Date of Meeting: February 23, 2017

#I-2

BOARD OF SUPERVISORS
BUSINESS MEETING
INFORMATION ITEM

SUBJECT: **Presentation of the Housing Needs Assessment**

ELECTION DISTRICT: Countywide

STAFF CONTACTS: Hope Stonerook, Acting Director, Family Services
Brian P. Reagan, Housing Programs Manager, Family Services

PURPOSE: To present the Board of Supervisors (Board) with the results of the Housing Needs Assessment (HNA) conducted by consultants Lisa Sturtevant, Jeannette Chapman, and Terry Clower from the George Mason University Center for Regional Analysis and Lisa Sturtevant & Associates, LLC.

BACKGROUND: On January 21, 2015, the Board directed (7-2, Delgaudio and Letourneau opposed) staff to work with the Housing Advisory Board (HAB) to develop a scope of services that could be performed by a consultant to produce an assessment of housing needs in the County. On October 7, 2015, the Board authorized (9-0) up to $100,000 from the unallocated FY 2016 General Fund appropriation for completion of the HNA (Attachment 1).

In February 2016, the County procured the consulting services of the George Mason University Center for Regional Analysis and Lisa Sturtevant & Associates, LLC, to complete the HNA. The consultant team has worked on a number of housing studies, including most recently in Arlington County, Virginia, and Montgomery County, Maryland. They developed the housing demand forecasting model that was used for the HNA and was also used to forecast housing demand in the Washington, DC region. The contract required the HNA to be completed in one year in order for it to be useful in the Comprehensive Plan Update process. The consultant has completed the project after incorporating comments from the HAB. The overall objective of the HNA was to analyze current demographic, economic, and housing market conditions and patterns of housing affordability in the County and to prepare detailed forecasts of housing demand based on future job projections and demographic factors.

The project started with a kick-off meeting on March 22, 2016, with the consultant and staff reviewing the contract, timeline, and scope of services. In accordance with the contract, the consultant provided mid-project updates to the HAB in July 2016 and in December 2016. The contract also prescribed that an inter-departmental team provide technical review and comment on draft reports to the consultant as the HNA was being developed. The interdepartmental team included Brian Reagan, Kelly Marrocco, Sarah Coyle Etro (Family Services staff); Beth

Hilkemeyer (Management and Budget staff); Rich Klusek, Jill Kaneff (Planning and Zoning staff); Miguel Salinas (Economic Development staff); and Betsy Self representing the HAB. (Please note: Kelly Marrocco, Miguel Salinas, and Rich Klusek no longer work for the County.)

The HAB met on December 14, 2016, and on January 11, 2017, with the consultant to discuss the drafts of the HNA. The consultant incorporated HAB comments into the final report dated February 2017 (Attachment 1). HAB comments included: simplifying the terminology used to explain the methodology; replacing the terms "constrained" with "land use plan-based" and "unconstrained" with "GMU employment-driven"; providing additional detail about the forecasted housing unit demand deficits by unit type; and explaining the forecasts in terms of households that are low and moderate income. These comments are reflected in the February 2017 report.

The HNA includes three major sections: 1) current demographic, economic, and housing market conditions; 2) forecasts of housing demand; and 3) an extensive data appendix that includes the methodology for the study. The HNA includes an executive summary on pages 1 to 12 that provides an overview of its findings. It also includes a section entitled "Scenarios" on pages 92 to 94 that describes the potential difference in the forecasts of future housing demand in Loudoun County should any of the assumptions used in the forecasting method change.

Methodology

The consultant prepared forecasts of housing demand over the 2015 through 2040 period. The GMU employment-driven (unconstrained) forecast methodology is a regional forecasting model based on local and regional employment growth and demographic trends. The primary driver of these forecasts is employment growth. These GMU employment-driven (unconstrained) forecasts reflect a housing demand that is not land use plan-based (constrained) by the amount or type of housing supply suggested by County land use plans or zoning. Instead, the GMU employment-driven (unconstrained) forecasts are based on an examination of projected future local and regional employment growth and assumptions about the amount of housing that would be needed to accommodate the growing workforce. These forecasts also take into account the aging of the population over the forecast period.

The GMU employment-driven (unconstrained) forecasts were compared to the land use plan-based (constrained) forecasts which reflect approved projects remaining to be built, the County's planned land use, the County's long-range supply of land, and land use/development constraints. The most recent forecasts reflect recent development activity in the County, market conditions, rezonings, comprehensive plan amendments, and Metrorail's estimated arrival in 2020. These forecasts were submitted to the Metropolitan Washington Council of Governments in March 2016 as part of the Round 9.0 forecasting process. As such, the land use plan-based (constrained) forecasts take into account land use plans and current land use constraints in estimating future household growth.

Current Demographic, Economic, and Housing Market Conditions

The Current Demographic, Economic, and Housing Market Conditions section of this report provides context for the demographic, economic and housing market conditions—both local and regional—that will shape future housing demand and supply in the County. Furthermore, this section includes a detailed analysis of current housing affordability in Loudoun County and the unmet housing needs that currently exist.

Key findings from the Current Demographic, Economic, and Housing Market Conditions section include:

- Young workers and families have fueled population growth in the County in recent years.
- The older adult (65+) population is relatively small but is growing at a faster rate than the overall population.
- The County's population has become increasingly racially and ethnically diverse.
- Between 2000 and 2014, the County experienced average annual population growth of 5.1% and average annual growth in the number of housing units by 4.7%.
- The County's economy has become both larger and more dependent on population growth.
- Professional & Business Services, Leisure & Hospitality, and Education & Health Services have been the fastest growing sectors.
- Overall, 56% of Loudoun County jobs are held by Loudoun County residents:
    - 76.9% of Loudoun County Public School employees live in the County,
    - 57.1% of Loudoun County Government workforce lives in the County,
    - 49% of Loudoun County Sheriff's Office employees live in the County, and
    - 23.3% of Fire and Rescue employees live in the County.
- The demand for home ownership rebounded relatively quickly following the housing market downturn.
- The number of renters in the County has increased substantially since the downturn and the characteristics of renters have evolved in recent years – more families and older adults are renters than in the past.
- When a household spends 30% or more of its income on housing, it is referred to as "cost burdened." 29.6% of Loudoun County households are cost burdened, including 78.4% of households earning less than 60% of the Area Median Income (AMI) (currently $65,200 for a family of four). This includes home owners and those who rent.
- Based on analysis of cost burdened households, there is a potential unmet need for 11,200 rental units, including 10,000 homes affordable to households with incomes below 80% of AMI (currently $86,900 for a family of four).
- Based on review of long-term home ownership rates, there is a potential need for 3,400 additional home ownership units, including 1,400 affordable to households with incomes below 100% of AMI (currently $108,600 for a family of four).

Forecasts of Housing Demand

The objectives of the Forecasts of Housing Demand section are to: 1) identify the economic and demographic factors that will drive household growth and housing demand in Loudoun County over the next 25 years; 2) describe the characteristics and housing preferences of future households with a desire to live in the County; and 3) measure the difference between the number of housing units that would be needed to meet the estimated housing demand and the number of housing units that would be accommodated given the County's planned land use, long-range supply of land, and land use/development constraint.

Key findings from the Forecasts of Housing Demand section include:

- 6.8% of Washington, DC, area jobs will be in Loudoun County by 2040.
- The Professional and Business Services employment sector will continue to grow and double.
- Households of four or more people will grow fastest by number and households of one person will grow fastest by rate.
- Nearly half of the 2040 demand will come from households earning 150% of AMI or higher.
- Significant demand from households earning 100% of AMI and below, particularly 50% of AMI and below.
- Growing demand for all housing types (single-family detached, single-family attached, and multi-family) at similar rates.
- Low income households, senior households, and renter-occupied households will be cost-burdened.
- According to the GMU employment-driven (unconstrained) forecast, there will be a demand for 66,604 new housing units in Loudoun County between 2015 and 2040 to accommodate 64,355 new households and 2,249 vacant units.
- According to the land use plan-based (constrained) forecast, the County has the capacity to add 48,910 housing units between 2015 and 2040.
- This reflects a potential future gap of 18,300 housing units under current plans, particularly with single-family detached and single-family attached units.
- Implications of having an insufficient supply of housing include:
    - People working in jobs in Loudoun County will have fewer options to live in the County and will have to live outside the County;
    - Businesses could see a lack of sufficient housing options as a negative when making decisions about locating or expanding in Loudoun County;
    - As Loudoun County residents age, they may not be able to remain in their communities;
    - Young families will continue to be attracted to Loudoun County because of its good schools and high-quality amenities but face increasing housing constraints; and
    - Limited housing supply will put upward pressure on overall housing prices and rents.

ISSUES: The HNA provides forecast data that may be used by the Board to help shape future housing and planning policy.

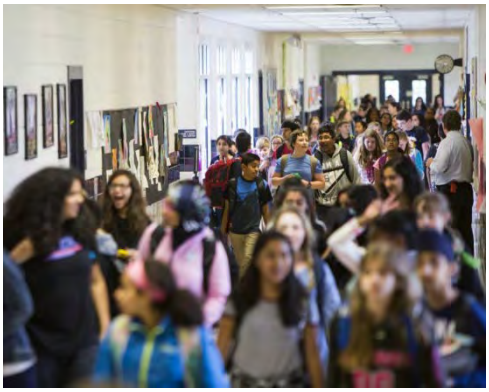
FISCAL IMPACT: There is no fiscal impact associated with this item. The HNA has been paid from the unallocated FY 2016 General Fund balance.

ATTACHMENT:

1. Loudoun County Housing Needs Assessment 2015 – 2040 dated February 2017

LOUDOUN COUNTY HOUSING NEEDS ASSESSMENT

2015 - 2040



George Mason University Center for Regional Analysis
Lisa Sturtevant & Associates, LLC

February 2017

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Table of Contents

SECTION I FIGURES

SECTION II FIGURES

Appendix Tables

CURRENT CONDITIONS APPENDIX TABLES

P. Population Characteristics in Loudoun County, VA Over Time

H. Household Characteristics in Loudoun County, VA

U. Housing Characteristics in Loudoun County, VA

FORECAST APPENDIX TABLES

FORECAST METHODOLOGY

Loudoun County Housing Needs Assessment

Report Summary

Loudoun County is a fast-growing and diversifying regional employment center with neighborhoods that attract residents from around the region, across the country, and from all over the world. In less than three decades, the County has evolved from a community with fewer than 100,000 residents and 40,000 jobs to a major component of the Washington DC metropolitan area's economic engine, with nearly 400,000 residents and about 150,000 jobs.

The ability for Loudoun County to meet its full economic development potential and to remain a vibrant and growing community is not assured. Loudoun County, as well as the greater Washington DC metropolitan area, face unprecedented challenges to its economic competitiveness, as the role of the Federal government in the region diminishes, the regional employment base diversifies, and incomes grow more slowly. In order to continue to attract and retain a talented workforce and to sustain and strengthen existing communities, it is important to have a sufficient supply of housing that is affordable to individuals and families across the income spectrum.

Loudoun County contracted with the George Mason University Center for Regional Analysis and Lisa Sturtevant & Associates LLC (GMU consulting team) to assess the County's current and future housing needs. Section I of this report includes an analysis of current demographic, economic and housing market conditions and patterns of housing affordability in the County, and describes the current gaps between housing demand and supply. Section II includes an assessment of the economic and demographic forces that will drive future housing demand in Loudoun County, presents detailed forecasts of household growth and housing demand to 2040, and analyzes the potential implications of a gap between projected demand and anticipated supply in the County.

KEY FINDINGS FROM THE HOUSING NEEDS ASSESSMENT

SECTION I. CURRENT DEMOGRAPHIC, ECONOMIC AND HOUSING MARKET CONDITIONS AND TRENDS

DEMOGRAPHICS

Loudoun County is one of the fastest growing counties in the region, and along with rapid population growth has come significant changes to the socioeconomic characteristics of the population. Since 2000, the County has added more than 200,000 residents and the characteristics of County residents have changed. Some of the demographic trends in Loudoun County reflect broader, national demographic trends but other changes are indicative of the County's unique history and place within the Washington DC metropolitan area. These changes have important implications for housing needs among Loudoun County residents.

Young workers and families have been a big part of the County's recent growth. Millennial households face greater economic challenges than did previous generations, and as a response to weaker economic prospects, many young adults have delayed marriage and childbearing, and therefore have also delayed home ownership or even moving out on their own.

Loudoun County's older adult (age 65+) population comprises a smaller share of the population than it does in some other jurisdictions in the Washington DC region. In recent years, however, the number of

seniors living in the County has increased significantly. This population growth is a result primarily of the aging in place of the existing population in their 50s and early 60s, but seniors have also moved into the County. Many seniors are living on their own and many live on fixed incomes.

The County's population has become increasingly racially and ethnically diverse. The Hispanic and Asian populations have been a major driver of population growth in the County over the past two decades. While there is significant diversity within the non-white population, Hispanic and Asian[1] households are more likely than the white population to live in larger families, and Hispanic households tend to have lower incomes and are more likely to be renters compared to the white population.

Figure A-1. Select Demographic Changes in Loudoun County, 2000-2014

Demographic Characteristic	Population (2014)	Percent Change (2000-2014)
Total Population	**351,753**	**107%**
Age Group		
Under 18	103,214	105%
18-24	24,394	154%
25-34	45,565	52%
35-44	62,257	72%
45-54	55,538	146%
55-64	32,793	183%
65+	27,813	198%
Race/Ethnicity		
White, non-Hispanic	205,198	52%
Black, non-Hispanic	24,278	111%
Asian, non-Hispanic	58,586	543%
Other, non-Hispanic	16,230	316%
Hispanic	47,280	369%

Source: U.S. Census Bureau, 2000 decennial Census (SF1) and 2014 American Community Survey
Note: Numbers may not sum to population total due to rounding.

[1] In this report, "Asian" refers to a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent, including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.

ECONOMY

Loudoun County's economy has shifted from one with a relatively limited employment base to one that is driven more by population growth and looks more like the overall regional economy. Over the past 15 years, Loudoun County has accounted for a growing share of the Washington DC metropolitan area's economic activity, with significant growth in the number of jobs in the relatively high-wage Professional & Business Services sector, as well as in the lower-wage Leisure & Hospitality and Education & Health Services sectors.

More than half of all the nearly 150,000 jobs located in the County are held by people who live in the County. About 61,000 workers currently commute from other jurisdictions to jobs in the County. In-commuting rates vary across sectors, with greater shares of workers in the Construction and Transportation & Utilities sectors living outside of Loudoun County. More than half of the jobs in the Professional & Business Services sector are held by residents of the County. Nearly 70 percent of State & Local government jobs located in the County, including Loudoun County Public School employees, are held by County residents.

Figure A-2. Largest Employment Sectors in Loudoun County and Share of Jobs Held by Residents

Industry Sector	Loudoun County Jobs (2014)	Share of Jobs held by County Residents (2012-2014 average)
Professional & Business Services	30,204	56%
State & Local Government	18,565	69%
Retail Trade	16,495	70%
Leisure & Hospitality	16,005	73%
Education & Health Services	13,530	64%
Construction	13,424	30%
Transportation & Utilities	9,645	33%
Other	31,784	49%
Total	**149,650**	**56%**

Source: Quarterly Workforce Indicators and Quarterly Census of Employment and Wages; 2012, 2013 and 2014 American Community Survey microdata (average)

HOUSING MARKET

Following the economic recession that began in late 2007 and officially ended in mid-2009, the housing market in Loudoun County stabilized relatively quickly and housing demand has been strong in recent years. Prices of single-family attached homes/townhomes and condominiums are lower in Loudoun County than they are in some other parts of the region, while the County's single-family detached homes command a price premium. The biggest risk to the County's for-sale market is the potential obstacles to home ownership among young, working households.

There has been a significant increase in the number of renters in Loudoun County since the recession. Overall rents in the County are higher than the regional average, primarily because the rental stock in Loudoun County includes a significant share of larger units and single-family homes. The characteristics of renters have evolved in recent years. More families and older adults are renters than they were than in the past.

Figure A-3. Existing Home Sale Prices and Rents, 2000 and 2014

	2000	2014	Change (2000-2014)
Median Existing Home Sales Price			
Condominiums	$104,000	$249,900	140%
Single-Family Attached	$167,900	$375,000	123%
Single-Family Detached	$295,000	$550,000	86%
All Home Types	$192,500	$419,900	118%
Median Gross Rent	$954	$1,674	75%

Source: Metropolitan Regional Information Systems (MRIS); U.S. Census Bureau, 2000 decennial Census (SF3), 2014 American Community Survey

HOUSING AFFORDABILITY

Housing affordability is often measured in terms of cost burden. Cost burdened households are those that spend 30 percent or more of their income on housing, a threshold that has been used nationally to determine reasonable housing costs that leave sufficient resources for other household expenditures.

Some segments of Loudoun County's population are more likely to be housing cost burdened than others. Renters, in particular, are more likely than home owners to be cost burdened, and because Loudoun County has added thousands of renter households since the housing market downturn, the number of renters who are cost burdened has grown significantly in the County.

Figure A-4. Cost Burdened Households by Selected Characteristics, 2012-2014

	Percent Cost Burdened
All Households	29.6%
Household income <60% AMI	78.4%
Under age 25	64.1%
Living alone (age 65+)	51.9%
Single-parent families	50.5%
Renters	49.7%
Hispanic households	49.7%
Persons with disabilities	39.3%

Source: U.S. Census Bureau, 2012, 2013 and 2014 American Community Survey microdata (average)

Young adults, seniors living alone, Hispanic households, and people with disabilities are more likely to face housing affordability challenges compared to the overall population. Renters are also more likely than home owners to be cost burdened. Households with low incomes—below 60 percent of AMI—are most likely to face housing affordability challenges, with nearly 80 percent of these households paying 30 percent or more of their income on housing.

The extent to which home owners are cost burdened depends not only on when they purchased their home—that is, at what price and interest rate—but also on their income trajectories. Home owners with declining, very low, or fixed incomes are most at risk of being cost burdened, with seniors and people with disabilities most vulnerable. The share of cost burdened home owners has declined in the County since the housing market downturn. Many would-be home owners have been excluded from the market as a result of rising home prices, flat incomes, and more restrictive lending.

CURRENT HOUSING GAPS

Estimates of the current housing gaps in Loudoun County suggest the greatest needs among low- and moderate-income renters, though there are also unmet needs among potential home owners.

Based on an analysis of renter cost burden in Loudoun County, there is currently a potential unmet need of about 11,200 rental units. Over 90 percent of the estimated unmet rental housing needs are among households with incomes below 80 percent of AMI ($87,350 for a family of four). Three quarters (75 percent) of the estimated unmet rental demand is among households with incomes below 60 percent of AMI ($65,520 for a family of four).

Renters are significantly more likely than current home owners to be cost burdened. However, a gap also potentially exists when it comes to home ownership. Indeed, some of the County's current renter households might have become home owners if there were sufficient home ownership opportunities. Home ownership rates in Loudoun County remain below long-term, historic levels. If the County were at a more typical, long-term home ownership rate, it would need an additional 3,400 home ownership units, including 1,400 home ownership units affordable to households with incomes below the area median income ($109,200 for a family of four).

SECTION II. FORECASTS OF HOUSING DEMAND

This housing needs assessment for Loudoun County includes forecasts of housing demand over the 2015 through 2040 period. As part of these forecasts, there is an analysis of the future economic and demographic forces that likely will drive future demand for housing within the County, as well as an assessment of the household characteristics, household incomes and preferred housing types of future households suggested by the forecasting model. The GMU consulting team's employment-driven approach to forecasting housing demand is different from the methodology used to generate forecasts prepared by Loudoun County for the Metropolitan Washington Council of Governments (MWCOG) cooperative forecasting process because the two forecasting processes serve different purposes. The GMU methodology is a regional forecasting model based on local and regional employment growth and demographic trends. There are two components of housing demand estimated as part of this model: 1) employment-driven housing demand resulting from growth in the labor force and 2) demographic-driven housing demand resulting from anticipated growth in the non-working population. Employment growth is the primary driver of the GMU forecasts of housing demand.

The GMU employment-driven forecasts are intended to reflect an assessment of future housing demand associated with employment growth which is not limited by the amount or type of housing supply suggested by current County land use plans. Instead, the GMU forecasts examine projected future employment growth, analyze expected socioeconomic characteristics of future households, and assess the amount and types of housing that would be needed in Loudoun County to accommodate future workers and the population over the forecast period.

The GMU forecasts are based on analysis of U.S. Census Bureau American Community Survey data, as well as data from IHS Economics and MWCOG. In addition, several key assumptions drive these employment-driven housing demand forecasts.

1. First, these forecasts assume that local and regional employment growth will drive the majority of housing demand in Loudoun County in the future.

2. Second, these forecasts assume that commuting patterns into and out of Loudoun County will not change over the forecast period.

3. Third, these forecasts assume that households with particular characteristics will not have different housing preferences than what are observed currently.

Changes to any of the assumptions would result in different results than what are presented from this forecasting model. If, for example, there is a sustained, long-term shift in preferences for more multi-family and/or rental housing, then the GMU forecasts will have underestimated the future demand for this type of housing in the County.

While these are the three primary assumptions driving the housing demand forecasts, the forecasting model includes other assumptions about the age and household composition of future workers, and retirement and migration rates. Details about the forecasting methodology are included in the Appendix.

The GMU employment-driven forecasts of housing demand were compared to forecasts prepared for the MWCOG Round 9.0 Cooperative forecasting process. The Round 9.0 forecasts are Loudoun County's most recently released forecasts; the County submitted these forecasts to MWCOG on March 21, 2016. The County/MWCOG forecasts are land use plan-based forecasts. The land use plan-based forecasts reflect recent development activity, market conditions, rezonings, comprehensive plan amendments, and Metrorail, estimated to arrive in Loudoun County in 2020. The County/MWCOG forecasts also reflect approved projects remaining to be built, the County's planned land use, the County's long-range supply of land, and land use/development constraints.

Results from Forecasts of Household Growth and Housing Demand

The housing demand forecasts includes estimates of future households and housing units. Given the GMU forecasting approach, and given the assumptions about employment growth, in-commuting rates, housing preferences, and other factors, these employment-driven housing demand forecasts suggest there will be a demand for 66,604 net new housing units in Loudoun County between 2015 and 2040 to accommodate 64,355 new households. Approximately 2,250 new housing units are expected to be vacant units based on typical vacancy rates.

The GMU employment-driven housing demand forecasts suggest **faster household growth** and **stronger demand for single-family housing** than what is suggested by the County's land use plan-based forecasts.

Households. The GMU employment-driven forecasts suggest a total of 185,460 households in Loudoun County in 2040, while the County/MWCOG forecasts estimate a total of 167,590 households in 2040, a difference of 17,870 households. The GMU employment-driven forecasts suggest an average annual household growth rate of 2.1 percent over the 2015 through 2040 period, while the County's land use

plan-based household forecasts suggest an annual household growth rate of 1.5 percent over the 2015 through 2040 period. Between 2010 and 2015, the number of households in the County increased by 3.0 percent.

Housing Units. The GMU employment-driven forecasts suggest a total of 193,680 housing units in 2040 (including occupied and vacant housing units), while the County/MWCOG forecasts suggest a total of 175,380 housing units in 2040, a difference of 18,300 housing units.

There are differences in the GMU employment-driven housing demand forecasts and the land use plan-based forecasts in terms of unit types. The GMU employment-driven housing demand forecasts include demand for 101,120 single-family detached units, 61,450 single-family attached units/townhomes and 31,110 multi-family units by 2040. These employment-driven housing demand forecasts suggest more demand for single-family housing and less demand for multi-family housing compared with what is forecasted in the County/MWCOG land use plan-based forecasts. Specifically, these employment-driven housing demand forecasts suggest that housing that can be accommodated under current County land use will result in a gap of 19,090 single-family detached units, a gap of 11,380 single-family attached units/townhomes, and a surplus of 12,170 multi-family units by 2040.

The GMU employment-driven housing demand forecasts indicate substantial growth in higher-income households and family households, which are two key factors in the relatively strong demand for single-family housing over the 2015 through 2040 period.

Figure A-5. GMU Employment-Driven Household Forecasts and County/MWCOG Land Use-Based Household Forecasts, 2020 - 2040

Year	GMU Employment-Driven Household Forecasts	Loudoun County / MWCOG Land Use Plan-Based Household Forecasts	Difference
2020	136,270	137,910	1,640
2025	150,610	150,760	150
2030	164,640	158,570	(6,070)
2035	175,860	164,330	(11,530)
2040	185,460	167,590	(17,870)

Figure A-6. Comparison of GMU Employment-Driven Housing Unit Forecasts and Loudoun County/MWCOG Land Use Plan-Based Housing Unit Forecasts

Year	GMU Employment-Driven Housing Unit Forecasts			
	Single-Family Detached	Single-Family Attached	Multi-Family	Total
2020	75,900	44,350	22,520	142,770
2025	83,650	49,070	24,890	157,610
2030	90,700	53,990	27,250	171,940
2035	96,600	58,050	29,190	183,840
2040	101,120	61,450	31,110	193,680
	Loudoun County / MWCOG 9.0 Land Use Plan-Based Housing Unit Forecasts[a]			
	Single-Family Detached	Single-Family Attached	Multi-Family	Total
2020	71,990	46,850	25,140	143,980
2025	76,940	49,540	31,000	157,480
2030	79,410	49,840	36,520	165,770
2035	80,860	50,070	40,980	171,900
2040	82,030	50,070	43,280	175,380
	Difference			
	Single-Family Detached	Single-Family Attached	Multi-Family	Total
2020	(3,910)	2,490	2,620	1,210
2025	(6,700)	470	6,110	(130)
2030	(11,290)	(4,150)	9,270	(6,170)
2035	(15,740)	(7,980)	11,780	(11,940)
2040	(19,090)	(11,380)	12,170	(18,300)

Source: Metropolitan Washington Council of Governments Cooperative Forecasts Round 9.0; Loudoun County Department of Planning and Zoning; GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

[a]The single-family attached and multi-family MWCOG forecasts each include half of the forecasted multi-family stacked housing units, which includes stacked townhomes, one-over-twos, and two-over-twos. The Census permitting data generally includes these units as multi-family units, but respondents in the American Community Survey, which forms the basis for the assumptions in this model, will likely split their responses between single-family attached (including buildings with 2-4 units) and multi-family buildings (5+ units).

Forecasts of Characteristics of Future Households and Housing Units

These housing demand forecasts, based on local and regional employment growth and assumptions about in-commuting, housing preferences and other economic and demographic trends, suggest that **there will be significant demand for housing from young adults over the next 10 years, though housing demand will come from older households later in the forecast period.** The demand for housing in Loudoun County from individuals under 35 years old is projected to increase over the next decade, with an estimated 15,000 new young adult households coming to the County between 2015 and 2025. By 2025, most Millennials will be over 35 years old, and as a result, there is expected to be strong demand for housing from people between the ages of 35 and 50 over the 2025 to 2040 period.

The generation that follows is expected to be somewhat smaller, and the key driver of housing demand in Loudoun County after 2025 will be from aging Millennials. Generation Z, those born in the first two decades of the 21st Century (age 16 and younger now), will start forming households around 2025. This population in the Washington DC metropolitan area will be somewhat smaller than the Millennial population as a result of lower birth rates as well as changes in the types of jobs in the region that will be less likely to attract younger workers. The demand for housing in Loudoun County from people under 35 years old is projected to decline modestly between 2025 and 2040 because of these two factors.

Based on an assessment of population trends and assumptions about migration rates into and out of the County, **the aging of Loudoun County's current population will drive housing demand for older adults.** Over the forecast period, the demand for housing in Loudoun County from households headed by someone age 65 years or older is projected to increase substantially. The forecasts suggest there could be 11,900 more 65+ households in 2040 than in 2015. The growth of the older adult population in Loudoun County is driven primarily by the aging of the County's current Baby Boomer population. Even with the fast growth, demand for housing from the senior population will be relatively lower in Loudoun County than in many other parts of the Washington DC region.

These housing demand forecasts suggest **there will be increasing demand for housing in Loudoun County from single-person households, but larger households will remain the main source of demand throughout the forecast period.** Housing demand in Loudoun County will include growth in the number of households of all sizes. The fastest rate of growth is expected among single-person households. Based on these forecasts, it is expected that the County will have 13,290 more single-person households in 2040 than it does in 2015. Demand from households with four or more people—primarily family households—will account for more than a third of future housing demand in the County, or nearly 23,000 new households between 2015 and 2040.

This housing demand forecasts model, which includes assumptions that in-commuting rates and housing preferences will not change over the forecast period, suggests that **home ownership rates in Loudoun County will rise slightly over the next 25 years.** Despite recent declines in home ownership rates nationally, regionally and locally, the demand for home ownership in Loudoun County is expected to be strong over the forecast period. Based on these forecasts, demand for home ownership in Loudoun County is strongly correlated with the expected number of high-income, working households that are projected to want to live in the County. These forecasts suggest a demand for housing in Loudoun County from about 50,650 new home owners and from about 13,706 new renter households over the 2015 to 2040 period.

These employment-driven housing demand forecasts assume that housing preferences for households will not change over the forecast period, given a household's particular household characteristics and income. Given this assumption, these housing demand forecasts suggest **strong demand for single-family housing in Loudoun County over the next 25 years.** Similar to preferences for home ownership, preferences for different types of homes is strongly correlated with age, household composition and size, and household income. Based on the characteristics of future households forecasted by this model, there will be strong demand in Loudoun County for single-family detached homes, with demand from 32,784 households for single-family detached homes over the 2015 to 2040 period. The forecasts suggest a demand from 21,395 households for new single-family attached homes (townhomes) in Loudoun County between 2015 and 2040. The demand for multi-family homes (i.e. residences in buildings with 5+ units) will grow at about the same rate as the demand for townhomes, with demand from 10,178 households for new multi-family units. In addition to the housing units needed for future households, there will be a need for additional units to account for typical housing vacancy rates in the County.

Given assumptions about employment growth, in-commuting patterns, retirement patterns, and migration rates, these housing demand forecasts suggest **there will be a need for housing in Loudoun County for households all along the income spectrum, including workers in low-wage jobs and non-workers (i.e. seniors and persons with disabilities) living on fixed-incomes.** Between 2015 and 2040, there will be demand for housing in Loudoun County from 3,200 new households with incomes below 30 percent of area median income (AMI), 3,470 new households with incomes between 30 and 49 percent of AMI, 3,120 new households with incomes between 50 and 59 percent of AMI, and 2,200 new households with incomes between 60 and 69 percent of AMI. These lower-income households include workers in the retail, hospitality and other lower-wage sectors, as well as seniors and persons with disabilities who have limited resources. Current lower-income households in Loudoun County are significantly more likely to be cost burdened than higher-income households, and the County currently has a deficit of housing affordable to this population.

The largest and fastest growing source of demand for housing in Loudoun County is projected to come from higher-income households, including many workers in the Professional & Business Services sector. These forecasts suggest demand for housing in Loudoun County from nearly 30,000 households earning 150 percent or more of AMI.

In these forecasts, **housing affordability remains a significant challenge** for low- and moderate-income households in Loudoun County. The GMU employment-driven housing demand forecasts suggest that in 2040, 70 percent of households with incomes below 60 percent of AMI will be cost burdened, paying 30 percent or more of their income on housing in the County. This projected rate of cost burden in 2040 is virtually unchanged from the 2015 cost burden rate.

Figure A-7. Summary of GMU Employment-Driven Housing Demand Forecasts, 2015 to 2040

Household Characteristics	2015 to 2040 Increase in Households in Loudoun County
Age of Household Head	
<35	+11,010
35-44	+19,610
45-54	+15,250
55-64	+6,590
65+	+11,900
Work Status	
Worker with a payroll job	+55,440
No workers with a payroll job	+8,910
Disability Status	
1+ members of the household w/ a disability	+8,210
Household Size	
1 Person	+13,290
2 People	+16,610
3 People	+11,780
4+ People	+22,680
Tenure	
Owners	+50,650
Renters	+13,700
Unit Type	
Single-Family Detached	+32,780
Single-Family Attached/Townhome	+21,400
Multi-Family (5+ unit building)	+10,180
Household Income	
<30% AMI	+3,200
30-49% AMI	+3,470
50-59% AMI	+3,120
60-69% AMI	+2,220
70-79% AMI	+2,510
80-99% AMI	+5,690
100-119% AMI	+6,450
120-149% AMI	+7,890
150%+ AMI	+29,810

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

Section I: Current Demographic, Economic and Housing Market Conditions

Loudoun County has evolved from a small, suburban bedroom community to a major center for economic growth that attracts a diverse population and workforce which has translated into growing and transforming housing needs. The County has tremendous economic development capacity and can continue to be a thriving, vibrant community; however, there are challenges to the County's prospects for meeting its full economic potential and for supporting robust growth in the years to come. Like so many other jurisdictions in the Washington DC metropolitan area[2], Loudoun County faces the challenge of ensuring that there is a sufficient supply of housing to meet the needs of the growing population and workforce. With the adoption of an amendment to its comprehensive plan in 2007, elected officials and local leaders formally recognized the challenges associated with ensuring that there are housing options for all people who live and/or work in Loudoun County.

This section of this report provides context for the demographic, economic and housing market conditions—both local and regional—that will shape future housing demand and supply in the County. Furthermore, this section includes a detailed analysis of current housing affordability in Loudoun County and the unmet housing needs that currently exist.

Population and Demographics

In the 1990s and 2000s, Loudoun County's population grew at a remarkable average rate of seven percent annually. The rate of population growth has slowed somewhat since 2007, but Loudoun County continues to add thousands of new residents each year. Just as important as the dramatic increase in the size of the population is the rapidly changing demographic characteristics of the County's residents. Many of these changes reflect broader national demographic trends, but these shifts can seem accelerated because Loudoun County has grown so quickly.

Key Demographic Trends

Young adult households. In the years ahead, more young adults will be forming their own households and will want to move into home ownership.[3] But nationally Millennial households have entered a labor market with fewer job opportunities and slower-growing wages than did past generations. As a response to weaker economic prospects, many young adults have delayed marriage and childbearing. These trends suggest that a growing number of young adult households in the Washington DC metropolitan area and in Loudoun County will have lower incomes than past generations, which will mean growing demands for smaller, more modestly-priced housing.

Older adults. Another important national demographic trend that has implications for housing demand is the aging of the population. The leading edge of the Baby Boom population has reached its mid-60s and over the coming decades the senior population will grow much faster than the population under age 65. While Loudoun County's senior population comprises a somewhat smaller share than it does in other

[2] The Washington DC metropolitan area is comprised of the following jurisdictions: District of Columbia; City of Alexandria, Arlington County, Clarke County, Culpeper County, Fairfax County, City of Fairfax, City of Falls Church, Fauquier County, Loudoun County, City of Manassas, City of Manassas Park, Prince William County, Rappahannock County, Spotsylvania County, Stafford County, City of Fredericksburg, and Warren County in Virginia; Calvert County, Charles County, Frederick County, Montgomery County, and Prince George's County in Maryland; and Jefferson County in West Virginia. In this report, Washington DC metropolitan area and Washington DC region are used interchangeably.

[3] Several national surveys of Millennials have confirmed a strong desire for home ownership among this population. See, for example, Fannie Mae's *National Housing Survey* available online at http://www.fanniemae.com/portal/research-and-analysis/housing-survey.html

jurisdictions in the Washington DC region, the number of older adults living in the County will increase substantially in the coming decades. This population growth is a result primarily of the aging in place of the existing population in their 50s and early 60s, but seniors have also moved into the County. As seniors comprise a larger share of the County's population there will be more demand for a variety of housing types that can facilitate aging within the community.

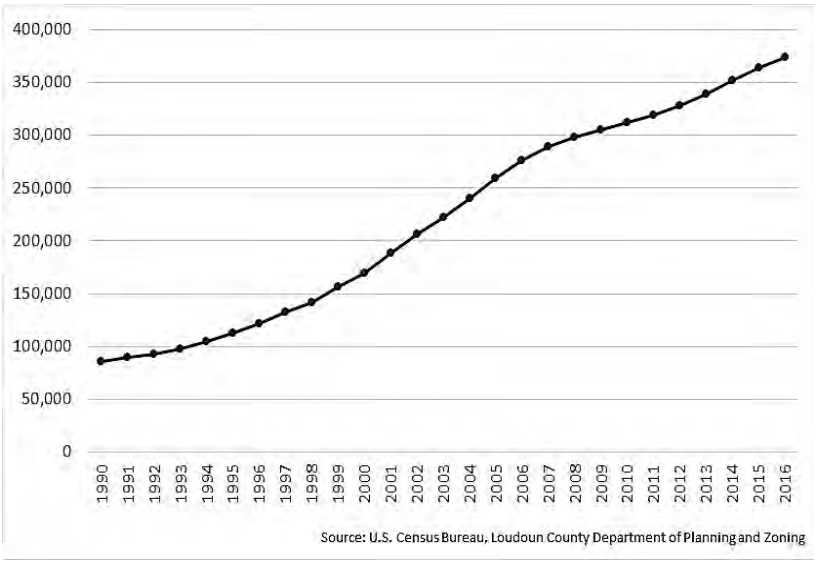
Racial/ethnic minorities. Loudoun County's population is growing more racially and ethnically diverse, like much of the rest of the country. The well-documented trend toward greater racial diversity is largely a result of a greater share of childbearing-age women and higher fertility rates among the non-white population, specifically the Hispanic and Asian populations, which is observed both nationally and locally. While there is significant diversity within the non-white population, Hispanic households tend to have lower incomes and are more likely to be renters compared to the white population. Asian households are more likely than Hispanic households to have higher incomes and be home owners, though there is a fair amount of variation among the Asian population. As Loudoun County's population has become more racially and ethnically diverse, housing needs in the County have also evolved.

Population

Loudoun County's population has grown dramatically since the middle of the last century. In 1950, the County's population was just over 20,000. In 2016 the Loudoun County Department of Planning and Zoning estimates that Loudoun County has a population of 373,694, reflecting a nearly 18-fold increase. The County's fastest population growth occurred during the late 1990s and the early 2000s when annual population growth rates averaged seven percent (Figure 1).[4] In recent years, the pace of annual growth has slowed slightly, but Loudoun County's population continues to increase at a faster rate than other jurisdictions in the Washington DC metropolitan area.

Over the past 15 years, the pace of new housing construction has been brisk, but in some important ways it has failed to keep up with the changing population's needs. Since 2000, the County added 204,100 people and 67,600 housing units. Over that time, Loudoun County's population grew at an average of 5.1 percent annually while the number of housing units grew by 4.7 percent annually (Figure 2).

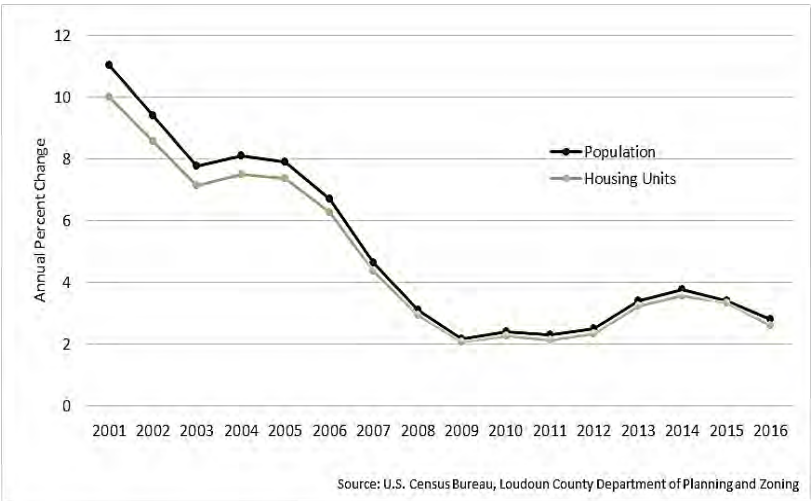
Figure 1. Population, 1990-2016



The number of housing units would grow more slowly than the population if vacancy rates were declining and/or household sizes were increasing. Vacancy rates fluctuated only slightly over this time period. In 2000, the housing vacancy rate in Loudoun County was

[4] Additional detailed data on all topics covered in this report are included in the Appendix.

Figure 2. Population and Housing Units, 1990-2016



3.6 percent. Since 2006, vacancy rates have been between 4.3 and 4.4 percent. Therefore, differences in population and housing unit growth rates can more likely be attributed to increases in average household sizes in the County.

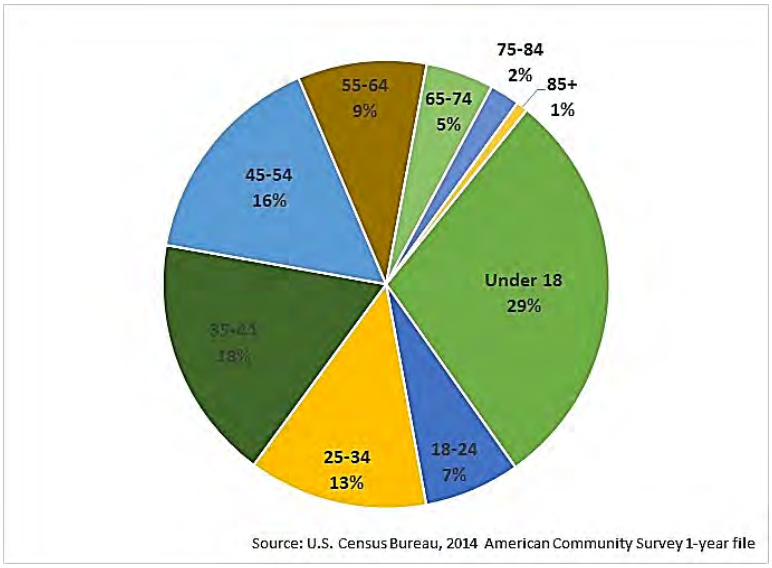
In 2000, the average household size for owner-occupied housing was 2.92. For renter-occupied housing, the average household size was 2.42. By 2014, the average household sizes in Loudoun County had increased to 3.05 among owners and 2.70 among renters. Increases in the number of family households, growth in the foreign- and native-born minority populations, more households doubling up (i.e. two or more families or sets of unrelated individuals sharing one home), and an expansion of the types of households that rent all contribute to the increases in household sizes within the County.

About American Community Survey Data

Data from the U.S. Census Bureau's American Community Survey (ACS) are used in this report to describe many of the characteristics of Loudoun County's residents and workers. The ACS is the best source of demographic data for local jurisdictions, and the most recent ACS data is for 2014. In this report, 2014 data are used to describe broad characteristics, such as age, race and home ownership rate. Because of the relatively small sample size, the 2014 one-year data are often not useful for examining very detailed characteristics. Therefore, for detailed tabulations, a file containing three years of ACS data—2012, 2013 and 2014—was created and was used to analyze more detailed characteristics such as household income by race. The statistics based on the three years of ACS data should be interpreted as an average of the characteristic over the 2012-2014 period. In the text, unless otherwise specified, the data presented are from the 2014 one-year ACS file. In all charts, the data source is included at the bottom. For more information on the ACS, see http://www.census.gov/programs-surveys/acs/.

Age of the Population

Figure 3. Age Distribution, 2014



Loudoun County's age distribution reflects its large number of family households. The County's population has a larger share of children under age 18 than any other jurisdiction among the comparable jurisdictions analyzed for this report.[5] In Loudoun County, 29.4 percent of the population is under age 18 (Figure3). In Fairfax County and in Montgomery County, about 24 percent of the population is under 18; in Prince William County, the share is 28.1 percent.

Loudoun County also has a greater share of 35-to-44 year olds than many of the other comparable jurisdictions, but the share of the population in this age group has declined in recent years. In 2014, 17.7 percent of Loudoun County's population was between the ages of 35 and 44. The share was 14.6 percent in Fairfax County and 15.4 percent in Prince William County. Arlington County's share was the closest to Loudoun County's, at 17.0 percent.

The Millennial population is not as well represented in Loudoun County.[6] The 25-to-34 year old population comprised 13.0 percent of Loudoun County's population in 2014, compared with 14.2 percent of Fairfax County's population, 14.5 percent of Prince William County's population and 13.5 percent of Montgomery County's population. In Arlington County, 25-to-34 year olds were 26.8 percent of the overall population. The 18-to-24 year old population was 6.9 percent of Loudoun County's population in 2014, while the shares were close to or above eight percent in comparable jurisdictions.

Compared to other jurisdictions in the region, older adults comprise a smaller share of the overall population in Loudoun County. In 2014, about eight percent of the County's population was age 65+ and 17.2 percent was age 55+. By contrast, in Fairfax County, 11.5 percent of the population was age 65+ and nearly a quarter (23.9 percent) was age 55+. In Montgomery County, 13.7 percent of the population was age 65+ and 26.5 percent was age 55+.

Like in other jurisdictions, the fastest growing age group in Loudoun County is the older adult population. The size of the overall population in Loudoun County more than doubled between 2000 and 2014, but the population age 65+ nearly tripled. The 85+ population grew even faster. The older adult population in Loudoun County is still relatively small. In 2000, people age 65+ accounted for 5.5 percent of the

[5] In this report and in the Appendix tables, characteristics of Loudoun County are compared to those in the Washington DC metropolitan area, as well as to Fairfax, Prince William and Arlington counties in Virginia and Montgomery and Frederick counties in Maryland.

[6] There is no universally accepted definition of the Millennial population, but many demographers define Millennials as people between the ages of 18 and 34.

Figure 4. Age Distribution, 2000 and 2014

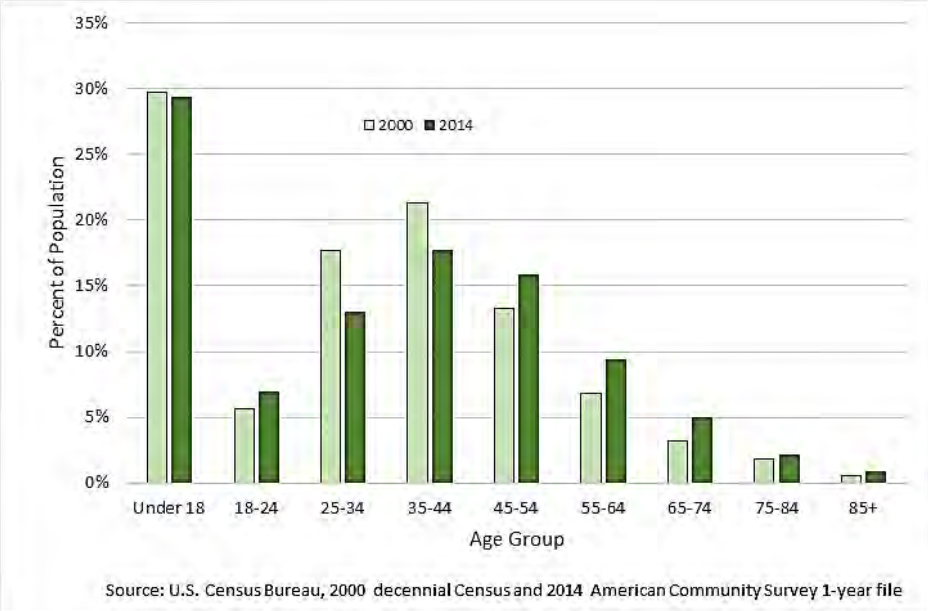
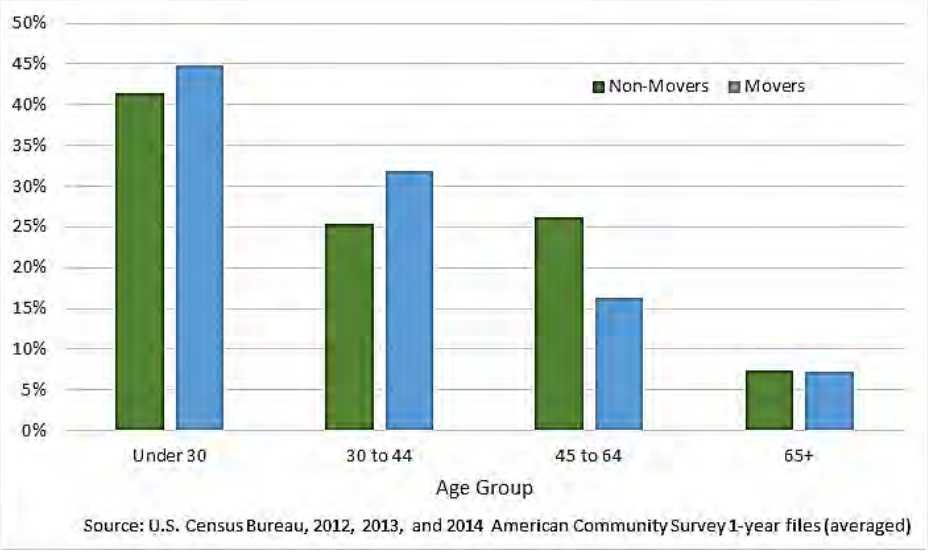


Figure 5. Age Distribution of Recent Movers and Non-Movers, 2012-2014



population but in 2014 their share was 7.9 percent (Figure 4). As the Baby Boomer population ages, the older adult population in Loudoun County will comprise an ever growing share of the overall population.

The older adult population has diverse housing needs, including needs for accessible homes. The growth of the senior population in Loudoun County has implications for the size of the population with disabilities since older adults are more likely to have disabilities than are younger people. In 2014, 30.0 percent of the 65+ population in Loudoun County had at least one disability. The most common disabilities among seniors in the County are ambulatory and independent living difficulties.[7]

The recent increase in the older adult population in Loudoun County is primarily a result of a population that is aging in place, rather than the movement of older people into the County. People who move tend to be younger. More than three-quarters of the people who moved into or within Loudoun County over the 2012 to 2014 period were under age 45, compared to 67 percent of existing residents (Figure 5). Only 16.1 percent of movers were between the ages of 45 and 64, compared to 26.0 percent of non-movers. However, there

[7] The Census Bureau's American Community Survey includes six disability types: Hearing difficulty (deaf or having serious difficulty hearing); Vision difficulty (blind or having serious difficulty seeing, even when wearing glasses); Cognitive difficulty (because of a physical, mental, or emotional problem, having difficulty remembering, concentrating, or making decisions); Ambulatory difficulty; (having serious difficulty walking or climbing stairs); self-care difficulty (having difficulty bathing or dressing); and Independent living difficulty (because of a physical, mental, or emotional problem, having difficulty doing errands alone such as visiting a doctor's office or shopping).

is evidence that some seniors are moving into the County in their later years; just over seven percent of recent movers into the County were age 65 or older, which is the same share as among non-movers.

Age of Household Heads

In addition to assessing trends in the age of the overall population, it is also helpful to look at the ages of people who form households.[8] Household formation rates are important for understanding housing demand, and these rates vary by age group and fluctuate depending on economic and housing market conditions. Households are formed when people leave their parents' homes or move out from a roommate situation and into their own home. The number of households can shrink when people living alone get married or when young adults who had been living on their own move back home. Since the recession, household formation rates have fallen nationally among younger households. This decline has primarily been the result of more young adults living with their parents.[9] Loudoun County has experienced the same decline in household formation rates among people in their 20s and early 30s that has been observed nationally. There is, however, some evidence that household formation rates are increasing among this population.

Older Adults & Housing

"With their rapidly growing 50-and-over populations, communities across the country must ensure that their older residents have the housing options and supportive services they need to live safely and independently for as long as possible. Meeting this challenge…requires enhanced federal supports as well as harnessing the creativity and entrepreneurial energy of businesses, nonprofits, and philanthropies to expand the options for aging in community."

Housing America's Older Adults, Harvard University Joint Center for Housing Studies

A "headship rate" is defined as the ratio of the number of household heads to the size of the population. The higher the rate, the more likely that segment of the population is to be the head of a household (as opposed to a spouse, roommate or child, for example.) The headship rate for 25-to-34 year olds fell to a low of 0.38 in 2012 and 2013 but rose slightly to 0.41 in 2014. (The rate had been 0.45 in 2000.) Headship rates declined for most age groups in the County, but the decline was more dramatic for the 25-to-34 year old population.

As a result of changes in headship rates and overall population trends, the share of households headed by people age 25 to 34 fell in Loudoun County after the economic and housing market downturn but has been rising slowly since 2012. In 2006, more than one in five households in Loudoun County (21.2 percent) was headed by a person between the ages of 25 and 34. In 2012, that share was just 14.9 percent, but in 2014 it had risen slightly to 16.1 percent.

Millennials & Housing

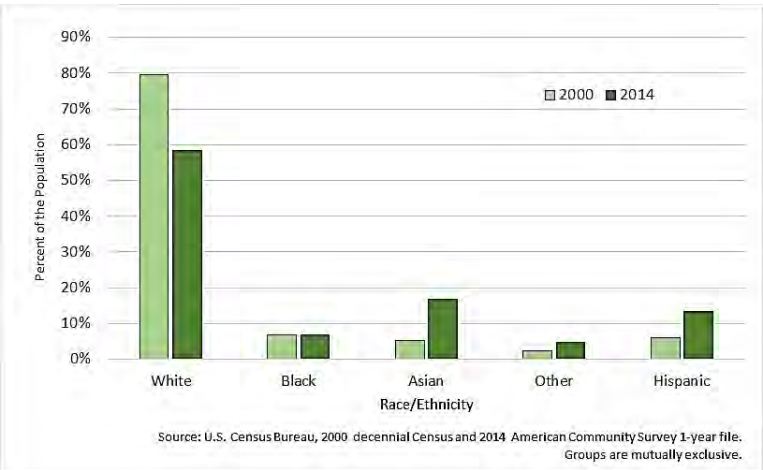
"During the downturn, an unprecedented share of young adults did choose to live with their parents rather than strike out on their own, hindering household formation and economic activity. As economic prospects improve, however, Millennials will emerge from their parents' basements."

Millennials and Their Homes: Still Seeking the American Dream, The Demand Institute

[8] A household is defined as a housing unit occupied by one or more people who may or may not be related.

[9] Fry, Richard. 2016. *For the First Time in Modern Era, Living with Parents Edges out Other Living Arrangements for 18-to-34 Year Olds*. Washington, DC: Pew Research Center. Available online http://www.pewsocialtrends.org/2016/05/24/for-first-time-in-modern-era-living-with-parents-edges-out-other-living-arrangements-for-18-to-34-year-olds/

Figure 6. Race/Ethnicity, 2000and 2014



Race/Ethnicity

One of the biggest demographic changes in Loudoun County and in much of the country has been the growth of the non-white population. In 2000, non-Hispanic white residents comprised 79.6 percent of Loudoun County's population. By 2014, that share had fallen to 58.4 percent (Figure 6). Over that period, growth of the Asian and Hispanic population far outpaced overall population growth. The black population grew at about the same rate as the overall population.[10] In 2000, the Asian population comprised just 5.4 percent of Loudoun County's population. In 2014, the share was 16.6 percent. The Hispanic population increased from 5.9 percent of the population in 2000 to 13.4 percent in 2014.

The Asian[11] and Hispanic[12] populations in Loudoun County reflect a wide range of demographic and economic characteristics. Asian residents in the County are more likely than Hispanic residents to be recent immigrants. Nearly two-thirds of Loudoun County's Asian residents were born outside the U.S., compared with less than half of the County's Hispanic residents. Going forward, a substantial share of the County's population growth will be among the non-white population, including not only new immigrants but also increasingly second and third generation immigrants. The primary reason why population growth has been and will continue to be driven by the non-white population is two-fold: 1) compared to white women, Hispanic and Asian women are more likely to be of childbearing age and 2) fertility rates among the non-white population are higher than they are for the white population.

Racial Minorities & Housing

"Significant changes are being powered by fast-growing minority populations—including Hispanics, Asians, and people of two or more races—which will double in size over the next 40 years. Housing will need to be made appropriate for these populations. Their particular preferences and tastes may be for multigenerational housing or particular kinds of communities. Huge amounts of attention were given to the baby boomers when it was learned that they were an important market. That same kind of focus needs to be given to these young, more diverse folks."

Diversity Explosion, William Frey

[10] The U.S. Census Bureau asks respondents to indicate whether or not they are Hispanic, and then to indicate the racial category that best describes them (e.g. white, black, Asian). In this analysis, white, black, Asian and Other racial categories include only people who are not Hispanic. All people of Hispanic origin, regardless of the race they indicated, are classified as Hispanic in this analysis.

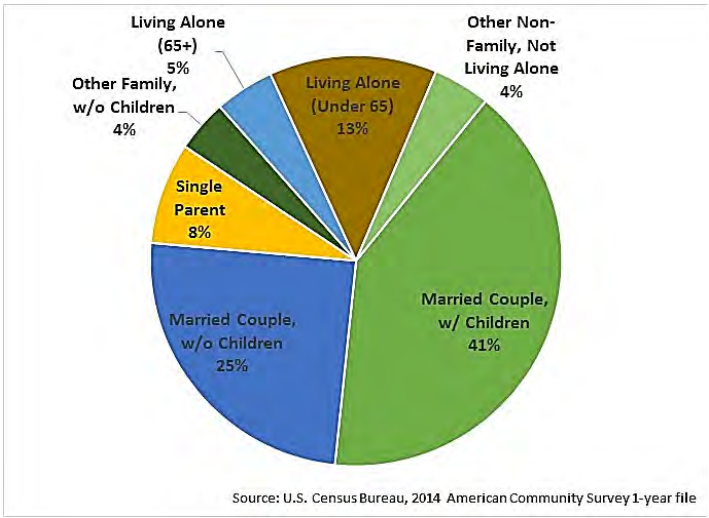
[11] "Asian" refers to a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent, including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam. About 40 percent of individuals identifying as Asian in Loudoun County are Indian.

