home Trust home in 2010 was \$102,000, while the median 2010 sales price of a home in Chapel Hill-Carrboro was \$323,300. Most homeowners work in public sector, with the largest group represented being a teacher, with 12% of homeowners in this profession.

CASA is a second provider in the area with 48 rental properties throughout Wake, Durham and Orange counties. CASA receives financial support from Federal, State and local grants and funding, as well as donations from the public, to make this possible. CASA develops and manages permanent rental housing, also serving as the landlord for these properties. Most CASA tenants pay just 30% of their income for housing.

Habitat for Humanity also has an Orange County branch, which creates affordable housing through volunteer labor, and offers zero-interest mortgages ranging between \$75,000 and \$120,000. The mortgage payments of around \$615 that homeowners pay directly to Habitat, then get reinvested into the provision of more affordable housing. Families also pay closing costs and invest 325 hours of sweat equity. Habitat homes are built to Energy Star/Systems Visions standards, universal design and a spacious 1100 square feet with three bedrooms and one to one and a half baths. In order to qualify for affordable housing, applicants must have one of the following housing needs: substandard, cost-burdened (rental is 33% or more of income), or overcrowded. Applicants must also have lived or work in Orange County for a year, demonstrate stable income, afford a one time closing cost of \$1700, earn 60% or less AMI and be willing to perform 325 hours of sweat equity. Habitat also works to train future homeowners in educational workshops, which cover financial budgeting, community-building, and basic home maintenance and repair.

North Carolina Affordable Housing Programs

There are also a number of programs and resources through the North Carolina Housing Finance Agency that help support the financial, informational and labor needs for affordable housing candidates. These include Homeownership program for individuals (The FirstHome Mortgage, the Mortgage Credit Certificate, the NC Housing Finance Agency's REO Special Financing); NC Foreclosure Prevention Resources (The NC Foreclosure Prevention Fund, The State Home

Foreclosure Prevention Project); Homeownership Programs for Local Governments & Nonprofit Groups (The New Homes Loan Pool, The Self-Help Loan Pool, The IDA Loan Pool); Rental Programs (The Housing Credit Program, The State Tax Credit, The Rental Production Program, The Key Program); Housing Rehabilitation Programs (The Single-Family Rehabilitation Program, The Urgent Repair Program, The Displacement Prevention Partnership, The Duke Home Energy Loan Program (HELP)); Education and Training (The Housing Tax Credit Compliance Training Program, The Supportive Housing Compliance Training Program, The N.C. Elderly Housing Rights and Consumer Protection Program, The Reverse Mortgage Counseling Program, The Supportive Services Program, Training for Predatory Lending Counselors, The N.C. Affordable Housing Conference).

Carrboro Affordable Housing Activities

The Town of Carrboro's Planning Board hosted a series of three Affordable Housing Dialogues during October of 2012. The kick-off event was held on Monday, October 15th, at Town Hall focusing on the topic of "Housing Diversity and Affordability in Carrboro." The second event was held on Wednesday, October 24th, at the OWASA headquarters, and the meeting topic was "Financial and Systemic Issues Affecting Housing Affordability and Access in Carrboro." A third event was held on Tuesday, October 30th, where discussion was targeted toward Creative and Collaborative Solutions: Case Studies and Community Visioning. This last session was held at the Century Center."⁸

The Carrboro Board of Alderman also created an Affordable Housing Task Force on June 26, 2012. This task force is comprised of 3 Board of Alderman members: Dan Coleman, Sammy Slade and Michelle Johnson. The Daily Tar Heel reported that, "The board formed the committee in response to the approval of an amendment that allows developers to pay fees instead of building the required percentage of affordable housing in a development."⁹

8 <http://www.ci.carrboro.nc.us/PZI/AffordableHousingDialogues.htm>

9 Trogon, Kathryn. "Carrboro Alderman Want to Encourage Affordable Housing." The Daily Tarheel. 4 December 2012. http://www.dailytarheel.com/blog/town_talk/2012/12/50bebf8e3f06