[12] The category "Hispanic" is self-reported by responds to the ACS and is generally considered a heritage, nationality group, lineage or ethnicity, rather than a race. However, for most reports on demographics, "Hispanic" or "Latino" is treated as a separate racial category. The largest group of Hispanic residents in Loudoun County is Salvadoran (about 15 percent).

Households and Families

Loudoun County has a relatively large share of families with children. Over 40 percent of Loudoun County households are married couples with children (Figure 7). About eight percent are single-parent households. Loudoun County has a larger share of married couple families with children than any of the comparable jurisdictions. For example, in Fairfax County, just 29.0 percent of households are married couples with children. The share in Prince Willian County is 34.0 percent. Married couple households without children make up about a quarter of all households in Loudoun County.

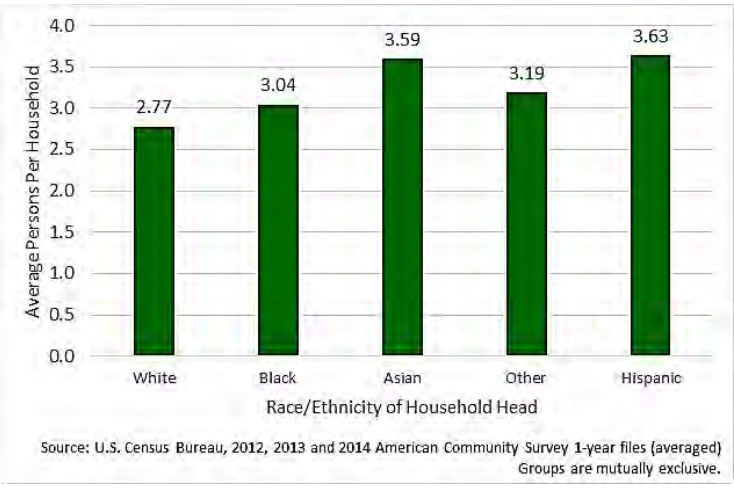
Figure 7. Household Type, 2014



Since 2006, the number of family households without children and the number of non-family households (i.e. households of two or more people where no one is related by marriage, birth or adoption) have grown faster than overall households.

In 2014, the average family household had 3.4 people while the average non-family household (including people living alone) had 1.3 people. The numbers of Hispanic and Asian households have increased dramatically in recent years and, in general, these households tend to be larger than white households. Over the 2012-2014 period, the average white household had 2.77 persons (Figure 8). By contrast, the average Asian household was 3.59 persons and the average Hispanic household had 3.63 persons. Asian households are much more likely than households of other races to be multi-generational. Less than three percent of white households in Loudoun County were multi-generational households.[13] Slightly more than three percent of Hispanic households lived in multi-generational households, while 8.5 percent of Asian households were multi-generational in 2014.

Figure 8. Household Size by Race/Ethnicity, 2012-2014



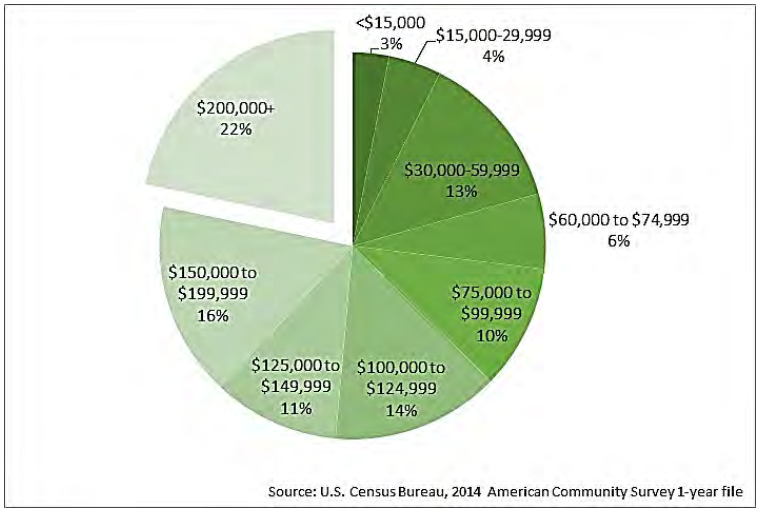
[13] The Census Bureau defines a multi-generational household as one that contains three or more parent-child generations; for example, the householder, child of householder (biological, stepchild or adopted child), and grandchildren of householder. A householder with a parent or parent-in-law of the householder and a child of the householder may also be a multi-generational household

Household Income

Over the past decade, Loudoun County has consistently ranked at the top of the list of highest-income counties in the U.S.[14] In 2014, the median household income in Loudoun County was $122,294 (2014 dollars). More than one in five households (21.7 percent) had a household income of $200,000 or more in 2014 (Figure 9). The Washington DC metropolitan area includes many high-income jurisdictions, and the share of higher income households in Loudoun County does not differ much from other local counties. For example, 18.6 percent of Arlington County households and 20.8 percent of Fairfax County households have incomes of $200,000 or higher.

Loudoun County differs from other local jurisdictions because it has a much smaller share of low- and moderate-income households. Just 37.3 percent of households have incomes below $100,000, the lowest share among the comparable jurisdictions. In Arlington County and Fairfax County, about 45 percent of households have incomes below $100,000. More than half of households in Prince William County, Virginia and in Montgomery and Frederick counties in Maryland have incomes below $100,000.

Figure 9. Household Income (2014 $s), 2014

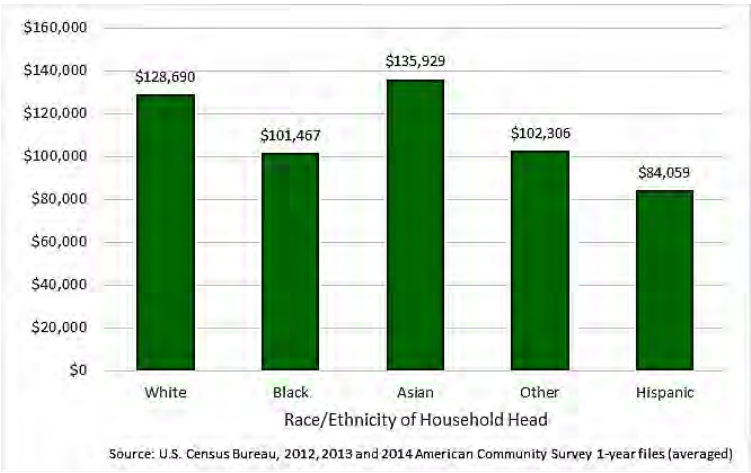


There are important differences in the household incomes of different segments of the Loudoun County population. The median household income in Loudoun County over the 2012-2014 period was $121,361 (in 2015 dollars). Over the same three-year period, the median household income of non-Hispanic white

Household Income

Median household income is used to measure the overall income available to a typical household, and includes both wage and non-wage income (e.g. investment income, income from rental properties, retirement income.) A more detailed discussion of wages is included in the section below on Employment & the Economy.

Figure 10. Household Income by Race/Ethnicity, 2012-2014 (2015 $s)



[14] In 2014, Loudoun County had the second highest median household income nationally, after the City of Falls Church, which is treated as a county-equivalent by the Census Bureau.

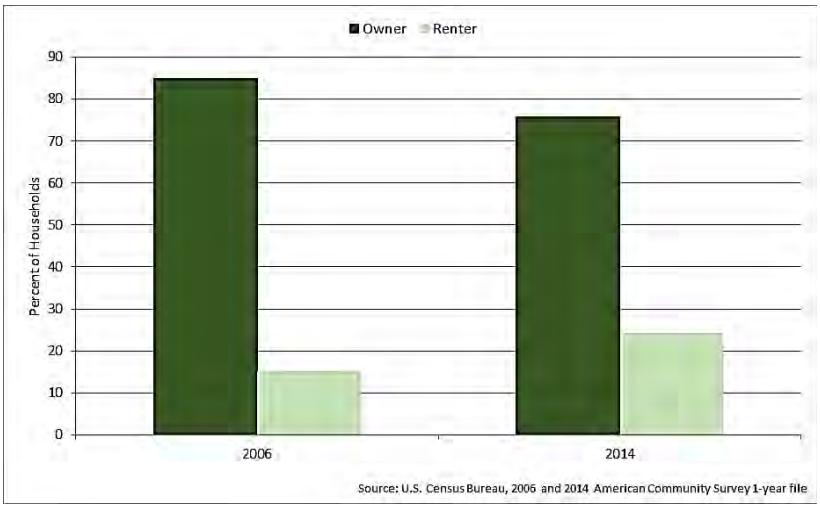
households in Loudoun County was $128,690 and the median household income for Asian households was $135,929 (Figure 10). Black and Hispanic households had lower median household incomes. Over the 2012-2014 period, the median household income for black households in Loudoun County was $101,467 and the median household income of Hispanic households was $84,059. (All values are in 2015 dollars.)

There are also significant differences in the household incomes of home owners and renters in the County. Over the 2012-2014 period, the median household income was $139,744 (in 2015 dollars) for home owners, compared to a median of just $73,001 (in 2015 dollars) for renters.

Housing Tenure

Loudoun County households are predominantly home owners but there has been a shift towards more renters in recent years. Just over three quarters of households in the County are owners and one-quarter are renters. In 2006, the home ownership rate in the County was 84.8 percent and only 15.2 percent of Loudoun County households were renters (Figure 11).

Figure 11. Housing Tenure, 2006 and 2014



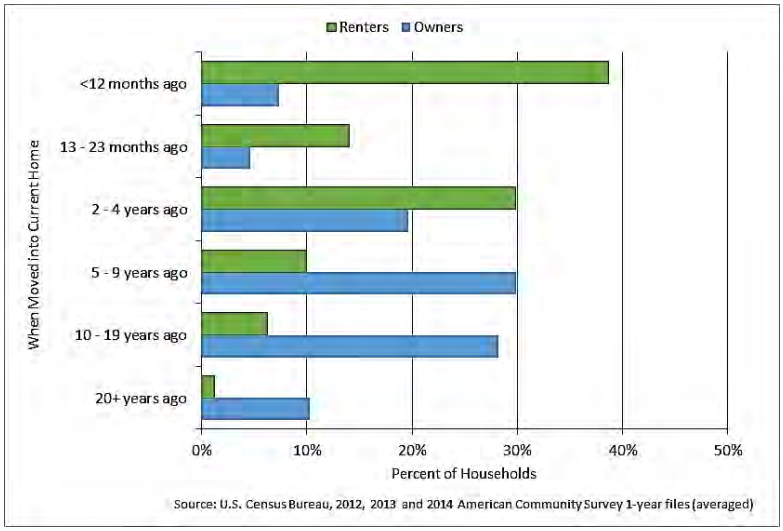
Home ownership rates are highly dependent on the age of the household head. Only 58 percent of households headed by a person age 25 to 34 are home owners, compared to 85 percent of households where the householder is in his or her 50s. The home ownership rate has fallen across age groups since the housing market downturn, but the decline has been most precipitous for younger households. Among 25-to-34 year olds, the home ownership rate fell nearly 20 percentage points between 2006 and 2014.

There are several reasons why home ownership rates have declined so much for people in this age group. First, this group of young adults left school and entered the labor market in the wake of the Great Recession, facing relatively few job prospects and stagnant wages. As a result, they have lower incomes than prior generations did at this age. Second, as a result of the housing crisis, mortgage lending requirements tightened considerably, making it significantly harder to qualify for a home loan in the post-recession years. Third, while incomes were lower and credit was harder to access, Millennials also had higher levels of student debt than did prior generations. All of these factors—accompanied by limited housing supply and rising housing affordability challenges in recent years—have contributed to lower home ownership rates among young adult households.

However, it is very possible that there will be a turnaround in home ownership rates. Mortgage rates are still at historically low levels and incomes are rising, which suggests potential for increases in home ownership.

Length of Residence in Current Home

Figure 12. Year Moved into Current Home, 2012-2014



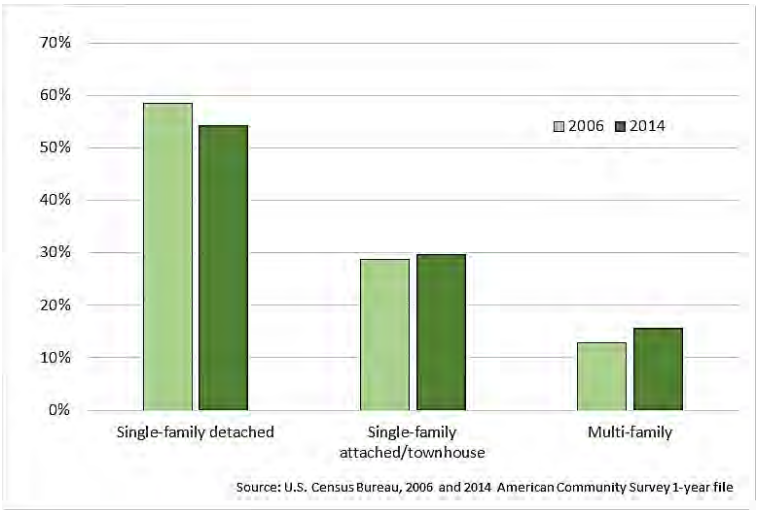
The Washington DC metropolitan area has a reputation as being a very transient area, and Loudoun County's population reflects that transiency, particularly among renters. Over the 2012-2014 period, more than one in five (21.4 percent) households in Loudoun County had moved into their current home within the prior two years (Figure 12). The share of recent movers is very different for Loudoun County home owners versus renters. While 12.0 percent of home owners moved into their current home within the prior two years, the share is 52.7 percent for renter households.

This rise in the number of renters has contributed to a growing share of Loudoun County's residents who are new to the County. It also means that many of these residents are less tied to the County through home ownership.

Housing Type

The majority of the existing, occupied housing stock in Loudoun County is single-family housing. In 2014, 54.3 percent of all housing units were single-family detached homes; 29.4 percent were single-family attached or townhouses (including buildings with two to four units). Only 15.7 percent of the County's current housing stock is multi-family and the majority of that (nearly 70 percent of all multi-family units) is in buildings with fewer than 20 units (Figure 13).[15]

Figure 13. Housing Units by Type, 2006 and 2014



There has been a slight shift towards more multi-family units since 2006. In 2006, 12.9 percent of housing units in Loudoun County were in multi-family (i.e. 5+ unit) buildings; in 2014 the share of multi-family units had increased to 15.7 percent. However, large multi-family buildings still represent a very small share of the County's housing units. Units in multi-family buildings with 50 or more units

[15] The Census Bureau identifies the number of units in a given building, rather than the entire property. If a unit is in a building with 15 units but there are several buildings that are part of the property, that unit is still classified as being a multi-family unit in a building with fewer than 20 units.

account for only 3.3 percent of housing units in the County.

Loudoun County has a greater share of single-family detached homes than Fairfax or Montgomery counties, but both Prince William County, Virginia and Frederick County, Maryland have a higher proportion of single-family detached homes in the housing stock. Loudoun County has a greater share of townhouses than any of the comparable jurisdictions.

Loudoun County homes tend to be relatively large. Nearly half of the housing units in the County (48.3 percent) have four or more bedrooms. By contrast, only one third of all occupied housing units in the Washington DC metropolitan area have four or more bedrooms. The prevalence of larger homes in the County is not particularly surprising given the suburban development patterns, the high home ownership rates and a relatively high share of families with children. There has been no significant change in the share of four or more bedroom homes in the County since 2006.

Are Loudoun County households "overhoused"?

There is no universal definition of people who might be considered "overhoused." For the purpose of this analysis, it is assumed that if there are two or more bedrooms than there are people, then that household is "overhoused." So, for example, a two-person household with four or more bedrooms would be considered "overhoused." According to this analysis, nearly a quarter of Loudoun County households are so-called "overhoused."

While there are overhoused households at all income levels, nearly half have incomes above 150 percent of area median income. About a fifth are households headed by a person age 65 or older, and about 28 percent are households headed by someone between the ages of 55 and 64. Nearly half of the "overhoused" households below 60 percent of AMI are senior households. Forty percent of "overhoused" households are married couples without children, but 30 percent are people under age 65 living alone. More than 90 percent of "overhoused" households are owners.

Employment and the Economy

Employment growth—in both the County and the Washington DC metropolitan area—is the key driver of housing demand in Loudoun County. To ensure a robust local economy, it is critical to provide sufficient housing that is affordable to workers all along the income spectrum. As Loudoun County seeks to attract businesses and workers, it is important to understand how the structure of the regional economy and the characteristics of the region's workforce are changing. These economic changes suggest housing needs that may be different than the needs from a decade or two ago.

Measuring Local and Regional Economic Growth

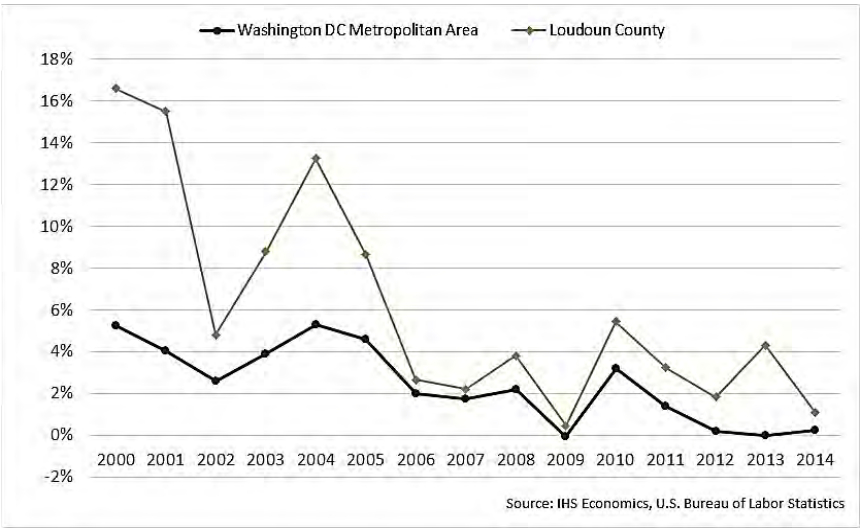
Local economic growth is often measured by gross regional product (for a metropolitan area) or gross county product (for a county). Gross regional or county product is a function of the total number of jobs in the region or county multiplied by the total wages in the region or county. The indicators are designed to be a measure of total economic productivity in a place.

Loudoun County has become an important regional job base, and increased its share of the jobs and economic activity in the Washington DC metropolitan area in recent years. The number of jobs in the County increased 68.0 percent between 2000 and 2014, driven by gains in the Professional & Business Services sector. While job growth has been robust in Loudoun County, the average wage of jobs in the County (excluding the Information sector) has increased by just 2.2 percent and is lower than the average wage for the Washington DC metropolitan area as a whole.

Loudoun County Jobs and Economy

Loudoun County's economy has grown exceptionally fast over the past 15 years. Growth in gross county product (GCP) has consistently surpassed growth in the Washington DC metropolitan area's gross regional product (GRP), particularly in the early part of the 2000s. In the period from 2000 to 2005, the County's GCP grew at an astounding 10.1 percent annually (Figure 14). The rate of economic growth slowed in the second half of the decade but remained higher than the growth rate for the region. As a result, the share of the Washington DC metropolitan area's economic activity that occurs in Loudoun County has grown to 5.2 percent in 2014 from just 3.5 percent in 2000.

Figure 14. Change in Gross County Product and Gross Regional Product, 2000-2014



Job Growth & Housing Demand

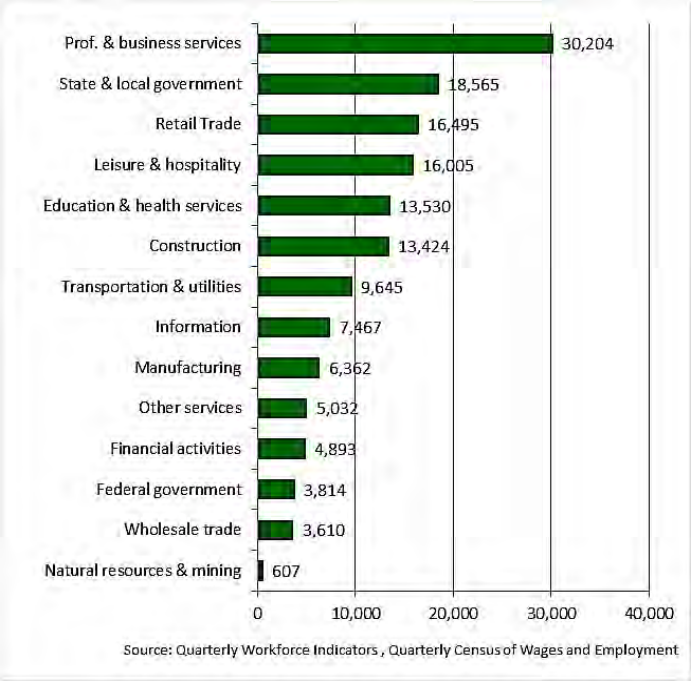
A key source of housing demand is from workers who wish to live in, or near, their workplace. Strong job growth will typically bolster the demand for housing, as long as housing prices and wages remain in sync. Conversely, a weak job market will reduce the potential pool of owners and renters as people delay household formation or look to move elsewhere.

Between 2000 and 2014, Loudoun County added 60,600 jobs for an average annual growth rate of 3.8 percent. By comparison, the Washington DC metropolitan area added jobs at an average annual rate of 1.1 percent during the same period. In 2000, Loudoun County had 89,100 jobs; by 2014, this number had increased to 149,650. Among the 24 jurisdictions in the Washington DC metropolitan area, Loudoun County ranked as the sixth highest in total number of jobs.

Six sectors account for nearly three quarters of the jobs in Loudoun County (Figure 15). The largest employment sector in the County is Professional & Business Services. In 2014, this sector accounted for a fifth (20.2 percent) of all jobs and had an average wage of $82,200 (Figure 16). Two-thirds of the jobs in this sector were in the Professional, Scientific, & Technical Services and Management of Companies & Enterprises sub-sectors; jobs in these sub-sectors tend to require a bachelor's degree or higher and command higher wages. However, the Professional & Business Services sector includes a variety of white collar workers, like engineers, accountants and software developers, as well as administrative support staff and building management support staff. Even with the variety of jobs in this sector, many of the Professional & Business Services sector workers are highly educated, which plays a role in the relatively high average wage.

The second largest sector in Loudoun County is the State & Local Government sector, which accounted for 12.4 percent of all jobs as of 2014. This sector includes public school teachers, librarians, fire and rescue workers, police officers and all types of public service employees. At $48,800, the average wage in this sector is lower than the overall average wage of $62,100. According to data from the Loudoun County Department of Human Resources, among jobs in this sector, the County's General Workforce had a median wage of $53,900, while the median wage for Fire and Rescue workers was $51,600. The County's Sheriff's office had the highest median wage ($63,030) among local government agencies.[16]

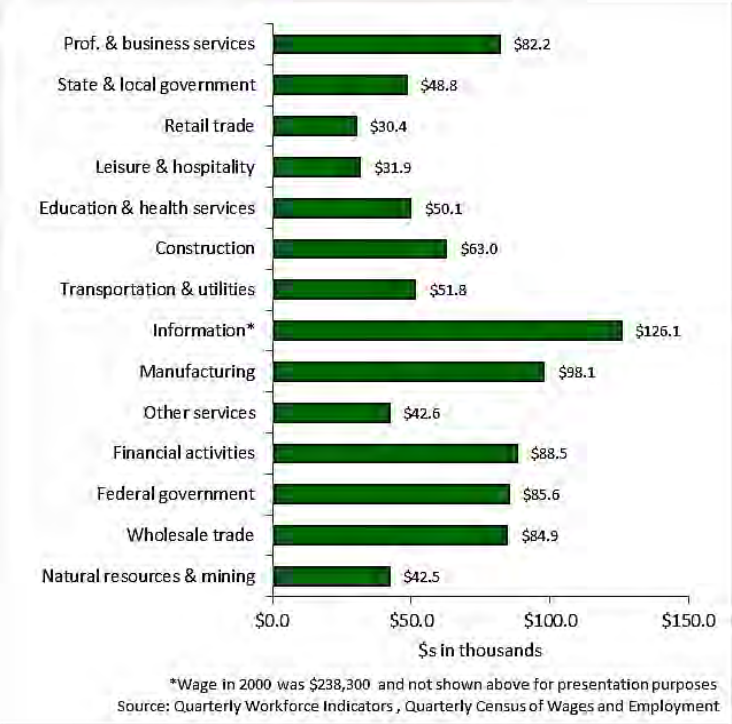
Figure 15. Payroll Jobs by Sector, 2014



The third largest employment sector in Loudoun County is Retail Trade, which accounts for 11.0 percent of all jobs located in the County. This sector generally includes a higher share of part-time workers than other sectors and includes salespeople, cashiers, retail store managers and customer service

[16] Median wages are reported for County employees since the median provides a better description of typical wages than do averages.

Figure 16. Average Wage by Sector, 2014 (000s of 2014$s)



representatives. This sector has the lowest average wage of all the sectors ($30,400 in 2014) and the average wage has decreased since 2000, after adjusting for inflation. Some of this decline may be driven by an increase in the number of part-time retail workers.

While economic growth slowed following the recession, the impact on the Loudoun County economy was fairly modest. The number of jobs in Loudoun County decreased only slightly, falling 1.6 percent or by 2,200 jobs between 2008 and 2009. Neither the Professional & Business Services nor the Education & Health Service sectors declined during this period.

Since 2000, job gains have been dominated by relatively few sectors. The Professional & Business Services sector had the largest gains over the 2000 through 2014 period, adding 17,400 jobs (Figure 17). The State & Local Government sector added the second largest number of jobs, increasing by 9,900 jobs or 5.6 percent annually. Growth in this sector tracked the County's population growth, which increased 5.3 percent per year between 2000 and 2014. Similarly, growth in the Education & Health Services and the Retail Trade sectors are also generally tied to population growth trends. The Education & Health Services sector increased by 9,200 job between 2000 and 2014, driven by primarily by the Ambulatory Health Care Services sub-sector, which includes home health care aids.

Among the five sectors with the largest gains, only the Professional & Business Services sector had a higher average wage than the average wage of all jobs in Loudoun County. In 2014, the average wage of Loudoun County Professional & Business Services sector jobs was $82,169, while the average wage of a job in the other sectors with the highest gains ranged from $30,400 (Retail Trade) to $50,100 (Education & Health Services).

Figure 17. Jobs by Select Sector, Largest Job Gains, 2000-2014

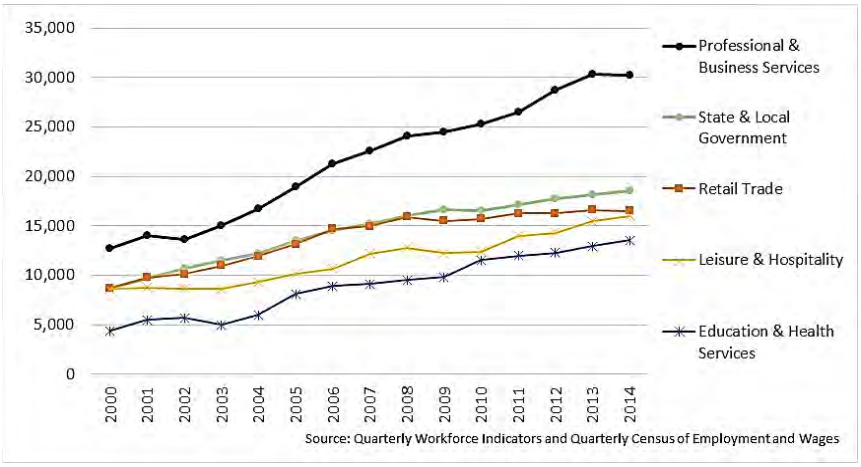


Figure 18. Most Common Occupations in Loudoun County by Sector, 2014

Sector	Most Common Major Occupation Group	
	Occupation	Share of Employment
Professional & business services		
	Computer & mathematical	21.1%
	Management	22.7%
	Business & Financial Operations	19.6%
State & Local Government		
	Education, Training, & Library	60.7%
	Protective Service	43.6%
	Management	9.2%
Retail Trade		
	Sales & Related	25.7%
	Office & Administrative Support	59.0%
	Transportation & Material Moving	13.8%
Leisure & hospitality		
	Food Preparation & Serving Related	52.6%
	Management	48.7%
	Sales & Related	13.1%
Education & health services		
	Healthcare Practitioners & Technical	36.8%
	Education, Training, & Library	25.8%
	Healthcare Support	19.7%
Construction	Construction & Extraction	60.1%
Transportation & Utilities	Transportation & Material Moving	48.6%
Information	Computer & mathematical	21.6%
Manufacturing	Management	21.5%
Other services	Personal Care & Service	30.5%
Financial activities	Management	28.2%
Federal Government	Office & Administrative Support	21.2%
Wholesale Trade	Sales & Related	45.2%
Natural resources & mining	Management	46.5%
All Jobs	**Management**	**13.8%**

Source: U.S. Census Bureau, 2012, 2013 and 2014 American Community Survey 1-year files (averaged)

Wages

The level of and outlook for wages in the County are important drivers of the home prices and rents workers can afford. Overall, the average wage of a job in Loudoun County has decreased steadily since 2001, after adjusting for inflation. Some of this decline has been driven by a shift in the types of jobs in the County, as sectors with lower wages have accounted for a larger share of the jobs in the County over time (Figure 19). But structural changes to the local economy is not the only explanation for declining wages. Nine of the 14 major sectors in the County also had a lower inflation-adjusted average wage in 2014 than in 2000 (Figure 20). The decline in wages across sectors accelerated in 2012, possibly as a result of the draw-down in Federal spending during this time.

Figure 19. Job Gains, 2000-2014, and Average Wages, 2014 (2014 $s)

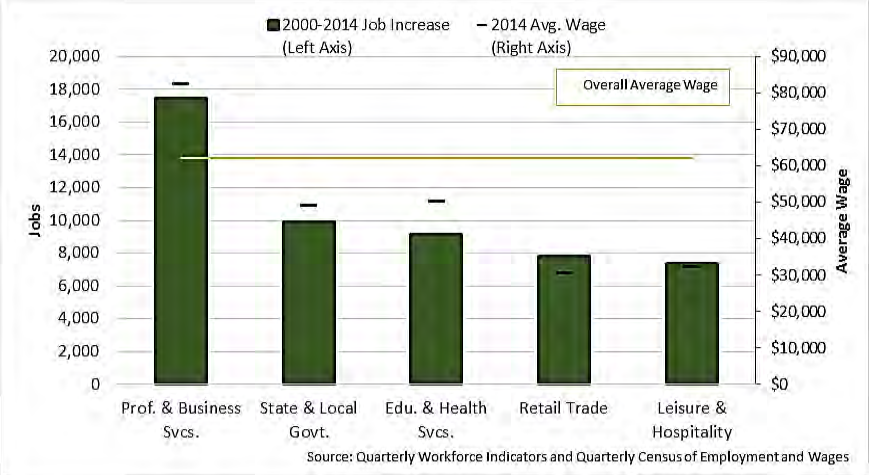
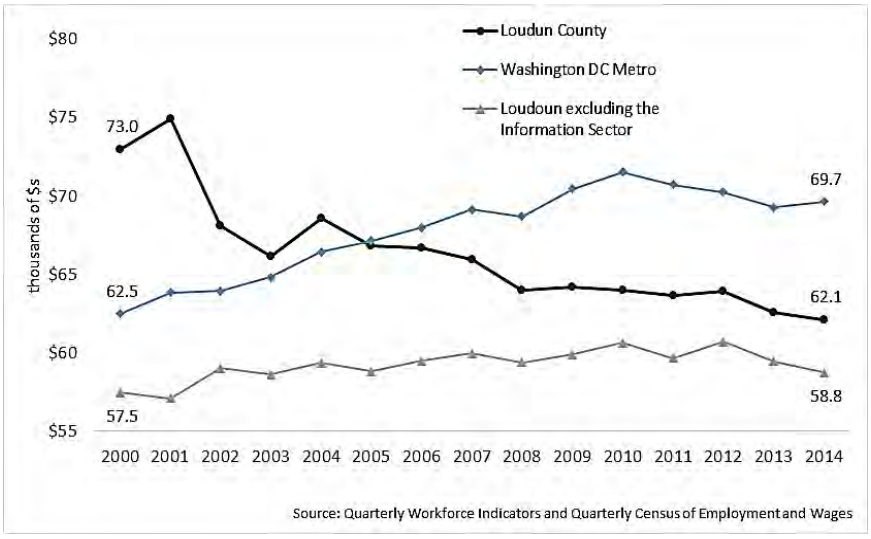


Figure 20. Average Wage, 2000-2014 (thousands of 2014 $s)



While wages in Loudoun County declined slightly, the Washington DC metropolitan area experienced an increase in the average wage between 2000 and 2010, followed by a modest decline until 2013 with increases thereafter. In 2005, the average wage in the region surpassed that in Loudoun County.

This trend suggests that Loudoun County's economy has shifted from a specialized, but relatively limited employment base to one more reliant on population growth and demographic trends. These resident-serving jobs include more jobs at lower wages.

However, there is more to the story about declining wages. A single sector played the largest role in the decline of average wages in Loudoun County since 2000—the Information sector. The Information sector primarily includes publishing and telecommunications companies, including those who distribute via the internet (AOL is a prime example). Loudoun County has had a slightly higher share of jobs in the Information sector than the nation overall since 2000, which indicates a degree of specialization. But this sector has undergone a tremendous structural shift both regionally and nationally, starting with the

dotcom boom and bust in the early 2000's, followed by the rapid expansion of the Internet and technology companies. Since 2000, the average wage in the Information sector in Loudoun County declined 47.1 percent, which is the sharpest drop of all the sectors. The number of jobs in this sector has also decreased by 2.3 percent. As a *share* of Loudoun County's economy, the decline has been even steeper. In 2000, 8.6 percent of all jobs in Loudoun County were in the Information sector. The share of jobs in this sector peaked in 2001 at 14.2 percent, but has since fallen to 5.0 percent.

Despite the relatively modest share of jobs in the Information sector, its high average wage has disproportionally affected the overall average wage in the County. Excluding the Information jobs changes the trend significantly. The trend in the average wage of all non-Information jobs more closely mirrors that of the region overall and has increased 2.2 percent since 2000. Furthermore, the non-Information average wage has been lower than the regional average wage since 2000 but the wage gap has increased over time. In 2000, the non-Information average wage in Loudoun County was about $5,000 lower than the regional average wage. By 2014, this difference had increased to nearly $10,900.

At-Place Employment versus Resident Workers

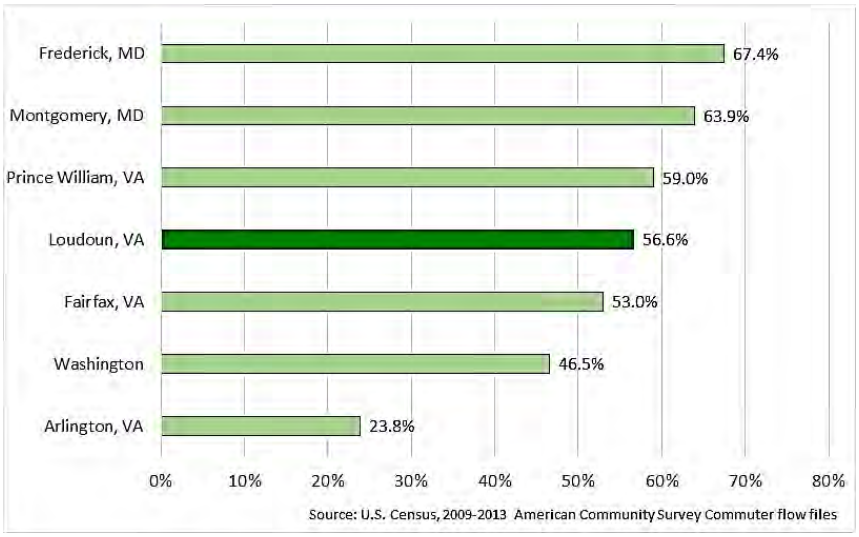
At-place employment in Loudoun County includes all jobs physically located Loudoun County. The workers filling these jobs—referred to as Workers in the County in this report—can, and do, live outside of the County.

Resident workers are Loudoun County residents with a job, regardless of where their place or work is. Loudoun County's resident labor force also includes residents who are looking for a job.

Workers in the County

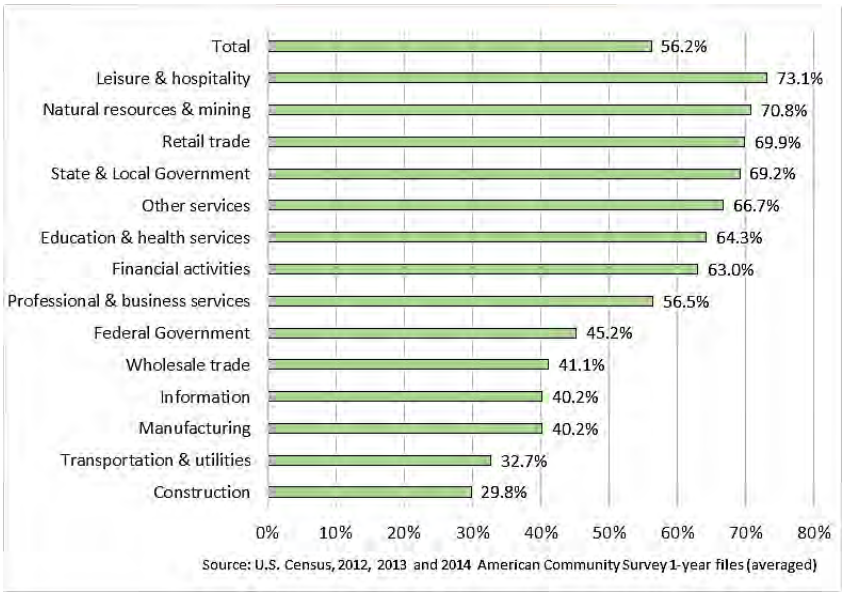
Loudoun County is a regional employment center and attracts workers from throughout the Washington DC metropolitan area, though it continues to draw a significant share of workers from within its borders. The majority (56.6 percent) of jobs located in the County are held by Loudoun County residents (Figure 21). Frederick and Montgomery counties in Maryland and Prince William County, Virginia all have a higher share of at-place jobs held by residents, but Fairfax County has a lower proportion of jobs held by residents.

Figure 21. Share of Jobs Held by Residents, 2009-2013



A larger share (72.1 percent) of County employees[17] live in the County, but there is considerable variation within the departments. The County's public school system has the largest share of workers living in the County, at 76.9 percent. The County's General Workforce has 57.1 percent of its workers living in the County. Almost half (49.0 percent) of workers in the Sheriff's office live in the County, while just 23.3 percent of the County's Fire and Rescue employees live in the County. Wages for employees in the County's Fire and Rescue Department are somewhat lower than they are in other County departments, but the small wage gap would not explain the differences in place of residence. These data on County public employees highlights the important point that living outside of the County remains a preference for some, even if there was additional housing available.

Figure 22. Share of Jobs Held by Residents by Sector, 2012-2014



Of the major private-employment sectors, Construction workers are more likely to be in-commuters than workers in other sectors; only 30 percent of Construction jobs located in Loudoun County are held by County residents (Figure 22). Construction jobs can be highly mobile which makes it less likely that job sites and home locations are in the same locality. Similarly, only one third of Transportation & Utility jobs

[17] Excluding part-time and hourly employees in public school system

are held by County residents. Workers in the Leisure & Hospitality sector were the least likely to commute from outside the County; nearly three-quarters (73.1 percent) of all Leisure & Hospitality jobs located in Loudoun County are held by County residents. Leisure & Hospitality jobs have the second lowest average wage in Loudoun County, and a similarly low wage in other jurisdictions. The lowest wage sector—Retail Trade—also had low levels of in-commuters. About 70 percent of Retail jobs in the County are held by residents.

Workers in the Leisure & Hospital and Retail Trade sectors have relatively low in-commuting rates (i.e. are relatively like to both live and work in the same jurisdiction) not just in Loudoun County but also in many of the other jurisdictions in the Washington DC metropolitan area. There are several reasons why in-commuting rates might be fairly low for workers in the Leisure & Hospitality and Retail Trade sectors. These sectors have more part-time workers than any other sector and part-time workers tend to have jobs close to home. In addition, these two sectors have higher shares of younger workers than other sectors, including young adults living at home. The part-time work, low wages and the younger ages of those holding a Leisure & Hospitality or Retail job makes long-distance commuting unattractive for many workers. The younger, part-time workers may hold these jobs to supplement their households' income, not act as the primary earner within it. Based on an analysis of the ACS data, workers in these two sectors who *do* live outside of Loudoun County tend to work more hours and are older, indicating that these households may be more reliant upon these wages.

The workers in Loudoun County's largest sector, Professional & Business Services, had the same in-commuting rate as the overall average. About 56 percent of Professional & Business Services sector jobs located in Loudoun County are held by residents. This pattern was also true in the comparable jurisdictions. The Information sector had the highest average wage of all sectors in Loudoun County, and workers in this sector were more likely than many others to live outside of the County.

On average, 61,600 workers commuted each day into Loudoun County during the 2009-2013 period. Most of these commuters lived in Northern Virginia (63.9 percent) or Suburban Maryland (9.3 percent). About one-fifth (18.6 percent) commuted from outside the Washington DC metropolitan area and only 4.0 percent commuted from outside Virginia, Maryland, West Virginia or the District of Columbia.[18]

While the majority of in-commuters live in Northern Virginia, many still have long commutes to their jobs in Loudoun County. While 26.9 percent of in-commuters had commutes of under 30 minutes over the 2012 to 2014 period, a significant share (9.7 percent) travelled longer than 90 minutes. By comparison, only 5.5 percent of all Washington DC metropolitan area commuters travelled 90 minutes or more one way to work.

[18] Loudoun County has only very modest economic ties to the Winchester metropolitan area. Just 2.7 percent of Loudoun County workers live in the Winchester region and 0.1 percent of Loudoun County residents commute into the Winchester region for work.

The vast majority of workers with a job in Loudoun County travelled to work by car, either driving alone (77.9 percent) or carpooling (10.4 percent) in 2014. Only 1.3 percent used transit to get to their Loudoun County job. These shares are similar to those in Fairfax County (79.0 percent and 9.2 percent, respectively) and Frederick County, Maryland (76.3 percent and 11.6 percent, respectively).

While younger workers continue to be attracted to jobs in Loudoun County, the number and share of older workers is increasing (Figure 23). Jobs in Loudoun County are increasingly held by older workers. In 2000, 9.8 percent of private sector job holders in Loudoun County were age 55 or older. By 2014, that share had grown to 18.7 percent, or about 24,000 workers. A similar increase occurred throughout the Washington DC metropolitan area over this period. Younger workers (in their late 20s and early 30s) have actually declined as a share of workers holding jobs in the County, falling from 28 percent in 2000 to 21 percent in 2014. The share of workers in this age group also fell in the Washington DC region, but the decline among Loudoun County job holders was significantly sharper. Over the 2012 to 2014 period, workers in the 25-to-34 year old age group were somewhat more likely to live outside of Loudoun County than the overall worker population. While there are many reasons that Loudoun County has fewer jobholders in this age group, access to entertainment and other amenities may be playing a role. As part of the Loudoun County Economic Development Advisory Commission's Nighttime Economy Ad-Hoc Committee Report, over half (54 percent) of all residents said that entertainment options would make Loudoun County a more popular destination.

Compared to the Washington DC metropolitan area, private sector workers at jobs in Loudoun County were also somewhat less likely to be age 55 years or older than were workers throughout the region. These differences among both younger and older workers suggests the importance of people in the prime working ages of 35 to 54 years old to the Loudoun County economy.

Retirees & Replacement Workers

The youngest Baby Boomers are currently 56 years old and the vast majority will retire in the upcoming decade, if they have not done so already. This retirement wave will lead to a large numbers of vacancies within Loudoun and the Washington DC metropolitan area. Many of these positions will be filled through promotions or circulation of current employees, leaving less senior positions open. New workers will be needed to fill these less senior positions.

Figure 23. Share of Private Sector Workers by Age Group, 2000, 2006 and 2014

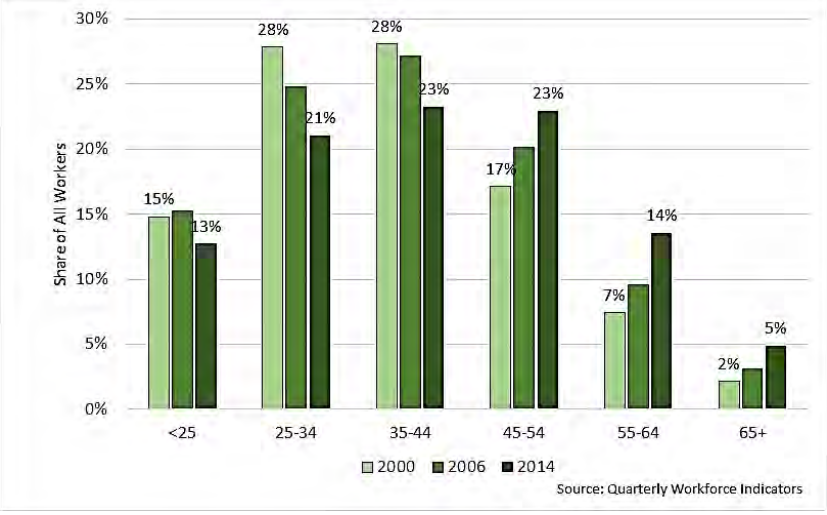


Figure 24. Unemployment Rate, 2000-2015

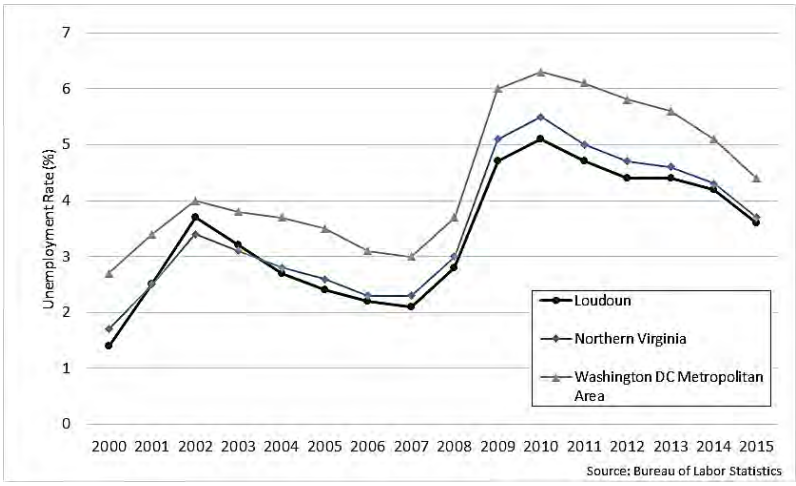
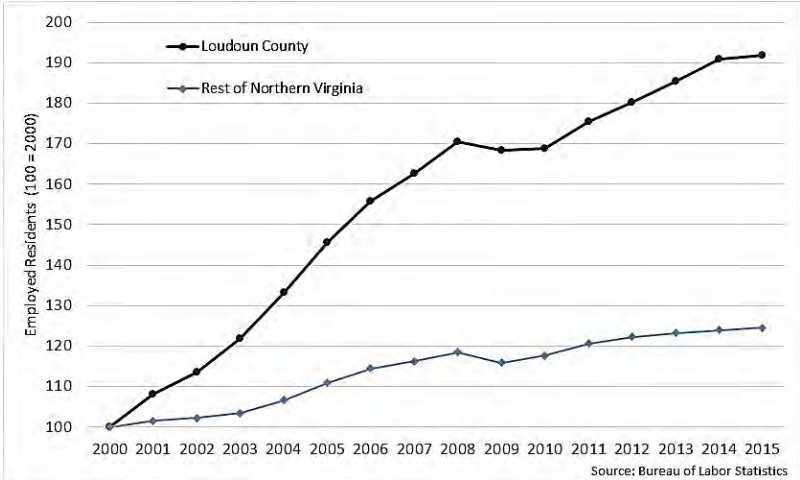


Figure 25. Employed Resident Growth (2000=100), 2000-2015



Resident Labor Force

In addition to a robust job base, Loudoun County is home to a large and well-educated labor force that works in jobs in both the County and the Washington DC metropolitan area (and beyond). The unemployment rate for County residents is generally low but subject to the same cyclical trends as the region. Between 2007 and 2010, the County's unemployment rate increased steadily, but remained lower than the rates in Northern Virginia and the Washington DC metropolitan area. Since 2010, the unemployment rate has fallen but has not returned to its 2007-level of 2.1 percent (Figure 24). However, the unemployment rate in 2015 was 3.6 percent and well below 5.0 percent, which is generally the maximum threshold for a healthy labor market.[19]

Loudoun County's low unemployment rate has occurred during a time of significant growth in the County's labor force which accompanied strong population growth (Figure 25). Over the past 15 years, the number of employed residents in Loudoun County has nearly doubled, compared to an increase of just 24.5 percent for the rest of Northern Virginia. The growth in the County's workforce has tracked closely with population growth, only diverging modestly after 2008 when the number of employed residents grew more slowly than the overall population. This divergence reflects the somewhat elevated unemployment rate over these years, as well as the aging of the County's workforce, which leads to a decrease in the County's overall labor force participation rate.

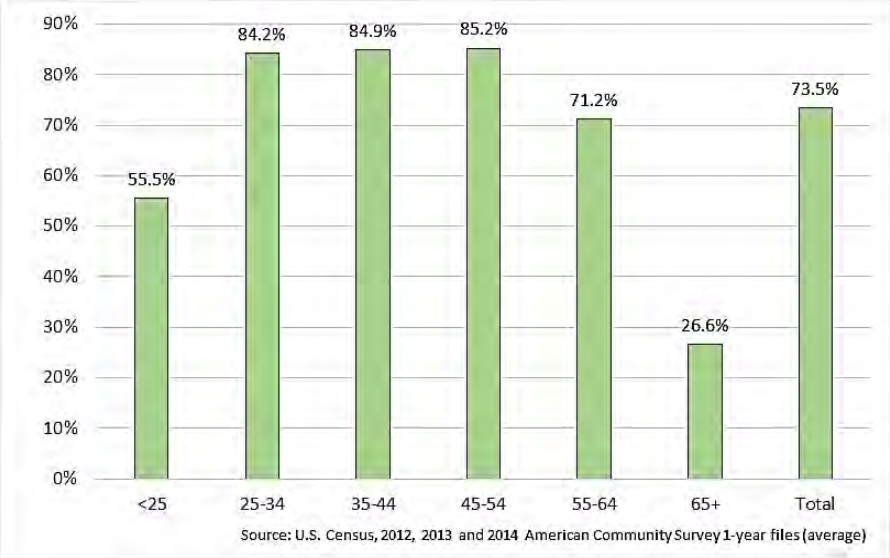
During the 2012-2014 period, the County had an average employment rate of 73.5 percent (Figure 26).[20] The highest employment rates are among people between 25 to 54 year olds and the employment rate for this cohort in Loudoun County is similar to the other comparable jurisdictions. Over half (55.5 percent)

[19] See *The Federal Reserve Current FAQs.* What is the lowest level of unemployment that the U.S. economy can sustain? available online at https://www.federalreserve.gov/faqs/economy_14424.htm

[20] The employment rate is calculated using an average of the 2012, 2013 and 2014 American Community Survey 1-year public use microdata (PUMS) files. This rate includes all people over 16 years old who have a wage and salary job, are self-employed, employed in a family business, have an internships or volunteer without pay.

of 16-to-24 year olds in the County had a job over the 2012-2014 period. While this is a lower share than in Arlington County, Virginia and Frederick County, Maryland, it is higher than the shares on the other comparable jurisdictions. Loudoun County's senior population is more likely to be employed than are seniors living in other places in the region. Over a quarter (26.6 percent) of residents age 65 years or older had a job over the 2012-2014 period, which is the highest of the comparable jurisdictions.

Figure 26. Employment Rate by Age Group, 2012-2014



Loudoun County residents were much more likely to work in the County than in any other jurisdiction. Nearly half (46.8 percent) of Loudoun County's employed residents held a job in the County during the 2009-2013 period. Nearly all of Loudoun County's employed residents worked within the Washington DC metropolitan area, primarily in another jurisdiction in Northern Virginia. Compared to Loudoun County in-commuters, out-commuters travelled somewhat shorter distances to work; only 3.4 percent held a job outside of the Washington DC region. Out-commuters were also less likely than in-commuters to have commutes longer than 90 minutes, though the share of 90+ minute commuters (7.0 percent) was still higher than the share of overall commuters in the Washington DC metropolitan area. Similar to in-commuters, most employed residents drove to work, either alone (77.8 percent) or in a carpool (8.6 percent), in 2014. Employed Loudoun County residents were somewhat more likely than workers in the County to use public transportation to get to work (4.6 percent).

Nearly half (45.2 percent) of all employed Loudoun County residents worked in one of three sectors during the 2012-2014 period—Professional & Business Services (24.2 percent), Education & Health Services (11.0 percent) or Retail Trade (10.0 percent). Similar to the at-place jobs in Loudoun County, Professional & Business Services resident workers had relatively high average wages ($97,500), while Educational & Health Services and Retail Trade workers earned lower average wages, at $40,100 and $24,300, respectively. The overall average wage for an employed Loudoun County resident was $61,500 and was in line with the average wage for a job located in the County.

Housing Market

Loudoun County experienced the roller coaster of the recent housing market bubble and bust, and currently has a relatively healthy market in terms of sales, construction activity and price growth. Relatively strong regional job growth following the economic recession, historically low interest rates, and Loudoun County's continued appeal to families have all bolstered the local housing market. Modest risks to continued improvements in the housing market include a slowdown in regional job growth and increases in mortgage interest rates. However, more pressing issues that could impact the County's housing market are the potential obstacles to home ownership among young, working households. Finally, pressures in the rental market, largely resulting from a lack of sufficient supply, will continue to make it difficult for many lower-income working households to find affordable and suitable rental housing.

Since the housing market downturn, Loudoun County housing demand has been strong. New inventory has increased but has not kept pace with demand. This unmet demand has driven up the cost of housing, both ownership and rental. Since the early 2000s both home prices and rents have increased dramatically and outpaced price and rent increases in many parts of the Washington DC metropolitan area. Between 2000 and 2014, the median existing home price in Loudoun County increased 116.6 percent and the median gross rent increased 75.5 percent. Vacancy rates for both ownership and rental units remain very low.

Ownership Market

Even with declines in the home ownership rate since the housing boom, Loudoun County residents are predominantly home owners. The home ownership rate in Loudoun County was 79.4 percent in 2000. It rose to a high of 84.8 percent in 2006 and fell to a low of 74.9 percent in 2013. In 2014, the home ownership rate increased to 75.8 percent and was higher than in comparable jurisdictions. The relatively high ownership rate reflects the strong demand for for-sale housing which, in turn, has driven increases in prices and sales in recent years.

Ownership Type and Building Type

Homes can be described by both the type of ownership and the type of building. When describing owned units, this report typically uses three main categories that combines both.

Single-family detached homes have fee simple ownership and are free standing buildings, not connected to any other units.

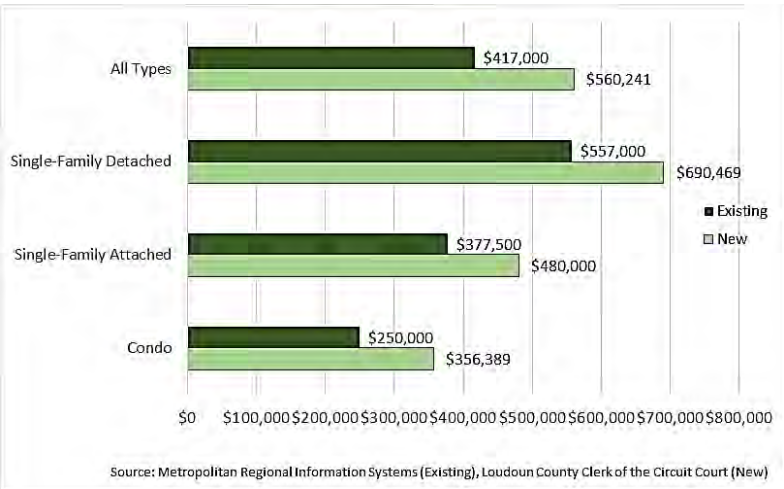
Single-family attached homes have fee simple ownership and are in structures with between 2 and 4 units, including homes that are side-by-side, or stacked.

Condo properties includes any home that has either a condominium or cooperative ownership structure, regardless of the building type. These homes are more likely to be in buildings with more than 5 units, but also include townhomes and two-over-two homes.

Prices

Home prices for single-family detached and single-family attached homes peaked in Loudoun County in 2005 while condominium prices peaked in 2006.[21] Home prices in the County are heading back towards peak levels and the substantial new construction in the County has mainly targeted the higher end of the market. Existing homes tend to be priced lower than new homes even when they have the same square footage and/or number of bedrooms.

Figure 27. Median Home Sales Price, 2015



In 2015, the median sales price for an existing home sold in Loudoun County was $417,000 while the median sales price for a new home was 34.4 percent higher, at $560,241 (Figure 27). New homes sold for significantly higher prices across home types. New condominium homes commanded the largest premium in 2015 when compared to existing condos. New condos had a median sales price that was 42.6 percent higher than existing homes. Condo fees in existing buildings have risen an average of four to five percent since 2000.

Housing Market "Boom" and "Bust"

Nationally, the increases in home prices and closed sales occurred between 2001 and 2005, peaking in 2005 and falling quickly thereafter. But this cycle varied by geography and housing type.

In Loudoun County, the number of closed sales peak in 2004 for all property types, and sales bottomed out in 2007 (and then hit another low point in 2010 and 2011). Home prices continued to rise for 1-2 years after sales peaked, hitting their highest levels in 2005 for single-family detached and attached homes and in 2006 for condos. In 2009, home prices in Loudoun County had bottomed out, beginning the climb back up.

	Pricing		Closed Sales	
	Peak	Trough	Peak	Trough
Condo	2006	2009	2004	2007
Single-Family Attached	2005	2009	2004	2007
Single-Family Detached	2005	2009	2004	2007

The cost of buying a home, either an existing or newly built home, has increased significantly, even as mortgage interest rates have remained at historically low levels. In 2000, the median sales price for an existing home was $192,500. Between 2000 and 2015, the median sales price increased 116.6 percent to $417,000. The median sales price for a new home increased 82.8 percent during this period.[22] Existing condo properties had the sharpest increase among existing home sales between 2000 and 2015, rising 140.4 percent. The median price of single-family attached homes increased 124.8 percent,

[21] Condominium units are defined based on their ownership structure (i.e. a condominium ownership structure rather than a fee simple ownership structure) and can include units in multi-family buildings, townhouse condominiums, units in "two-over-two" buildings and units in other types of configurations.

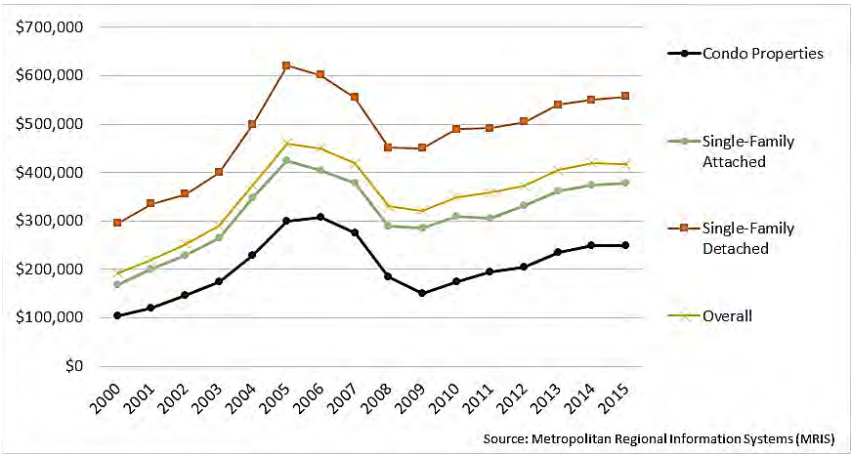
[22] Based on new home sales data in the Metropolitan Regional Information Systems (MRIS), which included 30 to 40 percent of all new construction sales in 2013-2015.

while prices of single-family detached homes increased 88.8 percent.

The median home price in Loudoun County peaked at $460,000 in 2005. Over the next four years, the median price decreased to $321,500. Median sales prices increased slowly until 2014, when they levelled off, following the regional pattern. New home prices have followed the same pattern as existing home prices.

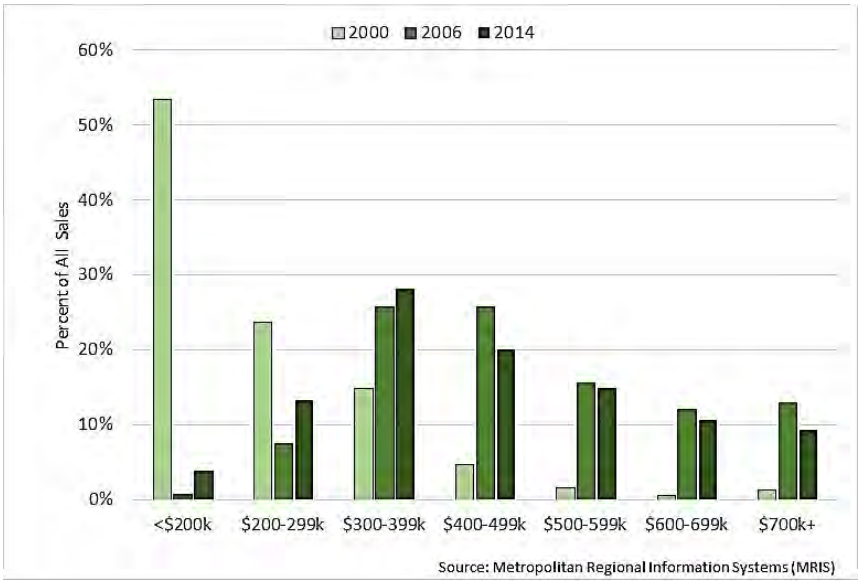
In 2015, existing sales prices were 90.7 percent of their 2005 peak-level, but there is some variation across housing types. The median sales price for a single-family detached home was $557,000 in 2015, or 89.8 percent of its peak-level. At $377,500, the median sales price of a single-family attached home was 88.8 percent of its peak-level. In 2015, the median sales price for condominiums was 81.2 percent of the peak-level, at of $250,000 (Figure 28).

Figure 28. Median Home Sales Price by Type, Existing Homes 2000-2015 (not adjusted for inflation)



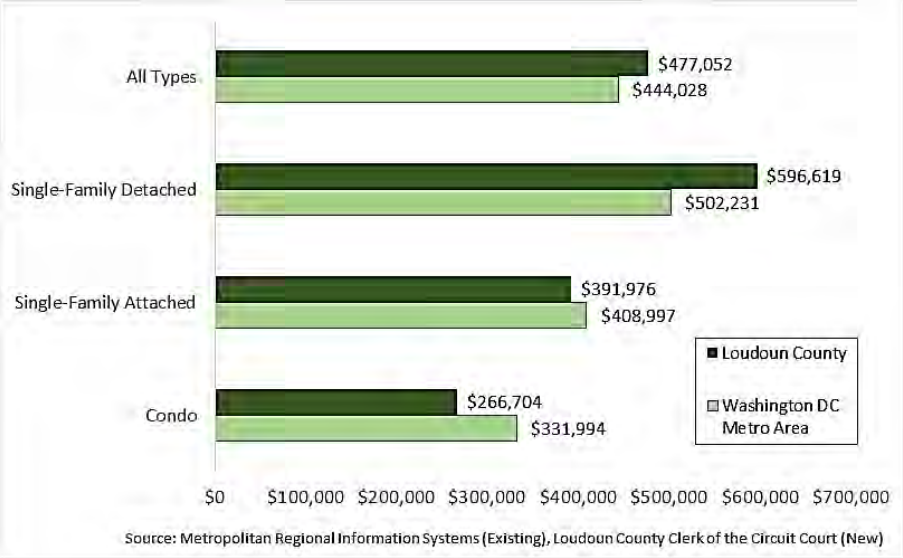
The share of lower-priced homes, those selling for less than $300,000, has shifted over the boom and bust period. In 2000, 71.7 percent of all homes sold for less than $300,000.[23] By 2006 this share had decreased to 6.9 percent (Figure 29). As the market cooled and foreclosures became an increasing share of home sales, the share of lower-priced homes increased and homes priced below $300,000 accounted for 40.4 percent of all sales in 2009. The share has fallen since and has stabilized at around 15 percent. The trend in the number of homes sold in this price range corresponds to the trend in bank-owned sales.[24] By 2009, bank-owned sales had peaked at about 37 percent of all sales in Loudoun County. In the

Figure 29. Share of Sales by Price Range, 2000, 2006 and 2014 (not adjusted for inflation)



[23] Excluding sales not in MRIS.
[24] Bank owned sales data from RealEstate Business Intelligence.

Figure 30. Average Sale Price by Housing Type, 2015



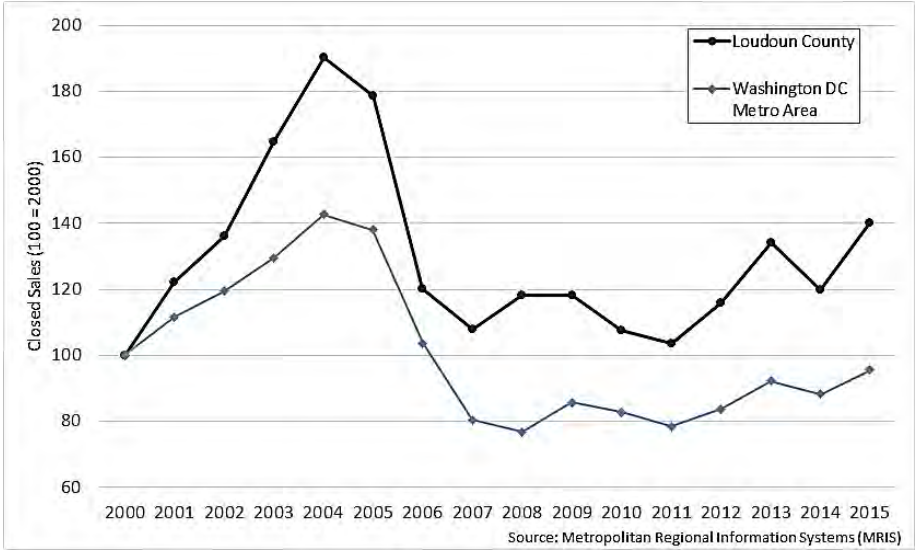
following years, bank-owned sales fell and now account for about five percent of all sales, which is more in line with the historic trend.

Home prices in Loudoun County tend to be higher than the regional average home prices (Figure 30). However, this premium is driven entirely by single-family detached homes. The average price for both a single-family attached home or a condominium home is higher for the overall Washington DC region than for Loudoun County. The premium for single-family detached homes in the County is due to the large home and lot sizes in Loudoun County and the relatively newer housing stock.

The inventory of homes for sale in Loudoun County include a significant share of larger homes. In 2015, only 10.2 percent of sales in Loudoun County had two bedrooms or fewer and one percent of these sales were studio or one-bedroom homes. The largest number of sold homes had three bedrooms (40.0 percent), and nearly as many had four bedrooms (35.1 percent). Nearly 15 percent of sold homes had five or more bedrooms. Condo properties tend to be smaller and over half (51.4 percent) of sold condos had two bedrooms or fewer. About three-quarters (73.0 percent) of single-family attached homes had three bedrooms. Single-family detached homes were typically the largest and over half (54.9 percent) of these homes had four or more bedrooms.

Smaller homes were more likely to have lower sales prices. Over half (52.1 percent) of homes that sold for less than $300,000 had two or fewer bedrooms. Similarly, larger homes had higher sales prices and 95.5 percent of all homes that sold for $600,000 or more had at least four bedrooms.

Figure 31. Closed Sales Comparison (100 = 2000-level of closed sales)



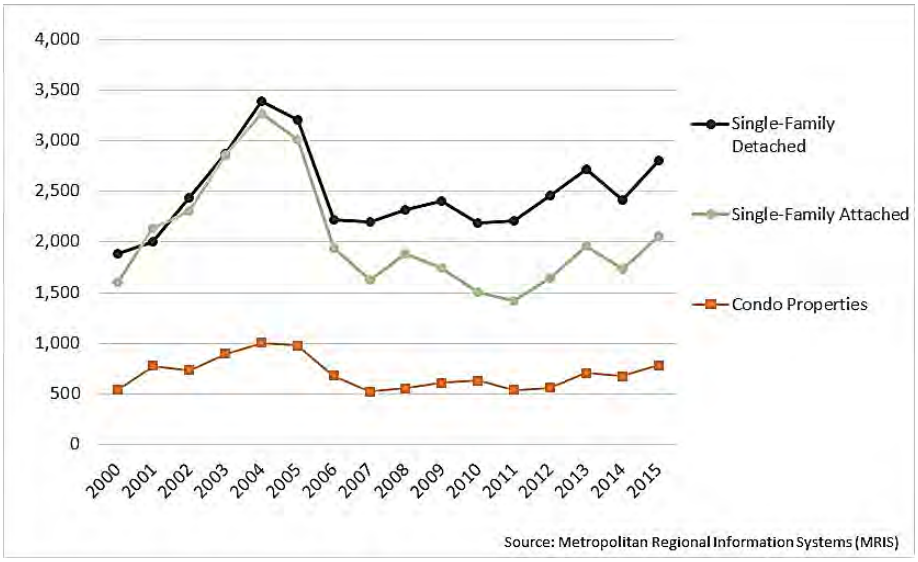
Sales

Like in the rest of the region and in most of the rest of the country, existing home sales in Loudoun County dropped off dramatically during the housing market bust. The recovery in home sales has been unsteady since the downturn. After bottoming out in 2007, the number of sales remained low, with the gains of one year reversing in the next (Figure 31). Between 2011 and 2013, the County had consistent growth in the number of home sales, but in 2014, buyer demand was weak as a result of slower wage and job growth, uncertainty about the region's economy and, potentially, a lack of inventory. Sales growth stalled in the County, as it did throughout the Washington DC metropolitan area. However, demand strengthened in 2015 and existing home sales in Loudoun County have now reached their highest level since 2005.

Sales of single-family detached homes recovered more quickly than the other unit types and reached 82.9 percent of their 2004 sales-level in 2015 (Figure 32). Condo sales were 77.5 percent of their 2004-level, while single-family attached homes were 62.9 percent.

Single-family detached homes have also grown as a share of total sales since the peak. In 2004, single-family detached homes accounted for 44.1 percent of existing sales. By 2015, this share had grown to 49.7 percent. Conversely, single-family attached homes now account for a smaller percentage of home sales, decreasing from 42.7 percent in 2004 to 36.5 percent in 2015. The shift in closed sales may reflect a broader shift in inventory.

Figure 32. Existing Home Sales, 2000-2015



Closed sales in Loudoun County rose more quickly than they did for the region overall and also have been relatively stronger compared to their 2000-level for all years. Home sales peaked in

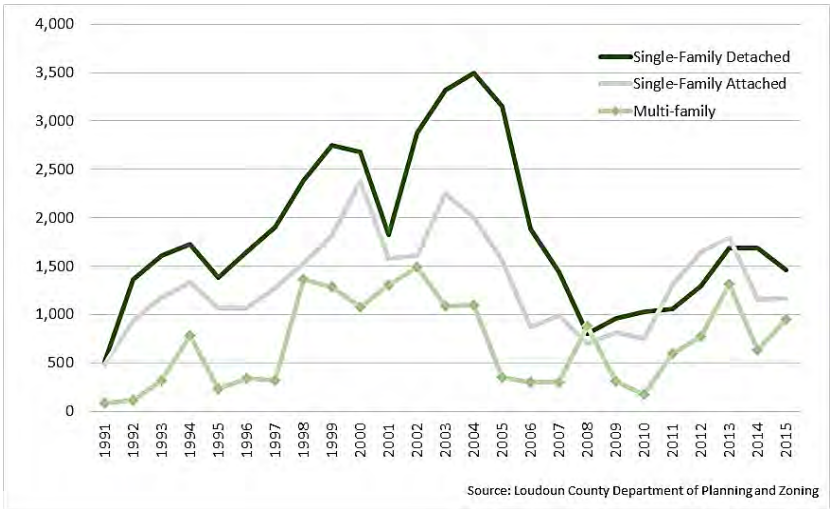
2004 for both Loudoun County and the region. Loudoun County hit the trough a year earlier and so sales were relatively stronger in 2007 and 2008. The trend in Loudoun County post-2009 has mirrored the regional trend. The number of sales declined through 2011 and then improved through 2013. The number of sales declined again in 2014 but increased sharply in 2015.

New Permits

New construction slowed considerably following the housing market downturn. The subsequent rebound in new residential construction activity has been steady but slow. Between 2000 and 2015, Loudoun County issued permits for the construction of 65,900 residential units (Figure 33). Over half (53.3 percent) were issued during the 2000-2005 period. The number of new permits decreased precipitously between 2004 and 2006, with the sharpest declines occurring for single-family home permits (including both single-family detached and attached homes).

The total number of permits issued continued to fall through 2010, when it hit a 19-year low. In the following years, the number of annual permits climbed steadily, with the number of permits for single- family attached homes briefly surpassing all other unit types for the first time since 1991, the earliest year examined. Permitting activity stalled again in 2014 and 2015 for all building types, as builders may have been reacting to regional economic uncertainty and weak job growth that also triggered weak buyer demand in 2014.

Figure 33. New Residential Permits, 1991-2015

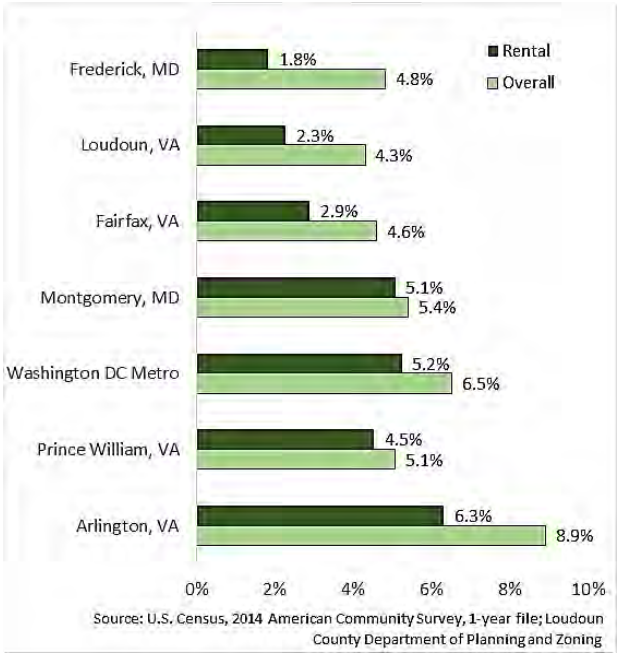


Permit data do not indicate whether new construction is ownership or rental. Based on both the housing stock and the for-sale market, multi-family units are more likely to be rental apartments, especially in the past few years, although the demand for multi-family condominiums has been on the rise. In 2015, permits for multi-family units made up 26.6 percent of all permits (952 out of 3,582). Most—if not all—of the single-family permits issued in Loudoun County are for home ownership units. The new ownership units that are produced are more likely to be priced in the upper range, based on an analysis of new home sales prices.

Rental Market

About a quarter of Loudoun County households are renters and the share of renters has increased significantly in recent years. Low rental vacancy rates and rent increases reflect the strong demand for rental housing. The vacancy rate for all housing units in Loudoun County was 4.3 percent in 2014 (Figure 34). This rate includes homes that are vacant for any reason, including those for sale, and vacation homes or homes that are not used as a primary residence for any reason. The *rental* vacancy rate was just 2.3 percent in 2014, including both multi-family apartments and single-family detached and attached homes. Both the overall vacancy rate and the rental vacancy rate in Loudoun County were among the lowest of the comparable jurisdictions in the Washington DC metropolitan area.

Figure 34. Housing Vacancy Rate, 2014



The rental vacancy rate has remained below 5.0 percent since 2009, even though the number of units for rent has increased tremendously. Between 2009 and 2014, the number of occupied rental units increased 31.7 percent. During the same period, occupied owner units increased just 9.9 percent.

The number of rental units in Loudoun County has more than tripled (+201.8 percent) between 2000 and 2014, as the County added a total of 18,900 rentals in any building type during this time. The growth in the rental stock was driven primarily by rental units in buildings with five or more units, which accounted for half (50.1 percent) of the growth during this period.

Rental units are often equated to large apartment buildings but in suburban jurisdictions, like Loudoun County, a significant share of the rental stock is comprised by single-family homes. In 2014, more than one fifth (21.3 percent) of Loudoun County's rental homes were single-family detached homes (Figure 35). By comparison, throughout the Washington DC metropolitan area, only 13.8 percent of rental units were single-family detached homes. Loudoun County also has a relatively high share of single-family attached rentals, including rentals in buildings with two to four units. In 2014, 28.4 percent of

Figure 35. Occupied Rental Units by Type, 2000, 2006 and 2014

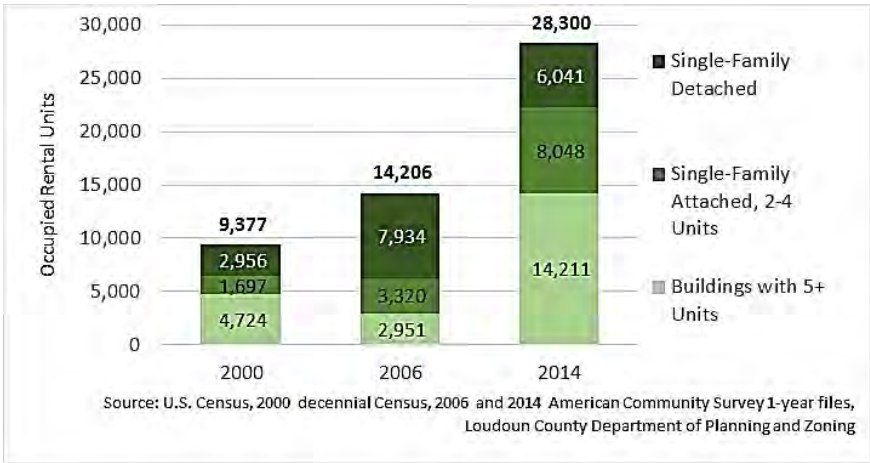
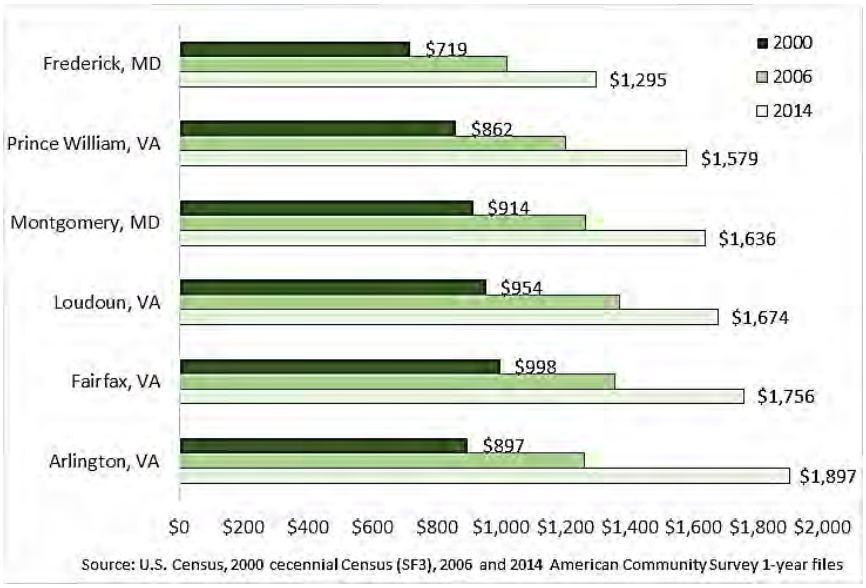


Figure 36. Median Gross Rent, 2000, 2006 and 2014



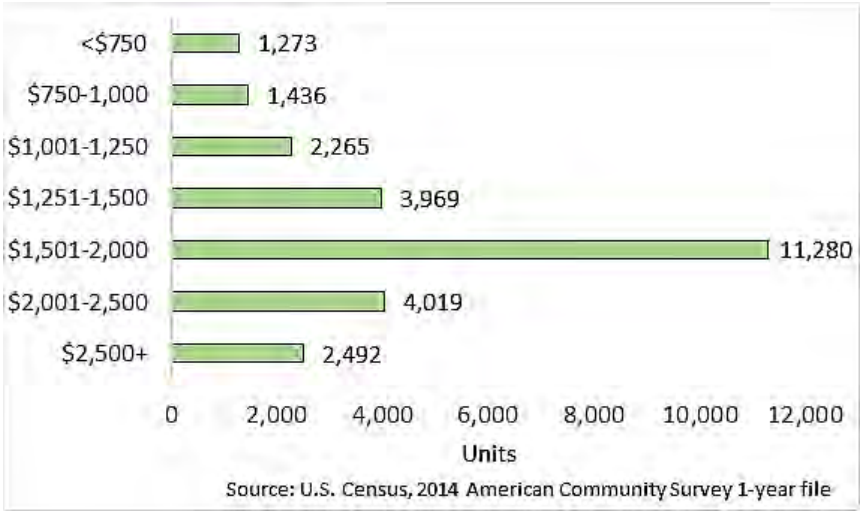
Loudoun County's occupied rentals were single-family attached units, compared to just 21.6 percent in the Washington DC metropolitan area.

Single-family detached homes that are currently being rented are more likely to have been built prior to 2000 than those that are currently owned. This indicates that these units were not added to the supply as planned rental units, but are being rented because of market conditions. The homes being rented are somewhat smaller and are more likely to have two or three bedrooms than owner-occupied single-family homes. Some of these homes may revert to ownership units as home prices continue to rise. The overall share of single-family detached units that are currently being rented is slightly higher than it was in 2000 though there are thousands of additional units in the housing stock in 2014. In 2000, about 8.5 percent of all single-family detached units were being rented. In 2014, that share was 10.3 percent.

The median gross rent in Loudoun County was higher than all but two comparable jurisdictions in 2014 (Figure 36). At $1,674, the median gross rent was 9.8 percent higher than the median rent for the Washington DC metropolitan area in 2014. The stock of single-family rentals likely impacts the relative rents. Single-family detached and attached homes are more likely to be larger than units in multi-family buildings, with higher rental rates. The median rent among single-family rentals was $1,930, with 30 percent renting for at least $2,500.

Between 2000 and 2014, the median gross rent in Loudoun County increased 75.5 percent. The building mix of rental units has not changed dramatically since 2000 and played a negligible role in the rising rental rates. The rent growth in Loudoun County over this time period was lower than the increase in all of the comparable jurisdictions—Arlington County (+111.5 percent), Prince William County (+83.2 percent), Frederick County,

Figure 37. Gross Rent, 2014



Maryland (+80.1 percent), Montgomery County (+79.0 percent), and Fairfax County (+76.0 percent). Rental rates in Loudoun County also did not rise as quickly as home sales prices.

Although the increase in median gross rent was lower than in other jurisdictions, relatively few rental units in Loudoun County are affordable to lower income households (Figure 37). In 2014, about 1,300 units were renting for less than $750 and would be affordable to households earning less than $51,500 (about 48% of AMI for a family of four). Another 1,400 units had rents between $750 and $1,000 and would be affordable for households earning up to $58,100 (or about 54 percent of AMI for a family of four).

Housing Affordability

Rising home prices and rents, coupled with slow growing wages, has made it increasingly difficult for many households to find housing they can afford. Difficulty finding affordable housing directly affects the individuals and families who cannot find housing. But a lack of a sufficient supply of housing affordable to low- and moderate-income households has broader implications for the local economy and community. When households spend a disproportionate share of their income on housing, there is less left over for other necessities. Families are sometimes forced to make trade-offs between paying for housing and paying for other necessities, including food and health care.[25] In addition, these households spend less on local goods and services and this reduced spending can have a negative impact on the local economy.

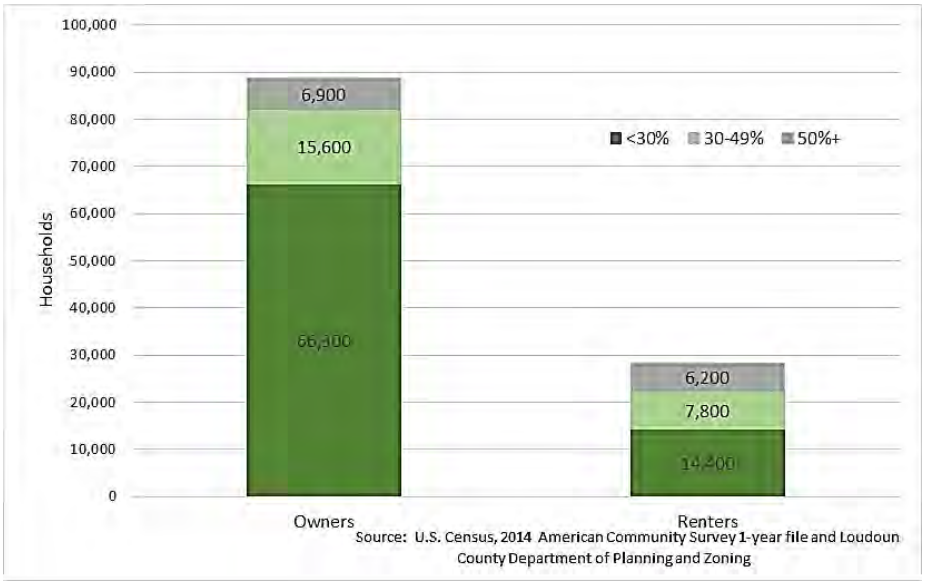
Measuring Housing Affordability

Affordability is typically measured by comparing a household's income to its housing costs. When a household spends 30 percent or more of its income on housing, it is referred to as "cost burdened." A household spending 50 percent or more of its income on housing is referred to as "severely cost burdened."

While housing affordability challenges are greatest among the lowest income households, there is evidence that higher income households are increasingly burdened by the high costs of housing in Loudoun County and the Washington DC metropolitan area. Higher than average transportation expenses for workers in Loudoun County add to the overall burden of housing plus transportation costs of County residents and workers.

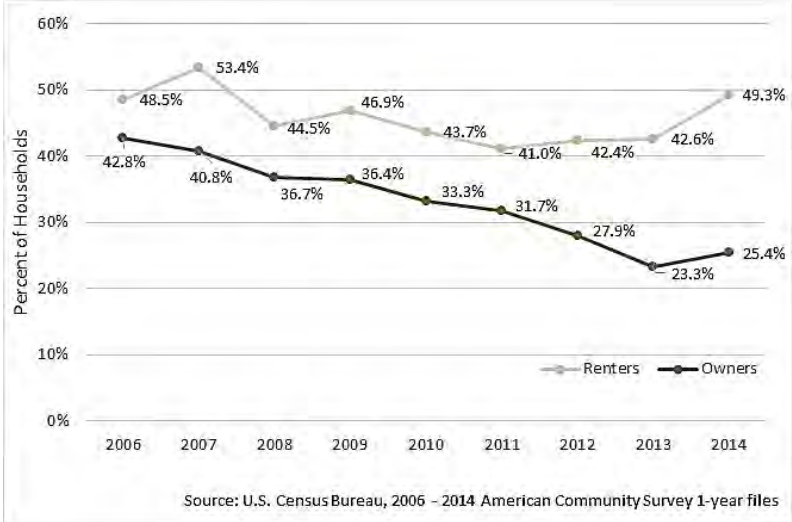
Renters in Loudoun County face higher cost burdens than do home owners. In 2014, nearly half of the County's renter households (nearly 14,000 households) were cost burdened, and 21.8 percent (6,200 households) were severely cost burdened (Figure 38). One quarter of Loudoun County home owners were cost burdened in 2014, meaning that more than 22,500 Loudoun County home owners spent 30 percent or more of their income on housing costs. In 2014, about eight percent of home owners—6,900 households—were severely cost burdened.

Figure 38. Cost Burdened Households by Tenure, 2014



[25] Roy, Joydeep, Melissa Maynard and Elaine Weiss. 2008. *The Hidden Costs of the Housing Crisis*. Washington, DC: The Partnership for America's Economic Success. Online at http://www.pewtrusts.org/~/media/legacy/uploadedfiles/wwwpewtrustsorg/reports/partnership_for_americas_economic_success/paeshousingreportfinal1pdf.pdf.

Figure 39. Cost Burdened Households by Tenure, 2006-2014



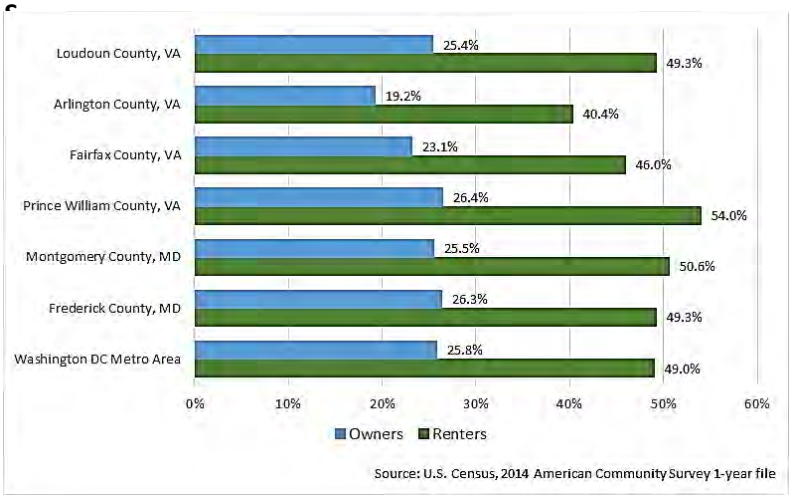
The share of cost burdened renter households in Loudoun County is only slightly higher than it was in 2006, but it has increased significantly from 2011 (Figure 39). In fact, if the rate of cost burden among renters was the same in 2014 than it was in 2011 there would be about 2,300 fewer cost burdened renter households in the County in 2014. Housing cost burden among renters is increasing as a result of rising rents and slow growing or declining incomes among the renter population.

As the for-sale housing market has recovered, some higher-income renters have been able to move into home ownership, leaving a greater share of lower-income households in the renter population.

The challenge of housing affordability among renters is magnified because the number of renters in the County has increased dramatically, particularly since the peak of the housing market. Since 2006, the County has added 23,700 households and well over half—14,100 households—are renters. Therefore, even as the rate of rental housing cost burden has remained about the same as it was in 2006, the number of cost burdened renter households in the County has grown substantially.

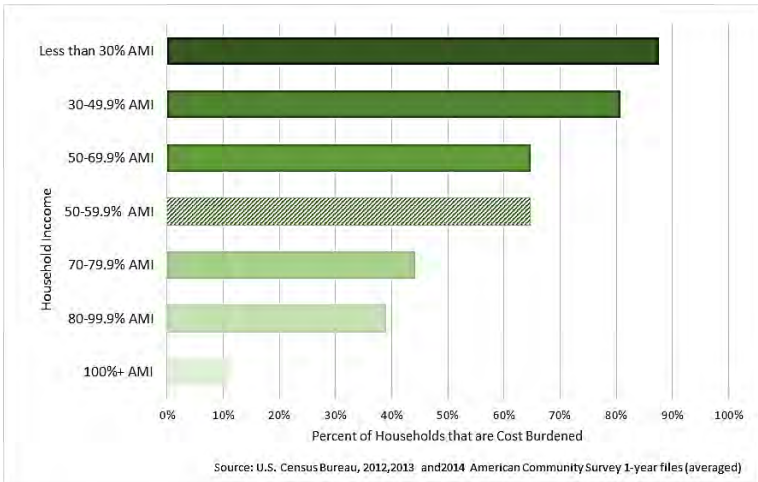
Housing cost burden among home owners increased slightly between 2013 and 2014 but affordability for home owners has actually improved since the peak of the housing market. In 2006, 42.8 percent of home owners in Loudoun County were cost burdened but in 2014 the share was 25.4 percent. The decline in the share of cost burdened home owners between 2006 and 2014 is related to the drop in home prices and the increase in foreclosures and short sales for several years. In addition, after the housing market bust, many lower-income households—that is, those who are most likely to be cost burdened—have been excluded from the home ownership market due to tighter lending standards and growing debt.

Figure 40. Cost Burdened Households by Tenure, Selected Jurisdictions, 2014



The share of cost burdened households in Loudoun County is similar to comparable jurisdictions

Figure 41. Cost Burdened Households by Household Income, 2012-2014



and to the overall Washington DC metropolitan area (Figure 40). The one exception is Arlington County, where the shares of renter households that are cost burdened are lower than in the region overall. Arlington County's renters tend to have higher incomes than renters in other jurisdictions, which largely explains Arlington County's somewhat lower share of cost burdened renter households. Compared to Loudoun County, the share of cost burdened renter households is slightly higher in Prince William County, Virginia and in Montgomery County, Maryland.

Overall, over the 2012-2014 period, 29.6 percent of all households in Loudoun County—including both owners and renters were cost burdened. However, there is wide variability in the housing affordability challenges faced by different types of households (Figure 41). Lower-income households are most likely to be cost burdened. Nearly 88 percent of households with incomes below 30 percent of AMI are cost burdened and 73.3 percent of these extremely low income households are severely cost burdened, spending half or more of their income on housing costs. About 81 percent of households with incomes between 30 and 50 percent of area median income are cost burdened and 39.0 percent are severely cost burdened (Figure 42).

Figure 42. Cost Burdened and Severely Cost Burdened Households by Household Income, 2012-2014

		Percent of Income Spent on Housing Costs					
		<30%		30-49%		50%+	
Area Median Income	Total Households	No.	%	No.	%	No.	%
Less than 30% AMI	7,048	881	12.5%	999	14.2%	5,169	73.3%
30-50% AMI	7,377	1,424	19.3%	3,076	41.7%	2,878	39.0%
50-70% AMI	10,579	3,738	35.3%	5,293	50.0%	1,548	14.6%
50-60% AMI	*5,879*	*2,077*	*35.3%*	*2,824*	*48.0%*	*978*	*16.6%*
70-80% AMI	5,698	3,186	55.9%	1,860	32.6%	653	11.5%
80-100% AMI	10,831	6,607	61.0%	3,630	33.5%	595	5.5%
100%+ AMI	71,645	63,856	89.1%	7,245	10.1%	543	0.8%
Total Households	**113,179**	**79,692**	**70.4%**	**22,102**	**19.5%**	**11,385**	**10.1%**

Source: 2012, 2013 and 2014 American Community Surveys 1-year files (averaged)

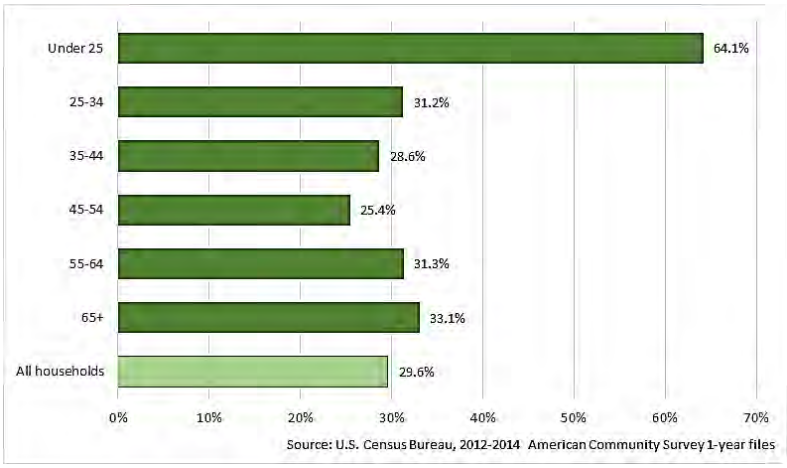
Nearly two-thirds of households with incomes between 50 and 70 percent of AMI are currently cost burdened, and about 15 percent are severely cost burdened. The rate of cost burden drops off for higher income households in the County, though 44.1 percent of households with incomes between 70 and 80 percent of AMI and 39.0 percent of households with incomes of between 80 and 100 percent of AMI are cost burdened.

The vast majority of the County's cost burdened households are working households. More than three quarters of Loudoun County's cost burdened households have a household head that is in the labor force. Among those not in the labor force, forty percent are age 65 or older and another 12 percent are non-elderly disabled households.

Many of the workers that support the local economy face challenges finding housing they can afford in Loudoun County. For example, a household with an income below 30 percent of the AMI could include a single person working in a retail, restaurant or day care job. A household in the 30 to 50 percent of AMI income range could include two workers in the retail or restaurant industry, or one worker in a job such as administrative assistant or teacher's aide. Higher up the income spectrum, cost burdened households include workers in the professional services, non-profit, government and health services fields, including police officers, teachers, and IT professionals.

The rates of housing cost burden also vary by other demographic characteristics, though these characteristics are generally also related to income. Households headed by young people face the highest housing cost burden. Sixty-four percent of households headed by people under age 25 spend 30 percent or more of their income on housing; 42.3 percent spend half or more of their income on housing (Figure 43). Seniors are also disproportionately likely to be cost burdened—33.1 percent of households headed by someone age 65 or older are cost burdened and 18.3 percent are severely cost burdened. The rate of severe cost burden among seniors is nearly twice the rate for the overall household population.

Figure 43. Cost Burdened Households by Age of Household Head, 2012-2014



What is Area Median Income (AMI)?

Area Median Income (AMI) is the median household income for a metropolitan area. The metropolitan area AMI varies by household size. In FY2015, the AMI for the Washington region was **$109,200** for a **family of four** and **$76,500** for a **single person**

Who are these households in Loudoun County?

Income Group (FY 2015)*	What type of household is this?	How much can they afford to spend on housing?**
0-30% AMI $0-$32,750 family of four $0-$22,950 single person	People who are unable to work due to disability or age. Seniors on fixed incomes. Low-wage workers, including many retail, restaurant workers and day care workers.	Rent: $0 - $819 family of four $0 - $575 single person Own: Up to $114,625 family of four Up to $80,325 single person
30-50% AMI $32,750-$54,600 family of four $22,950-$38,250 single person	One person working as an administrative assistant, electrician, or teacher's aide. Two workers in the retail, restaurant or child care sectors.	Rent: $819 - $1,365 family of four $575 - $956 single person Own: Up to $191,100 family of four Up to $133,875 single person
50-70% AMI $54,600-$76,440 family of four $38,250-$53,550 single person	One or two workers in entry-level, including research associates, program managers, nursing aids and nurses (LPNs).	Rent: $1,365 - $1,911 family of four $956 - $1,339 single person Own: Up to $267,540 family of four Up to $187,425 single person
70-80% AMI $76,440-$87,360 family of four $53,550-$61,200 single person	One or two workers in entry- to mid-level jobs, including family social workers, medical billing clerks, and librarians.	Rent: $1,911 - $2,184 family of four $1,339 - $1,530 single persons Own: Up to $305,760 family of four Up to $214,200 single person
80-100% AM $87,360-$109,200 family of four $60,880-$76,100 single person	One or two workers in entry- or mid-level jobs, including police officers, fire fighters, schools teachers and IT support personnel.	Rent: $2,184 - $2,730 family of four $1,530 - $1,913 single person Own: Up to $382,200 family of four Up to $266,350 single person

* This analysis uses 2015 income data and therefore uses FY2015 HUD income limits. The income limits for the Washington DC metropolitan area declined slightly in FY2016 ($108,600 for a family of four).
**Assumes 30 percent of income spent on rent. Assumes a maximum home price of 3.5 times household income.

Figure 44. Cost Burdened Households by Race, 2012-2014

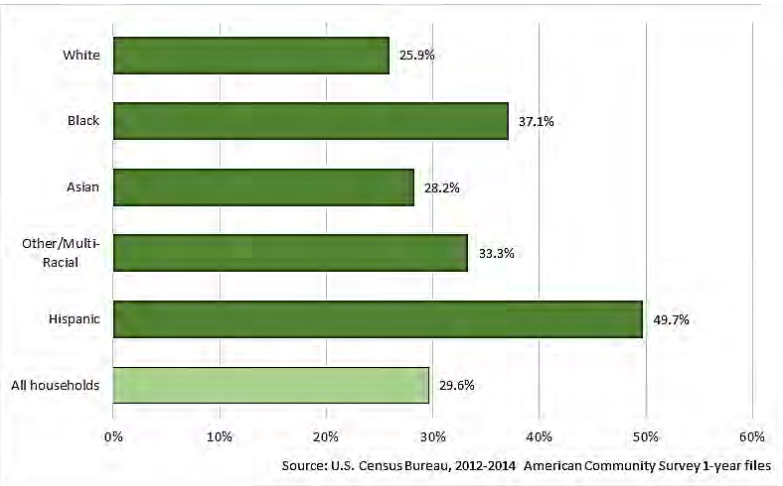
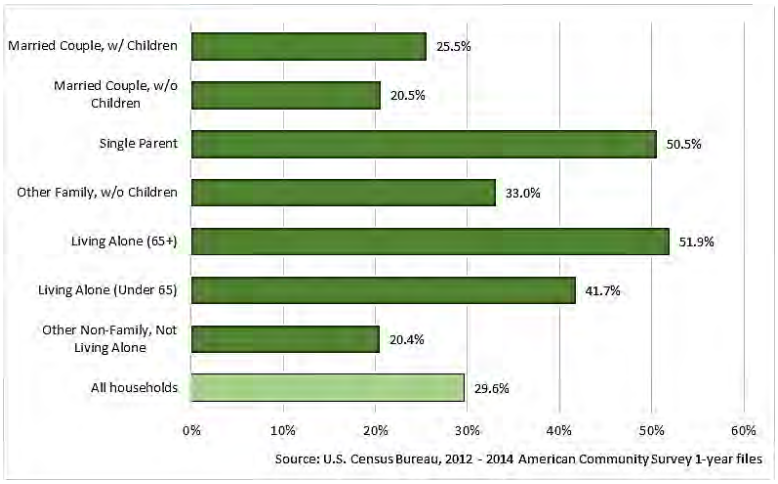


Figure 45. Cost Burdened Households by Household Type, 2012-2014



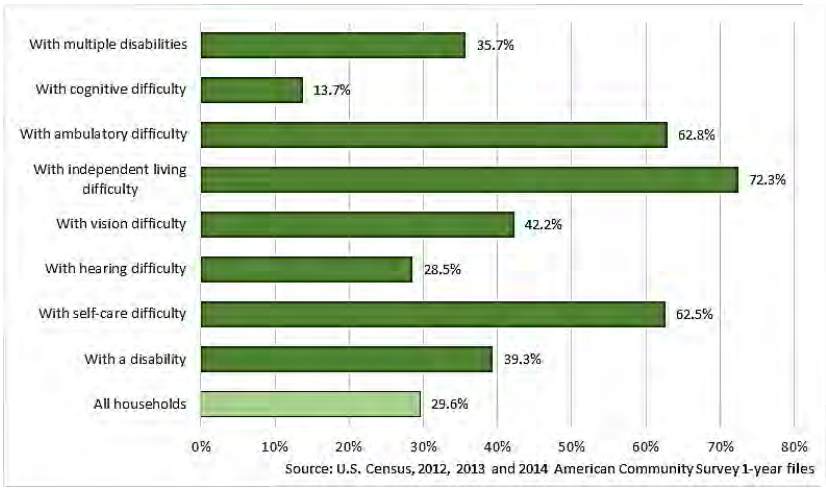
Housing cost burden rates also vary by race and ethnic (Figure 44).[26] Hispanic residents are significantly more likely to be cost burdened than other households living in Loudoun County. Nearly half of all Hispanic households, including both owners and renters, are cost burdened. More than 60 percent of Hispanic renters are cost burdened. Black households are slightly more likely to be cost burdened than the overall population; 37.1 percent of black households spend 30 percent or more of their income on housing compared to 29.6 percent of the overall population.

People living alone are more likely to be cost burdened than other households (Figure 45). About 44 percent of one-person households are cost burdened compared to about a quarter of households with two or more people. Seniors living alone comprise the household type most vulnerable to housing affordability challenges. Nearly 52 percent of seniors living alone are cost burdened and a third spend more than half of their income on housing. Single parents also face significant challenges finding affordable housing. More than half of single-parent families in Loudoun County are cost burdened and nearly one in five spends half or more of their income on housing. The lowest rates of cost burden in Loudoun County are among married couples with no children and non-family households not living alone (e.g. roommates).

Households that include a person with a disability are significantly more likely than the overall population to be cost burdened—39.3 percent versus 29.6 percent (Figure 46). Households that include a person with an independent living disability face daunting challenges—72.3 percent of these households are housing cost burdened.

[26] The race/ethnicity of the household is determined by the race/ethnicity of the head of the household as identified in the American Community Survey.

Figure 46. Cost Burdened Households by Disability Status, 2012-2014



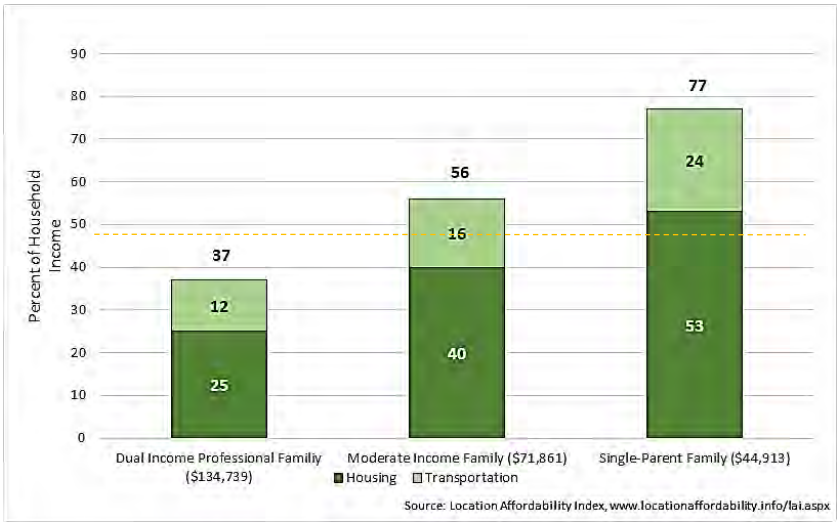
Housing + Transportation Costs

In the last two decades there has been growing recognition that housing costs alone cannot provide a full picture of housing affordability. Particularly during the run up in home prices, many families looked for housing further away from jobs and amenities in order to find a home they could afford. When lower home prices and rents are accompanied by higher transportation costs, the affordability picture may not be improved for families. The "drive 'til you qualify" phenomenon is not unique to Loudoun County or the Washington DC metropolitan area but understanding affordability in light of location is an important aspect of understanding Loudoun County's housing needs.

Researchers at the Center for Neighborhood Technology and the Center for Housing Policy have recommended that households spend no more than 45 percent of their incomes on combined housing plus transportation costs to allow households to have sufficient income for other household necessities.[27]

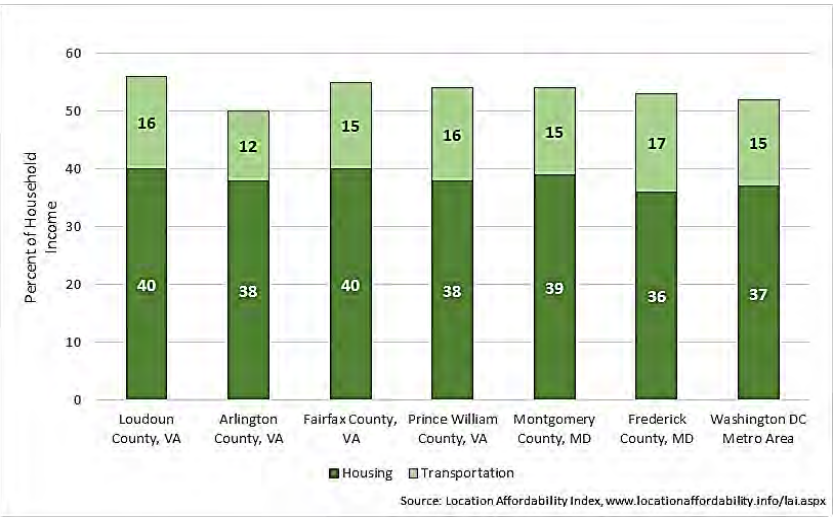
An online tool released by the U.S. Department of Housing and Urban Development and the U.S. Department of Transportation allows users to explore the combined housing plus transportation (H+T) costs for six different types of households through the U.S. According to the data, H+T costs in Loudoun County exceed the recommended threshold for all but the highest income households. A family with two commuters and two children and an income of $71,861 spends, on average, 40 percent of its income on housing and 16

Figure 47. Housing + Transportation Costs, 2008-2012



[27] Hickey, Robert, Jeffrey Lubell, Peter Haas and Stephanie Morse. 2012. Losing Ground: The Struggle of Moderate-Income Households to Afford the Rising Costs of Housing and Transportation. Washington, DC: National Housing Conference. Available online http://www.nhc.org/#!2012-losing-ground/cs9n5

Figure 48. H + T Costs, Moderate Income Families, 2008-2012



percent of its income on transportation for a combined H+T cost of 56 percent. (In the Location Affordability Index data, this family is called a "Moderate Income Family.") The average H+T costs for a single-parent family with two children earning $44,913 in Loudoun County is estimated to be 77 percent (Figure 47). (This household type is referred to as a "Single-Parent Family" in the Location Affordability Index data.)

Loudoun County has among the Washington DC metropolitan area's highest H+T costs, but they are only slightly higher than some of the comparable jurisdictions (Figure 48). While a moderate income family spends 56 percent of its income on housing and transportation in Loudoun County, the combined H+T costs are 50 percent in Arlington County. Combined H+T costs for a moderate income family in Fairfax, Prince William and Montgomery counties are similar to Loudoun County, between 54 and 55 percent. The share of income spent on transportation is higher in Loudoun County than in any of the comparable jurisdictions with the exception of Frederick County, Maryland. The higher than average transportation costs are not surprising given the higher share of commuters travelling 90 or more minutes each way to work.

Overcrowding

Even if households are not cost burdened, they still may face housing challenges. One way households make housing affordable is to double and triple up in housing units that are too small by traditional measures. One common measure of overcrowding is to compare the number of bedrooms with the number of people living in the home. If there are more than two people per bedroom, then that household can be defined as living in "overcrowded" conditions.[28]

Overcrowding is not a widespread problem in Loudoun County, according to data from the American Community Survey.[29] Less than three percent of the population in Loudoun County (approximately 7,600 people)—and less than 1.5 percent of households (approximately 1,500 households)—lived in overcrowded housing over the 2012-2014 period. Two-thirds of overcrowded households are not cost burdened while the other third still pay more than 30 percent of their income on housing costs. About three quarters of overcrowded households are renters and the other quarter own their homes. Not all of the households living in overcrowded conditions are low-income households. About half have incomes

[28] Blake, Kevin S., Rebecca L. Kellerson and Aleksandra Simic. 2007. *Measuring Overcrowding in Housing. Washington, DC: U.S. Department of Housing and Urban Development*. Available online https://www.huduser.gov/publications/pdf/measuring_overcrowding_in_hsg.pdf

[29] It is possible, of course, that overcrowded conditions are underreported to on the survey; however, the ACS remains the best source of local information on overcrowded conditions.

above 60 percent of AMI and a third have household incomes above 100 percent of AMI. About 60 percent of households living in overcrowded conditions are married couples with children. Less than seven percent (approximately 100 households) are non-family households. Asian and Hispanic families are more likely than white or black families to live in overcrowded conditions.

Current Housing Gaps

As Loudoun County plans for ways to ensure a sufficient supply of housing to meet housing needs going forward, it is important to understand the magnitude of the potential gaps that currently exist between housing demand and supply. Among existing residents living in the County, it is evident based on the preceding analysis of housing market trends and measures of housing affordability, that there is a gap between housing demand and supply at certain prices and rents, and potentially also in terms of unit sizes.

The current housing gap is a measure of the difference between the housing needs that exist in the County and the housing that is affordable and available to current residents. This analysis of current gaps does not take into account the new residents who would live in Loudoun County if there was sufficient housing. The forecasts of housing demand and supply (Section II below) will address that need.

There are several potential ways to measure the current housing gaps. This analysis includes three measures that attempt to gauge the extent of the current housing gap for different segments of the population.[30] The three measures include analysis of the following groups of households:

1. Homeless
2. Renter households
3. Potential home owners

In each case, the estimated gaps should be considered independently, with the understanding that the process of generating housing to fill the gaps defined by one measure would necessarily change the units needed to fill the other gap. For example, if the gap among potential home owners was filled by increasing the supply of for-sale housing, then there would be fewer rental units needed to meet the rental housing gap.

Homelessness

One of the clearest components of existing housing gaps in Loudoun County is the extent of homelessness in the County. Each year, Loudoun County participates in the point-in-time homeless counts coordinated by the Metropolitan Washington Council of Governments. For these counts, Loudoun County uses the HUD definition of homelessness which is "people who reside in emergency shelter, transitional housing, domestic violence shelters, runaway youth shelters, safe havens, or places not meant for human habitation, such as streets, parks, alleys, abandon buildings and stairwells."[31]

According to the 2016 point in time counts, there are 134 homeless individuals in Loudoun County, a 20 percent drop from the number of homeless individuals estimated during the 2012 point in time counts. This number includes 20 families with children (comprising 69 total adults and children) and 65 single

[30] The Appendix includes tables that provide summaries of the number of renter and owner households by household income along with estimates of the current stock of rental and home ownership units affordable at different income levels. These Appendix tables provide another way of looking at potential gaps in demand and supply, though they do not take into account household sizes or preferences for units of different sizes.

[31] Chapman, Hilary. 2016. Homelessness in Metropolitan Washington: Results and Analysis from the Annual Point-in-Time (PIT) Count of Persons Experiencing Homelessness. Washington, DC: Metropolitan Washington Council of Governments. Available online http://www.mwcog.org/.

adults. Based on interviews with homeless individuals, it is estimated that 78 percent of homeless adults in families and 57 percent of single homeless adults are employed.

The number of homeless individuals in Loudoun County has held fairly steady over the past 10 years, with a peak homeless count of 211 in 2007 and the recent low in 2016. According to homeless advocates in Loudoun County, the MWCOG homelessness counts significantly understate the number of homeless individuals and families, and the actual homeless count is three to three and a half times higher than what is presented in the MWCOG report. As a result, the number of homeless individuals in Loudoun County could be as high as 469.

Renter Households

Many households in Loudoun County face housing instability due to high rents or pay a disproportionately high share of their income in rent. If there were more lower-rent housing options, fewer households in the County would be cost burdened. Ideally, the rental housing gap would be measured by comparing the number of units available in Loudoun County at different rent levels with the household incomes of existing renters. Unfortunately, there is insufficient unit-level data on rents from the County or other public data sources. As an alternative, the current renter housing gap in Loudoun County can be estimated by examining the characteristics of renters that are currently cost burdened. By measuring housing gaps this way, it is assumed that households living in the County pay 30 percent or more of their income for housing because they cannot find suitable, affordable housing. This analysis of the gap in the availability of rental housing does not take into account potential renters who would like to live in Loudoun County but cannot find an affordable and available home to rent. It also does not explicitly take into account renters who pay 30 percent or more of their income by choice.

This analysis includes estimates of the number of cost burdened renter households by household income (measured as a percent of AMI) and household size currently living in Loudoun County. Several assumptions are made to use these cost burden figures to estimate current rental housing gaps:

- **Assume gaps exist across the income spectrum, up to 100% of area median income.** The vast majority of cost burdened renters in Loudoun County (91.2 percent) have incomes below 80 percent of AMI which was $87,360 for a family of four in 2015. At 80 percent of AMI, a family of four can afford monthly rent of $2,184 and a single person can affordable monthly rent of $1,530. At the upper end of these ranges and above, the market can generally meet demand without government subsidy if land use regulations and zoning allowed for sufficient housing construction. More housing available at higher rents might free up lower rent units if higher income households choose to move into higher rent housing. This “filtering up” of households is not at all ensured, however, and is not explicitly part of this gap analysis. The biggest needs are for units that may require financial or non-financial (e.g. regulatory relief, land donation) subsidy from the County to meet the gap that exists for households below 80 percent of AMI based on the cost burden analysis.
- **Assume households of different sizes will live in units with a particular number of bedrooms.** It is assumed that all one-person and two-person households will live in studio or one-bedroom units, three-person households will live in two-bedroom units and four-or-more person

households will live in units with three or more bedrooms. This assumption simplifies the analysis although changes to this assumption will not substantially impact the findings.

- **Assume households have incomes at the high end of their income category and spend 30 percent of their income on housing.** If a household is defined as having an income between 0 and 30 percent of AMI, it is assumed that its income is 30 percent of AMI and that it will pay 30 percent of that income on rent. For higher income households, this approach will overstate the rent levels of units needed because the share of income spent on housing declines with higher incomes.[32]

Figure 49. Cost Burdened Renter Households by Household Income and Household Size, 2012-2014

	Household Size				
	1	2	3	4+[1]	Totals
<30% AMI	**1,283**	**720**	**568**	**801**	**3,372**
Max Affordable Income	$ 22,950	$ 26,200	$ 29,500	$ 32,750	N/A
Max Affordable Rent	$ 574	$ 655	$ 738	$ 819	N/A
30-50% AMI	**640**	**504**	**364**	**1,429**	**2,938**
Max Affordable Income	$ 38,250	$ 43,700	$ 49,150	$ 54,600	N/A
Max Affordable Rent	$ 956	$ 1,093	$ 1,229	$ 1,365	N/A
50-60% AMI	**412**	**252**	**531**	**803**	**1,999**
Max Affordable Income	$ 45,900	$ 52,440	$ 58,980	$ 65,520	N/A
Max Affordable Rent	$ 1,148	$ 1,311	$ 1,475	$ 1,638	N/A
60-80% AMI	**777**	**206**	**437**	**510**	**1,931**
Max Affordable Income	$ 61,200	$ 69,920	$ 78,640	$ 87,360	N/A
Max Affordable Rent	$ 1,530	$ 1,748	$ 1,966	$ 2,184	N/A
80-100% AMI	**196**	**201**	**142**	**208**	**748**
Max Affordable Income	$ 76,500	$ 87,400	$ 98,300	$ 109,200	N/A
Max Affordable Rent	$ 1,913	$ 2,185	$ 2,458	$ 2,730	N/A
100% + AMI	**81**	**52**	**29**	**70**	**232**
Max Affordable Income	N/A	N/A	N/A	N/A	N/A
Max Affordable Rent	N/A	N/A	N/A	N/A	N/A
Total	**3,389**	**1,936**	**2,073**	**3,821**	**11,219**

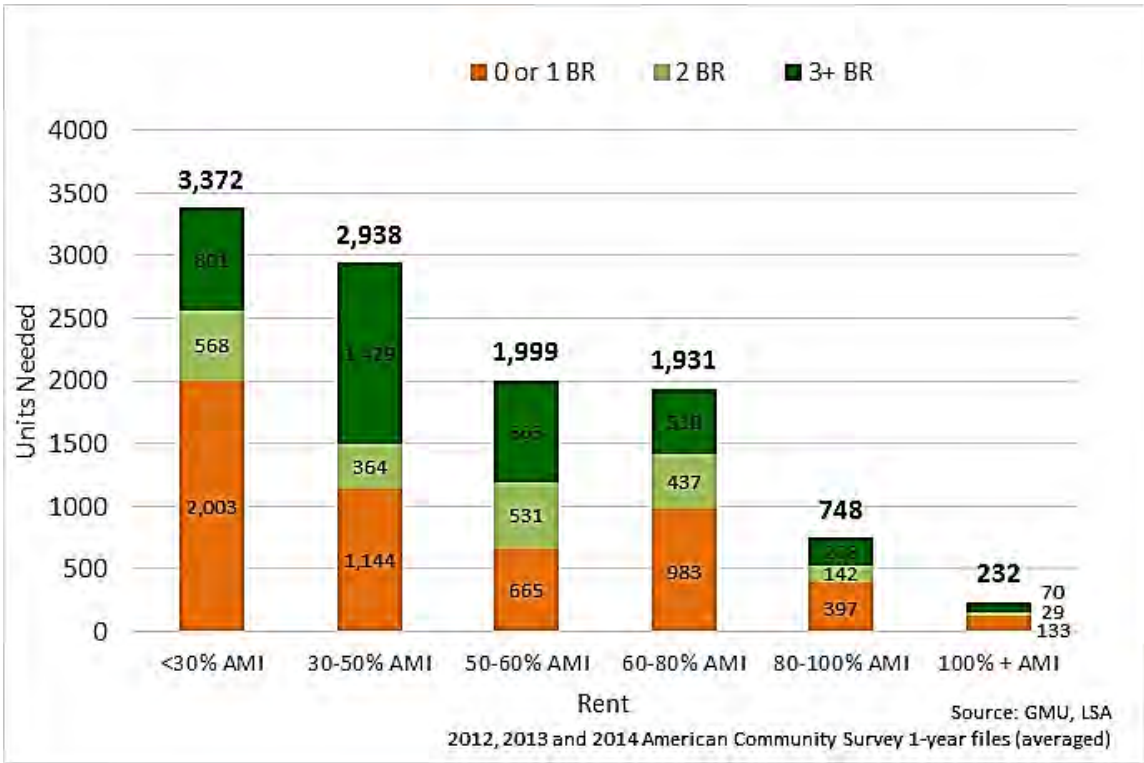
[1] Household income shown for a 4-person family

Source: GMU; LSA; U.S. Census Bureau, 2012, 2013 and 2014 American Community Survey 1-year files (averaged); U.S. Department of Housing and Urban Development

Using data from the 2012-2014 American Community Surveys, there are more than 11,200 renter households in Loudoun County that are currently cost burdened but the greatest needs are for housing affordable to households with incomes below 50 percent of AMI. About 56 percent of cost burden renters have incomes below this level (Figure 49).

[32] For example, in a recent report on housing needs in the Washington DC metropolitan area, it was estimated that households with income above $75,000 spend between 18 and22 percent of their incomes on housing. See Sturtevant, Lisa and Jeannette Chapman. 2013. Housing the Region's Future Workforce. Arlington, VA: George Mason University. Available online http://cra.gmu.edu/pdfs/studies_reports_presentations/Housing_the_Regions_Future_Workforce_2012.pdf.

Figure 50. Estimates of Current Rental Housing Gap by Household Income and Bedrooms



Among the extremely low income households (with incomes below 30 percent of AMI), the biggest need is for studio or one-bedroom units to serve one-person households. In order to be affordable to this population, these 1,283 units would need to rent for $574 or less per month. Another 720 units needed to serve two-person households with incomes below 30 percent of AMI would need to rent for $655 per month or less to be affordable (Figure 50).

There is also a substantial need for units for one- and two-person households with incomes between 30 and 50 percent of AMI. These studio or one bedrooms units would need to rent for $956 per month or below to be affordable to these households. A greater need among the population with incomes of between 30 and 50 percent of AMI is for family-sized units. There are 1,429 households with incomes in this range that have four or more people. These households, that are currently cost burdened or severely cost burdened, would need units with three or more bedrooms than rent for $1,365 per month or less.

Among cost burdened renter households with incomes between 50 and 60 percent of AMI, there is also a considerable need for family-sized units. This group of households has an unmet need for 803 units with three or more bedrooms that rent for $1,638 per month or less.

There are nearly 2,000 cost burdened renter households in Loudoun County with incomes between 60 and 80 percent of AMI. A significant share—777 households—are one-person households who need a unit that rents for $1,530 per month or less.

Finally, though the rate of cost burden is much smaller, there still exists a gap between housing demand and supply among current renters with incomes between 80 and 100 percent of AMI. The need is split fairly evenly across household sizes for this income group. A four-person family with an income between 80 and 100 percent of AMI would need a three-bedroom unit with a rent of $2,730 per month or less.

Potential Home Owners

Renters are much more likely than current home owners to be cost burdened. However, a gap also potentially exists when it comes to home ownership. Indeed, some of the County's current renter households might have become home owners if there were sufficient home ownership opportunities.[33] A number of factors, including mortgage interest rates, access to credit, and available inventory can complicate the measurement the existing gap in the number of ownership units. If (and when) mortgage interest rates rise, homes will be more expensive, holding all other things constant, and will make home ownership out of reach for households at particular incomes, or will put downward pressure on home prices. If mortgage underwriting standards are more restrictive, even income-qualified households may find it difficult to become a home owner. Finally, limited inventory—as a result of limited new construction and/or fewer existing home owners listing their homes for sale—will limit home ownership opportunities, potentially keeping would-be home owners out of the market. These are all important factors driving the level of home ownership in the County; however, this analysis of current gaps does not explicitly take into account these external factors.

One way to measure a potential home ownership gap in Loudoun County is to look at home ownership rates for households at different income levels during a more "normal" period and then compare those home ownership rates to current rates. Nationally, the overall home ownership rate has dropped from the peak of the mid 2000s and has fallen to about 64 percent. Some experts have called this level the new long-term average,[34] but the rate of home ownership has fallen again in recent months so it is unclear when home ownership rates will bottom out nationally. Home ownership rates also fell in Loudoun County though they have begun to rebound for some segments of the population. However, it could be argued that the level of home ownership in Loudoun County remains below what could be considered a "normal" level. This gap analysis quantifies the gap in home owners by making assumptions about what that "normal" level should be.

Assumptions made for this portion of the gap analysis are as follows:

- **Assume home ownership rates return to mid-1990s levels**. Nationally, the home ownership rate began to rise in the mid-1990s and based on Census data in 1990 and 2000, Loudoun County experienced a similar increase during that time. An estimate of the home ownership rate in the mid-1990s, therefore, is used to approximate a long-term "normal" home ownership rate in Loudoun County. Based on these estimates, the overall home ownership rate in the County in the mid-1990s

[33] There are cost burdened home owners in Loudoun County which potentially constitutes another gap between housing demand and supply on the home ownership side. However, from a practical standpoint, existing home owners would be unable or unlikely to move into more affordable housing if it were available. Therefore, the approach in this analysis focuses on would-be home owners and the potential housing gaps that exist preventing them from becoming home owners.

[34] The State of the Nation's Housing. 2016. Cambridge, MA: Harvard University Joint Center for Housing Studies. Available online http://www.jchs.harvard.edu/research/state_nations_housing

Figure 51.Home Ownership Rates by Household Income, mid-1990s (est.) and 2014

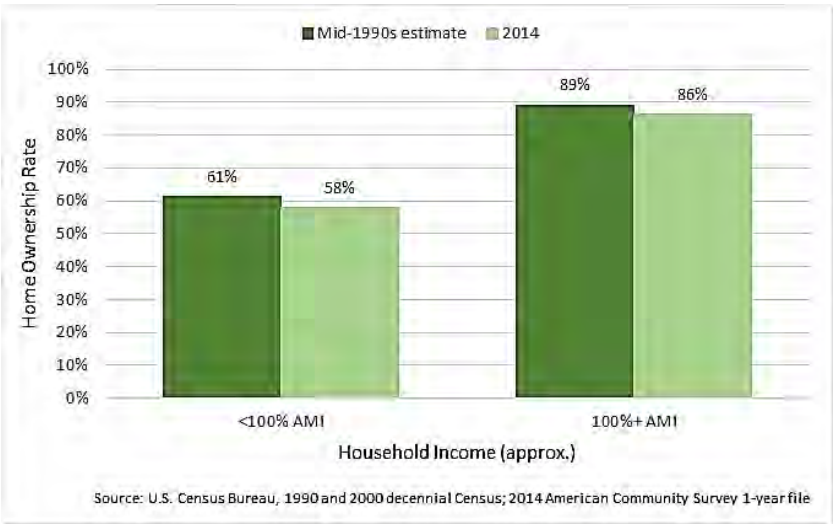
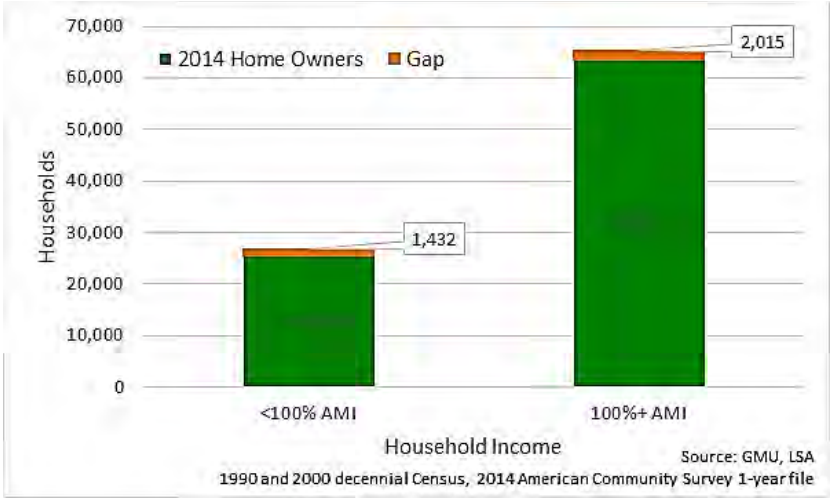


Figure 52. Estimates of Current Home Ownership Gap by Household Income



was 77.4 percent. Among households with incomes below the area median income (estimated using data from the 1990 and 2000 Census), the home ownership rate was 61 percent. For households at or above the median income, the home ownership rate was an estimated 89 percent. The home ownership rates in 2014 were lower for both income groups—58 percent for households below median income and 86 for households at or above median income. The differences in these home ownership rates by broad income groups were used to estimate potential home ownership gaps in the County (Figure 51).[35]

- **Assume preferences for home ownership have not changed dramatically.** If preferences for home ownership shift substantially, there may be reasons to expect lower demand for home ownership even without any limits on home ownership opportunities. However, almost universally, national surveys of households indicate that the desire for home ownership is strong, and more than 90 percent of households either own or expect to own a home at some point.[36]

- **Assume standard guidelines for housing affordability.** To determine how much a household could afford given a particularly income, the Zillow "Affordability Calculator"[37] was used, with assumptions of a $20,000 downpayment, a 3.875 interest rate, a 30-year fixed rate mortgage, a 36 percent debt-to-income ratio, and average values for property taxes and insurance.

[35] Because of the way the data are presented in the earlier decennial Censuses, it was not possible to estimate earlier home ownership rates for other categories of area median income.
[36] 2016 Q1 Homeownership Opportunities and Market Experience (HOME) Survey. 2016. Washington, DC: National Association of Realtors®. Available online http://www.realtor.org/reports/2016-q1-housing-opportunities-and-market-experience-home-survey.
[37] https://www.zillow.com/mortgage-calculator/house-affordability/

According to this analysis, Loudoun County would have 3,447 additional home owners if home ownership rates returned to the level from the mid-1990s (Figure 52). This difference includes an additional 1,432 home owners with incomes below the area median household income ($109,200 for a family of four in 2015). Households with incomes at the area median income could afford a home priced at about $500,000.

About 60 percent of homes sold in Loudoun County in 2015 (3,300 homes) were priced below $500,000. About 80 percent of those homes priced under $500,000 had three or more bedrooms which suggests they could accommodate larger family and household sizes. It was not possible to estimate potential home ownership gaps at lower income levels; however, it is likely that households with lower incomes (e.g. at or below 80 percent of AMI) would have a harder time finding home ownership opportunities. At an income of $87,360 for a family of four, these households could afford to purchase a home priced at about $392,000, a level below which it is much more difficult to find housing.

This analysis of the home ownership gap in Loudoun County has at least two implications. First, for higher income households, the decline in home ownership is likely due to a lack of inventory as well as other factors, including higher debt levels, lower credits scores and/or difficulty accessing credit. Second, while external factors are important for more moderate income households, as well, the market has not been particularly effective at producing home ownership opportunities below $400,000 or even below $500,000. The average price of a new home in Loudoun County in 2015 was over $560,000.

Summary of Housing Gaps

Based on this analysis of current gaps, there are **at least 134 (and potentially up to 469) homeless adults and children** with urgent needs for housing.

In addition, there is a potential unmet need for about **11,200 rental units** to meet demand among cost burdened renter households. The vast majority (91 percent) of unmet rental housing needs are among households with incomes below 80 percent of AMI ($87,350 for a family of four). Three quarters of the estimated unmet rental demand is among households with incomes below 60 percent of AMI ($65,520 for a family of four.) Even with County programs that target this population, there remains a substantial gap between housing supply affordable at this income level.

Finally, it has been estimated that there is a gap of **3,400 home ownership units**, which would be needed to return the County to a more typical, long-term home ownership rate.

These estimates of the current housing gap suggest there is a mismatch between the County's current housing stock and the needs of current County residents, particularly low-income renters and low- and moderate-income home owners (or would-be home owners). Thousands of households in the County are cost burdened, live double or tripled up, or are excluded from the home ownership market because of a lack of a sufficient supply of housing affordable to households all along the income spectrum. Furthermore, these estimates of the current gap likely understate the full extent of the housing needs because they do not include housing needed for Loudoun County workers who currently live outside of the County but would prefer to live in the County.

Section II: Forecasts of Housing Demand

The GMU consulting team prepared forecasts of housing demand in Loudoun County over the 2015 through 2040 period. The GMU methodology is a regional forecasting model based on local and regional employment growth and demographic trends. The primary driver of these forecasts is employment growth. These employment-driven forecasts reflect a housing demand that is not constrained by the amount or type of housing supply suggested by County land use plans or zoning. Instead, the GMU forecasts are based on an examination of projected future local and regional employment growth and assumptions about the amount of housing that would be needed to accommodate the growing workforce. These forecasts also take into account the aging of the population over the forecast period.

There are three primary objectives of producing these forecasts:

1) To identify the economic and demographic factors that will drive household growth and housing demand in Loudoun County over the next 25 years;

2) To describe the characteristics and housing preferences of future households with a desire to live in the County, and

3) To measure the difference between the number of housing units that would be needed to meet the estimated housing demand and the number of housing units that would be accommodated given the County's planned land use, its long-range supply of land, and its land use/development constraint.

Summary of the Forecast Process

The forecasts described in this report use both employment trends and demographic trends to estimate the demand for housing in Loudoun County. A detailed methodology is included in the Appendix; this section provides an overview of the forecasting process.

For these forecasts, the demand for housing in Loudoun County comes from one of two sources: 1) workers with a job located either in Loudoun County or somewhere else in the Washington DC region ("employment-driven" demand) and 2) other residents that are projected to be in the County generally for non-employment reasons[38], primarily retirees ("demographic-driven" demand).

The majority of future housing demand in Loudoun County will be related to employment growth, or from workers with a payroll job[39], or a position with a regular wage or salary, in Loudoun County or somewhere else in the Washington DC region. For these housing demand forecasts, future workers are expected to live in Loudoun County at the same rates as they currently do. In addition, some workers with jobs in other parts of the region are also assumed to live in Loudoun County in the future at the same rates they do currently.

[38] The demographic-driven forecasts include people with non-payroll jobs (i.e. self-employed workers).

[39] Payroll employment is the type of employment that is covered by unemployment insurance and is included in estimates from the Bureau of Labor Statistics and employment forecasts from IHS Economics, which are used for this analysis.

In addition to housing demand associated with net new jobs, these forecasts estimate the amount of housing that will be needed to accommodate replacement workers—that is, workers filling jobs vacated by retirees.

The estimates of future employment growth that drive these housing demand forecasts are based on forecasts of employment growth by industry sector from IHS Economics and the MWCOG. Assumptions about worker characteristics are used to forecast households and then housing units (Figure 1).

For these housing demand forecasts, the remainder of future housing demand in Loudoun County is derived from demographic trends, specifically the trends that will drive the need for housing for retirees, students, and some types of self-employed residents. A separate forecasting process based on projected age and sex of the population[40] was used to determine how many of these households will be expected to live in the County by 2040, along with the types of housing they will demand (Figure 2).

Figure 1. Schematic of Employment-Driven Portion of Household Demand Forecasts

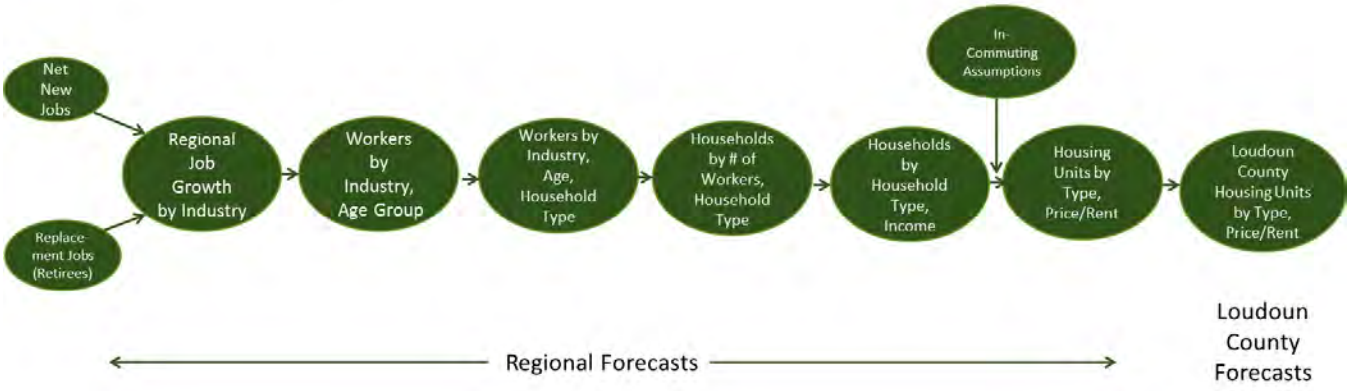
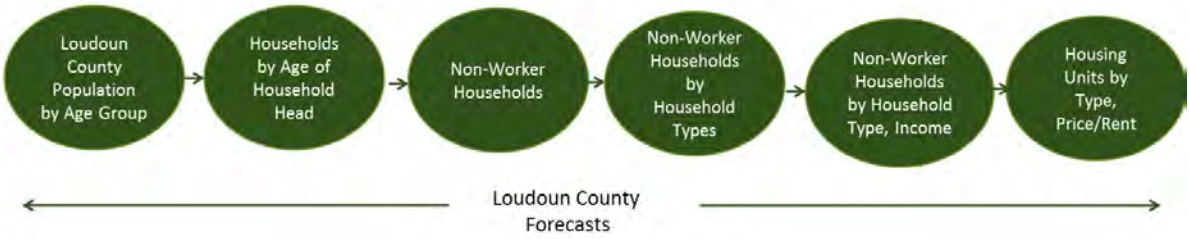


Figure 2. Schematic of Demographic-Driven Portion of Household Demand Forecasts



Note: These figures depict a high-level representation of the forecasting process. A detailed, step-by-step description of the forecasting methodology is included in the Appendix.

[40] The householder and the head of household is used interchangeably throughout this report.

For both groups, these forecasts include estimates of household characteristics of future households. The household characteristics—including age of the household head, household size and composition, and household incomes—are used to predict housing unit preferences.

Key Assumptions

GMU's approach to forecasting housing demand is different from forecasts prepared by the County for MWCOG or by other consultants. These forecasts are designed to reflect the amount and types of housing that would be needed to support economic growth and accommodate the aging of the population in Loudoun County over the 2015 to 2040 period, and are not limited or influenced by supply constraints or pipeline development.

These housing demand forecasts are highly dependent on assumptions about economic and demographic trends. Key assumptions of the GMU forecasting methodology are described below:

1. **Employment growth.** These forecasts are based primarily on local and regional employment growth and the housing that will be needed to accommodate new workers. Future regional employment growth by industry sector is based on forecasts from IHS Economics and MWCOG. Between 2015 and 2040, it is estimated that Loudoun County will add 107,100 net new jobs. Over that same time period, the Washington DC metropolitan area is expected to add 745,300 net new jobs, including Loudoun County jobs.

2. **Commuting patterns.** For these housing demand forecasts, the share of new workers that will be housed in Loudoun County in the future is based on assumptions about commuting patterns. It is assumed that Loudoun County will continue to house the same share of its own workers that it does now, based on an analysis of commuting patterns of current Loudoun County workers by industry and age. These housing demand forecasts also assume that Loudoun County will continue to house workers who have jobs in other jurisdictions at the same rates at which it does now, allowing for housing in the future to accommodate Loudoun County residents who will work outside the County.

3. **Housing preferences.** For these housing demand forecasts, it is assumed that housing preferences will not change over time, after taking into account household characteristics and household income. Therefore, these forecasts assume that particular types of households (e.g. single people under age 45, married couples with children, seniors) with particular incomes will prefer the same type of housing that people with those characteristics currently do. For example, if 41 percent of two-adult households with an income over 120 percent AMI (about $100,000) lives in owner-occupied single-family housing now, these forecasts assume that about 41 percent of *future* two-adult households with an income of 120 percent of AMI will want to live in owner-occupied single-family housing.

These three assumptions are the main drivers of the housing demand forecasts presented in this report. Other assumptions that are included as part of this forecasting model are assumptions about the age distributions of future workers, the wages of future jobs by industry sector, the retirement rates among the current and future workforce, and migration patterns. Details about the forecasting methodology and all assumptions are included in the Appendix.

Changes to any of these assumptions or changes to the forecasting methodology more generally will result in different estimates of future housing demand. The Scenarios section at the end of this report provides an analysis of the potential impact of altering these and other assumptions.

The rest of this section describes the key economic drivers of these housing demand forecasts, summarizes the estimates of future household growth and household characteristics that result from this forecasting process, and summarizes estimates of future housing units by type that would be required to meet future demand as estimated by this methodology. This report concludes with a discussion of how these forecasts differ from land use plan-based forecasts produced by the County and a discussion of alternative outcomes if key assumptions that are part of this forecasting methodology were changed.

Economic Drivers of Housing Demand in Loudoun County

The primary driver of housing demand in Loudoun County will come from growth in the labor force, both as a result of job growth in Loudoun County as well as job growth in the greater Washington DC region.[41] The ability for Loudoun County to grow its employment base and diversify its economy depends at least in part on the availability of a sufficient supply of housing of the right types and prices to meet demand. This section describes the projected employment growth and assumptions about regional commuting patterns that drive these housing demand forecasts.

Over the forecast period, Loudoun County is expected to expand its role as an employment center in the Washington DC metropolitan area. The County is expected to add 107,100 jobs between 2015 and 2040. Over the same period, the Washington DC region is forecasted to gain 745,300 jobs, including those jobs that will be located in Loudoun County.

Based on these employment forecasts, and given the other forecasting assumptions, these housing demand forecasts suggest there will be demand for 66,604 net new housing units in Loudoun County between 2015 and 2040 to accommodate 64,355 households.[42] More than 86 percent of the forecasted household growth—55,445 total households—is expected to come from households with at least one worker. These 55,445 total working households includes 39,750 households that both live and work in Loudoun County and 15,665 households with a household head that works in another jurisdiction in the Washington DC region but chooses to live in Loudoun County (Figure3).

Figure 3. Forecasted Household Growth based on GMU Employment-Driven Housing Demand Forecasts

	Total
Total Household Growth	**64,355**
Households with a Payroll Worker	55,445
Main Job In Loudoun County	39,780
Main Job Elsewhere in the Region	15,665
Households without a Payroll Worker	*8,910*

Source: GMU Center for Regional Analysis, Lisa Sturtevant & Associates, LLC

The following describes the economic forecasts at the County and regional level that are key inputs to these estimates of future housing demand.

[41] The Washington DC metropolitan area is comprised of the following jurisdictions: District of Columbia; City of Alexandria, Arlington County, Clarke County, Culpeper County, Fairfax County, City of Fairfax, City of Falls Church, Fauquier County, Loudoun County, City of Manassas, City of Manassas Park, Prince William County, Rappahannock County, Spotsylvania County, Stafford County, City of Fredericksburg, and Warren County in Virginia; Calvert County, Charles County, Frederick County, Montgomery County, and Prince George's County in Maryland; and Jefferson County in West Virginia. The greater Washington DC region includes an extended employment shed to determine the demand for housing in this forecast. For these forecasts, the greater Washington DC region also includes the counties of King George, Caroline, Orange, Madison, Page, Shenandoah, Frederick and the city of Winchester in Virginia, and the counties of Mineral, Hampshire, Morgan and Berkeley in West Virginia, and St. Mary's County, MD.

[42] About 2,240 new housing units are expected to be vacant units based on typical housing vacancy rates.

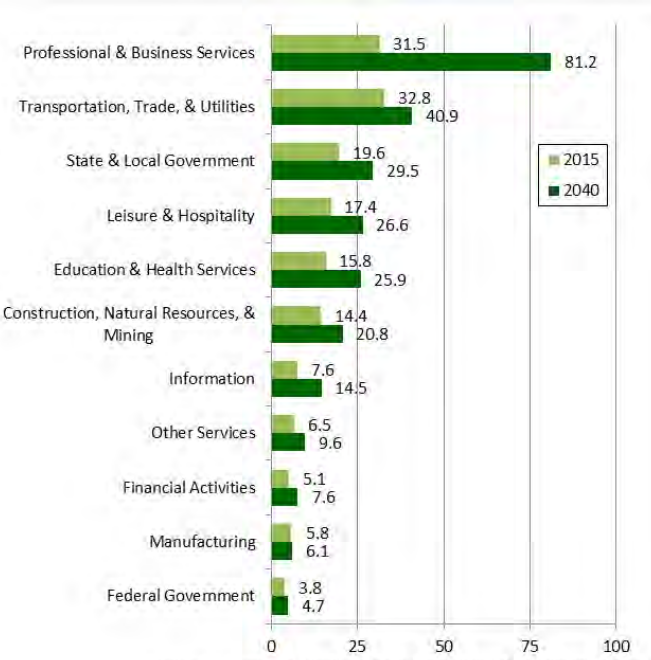
Employment Growth in Loudoun County

Over the forecast period, Loudoun County is expected to expand its role as an employment center in the Washington DC metropolitan area. According to estimates from IHS Economics and MWCOG, between 2015 and 2040, the Washington DC region is forecasted to gain 745,300 jobs, for an increase of 23.5 percent. The number of jobs in the County is projected to grow more quickly, increasing 66.8 percent or by 107,100 jobs, between 2015 and 2040. By 2040, about 6.8 percent of the region's jobs will be located in Loudoun County, up from 5.1 percent in 2015.

The specific types of jobs and the wages associated with those jobs are important determinants of housing demand in this forecasting model.

Job growth in both the region and the County will be driven by the Professional & Business Services sector. In Loudoun County, the number of jobs in this sector is forecasted to more than double, increasing by 49,700 jobs between 2015 and 2040 (Figure 4). These gains will account for nearly half (46.4 percent) of all the job growth in the County over the forecast period. By 2040, 30.4 percent of all jobs in Loudoun County will be in the Professional & Business Services sector, up from 19.7 percent in 2015.

Figure 4. Job in Loudoun County by Sector (in 000s), 2015 and 2040



Source: IHS Economics, Loudoun County Department of Planning and Zoning, GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

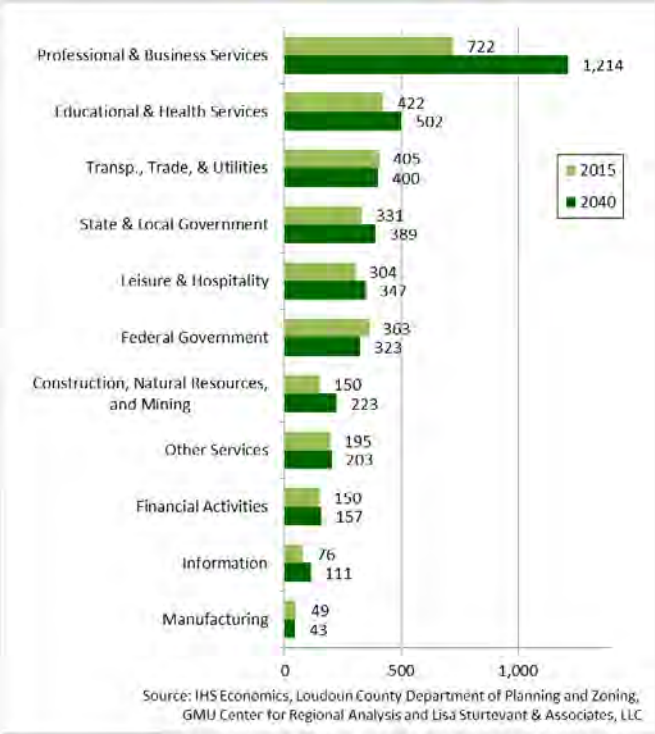
The Professional & Business Services sector includes both high-wage occupations (e.g. Management) as well as lower-wage occupations (e.g. Administrative Support). In fact, these two occupations will constitute the largest increases in specific occupations over the forecast period.

The second largest gains in the Loudoun County economy will be in the Education & Health Services sector. Over the next 25 years, this sector is projected to add 10,100 jobs in the County. The growth rate in this sector in Loudoun County is expected to exceed the growth rate in the region. By 2040, the Education & Health Services sector will account for 9.7 percent of all jobs in the County.

Employment in State & Local Government in the County is forecasted to increase by 9,900 jobs between 2015 and 2040. The Leisure & Hospitality sector is projected to gain about as many jobs, adding 9,200 jobs between 2015 and 2040. Both the State & Local Government and the Leisure & Hospitality sectors will be more concentrated in Loudoun County than in the region. In 2040, 11.0 percent of all jobs in the County will be in State & Local Government while 9.9 percent will be in Leisure & Hospitality, compared to 9.9 percent and 8.9 percent, respectively, in the region.

Of the jurisdictions in the region, Loudoun County is projected to have the second largest increase in jobs and the second highest job growth rate between 2015 and 2040. The District of Columbia is projected to have the largest absolute job gains during the forecast period. Culpeper County is projected to have the largest percentage increase in jobs. Largely due to the increase in Loudoun County, employment will be more dispersed geographically throughout the region by 2040.

Figure 5. Jobs in the Washington DC Region by Sector (in 000s), 2015 and 2040



Employment Growth in the Washington DC Region

According to forecasts from IHS Economics and MWCOG, the Washington DC region is expected to add 745,300 net new jobs between 2015 and 2040. Professional & Business Service employment is projected to have the largest gains, expanding by 492,100 jobs region-wide (Figure 5).

Throughout the region, the second largest absolute increase in jobs will be in the Education & Health Services sector. During the forecast period, this sector will increase by 80,100 jobs, or 19.0 percent.

The Construction, Natural Resource and Mining sector, which consists primarily of construction in the Washington DC metropolitan area, will have the third largest absolute increase between 2015 and 2040. In 2015, there were 150,300 jobs in this sector. By 2040, there are projected to be 223,200 jobs in this sector, an increase of 72,900 between 2015 and 2040.

Summary of Economic Drivers

These local and regional job growth forecasts are the primary driver of the housing demand forecasts for Loudoun County. The 107,100 net new jobs in Loudoun County and the 745,300 net new jobs region-wide will form the basis for most of the demand for housing in the County in the years to come. The shares of new workers that Loudoun County will house is a key assumption for this forecasting model. These housing demand forecasts assume that the rates of in-commuting for the future workforce will remain unchanged over time, given the characteristics of future worker households. Currently, approximately 56 percent of jobs located in Loudoun County are held by County residents. In addition, these forecasts assume that Loudoun County will continue to house workers in other jurisdictions at the same rates at which it does currently.

Overall, the employment-driven housing demand estimates based on these assumptions suggest growth of 64,355 net new households in Loudoun County over the next 25 years, including 55,445 net new households with at least one payroll worker.

Household Forecasts

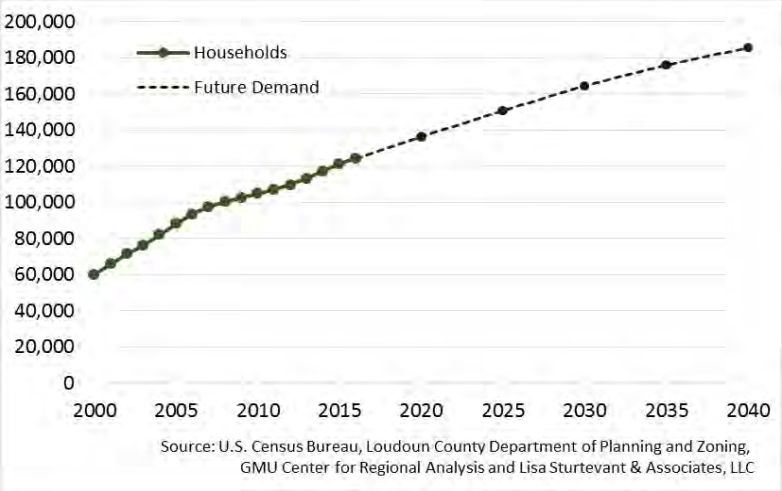
Future demand for housing in Loudoun County reflects not only local and regional economic growth but also change associated with the aging of the population, as well as forecasts of in- and out-migration, and birth and death rates. These forecasts assume that migration rates by age group, and birth and death rates will not change over the forecast period. Together, the employment-driven and demographic-driven components of this forecasting model result in overall forecasts of household growth in the County between 2015 and 2040.

This section describes the characteristics of the future households suggested by the GMU forecasting model over the 25-year forecast period. The estimated characteristics of these households are based on expected characteristics of the labor force and the aging of the population through the forecast period. These household characteristics are used to predict the types of housing units that will be desired in Loudoun County in the future.

Based on these housing forecasts, over the next 25 years, 64,355 new households are expected to want to live in Loudoun County. Thus, in 2040, these forecasts suggest 185,460 households in Loudoun County in 2040, up from 121,100 in 2015.

Figure 6. Number of Households and Future Growth, Loudoun County, 2000-2040

GMU Employment-Driven Housing Demand Forecasts



Based on these forecasts, the majority of future household growth—about 86 percent—is expected as a result of net new jobs growth in the County and the region. The remaining household growth is expected to be associated with non-employment trends.

Over the 25-year forecast period, households in Loudoun County are projected to increase an average of by 2.1 percent annually. The number of households in the County is projected to have the sharpest growth between 2015 and 2020, rising 2.4 percent per year. Household growth is expected to moderate over the forecast period, reaching 1.1 percent per year during the 2035-2040 period (Figure 6).

By comparison, the number of households in Loudoun County increased by 3.0 percent annually between 2010 and 2015.

Based on this forecasting methodology, the characteristics of future households—including their ages, household composition and incomes—are used to predict the types of housing future households in Loudoun County will prefer and the prices and rents they will be able to afford.

Householder, or Head of Household

The terms "head of the household" and "the householder" are used interchangeably throughout this report. Both terms refer to the person primarily responsible for running the household. While no single person is exclusively responsible for any household, each household is asked to provide this information when responding to the American Community Survey, which is utilized in these forecasts.

Age of Householder[43]

Age is an important determinant of housing demand. Based on these employment-driven housing demand forecasts, Loudoun County is forecasted to have household growth across all age groups, led by the aging of both the Baby Boomer and Millennial generations and the emergence of Generation Z over the 25-year forecast period.[44]

Figure 7. Household Growth by Age of Householder, 2015 and 2040 *GMU Employment-Driven Housing Demand Forecasts*

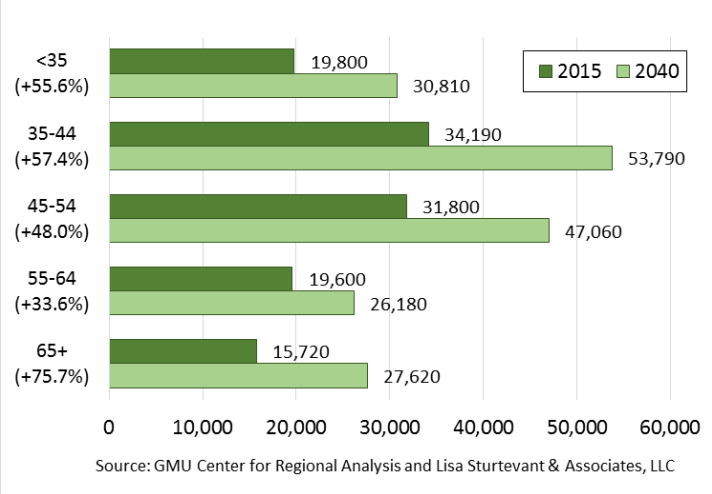
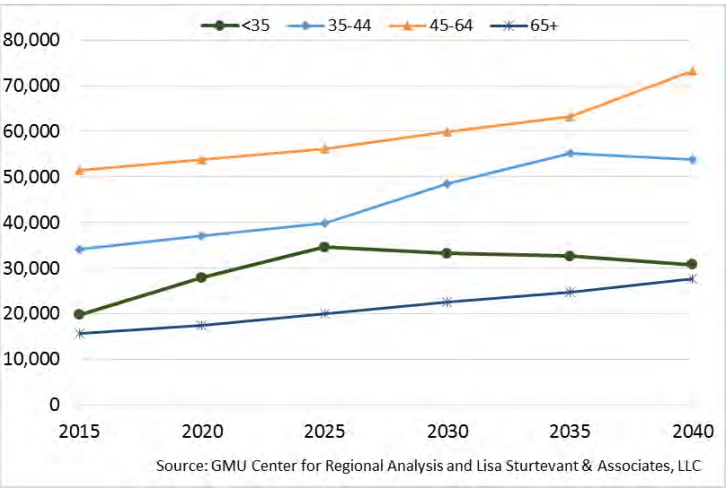


Figure 8. Household Growth by Age of Householder, 2015-2040 *GMU Unconstrained Housing Demand Forecasts*



Based on this forecasting model, the number of older adult households in Loudoun County, those headed by someone 65 years old and older, is expected to increase at the fastest rate during the forecast period.[45] The largest absolute increase in households will be among those headed by someone between 35 and 44 years old, as the Millennials and older members of Generation Z age.

These housing demand forecasts span a 25-year period. Therefore, the housing needs of residents who move to the County early in the forecast period will change as they age. In general, when presenting results from the housing demand forecasts, we present the overall change in households by age group over the 2015 to 2040 period. See detailed Appendix tables for five-year forecasts of household growth by age group.

Baby Boomers

Loudoun County, like the region and the nation, is expected to have relatively high growth in the number of senior households. This growth will be a result of the aging Baby Boomer population

[43] In this report, the characteristics of households in 2015 applies the average rates using the 2012-2015 American Community Survey microdata to the 2015 total from the Loudoun County Department of Planning and Zoning.

[44] The Baby Boomer generation includes people who were born between 1946 and 1964 and is the only generation with an official definition. While there is no universally accepted definition of Generation X, many demographers define them as those born between 1965 and 1981. The common definition of the Millennial generation are people born between 1982 and 2000. Generation Z is not yet fully defined as many in this generation have not yet been born but generally includes those born in the 20 years following 2001.

[45] These forecasts only include seniors living in a household and exclude those who are living in nursing homes or other facilities with 24-hour care.

and the increased ability of older adults to stay in their homes longer. The Baby Boomer generation is now between 52 and 70 years old. Between 2015 and 2030, all Baby Boomer households will be over 65 years old. Based on these housing demand forecasts, the number of senior households in Loudoun County is projected to increase by 44.3 percent between 2015 and 2040. Growth in the 65+ population is expected to slow between 2030 and 2040, but remain higher than the rate of growth for non-senior households. Advances in health care, life expectancy and technology will allow a larger share of seniors to stay in their homes for longer than ever before, which will play a role in this relatively high growth. Overall, based on these housing demand forecasts, the County is projected potentially to have 11,900 more senior households in 2040 than it did in 2015.

Millennials

Members of the Millennial generation are currently between 18 and 34 years old. Many of the oldest Millennials have formed their own households, but there is still another decade of younger Millennials who have yet to do so. These younger Millennials will drive the increase in the demand for housing from households headed by someone under 35 years old over the next decade. Based on these employment-driven forecasts, the demand from young households is expected to peak in 2025 when under-35 households are projected to account for 23.0 percent of all households in Loudoun County under this employment-driven forecast. By 2030, the majority of Millennial households will be over 35 years old, which means that there will be a shift in demand to more householders between 35 and 44 years old. By the end of the forecast period, Millennial households will be primarily split between the 35-44 and 45-54 age groups, which are forecasted to grow by 19,610 and 15,250 households, respectively, over the 25-year forecast period.

Generation Z

Based on these housing demand forecasts, Loudoun County is expected to have less demand for housing from Generation Z households than it does from Millennial households. After Millennials age out of the under 35 age group, the following generation in Loudoun County will not fully replace them, leading to a modest decline in the number of young households. In general, Generation Z will likely be smaller than the Millennial generation since they are born to parents who are members of a smaller generation. In addition, the employment forecasts that drive these housing demand forecasts suggest growth in sectors that tend to employ somewhat older workers, suggesting slower growth in young workers in the out years of the forecast period. Even with the slow growth in the under-35 population after 2025, demand from young households is projected to increase at a faster rate than overall demand. In 2040, these housing demand forecasts suggest that Loudoun County could have 11,010 more households headed by someone under age 35 than it did in 2015.

Assessing household growth and housing demand by age group is important for underscoring the importance of having a housing stock that can accommodate residents throughout the life cycle. Without options that meet the different needs of people and families at different ages, there is a possibility that Loudoun County could have difficulty attracting and retaining some types of households, particularly young working households, families with children, and seniors.

Age, along with household income, is a strong predictor of housing preference. Younger households, regardless of generation, will be more likely to demand rental units than other age groups. As households age, they are more likely to be home owners. Similarly, younger households are more likely to demand

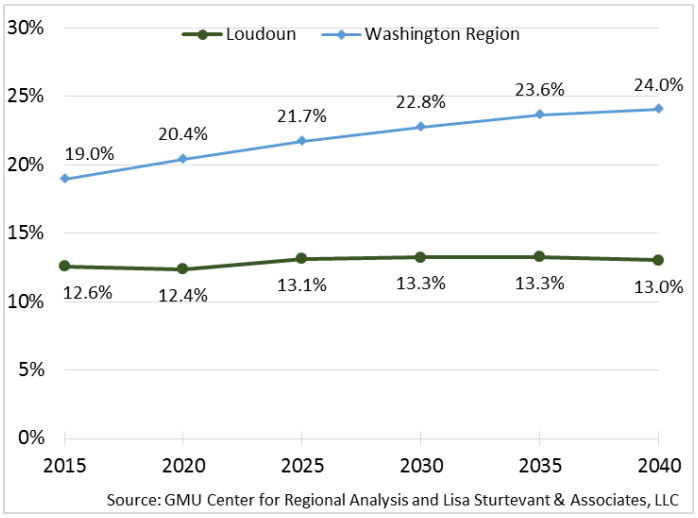
either multi-family or single-family attached homes than are older households. Older households are more likely to prefer to live in a single-family detached home. These housing demand forecasts account for changing housing needs over the 25-year period. More details are provided below about the specific types of housing units that these household growth projections suggest will be needed in Loudoun County.

Labor Force Participation

Most of the demand for housing in Loudoun County will be from working households, with at least one household member with a payroll job. Currently, the majority (87.4 percent) of households in Loudoun County have at least one person in the household with a payroll job. While this trend is expected to continue throughout the forecast period, the retirement of the Baby Boomers and the larger share of senior households, more generally, will result in somewhat faster growth and increasing housing demand from non-working households (Figure 9). The number of non-payroll job households does include households with only self-employed workers. These forecasts assume that the growth of self-employment, including the gig economy (e.g. independent workers who contract with companies on a short-term basis), will grow at similar rates as in the past.

Figure 9. Share of Growth from Households without a Payroll Job, Loudoun County and the Washington DC Region

GMU Employment-Driven Housing Demand Forecasts



Projections of the shares of working and non-working households has important implications for estimates of future household incomes which in turn has implications for housing demand.

In 2015, there were 15,240 households in Loudoun County without a payroll job, consisting of retirees, students and some types of self-employed people. By 2040, based on these employment-driven and demographic-driven housing demand forecasts, the County is expected to have demand from an additional 24,160 households without a payroll job.

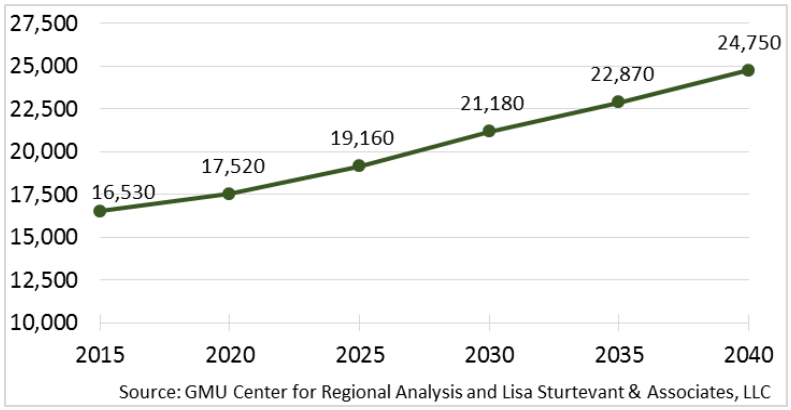
Nearly all of the increased demand from households without a payroll job will be driven by older adult households. The majority of these future retirees in these housing demand forecasts are currently living in Loudoun County and working within the region and are forecasted to desire to remain in the County, either aging-in-place or aging-in-community, after retirement. Households without a payroll job are projected to have lower household incomes than working households which has implications for the types of housing they will need in the future.

Disability Status

Based on these housing demand forecasts, which take into account prevalence of disability status by age group, the demand from households with at least one person with a disability is expected to increase at a slightly lower rate than the overall household growth rate in Loudoun County.

Figure 10. Growth in Households with at least One Disabled Person, 2015-2040

GMU Unconstrained Housing Demand Forecasts



In 2015, 16,530 households in Loudoun County had at least one person with a disability. Based on these housing demand forecasts, by 2040, there could be demand from 24,750 households with a person with a disability, an increase of 8,210 households over the 25-year period (Figure 10). The majority of this increase (4,260 households) is driven by the growth in the number of seniors, who are more likely to be disabled.

Because households with a person with a disability are more likely to be older, their housing preferences are expected to be similar to those of senior households in this analysis of housing demand. These housing demand forecasts therefore suggest growing needs for homes of all types that are accessible to individuals with both physical and mental challenges.

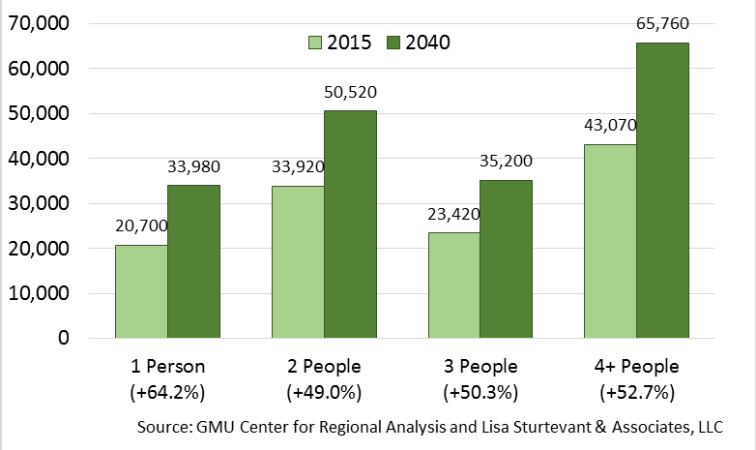
Household Size

These housing demand forecasts estimate the household size and composition of projected future households that will desire housing in Loudoun County over the 2015 to 2040 period. Household sizes in Loudoun County are larger than in many other parts of the region. These employment-driven housing demand forecasts suggest that larger households will continue to desire housing in Loudoun County in the future, and the growth of larger households has implications for the types of housing that these households will demand.

Under these employment-driven forecasts, the number of households with at least four people in Loudoun County is projected to rise from 43,070 in 2015 to 65,760 in 2040, reflecting an increase of 22,680 households (Figure 11). Based on these forecasts, households with four or more people are projected to account for the largest absolute increase in households in Loudoun County over the next 25 years.

Based on these housing demand forecasts, the fastest growth *rate* is projected to be among single people living alone. In 2015, there were 20,700 one-person households in Loudoun County. By 2040, these housing demand forecasts suggest there will be demand from 33,980 one-person households, an increase of 13,280 household over the 2015 to 2040 period.

Figure 11. Households By Household Size, 2015 and 2040
GMU Employment-Driven Housing Demand Forecasts



By 2040, these housing demand forecasts suggest the County will have demand from an additional 16,610 two-person households. By 2040, the forecasting model suggests that almost half (48.5 percent) of these two-person households will be headed by someone who is at least 55 years old.

Three-person households are projected to have the smallest absolute increase in demand during the forecast period. In 2015, there were 23,420 three person households in the County. By 2040, these housing demand forecasts suggest there will be demand for housing in Loudoun County from an additional 11,780 three-person households.

The sizes of future households in Loudoun County have important implications for the types of housing that will be needed to accommodate future residents. For example, people living alone are more likely to be renters than other households. Households with more people are less likely to prefer to live in multi-family homes than are people living alone.

Summary of the Characteristics of Future Households

Given the assumptions about employment growth, commuting patterns, ages and household composition of workers, and retirement and migration rates, these housing demand forecasts suggest that the County could add 64,355 new households over the 2015 to 2040 period. The characteristics of future households—including age and household size and composition—are based on an assessment of current commuting patterns and an assumption that in the future Loudoun County will continue to house the same share of its own workers and other workers in the region.

These forecasted household characteristics—along with estimates of household income (see below)—are critical determinants of the forecasts of the housing unit types that will be desired in Loudoun County over the next 25 years.

Household Income Forecasts

These employment-driven housing demand forecasts suggest a need for housing to accommodate households all along the income spectrum. Based on these forecasts, Loudoun County is expected to add a substantial number of relatively high income households, reflecting the characteristics of new high-skill jobs expected to come to the County. The County is also expected to see demand for housing from lower-income households, including workers in low-wage industries and seniors and others living on fixed incomes. Household income is a key determinant of the types of housing that will be demanded, with higher income households more likely to demand single-family housing.

Households by Area Median Income

Over the forecast period, there is expected to be household growth and demand for housing among every income group. Using data on wages by industry sector and with assumptions about the incomes of households without a payroll job, these forecasts include estimates of household growth by household incomes as measured by percent of the area median income (AMI). Based on these housing demand forecasts, compared to 2015, there could be a somewhat smaller share of households earning less than 150 percent AMI and a somewhat higher share with incomes 150 percent AMI or above in 2040 (Figure 12). This forecasted shift in incomes is primarily due to the growth in higher wage Professional & Businesses Services sector jobs in Loudoun County, and the continued pattern of higher income workers both living and working in the County.

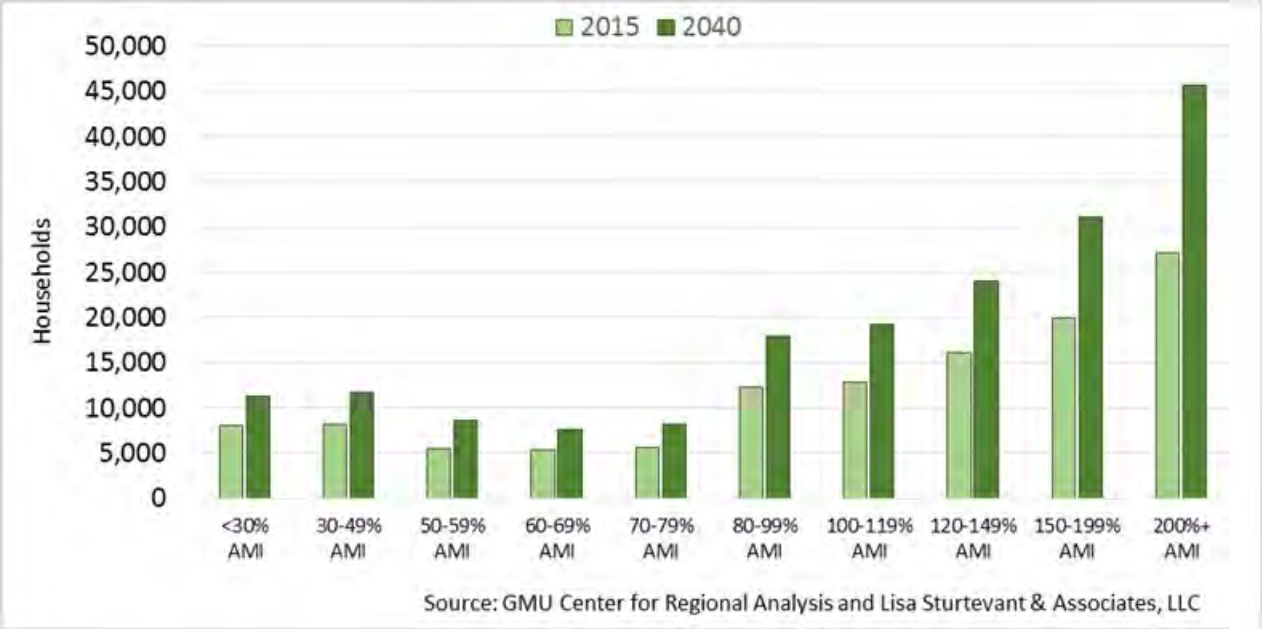
In 2015, about 8,090 households in Loudoun County had incomes below 30 percent of AMI, or a household income of up to $22,930 for a single person or $32,760 for a household of four. Between 2015 and 2040, these forecasts suggest demand from 3,200 additional households with incomes below 30 percent of AMI, reflecting an increase of 39.5 percent over the 25-year period. About half of these extremely low income households in 2040 will not have a payroll job and the majority will be senior households.

Based on these employment-driven housing demand forecasts, between 2015 and 2040, the number of households with incomes between 30 and 49 percent of AMI could increase from 8,220 to 11,690, or an additional 3,470 households over the forecast period. About a third of the household growth in this income range will be from households who do not have a payroll job and the rest is from those employed in lower wage jobs.

By 2040, these forecasts suggest there will be demand for housing in Loudoun County from 8,670 households with incomes between 50 and 59 percent of AMI, rising from 5,560 households with incomes in this range in 2015, or an increase of 3,120 or 56.1 percent. The number of households in this AMI group is projected to have relatively fast growth, primarily as a result of increases in households with a low wage job, including many jobs in the Retail and Leisure & Hospitality sectors. In 2040, over a quarter (26.3 percent) of these households will be headed by someone between 35 and 44 years old and nearly a quarter (23.5 percent) will be senior households.

Between 2015 and 2040, the housing demand forecasts suggest an additional 4,730 households in Loudoun County with incomes between 60 and 79 percent of AMI. These households tend to be in their 30s and 40s, many are young families with children and may be looking to buy a first home.

Figure 12. Household Growth by Household Income, 2015-2040
GMU Employment-Driven Housing Demand Forecasts



In 2015, there were 12,220 households earning between 80 and 99 percent of AMI. By 2040, these housing demand forecasts suggest there will be 17,910 households in this AMI group who desire to live in Loudoun County, an increase of 5,690 households and 46.5 percent.

Between 2015 and 2040, the number of households with incomes between 100 and 119 percent of AMI is forecasted to increase from 12,820 to 19,270, or by 6,450 households and 50.3 percent. The number of households with incomes between 120 and 149 percent is forecast to increase by 7,890, or 49.0 percent. Together, based on these employment-driven demand forecasts, nearly a quarter (22.3 percent) households will have incomes between 100 and 149 percent of AMI. Many of these households are headed by someone in their late 30, 40s and early 50s, including many families with children, and nearly all include a payroll worker.

Based on these forecasts, which include assumptions that in-commuting rates will remain fairly constant over time and that Loudoun County will continue to house the same share of its workers that it does now, households earning 150 percent or more of AMI are projected to continue to account for the majority of the household growth throughout the forecast period. In 2015, 47,060 households in Loudoun County had incomes of 150 percent or more of AMI, or 38.9 percent of all households in the County. By 2040, these housing demand forecasts suggest that there could be 76,870 households—or 41.4 percent of all households—in this income group. Nearly half of the future housing demand predicted by the model (46.3 percent) will come from households with incomes of 150 percent of AMI or higher.

Housing demand from higher income households is being driven by the very high-income households, those earning 200 percent or more of AMI. Based on these employment-driven housing demand forecasts, between 2015 and 2040, it is expected that there will be 18,550 new households in this high-income group that will desire housing in Loudoun County. Most of these high-income households will have at least one worker with a job in Loudoun County. Overall, high-income households are most likely to be headed by someone between 35 and 54 years old and include a significant number of families with children. Higher income households are significantly more likely to demand single-family homes compared to households with lower incomes.

Housing Unit Forecasts

In these employment-driven housing demand forecasts, the estimated characteristics of future households are used to predict the types of housing units that will be needed to meet demand. This model of housing demand assumes that housing preferences will be determined based on the age of the household head, the composition and size of the household, and household income. It is further assumed that housing preferences will not change over the forecast period, given these household characteristics. In other words, if larger households with higher incomes are relatively more likely than others to live in single-family ownership housing now, then these forecasts assume that larger households with relatively higher incomes will be more likely than others to want to live in single-family ownership housing in the future.

Changes to assumptions about housing preferences would result in different results than what are presented from this forecasting model. If, for example, there is a sustained, long-term shift in preferences for more multi-family and/or rental housing, then the GMU forecasts will have underestimated the future demand for this type of housing in the County.

In these employment-driven forecasts, projections of household growth and housing demand are not limited by land use, pipeline development or land supply in the County. Rather, these estimates look at the patterns of housing preferences for households of different types, given labor force growth and demographic change. Thus, this model provides estimates of the number and types of households that will want to live in Loudoun County over the next 25 years, and then uses characteristics of these forecasted households to forecast the types of housing units they will want to live in.

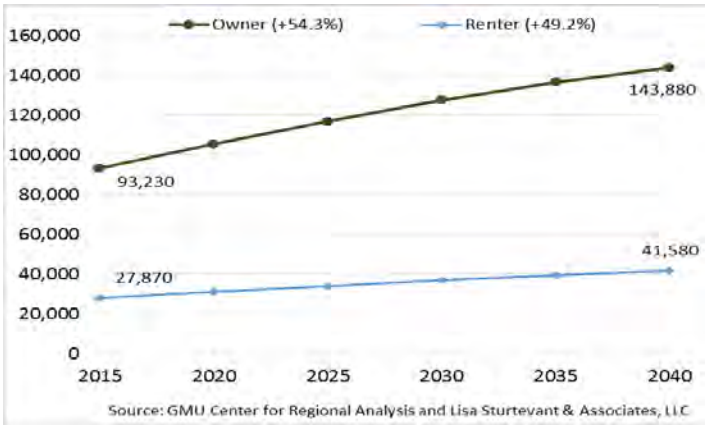
This section describes in more detail the characteristics of the housing units that would be needed to accommodate forecasted household growth in Loudoun County over the 2015 to 2040 period, based on this forecasting methodology.

Over the 25-year forecast period, based on the economic and demographic factors that are assumed to drive household growth and housing demand, these forecasts suggest that Loudoun County will continue to be a community of home owners and that desire for single-family housing will continue to be strong. The primary driver of the demand for single-family housing in Loudoun County is the projected growth in large (4+ people), high income households, many including workers in high-wage professional and technical services jobs expected in the region. There will be a modest shift towards a greater share of multi-family units over the forecast period; demand for multi-family units is projected to grow at a faster rate than the demand for either single-family detached homes or townhomes. The demand for home ownership is expected to be strong with growing demand for both multi-family home ownership and single-family home ownership over the next 25 years.

Tenure

Tenure—whether someone rents or owns—is strongly associated with age, household composition and size, and household income. Characteristics of forecasted households are used to forecast tenure choice. Based on these housing demand forecasts, the home ownership rate in Loudoun County is expected to increase modestly between 2015 and 2040 as a result of demand from older households, families and higher income households.

Figure 13. Household Growth by Tenure, 2015-2040
GMU Employment-Driven Housing Demand Forecasts



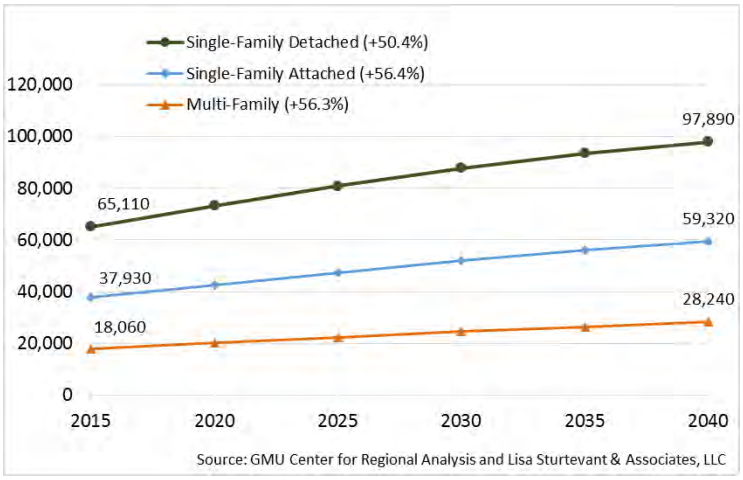
In 2015, the home ownership rate in Loudoun County was 77.0 percent. By 2025, based on these housing demand forecasts, 77.5 percent of occupied housing units will be owner-occupied. The ownership rate is forecasted to remain at 77.5 percent until 2035, when it will rise slightly to 77.6 percent. The ownership rate is projected to remain at 77.6 percent in 2040.

Between 2015 and 2040, these forecasts suggest a need for 50,560 additional home ownership units in Loudoun County over the 2015 to 2040 period to accommodate forecasted household growth (Figure 13). The demand for rental units is projected to increase by 13,710 units over the 25-year period. Thus, if Loudoun County accommodated estimated future household growth suggested by these employment-driven housing demand forecasts, there would be a total of 143,880 owner-occupied homes and 41,580 renter-occupied homes in the County in 2040. In 2015, there were 93,230 owner-occupied housing units and 27,870 renter-occupied housing units.

Housing Type

These housing demand forecasts include estimates of the type of home each future household will prefer based on a set of household characteristics. Like housing tenure, preferences for different housing types are highly correlated with the age of the household head, household composition and size, and household income.

Figure 14. Household Growth by Housing Type, 2015-2040 *GMU Employment-Driven Housing Demand Forecasts*



Based on these housing demand forecasts which predict preferences for housing units type based on characteristics of projected future in Loudoun County over the 2015 to 2040 period, there will be growing demand for all housing types over the forecast period (Figure 14).

Assuming no changes in the relationship between household characteristics and housing preferences, these housing demand forecasts suggest Loudoun County would need to add 32,784 single-family detached homes to meet demand, an increase of 50.4 percent over the 25-year period.

These housing demand forecasts suggest that between 2015 and 2040, there will be demand for 21,395 additional single-family attached homes/townhomes in Loudoun County to meet expected household growth, which reflects an increase of 56.4 percent over the 25-year period.

These housing demand forecasts suggest that demand for homes in multi-family buildings will grow slightly faster than the demand for single-family homes over the forecast period. In 2015, there were 18,060 multi-family homes in the County. Between 2015 and 2040, there is expected to be demand for 10,178 new multi-family housing units, which reflects an increase of 56.3 percent over the forecast period.

Detailed Housing by Unit Type

As stated previously, these housing demand forecasts rely on characteristics of future households, including age, household composition, household size, and household income, to estimate the types of housing that future households in Loudoun County will demand. Both housing tenure and housing unit type preference are highly correlated with these socioeconomic characteristics. These housing demand forecasts assume that housing preferences will not change in the future for households with given characteristics.

Figure 15. Percent Increase in Occupied Housing Units by Unit Type, 2015 to 2040

GMU Employment-Driven Housing Demand Forecasts

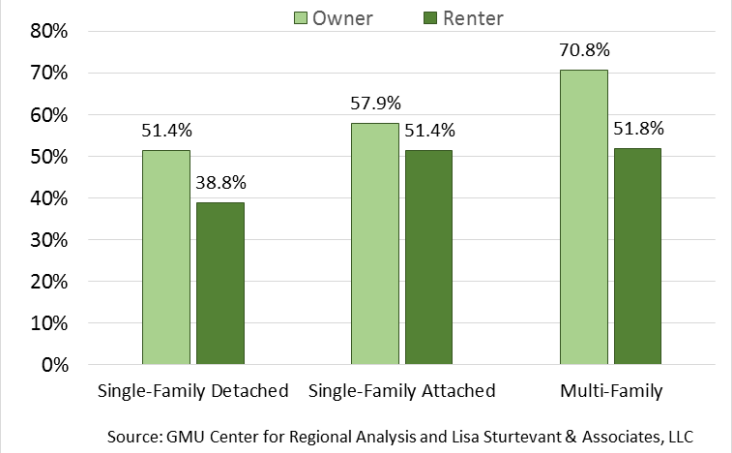
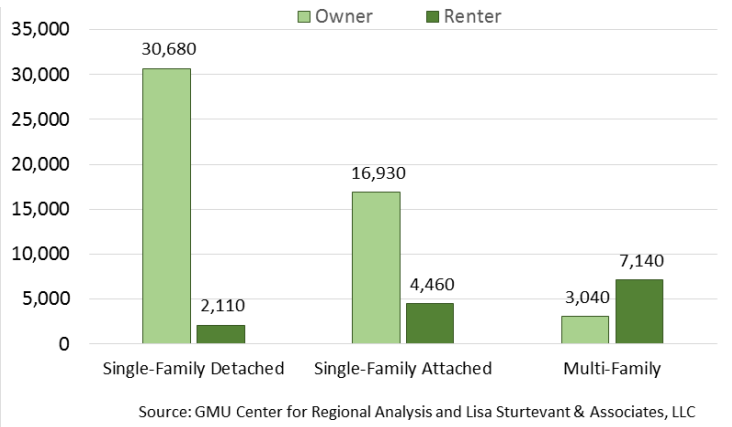


Figure 16. Overall Increase in Occupied Housing Units by Unit Type, 2015 to 2040

GMU Employment-Driven Housing Demand Forecasts



These housing demand forecasts include estimates of the demand for housing by both tenure and housing unit type. While these housing characteristics can be considered separately, it can also be helpful to combine tenure and type in estimates of future housing needs. Planning for multi-family rental housing, for example, might involve different policies or strategies than planning for multi-family ownership housing (i.e. condos).

Based on these employment-driven housing demand forecasts, the fastest growth in housing demand will be for home ownership units in multi-family buildings, followed by home ownership units in single-family attached homes (Figure 15). These housing demand forecasts suggest that the number of multi-family ownership units in the County would have to increase by 70.8 percent between 2015 and 2040 to accommodate the projected household growth. The number of single-family attached homes/ townhomes would have to increase by 57.9 percent between 2015 and 2040 to meet forecasted household growth.

Between 2015 and 2040, these housing demand forecasts suggest a need for an additional 3,040 multi-family ownership units (i.e. condos) to meet demand in the County (Figure 16). Despite the growth in demand, this unit type will remain a small share of the overall housing stock in Loudoun County, accounting for just 4.0 percent of all homes in 2040 if the demand for all housing types suggested by these forecasts is accommodated.

These housing demand forecasts also suggest there will be strong demand for multi-family rental units in the County over the forecast period. Between 2015 and 2040, these forecasts suggest that the County would need to add 7,140 multi-family rental units to meet forecasted demand. By 2040, multi-family rental units would account for 11.3 percent of the housing stock, if the supply meets the projected demand.

Between 2015 and 2040, these housing demand forecasts suggest there will be demand for 16,930 additional single-family attached ownership units. If the total demand is met during the forecast period, owner-occupied townhomes will account for a quarter (24.9 percent) of the housing stock in Loudoun County in 2040, up from 24.2 percent in 2015.

These housing demand forecasts suggest that there will be continued strong demand for single-family detached ownership housing in Loudoun County over the next 25 years. In 2015, there were 59,680 single-family home ownership units in Loudoun County, which accounted for 49.3 percent of all occupied homes. Between 2015 and 2040, these housing demand forecasts suggest there will be demand for an additional 30,680 single-family detached homes occupied by home owners.

Both single-family detached and attached rental units will be a relatively smaller share of the housing demanded in 2040 when compared to 2015, but the decrease is projected to be fairly small. Single-family detached rentals are projected to shrink to 4.1 percent of the housing stock in 2040 from 4.5 percent in 2015. Even with the relative decline, these housing demand forecasts suggest there will be demand for 2,110 additional single-family detached rental homes during this period. Similarly, single-family attached rentals will account for 7.1 percent of the demand in 2040; in 2015 7.2 percent of all occupied housing units were single-family attached rentals. Nevertheless, these forecasts suggest demand for an additional 4,460 single-family attached rental homes between 2015 and 2040.

Summary of Housing Unit Characteristics

Given assumptions about employment growth, wages, in-commuting household preferences, household characteristics and other factors, these housing demand forecasts suggest that there is a need for 66,604 net new housing units to accommodate 64,355 new households in the County over the 2015 through 2040 period. These forecasts suggests a need for a wide range of housing types to accommodate expected household growth in the County. Given the projected characteristics of future households, including significant growth in large households and high income households, the employment-driven housing demand forecasts suggest strong demand for single-family housing over the 25-year forecast period.

Housing Affordability Forecasts

These housing demand forecasts suggest that households of all income levels will need housing in Loudoun County in the years to come. As part of these forecasts of future housing demand, rates of cost burden are also forecasted. Currently, about one quarter of Loudoun County home owners and nearly half of County renters are cost burdened, spending 30 percent or more of their income on housing costs. Based on these housing demand forecasts, over time, housing affordability challenges are not expected to improve for many households in Loudoun County, and for many at the lowest income levels, the challenges will be exacerbated in the future. This pattern of growing housing affordability challenges is expected to occur not only in Loudoun County, but throughout the region.

Assuming that all forecasted households are accommodated in the County and that housing costs rise at the same rates as incomes, the County's overall rate of housing cost burden is projected to decline slightly over the forecast period, however extremely low income households will have higher cost burden rates by 2040 when compared to 2015.

Housing Cost Burden and Rental Rates and Home Prices Affordable to Households

It is challenging to estimate what housing cost burden rates will be in Loudoun County in the future. For this analysis, assumptions about household incomes relative to housing costs were made in order to estimate housing cost burden rates for different types of households.

Measuring Housing Affordability

Affordability is typically measured by comparing a household's income to its housing costs. When a household spends 30 percent or more of its income on housing, it is referred to as "cost burdened." A household spending 50 percent or more of its income on housing is referred to as "severely cost burdened."

By 2040, it is estimated that 25.3 percent of all households in the County will spend more than 30 percent of their income on rent or owner costs and be defined as housing cost burdened. Based on these employment-driven forecasts of household growth and housing demand in Loudoun County, the overall rate of housing cost burden in Loudoun County is projected to be slightly lower in 2040 than it was in 2015 (26.6 percent). The modest overall decline is a result of projected growth in higher income households and in owner households in Loudoun County, two groups that tend to be less likely to be cost burdened.

Despite the modest decline in the overall housing cost burden rate in the County, several groups will continue to face serious housing affordability challenges in Loudoun County. Throughout the forecast period, renters will continue to be significantly more likely to be cost burdened than owners (Figure 17). In 2015, 39.1 percent of all renters were cost burdened. Based on these housing demand forecasts by 2040, this share is projected to fall to 38.1 percent. But this decline is projected to occur near the end of the forecast period. Between 2015 and 2020, cost burden rate among renters is projected to rise to 39.3 percent, and then stabilize at about 39.1 percent during the 2025 to 2035 period. An increase in the projected number of higher-income renters over the forecast period is largely driving these renter cost burden trends.

Home owners in Loudoun County are also projected to be relatively less burdened in 2040 compared to 2015, with the declines in the rate of cost burden among home owners forecasted for each five year interval. In 2015, 22.8 percent of home owners were housing cost burdened. During the next decade, this rate is projected to decline to 21.4 percent. Similar to renter households, the primary reason for the

Figure 17. Percent of Housing Cost Burdened Households by Tenure, 2015-2040

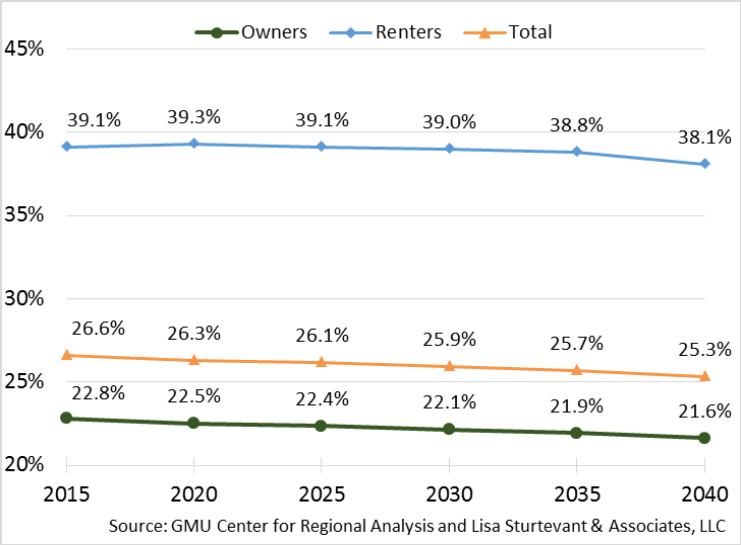
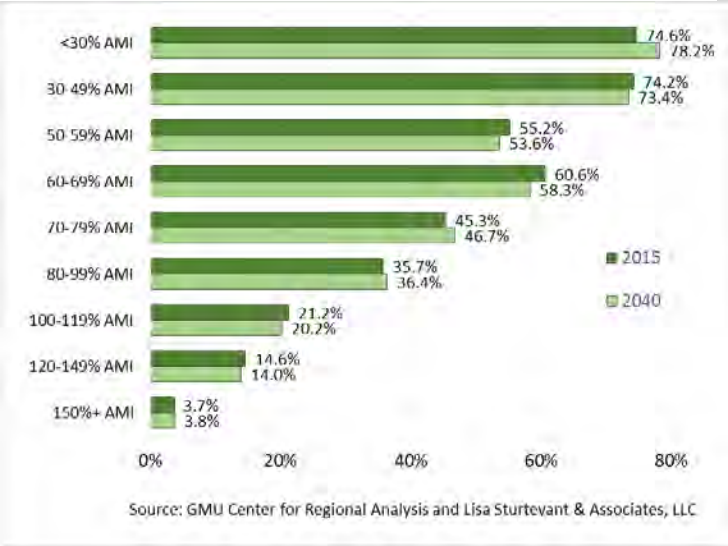


Figure 18. Percent of Housing Cost Burdened Households by Area Median Income, 2015 and 2040



decline in rates of cost burden is a result of the forecasting model which projects an increase in demand for housing in Loudoun County from higher income households.

For some groups, cost burden rates are projected to rise over the forecast period. A greater share of extremely low income households (e.g. with incomes less than 30 percent of AMI) is projected to be cost burdened in 2040 compared to 2015, facing increasing challenges finding housing they can afford in the County. About three-quarters (74.6 percent) of extremely low income households were housing cost burdened in 2015. By 2040, that share is projected to rise to 78.2 percent.

Based on this analysis, rates of housing cost burden are also projected to rise for more moderate-income households. The share of households earning 70 to 79 percent of AMI that is cost burdened is expected to rise from 45.3 percent in 2015 to 46.7 percent in 2040. Among households earning 80 to 99 percent of AMI, the rate of housing cost burden is projected to rise from 35.7 percent to 36.4 percent over the forecast period. The primary reason for this shift is an increase in the share of renters in these income groups, who are more likely to be cost burdened.

The rates of housing cost burden for nearly every other income group are projected to decline slightly between 2015 and 2040.

Low- and moderate-income households earning less than 80 percent of AMI will continue to have difficulty finding housing that is affordable to them during the forecast period. Many of these households will be renters—some by choice, but others out of necessity. Home ownership may be increasingly out of reach for more moderate-income households in Loudoun County over the forecast period.

The majority of low income renters will have difficulty finding a home that is affordable to them (Figure 19). These housing demand forecasts suggest an additional 5,180 extremely low income households will be in Loudoun County in 2040. These households will only be able to afford rents between $570 and $820

per month (in 2015 $s), depending on their household size. Homes that have rents in this range will be difficult to find in Loudoun County (or in many places in the Washington DC region). Households earning less than 50 percent of AMI are expected to have nearly as much difficulty finding an affordable apartment with maximum rents of between $960 and $1,370 per month, depending on the size of the household.

Summary of Housing Affordability Forecasts

Overall, over the forecast period, low income households regardless of tenure, senior households, and renter households with at least four people or those that include at least one person with a disability are more likely to be housing cost burdened in Loudoun County both now and in the future, according to these housing demand forecasts. Among home owners, single-person households will be most likely to be cost burdened in Loudoun County.

Figure 19. Rents and Home Prices Affordable to Households by Area Median Income, 2015 Dollars

		Income Limit	Maximum Affordable Rent ($)	Maximum Affordable Home Price ($)
30% AMI				
	1 Person	22,930	570	80,260
	2 People	26,210	660	91,730
	3 People	29,480	740	103,190
	4 People	32,760	820	114,660
50% AMI				
	1 Person	38,220	960	133,770
	2 People	43,680	1,090	152,880
	3 People	49,140	1,230	171,990
	4 People	54,600	1,370	191,100
70% AMI				
	1 Person	53,510	1,340	187,280
	2 People	61,150	1,530	214,030
	3 People	68,800	1,720	240,790
	4 People	76,440	1,910	267,540
80% AMI				
	1 Person	61,150	1,530	214,030
	2 People	69,890	1,750	244,610
	3 People	78,620	1,970	275,180
	4 People	87,360	2,180	305,760
100% AMI				
	1 Person	76,500	1,913	267,750
	2 People	87,400	2,185	305,900
	3 People	98,300	2,458	344,050
	4 People	109,200	2,730	382,200

Source: U.S. Department of Housing and Urban Development, GMU Center for Regional Analysis, Lisa Sturtevant & Associates, LLC. Maximum rents are based on 30 percent of monthly household income. Maximum home prices are 3.5 times household income.

Forecasts of Potential Future Housing Gaps

The GMU forecasts of housing demand based on estimates of local and regional employment growth and demographic changes and driven by assumptions about commuting patterns, housing preferences and other factors, are compared to forecasts prepared by Loudoun County for the MWCOG Round 9.0 cooperative forecasting process. The MWCOG Round 9.0 forecasts are Loudoun County's most recently released set of forecasts, submitted to MWCOG on March 21, 2016. These land use plan-based forecasts reflect approved projects remaining to be built, the County's planned land use, the County's long-range supply of land, and land use/development constraints. The most recent Round 9.0 forecasts reflect recent development activity in the County, market conditions, rezonings, comprehensive plan amendments, and Metrorail's estimated arrival in 2020. As such, the County/MWCOG forecasts take into account land use plans and current land use constraints in estimating future household growth, and are referred to as "land use plan-based forecasts." By contrast, the GMU forecasts are not limited by County land use plans, zoning, or development capacity, but rather examine anticipated future employment growth and population trends to, along with a set of assumptions, to forecast potential household growth and housing demand in Loudoun County.

The GMU housing demand forecasts suggest faster household growth in Loudoun County over the 2015 to 2040 period than is suggested by the County/MWCOG land use plan-based forecasts. Furthermore, given the methodology and assumptions used, the GMU forecasts of housing demand suggest greater demand for single-family housing and lower demand for multi-family housing than what is suggested by the land use plan-based forecasts developed by the County for the MWCOG cooperative forecasts.

Household Forecasts. The GMU employment-driven forecasts suggest a total of 185,460 households in Loudoun County in 2040, while the land use plan-based County/MWCOG forecasts estimate a total of 167,590 households in 2040, a difference of 17,870 households (Figure 20). The GMU employment-driven forecasts suggest an average annual household growth rate of 2.1 percent over the 2015 through 2040 period, while the County's land use plan-based household forecasts suggest an annual household growth rate of 1.5 percent over the 2015 through 2040 period. Between 2010 and 2015, the number of households increased at an annual average rate of 3.0 percent. The GMU employment-driven forecasts suggest a slowdown in household growth over time, but the land use plan-based forecasts suggest a slower growth rate over the 25-year period.

Figure 20. GMU Employment-Driven Household Forecasts and County/MWCOG Land Use-Based Household Forecasts, 2020 - 2040

Year	GMU Employment-Driven Household Forecasts	Loudoun County / MWCOG Land Use Plan-Based Household Forecasts	Difference
2015	121,100	121,100	-
2020	136,270	137,910	1,640
2025	150,610	150,760	150
2030	164,640	158,570	(6,070)
2035	175,860	164,330	(11,530)
2040	185,460	167,590	(17,870)

Housing Units. The GMU employment-driven forecasts suggest a total of 193,680 housing units in 2040 (including occupied and vacant housing units), while the County/MWCOG forecasts suggest a total of 175,380 housing units in 2040, a difference of 18,300 housing units. However, there are significant differences in the GMU employment-driven forecasts and the land use plan-based forecasts in terms of the unit mix. Specifically, the GMU forecasts suggest a demand for significantly more single-family housing and less multi-family housing than the County/MWCOG land use plan-based forecasts.

The GMU employment-driven housing demand forecasts suggest that in 2040, there will be a demand for 101,120 single-family detached homes, 61,450 single-family attached homes/townhomes, and 31,110 units in multi-family buildings. Therefore, between 2015 and 2040, these housing demand forecasts indicate that Loudoun County would have to accommodate 33,620 net new single-family detached units, 22,060 net new single-family attached units and 10,911 net new multi-family units above what was on the ground in 2015 to meet the demand suggested by GMU's employment-driven housing demand forecasts (Figure 21).

Compared to the land use plan-based forecasts, the GMU employment-driven forecasts estimate a need for more single-family housing and less demand for multi-family housing. The demand for single-family housing in the GMU forecasts is a result of the growth in the number of large households and the number of higher-income households, household types that are most likely to demand this type of housing.

The GMU employment-driven housing demand forecasts suggest there will be demand for 19,090 more single-family detached homes in 2040 than what the County is forecasting in its land use plan-based forecasts. In 2040, the GMU employment-driven forecasts suggests a demand for 11,380 more single-family attached homes compared to what is suggested by the land use plan-based forecasts.

Therefore, based on these forecasts, the County is planning for an insufficient of single-family housing to accommodate household growth associated with growth in the labor force.

Compared to the County/MWCOG land use plan-based forecasts, the GMU forecasts suggest lower demand for multi-family housing over the forecast period. In 2040, the GMU forecasts suggest a level of demand for multi-family housing that is 12,170 units lower than what the County forecasts in the land use plan-based forecasts.

Figure 21. GMU Employment-Driven Housing Demand Forecasts, 2015-2040

	Total	Single-Family Detached	Single-Family Attached	Multi-Family
2015 Existing Housing (est)	127,076	67,500	39,390	20,199
Net New Housing Based on Unconstrained Housing Demand Forecasts				
2015-2020	15,694	8,400	4,960	2,321
2020-2025	14,840	7,750	4,720	2,370
2025-2030	14,330	7,050	4,920	2,360
2030-2035	11,900	5,900	4,060	1,940
2035-2040	9,840	4,520	3,400	1,920
Total Forecasted Housing Demand Net New Units				
2015 - 2040	66,604	33,620	22,060	10,911

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

Figure 22. Comparison of GMU Employment-Driven Forecasts and Loudoun County/MWCOG Land Use Plan-Based Forecasts

	GMU Employment-Driven Forecast of Housing Units			
	Single-Family Detached	Single-Family Attached	Multi-Family	Total
2020	75,900	44,350	22,520	142,770
2025	83,650	49,070	24,890	157,610
2030	90,700	53,990	27,250	171,940
2035	96,600	58,050	29,190	183,840
2040	101,120	61,450	31,110	193,680
	Loudoun County / MWCOG 9.0 Land Use Plan-Based Forecast of Housing Units[46]			
	Single-Family Detached	Single-Family Attached	Multi-Family	Total
2020	71,990	46,850	25,140	143,980
2025	76,940	49,540	31,000	157,480
2030	79,410	49,840	36,520	165,770
2035	80,860	50,070	40,980	171,900
2040	82,030	50,070	43,280	175,380
	Difference (Loudoun/MWCOG - GMU)			
	Single-Family Detached	Single-Family Attached	Multi-Family	Total
2020	(3,910)	2,490	2,620	1,210
2025	(6,700)	470	6,110	(130)
2030	(11,290)	(4,150)	9,270	(6,170)
2035	(15,740)	(7,980)	11,780	(11,940)
2040	(19,090)	(11,380)	12,170	(18,300)

Source: Metropolitan Washington Council of Governments Cooperative Forecasts Round 9.0; Loudoun County Department of Planning and Zoning; GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

[46] The single-family attached and multi-family MWCOG forecasts each include half of the forecasted multi-family stacked attached housing units, which includes stacked townhomes, one-over-twos, and two-over-twos. The Census permitting data generally includes these units as multi-family units, but respondents in the American Community Survey, which forms the basis for the assumptions in this model, will likely split their responses between single-family attached (including buildings with 2-4 units) and multi-family buildings (5+ units).

There are several implications of having an insufficient supply of housing in the County to meet projected demand:

1. **People working in jobs in Loudoun County will have fewer options to live in the County and will have to live outside the County.** If the amount or types of housing available in Loudoun County does not meet demand, it is likely that the shares of people who can both live and work in the County will decline. Assuming Loudoun County continues to attract employers and expand its jobs base, an insufficient housing supply could result in more workers commuting in from other jurisdictions, potentially making longer commutes and increasing the level of traffic in the Northern Virginia region. Over time, if commutes become too onerous, it is possible that some workers could decide to find a job closer to their home.

2. **Businesses could see a lack of sufficient housing options as a negative when making decisions about locating or expanding in Loudoun County.** The impact of a lack of a sufficient supply of housing of the types demanded by future workers could be felt more broadly than the workers themselves. Increasingly, quality of life issues are important to business owners and economic development professionals. The availability of housing for all employees—including single-family housing and home ownership opportunities—can be an important factor in where a business decides to open or expand. Loudoun County will compete not only with other places in the Washington DC area for economic development, but also with places around the country that are making housing availability and affordability a key component of their economic development strategies. Having an insufficient supply of housing could make Loudoun County less competitive when it comes to attracting businesses.

3. **As Loudoun County residents age, they may not be able to remain in their communities.** Research from AARP and other organizations have found that most older adults would prefer to age either in their homes or in their communities.[47] In the years to come, the aging of the population will create new demand for housing in Loudoun County. Some retirees in Loudoun County who want to remain in the County may want to stay in their homes, but others will want to downsize from their family homes. If there is an insufficient range of housing options in the County, some of Loudoun County's older residents may not find options to accommodate their preferences for remaining in the County.

4. **Young families will continue to be attracted to Loudoun County because of its good schools and high-quality amenities but face increasing housing constraints.** Young working families are forecasted to be a key component of Loudoun County's growth over the next 25 years, largely as a result of employment growth. Without a sufficient supply of housing, and particularly home ownership opportunities, at prices affordable to entry- or mid-career working households, the County may have a harder time attracting and retaining these families.

5. **Finally, new Federal regulations are bringing increased scrutiny to local jurisdictions' land use planning and zoning, examining whether they are proactively planning for a wide range of**

[47] See AARP. 2014. What is Livable? Community Preferences of Older Adults. Online http://www.aarp.org/about-aarp/press-center/info-04-2014/aarp-report-outlines-communities.html

housing options. The Affirmatively Furthering Fair Housing (AFFH) regulations, released in summer 2015, provide new guidance and requirements to local jurisdictions to promote fair housing. As part of this rule, local jurisdictions are required to use data and metrics to demonstrate how housing policies and planning help promote the availability of housing in high opportunity neighborhoods that is affordable to lower-income households.

Summary of the Analysis of Future Housing Gaps

Overall, based on the employment-driven housing demand forecasts produced by GMU and based on assumptions described throughout this report, there will be a demand for 66,604 net new housing units in Loudoun County between 2015 and 2040, largely to accommodate net new workers. The demand for housing for new households coming to the region to fill a job is based on analyses of current commuting patterns and characteristics of future workers. The demand for specific types of housing is based on an analysis of the key drivers of housing unit preferences, including age, household size and composition and household income.

These employment-driven housing demand forecasts are compared with the County/MWCOG forecasts that are based on analysis of current land use plans and projected capacity. Based on this analysis, the demand for single-family detached and single-family attached homes exceeds what is planned for in 2040. The demand for multi-family housing is lower than what is currently planned for.

These forecasts do not include an analysis of the impacts on potential housing demand if households cannot find the housing they want in Loudoun County. It is possible that if demand for a particular housing type cannot be met, then households would shift to a different housing type (e.g. from a single-family attached home to a multi-family home). It is also possible that the physical characteristics of housing types might shift in the future, appealing to different types of households (e.g. smaller single-family detached homes, larger multi-family homes, duplexes or triplexes, etc.) See Scenarios section for additional discussion on the implications of a potential mismatch between the types of housing demanded and planned.

Scenarios

The GMU consulting team prepared estimates of housing demand in Loudoun County over the 2015 through 2040 period using a regional employment-driven forecasting model. The GMU methodology is based on local and regional employment growth and demographic trends, and therefore differs from other housing forecasts that have been produced by the County and others. Using forecasts on local and regional employment growth and demographic change, along with key assumptions about in-commuting and housing preferences, the housing demand forecasts presented in this report are intended to reflect an estimate of the demand for housing in Loudoun County in 2040 which is not limited by the amount or type of housing supply that might be included currently in County plans.

If any of the assumptions utilized in the forecasting method were changed, these forecasts of future housing demand in Loudoun County could be different:

Local and Regional Employment Growth: The primary driver of these housing demand forecasts is local and regional employment growth. Based on this methodology, more than 60 percent of the forecasted housing demand is to accommodate future workers with jobs located in Loudoun County; about 86 percent of the forecasted housing demand in Loudoun County is from new workers in Loudoun County or the wider Washington DC region.

The forecasts of job growth used for this analysis are derived from forecasts prepared by IHS Economics, which uses an econometric model based on past economic performance to forecast future growth. IHS Economics produces local and regional job forecasts by industry sector. The job forecasts used in this analysis also make use of recent MWCOG employment forecasts which are used to refine the IHS Economics figures. The employment forecasts reflect a shift away from Federal government employment throughout the region and into more Professional and Business Services employment, and resident-serving employment, including jobs in the Education and Health Services, Leisure and Hospitality and Local Government sectors. Based on these forecasts, over the forecast period, Loudoun County is expected to capture a greater share of regional Professional and Business Services employment, which is one reason why these forecasts suggest strong growth among high income households and strong demand for home ownership and single-family detached housing in the County.

There are unknown factors that could pose challenges to future local and regional employment growth. Transportation challenges, including road congestion and service challenges on Metrorail, could lead to slower job growth in the region. Any delays in Metrorail's extension of the Silver Line into Loudoun County could slow employment growth locally. A change in the business climate in the state of Virginia could impact Loudoun County's attractiveness as a business location. Dramatic cuts to Federal government spending could accelerate losses in Federal government employment and slow growth in private sector employment that serves the Federal government.

If these employment forecasts were changed, then the demand for housing in Loudoun County that result from this model would also change. Specifically, if regional job growth slowed considerably in the future then overall housing demand in Loudoun County would also grow more slowly. If the growth of high-wage jobs in Loudoun County was less robust, then the demand for housing in the County, particularly home ownership and single-family detached housing, would also be lower.

There is also a potential feedback loop between employment growth and housing supply that is not explicitly taken into account in these housing demand forecasts. Without a sufficient response to housing

needs by local jurisdictions in the region—all jurisdictions in the region, and not just Loudoun County—it is possible that high housing costs in the Washington DC metro area, exacerbated by an insufficient supply of housing, could slow labor force growth and consequently slow overall economic growth. With slower job growth, housing demand could also slow. Therefore, while the employment forecasts are taken as an independent input into these housing demand forecasts, it is possible that external factors, including local decisions about housing policy and housing supply, could alter these employment assumptions and therefore alter the resulting estimates of future household growth and housing demand.

In-Commuting: The housing demand forecasts depend on assumptions not just about local and regional employment growth, but also what share of new workers will be housed in Loudoun County. Specifically, these forecasts assume that in-commuting rates for different types of workers will remain constant over the forecast period. Therefore, for these forecasts, it is assumed that Loudoun County will continue to house the same share of future workers as it houses current workers, based on the worker characteristics. In addition, these forecasts assume that in the future, Loudoun County will house future workers who work in other jurisdictions in the Washington DC metro area at the same rates that it does currently.

Changes to these assumptions about in-commuting rates could result in changes in the numbers and types of households that the forecasting model would predict would live in Loudoun County in the future. If Loudoun County attracted different types of households—which is what changing the in-commuting assumptions would mean—then those households would potentially demand different types of housing and the forecasts of both household characteristics and housing unit characteristics could change.

For example, if Loudoun County were to house a greater share of its Retail or Leisure and Hospitality workers in the future than it does now, that would mean that the County would be attracting younger, lower-wage households than the forecasts suggest, which would imply a need for more rental and multi-family housing. If Loudoun County continues to house a high share of its Professional and Business Sector workers in the future but in-commuting rates change so that it attracts a higher share of younger workers in this sector, then, again, the forecasted household characteristics would be different and would likely imply demand for different types of housing.

Making different assumptions about in-commuting rates by worker characteristic could lead to different types of households in the County in the future and these different household could prefer different types of housing than the GMU forecasts suggest. Of course, there is a back and forth relationship between these assumptions about in-commuting patterns and housing supply. The types of housing that Loudoun County might encourage in the future could also result in the County attracting different types of households with different characteristics, leading to different rates of in-commuting. For example, if the County increased its supply of multi-family housing, it would likely mean that the County's future households would be younger, less likely to have children, and have lower incomes than these housing demand forecasts suggest.

Housing Preferences: These housing demand forecasts assume that in the future, Loudoun County will attract certain types of households based on patterns of in-commuting (see above) and that the characteristics of the households will predict their housing preferences. The assumptions about housing preferences are based on patterns observed in 2012 through 2014 data, which includes a time when home ownership rates in the region were still below long-term averages and there was a modest shift to more renters and multi-family housing residents. Therefore, in these forecasts of housing demand, it is assumed that, for households with particular characteristics, the housing preferences that are exhibited today in

the data are assumed to continue through the forecast period. In other words, these housing demand forecasts assume that people at different ages and at different phases of the life cycle will choose certain kinds of housing at roughly the same rates in the future that people like them currently choose. Younger people will be more likely to rent, families will be more likely to be home owners. Higher income households will be more likely to prefer single-family detached homes. Lower income households will be more likely to live in multi-family housing. Despite recent discussions about changing housing preferences among some types of households, the relationships between household characteristics and housing choice (including tenure and unit type) have been remarkably stable for decades with research demonstrating those links over time both in the Washington DC region and nationally.

But changes to the assumptions about housing preferences could change the results of these forecasts of housing demand. Housing preferences could be different in the future if there was a sustained shift in individuals' preferences for certain types of homes and neighborhoods. Housing preferences among future households in Loudoun County could change if the types of housing they prefer is not available in the future. Housing choice generally involves a number of trade-offs. One key trade-off is between location (e.g. Loudoun County) and housing type (e.g. single-family detached home.) It is possible that in the future, households that want to live in Loudoun County may be willing to trade-off their preferred housing type for another type of housing in order to live in the County. That type of trade-off would change the forecasts of the types of units that would accommodate future housing demand in the County.

If housing preferences were to change significantly over the forecast period, the forecasts of housing demand could also change. If, for example, preferences for multi-family housing increased among higher income groups, the demand for multi-family housing in Loudoun County could be higher than what these housing demand forecasts suggest.

There are other external factors that could impact these housing demand forecasts. One key factor that merits discussion is **interest rates.** The demand for home ownership depends, at least somewhat, on mortgage interest rates. Interest rates currently remain at or near historically low levels. Rates will eventually rise, probably within the next six months or year, which theoretically could dampen the demand for home ownership in Loudoun County in the future by increasing the overall cost of housing.

However, it is unlikely that rates will rise sufficiently high to significantly shrink the demand for home ownership in the County given that the other fundamentals will remain too strong—attractive neighborhoods, good schools, increases in high-wage jobs and high-income households, improved transportation access.

Appendix

Appendix Tables

CURRENT CONDITIONS APPENDIX TABLES

P. Population Characteristics in Loudoun County, VA Over Time

H. Household Characteristics in Loudoun County, VA

U. Housing Characteristics in Loudoun County, VA

FORECAST APPENDIX TABLES

a. Housing Cost Burden by AMI, 2015-2040
b. Housing Cost Burden by Age of Householder, 2015-2040
c. Housing Cost Burden by Labor Force Participation Status, 2015-2040
d. Housing Cost Burden by Disability Status, 2015-2040
e. Housing Cost Burden by Household Size, 2015-2040

X. Housing Gap by Unit Type, 2030-2040
a. Housing Gap by AMI, 2030-2040
b. Housing Gap by Age of Householder, 2030-2040

FORECAST METHODOLOGY

A. Population and Cohort Change Ratios, Loudoun County
B. Ratio of Females Aged 20-44 to Children <10 years old, i.e. Child Generation Rates, Loudoun County
C. Distribution by Age and Sex in Loudoun County and the Nation, 1990-2015 and Forecasted
D. Headship Rate, Loudoun County
E. Percent of Households without a Payroll Job, Loudoun County
F. Households Without a Payroll Job Headed by a Female Aged 75-79 Years Old by Unit Type and AMI Group, Loudoun County
G. Total Jobs, Loudoun County
H. Net New Jobs and Retirement Positions, Loudoun County, 2015-2040
I. Workers by Age and Movers, Loudoun County
J. Current and Future Age Distribution of Workers, Loudoun County
K. Household Types
L. Distribution of Workers by Household Type and Age Group, Professional & Business Service Jobs, Loudoun County
M. Distribution of Workers by Household Type and AMI Group, Professional & Business Service Jobs, Loudoun County
N. Average Workers per Household by AMI Group, Loudoun County
O. Unit Type by Select Household Type, 200%+ of AMI, Loudoun County
P. Share of Households with a Main Worker in Fairfax County, Fairfax City or Falls Church City living in Loudoun, earning 200%+ of AMI, by Housing Unit Type
Q. FY 2015 AMI Limits, Washington DC Metro Area
R. Washington DC Metropolitan Statistical Area
S. Greater Washington DC Region

FORECAST APPENDIX TABLES

P.I. Population by Age Group

Loudoun County, Virginia

Population										
Age	**2000**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Under 18	50,436	79,148	87,763	89,328	90,685	95,520	96,439	97,464	100,822	103,214
18-24	9,596	22,192	21,954	20,696	21,026	18,606	19,761	21,535	23,123	24,394
25-34	29,925	47,259	45,718	49,083	42,570	42,682	40,943	42,686	44,251	45,565
35-44	36,198	53,741	54,800	54,203	59,906	59,192	63,155	60,312	60,176	62,257
45-54	22,531	37,391	39,390	42,387	46,212	48,579	48,749	52,006	53,516	55,538
55-64	11,569	20,984	22,737	24,594	24,828	27,328	28,636	29,722	31,892	32,793
65-74	5,405	9,654	10,835	11,715	12,053	11,787	13,318	14,217	15,278	17,312
75-84	3,053	5,081	4,366	4,629	5,060	6,589	6,490	6,911	7,164	7,594
85+	886	1,093	1,835	1,785	2,624	2,028	2,045	2,752	2,511	2,907
Total Population	**169,599**	**276,542**	**289,397**	**298,420**	**304,964**	**312,311**	**319,537**	**327,605**	**338,733**	**351,573**

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 1),
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

Share Of Total										
Age	**2000**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Under 18	29.7%	28.6%	30.3%	29.9%	29.7%	30.6%	30.2%	29.8%	29.8%	29.4%
18-24	5.7%	8.0%	7.6%	6.9%	6.9%	6.0%	6.2%	6.6%	6.8%	6.9%
25-34	17.6%	17.1%	15.8%	16.4%	14.0%	13.7%	12.8%	13.0%	13.1%	13.0%
35-44	21.3%	19.4%	18.9%	18.2%	19.6%	19.0%	19.8%	18.4%	17.8%	17.7%
45-54	13.3%	13.5%	13.6%	14.2%	15.2%	15.6%	15.3%	15.9%	15.8%	15.8%
55-64	6.8%	7.6%	7.9%	8.2%	8.1%	8.8%	9.0%	9.1%	9.4%	9.3%
65-74	3.2%	3.5%	3.7%	3.9%	4.0%	3.8%	4.2%	4.3%	4.5%	4.9%
75-84	1.8%	1.8%	1.5%	1.6%	1.7%	2.1%	2.0%	2.1%	2.1%	2.2%
85+	0.5%	0.4%	0.6%	0.6%	0.9%	0.6%	0.6%	0.8%	0.7%	0.8%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 1)
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

P.I.a. Population by Age Group, 2014
Select Jurisdictions

Population

Age	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area
Under 18	103,214	38,936	271,244	125,422	242,345	58,275	1,404,798
18-24	24,394	17,648	94,690	39,439	80,956	20,559	543,892
25-34	45,565	60,916	161,535	64,697	138,933	30,420	935,097
35-44	62,257	38,550	166,257	68,779	143,650	32,179	875,479
45-54	55,538	27,491	171,501	65,398	151,163	39,805	877,013
55-64	32,793	23,147	141,889	45,477	132,434	30,613	708,648
65-74	17,312	12,158	80,455	24,068	78,833	18,429	413,933
75-84	7,594	5,142	34,010	9,295	38,069	9,230	186,657
85+	2,907	2,920	15,957	3,519	24,064	4,165	87,227
Total Population	**351,573**	**226,908**	**1,137,538**	**446,094**	**1,030,447**	**243,675**	**6,032,744**

Source: 2014 American Community Survey, 1-year file, and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

Share of Total

Age	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area
Under 18	29.4%	17.2%	23.8%	28.1%	23.5%	23.9%	23.3%
18-24	6.9%	7.8%	8.3%	8.8%	7.9%	8.4%	9.0%
25-34	13.0%	26.8%	14.2%	14.5%	13.5%	12.5%	15.5%
35-44	17.7%	17.0%	14.6%	15.4%	13.9%	13.2%	14.5%
45-54	15.8%	12.1%	15.1%	14.7%	14.7%	16.3%	14.5%
55-64	9.3%	10.2%	12.5%	10.2%	12.9%	12.6%	11.7%
65-74	4.9%	5.4%	7.1%	5.4%	7.7%	7.6%	6.9%
75-84	2.2%	2.3%	3.0%	2.1%	3.7%	3.8%	3.1%
85+	0.8%	1.3%	1.4%	0.8%	2.3%	1.7%	1.4%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: 2014 American Community Survey, 1-year file, and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

P.II. Population by Race and Hispanic Origin

Loudoun County, Virginia

Population										
Race and Hispanic Origin	**2000**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Non-Hispanic	159,510	249,583	259,784	267,293	272,420	273,575	279,432	285,752	294,353	304,294
White	134,972	187,212	194,326	198,873	200,604	195,233	196,413	198,414	202,355	205,198
Black/African-American	11,517	20,642	22,248	22,785	23,144	22,219	26,016	23,293	23,957	24,278
Asian or Pacific Islander	9,118	36,049	35,888	37,206	39,185	42,629	47,418	52,565	51,669	58,586
Multi-racial/Other	3,903	5,681	7,322	8,429	9,487	13,494	9,585	11,480	16,372	16,230
Hispanic	10,089	26,959	29,614	31,127	32,544	38,736	40,104	41,853	44,380	47,280
Total Population	**169,599**	**276,542**	**289,397**	**298,420**	**304,964**	**312,311**	**319,537**	**327,605**	**338,733**	**351,573**

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 1)
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

Share of Total										
Race and Hispanic Origin	**2000**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Non-Hispanic	94.1%	90.3%	89.8%	89.6%	89.3%	87.6%	87.4%	87.2%	86.9%	86.6%
White	79.6%	67.7%	67.1%	66.6%	65.8%	62.5%	61.5%	60.6%	59.7%	58.4%
Black/African-American	6.8%	7.5%	7.7%	7.6%	7.6%	7.1%	8.1%	7.1%	7.1%	6.9%
Asian or Pacific Islander	5.4%	13.0%	12.4%	12.5%	12.8%	13.6%	14.8%	16.0%	15.3%	16.7%
Multi-racial/Other	2.3%	2.1%	2.5%	2.8%	3.1%	4.3%	3.0%	3.5%	4.8%	4.6%
Hispanic	5.9%	9.7%	10.2%	10.4%	10.7%	12.4%	12.6%	12.8%	13.1%	13.4%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 1)
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

P.II.a. Population by Race and Hispanic Origin, 2014

Population

Age	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area
Non-Hispanic	304,294	191,260	951,136	347,964	837,570	223,165	5,122,578
White	205,198	141,865	589,889	202,717	471,513	183,917	2,821,098
Black/African-American	24,278	18,310	104,900	86,175	178,815	21,523	1,491,222
Asian or Pacific Islander	58,586	23,797	214,050	34,216	151,989	11,107	597,091
Multi-racial/Other	16,230	7,288	42,297	24,856	35,253	6,618	213,167
Hispanic	47,280	35,648	186,402	98,130	192,877	20,510	910,166
Total Population	**351,573**	**226,908**	**1,137,538**	**446,094**	**1,030,447**	**243,675**	**6,032,744**

Source: 2014 American Community Survey, 1-year file, and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

Share of Total

Age	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area
Non-Hispanic	86.6%	84.3%	83.6%	78.0%	81.3%	91.6%	84.9%
White	58.4%	62.5%	51.9%	45.4%	45.8%	75.5%	46.8%
Black/African-American	6.9%	8.1%	9.2%	19.3%	17.4%	8.8%	24.7%
Asian or Pacific Islander	16.7%	10.5%	18.8%	7.7%	14.7%	4.6%	9.9%
Multi-racial/Other	4.6%	3.2%	3.7%	5.6%	3.4%	2.7%	3.5%
Hispanic	13.4%	15.7%	16.4%	22.0%	18.7%	8.4%	15.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: 2014 American Community Survey, 1-year file, and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

P.III. Population by Place of Birth

Loudoun County, Virginia

Population										
Place of Birth	**2000**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
U.S.*	150,483	218,544	231,950	241,551	240,099	243,237	245,366	251,804	263,634	267,134
Outside the U.S.	19,116	57,998	57,447	56,869	64,865	69,074	74,171	75,801	75,099	84,440
Total Population	**169,599**	**276,542**	**289,397**	**298,420**	**304,964**	**312,311**	**319,537**	**327,605**	**338,733**	**351,573**

*Includes Puerto Rico, U.S. Islands and those born abroad to American parent(s)

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 3)
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

Share of Total										
Place of Birth	**2000**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
U.S.*	88.7%	79.0%	80.1%	80.9%	78.7%	77.9%	76.8%	76.9%	77.8%	76.0%
Outside the U.S.	11.3%	21.0%	19.9%	19.1%	21.3%	22.1%	23.2%	23.1%	22.2%	24.0%
Total Population	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

*Includes Puerto Rico, U.S. Islands and those born abroad to American parent(s)

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 3)
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

P.IV. Educational Attainment

Population Age 25+

Loudoun County, Virginia

Population										
Educational Attainment	**2000**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Less than high school	8,182	12,177	10,966	13,187	9,894	13,069	12,629	12,563	14,128	16,594
High school diploma/GED	19,358	29,899	28,009	23,572	27,405	27,498	31,061	29,852	28,520	29,007
Associate's degree or some college	30,318	40,178	39,416	41,432	41,962	41,849	45,773	46,270	50,346	46,898
Bachelor's degree	35,010	60,614	63,375	69,207	69,194	72,055	68,529	69,072	77,503	75,920
Graduate or professional degree	16,699	32,333	37,915	40,997	44,798	43,715	45,344	50,850	44,291	55,547
Total Population Age 25+	**109,567**	**175,202**	**179,681**	**188,396**	**193,252**	**198,186**	**203,337**	**208,606**	**214,788**	**223,966**

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 3)
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

Share of Total										
Educational Attainment	**2000**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Less than high school	7.5%	7.0%	6.1%	7.0%	5.1%	6.6%	6.2%	6.0%	6.6%	7.4%
High school diploma/GED	17.7%	17.1%	15.6%	12.5%	14.2%	13.9%	15.3%	14.3%	13.3%	13.0%
Associate's degree or some college	27.7%	22.9%	21.9%	22.0%	21.7%	21.1%	22.5%	22.2%	23.4%	20.9%
Bachelor's degree	32.0%	34.6%	35.3%	36.7%	35.8%	36.4%	33.7%	33.1%	36.1%	33.9%
Graduate or professional degree	15.2%	18.5%	21.1%	21.8%	23.2%	22.1%	22.3%	24.4%	20.6%	24.8%
Total Population Age 25+	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 3)
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

P.V. Population by Disability Status, 2012-2014 Average

Loudoun County, Virginia

	< 5 Years Old		5 - 14 Years Old		15 - 64 Years Old		65+ Years Old	
Disability	**No.**	**Pct.**	**No.**	**Pct.**	**No.**	**Pct.**	**No.**	**Pct.**
With Disability (people with multiple disabilities counted more than once)								
Hearing Difficulty	46	0.2%	207	0.4%	2,038	0.9%	2,926	11.8%
Vision Difficulty	93	0.4%	414	0.7%	2,106	0.9%	1,216	4.9%
Cognitive Difficulty	N/A	N/A	810	1.4%	3,496	1.5%	1,756	7.1%
Ambulatory Difficulty	N/A	N/A	106	0.2%	4,030	1.8%	4,380	17.6%
With a Self-Care Difficulty	N/A	N/A	352	0.6%	1,286	0.6%	1,592	6.4%
Independent Living Difficulty	N/A	N/A	N/A	N/A	3,266	1.4%	3,648	14.7%
Total Persons With Disabilities	93	0.4%	1,167	2.0%	9,930	4.3%	7,370	29.7%
Total Persons Without Disabilities	26,416	99.6%	57,417	98.0%	219,445	95.7%	17,466	70.3%
Total Population	**26,509**	**100.0%**	**58,584**	**100.0%**	**229,375**	**100.0%**	**24,835**	**100.0%**

Note: Cognitive, ambulatory, self-care and independent living difficulties are not determine for all children under 15 years old.

Source: U.S. Census Bureau, 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

H.I. Households by Age of Head of Household

Loudoun County, Virginia

Households										
Age	**2000**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Under 25	1,709	1,366	1,513	2,447	1,605	2,415	1,381	1,431	1,347	2,639
25-34	13,531	19,807	19,267	22,177	18,688	17,321	16,331	16,267	16,973	18,814
35-44	19,229	30,161	31,587	27,840	31,331	31,404	35,025	32,156	31,256	32,271
45-54	13,011	21,842	23,131	24,095	25,983	27,537	25,773	28,947	30,914	31,329
55-64	6,685	12,054	13,703	14,238	14,749	14,965	16,255	18,011	17,879	18,307
65+	5,735	8,128	8,205	9,443	9,937	10,942	12,088	12,601	14,646	13,748
Total Households	**59,900**	**93,359**	**97,405**	**100,239**	**102,293**	**104,583**	**106,851**	**109,414**	**113,015**	**117,108**

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 1)
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

Share of Total										
Age	**2000**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Under 25	2.9%	1.5%	1.6%	2.4%	1.6%	2.3%	1.3%	1.3%	1.2%	2.3%
25-34	22.6%	21.2%	19.8%	22.1%	18.3%	16.6%	15.3%	14.9%	15.0%	16.1%
35-44	32.1%	32.3%	32.4%	27.8%	30.6%	30.0%	32.8%	29.4%	27.7%	27.6%
45-54	21.7%	23.4%	23.7%	24.0%	25.4%	26.3%	24.1%	26.5%	27.4%	26.8%
55-64	11.2%	12.9%	14.1%	14.2%	14.4%	14.3%	15.2%	16.5%	15.8%	15.6%
65+	9.6%	8.7%	8.4%	9.4%	9.7%	10.5%	11.3%	11.5%	13.0%	11.7%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 1)
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

H.II. Household Income, 2014 (in 2015 $s)

Loudoun County, Virginia

Household Income	No.	Pct.
<$15,000	3,778	3.2%
$15,000-29,999	4,524	3.9%
$30,000-59,999	14,504	12.4%
$60,000-79,999	9,276	7.9%
$80,000-99,999	11,181	9.5%
$100,000-119,999	12,314	10.5%
$120,000-149,999	14,504	12.4%
$150,000-199,999	19,223	16.4%
$200,000-249,999	11,983	10.2%
$150,000+	15,822	13.5%
Total Households	**117,108**	**100.0%**

Source: 2014 American Community Survey, 1-year public use microdata sample (PUMS) files
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

H.II.a. Households by Household Income

Select Jurisdictions

H.II.a (1) Household Income, 2014 (in 2014 $s)

Household Income	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area
<$15,000	3,548	5,895	17,970	5,405	20,444	5,325	143,741
$15,000-29,999	5,181	6,519	20,189	7,234	24,031	7,810	161,025
$30,000-59,999	15,434	12,914	51,524	28,649	62,410	17,599	385,964
$60,000 to $74,999	7,364	7,725	31,705	14,413	33,224	8,683	198,268
$75,000 to $99,999	12,173	11,810	52,249	19,159	45,668	13,464	282,127
$100,000 to $124,999	16,505	13,677	46,210	16,215	42,256	11,685	250,360
$125,000 to $149,999	12,374	10,066	37,461	12,564	28,474	8,487	182,296
$150,000 to $199,999	19,066	13,396	52,676	17,086	44,171	8,191	239,968
$200,000+	25,464	18,730	81,495	16,709	64,176	7,840	310,398
Total Households	**117,108**	**100,732**	**391,479**	**137,434**	**364,854**	**89,084**	**2,154,147**

Source: 2014 American Community Survey, 1-year file, and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

H.II.a. Households by Household Income

Select Jurisdictions

H.II.a (2) Household Income, 2010 (in 2010 $s)

Household Income	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area*
<$15,000	2,250	4,653	16,750	4,910	24,383	4,655	138,408
$15,000-29,999	4,073	6,538	22,613	8,250	28,499	6,571	163,735
$30,000-59,999	12,837	15,348	59,711	24,558	65,981	16,779	402,114
$60,000 to $74,999	8,527	8,570	35,863	11,393	33,073	9,847	199,153
$75,000 to $99,999	12,269	13,823	49,896	20,252	44,044	12,755	273,215
$100,000 to $124,999	16,746	12,228	45,925	16,860	41,130	11,570	237,783
$125,000 to $149,999	12,156	7,976	35,400	15,283	28,595	7,510	168,509
$150,000 to $199,999	16,899	9,379	54,562	15,757	40,352	8,364	217,899
$200,000+	18,826	14,467	68,695	13,095	53,419	5,913	241,338
Total Households	**104,583**	**92,982**	**389,415**	**130,358**	**359,476**	**83,964**	**2,042,154**

*Excludes Culpeper, VA and Rappahannock, VA

Source: 2010 American Community Survey, 1-year file, and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

H.II.a. Households by Household Income

Select Jurisdictions

H.II.a (3) Household Income, 2006 (in 2006 $s)

Household Income	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area*
<$15,000	3,885	5,424	16,358	4,543	16,813	3,614	134,161
$15,000-29,999	4,485	6,698	20,482	6,799	25,202	7,644	162,029
$30,000-59,999	14,462	15,400	61,875	30,010	72,163	18,423	424,522
$60,000 to $74,999	8,679	7,580	32,539	14,875	32,245	11,031	202,820
$75,000 to $99,999	15,544	14,469	49,644	20,089	47,004	14,550	282,278
$100,000 to $124,999	11,602	9,820	46,759	15,308	40,916	8,508	225,705
$125,000 to $149,999	10,789	6,779	33,935	10,897	29,279	6,988	151,410
$150,000 to $199,999	13,139	7,676	46,691	11,133	33,913	5,708	176,927
$200,000+	10,774	11,491	55,045	8,681	43,903	3,517	182,664
Total Households	**93,359**	**85,337**	**363,328**	**122,335**	**341,438**	**79,983**	**1,942,516**

*Excludes Culpeper, VA and Rappahannock, VA

Source: 2006 American Community Survey, 1-year file, and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

H.II.a. Households by Household Income

Select Jurisdictions

H.II.a (4) Household Income, 1999 (in 1999 $s)

Household Income	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area*
<$15,000	1,962	6,791	15,121	4,214	20,086	5,014	149,821
$15,000-29,999	4,057	9,033	24,539	9,058	29,317	8,509	201,019
$30,000-59,999	12,759	24,652	77,919	28,183	82,375	21,307	497,348
$60,000 to $74,999	8,194	10,592	42,382	13,676	38,242	10,135	220,274
$75,000 to $99,999	11,774	12,292	59,372	17,224	49,573	11,846	272,688
$100,000 to $124,999	8,483	7,948	44,320	10,792	34,098	6,453	174,476
$125,000 to $149,999	5,114	5,379	29,439	5,316	22,467	3,042	102,465
$150,000 to $199,999	4,412	5,062	31,718	4,125	24,199	2,253	98,004
$200,000+	3,166	4,725	26,469	2,074	24,583	1,556	85,754
Total Households	**59,921**	**86,474**	**351,279**	**94,662**	**324,940**	**70,115**	**1,801,849**

*Excludes Culpeper, VA and Rappahannock, VA

Source: 2000 Decennial Census (Summary File 3)

H.III. Households by Area Median Income Group, 2014

Loudoun County, Virginia

Household Income	No.	Pct.
<30% AMI	7,269	6.2%
30-49% AMI	7,895	6.7%
50-59% AMI	5,926	5.1%
60-79% AMI	9,850	8.4%
80-99% AMI	10,608	9.1%
100-119% AMI	12,586	10.7%
120-139% AMI	10,044	8.6%
140-159% AMI	10,104	8.6%
160-179% AMI	7,504	6.4%
180-199% AMI	7,691	6.6%
200% AMI+	27,631	23.6%
Total Households	**117,108**	**100.0%**

Source: 2014 American Community Survey, 1-year public use microdata sample (PUMS) files
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

H.IV. Households by Household Type

Loudoun County, Virginia

Households										
Household Type	**2000**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Married Couple, w/ Children*	21,910	32,900	36,016	37,326	38,753	42,401	44,336	44,695	45,972	47,795
Married Couple, w/o Children*	16,591	22,405	22,670	25,976	26,966	25,840	25,563	26,827	26,678	28,969
Single Parent	3,902	6,174	5,716	7,209	6,974	10,787	8,212	10,068	8,833	9,382
Other Family, w/o Children*	2,617	2,734	2,679	3,788	4,039	4,890	3,070	4,914	5,290	4,813
Living Alone (65+)	2,199	3,913	3,244	3,549	4,034	4,204	4,464	4,393	6,090	5,462
Living Alone (Under 65)	8,851	22,015	24,129	18,033	15,205	11,105	16,090	12,926	14,324	15,438
Other Non-Family, Not Living Alone	3,830	3,218	2,952	4,357	6,321	5,354	5,116	5,591	5,828	5,249
Total Households	**59,900**	**93,359**	**97,405**	**100,239**	**102,293**	**104,583**	**106,851**	**109,414**	**113,015**	**117,108**

*Own children

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 1) and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

Share of Total										
Household Type	**2000**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Married Couple, w/ Children*	36.6%	35.2%	37.0%	37.2%	37.9%	40.5%	41.5%	40.8%	40.7%	40.8%
Married Couple, w/o Children*	27.7%	24.0%	23.3%	25.9%	26.4%	24.7%	23.9%	24.5%	23.6%	24.7%
Single Parent	6.5%	6.6%	5.9%	7.2%	6.8%	10.3%	7.7%	9.2%	7.8%	8.0%
Other Family, w/o Children*	4.4%	2.9%	2.8%	3.8%	3.9%	4.7%	2.9%	4.5%	4.7%	4.1%
Living Alone (65+)	3.7%	4.2%	3.3%	3.5%	3.9%	4.0%	4.2%	4.0%	5.4%	4.7%
Living Alone (Under 65)	14.8%	23.6%	24.8%	18.0%	14.9%	10.6%	15.1%	11.8%	12.7%	13.2%
Other Non-Family, Not Living Alone	6.4%	3.4%	3.0%	4.3%	6.2%	5.1%	4.8%	5.1%	5.2%	4.5%
Total Households	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

*Own children

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 1) and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

H.IV.a. Households by Household Type

Select Jurisdictions

H.IV.a (1) Household Type, 2014

Household Type	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area
Married Couple, w/ Children*	47,795	16,224	113,393	46,766	94,432	23,539	509,455
Married Couple, w/o Children*	28,969	19,375	110,742	33,649	98,702	27,351	530,547
Single Parent	9,382	5,087	29,467	16,228	35,446	7,011	222,327
Other Family, w/o Children*	4,813	3,627	22,219	8,289	22,740	5,901	144,352
Living Alone (65+)	5,462	7,022	28,691	6,616	33,935	6,816	166,386
Living Alone (Under 65)	15,438	33,330	61,075	19,384	57,692	12,810	424,238
Other Non-Family, Not Living Alone	5,249	16,067	25,892	6,502	21,907	5,656	156,842
Total Households	**117,108**	**100,732**	**391,479**	**137,434**	**364,854**	**89,084**	**2,154,147**

*Own children

Source: 2014 American Community Survey, 1-year file, and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

H.IV.a. Households by Household Type

Select Jurisdictions

H.IV.a (2) Household Type, 2010

Household Type	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area**
Married Couple, w/ Children*	42,401	12,051	108,318	44,027	92,340	25,053	481,424
Married Couple, w/o Children*	25,840	20,264	111,623	33,571	96,509	26,779	500,432
Single Parent	10,787	5,614	31,209	14,212	34,079	6,266	216,396
Other Family, w/o Children*	4,890	4,754	21,866	8,280	22,600	4,090	135,765
Living Alone (65+)	4,204	6,109	22,770	5,392	31,831	5,937	144,614
Living Alone (Under 65)	11,105	31,045	69,051	18,382	60,206	12,468	418,626
Other Non-Family, Not Living Alone	5,354	13,145	24,578	6,494	21,911	3,371	144,897
Total Households	**104,583**	**92,982**	**389,415**	**130,358**	**359,476**	**83,964**	**2,042,154**

*Own children

**Excludes Culpeper, VA and Rappahannock, VA

Source: 2010 American Community Survey, 1-year file, and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

H.IV.a. Households by Household Type

Select Jurisdictions

H.IV.a (3) Household Type, 2006

Household Type	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area**
Married Couple, w/ Children*	32,900	13,790	99,178	41,814	96,232	23,999	467,052
Married Couple, w/o Children*	22,405	16,582	100,018	29,451	91,790	22,783	460,065
Single Parent	6,174	5,265	27,370	16,387	30,239	7,320	207,831
Other Family, w/o Children*	2,734	3,485	22,215	6,162	21,108	2,972	122,337
Living Alone (65+)	3,913	6,106	21,321	4,364	27,031	5,399	131,586
Living Alone (Under 65)	22,015	32,950	77,629	17,350	56,926	11,291	437,248
Other Non-Family, Not Living Alone	3,218	7,159	15,597	6,807	18,112	6,219	116,397
Total Households	**93,359**	**85,337**	**363,328**	**122,335**	**341,438**	**79,983**	**1,942,516**

*Own children

**Excludes Culpeper, VA and Rappahannock, VA

Source: 2006 American Community Survey, 1-year file, and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

H.IV.a. Households by Household Type

Select Jurisdictions

H.IV.a (4) Household Type, 2000

Household Type	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area**
Married Couple, w/ Children*	21,910	12,800	105,709	32,310	89,960	21,613	439,496
Married Couple, w/o Children*	16,591	17,722	102,684	25,647	89,232	21,202	450,768
Single Parent	3,902	3,825	21,522	9,455	23,705	5,402	159,153
Other Family, w/o Children*	2,617	4,975	20,366	5,325	21,328	3,732	137,100
Living Alone (65+)	2,199	6,345	16,672	2,829	25,022	4,704	114,024
Living Alone (Under 65)	8,851	28,871	58,486	13,335	54,277	9,368	363,314
Other Non-Family, Not Living Alone	3,830	11,814	25,275	5,669	21,041	4,039	136,408
Total Households	**59,900**	**86,352**	**350,714**	**94,570**	**324,565**	**70,060**	**1,800,263**

*Own children

**Excludes Culpeper, VA and Rappahannock, VA

Source: 2000 Decennial Census, Summary File 1

HV. Length of Residence in Current Home, 2014

Loudoun County, Virginia

Time in Current Home	No.	Pct.
<12 months	19,351	16.5%
13-23 months	9,262	7.9%
2-4 years	25,686	21.9%
5-9 years	25,458	21.7%
10-19 years	27,492	23.5%
20+ years	9,859	8.4%
Total Households	**117,108**	**100.0%**

Source: 2014 American Community Survey, 1-year public use microdata sample (PUMS) files
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

HVI. Place of Residence Year Ago for Households that Moved into the County, 2012-2014 Average
Loudoun County, Virginia

Place of Residence	No.	Pct.
Within Washington DC Metropolitan Area*	4,184	54.7%
DC	111	1.4%
Suburban Maryland	211	2.8%
Northern Virginia	3,862	50.5%
Fairfax	2,938	38.4%
Elsewhere in VA	334	4.4%
Elsewhere in U.S.	2,703	35.3%
International	433	5.7%
Total Households	**7,655**	**100.0%**

*Approximate and based on public use microdata area geographies

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

U.I. Housing Units by Tenure

Occupied Units

Loudoun County, Virginia

Units										
Tenure	**2000***	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Owned with mortgage	37,765	72,123	75,040	71,585	74,110	73,978	73,503	76,826	73,880	76,534
Owned free and clear	3,070	7,030	5,666	6,331	6,695	7,905	8,597	9,704	10,791	12,273
Rented	11,134	13,477	16,050	21,115	20,514	21,772	23,984	21,812	27,012	27,521
Occupied without payment	445	729	649	1,209	974	928	768	1,071	1,332	779
Total Occupied Housing Units	**52,414**	**93,359**	**97,405**	**100,239**	**102,293**	**104,583**	**106,851**	**109,414**	**113,015**	**117,108**

*Only includes specified units

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 3) and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

Share of Total										
Tenure	**2000***	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Owned with mortgage	72.1%	77.3%	77.0%	71.4%	72.4%	70.7%	68.8%	70.2%	65.4%	65.4%
Owned free and clear	5.9%	7.5%	5.8%	6.3%	6.5%	7.6%	8.0%	8.9%	9.5%	10.5%
Rented	21.2%	14.4%	16.5%	21.1%	20.1%	20.8%	22.4%	19.9%	23.9%	23.5%
Occupied without payment	0.8%	0.8%	0.7%	1.2%	1.0%	0.9%	0.7%	1.0%	1.2%	0.7%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

*Only includes specified units

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 3) and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

U.I.a. Housing Units by Tenure

Occupied Units

Select Jurisdictions

U.I.a (1) Tenure, 2014

Tenure	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area
Owned with mortgage	76,534	33,405	207,871	84,219	178,173	51,546	1,071,005
Owned free and clear	12,273	11,161	55,659	15,487	60,630	14,413	279,607
Rented	27,521	54,909	125,049	37,022	122,352	21,922	779,709
Occupied without payment	779	1,257	2,900	706	3,699	1,203	23,826
Total Occupied Units	**117,108**	**100,732**	**391,479**	**137,434**	**364,854**	**89,084**	**2,154,147**

Source: 2014 American Community Survey, 1-year file, and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

U.I.a (2) Tenure, 2010

Tenure	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area*
Owned with mortgage	72,843	33,438	225,962	82,947	188,428	51,770	1,078,260
Owned free and clear	7,784	7,872	46,262	12,404	49,594	11,622	233,514
Rented	21,438	50,727	114,961	33,938	117,459	19,517	708,077
Occupied without payment	914	945	2,230	1,069	3,995	1,055	22,303
Total Occupied Units	**102,979**	**92,982**	**389,415**	**130,358**	**359,476**	**83,964**	**2,042,154**

*Excludes Culpeper, VA and Rappahannock, VA

Source: 2010 American Community Survey, 1-year file, and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

U.I.a. Housing Units by Tenure

Occupied Units

Select Jurisdictions

U.I.a (3) Tenure, 2006

Tenure	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area*
Owned with mortgage	72,123	35,935	233,546	82,129	192,870	51,399	1,100,671
Owned free and clear	7,030	9,788	39,549	8,202	48,238	9,249	217,875
Rented	13,477	37,868	86,702	31,069	95,169	18,082	599,654
Occupied without payment	729	1,746	3,531	935	5,161	1,253	24,316
Total Occupied Units	**93,359**	**85,337**	**363,328**	**122,335**	**341,438**	**79,983**	**1,942,516**

*Excludes Culpeper, VA and Rappahannock, VA

Source: 2006 American Community Survey, 1-year file, and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

U.I.a (4) Tenure, 2000

Only includes specified units

Tenure	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area*
Owned with mortgage	37,765	21,853	190,797	57,201	158,344	37,841	831,664
Owned free and clear	3,070	6,220	27,982	4,655	33,207	8,526	154,513
Rented	11,134	48,193	98,438	25,193	98,650	15,360	627,982
Occupied without payment	445	735	3,209	1,420	2,571	878	20,431
Total Occupied Units	**52,414**	**77,001**	**320,426**	**88,469**	**292,772**	**62,605**	**1,634,590**

*Excludes Culpeper, VA and Rappahannock, VA

Source: 2000 Decennial Census, Summary File 3

U.II. Housing Units by Building Type

Occupied Units

Loudoun County, Virginia

Units										
Building Type	**2000**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Single-family detached	34,609	54,571	54,954	54,632	56,805	59,859	57,716	60,332	58,737	63,569
Single-family attached/townhouse	16,577	26,003	29,134	29,545	29,375	27,607	30,407	32,746	34,739	32,981
2-4 units	696	583	156	1,038	986	1,522	1,495	1,314	1,885	1,481
5-19 units	5,782	8,089	8,568	10,343	10,101	9,694	10,572	9,447	12,136	12,840
20-49 units	913	2,036	2,425	2,275	1,803	2,132	3,630	1,446	2,003	1,682
50+ units	1,066	1,954	1,820	1,919	3,039	3,015	2,828	3,478	3,114	3,896
Mobile home/trailer/other	257	125	349	488	183	754	204	650	401	658
Total Occupied Housing Units	**59,900**	**93,359**	**97,405**	**100,239**	**102,293**	**104,583**	**106,851**	**109,414**	**113,015**	**117,108**

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 3)
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

Share of Total										
Building Type	**2000**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Single-family detached	57.8%	58.5%	56.4%	54.5%	55.5%	57.2%	54.0%	55.1%	52.0%	54.3%
Single-family attached/townhouse	27.7%	27.9%	29.9%	29.5%	28.7%	26.4%	28.5%	29.9%	30.7%	28.2%
2-4 units	1.2%	0.6%	0.2%	1.0%	1.0%	1.5%	1.4%	1.2%	1.7%	1.3%
5-19 units	9.7%	8.7%	8.8%	10.3%	9.9%	9.3%	9.9%	8.6%	10.7%	11.0%
20-49 units	1.5%	2.2%	2.5%	2.3%	1.8%	2.0%	3.4%	1.3%	1.8%	1.4%
50+ units	1.8%	2.1%	1.9%	1.9%	3.0%	2.9%	2.6%	3.2%	2.8%	3.3%
Mobile home/trailer/other	0.4%	0.1%	0.4%	0.5%	0.2%	0.7%	0.2%	0.6%	0.4%	0.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 3)
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

U.II.a. Housing Units by Building Type

Occupied Units

Select Jursidictions

U.II.a (1) Building Type, 2014

Building Type	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area
Single-family detached	64,024	27,075	186,522	77,013	177,756	56,642	1,014,555
Single-family attached/townhouse	33,217	12,570	93,154	35,823	66,843	17,861	430,294
2-4 units	1,492	6,103	6,113	1,638	8,207	2,516	66,196
5-19 units	12,932	13,624	59,349	15,812	54,057	7,491	315,895
20-49 units	1,694	4,263	9,517	1,977	10,795	1,949	66,011
50+ units	3,924	36,930	35,010	2,538	46,534	2,193	246,980
Mobile home/trailer/other	663	167	1,814	2,633	662	432	14,216
Total Occupied Units	**117,946**	**100,732**	**391,479**	**137,434**	**364,854**	**89,084**	**2,154,147**

Source: 2014 American Community Survey, 1-year file, and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

U.II.a (2) Building Type, 2010

Building Type	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area*
Single-family detached	73,978	26,558	195,020	75,624	174,950	53,596	981,646
Single-family attached/townhouse	7,905	9,928	88,385	34,051	66,384	16,936	400,546
2-4 units	21,772	5,703	5,511	2,024	5,767	1,990	62,599
5-19 units	928	11,735	56,445	13,966	53,594	7,512	285,562
20-49 units	104,583	4,894	11,379	2,171	9,432	1,183	65,215
50+ units	2,969	33,766	30,821	1,434	49,075	2,075	233,161
Mobile home/trailer/other	742	398	1,854	1,088	274	672	13,425
Total Occupied Units	**102,979**	**92,982**	**389,415**	**130,358**	**359,476**	**83,964**	**2,042,154**

*Excludes Culpeper, VA and Rappahannock, VA

Source: 2010 American Community Survey, 1-year file, and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

U.II.a. Housing Units by Building Type
Occupied Units
Select Jursidictions

U.II.a (3) Building Type, 2006

Building Type	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area*
Single-family detached	48,522	28,974	190,432	71,119	176,504	49,880	957,578
Single-family attached/townhouse	23,121	8,895	85,793	28,801	64,113	15,576	382,073
2-4 units	518	3,005	4,273	2,344	6,103	3,220	57,906
5-19 units	7,192	15,266	46,714	15,795	46,214	8,449	280,310
20-49 units	1,810	3,033	9,860	895	9,093	644	57,993
50+ units	1,737	26,067	24,291	2,007	39,180	1,679	193,985
Mobile home/trailer/other	111	97	1,965	1,374	231	535	12,671
Total Occupied Units	**83,011**	**85,337**	**363,328**	**122,335**	**341,438**	**79,983**	**1,942,516**

*Excludes Culpeper, VA and Rappahannock, VA

Source: 2006 American Community Survey, 1-year file, and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

U.II.a (4) Building Type, 2000

Building Type	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area*
Single-family detached	34,609	27,027	178,658	51,585	168,385	46,232	857,062
Single-family attached/townhouse	16,577	8,941	80,981	25,174	58,404	12,372	349,825
2-4 units	696	5,376	6,424	1,718	6,233	2,679	63,991
5-19 units	5,782	13,918	50,285	11,801	45,437	6,305	270,468
20-49 units	913	3,252	9,020	1,007	8,881	948	54,176
50+ units	1,066	27,737	23,260	1,637	36,718	833	189,515
Mobile home/trailer/other	257	101	2,086	1,648	507	691	15,226
Total Occupied Units	**59,900**	**86,352**	**350,714**	**94,570**	**324,565**	**70,060**	**1,800,263**

*Excludes Culpeper, VA and Rappahannock, VA

Source: 2000 Decennial Census, Summary File 3

U.III. Housing Units by Year Built

Occupied Units

Loudoun County, Virginia

	2000		2014	
Year Built	**No.**	**Pct.**	**No.**	**Pct.**
2012-2014	N/A	N/A	4,815	4.1%
2010 or 2011	N/A	N/A	5,511	4.7%
2005-2009	N/A	N/A	18,860	16.1%
2000-2004	N/A	N/A	23,891	20.4%
Built 1999 to March 2000	5,528	9.2%	N/A	N/A
1990-1999	24,817	41.4%	30,639	26.2%
1980-1989	12,384	20.7%	13,331	11.4%
1979-1979	7,993	13.3%	8,931	7.6%
1960-1969	3,735	6.2%	4,254	3.6%
1950-1959	1,571	2.6%	2,262	1.9%
Before 1950	3,872	6.5%	4,613	3.9%
Total Occupied Housing Units	**59,900**	**100.0%**	**117,108**	**100.0%**

Source: 2014 American Community Survey, 1-year public use microdata sample (PUMS) files, 2000 Decennial Census (Summary File 3) and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

U.IV. Housing Units by Number of Bedrooms

Occupied Units

Loudoun County, Virginia

Units										
Number of Bedrooms	**2000**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
No Bedrooms / Studio	466	54	133	536	475	323	328	177	630	555
1 Bedroom	3,214	3,612	4,550	5,472	5,502	5,139	5,093	4,676	5,726	6,470
2 Bedrooms	9,463	12,627	14,335	14,408	14,978	14,186	17,153	16,648	16,112	15,448
3 Bedrooms	22,641	33,473	31,281	34,286	33,730	34,165	33,651	36,417	38,674	38,046
4 Bedrooms	19,279	32,387	32,777	30,424	33,679	36,165	33,740	35,929	35,672	39,931
5+ Bedrooms	4,837	11,206	14,330	15,113	13,929	14,606	16,886	15,568	16,200	16,658
Total Occupied Housing Units	**59,900**	**93,359**	**97,405**	**100,239**	**102,293**	**104,583**	**106,851**	**109,414**	**113,015**	**117,108**

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 3)
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

Share of Total										
Number of Bedrooms	**2000**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
No Bedrooms / Studio	0.8%	0.1%	0.1%	0.5%	0.5%	0.3%	0.3%	0.2%	0.6%	0.5%
1 Bedroom	5.4%	3.9%	4.7%	5.5%	5.4%	4.9%	4.8%	4.3%	5.1%	5.5%
2 Bedrooms	15.8%	13.5%	14.7%	14.4%	14.6%	13.6%	16.1%	15.2%	14.3%	13.2%
3 Bedrooms	37.8%	35.9%	32.1%	34.2%	33.0%	32.7%	31.5%	33.3%	34.2%	32.5%
4 Bedrooms	32.2%	34.7%	33.6%	30.4%	32.9%	34.6%	31.6%	32.8%	31.6%	34.1%
5+ Bedrooms	8.1%	12.0%	14.7%	15.1%	13.6%	14.0%	15.8%	14.2%	14.3%	14.2%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 3)
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

U.V. Housing Units by Occupants Per Room

Occupied Units

Loudoun County, Virginia

Units										
Occupants Per Room	**2000**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
0.50 or less	47,306	74,487	77,989	83,603	80,318	79,561	83,988	82,548	88,282	85,549
0.51 - 1.00	11,189	18,026	18,220	15,430	20,867	23,565	19,734	25,832	22,788	29,215
1.01 - 1.50	807	846	1,157	920	1,006	1,285	2,284	1,034	1,350	1,861
1.51 - 2.00	511	-	39	158	54	89	650	-	357	484
2.01+	87	-	-	128	48	82	195	-	239	-
Total Occupied Housing Units	**59,900**	**93,359**	**97,405**	**100,239**	**102,293**	**104,583**	**106,851**	**109,414**	**113,015**	**117,108**

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 3)
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

Share of Total										
Occupants Per Room	**2000**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
0.50 or less	79.0%	79.8%	80.1%	83.4%	78.5%	76.1%	78.6%	75.4%	78.1%	73.1%
0.51 - 1.00	18.7%	19.3%	18.7%	15.4%	20.4%	22.5%	18.5%	23.6%	20.2%	24.9%
1.01 - 1.50	1.3%	0.9%	1.2%	0.9%	1.0%	1.2%	2.1%	0.9%	1.2%	1.6%
1.51 - 2.00	0.9%	0.0%	0.0%	0.2%	0.1%	0.1%	0.6%	0.0%	0.3%	0.4%
2.01+	0.1%	0.0%	0.0%	0.1%	0.0%	0.1%	0.2%	0.0%	0.2%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 3)
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

U.VI. Housing Units by Gross Rent

Renter Occupied Units

Loudoun County, Virginia

	2014	
Gross Rent	**No.**	**Pct.**
<$750	1,273	4.6%
$750-1,000	1,436	5.2%
$1,001-1,250	2,265	8.2%
$1,251-1,500	3,969	14.4%
$1,501-2,000	11,280	41.0%
$2,001-2,500	4,019	14.6%
$2,500+	2,492	9.1%
Occupied without Rent	787	2.9%
Total Renter Occupied Housing Units	**27,521**	**100.0%**

Source: 2014 American Community Survey, 1-year public use microdata sample (PUMS) files
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

U.VII. Housing Units by Home Value

Owner Occupied Units

Loudoun County, Virginia

	2014	
Home Value	**No.**	**Pct.**
<$200,000	6,733	7.6%
$200,000-299,999	7,400	8.3%
$300,000-399,999	19,215	21.6%
$400,000-499,999	15,468	17.4%
$500,000-599,999	13,860	15.6%
$600,000-699,999	12,940	14.6%
$700,000-799,999	5,895	6.6%
$800,000-899,999	3,665	4.1%
$900,000-999,999	1,184	1.3%
$1,000,000+	2,447	2.8%
Total Owner Occupied Housing Units	**88,807**	**100.0%**

Source: 2014 American Community Survey, 1-year public use microdata sample (PUMS) files and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

HM.I.a. Number of Sales of Existing and New Homes

Loudoun County, Virginia

	Existing Homes				New Construction*				
Year	Condo Properties	Single-Family Attached	Single-Family Detached	Total	Condo Properties	Single-Family Attached	Single-Family Detached	Total	Total
2000	540	1,607	1,880	4,027	36	250	706	992	5,019
2001	780	2,133	2,005	4,918	46	392	839	1,277	6,195
2002	735	2,306	2,438	5,479	27	353	869	1,249	6,728
2003	898	2,858	2,872	6,628	22	372	1,243	1,637	8,265
2004	1,009	3,273	3,384	7,666	97	306	1,318	1,721	9,387
2005	977	3,013	3,201	7,191	152	409	1,357	1,918	9,109
2006	681	1,940	2,220	4,841	70	213	777	1,060	5,901
2007	523	1,625	2,199	4,347	65	210	602	877	5,224
2008	558	1,887	2,320	4,765	67	213	452	732	5,497
2009	614	1,742	2,404	4,760	81	182	369	632	5,392
2010	632	1,507	2,191	4,330	105	211	421	737	5,067
2011	543	1,422	2,209	4,174	62	273	430	765	4,939
2012	561	1,647	2,461	4,669	98	456	531	1,085	5,754
2013	708	1,966	2,723	5,397	204	382	526	1,112	6,509
2014	679	1,737	2,413	4,829	182	351	595	1,128	5,957
2015	782	2,058	2,805	5,645	130	316	502	948	6,593

*Includes 30-40% of all new construction sales in 2013-2015, based on comparisons with data from the Loudoun County Commissioner of the Revenue.

Source: Metropolitan Regional Information Systems (MRIS), GMU Center for Regional Analysis

HM.I.b.i. Median Sales Price of Existing and New Home Sales

Loudoun County, Virginia

	Existing Homes				New Construction*				
Year	Condo Properties	Single-Family Attached	Single-Family Detached	Total	Condo Properties	Single-Family Attached	Single-Family Detached	Total	Total
2000	104,000	167,900	295,000	192,500	161,810	187,555	339,636	300,610	209,000
2001	121,000	200,000	335,000	220,000	214,558	258,642	400,000	328,540	238,000
2002	147,000	229,900	355,950	252,500	273,426	277,733	430,272	374,770	269,345
2003	174,950	265,000	400,000	289,900	245,215	319,909	489,439	443,190	309,900
2004	229,900	347,900	500,000	375,000	309,687	402,195	579,157	528,320	391,000
2005	300,000	425,000	620,000	460,000	350,096	496,876	730,000	656,378	485,900
2006	308,000	405,000	601,000	450,000	362,140	507,072	785,975	702,998	484,900
2007	275,000	378,000	555,000	419,000	319,000	470,000	691,583	608,749	440,000
2008	184,900	289,900	451,000	330,000	296,990	416,842	627,637	520,665	350,000
2009	150,000	285,000	450,000	321,500	276,600	380,000	538,857	447,385	335,000
2010	175,000	309,900	490,000	349,900	304,209	380,000	557,514	439,015	364,900
2011	195,000	305,000	492,000	358,745	264,067	388,424	568,485	466,410	380,000
2012	205,995	331,650	505,000	372,900	305,058	409,026	594,000	464,367	395,470
2013	235,000	363,000	540,000	405,000	345,000	443,477	647,207	490,925	421,989
2014	249,900	375,000	550,000	419,900	344,312	447,800	670,655	524,930	435,000
2015	250,000	377,500	557,000	417,000	350,200	469,822	677,293	549,559	435,000

*Includes 30-40% of all new construction sales in 2013-2015, based on comparisons with data from the Loudoun County Commissioner of the Revenue. Pricing does not substantially differ between the two.

Source: Metropolitan Regional Information Systems (MRIS), GMU Center for Regional Analysis

HM.I.b.ii. Price of Existing and New Home Sales

Loudoun County, Virginia

Existing Homes											
Year	**<$200k**	**$200-299k**	**$300-399k**	**$400-499k**	**$500-599k**	**$600-699k**	**$700-799k**	**$800-899k**	**$900-999k**	**$1M+**	**Total**
2000	2,152	954	596	188	65	21	15	13	8	15	4,027
2001	1,916	1,675	769	344	105	45	18	13	11	22	4,918
2002	1,323	2,326	990	538	178	58	32	11	7	16	5,479
2003	1,011	2,627	1,505	888	329	146	59	24	13	26	6,628
2004	352	1,432	2,673	1,423	902	522	179	77	31	74	7,665
2005	70	555	1,483	2,183	1,086	777	514	240	118	165	7,191
2006	34	358	1,246	1,247	753	579	309	156	55	104	4,841
2007	81	529	1,243	988	605	428	211	110	44	108	4,347
2008	758	1,267	1,113	599	472	253	147	73	40	43	4,765
2009	849	1,241	1,066	585	508	279	108	54	35	35	4,760
2010	611	984	1,031	609	511	296	130	75	36	47	4,330
2011	449	1,019	941	630	526	275	169	75	28	62	4,174
2012	366	934	1,293	758	624	346	175	84	24	65	4,669
2013	242	814	1,556	1,019	750	545	228	122	46	75	5,397
2014	166	683	1,352	970	704	478	220	122	46	88	4,829
2015	209	752	1,592	1,134	837	595	262	114	56	94	5,645

Source: Metropolitan Regional Information Systems (MRIS), GMU Center for Regional Analysis

New Construction Sales*											
Year	**<$200k**	**$200-299k**	**$300-399k**	**$400-499k**	**$500-599k**	**$600-699k**	**$700-799k**	**$800-899k**	**$900-999k**	**$1M+**	**Total**
2000	208	286	285	125	41	19	18	8	-	2	992
2001	94	439	308	257	93	35	25	10	7	9	1,277
2002	18	348	356	223	152	86	28	14	8	16	1,249
2003	10	211	437	362	302	185	72	34	8	16	1,637
2004	8	139	270	344	344	261	162	91	56	46	1,721
2005	6	59	186	291	301	258	312	210	122	173	1,918
2006	4	13	60	157	129	156	156	158	74	153	1,060
2007	2	23	100	172	128	136	126	75	37	78	877

2008	2	51	128	152	142	105	58	39	16	39	732
2009	10	79	146	169	102	57	33	17	4	15	632
2010	5	61	235	143	134	80	48	21	2	8	737
2011	8	42	206	173	187	94	32	8	10	5	765
2012	4	72	250	283	221	159	65	17	5	9	1,085
2013	3	36	271	261	185	182	102	44	17	11	1,112
2014	3	9	247	270	147	211	136	50	19	36	1,128
2015	3	4	165	233	137	195	124	46	14	27	948

*Includes 30-40% of all new construction sales in 2013-2015, based on comparisons with data from the Loudoun County Commissioner of the Revenue.

Source: Metropolitan Regional Information Systems (MRIS), GMU Center for Regional Analysis

HM.I.c. Closed Sales by Price, Type and Number of Bedrooms, 2015

Loudoun County, Virginia

Single-Family Detached							
	0/1	**2**	**3**	**4**	**5**	**6+**	**Total**
<200k	1	8	3	2	0	0	14
200-299k	1	13	50	18	1	1	84
300-399k	-	27	174	204	36	3	444
400-499k	1	13	137	305	62	5	523
500-599k	-	6	72	522	151	12	763
600-699k	1	2	25	441	253	32	754
700-799k	1	0	12	191	141	34	379
800-899k	-	0	2	71	61	24	158
900-999k	-	0	1	22	33	12	68
1M+	-	0	7	39	46	28	120
Total	**5**	**69**	**483**	**1,815**	**784**	**151**	**3,307**

Source: Metropolitan Regional Information Systems (MRIS), GMU Center for Regional Analysis

Single-Family Attached							
	0/1	**2**	**3**	**4**	**5**	**6+**	**Total**
<200k	-	3	10	0	0	0	13
200-299k	-	56	188	37	0	0	281
300-399k	1	59	800	154	2	0	1,016
400-499k	-	3	608	200	5	0	816
500-599k	3	2	113	61	22	1	202
600-699k	-	0	12	19	2	1	34
700-799k	-	0	2	3	2	0	7
800-899k	-	0	1	0	1	0	2
900-999k	-	0	1	1	0	0	2
1M+	-	0	0	1	0	0	1
Total	**4**	**123**	**1,735**	**476**	**34**	**2**	**2,374**

Source: Metropolitan Regional Information Systems (MRIS), GMU Center for Regional Analysis

Condo Properties							
	0/1	2	3	4	5	6+	Total
<200k	63	99	23	0	0	0	185
200-299k	5	255	126	5	0	0	391
300-399k	1	37	245	14	0	0	297
400-499k	-	9	18	0	0	1	28
500-599k	-	0	6	3	0	0	9
600-699k	-	0	1	1	0	0	2
700-799k	-	0	0	0	0	0	-
800-899k	-	0	0	0	0	0	-
900-999k	-	0	0	0	0	0	-
1M+	-	0	0	0	0	0	-
Total	**69**	**400**	**419**	**23**	**-**	**1**	**912**

Source: Metropolitan Regional Information Systems (MRIS), GMU Center for Regional Analysis

All Properties							
	0/1	2	3	4	5	6+	Total
<200k	64	110	36	2	-	-	212
200-299k	6	324	364	60	1	1	756
300-399k	2	123	1,219	372	38	3	1,757
400-499k	1	25	763	505	67	6	1,367
500-599k	3	8	191	586	173	13	974
600-699k	1	2	38	461	255	33	790
700-799k	1	-	14	194	143	34	386
800-899k	-	-	3	71	62	24	160
900-999k	-	-	2	23	33	12	70
1M+	-	-	7	40	46	28	121
Total	**78**	**592**	**2,637**	**2,314**	**818**	**154**	**6,593**

Source: Metropolitan Regional Information Systems (MRIS), GMU Center for Regional Analysis

HM.I.d. Active Listings by Price, April 2016

Loudoun County, Virginia

Price Group	No.	Pct.
<$200k	33	1.8%
$200-299k	104	5.7%
$300-399k	224	12.3%
$400-499k	231	12.7%
$500-599k	283	15.6%
$600-699k	373	20.6%
$700-799k	178	9.8%
$800-899k	137	7.5%
$900-999k	81	4.5%
$1M+	171	9.4%
Total	**1,815**	**100.0%**

Source: Metropolitan Regional Information Systems (MRIS), GMU Center for Regional Analysis

HM.I.e. Active Listings by Unit Type, Number of Bedrooms and Unit Size, April 2016

Loudoun County, Virginia

	No.	Pct.
Unit Type		
Condo	219	12.1%
Single-Family Attached	337	18.6%
Single-Family Detached	1,259	69.4%
Number of Bedrooms		
0	2	0.1%
1	19	1.0%
2	129	7.1%
3	478	26.3%
4	740	40.8%
5	345	19.0%
6+	102	5.6%
Unit Square Feet		
N/A	374	20.6%
<1,000	34	1.9%
1,000 - 1,999	239	13.2%
2,000 - 2,999	322	17.7%
3,000 - 3,999	316	17.4%
4,000 - 4,999	250	13.8%
5,000 - 5,999	124	6.8%
6,000 - 6,999	66	3.6%
7,000+	90	5.0%
Total	**1,815**	**100.0%**

Source: Metropolitan Regional Information Systems (MRIS), GMU Center for Regional Analysis

HM.II. Summary of 2015 Rental Market

Loudoun County, Virginia

	Units by # of Bedrooms				Share of Total by Bedrooms			
	0 or 1	**2**	**3**	**Total**	**0 or 1**	**2**	**3**	**Total**
Market-Rate Units* by Average Price								
<$1,000	10	50	2	72	14%	69%	3%	100%
$1,000-1,199	218	138	-	574	38%	24%	0%	100%
$1,200-1,299	657	718	-	2,032	32%	35%	0%	100%
$1,300-1,399	518	942	36	2,014	26%	47%	2%	100%
$1,400-1,499	970	570	298	2,808	35%	20%	11%	100%
$1,500-1,599	640	1,004	178	2,462	26%	41%	7%	100%
$1,600-1,699	280	1,188	64	1,812	15%	66%	4%	100%
$1,700-1,799	346	228	202	1,122	31%	20%	18%	100%
$1,800-1,999	-	994	95	1,089	0%	91%	9%	100%
$2,000-2,199	-	-	183	183	0%	0%	100%	100%
$2,200+	-	-	77	77	0%	0%	100%	100%
Total	**3,639**	**5,832**	**1,135**	**14,245**	**26%**	**41%**	**8%**	**100%**
Income Restricted Complexes**								
Total	118	225	38	381	31%	59%	10%	100%
Senior Housing**								
Total	637	157	28	822	77%	19%	3%	100%

* Includes complexes for which the total number of units is known by number of bedrooms and price range.

** Includes complexes for which the total number of units is known.

Source: Loudoun County Department of Family Services

HM.III. Residential Building Permits by Type of Structure

Loudoun County, Virginia

	Permits Issued				Share of Total			
Year	Single-Family Detached	Single-Family Attached	Multi-family	Total	Single-Family Detached	Single-Family Attached	Multi-family	Total
1991	523	493	84	1,100	48%	45%	8%	100%
1992	1,369	942	115	2,426	56%	39%	5%	100%
1993	1,610	1,175	319	3,104	52%	38%	10%	100%
1994	1,723	1,339	786	3,848	45%	35%	20%	100%
1995	1,382	1,066	238	2,686	51%	40%	9%	100%
1996	1,646	1,065	345	3,056	54%	35%	11%	100%
1997	1,904	1,278	323	3,505	54%	36%	9%	100%
1998	2,384	1,527	1,363	5,274	45%	29%	26%	100%
1999	2,746	1,817	1,289	5,852	47%	31%	22%	100%
2000	2,680	2,377	1,077	6,134	44%	39%	18%	100%
2001	1,827	1,578	1,307	4,712	39%	33%	28%	100%
2002	2,874	1,608	1,494	5,976	48%	27%	25%	100%
2003	3,316	2,247	1,094	6,657	50%	34%	16%	100%
2004	3,498	2,000	1,095	6,593	53%	30%	17%	100%
2005	3,151	1,557	357	5,065	62%	31%	7%	100%
2006	1,886	870	305	3,061	62%	28%	10%	100%
2007	1,442	996	301	2,739	53%	36%	11%	100%
2008	804	706	881	2,391	34%	30%	37%	100%
2009	960	816	309	2,085	46%	39%	15%	100%
2010	1,027	755	177	1,959	52%	39%	9%	100%
2011	1,061	1,302	596	2,959	36%	44%	20%	100%
2012	1,299	1,649	771	3,719	35%	44%	21%	100%
2013	1,685	1,797	1,318	4,800	35%	37%	27%	100%
2014	1,686	1,160	641	3,487	48%	33%	18%	100%
2015	1,465	1,165	952	3,582	41%	33%	27%	100%

Source: Loudoun County Department of Building and Development.

A.I. Housing Costs as a Percent of Household Income

Owner Households

Loudoun County, Virginia

Owner Households	2000*	2006	2007	2008	2009	2010	2011	2012	2013	2014
<30%	32,113	45,271	47,766	49,306	51,374	54,635	56,100	62,401	64,983	66,265
30-49%	6,751	19,685	20,747	19,934	19,962	19,858	18,145	16,539	13,278	15,628
50%+	1,971	14,198	12,193	8,675	9,469	7,390	7,855	7,590	6,410	6,914
Total Owner Households	**40,835**	**79,153**	**80,706**	**77,915**	**80,805**	**81,883**	**82,100**	**86,530**	**84,671**	**88,807**

*Only includes specified units

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 3)
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

Share of Owner Households	2000*	2006	2007	2008	2009	2010	2011	2012	2013	2014
<30%	78.6%	57.2%	59.2%	63.3%	63.6%	66.7%	68.3%	72.1%	76.7%	74.6%
30-49%	16.5%	24.9%	25.7%	25.6%	24.7%	24.3%	22.1%	19.1%	15.7%	17.6%
50%+	4.8%	17.9%	15.1%	11.1%	11.7%	9.0%	9.6%	8.8%	7.6%	7.8%
Total Owner Households	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

*Only includes specified units

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 3)
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

A.II. Housing Costs as a Percent of Household Income

Renter Households

Loudoun County, Virginia

Renter Households	2000*	2006	2007	2008	2009	2010	2011	2012	2013	2014
<30%	7,874	7,317	7,790	12,380	11,399	12,785	14,596	13,187	16,268	14,359
30-49%	2,309	3,954	5,335	4,876	5,432	5,715	6,360	5,691	7,819	7,772
50%+	1,396	2,934	3,574	5,068	4,656	4,200	3,795	4,005	4,256	6,169
Total Renter Households	**11,579**	**14,206**	**16,699**	**22,324**	**21,488**	**22,700**	**24,751**	**22,884**	**28,344**	**28,300**

*Only includes specified units

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 3)
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

Share of Renter Households	2000*	2006	2007	2008	2009	2010	2011	2012	2013	2014
<30%	68.0%	51.5%	46.6%	55.5%	53.1%	56.3%	59.0%	57.6%	57.4%	50.7%
30-49%	19.9%	27.8%	32.0%	21.8%	25.3%	25.2%	25.7%	24.9%	27.6%	27.5%
50%+	12.1%	20.7%	21.4%	22.7%	21.7%	18.5%	15.3%	17.5%	15.0%	21.8%
Total Renter Households	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

*Only includes specified units

Source: 1-Year American Community Survey (2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014), 2000 Decennial Census (Summary File 3)
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

A.I.a. Percent of Households that are Cost Burdened

Select Jurisdictions

A.I.a (1) Percent of Households that are Cost Burdened, 2014

	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area
Owner Households	25.4%	19.2%	23.1%	26.4%	25.5%	26.3%	25.8%
Renter Households	49.3%	40.4%	46.0%	54.0%	50.6%	49.3%	49.0%
Total Occupied Units	**31.2%**	**31.0%**	**30.6%**	**34.0%**	**34.2%**	**32.3%**	**34.5%**

Source: 2014 American Community Survey, 1-year file, and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

A.I.a (2) Percent of Households that are Cost Burdened, 2010

	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area*
Owner Households	33.3%	26.4%	28.3%	32.4%	32.8%	30.3%	32.5%
Renter Households	43.7%	39.1%	44.1%	46.9%	53.1%	40.3%	48.3%
Total Occupied Units	**35.5%**	**33.5%**	**33.0%**	**36.3%**	**39.6%**	**32.7%**	**38.1%**

*Excludes Culpeper, VA and Rappahannock, VA

Source: 2010 American Community Survey, 1-year file, and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

A.I.a (3) Percent of Households that are Cost Burdened, 2006

	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area*
Owner Households	42.8%	27.7%	32.0%	41.0%	31.9%	32.3%	33.8%
Renter Households	48.5%	37.1%	47.3%	45.9%	46.0%	37.6%	45.5%
Total Occupied Units	**43.7%**	**32.0%**	**35.8%**	**42.3%**	**36.1%**	**33.5%**	**37.6%**

*Excludes Culpeper, VA and Rappahannock, VA

Source: 2006 American Community Survey, 1-year file, and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

A.I.a (4) Percent of Households that are Cost Burdened, 2000

Only includes specified units

	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area*

Owner Households	21.4%	17.4%	19.8%	22.9%	22.0%	22.6%	22.8%
Renter Households	32.0%	32.6%	31.8%	33.5%	36.7%	33.3%	35.4%
Total Occupied Units	**23.7%**	**27.1%**	**23.6%**	**26.1%**	**27.1%**	**25.4%**	**27.8%**

*Excludes Culpeper, VA and Rappahannock, VA

Source: 2000 Decennial Census, Summary File 3

A.III.a. Housing Costs as a Percent of Household Income by Household Income, 2012-2014 Average (2015 $s)

All Households

Loudoun County, Virginia

	Total Households		<30%		30-49%		50%+	
Household Income	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
<$15K	3,025	2.7%	355	11.7%	249	8.2%	2,420	80.0%
$15-29K	4,846	4.3%	894	18.4%	833	17.2%	3,120	64.4%
$30-59K	14,273	12.6%	3,989	28.0%	6,457	45.2%	3,827	26.8%
$60-79K	9,708	8.6%	4,528	46.6%	4,164	42.9%	1,017	10.5%
$80-99K	12,021	10.6%	7,822	65.1%	3,640	30.3%	559	4.7%
$100-119K	11,848	10.5%	9,359	79.0%	2,240	18.9%	249	2.1%
$120-149K	14,839	13.1%	12,435	83.8%	2,272	15.3%	132	0.9%
$150-199K	17,495	15.5%	16,076	91.9%	1,359	7.8%	60	0.3%
$200-249K	11,740	10.4%	11,212	95.5%	528	4.5%	0	0.0%
$250K+	13,382	11.8%	13,021	97.3%	360	2.7%	0	0.0%
Total Households	**113,179**	**100.0%**	**79,692**	**70.4%**	**22,102**	**19.5%**	**11,385**	**10.1%**

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

A.III.b. Housing Costs as a Percent of Household Income by Percent of 2015 Area Median Income, 2012-2014 Average

All Households

Loudoun County, Virginia

	Total Households		<30%		30-49%		50%+	
Area Median Income	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Less than 30% AMI	7,048	6.2%	881	12.5%	999	14.2%	5,169	73.3%
30-49% AMI	7,377	6.5%	1,424	19.3%	3,076	41.7%	2,878	39.0%
50-59% AMI	5,879	5.2%	2,077	35.3%	2,824	48.0%	978	16.6%
60-79% AMI	10,398	9.2%	4,847	46.6%	4,328	41.6%	1,223	11.8%
80-99% AMI	10,831	9.6%	6,607	61.0%	3,630	33.5%	595	5.5%
100-119% AMI	12,511	11.1%	9,505	76.0%	2,694	21.5%	311	2.5%
120-139% AMI	10,890	9.6%	8,966	82.3%	1,814	16.7%	110	1.0%
140-159% AMI	8,628	7.6%	7,451	86.4%	1,108	12.8%	69	0.8%
160-179% AMI	6,936	6.1%	6,501	93.7%	382	5.5%	53	0.8%
180-199% AMI	7,706	6.8%	7,288	94.6%	417	5.4%	0	0.0%
200%AMI +	24,975	22.1%	24,145	96.7%	830	3.3%	0	0.0%
Total Households	**113,179**	**100.0%**	**79,692**	**70.4%**	**22,102**	**19.5%**	**11,385**	**10.1%**

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

A.III.c. Housing Costs as a Percent of Household Income by Percent of 2015 Select Area Median Income, 2012-2014 Average

All Households

Loudoun County, Virginia

	Total Households		<30%		30-49%		50%+	
Area Median Income	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Less than 30% AMI	7,048	6.2%	881	12.5%	999	14.2%	5,169	73.3%
30-49.9% AMI	7,377	6.5%	1,424	19.3%	3,076	41.7%	2,878	39.0%
50-69.9% AMI	10,579	9.3%	3,738	35.3%	5,293	50.0%	1,548	14.6%
50-59.9% AMI	5,879	5.2%	2,077	*35.3%*	2,824	*48.0%*	978	*16.6%*
70-79.9% AMI	5,698	5.0%	3,186	55.9%	1,860	32.6%	653	11.5%
80-99.9% AMI	10,831	9.6%	6,607	61.0%	3,630	33.5%	595	5.5%
100%+ AMI	71,645	63.3%	63,856	89.1%	7,245	10.1%	543	0.8%
Total Households	**113,179**	**100.0%**	**79,692**	**70.4%**	**22,102**	**19.5%**	**11,385**	**10.1%**

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

A.III.d. Housing Costs as a Percent of Household Income by Household Type, 2012-2014 Average

All Households

Loudoun County, Virginia

	Total Households		<30%		30-49%		50%+	
Household Type	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Married Couple, w/ Children	46,482	41.1%	34,648	74.5%	9,401	20.2%	2,432	5.2%
Married Couple, w/o Children	27,236	24.1%	21,656	79.5%	3,671	13.5%	1,909	7.0%
Single Parent	9,138	8.1%	4,524	49.5%	2,935	32.1%	1,679	18.4%
Other Family, w/o Children	5,153	4.6%	3,452	67.0%	986	19.1%	716	13.9%
Living Alone (65+)	5,083	4.5%	2,445	48.1%	945	18.6%	1,693	33.3%
Living Alone (Under 65)	14,181	12.5%	8,264	58.3%	3,492	24.6%	2,425	17.1%
Other Non-Family, Not Living Alone	5,905	5.2%	4,702	79.6%	673	11.4%	530	9.0%
Total Households	**113,179**	**100.0%**	**79,692**	**70.4%**	**22,102**	**19.5%**	**11,385**	**10.1%**

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

A.III.e. Housing Costs as a Percent of Household Income by Household Size, 2012-2014 Average

All Households

Loudoun County, Virginia

	Total Households		<30%		30-49%		50%+	
Household Size	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
1-person	19,265	17.0%	10,709	55.6%	4,437	23.0%	4,119	21.4%
2-person	30,876	27.3%	23,058	74.7%	5,049	16.4%	2,768	9.0%
3-person	21,657	19.1%	15,890	73.4%	4,040	18.7%	1,728	8.0%
4+ person	41,381	36.6%	30,034	72.6%	8,576	20.7%	2,770	6.7%
Total Households	**113,179**	**100.0%**	**79,692**	**70.4%**	**22,102**	**19.5%**	**11,385**	**10.1%**

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

A.III.f. Housing Costs as a Percent of Household Income by Race/Ethnicity of Household Head, 2012-2014 Average

All Households

Loudoun County, Virginia

	Total Households		<30%		30-49%		50%+	
Householder Race/Ethnicity	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
White	75,262	66.5%	55,800	74.1%	12,357	16.4%	7,105	9.4%
Black	8,061	7.1%	5,071	62.9%	1,922	23.8%	1,068	13.2%
Asian	15,464	13.7%	11,105	71.8%	2,991	19.3%	1,368	8.8%
Other/Multi-Racial	2,910	2.6%	1,941	66.7%	619	21.3%	350	12.0%
Hispanic	11,483	10.1%	5,775	50.3%	4,215	36.7%	1,493	13.0%
Total Households	**113,179**	**100.0%**	**79,692**	**70.4%**	**22,102**	**19.5%**	**11,385**	**10.1%**

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

A.III.g. Housing Costs as a Percent of Household Income by Age of Household Head, 2012-2014 Average

All Households

Loudoun County, Virginia

	Total Households		<30%		30-49%		50%+	
Householder Age	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Under 25	1,457	1.3%	522	35.9%	318	21.8%	617	42.3%
25-34	16,991	15.0%	11,686	68.8%	3,664	21.6%	1,640	9.7%
35-44	32,773	29.0%	23,396	71.4%	7,063	21.6%	2,313	7.1%
45-54	29,667	26.2%	22,140	74.6%	5,376	18.1%	2,151	7.3%
55-64	18,801	16.6%	12,915	68.7%	3,686	19.6%	2,200	11.7%
65+	13,490	11.9%	9,031	66.9%	1,995	14.8%	2,464	18.3%
Total Households	**113,179**	**100.0%**	**79,692**	**70.4%**	**22,102**	**19.5%**	**11,385**	**10.1%**

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

A.III.g.1. Housing Costs as a Percent of Household Income by Age of Household Head
All Households
Loudoun County, Virginia (2012-2014)

		<30%		30-49%		50%+	
Householder Age	**Total**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Under 20	82	0	0.0%	0	0.0%	82	100.0%
20-34	18,366	12,209	66.5%	3,982	21.7%	2,175	11.8%
35-64	81,241	58,452	71.9%	16,125	19.8%	6,664	8.2%
65+	13,490	9,031	66.9%	1,995	14.8%	2,464	18.3%
55+	32,291	21,946	68.0%	5,681	17.6%	4,664	14.4%
62+	17,487	11,530	65.9%	2,908	16.6%	3,050	17.4%
70+	8,646	5,512	63.8%	1,141	13.2%	1,993	23.0%
Total Households	**113,179**	**79,692**	**70.4%**	**22,102**	**19.5%**	**11,385**	**10.1%**

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average

A.III.h. Housing Costs as a Percent of Household Income by Disability Status of Household Members, 2012-2014 Average
All Households
Loudoun County, Virginia

	Total Households		<30%		30-49%		50%+	
	No.	%	No.	%	No.	%	No.	%
With a Disability	**7,301**	**6.5%**	**4,431**	**60.7%**	**1,374**	**18.8%**	**1,496**	**20.5%**
Hearing Difficulty	1,780	1.6%	1,272	71.5%	265	14.9%	242	13.6%
Vision Difficulty	569	0.5%	329	57.8%	91	16.0%	149	26.2%
Cognitive Difficulty	568	0.5%	490	86.3%	8	1.4%	70	12.3%
Ambulatory Difficulty	1,192	1.1%	443	37.2%	406	34.1%	342	28.7%
With a Self-Care Difficulty	72	0.1%	27	37.5%	18	25.0%	27	37.5%
Independent Living Difficulty	376	0.3%	104	27.7%	180	47.9%	92	24.5%
Multiple Disabilities	2,743	2.4%	1,765	64.3%	405	14.8%	574	20.9%
Without a Disability	**105,877**	**93.5%**	**75,261**	**71.1%**	**20,728**	**19.6%**	**9,889**	**9.3%**
Total Households	**113,179**	**100.0%**	**79,692**	**70.4%**	**22,102**	**19.5%**	**11,385**	**10.1%**

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average
and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

A.III.i.1. Households by Income and Homes Affordable at Different Income Levels (Homeowners)
Loudoun County, Virginia (2012-2014)

	Number of Bedrooms					
Units with Values Affordable to	**0**	**1**	**2**	**3**	**4+**	**Total**
Less than 30% AMI	-	99	540	1,145	915	2,699
30-49.9% AMI	-	255	999	1,412	814	3,480
50-69.9% AMI	-	312	1,511	3,193	2,303	7,319
50-59.9% AMI	-	*189*	*644*	*1,564*	*1,088*	*3,485*
70-79.9% AMI	-	-	1,135	3,669	1,833	6,637
80-99.9% AMI	27	93	1,732	8,772	5,444	16,067
100%+ AMI	27	204	1,094	11,372	38,093	50,790
Total Ownership Units	**54**	**964**	**7,011**	**29,563**	**49,401**	**86,993**

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

	Household Size					
Owner Households Earning	**1**	**2**	**3**	**4**	**5+**	**Total**
Less than 30% AMI	1,624	672	394	224	217	3,132
30-49.9% AMI	1,225	962	633	706	646	4,171
50-69.9% AMI	1,520	1,773	851	1,012	865	6,020
50-59.9% AMI	*728*	*955*	*377*	*581*	*343*	*2,984*
70-79.9% AMI	726	1,160	570	639	963	4,058
80-99.9% AMI	1,355	1,459	1,136	1,834	1,723	7,507
100%+ AMI	5,707	18,337	13,782	15,771	8,509	62,106
Total Owner Households	**12,158**	**24,362**	**17,366**	**20,185**	**12,922**	**86,993**

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

About 42 percent of homes in Loudoun County are affordable to households earning below the area median household income (AMI), including 37 percent of homes with three or more bedrooms. Only about 28 percent of current homeowners have incomes below AMI.

It is particularly difficult for lower-income households to find homeownership opportunities they can afford. For example, only about one out of ten homes in the County are affordable to families earning at or below 60 percent of AMI.

A.III.i.2. Households by Income and Homes Affordable at Different Income Levels (Renters*)
Loudoun County, Virginia (2012-2014)

	Number of Bedrooms					
Units with Rents Affordable to	**0**	**1**	**2**	**3**	**4+**	**Total**
Less than 30% AMI	125	267	412	449	57	1,311
30-49.9% AMI	-	833	1,507	988	149	3,477
50-69.9% AMI	61	1,753	3,485	3,355	941	9,594
50-59.9% AMI	*-*	*570*	*1,344*	*1,422*	*250*	*3,587*
70-79.9% AMI	51	760	1,905	1,411	524	4,651
80-99.9% AMI	-	404	1,013	1,788	879	4,084
100%+ AMI	88	388	413	325	851	2,066
Total Rental Units	**325**	**4,405**	**8,736**	**8,316**	**3,401**	**25,183**

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

*Excludes households not paying rent

	Household Size					
Renter Households Earning	**1**	**2**	**3**	**4**	**5+**	**Total**
Less than 30% AMI	1,437	779	647	424	376	3,663
30-49.9% AMI	688	522	364	800	750	3,124
50-69.9% AMI	1,306	797	938	796	642	4,478
50-59.9% AMI	*705*	*593*	*595*	*409*	*550*	*2,851*
70-79.9% AMI	407	325	256	140	356	1,485
80-99.9% AMI	511	934	376	632	722	3,175
100%+ AMI	2,375	2,942	1,595	1,540	806	9,258
Total Renter Households	**6,725**	**6,298**	**4,177**	**4,332**	**3,651**	**25,183**

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average and Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series

*Excludes households not paying rent

There are nearly 9,700 renters in Loudoun County with incomes below 60 percent of the area median income (AMI), including more than 3,300 households with four or more people. There are very few units--less than 1,500--that are affordable to these lower-income households with larger family sizes.
There are very few smaller units affordable and available to extremely low income households. There are nearly 3,700 renter households with incomes below 30 percent of AMI but only 1,311 units that are available at this income level.

E.I. Gross Regional Product and Gross County Product, Percent Change from Prior Year, 2000-2014

Year	Washington Metropolitan Area	Loudoun County, VA
2000	5.3	16.6
2001	4.1	15.5
2002	2.6	4.8
2003	3.9	8.8
2004	5.3	13.2
2005	4.6	8.6
2006	2.0	2.7
2007	1.7	2.2
2008	2.2	3.8
2009	(0.1)	0.5
2010	3.2	5.5
2011	1.4	3.2
2012	0.2	1.8
2013	(0.0)	4.3
2014	0.3	1.1

Source: Bureau of Economic Analysis, IHS Economics, GMU Center for Regional Analysis

E.II.a. Jobs By Sector

Job Located in Loudoun County, Virginia

Jobs										
Sector	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Natural resources and mining	520	592	625	533	579	580	624	641	631	564
Construction	9,070	10,204	10,418	10,806	12,596	14,887	14,923	14,261	14,114	13,630
Manufacturing	4,260	4,184	4,271	4,627	4,773	4,918	5,286	5,132	4,877	4,666
Wholesale Trade	2,780	2,695	3,071	3,129	3,323	3,312	3,385	3,557	3,461	3,481
Retail Trade	8,695	9,747	10,139	10,981	11,947	13,159	14,720	14,938	15,893	15,512
Transportation and Utilities	12,334	11,488	9,815	9,854	9,353	10,243	10,261	10,255	10,295	9,380
Information	7,640	14,411	12,986	11,450	11,724	11,011	10,193	10,477	9,489	8,963
Financial activities	2,949	3,444	3,267	3,492	3,446	3,754	3,958	4,116	4,237	4,195
Professional and business services	12,766	14,063	13,606	15,083	16,726	18,970	21,241	22,619	24,051	24,523
Education and health services	4,362	5,491	5,670	4,998	6,009	8,120	8,929	9,108	9,524	9,828
Leisure and hospitality	8,609	8,758	8,665	8,598	9,343	10,180	10,673	12,166	12,776	12,226
Other services	2,163	2,313	2,625	3,113	3,577	3,927	3,962	3,910	4,151	4,010
Federal Government	4,267	4,106	4,281	4,792	4,650	4,444	4,265	4,278	4,336	4,154
State & Local Government	8,648	9,696	10,704	11,517	12,260	13,519	14,565	15,254	16,055	16,595
Total	**89,064**	**101,191**	**100,142**	**102,973**	**110,305**	**121,022**	**126,985**	**130,709**	**133,890**	**131,727**

Source: Quarterly Workforce Indicators (Private Sector), Quarterly Census of Wages and Employment (Public Sector)

Share of Total										
Sector	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Natural resources and mining	0.6%	0.6%	0.6%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.4%
Construction	10.2%	10.1%	10.4%	10.5%	11.4%	12.3%	11.8%	10.9%	10.5%	10.3%
Manufacturing	4.8%	4.1%	4.3%	4.5%	4.3%	4.1%	4.2%	3.9%	3.6%	3.5%
Wholesale Trade	3.1%	2.7%	3.1%	3.0%	3.0%	2.7%	2.7%	2.7%	2.6%	2.6%
Retail Trade	9.8%	9.6%	10.1%	10.7%	10.8%	10.9%	11.6%	11.4%	11.9%	11.8%
Transportation and Utilities	13.8%	11.4%	9.8%	9.6%	8.5%	8.5%	8.1%	7.8%	7.7%	7.1%
Information	8.6%	14.2%	13.0%	11.1%	10.6%	9.1%	8.0%	8.0%	7.1%	6.8%
Financial activities	3.3%	3.4%	3.3%	3.4%	3.1%	3.1%	3.1%	3.1%	3.2%	3.2%
Professional and business services	14.3%	13.9%	13.6%	14.6%	15.2%	15.7%	16.7%	17.3%	18.0%	18.6%

E.II.a. Jobs By Sector

Job Located in Loudoun County, Virginia

Education and health services	4.9%	5.4%	5.7%	4.9%	5.4%	6.7%	7.0%	7.0%	7.1%	7.5%
Leisure and hospitality	9.7%	8.7%	8.7%	8.3%	8.5%	8.4%	8.4%	9.3%	9.5%	9.3%
Other services	2.4%	2.3%	2.6%	3.0%	3.2%	3.2%	3.1%	3.0%	3.1%	3.0%
Federal Government	4.8%	4.1%	4.3%	4.7%	4.2%	3.7%	3.4%	3.3%	3.2%	3.2%
State & Local Government	9.7%	9.6%	10.7%	11.2%	11.1%	11.2%	11.5%	11.7%	12.0%	12.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Quarterly Workforce Indicators (Private Sector), Quarterly Census of Wages and Employment (Public Sector)

2010	2011	2012	2013	2014
578	630	688	628	607
14,296	13,523	11,696	12,760	13,424
4,856	5,227	6,142	6,515	6,362
3,229	3,579	3,767	3,550	3,610
15,726	16,286	16,262	16,600	16,495
9,412	9,700	10,136	9,427	9,645
7,297	7,320	6,743	6,951	7,467
4,200	4,721	4,894	4,952	4,893
25,311	26,470	28,775	30,315	30,204
11,547	12,010	12,298	12,930	13,530
12,379	14,016	14,304	15,457	16,005
4,252	4,738	5,001	4,995	5,032
4,269	4,391	4,301	4,049	3,814
16,573	17,154	17,783	18,183	18,565
133,923	**139,763**	**142,790**	**147,311**	**149,650**

2010	2011	2012	2013	2014
0.4%	0.5%	0.5%	0.4%	0.4%
10.7%	9.7%	8.2%	8.7%	9.0%
3.6%	3.7%	4.3%	4.4%	4.3%
2.4%	2.6%	2.6%	2.4%	2.4%
11.7%	11.7%	11.4%	11.3%	11.0%
7.0%	6.9%	7.1%	6.4%	6.4%
5.4%	5.2%	4.7%	4.7%	5.0%
3.1%	3.4%	3.4%	3.4%	3.3%
18.9%	18.9%	20.2%	20.6%	20.2%

8.6%	8.6%	8.6%	8.8%	9.0%
9.2%	10.0%	10.0%	10.5%	10.7%
3.2%	3.4%	3.5%	3.4%	3.4%
3.2%	3.1%	3.0%	2.7%	2.5%
12.4%	12.3%	12.5%	12.3%	12.4%
100.0%	**100.0%**	**100.0%**	**100.0%**	**100.0%**

E.II.b. Average Wage By Sector (2014 $s)

Job located in Loudoun County, Virginia

Sector	2000	2001	2002	2003	2004	2005	2006	2007	2008
Natural resources and mining	48,788	48,700	49,551	51,032	48,671	53,537	48,600	48,921	48,649
Construction	60,015	59,576	60,252	60,285	62,105	63,265	61,824	68,179	66,226
Manufacturing	59,165	62,393	74,631	76,720	80,242	78,307	79,984	82,129	86,248
Wholesale Trade	91,667	85,843	80,445	80,679	83,719	87,543	86,987	89,529	93,177
Retail Trade	36,391	35,219	36,604	35,824	34,840	35,248	34,271	33,602	32,172
Transportation and Utilities	59,101	65,175	71,097	62,156	53,207	50,062	57,565	52,690	51,895
Information	238,286	182,465	129,211	126,122	145,956	146,868	149,111	135,009	124,783
Financial activities	62,668	61,832	68,633	69,673	71,782	72,159	80,773	73,576	71,107
Professional and business services	76,921	73,305	74,584	76,008	81,120	83,390	82,042	85,942	84,029
Education and health services	51,671	48,058	48,614	54,855	55,555	51,897	50,413	51,214	54,327
Leisure and hospitality	35,116	33,641	33,676	32,654	35,221	32,473	36,665	32,795	34,143
Other services	45,177	45,315	46,518	49,818	51,409	49,513	46,756	45,350	44,619
Federal Government	86,810	88,128	88,701	83,689	87,468	85,427	84,674	82,361	82,658
State & Local Government	45,812	47,904	50,668	49,860	49,693	49,458	50,468	51,435	50,834
Total	**72,996**	**74,948**	**68,123**	**66,144**	**68,569**	**66,839**	**66,697**	**65,992**	**64,022**

Source: Quarterly Workforce Indicators (Private Sector), Quarterly Census of Wages and Employment (Public Sector)

2009	2010	2011	2012	2013	2014
44,294	43,543	42,827	49,170	41,509	42,497
66,407	68,767	66,994	68,091	62,968	63,014
83,484	88,130	85,525	91,209	97,961	98,112
95,311	99,032	96,334	88,898	87,732	84,868
31,291	30,632	30,179	31,054	29,934	30,442
51,574	51,428	49,869	53,971	55,701	51,803
123,565	122,738	136,087	129,412	125,764	126,054
67,339	74,563	79,787	92,445	84,010	88,453
86,646	86,588	87,078	86,069	84,215	82,169
54,196	51,969	51,935	52,038	51,670	50,131
33,219	37,146	33,524	32,276	30,738	31,927
44,470	46,008	47,189	44,492	42,886	42,572
84,231	84,779	83,952	82,835	82,092	85,616
51,698	50,346	48,691	49,035	48,698	48,840
64,226	**64,021**	**63,670**	**63,950**	**62,585**	**62,122**

E.II.c. Summary of Employment and Wages, 2000 and 2014

Job located in Loudoun County, Virginia

	2000			2014			Change			
							Jobs		Average Wage	
	Jobs	Share	Avg. Wage (2014 $s)	Jobs	Share	Avg. Wage (2014 $s)	Jobs	Percent	Wage	Percent
Natural resources & mining	520	0.6%	48,788	607	0.4%	42,497	87	16.6%	(6,292)	-12.9%
Construction	9,070	10.2%	60,015	13,424	9.0%	63,014	4,354	48.0%	2,999	5.0%
Manufacturing	4,260	4.8%	59,165	6,362	4.3%	98,112	2,102	49.4%	38,947	65.8%
Wholesale trade	2,780	3.1%	91,667	3,610	2.4%	84,868	830	29.8%	(6,799)	-7.4%
Retail Trade	8,695	9.8%	36,391	16,495	11.0%	30,442	7,799	89.7%	(5,949)	-16.3%
Transportation & utilities	12,334	13.8%	59,101	9,645	6.4%	51,803	(2,689)	-21.8%	(7,298)	-12.3%
Information	7,640	8.6%	238,286	7,467	5.0%	126,054	(173)	-2.3%	(112,232)	-47.1%
Financial activities	2,949	3.3%	62,668	4,893	3.3%	88,453	1,944	65.9%	25,785	41.1%
Professional & business services	12,766	14.3%	76,921	30,204	20.2%	82,169	17,437	136.6%	5,247	6.8%
Education & health services	4,362	4.9%	51,671	13,530	9.0%	50,131	9,168	210.2%	(1,540)	-3.0%
Leisure & hospitality	8,609	9.7%	35,116	16,005	10.7%	31,927	7,396	85.9%	(3,189)	-9.1%
Other services	2,163	2.4%	45,177	5,032	3.4%	42,572	2,869	132.6%	(2,606)	-5.8%
Federal government	4,267	4.8%	86,810	3,814	2.5%	85,616	(453)	-10.6%	(1,194)	-1.4%
State & local government	8,648	9.7%	45,812	18,565	12.4%	48,840	9,917	114.7%	3,028	6.6%
Total	**89,064**	**100.0%**	**72,996**	**149,650**	**100.0%**	**62,122**	**60,586**	**68.0%**	**(10,874)**	**-14.9%**

Source: Quarterly Workforce Indicators (Private Sector), Quarterly Census of Wages and Employment (Public Sector)

E.II.d. Common Occupation By Sector, 2012-2014 Average

Jobs Located in Loudoun County, Virginia

	Most Common Detailed Occupation		Most Common Major Occupation Group	
Sector	**Occupation**	**Share of Employment**	**Occupation**	**Share of Employment**
Natural resources & mining	Farmers, ranchers, & other agricultural managers	35.4%	Management	46.5%
Construction	Construction laborers	11.9%	Construction & Extraction	60.1%
Manufacturing	Miscellaneous managers	9.7%	Management	21.5%
Wholesale Trade	Sales representatives, wholesale & manufacturing	32.5%	Sales & Related	45.2%
Retail Trade	Retail salespersons	21.5%	Sales & Related	59.0%
Transportation & Utilities	Flight attendants	12.3%	Transportation & Material Moving	48.6%
Information	Network & computer systems administrators	5.9%	Computer & mathematical	21.6%
Financial activities	Financial managers	13.2%	Management	28.2%
Professional & business services	Miscellaneous managers	8.4%	Computer & mathematical	22.7%
Education & health services	Registered nurses	9.4%	Healthcare Practitioners & Technical	25.8%
Leisure & hospitality	Waiters & waitresses	16.4%	Food Preparation & Serving Related	48.7%
Other services	Childcare workers	9.8%	Personal Care & Service	30.5%
Federal Government	Security guards & gaming surveillance officers	6.1%	Office & Administrative Support	21.2%
State & Local Government	Elementary & middle school teachers	26.0%	Education, Training, & Library	43.6%
All Jobs	**Miscellaneous managers**	**4.1%**	**Management**	**13.8%**

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average

E.II.e. Workers By Age Group

Hold Private Sector Job in Loudoun County, Virginia

Workers								
Year	**<25**	**25-34**	**35-44**	**45-54**	**55-64**	**65+**	**Total**	
2000	11,574	21,784	21,946	13,369	5,805	1,672	76,150	7,478
2001	13,087	25,471	25,068	15,273	6,544	1,946	87,388	8,490
2002	12,361	24,224	24,451	15,206	6,936	1,981	85,158	8,917
2003	12,617	23,715	24,814	15,961	7,423	2,135	86,665	9,558
2004	14,148	25,205	26,140	17,443	8,070	2,390	93,396	10,460
2005	16,010	26,738	28,202	19,849	9,333	2,928	103,060	12,261
2006	16,481	26,822	29,370	21,807	10,328	3,360	108,169	13,688
2007	16,589	27,097	29,712	23,081	11,111	3,602	111,192	14,713
2008	16,552	27,022	29,602	24,455	11,963	3,934	113,528	15,897
2009	15,354	25,711	28,686	24,977	12,288	3,960	110,976	16,248
2010	15,161	25,847	28,574	26,095	13,125	4,279	113,080	17,404
2011	15,887	26,537	29,117	27,459	14,430	4,787	118,216	19,217
2012	15,867	26,491	29,107	28,340	15,538	5,363	120,706	20,902
2013	16,421	27,215	29,997	29,017	16,515	5,915	125,080	22,429
2014	16,438	27,237	30,089	29,650	17,523	6,335	127,270	23,858

Source: Quarterly Workforce Indicators

Share of Total								
Year	**<25**	**25-34**	**35-44**	**45-54**	**55-64**	**65+**	**Total**	
2000	15.2%	28.6%	28.8%	17.6%	7.6%	2.2%	100.0%	9.8%
2001	15.0%	29.1%	28.7%	17.5%	7.5%	2.2%	100.0%	9.7%
2002	14.5%	28.4%	28.7%	17.9%	8.1%	2.3%	100.0%	10.5%
2003	14.6%	27.4%	28.6%	18.4%	8.6%	2.5%	100.0%	11.0%
2004	15.1%	27.0%	28.0%	18.7%	8.6%	2.6%	100.0%	11.2%
2005	15.5%	25.9%	27.4%	19.3%	9.1%	2.8%	100.0%	11.9%
2006	15.2%	24.8%	27.2%	20.2%	9.5%	3.1%	100.0%	12.7%
2007	14.9%	24.4%	26.7%	20.8%	10.0%	3.2%	100.0%	13.2%
2008	14.6%	23.8%	26.1%	21.5%	10.5%	3.5%	100.0%	14.0%

2009	13.8%	23.2%	25.8%	22.5%	11.1%	3.6%	100.0%	14.6%
2010	13.4%	22.9%	25.3%	23.1%	11.6%	3.8%	100.0%	15.4%
2011	13.4%	22.4%	24.6%	23.2%	12.2%	4.0%	100.0%	16.3%
2012	13.1%	21.9%	24.1%	23.5%	12.9%	4.4%	100.0%	17.3%
2013	13.1%	21.8%	24.0%	23.2%	13.2%	4.7%	100.0%	17.9%
2014	12.9%	21.4%	23.6%	23.3%	13.8%	5.0%	100.0%	18.7%

Source: Quarterly Workforce Indicators

E.II.f. Workers By Age Group, Comparison with Washington DC Metropolitan Area, 2006 & 2014

Private Sector Jobs

Share of Workers

	2006			2014			2006-2014 Change (Pct. Pts.)		
Place of Work	Washington	Loudoun	Difference (Pct. Pts.)	Washington	Loudoun	Difference (Pct. Pts.)	Washington	Loudoun	Difference (Pct. Pts.)
<25	14.3%	15.2%	0.9%	11.7%	12.9%	1.2%	-2.6%	-2.3%	0.3%
25-34	24.4%	24.8%	0.4%	23.6%	21.4%	-2.2%	-0.7%	-3.4%	-2.7%
35-44	25.3%	27.2%	1.9%	22.4%	23.6%	1.2%	-2.9%	-3.5%	-0.6%
45-54	21.2%	20.2%	-1.1%	22.2%	23.3%	1.1%	1.0%	3.1%	2.1%
55-64	11.4%	9.5%	-1.8%	14.6%	13.8%	-0.9%	3.3%	4.2%	1.0%
65+	3.4%	3.1%	-0.3%	5.4%	5.0%	-0.4%	2.0%	1.9%	-0.1%

Source: Quarterly Workforce Indicators

E.II.g. Place of Residence for Workers over 16 Years Old, 2009-2013 Average

Select Jurisdictions

Place of Work	Loudoun County, VA		Arlington County, VA		Fairfax County, VA		Prince William County, VA		Montgomery County, MD	
	# of Workers	Share of Workers	# of Workers	Share of Workers	# of Workers	Share of Workers	# of Workers	Share of Workers	# of Workers	Share of Workers
Residence										
Same County	80,274	56.6%	45,721	23.8%	314,595	53.0%	76,431	59.0%	310,261	63.9%
Elsewhere in Washington DC Metropolitan Area	50,165	35.3%	135,350	70.6%	255,137	43.0%	47,813	36.9%	125,888	25.9%
Virginia	39,386	27.8%	89,889	46.9%	198,559	33.4%	45,968	35.5%	30,396	6.3%
Maryland	5,746	4.0%	30,855	16.1%	43,462	7.3%	1,435	1.1%	73,663	15.2%
West Virginia	4,055	2.9%	278	0.1%	1,366	0.2%	186	0.1%	1,344	0.3%
D.C.	978	0.7%	14,328	7.5%	11,750	2.0%	224	0.2%	20,485	4.2%
Elsewhere in Virginia	5,181	3.7%	1,584	0.8%	7,633	1.3%	3,417	2.6%	1,033	0.2%
Elsewhere in West Virginia	2,004	1.4%	182	0.1%	1,146	0.2%	198	0.2%	1,577	0.3%
Elsewhere in Maryland	1,848	1.3%	5,741	3.0%	6,934	1.2%	346	0.3%	40,097	8.3%
Other	2,445	1.7%	3,128	1.6%	8,383	1.4%	1,343	1.0%	6,924	1.4%
Total	**141,917**	**100.0%**	**191,706**	**100.0%**	**593,828**	**100.0%**	**129,548**	**100.0%**	**485,780**	**100.0%**

Source: 2009-2013 American Community Survey, 5-year average

Frederick County, MD	
# of Workers	Share of Workers
70,661	67.4%
9,435	9.0%
1,216	1.2%
6,388	6.1%
1,712	1.6%
119	0.1%
354	0.3%
1,979	1.9%
15,742	15.0%
6,673	6.4%
104,844	**100.0%**

E.II.h. Share of Residents Holding At-Place Jobs, 2012-2014 Average

Select Jurisdictions

	Loudoun County, VA	Arlington County, VA	Fairfax County, VA*	Prince William County, VA**	Montgomery County, MD	Frederick County, MD
Natural resources and mining	71%	17%	44%	81%	82%	58%
Construction	30%	28%	44%	55%	51%	55%
Manufacturing	40%	36%	43%	57%	63%	61%
Wholesale Trade	41%	43%	50%	46%	55%	56%
Retail Trade	70%	24%	64%	77%	68%	77%
Transportation and Utilities	33%	9%	39%	60%	56%	57%
Information	40%	26%	45%	58%	49%	71%
Financial activities	63%	26%	52%	59%	61%	56%
Professional and business services	56%	23%	49%	62%	62%	65%
Education and health services	64%	25%	56%	65%	64%	75%
Leisure and hospitality	73%	38%	68%	83%	77%	84%
Other services	67%	26%	64%	71%	74%	73%
Federal Government	45%	16%	43%	39%	57%	64%
State & Local Government	69%	33%	61%	68%	70%	74%
Total	**56%**	**24%**	**53%**	**63%**	**64%**	**69%**

*includes the cities of Fairfax and Falls Church

**includes the cities of Manassas and Manassas Park

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average

E.II.i. Percent of At-Place Employment Held by Non-Residents, 2012-2014 Average

Select Jurisdictions

	Loudoun County, VA	Arlington County, VA	Fairfax County, VA*	Prince William County, VA**	Montgomery County, MD	Frederick County, MD
Natural resources and mining	29%	83%	56%	19%	18%	42%
Construction	70%	72%	56%	45%	49%	45%
Manufacturing	60%	64%	57%	43%	37%	39%
Wholesale Trade	59%	57%	50%	54%	45%	44%
Retail Trade	30%	76%	36%	23%	32%	23%
Transportation and Utilities	67%	91%	61%	40%	44%	43%
Information	60%	74%	55%	42%	51%	29%
Financial activities	37%	74%	48%	41%	39%	44%
Professional and business services	44%	77%	51%	38%	38%	35%
Education and health services	36%	75%	44%	35%	36%	25%
Leisure and hospitality	27%	62%	32%	17%	23%	16%
Other services	33%	74%	36%	29%	26%	27%
Federal Government	55%	84%	57%	61%	43%	36%
State & Local Government	31%	67%	39%	32%	30%	26%
Total	**44%**	**76%**	**47%**	**37%**	**36%**	**31%**

*includes the cities of Fairfax and Falls Church

**includes the cities of Manassas and Manassas Park

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average

E.II.j. Mode of Commute to Work for Workers over 16 Years Old, 2014

Select Jurisdictions

Workers by Place of Work

Mode	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area
Drove alone	129,444	99,053	492,716	114,634	352,845	80,996	2,194,432
Carpooled	17,285	17,432	57,223	15,131	51,843	12,300	318,019
Public Transportation	2,207	43,006	19,463	2,895	54,170	1,166	473,409
Bicycled	419	1,226	1,663	342	2,160	446	25,994
Walked	3,183	6,492	9,577	2,808	9,329	2,616	100,060
Other	1,348	1,643	6,915	1,008	3,858	626	33,990
Worked at Home	12,245	10,600	36,054	6,888	30,211	8,017	159,705
Total	**166,131**	**179,452**	**623,611**	**143,706**	**504,416**	**106,167**	**3,305,609**

Source: 2014 American Community Survey, 1-year file

As a Share of Total

Mode	Loudoun County, VA	Arlington County, VA	Fairfax County, VA	Prince William County, VA	Montgomery County, MD	Frederick County, MD	Washington DC Metropolitan Area
Drove alone	77.9%	55.2%	79.0%	79.8%	70.0%	76.3%	66.4%
Carpooled	10.4%	9.7%	9.2%	10.5%	10.3%	11.6%	9.6%
Public Transportation	1.3%	24.0%	3.1%	2.0%	10.7%	1.1%	14.3%
Bicycled	0.3%	0.7%	0.3%	0.2%	0.4%	0.4%	0.8%
Walked	1.9%	3.6%	1.5%	2.0%	1.8%	2.5%	3.0%
Other	0.8%	0.9%	1.1%	0.7%	0.8%	0.6%	1.0%
Worked at Home	7.4%	5.9%	5.8%	4.8%	6.0%	7.6%	4.8%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: 2014 American Community Survey, 1-year file

E.III.a. Resident Workers by Sector, 2012-2014 Average

Residents of Loudoun County, Virginia

Year	# of Workers	% of Total
Natural resources and mining	632	0.4%
Construction	7,545	4.2%
Manufacturing	8,601	4.8%
Wholesale Trade	2,511	1.4%
Retail Trade	17,939	10.0%
Transportation and Utilities	5,400	3.0%
Information	7,283	4.1%
Financial activities	11,141	6.2%
Professional and business services	43,340	24.2%
Education and health services	19,646	11.0%
Leisure and hospitality	13,541	7.6%
Other services	7,608	4.2%
Federal Government	16,800	9.4%
State & Local Government	17,094	9.5%
Total	**179,081**	**100.0%**

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average

E.III.b. Median Wage for Resident Workers by Sector, 2012-2014 Average, 2015 $s

Residents of Loudoun County, Virginia

Year	Median Wage
Natural resources and mining	51,288
Construction	52,140
Manufacturing	92,318
Wholesale Trade	55,623
Retail Trade	24,272
Transportation and Utilities	45,509
Information	101,132
Financial activities	80,906
Professional and business services	97,447
Education and health services	40,149
Leisure and hospitality	20,515
Other services	40,453
Federal Government	105,323
State & Local Government	48,211
Total	**61,525**

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average

E.III.c. Resident Workers Age Group, 2012-2014 Average

Residents of Loudoun County, Virginia

Year	# of Workers	% of Total
<25	17,938	10.0%
25-34	36,515	20.4%
35-44	51,982	29.0%
45-54	44,998	25.1%
55-64	21,722	12.1%
65+	5,927	3.3%
Total	**179,081**	**100.0%**

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average

E.III.d. Place of Work for Resident Workers over 16 Years Old, 2009-2013 Average

Select Jurisdictions

Place of Residence	Loudoun, VA		Arlington, VA		Fairfax, VA		Prince William, VA		Montgomery, MD	
	# of Workers	Share of Workers	# of Workers	Share of Workers	# of Workers	Share of Workers	# of Workers	Share of Workers	# of Workers	Share of Workers
Place of Work										
Same County	80,274	46.8%	45,721	33.1%	314,595	53.2%	76,431	35.6%	310,261	59.6%
Elsewhere in Washington DC Metropolitan Area	87,960	51.3%	90,228	65.3%	265,687	45.0%	135,340	63.0%	184,579	35.5%
Virginia	72,895	42.5%	34,822	25.2%	142,565	24.1%	107,411	50.0%	36,823	7.1%
D.C.	9,841	5.7%	48,944	35.4%	95,323	16.1%	22,033	10.2%	111,136	21.4%
Maryland	5,098	3.0%	6,462	4.7%	27,782	4.7%	5,809	2.7%	36,548	7.0%
West Virginia	126	0.1%	-	0.0%	17	0.0%	87	0.0%	72	0.0%
Elsewhere in Virginia	839	0.5%	423	0.3%	2,313	0.4%	816	0.4%	538	0.1%
Elsewhere in Maryland	903	0.5%	756	0.5%	3,717	0.6%	1,098	0.5%	20,737	4.0%
Elsewhere in West Virginia	66	0.0%	-	0.0%	145	0.0%	24	0.0%	126	0.0%
Other	1,329	0.8%	1,033	0.7%	4,599	0.8%	1,256	0.6%	3,984	0.8%
Total	171,371	100.0%	138,161	100.0%	591,056	100.0%	214,965	100.0%	520,225	100.0%

Source: 2009-2013 American Community Survey, 5-year average

Frederick, MD	
# of Workers	Share of Workers
70,661	57.7%
37,378	30.5%
5,560	4.5%
4,230	3.5%
27,195	22.2%
393	0.3%
324	0.3%
11,863	9.7%
216	0.2%
2,071	1.7%
122,513	100.0%

E.III.e. Mode of Commute to Work for Resident Workers over 16 Years Old, 2014

Select Jurisdictions

Workers by Place of Residence

Mode	Loudoun, VA	Arlington, VA	Fairfax, VA	Prince William, VA	Montgomery, MD	Frederick, MD	Washington DC Metropolitan Area
Drove alone	146,226	77,513	431,199	173,549	343,435	97,677	2,083,081
Carpooled	16,144	7,711	55,535	32,316	56,746	13,763	305,011
Public Transportation	8,623	37,754	61,305	11,665	87,252	4,326	450,131
Bicycled	256	2,648	1,935	291	3,677	505	25,698
Walked	3,312	5,450	10,670	2,371	9,477	2,638	98,391
Other	1,186	1,573	6,521	2,081	4,579	1,111	30,724
Worked at Home	12,245	10,600	36,054	6,888	30,211	8,017	159,705
Total	**187,992**	**143,249**	**603,219**	**229,161**	**535,377**	**128,037**	**3,152,741**

Source: 2014 American Community Survey, 1-year file

As a Share of Total

Mode	Loudoun, VA	Arlington, VA	Fairfax, VA	Prince William, VA	Montgomery, MD	Frederick, MD	Washington DC Metropolitan Area
Drove alone	77.8%	54.1%	71.5%	75.7%	64.1%	76.3%	66.1%
Carpooled	8.6%	5.4%	9.2%	14.1%	10.6%	10.7%	9.7%
Public Transportation	4.6%	26.4%	10.2%	5.1%	16.3%	3.4%	14.3%
Bicycled	0.1%	1.8%	0.3%	0.1%	0.7%	0.4%	0.8%
Walked	1.8%	3.8%	1.8%	1.0%	1.8%	2.1%	3.1%
Other	0.6%	1.1%	1.1%	0.9%	0.9%	0.9%	1.0%
Worked at Home	6.5%	7.4%	6.0%	3.0%	5.6%	6.3%	5.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: 2014 American Community Survey, 1-year file

E.III.f. Employment Rate by Age Group, 2012-2014 Average

Includes wage and salary employment, self-employment, employment in a family business and internships/volunterism without pay

Place of Residence	Loudoun County, VA	Arlington County, VA	Fairfax County, VA*	Prince William County, VA**	Montgomery County, MD	FrederickCounty, MD
16-24	55.5%	63.5%	49.8%	55.1%	46.9%	56.7%
25-34	84.2%	87.7%	83.6%	82.5%	82.2%	84.0%
35-44	84.9%	86.6%	84.1%	82.9%	84.1%	85.1%
45-54	85.2%	83.6%	84.1%	84.1%	85.5%	82.9%
55-64	71.2%	69.9%	73.6%	72.0%	74.7%	71.0%
65+	26.6%	25.0%	25.1%	22.5%	25.7%	20.8%
Total	**73.5%**	**75.4%**	**69.4%**	**70.9%**	**67.9%**	**67.7%**

*Includes the cities of Fairfax and Falls Church

**Includes the cities of Manassas and Manassas Park

Source: 2012, 2013 and 2014 American Community Surveys, 1-year public use microdata sample (PUMS) files, average

I. Jobs by Sector, Loudoun County, 2015-2040

	2015	2020	2025	2030	2035	2040
Construction, Natural Resources, & Mining	14,350	18,009	19,092	20,290	20,362	20,754
Manufacturing	5,803	6,182	6,300	6,312	6,232	6,092
Transportation, Trade, & Utilities	32,818	35,584	37,473	39,662	40,735	40,916
Information	7,609	8,584	10,405	11,832	13,413	14,508
Financial Activities	5,142	5,326	5,900	6,513	7,149	7,647
Professional & Business Services	31,496	39,348	48,876	59,548	69,754	81,183
Education & Health Services	15,794	18,353	20,742	22,889	24,661	25,862
Leisure & Hospitality	17,365	19,894	21,543	23,312	25,092	26,585
Other Services	6,504	6,872	7,605	8,600	9,119	9,607
Federal Government	3,808	3,706	3,950	4,344	4,508	4,697
State & Local Government	19,569	21,628	24,047	26,545	28,439	29,473
Military	1,114	1,133	1,152	1,148	1,143	1,142
Total, non-Military	*160,258*	*183,486*	*205,934*	*229,846*	*249,463*	*267,324*
Total	**161,372**	**184,620**	**207,087**	**230,994**	**250,607**	**268,466**

Source: IHS Economics, Loudoun County Department of Planning and Zoning, GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

II. Jobs by Occupation, Loudoun County, 2015-2040

	2015	2020	2025	2030	2035	2040
Management Occupations	22,072	25,210	28,182	31,295	33,805	36,188
Business and Financial Operations Occupations	7,963	9,750	11,864	14,240	16,534	18,956
Computer and mathematical occupations	11,794	13,656	15,969	18,327	20,378	22,410
Architecture and Engineering Occupations	4,508	4,997	5,533	6,067	6,502	6,934
Life, Physical, and Social Science Occupations	1,428	1,789	2,227	2,715	3,171	3,644
Community and Social Service Occupations	1,747	1,999	2,311	2,656	2,942	3,180
Legal Occupations	1,348	1,853	2,527	3,347	4,232	5,255
Education, Training, and Library Occupations	12,066	13,072	14,107	15,042	15,581	15,649
Arts, Design, Entertainment, Sports, and Media Occupations	2,126	2,956	4,016	5,238	6,576	7,960
Healthcare Practitioners and Technical Occupations	5,694	6,586	7,459	8,292	8,982	9,499
Healthcare Support Occupations	2,340	2,635	2,904	3,135	3,299	3,388
Protective Service Occupations	3,986	4,588	5,338	6,187	6,945	7,676
Food Preparation and Serving Related Occupations	9,605	11,054	12,086	13,195	14,286	15,205
Building and Grounds Cleaning and Maintenance Occupations	5,553	6,482	7,500	8,624	9,633	10,668
Personal Care and Service Occupations	5,630	5,862	6,059	6,244	6,187	5,993
Sales and Related Occupations	19,014	20,973	22,701	24,492	25,728	26,433
Office and Administrative Support Occupations	16,146	18,760	21,621	24,778	27,595	30,236
Farming, Fishing, and Forestry Occupations	308	382	415	453	473	501
Construction and Extraction Occupations	9,257	11,535	12,376	13,302	13,546	13,953
Installation, Maintenance, and Repair Occupations	5,388	5,966	6,481	6,988	7,265	7,434
Production Occupations	3,018	3,418	3,794	4,183	4,483	4,740
Transportation and Material Moving Occupations	9,268	9,966	10,465	11,046	11,321	11,422
Total, non-Military	**160,258**	**183,486**	**205,934**	**229,846**	**249,463**	**267,324**

Source: IHS Economics, Loudoun County Department of Planning and Zoning, GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

III. Households by Age of Householder, Loudoun County, 2015-2040

	2015	2020	2025	2030	2035	2040
<35	19,795	27,936	34,591	33,274	32,684	30,807
35-44	34,186	37,043	39,829	48,544	55,224	53,793
45-54	31,805	33,124	34,676	37,137	39,255	47,056
55-64	19,596	20,672	21,517	22,835	23,983	26,183
65+	15,718	17,493	20,001	22,673	24,817	27,618
Total	**121,100**	**136,269**	**150,615**	**164,463**	**175,964**	**185,456**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

IV. Households by Labor Force Participation Status, Loudoun County, 2015-2040

	2015	2020	2025	2030	2035	2040
Household has a worker with a payroll job	105,857	119,416	130,838	142,666	152,593	161,301
Household does not have a worker with a payroll job	15,243	16,853	19,777	21,797	23,371	24,155
Total	**121,100**	**136,269**	**150,615**	**164,463**	**175,964**	**185,456**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

V. Households by Disability Status, Loudoun County, 2015-2040

	2015	2020	2025	2030	2035	2040
No member of the household has a disability	104,566	118,751	131,452	143,284	153,098	160,711
1+ members of the household has/have a disability	16,534	17,518	19,163	21,178	22,866	24,745
Total	**121,100**	**136,269**	**150,615**	**164,463**	**175,964**	**185,456**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

VI. Households by Household Size, Loudoun County, 2015-2040

	2015	2020	2025	2030	2035	2040
1 Person	20,696	23,250	26,305	29,134	31,438	33,981
2 People	33,915	37,882	41,785	44,912	47,465	50,521
3 People	23,415	26,517	29,299	31,553	33,469	35,198
4+ People	43,074	48,620	53,226	58,864	63,592	65,756
Total	**121,100**	**136,269**	**150,615**	**164,463**	**175,964**	**185,456**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

VII. Households by Unit Type, Loudoun County, 2015-2040

	2015	2020	2025	2030	2035	2040
Single-Family Detached, Owner	59,683	67,340	74,412	80,849	86,246	90,360
Single-Family Detached, Renter	5,425	5,957	6,440	6,879	7,234	7,532
Single-Family Attached, Owner	29,247	33,143	36,734	40,415	43,468	46,178
Single-Family Attached, Renter	8,681	9,601	10,585	11,678	12,559	13,145
Multi-Family, Owner	4,298	4,903	5,556	6,230	6,804	7,340
Multi-Family, Renter	13,766	15,325	16,887	18,413	19,653	20,901
Total	**121,100**	**136,269**	**150,615**	**164,463**	**175,964**	**185,456**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

VIII. Households by Area Median Income Group, Loudoun County, 2015-2040

	2015	2020	2025	2030	2035	2040
<30% AMI	8,092	8,607	9,570	10,328	10,919	11,291
30-49% AMI	8,219	8,964	9,828	10,657	11,293	11,689
50-59% AMI	5,557	6,316	6,975	7,699	8,250	8,673
60-69% AMI	5,414	5,994	6,533	6,980	7,334	7,635
70-79% AMI	5,617	6,304	6,914	7,443	7,845	8,125
80-99% AMI	12,220	13,658	14,905	16,133	17,152	17,907
100-119% AMI	12,815	14,396	15,835	17,238	18,396	19,268
120-149% AMI	16,106	18,048	19,799	21,477	22,853	23,996
150%+ AMI	47,061	53,982	60,257	66,507	71,922	76,871
Total	**121,100**	**136,269**	**150,615**	**164,463**	**175,964**	**185,456**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

VIII.a. Households by Area Median Income Group and Age of Householder, Loudoun County, 2015-2040

Householder Under 35 Years Old

	2015	2020	2025	2030	2035	2040
<30% AMI	1,928	2,103	2,328	2,257	2,217	2,121
30-49% AMI	1,766	2,162	2,416	2,300	2,266	2,164
50-59% AMI	1,010	1,370	1,631	1,564	1,540	1,447
60-69% AMI	1,344	1,607	1,803	1,735	1,709	1,634
70-79% AMI	1,192	1,556	1,843	1,773	1,728	1,621
80-99% AMI	2,517	3,258	3,808	3,644	3,598	3,426
100-119% AMI	2,456	3,318	3,990	3,826	3,751	3,534
120-149% AMI	2,650	3,749	4,643	4,465	4,372	4,107
150%+ AMI	4,934	8,813	12,128	11,710	11,503	10,753
Total	**19,795**	**27,936**	**34,591**	**33,274**	**32,684**	**30,807**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

Householder Between 35 and 44 Years Old

	2015	2020	2025	2030	2035	2040
<30% AMI	1,138	1,149	1,209	1,523	1,732	1,647
30-49% AMI	2,185	2,283	2,389	2,873	3,172	3,027
50-59% AMI	1,478	1,583	1,672	2,096	2,384	2,283
60-69% AMI	1,126	1,161	1,237	1,493	1,673	1,608
70-79% AMI	1,532	1,623	1,720	2,060	2,301	2,224
80-99% AMI	3,440	3,754	4,029	4,877	5,509	5,345
100-119% AMI	4,243	4,546	4,843	5,779	6,481	6,290
120-149% AMI	4,998	5,405	5,766	6,865	7,700	7,503
150%+ AMI	14,048	15,540	16,964	20,978	24,272	23,865
Total	**34,186**	**37,043**	**39,829**	**48,544**	**55,224**	**53,793**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

Householder Between 45 and 54 Years Old

	2015	2020	2025	2030	2035	2040
<30% AMI	1,563	1,420	1,467	1,512	1,549	1,858
30-49% AMI	1,233	1,230	1,284	1,358	1,417	1,773
50-59% AMI	914	987	1,042	1,133	1,206	1,568
60-69% AMI	1,022	1,089	1,137	1,207	1,264	1,538
70-79% AMI	1,076	1,124	1,183	1,274	1,351	1,640

VIII.a. Households by Area Median Income Group and Age of Householder, Loudoun County, 2015-2040

80-99% AMI	2,914	3,016	3,155	3,374	3,559	4,258
100-119% AMI	3,207	3,271	3,428	3,686	3,902	4,686
120-149% AMI	4,705	4,936	5,145	5,453	5,722	6,687
150%+ AMI	15,172	16,051	16,835	18,138	19,285	23,049
Total	**31,805**	**33,124**	**34,676**	**37,137**	**39,255**	**47,056**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

VIII.a. Households by Area Median Income Group and Age of Householder, Loudoun County, 2015-2040

Householder Between 55 and 64 Years Old

	2015	2020	2025	2030	2035	2040
<30% AMI	1,074	1,234	1,315	1,303	1,301	1,316
30-49% AMI	1,062	1,173	1,226	1,251	1,273	1,325
50-59% AMI	1,121	1,105	1,134	1,194	1,242	1,333
60-69% AMI	866	918	959	995	1,026	1,092
70-79% AMI	920	986	1,032	1,080	1,123	1,209
80-99% AMI	1,768	1,921	2,002	2,114	2,208	2,389
100-119% AMI	1,545	1,705	1,782	1,906	2,011	2,216
120-149% AMI	2,499	2,563	2,655	2,857	3,033	3,350
150%+ AMI	8,740	9,067	9,413	10,134	10,767	11,952
Total	**19,596**	**20,672**	**21,517**	**22,835**	**23,983**	**26,183**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

Householder 65 Years Old or Older

	2015	2020	2025	2030	2035	2040
<30% AMI	2,389	2,701	3,251	3,733	4,121	4,348
30-49% AMI	1,973	2,116	2,513	2,876	3,165	3,401
50-59% AMI	1,034	1,270	1,496	1,711	1,877	2,042
60-69% AMI	1,056	1,220	1,396	1,550	1,662	1,764
70-79% AMI	898	1,015	1,136	1,256	1,342	1,432
80-99% AMI	1,581	1,709	1,910	2,123	2,278	2,489
100-119% AMI	1,364	1,556	1,792	2,041	2,252	2,542
120-149% AMI	1,255	1,395	1,589	1,836	2,026	2,349
150%+ AMI	4,167	4,511	4,917	5,547	6,095	7,251
Total	**15,718**	**17,493**	**20,001**	**22,673**	**24,817**	**27,618**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

VIII.b. Households by Area Median Income Group and Labor Force Participation Status, Loudoun County, 2015-2040

Household has a worker with a payroll job

	2015	2020	2025	2030	2035	2040
<30% AMI	4,124	4,500	4,784	5,113	5,355	5,522
30-49% AMI	5,825	6,407	6,807	7,278	7,626	7,847
50-59% AMI	4,580	5,114	5,532	6,063	6,468	6,813
60-69% AMI	4,354	4,784	5,120	5,449	5,719	5,992
70-79% AMI	4,964	5,533	6,001	6,442	6,786	7,059
80-99% AMI	10,872	12,119	13,123	14,196	15,107	15,826
100-119% AMI	11,587	13,032	14,213	15,449	16,465	17,275
120-149% AMI	14,951	16,767	18,306	19,831	21,101	22,192
150%+ AMI	44,600	51,160	56,951	62,844	67,966	72,775
Total	**105,857**	**119,416**	**130,838**	**142,666**	**152,593**	**161,301**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

Household does not have a worker with a payroll job

	2015	2020	2025	2030	2035	2040
<30% AMI	3,968	4,107	4,786	5,215	5,564	5,769
30-49% AMI	2,394	2,557	3,021	3,379	3,667	3,842
50-59% AMI	977	1,202	1,442	1,636	1,783	1,860
60-69% AMI	1,060	1,210	1,412	1,531	1,615	1,644
70-79% AMI	654	771	913	1,001	1,059	1,067
80-99% AMI	1,348	1,538	1,781	1,938	2,045	2,081
100-119% AMI	1,228	1,364	1,622	1,788	1,930	1,993
120-149% AMI	1,154	1,282	1,493	1,646	1,752	1,804
150%+ AMI	2,461	2,822	3,306	3,663	3,956	4,096
Total	**15,243**	**16,853**	**19,777**	**21,797**	**23,371**	**24,155**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

VIII.c. Households by Area Median Income Group and Disability Status, Loudoun County, 2015-2040

No member of the household has a disability

	2015	2020	2025	2030	2035	2040
<30% AMI	6,032	6,696	7,450	8,024	8,452	8,667
30-49% AMI	6,533	7,132	7,750	8,306	8,727	8,935
50-59% AMI	4,426	5,071	5,602	6,120	6,514	6,803
60-69% AMI	4,256	4,816	5,268	5,628	5,913	6,135
70-79% AMI	4,894	5,545	6,094	6,572	6,935	7,142
80-99% AMI	10,734	12,062	13,166	14,246	15,136	15,759
100-119% AMI	11,108	12,583	13,849	15,063	16,051	16,728
120-149% AMI	14,437	16,186	17,757	19,224	20,430	21,441
150%+ AMI	42,148	48,659	54,516	60,101	64,939	69,101
Total	**104,566**	**118,751**	**131,452**	**143,284**	**153,098**	**160,711**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

1+ members of the household has/have a disability

	2015	2020	2025	2030	2035	2040
<30% AMI	2,060	1,911	2,120	2,304	2,467	2,623
30-49% AMI	1,686	1,832	2,078	2,351	2,565	2,754
50-59% AMI	1,131	1,245	1,373	1,579	1,737	1,871
60-69% AMI	1,158	1,178	1,265	1,352	1,421	1,501
70-79% AMI	724	758	820	871	911	983
80-99% AMI	1,486	1,596	1,739	1,888	2,016	2,148
100-119% AMI	1,706	1,813	1,986	2,174	2,345	2,540
120-149% AMI	1,669	1,862	2,041	2,253	2,423	2,555
150%+ AMI	4,913	5,322	5,741	6,406	6,982	7,770
Total	**16,534**	**17,518**	**19,163**	**21,178**	**22,866**	**24,745**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

VIII.d. Households by Area Median Income Group and Household Size, Loudoun County, 2015-2040

One Person

	2015	2020	2025	2030	2035	2040
<30% AMI	3,748	3,946	4,544	4,991	5,340	5,589
30-49% AMI	2,246	2,419	2,760	3,040	3,258	3,464
50-59% AMI	1,389	1,570	1,793	2,053	2,257	2,426
60-69% AMI	1,479	1,686	1,881	2,051	2,179	2,336
70-79% AMI	1,103	1,230	1,407	1,556	1,674	1,776
80-99% AMI	2,332	2,733	3,056	3,353	3,590	3,861
100-119% AMI	1,718	2,045	2,312	2,601	2,854	3,120
120-149% AMI	2,384	2,744	3,067	3,386	3,655	4,009
150%+ AMI	4,295	4,878	5,487	6,103	6,631	7,400
Total	**20,696**	**23,250**	**26,305**	**29,134**	**31,438**	**33,981**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

Two People

	2015	2020	2025	2030	2035	2040
<30% AMI	1,621	1,722	1,886	1,986	2,072	2,148
30-49% AMI	1,681	1,803	2,024	2,194	2,333	2,451
50-59% AMI	1,463	1,712	1,897	2,046	2,152	2,269
60-69% AMI	1,534	1,680	1,833	1,952	2,052	2,127
70-79% AMI	1,650	1,868	2,008	2,108	2,182	2,259
80-99% AMI	2,891	3,172	3,463	3,692	3,870	4,061
100-119% AMI	3,984	4,324	4,742	5,060	5,306	5,575
120-149% AMI	4,324	4,802	5,299	5,725	6,050	6,420
150%+ AMI	14,769	16,798	18,633	20,147	21,449	23,211
Total	**33,915**	**37,882**	**41,785**	**44,912**	**47,465**	**50,521**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

Three People

	2015	2020	2025	2030	2035	2040
<30% AMI	1,107	1,167	1,253	1,312	1,358	1,390
30-49% AMI	1,178	1,333	1,438	1,511	1,568	1,603
50-59% AMI	993	1,100	1,206	1,296	1,367	1,432
60-69% AMI	817	950	1,045	1,109	1,158	1,186
70-79% AMI	913	992	1,094	1,168	1,219	1,259

VIII.d. Households by Area Median Income Group and Household Size, Loudoun County, 2015-2040

80-99% AMI	1,697	1,818	1,960	2,072	2,171	2,245
100-119% AMI	2,280	2,585	2,852	3,074	3,254	3,376
120-149% AMI	3,257	3,626	3,959	4,209	4,426	4,615
150%+ AMI	11,175	12,945	14,491	15,803	16,948	18,092
Total	**23,415**	**26,517**	**29,299**	**31,553**	**33,469**	**35,198**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

VIII.d. Households by Area Median Income Group and Household Size, Loudoun County, 2015-2040

Four People or More

	2015	2020	2025	2030	2035	2040
<30% AMI	1,616	1,773	1,887	2,039	2,149	2,164
30-49% AMI	3,114	3,410	3,607	3,913	4,134	4,171
50-59% AMI	1,712	1,934	2,080	2,304	2,474	2,546
60-69% AMI	1,584	1,678	1,773	1,867	1,945	1,986
70-79% AMI	1,952	2,214	2,405	2,611	2,770	2,831
80-99% AMI	5,301	5,933	6,427	7,017	7,521	7,741
100-119% AMI	4,833	5,442	5,928	6,503	6,982	7,198
120-149% AMI	6,140	6,876	7,473	8,157	8,722	8,952
150%+ AMI	16,821	19,360	21,645	24,454	26,894	28,167
Total	**43,074**	**48,620**	**53,226**	**58,864**	**63,592**	**65,756**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

VIII.e. Households by Area Median Income Group and Unit Type, Loudoun County, 2015-2040

Single-Family Detached, Owner

	2015	2020	2025	2030	2035	2040
<30% AMI	2,190	2,420	2,741	2,982	3,175	3,304
30-49% AMI	2,476	2,754	3,020	3,195	3,325	3,404
50-59% AMI	1,414	1,639	1,822	1,952	2,049	2,107
60-69% AMI	2,306	2,588	2,847	3,038	3,184	3,285
70-79% AMI	1,791	2,080	2,286	2,448	2,565	2,621
80-99% AMI	4,759	5,206	5,645	6,037	6,352	6,543
100-119% AMI	5,221	5,803	6,288	6,653	6,943	7,110
120-149% AMI	7,514	8,304	9,078	9,799	10,388	10,768
150%+ AMI	32,013	36,545	40,685	44,745	48,266	51,217
Total	**59,683**	**67,340**	**74,412**	**80,849**	**86,246**	**90,360**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

Single-Family Detached, Renter

	2015	2020	2025	2030	2035	2040
<30% AMI	746	813	884	908	920	922
30-49% AMI	948	957	1,006	1,031	1,048	1,046
50-59% AMI	477	494	524	563	594	632
60-69% AMI	228	264	282	298	313	321
70-79% AMI	511	589	643	693	732	760
80-99% AMI	730	814	889	970	1,034	1,082
100-119% AMI	369	413	451	493	529	565
120-149% AMI	483	532	559	580	601	626
150%+ AMI	934	1,081	1,203	1,343	1,463	1,578
Total	**5,425**	**5,957**	**6,440**	**6,879**	**7,234**	**7,532**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

Single-Family Attached, Owner

	2015	2020	2025	2030	2035	2040
<30% AMI	1,161	1,201	1,306	1,395	1,462	1,535
30-49% AMI	1,579	1,560	1,731	1,904	2,040	2,126
50-59% AMI	1,274	1,465	1,617	1,803	1,936	2,009
60-69% AMI	949	1,072	1,160	1,225	1,279	1,320
70-79% AMI	1,287	1,496	1,673	1,835	1,962	2,052

VIII.e. Households by Area Median Income Group and Unit Type, Loudoun County, 2015-2040

80-99% AMI	3,448	3,865	4,200	4,555	4,853	5,081
100-119% AMI	4,347	5,047	5,630	6,261	6,782	7,173
120-149% AMI	5,067	5,721	6,293	6,863	7,330	7,763
150%+ AMI	10,135	11,716	13,125	14,573	15,824	17,120
Total	**29,247**	**33,143**	**36,734**	**40,415**	**43,468**	**46,178**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

VIII.e. Households by Area Median Income Group and Unit Type, Loudoun County, 2015-2040

Single-Family Attached, Renter

	2015	2020	2025	2030	2035	2040
<30% AMI	1,167	1,063	1,180	1,258	1,322	1,340
30-49% AMI	924	1,061	1,148	1,316	1,437	1,456
50-59% AMI	852	966	1,064	1,193	1,289	1,359
60-69% AMI	568	636	688	737	775	786
70-79% AMI	561	599	649	698	735	758
80-99% AMI	1,369	1,596	1,771	1,977	2,153	2,268
100-119% AMI	815	896	997	1,104	1,193	1,255
120-149% AMI	851	995	1,118	1,233	1,333	1,415
150%+ AMI	1,575	1,788	1,968	2,161	2,324	2,508
Total	**8,681**	**9,601**	**10,585**	**11,678**	**12,559**	**13,145**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

Multi-Family, Owner

	2015	2020	2025	2030	2035	2040
<30% AMI	224	226	257	290	321	343
30-49% AMI	628	744	857	975	1,082	1,162
50-59% AMI	387	392	429	482	533	578
60-69% AMI	324	390	439	489	531	591
70-79% AMI	358	350	397	459	510	564
80-99% AMI	493	568	660	749	822	900
100-119% AMI	437	517	601	679	750	813
120-149% AMI	673	774	853	933	994	1,041
150%+ AMI	774	941	1,063	1,172	1,261	1,348
Total	**4,298**	**4,903**	**5,556**	**6,230**	**6,804**	**7,340**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

Multi-Family, Renter

	2015	2020	2025	2030	2035	2040
<30% AMI	2,603	2,934	3,204	3,425	3,578	3,644
30-49% AMI	1,664	1,916	2,068	2,178	2,250	2,320
50-59% AMI	1,153	1,378	1,520	1,650	1,739	1,814
60-69% AMI	1,040	1,055	1,116	1,158	1,184	1,217
70-79% AMI	1,109	1,205	1,268	1,291	1,309	1,320

VIII.e. Households by Area Median Income Group and Unit Type, Loudoun County, 2015-2040

80-99% AMI	1,422	1,631	1,741	1,799	1,849	1,895
100-119% AMI	1,626	1,740	1,870	1,983	2,074	2,153
120-149% AMI	1,518	1,740	1,900	1,994	2,058	2,140
150%+ AMI	1,630	1,935	2,216	2,403	2,563	2,735
Total	**13,766**	**15,532**	**16,904**	**17,880**	**18,604**	**19,237**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

IX. Households by Share of Household Income Spent on Rent and Tenure, Loudoun County, 2015-2040

Owner Households

	2015	2020	2025	2030	2035	2040
<30 Percent	71,948	81,659	90,593	99,264	106,584	112,774
30 Percent or More	21,280	23,727	26,110	28,229	29,934	31,104
Total	**93,228**	**105,387**	**116,703**	**127,493**	**136,518**	**143,878**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

Renter Households

	2015	2020	2025	2030	2035	2040
<30 Percent	16,969	18,748	20,646	22,547	24,141	25,747
30 Percent or More	10,902	12,134	13,266	14,422	15,305	15,831
Total	**27,872**	**30,882**	**33,913**	**36,970**	**39,446**	**41,578**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

IX.a. Households by Share of Household Income Spent on Rent and Area Median Income Group, Loudoun County, 2015-2040

<30 Percent

	2015	2020	2025	2030	2035	2040
<30% AMI	2,054	1,864	2,070	2,222	2,342	2,463
30-49% AMI	2,124	2,314	2,570	2,798	2,976	3,112
50-59% AMI	2,490	2,876	3,211	3,543	3,795	4,024
60-69% AMI	2,131	2,411	2,667	2,871	3,035	3,187
70-79% AMI	3,073	3,446	3,746	3,991	4,174	4,331
80-99% AMI	7,852	8,673	9,426	10,259	10,938	11,395
100-119% AMI	10,096	11,359	12,523	13,681	14,644	15,377
120-149% AMI	13,756	15,536	17,122	18,496	19,637	20,647
150%+ AMI	45,341	51,927	57,905	63,950	69,185	73,985
Total	**88,917**	**100,407**	**111,239**	**121,811**	**130,725**	**138,521**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

30 Percent or More

	2015	2020	2025	2030	2035	2040
<30% AMI	6,037	6,743	7,500	8,106	8,577	8,828
30-49% AMI	6,095	6,650	7,258	7,859	8,317	8,577
50-59% AMI	3,067	3,440	3,764	4,156	4,455	4,650
60-69% AMI	3,283	3,584	3,866	4,109	4,300	4,448
70-79% AMI	2,544	2,857	3,169	3,452	3,671	3,795
80-99% AMI	4,368	4,985	5,479	5,874	6,214	6,512
100-119% AMI	2,719	3,037	3,312	3,557	3,752	3,891
120-149% AMI	2,349	2,512	2,676	2,981	3,216	3,349
150%+ AMI	1,719	2,054	2,352	2,557	2,736	2,886
Total	**32,183**	**35,862**	**39,376**	**42,652**	**45,238**	**46,935**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

IX.b. Households by Share of Household Income Spent on Rent and Age of Householder, Loudoun County, 2015-2040

<30 Percent

	2015	2020	2025	2030	2035	2040
<35	13,766	19,978	25,227	24,318	23,893	22,509
35-44	25,365	27,680	29,872	36,436	41,608	40,675
45-54	24,893	26,002	27,235	29,236	30,971	37,046
55-64	14,199	14,766	15,362	16,484	17,458	19,289
65+	10,695	11,981	13,543	15,337	16,795	19,002
Total	**88,917**	**100,407**	**111,239**	**121,811**	**130,725**	**138,521**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

30 Percent or More

	2015	2020	2025	2030	2035	2040
<35	6,030	7,958	9,364	8,956	8,791	8,298
35-44	8,821	9,363	9,957	12,108	13,616	13,118
45-54	6,912	7,122	7,442	7,901	8,283	10,010
55-64	5,397	5,906	6,155	6,351	6,525	6,894
65+	5,023	5,512	6,459	7,337	8,022	8,616
Total	**32,183**	**35,862**	**39,376**	**42,652**	**45,238**	**46,935**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

IX.c. Households by Share of Household Income Spent on Rent and Labor Force Participation Status, Loudoun County, 2015-2040

<30 Percent

	2015	2020	2025	2030	2035	2040
Household has a worker with a payroll job	80,209	90,813	99,897	109,207	117,140	124,468
Household does not have a worker with a payroll job	8,709	9,594	11,342	12,605	13,585	14,053
Total	**88,917**	**100,407**	**111,239**	**121,811**	**130,725**	**138,521**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

30 Percent or More

	2015	2020	2025	2030	2035	2040
Household has a worker with a payroll job	25,648	28,603	30,941	33,460	35,453	36,833
Household does not have a worker with a payroll job	6,534	7,259	8,435	9,192	9,786	10,102
Total	**32,183**	**35,862**	**39,376**	**42,652**	**45,238**	**46,935**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

IX.d. Households by Share of Household Income Spent on Rent and Disability Status, Loudoun County, 2015-2040

<30 Percent

	2015	2020	2025	2030	2035	2040
No member of the household has a disability	77,352	88,148	97,830	106,933	114,602	120,976
1+ members of the household has/have a disability	11,565	12,259	13,409	14,879	16,124	17,545
Total	**88,917**	**100,407**	**111,239**	**121,811**	**130,725**	**138,521**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

30 Percent or More

	2015	2020	2025	2030	2035	2040
No member of the household has a disability	27,214	30,603	33,622	36,352	38,496	39,735
1+ members of the household has/have a disability	4,969	5,259	5,754	6,300	6,743	7,200
Total	**32,183**	**35,862**	**39,376**	**42,652**	**45,238**	**46,935**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

IX.e. Households by Share of Household Income Spent on Rent and Household Size, Loudoun County, 2015-2040

<30 Percent

	2015	2020	2025	2030	2035	2040
1 Person	12,334	13,878	15,678	17,378	18,796	20,565
2 People	26,548	29,617	32,705	35,279	37,395	40,085
3 People	18,089	20,583	22,810	24,653	26,233	27,708
4+ People	31,947	36,329	40,046	44,501	48,302	50,163
Total	**88,917**	**100,407**	**111,239**	**121,811**	**130,725**	**138,521**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates

30 Percent or More

	2015	2020	2025	2030	2035	2040
1 Person	8,362	9,372	10,627	11,756	12,642	13,416
2 People	7,368	8,264	9,079	9,633	10,071	10,435
3 People	5,326	5,934	6,489	6,899	7,237	7,490
4+ People	11,127	12,291	13,180	14,364	15,289	15,594
Total	**32,183**	**35,862**	**39,376**	**42,652**	**45,238**	**46,935**

Source: GMU Center for Regional Analysis and Lisa Sturtevant & Associates

X. Housing Unit Gap by Unit Type, Loudoun County, 2020-2040

	2020	2025	2030	2035	2040
Single-Family Detached	(3,906)	(6,705)	(11,287)	(15,741)	(19,091)
Single-Family Attached*	2,492	466	(4,155)	(7,982)	(11,379)
Multi-Family*	2,623	6,111	9,268	11,784	12,170
Total	**1,210**	**(128)**	**(6,174)**	**(11,939)**	**(18,300)**

*The supply used to forecast this gap includes half of the forecasted multi-family stacked attached housing units, which includes stacked townhomes, one-over-twos, two-over-twos. The Census permitting data generally includes these units as multi-family units, but respondents in the American Community Survey, which forms the basis for the assumptions in this model, will likely split their responses between single-family attached (including buildings with 2-4 units) and multi-family buildings (5+ units)

Source: Metropolitan Washington Council of Governments Cooperative Forecasts Round 9.0, GMU Center for Regional Analysis and Lisa Sturtevant & Associates, LLC

Loudoun County Housing Needs Assessment
Study Methodology

With the adoption of an amendment to its comprehensive plan in 2007, elected officials and local leaders formally recognized the challenges associated with ensuring that there are sufficient housing options for all people who live and/or work in Loudoun County. However, there are challenges to Loudoun County's prospects for meeting its full economic development potential and for remaining a vibrant and growing community in the years to come. A particular challenge is providing housing to meet the needs of the growing population and workforce.

The George Mason University Study Team ("study team) will analyze current and future housing needs to help guide the County's future housing work. The process of analyzing current and future housing needs and assessing the County's capacity to meet those needs is described below.

1. Review of alternative housing needs assessment methodologies. There are different ways to approach an assessment of current and future housing needs in a community. Almost all analyses of local housing needs include an assessment of current conditions, including tabulations and discussions of population demographics, housing market conditions, and housing affordability, typically measuring cost burdened households as those spending more than 30 percent of their income on housing. In this housing market and needs analysis in Loudoun County, we will analyze current demographic, housing market conditions and housing affordability similar to other recent local studies of housing needs. In addition, however, we will also analyze economic and employment conditions in Loudoun County and in the region, assess commuting patterns into and out of Loudoun County, and present alternative measures of housing affordability (e.g. housing plus transportation cost data). Our approach, therefore, provides a more comprehensive picture of current conditions and recent trends that impact housing demand and supply in the County.

To forecast future housing needs in local jurisdiction, researchers have often used a method based on data on natural population increase (i.e. births minus deaths) and population in-migration. With this method, future housing needs are driven by future population growth, and future population growth is expected to follow similar patterns as past population growth. Sometimes new assumptions about natural increase and/or population migration can be applied to forecast future population growth. The Urban Institute took this approach using population data in a recent study of current and future housing needs in the District of Columbia.[1] A study of housing needs in the Richmond Region conducted by researchers at Virginia Tech and Virginia Commonwealth University also used a population-based approach to projecting housing needs.[2]

[1] Tatian, Peter, Graham MacDonald, Josh Leopold, Austin Nichols, Elizabeth Oo, Maia Woluchem, Gerry Jospeh and Simone Zhang, *Affordable Housing Needs Assessment for the District of Columbia* (Washington DC: The Urban Institute, 2015)
[2] *Housing the Richmond Region: Needs, Impediments and Strategies* (Richmond, VA: Partnership for Housing Affordability, 2015)

We are proposing a somewhat different approach to forecasting housing needs in Loudoun County. Our methodology includes a two-pronged approach: i) an employment-driven housing demand forecast and ii) a demographic-driven (i.e. non-employment related) housing demand forecast. Our demographic-driven approach is similar to the population-based approach described above. It is the employment-driven component that makes our approach unique. Linking housing demand to regional job growth is important for at least two reasons. First, Loudoun County is a fast-growing suburban jurisdiction that is quickly becoming an important regional employment center. That position as a regional economic growth center will be a critical element to assessing the quantity and types of housing that will be needed in the future. Because the County is growing and changing, it is very likely that future housing needs will be different than the housing needs that past population growth might suggest. Second, using a method that ties housing demand to job growth can be useful for communicating study findings to many different audiences, including economic development organizations, employers and the broader public.

We have used a similar two-pronged methodology for forecasting housing demand in Arlington County, Virginia and in the greater Washington DC metropolitan area, including many individual jurisdictions. We feel confident that this approach builds on what we can learn from a population-only driven set of forecasts and incorporates more nuanced information about the housing needs of new working households, as well as households not in the labor force. The remainder of this report describes our methodology in more detail.

2. Detailed Analysis of Trends, Current Conditions and Housing Affordability

The study team will develop detailed tables and will prepare a comprehensive narrative describing trends and current conditions for Loudoun County, along with several comparison jurisdictions and the Washington DC metropolitan area as a whole. The comparison jurisdictions that will be used in this analysis are: Arlington, Fairfax and Prince William counties in Virginia, and Montgomery and Frederick counties in Maryland. The primary goal of this part of the analysis is to better understand the local and regional trends that will shape future housing needs and to document the existing housing gaps in the County. The analysis will cover population and demographics, employment and the economy, and housing market conditions. In addition, the study team will prepare detailed cross-tabulations and written analysis of current housing affordability for various subpopulations in Loudoun County, as well as selected tabulations for comparison jurisdictions. The analysis will include typical measures of housing affordability, as well as alternative measures of affordability, assessment of crowding/underhoused families and homelessness. In addition, the study team will discuss at least two different measures of the current housing gap in the County.

2-1. Data Sources

For the analysis of population, demographic and some economic characteristics, we will use microdata from the U.S. Census Bureau's **American Community Survey** and **2000 decennial Census**. Historically, the decennial Census included a long-form survey that collected detailed demographic, social, economic and housing data from a sample of U.S. households and persons residing in group quarters (e.g. dorms, jails, nursing facilities.) The detailed data from the decennial Census were reported out as Summary File 3 (SF3)

data. Beginning in 2010, the U.S. Census Bureau replaced the decennial Census long-form data with data from the American Community Survey (ACS), which was implemented nationwide in 2006. The ACS is an annual survey of a sample of households and persons residing in group quarters. Each year, approximately one out of 10 households in the U.S. receives an ACS questionnaire. Typically, response rates are between 96 and 98 percent. In Virginia, the 2014 response rate was 96.9 percent.[3] The ACS is now the most reliable and timely source for demographic data for states and localities.

The ACS data are available either as one-year data (i.e. data from the 2014 ACS survey form are reported out) or five years of ACS data are combined and reported out as five-year data (i.e. data from the 2009-2014 ACS survey forms are combined and summarized).[4] The one-year data provide the most current information on a locality, usually available within 12 months after the end of the year. The five-year data provide more reliable estimates for very small places and for unique characteristics.

Data from the ACS and decennial Census are reported out in summary form on the U.S. Census Bureau's website via its American FactFinder (AFF) tool.[5] While thousands of summary tables are available from the AFF tool, a user cannot produce custom tables from the site. The study team will use the **public use microdata sample (PUMS)** file for the 2014 ACS, as well as the microdata file for the 2000 Census SF3. Unfortunately, we cannot use the ACS 2009-2014 five-year for Loudoun County because of a change in the Census geography.[6] Therefore, we will combine the 2012, 2013 and 2014 ACS one-year files to create a three-year file for some of the analysis (and forecasting). We will use one-year data to summarize broad characteristics of the population (e.g. share of owners and renters), and will use three-year data to analyze detailed characteristics (e.g. share of owners and renters by age that are cost burdened).

The study team will use county-level data from the U.S. Census Bureau to analyze private sector employment in the Washington DC metro area and Loudoun County.[7] The Census releases **Quarterly Workforce Indicators (QWI) data** for counties on employment and wages by industry (defined by up to six-digit NAICS code[8]) and age group. QWI quarterly employment data represent the number of covered workers who received pay during a given quarter. Multiple datasets are linked to create this data set, including unemployment insurance earnings records, QCEW, Business Dynamics Statistics, 2000 Census, Social Security Administrative records, individual tax returns and other administrative records. Quarterly data are usually available at three quarters after the end of the period.[9]

[3] For information on the design and quality of ACS data, see https://www.census.gov/acs/www/methodology/sample-size-and-data-quality/.
[4] The U.S. Census Bureau used to produce a three-year file but they discontinued the release of that data in 2014.
[5] The U.S. Census Bureau's American FactFinder tool can be accessed online at http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml.
[6] Prior to 2012, data for Loudoun County in the PUMS file was combined with data for Warren, Fauquier and Clarke counties.
[7] Federal employment is only available as a limited beta release for select states that does not yet include Virginia. We will use other sources, including the U.S. Bureau of Labor Statistics and the Bureau of Economic Analysis, to supplement federal employment data.
[8] NAICS is the North American Classification System, which is the standard system used by Federal government agencies to classify business establishments and workers into industries.
[9] Census QWI data are available online at http://lehd.ces.census.gov/data/.

To analyze trends and current conditions in the for-sale market, the study team will use **transaction-level data from MRIS**, the region's multiple listing service. MRIS publishes monthly summary reports on home sales, prices, and inventories for all counties in the mid-Atlantic region. The study team can use this publically-available summary data[10], but also has access to transaction-level data for all home sales in the region. These data include information on prices and days on market for all home sales listed in the MRIS, as well as a set of characteristics of the homes (e.g. number of bedrooms). The data also include records of all homes currently listed for sale, including the ask price and the home characteristics. The MRIS data provides the most complete information about sales of existing homes. However, new home sales are often not reported out in the MRIS data because they are sold directly by the builder and not through a real estate agent and the multiple listing service. As a result, we will supplement the housing market data with sales data from the **Loudoun County Commissioner of Revenue** and from data we can collect from the **Northern Virginia Building Industry Association**. If necessary, we will investigate other sources of data on new home sales (e.g. specific developer data) to provide as complete a picture as possible of the for-sale market in Loudoun County.

On the rental side, we will use data from the Census and ACS to summarize characteristics of the current supply of rental housing. We will supplement this information with data from the **Loudoun County Rent and Vacancy Survey** which will be provided to the study team by County staff.

Data on new construction will use data from the **County's Annual Residential Building Permits Summary** from the Loudoun County Department of Building and Development and the Loudoun County Department of Planning and Zoning. Additional data are available from the County in the *Fiscal Impact Committee Guidelines and Growth Summaries* which includes a plethora of data on historic residential development and assumptions about and projections of future residential development. We will also make use of the most recent Loudoun County permit and pipeline data which will provide the best information on recent and forthcoming residential development activity.

We will use ACS data to measure housing cost burden—defined as households spending 30 percent or more of their income on housing costs—and severe housing cost burdened—defined as households spending 50 percent or more of their income on housing costs. In addition, we will use data from the **Location Affordability Index (LAI)** portal[11] that reports on data on housing plus transportation costs for 14 different household/family types for counties and smaller levels of geography (i.e. Census tracts). The LAI data are not as recent as the ACS data but they provide an alternative ways of assessing housing affordability in the County. We recommend using County data only. The tract-level data are not always reliable because of the very small sample sizes. We will provide additional analysis of housing affordability in the County by using data from the **Economic Policy Institute's Family Budget Calculator[12]** which reports the income a family needs in order to attain a "modest yet adequate standard of living." Data are available

[10] Summary data from MRIS can be access online at http://www.getsmartcharts.com/?utm_source=mrisdotcom&utm_medium=tab&utm_campaign=mris-products.
[11] The LAI portal can be accessed online at http://www.locationaffordability.info/lai.aspx.
[12] The EPI Family Budget Calculator can be accessed online at http://www.epi.org/resources/budget/.

at the county level for 10 family types (one or two adults with zero to four children). We will not present detailed tables using these alternative affordability measures but rather will incorporate the data from these sources in a broad discussion of the cost of living and availability of affordable housing in the county.

2-2. Trends and Current Conditions

2-2-a. Population and Demographics

The study team will prepare detailed tables and written narrative on the demographic characteristics of Loudoun County's population using data from the most recent ACS. We will also present an analysis of demographic trends in the County between 2000 and 2014. As part of the final report, we will prepare a detailed narrative that analyzes the current population and demographic conditions, recent trends and the implications of those trends for housing demand.

The analysis of population and demographic data will include a summary of the following characteristics: age, race/ethnicity, educational attainment, household composition and size, renter/owner, length of time living in the County, prior place of residence for recent movers, and disability status. A list of the proposed tables we will produce is included in the Appendix. For a subset of tables, we tabulate data for Loudoun County as well as for Arlington, Fairfax and Prince William counties in Virginia; Montgomery and Frederick counties in Maryland; and for the Washington DC metropolitan area.[13]

The Loudoun County Department of Planning and Zoning produces population and household counts. These counts will be used to re-weight all ACS data in all tables where totals are shown. In other words, we will use the relevant percentages from the ACS data analysis (e.g. percentage of households that are home owners) and we will apply these percentages to current population and household totals that the County has developed. This allows us to present the most recent information on population and household *characteristics,* but allows us to present population and household *totals* that are consistent with totals published by the County.

2-2-b. Employment and the Economy

A key element of this housing needs analysis is to tie housing needs and future housing demand to regional job growth and economic vitality. As a result, it is important to have a detailed analysis of trends and current conditions in the Loudoun County economy. We will use BLS and Census data to tabulate key statistics about the County's economy and will prepare a detailed narrative about local economic conditions and Loudoun County's role in the larger Washington DC area economy. We will include analyses both about at-place employment (i.e. jobs located in the County and workers who work in those jobs) and resident workers (i.e. workers who live in Loudoun County and work anywhere).

The analysis of employment and the economy will include:

[13] The Washington DC metropolitan area includes 26 cities and counties in Washington DC, Virginia, Maryland and West Virginia.

- Trends in employment and gross county/regional product (GRP) for Loudoun County and the Washington DC metro area (2000-2014); employment by sector
- Share of County jobs held by County residents, commuting patterns of in-commuters
- Characteristics of at-place employment (i.e. jobs located in the County) (2014): industry sector (2-digit NAICs), average or median wage by industry, place of residence of workers (i.e. in the County, other counties and cities with main locations listed out individually), and commute mode
- Characteristics of resident workers (2014): industry sector (2-digit NAICs), average or median wage by industry, place of work (i.e. in the County, other counties and cities with main locations listed out individually), age group for workers
- Characteristics of County government workers and Loudoun County Public Schools (LCPS) workers (to the extent data are provided by the County and the LCPS)

A full list of the proposed tables is included in the Appendix.

2-2-c. Housing Market

The study team's analysis of housing market conditions will include an overview of the County's housing market (including both the for-sale and rental side) and an assessment of new construction and pipeline development. Pipeline development includes residential projects that have been approved by the County or have begun construction. We will use ACS, MRIS and Census Bureau building permit data, along with additional data provided by the County, including data from the County's Annual Residential Building Permits Summary, Rent and Vacancy Survey, the Commissioner of Revenue, and pipeline/approvals data. We will also incorporate into this analysis results from the County's build-out analysis. In our assessment of occupied housing units, we will analyze the types and sizes of units currently available, along with their costs, and discuss the types and sizes of households that could be accommodated in those housing units.

The analysis of housing market conditions and trends will include the following:

- For-sale market: trends (2000-2016) including sales, prices and inventory of existing and new homes, unit type, and bedrooms
- Rental market: trends (2000-2014, 2015 or 2016 depending on data availability) and current conditions, including rents and unit size/number of bedrooms
- Residential construction: trends (2000-2016 depending on data availability) in housing permits and current pipeline development (e.g. projects recently approved by the County and projects currently under construction)

A full list of the proposed tables is included in the Appendix.

2-3. Current Housing Affordability

The study team will prepare detailed tabulations and written analysis of housing affordability in the County, and will also provide selected analysis of housing affordability measures over time and for

comparable jurisdictions and the Washington DC metropolitan area. In general, the tabulations of housing affordability will use standard measures of affordability, specifically the housing cost burden metric which states that housing is not affordable when households spend more than 30 percent of the income on housing costs. (Severe housing cost burden is defined as households spending more than 50 percent of their income on housing costs.) In addition, the study team will report out measures of housing plus transportation (H+T) costs for Loudoun County and comparison jurisdictions for select household types as defined by HUD and DOT in the Location Affordability Index (LAI) tool.

- Housing affordability for various subgroups of the population, including an analysis by household income, household type, age of household head, race/ethnicity of household head, and tenure (i.e. renters/owners).
- Assessment of alternative housing affordability measures including the LAI.

A full list of the proposed tables is included in the Appendix.

2-4. Current Housing Gaps

The study team will use the analyses described above to summarize and, to the extent possible, quantify the current gaps between housing demand and supply in Loudoun County. At least three approaches will be used to measure current housing gaps:

- Estimates of **housing cost burden by household income by and household type**. We will use the number of cost burdened households as one measure of current unmet housing needs in the County.
- Estimates of the **number of in-commuters who might live in Loudoun County if housing were available and affordable**. We will analyze the characteristics of people who work in Loudoun County but live outside of the County, and will develop assumptions about the share of current workers who might live in the County if housing were affordable and available. For example, we will analyze the share of higher-income County workers (e.g. professional and business services professions) that live in the County and compare that share to the share of lower-income County workers (e.g. retail workers) that live in the County. The difference in these shares is another way to measure the potential current housing gap for households at different income levels.
- Assessment of the **rents and prices of existing housing and recent new construction** in relation to County household income distribution. We will tabulate the household incomes and household sizes of the County's population and estimate the rent and home price households can afford. We will then compare these estimates to the rents and home prices of existing homes and new construction in the County. We can then estimate a housing gap based on the differences in the rents/prices in the existing inventory and new construction and the rents/prices that are affordable to current residents.

3. Forecasts of Future Housing Needs

The study team will prepare forecasts of housing demand for the 2015-2040 period (2015, 2020, 2030, and 2040). Future housing demand in Loudoun County will be driven by: 1) the need for housing for working households and 2) the need for housing for people not in the labor force (especially seniors and persons with disabilities). The forecasts will incorporate assumptions that have been developed and agreed to jointly by the study team and the County staff interdepartmental team (IDT). The final set of household forecasts will be summarized by income interval and by other household characteristics, including household size (1, 2, 3 and 4+ person households), age of household head (under 30, 30 to 44, 44 to 64, 65+), disability status of household members (physical, other), tenure (renter and owner), and type of housing unit (single-family detached, single-family attached, and multi-family). (See Figure 1 below).

The analysis of future housing needs will include an assessment of the County's ability to meet projected demand. The study team will provide a detailed written summary of the forecasts and summary tables, along with detailed forecasts data (including all input data) in Excel format. In addition, the study team will include an analysis of the limitations of the forecasting methodology and any caveats for the resulting estimates.

3-1. Data Sources

The study team will use several data sources that were described above in Section 2-1 to produce baseline estimates and to develop assumptions for forecasts of future household growth and housing demand. These include 2012, 2013 and 2014 one-year ACS PUMS data, and decennial Census data. In addition, this analysis will use **U.S. Census Population Estimates (vintage 2015)** to benchmark baseline age distribution and sex. The forecasting process will also use the **U.S. Census 2014 National Population Projections** to estimate future growth rates by age group and sex (see below).

The main source of data for the employment forecasts used in this analysis is **IHS Economics** (formerly known as IHS Global Insight). IHS Economics is a proprietary source of data that includes county-level forecasts of employment growth by industry sector (generally 2-digit NAICS, or combinations of 2-digit NAICS). The study team will also use data from the **Metropolitan Washington Council of Governments Cooperative Forecast Round 9.0** to refine the forecasts of new regional jobs.

The **Current Population Survey** microdata from the U.S. Bureau of Labor Statistics will be used to determine the number of current retirees by age and industry. We will use these estimates to forecast the number and industry of jobs that will be vacated by retirees in the future.

Finally, to address potential capacity constraints and to assess the potential future gaps between housing demand and supply, the study team will use results from the **County's Residential Build-Out** analysis (which should be available in July), population and household estimates from **Metropolitan Washington Council of Governments Cooperative Forecast Round 9.0** and **2009-2013 American Community Survey, Commuting Worker Flows**.

3-2. Overview of the Forecasting Process

The study team will take a regional approach to forecasting housing demand to account for the fact that Loudoun County is part of the larger Washington DC metropolitan area labor and housing market. The methodology described below builds off the housing demand forecasts we have prepared for the Washington DC region, Arlington County, Richmond and the Hampton Roads area.

There will be two main sources of housing demand—i) demand from households with workers (including workers who work in Loudoun County and those who work in other places in the region) and ii) demand from households without workers. We will prepare forecasts not only of the total housing units that will be needed (out to 2040) but also the types and prices of units that will be needed to meet the demand of households of different household types. For each part of the forecasting process, we will develop assumptions in collaboration with the County IDT; a discussion of the key assumptions are described in more detail below.

3-2-a. Employment-Driven Housing Demand

The first source of demand will be from households with at least one worker. The number and types of future jobs in the region (i.e. the Washington DC Metro Area) will help determine how many of these households will live in Loudoun and how many will live in other parts of the region. The types of jobs will also determine the wages of new workers, and the household incomes of new working households. We will forecast new households by category of area median income (AMI) and we will also forecast the household type of these new households. The household type (e.g. single-person, married couple with children, etc.; See Figure 3) and AMI group will then be used to estimate the type of housing unit these new households will live in. Figure 2 below depicts the process of forecasting employment-driven housing demand.

Figure 1. Forecasting Housing Needs in Loudoun County – Presentation of Final Forecasts

Subgroup	2015	2020	2030	2040
Overall Housing Demand				
Household Size 1-person 2-person 3-person 4+ person				
Age of Household Head Under 30 30 to 44 44 to 64 65+				
Disability Status Physical disability Other disability				
Household Income[(a)] <30% AMI 30-49.9% AMI 50-59.9% AMI 60-879.9% AMI 80-99.9% AMI 100-119.9% AMI 120-139.9% AMI 140-159.9% AMI 160-179.9% AMI 180-199.9AMI 200%+AMI				
Tenure Owner Renter				
Unit Type Single-family detached Single-family attached Multi-family (5+ units)				

(a) Income intervals may have to be consolidated if there are insufficient data.

Steps 1a and 1b. Net New Jobs

The projected housing needs rely on forecasts of job growth in the Washington DC Metropolitan Area. In this analysis, a "job" is defined as a payroll job which are those held by an employee of a company or government, and receives wages. It will exclude unincorporated self-employment, including some types of contract workers, and all unpaid positions (volunteering, internships etc.). For the housing needs forecast, we include unincorporated self-employed persons in the demographic-driven forecasts (see below).

Future job growth has two components: net new job growth and jobs vacated by retirees. To determine net new job growth, we will begin with forecasts from IHS Economics for 12 main industry sectors defined generally by NAICS: construction, natural resources, and mining; manufacturing; transportation, trade and utilities; information; financial activities; professional and business services; education and health services; leisure and hospitality; other services; federal government; state and local government; and military. IHS Economics produces county-level employment forecasts for these industry classifications out to 2040. We will aggregate county-level forecasts to arrive at regional employment forecast totals.

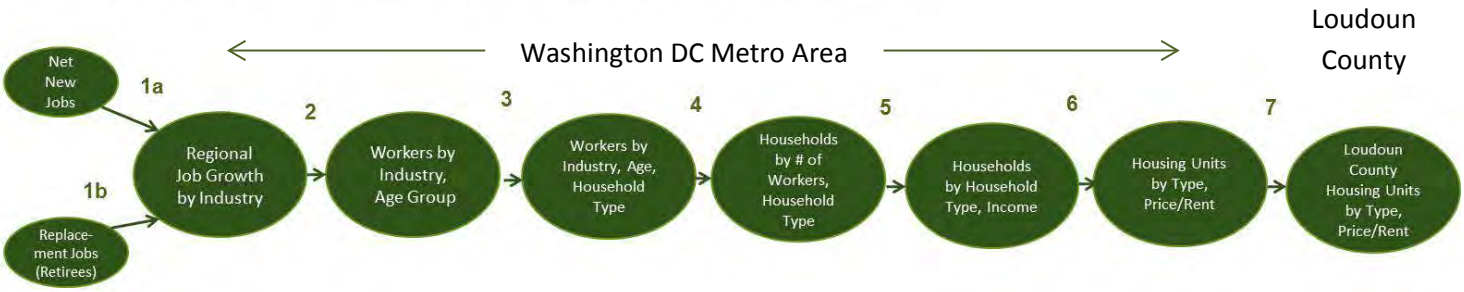
Historically, however, IHS Economics has significantly overestimated job growth for Loudoun County. Therefore, we will adjust the IHS Economics forecasts to align more closely to the Metropolitan Washington Council of Governments (MWCOG) Cooperative Forecasts 9.0. We will use the same industry shares in the IHS Economics forecasts for Loudoun County but we will use the rate of job growth as specified in the MWCOG forecasts for Loudoun County. With the adjusted employment forecasts for Loudoun County, and the IHS Economics forecasts for the other jurisdictions in the region[14], produce forecasts of job growth by industry for the Washington DC Metropolitan Area for 2015, 2020, 2030 and 2040. Because the region job forecasts are built from County-level forecasts, we will also produce job forecast by industry for Loudoun County.

Some portion of housing demand is related to people moving into the region to take jobs vacated by retirees. To determine the number of jobs that will be vacated by retirees, we will use the Bureau of Labor Statistics 2014, 2015 and year-to-date 2016 Current Population Survey (CPS) data to calculate the share of retirees in each five-year age group and for each industry for the population over 55 years old in the metro area. These shares are then applied to the current workforce to estimate of the number of jobs that will be vacated by retirees, by industry, for 2015, 2020, 2030 and 2040.

We will combine the net new job forecasts and the retiree-vacated job forecasts to determine the total new jobs forecast by industry in the metro area and Loudoun County for 2015, 2020, 2030 and 2040.

[14] Based on our analysis of the IHS Economics employment forecasts, Loudoun County is the only jurisdictions in the Washington DC metropolitan area where these forecasts substantially misrepresent future employment growth. As a result, we feel comfortable using the IHS Economics forecasts for the rest of the region. We will confirm this assumption and will compare the IHS Economics forecasts to the MWCOG forecasts for all jurisdictions.

Figure 2. Overview of Process – Employment-Driven Housing Demand in Loudoun County



Step 2. Age Distribution of New Workers

The first step in moving from forecasts of new jobs to housing demand will be to estimate the age distribution of the new workers that will fill those jobs. The ages of new workers is highly dependent on the industry. For example, construction and retail workers tend to be younger than workers in the financial services sector. We will assign some share of new workers in each sector to one of three age groups: under 30, 30-44 or 45-64. For workers filling jobs vacated by retirees, we will assume that the job opening filled by the new worker will not be the same level as the retiree. Rather, we will assume that a current worker will take the retiree's position, leaving a vacancy in a job that is currently held by someone under 65 years old. This will be the only "cycling" of jobs in this analysis and turnover and other replacement workers needs will not be addressed.

Estimating the age of new workers is a critical step. We assume that the demand for different types of housing is highly dependent on individuals' ages. We further assume that new workers will be somewhat younger than the existing workforce. We also use the age distribution of workers to estimate wages and household income (and ultimate the percent of area median income that the household falls into).

We will use data from the 2012-2014 American Community Surveys to estimate the age distribution of current workers for each industry sector. We will then adjust this age distribution to account for the fact that new workers would be younger than the existing workforce by analyzing the age distribution of workers who had recently moved into the metro area. We will apply the updated ratios to the age distribution of existing workers to create an age distribution for new workers for two age groups (<30 and 30 to 44). The remaining workers are assumed to be between 45 and 64. We assume that no new workers will be age 65 and older.

Thus, for each sector, we forecast the percent of new jobs held by workers under age 30, between 30 and 44, and between 45 and 64. This information will help estimate the household types and household incomes for future working households.

Step 3. Household Types of New Workers

The next step is to estimate the type of household to which a worker is most likely to belong based on age. Age is an important determinant of housing demand largely because of the household composition implied by the ages of the individuals in the households. For example, workers under age 30 are more likely to live in one-person households or two adult-no children households and workers age 30 to 44 are more likely to live in households with children.

We will forecast which of 11 household types he or she will live based on the age group of the worker.

The 11 household types are listed in Figure 3.

Figure 3. Household Types

Household Size	Household Composition
1-person households	1 adult
2-person households	1 adult, 1 child
	2 adults
3-person households	1 adult, 2 child
	2 adults, 1 child
	3 adults
4+ person households	1 adult, 3+ children
	2 adults, 2+ children
	3 adults, 1+ children
	4+ adults, 1+ children
	4+ adults

We estimate households by household type based on analysis of the 2012-2014 ACS data. We will the current distribution of household types for each age group. Thus, we will know the percent of current workers under 30 who live in one-adult households, the percent who live in one-adult, one-child households and so on. Based on the age of the new workers, we will assign each to a household type. This process assumes that the distribution of household types for different age groups remains fairly constant over time—i.e. people under 30 are just as likely to be in a married couple household in 20 years as they are currently. (See discussion of assumptions below.)

Step 4. Workers per Household

We will estimate the total number of future households regionwide based on the average number of workers in each household. To do so, we will use the 2012-2014 ACS data to calculate the average number of workers in each household type currently (including only households with workers). We are assuming, therefore, that the average number of workers by household type will not change substantially in the future.

The average number of workers in each of the 11 household types will be used to convert workers into households. Households are calculated by dividing the total number of workers by the average number of workers in each household type. For ease of the analysis, we will assume that workers who live in the same household also work in the same sector and jurisdiction.

Step 5. Household Income of New Households

We then will forecast the household income of the new worker households throughout the region. Housing demand is driven by housing preferences, which are associated with age and household composition, but demand is also necessarily related to household income.

We will calculate the median household income for all 11 household types by both industry and worker age. Then, we will estimate the household income based on the number of workers in each household. We will assume that all workers in the household are in the same industry and age group. Then, based on the distribution of household income, we will assign each household to an AMI group. (See Figure 4 for the current AMI limits).

Figure 4. FY 2015 AMI Limits, Washington Metro Area, Example of Forecast Thresholds

	1-Person	2-Person	3-Person	4-Person	5-Person	6-Person	7-Person	8-Person
	70% of 4-person HH	80% of 4-person HH	90% of 4-person HH	100%	108% of 4-person HH	116% of 4-person HH	124% of 4-person HH	132% of 4-person HH
Extremely Low Income Limits (30% AMI)	22,932	26,208	29,484	32,760	35,381	38,002	40,622	43,243
Very Low Income Limits (50% AMI)	38,220	43,680	49,140	54,600	58,968	63,336	67,704	72,072
Low Income Limits (80% AMI)	61,152	69,888	78,624	87,360	94,349	101,338	108,326	115,315
100% AMI	76,440	87,360	98,280	109,200	117,936	126,672	135,408	144,144
120% AMI	91,728	104,832	117,936	131,040	141,523	152,006	162,490	172,973

Source: U.S. Department of Housing and Urban Development and GMU Center for Regional Analysis

Step 6. Housing Unit Type of New Households

Finally, we will forecast what type of housing unit each new worker household will live in. After the previous step, we will have regional forecasts of the number of new households by 11 household types and 10 AMI groups based on the number of new jobs coming to the region. We will forecast housing units by type based on household type and household AMI. Household type and income are strongly associated with the type of housing unit. For example, single-person households and lower-income households are more likely to be renters in multi-family buildings while married couple households with higher incomes are more likely to be owners of single-family detached homes.

The six housing unit types we will forecast are: single-family detached, single-family attached/townhome/2-4 unit buildings, and multi-family (5+ unit buildings); and owner and renter for each unit type.

We will forecast the type of housing unit each household lives in based on the current patterns by household type and AMI. (See discussion of assumptions below.) We will use the 2012-2014 ACS data to estimate the share of each household type and AMI group combinations by housing unit type. The results of this analysis will show the current distribution of housing unit types for different household types and household incomes. We will apply these distributions to the projected households for the entire region to estimate the need for housing by unit type by AMI group and household type.

Step 7. Housing Unit Demand in Loudoun County Resulting from Regional Job Growth

We need to determine the share of future regional housing demand resulting from regional employment growth that will be in Loudoun County. We will analyze current commuting patterns, including i) people who work in Loudoun County and live in Loudoun County, ii) people who commute to jobs in other jurisdictions and live in Loudoun County; and iii) people who work in Loudoun County and live elsewhere. We will analyze commuting patterns using the most recent ACS data, as well as historic Census data. We will also analyze commuting patterns for Fairfax County. This analysis will help us determine the share of projected housing unit demand regionally that will be in Loudoun County. We will confer with the Loudoun County IDT on the appropriate shares to use after the preliminary analysis is completed. (See discussion of assumptions below).

3-2-b. Demographic-Driven (i.e. non-job related) Housing Demand

The second source of demand for housing is from households without a worker (non-worker households). A non-working household is one in which no members of the household have a payroll job. This includes households consisting of retirees, students, workers looking for a job and unincorporated self-employed workers. Changes in non-worker households are driven by demographic changes, so we will estimate these households separately from worker households.

First, we will estimate the ages of the total future population in Loudoun County, regardless of workforce status. Then, we will estimate the number of households that are formed by the age of the household

head, using headship rates. The age of the household head is a predictor of whether there is a worker in the household, and will be used to estimate the total number of non-worker households. The number of future non-working households in Loudoun County will be determined primarily by the aging of the population. Lastly, the age of the non-working household head will be used to determine the AMI group and unit type of these households.

Step 1. Population by Age

To estimate the number of non-working households by age, we will start by forecasting the age distribution by sex of the population. To do so, we will start by using cohort change ratios.[15] The cohort change ratios capture both the "aging up" and net migration by age group and sex in prior decades. The population in 1990, 2000, and 2010 will be grouped by 5-year age group by sex. To begin, we will estimate the number of people in each age group who would have lived in the County if no current residents left, and no new residents came. We will do this by simply "aging up" each person by ten years. For example, in 1990, there were 4,371 males in Loudoun between 25 and 29 years old. If no one left or came in the next decade, there would have been the same number of males between 35 and 39 years old in 2000. Then, we will compare this to what actually happened. In the no-change example, the number 25-29 year olds in 1990 would equal the number of 35-39 year olds in 2000, for a ratio of 1:1. But in 2000, there were twice (2.3 times) as many 35-39 year old males as expected because Loudoun had in-migration in this age group. This ratio is generally higher in younger age groups and lower in older age groups, in part because older people move less frequently but also because this ratio reflects deaths.

A simple or weighted average of the 1990-2000 and 2000-2010 cohort change ratios will be applied to the 2015 Loudoun County population to forecast the age groups and sex of in 2025, 2035 and 2045. (Because the cohort change ratios are for a 10-year period, we need to forecast out at 10-year intervals. The midpoint of those estimates will be used to determine the population estimates for 2020, 2030 and 2040.) Overall population forecasts from the Round 9.0 Cooperative Forecast from Metropolitan Washington Council of Governments (MWCOG) will be used to control each forecast.

The cohort change ratios only look at past trends as a predictor of the future, but we also will look at recent national trends and trends in nearby jurisdictions (e.g. Fairfax County) and potentially use these other estimates to modify the Loudoun County forecast. We will also look at the National Population Projections, which are available by age and sex. We will compare the forecasted growth in each age group for the nation to the one found using the above method for Loudoun County. If the growth rates differ significantly, we may adjust the age distribution in Loudoun County to account for key national trends.

Step 2. Households by Age of Household Head

The next step will be to estimate the number of households by the age of the head of the household. To do this, we will estimate what percentage of the population is the head of a household (a headship rate). We will calculate this headship rate for all age groups by sex using data from the 2000 and 2010 Census,

[15] This approach is called the Hamilton-Perry Method, and is a common approach to demographic forecasting.

and 2012-2014 American Community Surveys. An average of the headship rates will then be applied to the forecasted population by age and sex group to determine the number of households headed by each age group. The total households will be controlled to match the forecasted number of households from MWCOG.

Again, we will look at the trends in comparable jurisdictions to see if it is appropriate to use another jurisdiction for these assumptions.

Step 3. Households without a Worker

Next, we will estimate the number of future households without a worker. The age of the householder is a predictor of if there is a worker in the household. Households with older household heads are more likely to have no workers than younger household heads. Using the 2012-2014 ACS data, we will calculate the percentage of each age group and sex that are non-worker households. This percentage will be applied to the forecasted households by the householder's age group and sex. If it is determined in prior steps that another jurisdiction's assumptions are more appropriate, then that jurisdiction's assumptions will be used here as well. (See discussion of assumptions below.)

Step 4. Household Incomes and Unit Types of Non-Working Households

Finally, we will forecast the AMI group of each non-worker household and what type of unit they will be living it. The age and sex of the future non-working householder is assumed to drive the household's AMI and housing unit characteristics. From 2012-2014 ACS data, the share of current non-working households in each AMI group and unit type will be calculated for each the age group by sex. These shares will then be applied to the forecasted households by householder age group and sex to generate the future number of non-working households by AMI and unit type. If it is determined in prior steps that another jurisdiction's assumptions are more appropriate, then that jurisdiction's assumptions will be used here as well.

3-3. Reconciling Housing Demand Forecasts

These forecasts do not presume anything about current land use patterns or capacity for residential development in the County. The forecasting process generates total housing demand in Loudoun County as the sum of the employment-driven and demographic-driven estimates. These preliminary forecast totals will be compared with external sources, including the MWCOG Round 9.0 household forecasts for Loudoun County and the housing unit projections resulting from the County's build-out analysis. These two sources—the MWCOG forecasts and the results from the County's build-out analysis—will be used as the estimate of future housing supply. We will compare our housing demand forecasts with these two estimates of future housing supply to estimate potential future housing gaps.

Most likely, the initial housing demand forecasts will be higher than what is suggested by either of these two sources. If so, we will lay out the assumptions for determining which households will not be accommodated in Loudoun County in the future. For example, if certain types of households are not currently able to find a sufficient supply of affordable and available housing in the County, we may assume

that these types of households will also have difficulty finding affordable and available housing in the County in the future. This approach will allow us to estimate the projected future gap between housing demand and supply in Loudoun County for households of different types and at different income levels.

3-4. Assumptions

The housing demand forecasts rely heavily on assumptions about demographic, economic and housing market conditions and preferences. We will get confirmation from County IDT staff on all assumptions. Some preliminary decisions about assumptions are described below:

- Rates of retirement by age group and industry – Assume current patterns based on analysis of 2012-2014 ACS data ("current patterns")
- Age distribution by industry – Current patterns
- Household composition (type) by age group – While we may end using current patterns, we will first investigate household formation rates and patterns of household composition in different years in Loudoun County (e.g. 2000) and in different jurisdictions (e.g. Fairfax County). After we conduct this analysis, we will confer with the IDT to determine how to proceed.
- Average number of workers by age group and household type – Current patterns
- Median wages by age group and industry – Current patterns
- Housing unit type (preferences) by household type and household income – While we may end up using current patterns, we will first investigate housing unit types in earlier years (e.g. 2000) and in other jurisdictions (e.g. Fairfax County). After we conduct this analysis, we will confer with the IDT to determine how to proceed.
- Commuting patterns – We will use data on commuting patterns to allocate to Loudoun County housing demand associated with regional job growth. After we conduct an analysis of current commuting patterns both for Loudoun County and Fairfax County, we will confer with the IDT to determine the appropriate commuting shares to use in the forecasts.
    - Share of Loudoun County workers that live in the County (by household type)
    - Shares of workers in the rest of the region that live in Loudoun County (by household type)
    - Jobs-to-housing unit ratios in Loudoun and surrounding counties over time
- Shares of households without a worker by age group (non-worker households) – Current patterns
- Household income distributions of non-worker households – Current patterns

3-5. Quality Assurance

We aim to produce high quality forecasts of housing demand for the Loudoun County Housing Needs Assessment. All of the analysis described in this Methodology will be done by Jeannette Chapman and Lisa Sturtevant. We have internal quality assurance (QA) checks as we go through the process. In addition, we will request validation from members of the IDT staff at critical points during the process. Finally, we will make available all data used in the analysis in Excel format.

4. Implications of Analysis of Current Conditions and Trends

In the final report, in addition to the detailed analysis as described above, we will also discuss the implications of the forecasts for policy and planning. This part of the analysis will include the following:

- Discussion of recent housing construction patterns; assumptions about whether these patterns will continue and the resulting gaps between demand and supply
- Assessment of the County's housing programs and policies for delivering sufficient housing
- Discussion of other factors that might affect housing demand or supply; qualitative discussion of how changes to assumptions will impact forecasts, including mortgage rates, slowdown in the regional economy, changes to assumptions (e.g. household formation rates, retirement rates, housing preferences)

While we are not developing specific policy recommendations for meeting projected housing needs in the County, we will include in the final report a discussion of the potential for local policies to address gaps given the regional nature of housing and labor markets.

In addition, because this study focuses explicitly on the link between economic growth and housing availability and affordability, in the conclusions section of the final report, we will discuss how potential future gaps between housing supply and housing demand may impact Loudoun County's economic competitiveness.

5. Final Data Files

We will provide all data files in Excel format so that the data can be updated. While much of the forecasting analysis will be conducted in STATA, we will include all of the data used in the assumptions in the Excel files.

APPENDIX

Detailed Analysis of Trends, Current Conditions and Housing Affordability

P. Population Characteristics

P.I. Age Group (<18, 18-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85+)

P.II. Race and Ethnicity (Non-Hispanic - White, one race, Black/African American, one race, Asian, one race, Multi-racial/other; Hispanic, any race)

P.III. Place of Birth (U.S., foreign country)

P.IV. Educational Attainment for Population over 25 Years Old (Less than high school graduate, High school graduate or equivalent, Some college or associate's degree, Bachelor's degree, Graduate or professional degree)

P.V. Disability Status for Civilian, Noninstitutionalized Population (With a hearing difficulty, With a vision difficulty, With an ambulatory difficulty, With a cognitive difficulty, With a self-care difficulty, With an independent living difficulty; separately for under 65 and 65+)

P.I.a. Population by Age Groups (2014)

P.I.a (1) Arlington County, VA
P.I.a (2) Fairfax County, VA
P.I.a (3) Prince William County, VA
P.I.a (4) Montgomery County, MD
P.I.a (5) Frederick County, MD
P.I.a (6) Washington Metropolitan Area

P.II.a. Population by Race and Ethnicity (2014)

P.II.a (1) Arlington County, VA
P.II.a (2) Fairfax County, VA
P.II.a (3) Prince William County, VA
P.II.a (4) Montgomery County, MD
P.II.a (5) Frederick County, MD
P.I.a (6) Washington Metropolitan Area

H. Household Characteristics

H.I. Households by Age of Household Head (<25, 25-34, 35-44, 45-54, 55-64, 65+)

H.II. Households by Household Income (<$15K, $15-29K, $30-59K, $60-79K, $80-99K, $100-119K, $120-149K, 150-199K, $200-249K, $250K+)

H.III. Household by Percent of Area Median Income (<30% AMI, 30-49% AMI, 50-59% AMI, 60-79% AMI, 80-99% AMI, 100-119% AMI, 120-139% AMI, 140-159% AMI, 160-179% AMI, 180-199% AMI, 200% AMI+)

H.IV. Households by Household Type (Family Household-Married, No Kids, Married, w/Kids, Single Parent, Other Family; Non-Family Household-Living Alone, under 65, Living Alone, 65+, Not Living Alone)

H.V. Households by Year Moved into Unit Moved in (2010 or later, Moved in 2000 to 2009, Moved in 1990 to 1999, Moved in 1980 to 1989, Moved in 1970 to 1979, Moved in 1969 or earlier)

H.VI. Place of Residence Year Ago for Households that Moved into the County (moved from other places in the Washington DC metro area, moved from outside the region)

H.I.a. Household Income over Time (2000-2014)

- H.II.a (1) Arlington County, VA
- H.II.a (2) Fairfax County, VA
- H.II.a (3) Prince William County, VA
- H.II.a (4) Montgomery County, MD
- H.II.a (5) Frederick County, MD
- H.II.a (6) Washington Metropolitan Area

H.III.a. Household Type over Time (2000-2014)

- H.III.a (1) Arlington County, VA
- H.III.a (2) Fairfax County, VA
- H.III.a (3) Prince William County, VA
- H.III.a (4) Montgomery County, MD
- H.III.a (5) Frederick County, MD
- H.III.a (6) Washington Metropolitan Area

U. Housing Characteristics

U.I. Occupied Housing by Tenure (owner, renter)

U.II. Occupied Housing by Type of Building (Mobile home / trailer, Single-Family, Detached, Single-Family, Attached, 2-19 Units, 20-49 Units, 50 or more Units)

U.III. Occupied Housing by Year Building Built (2010 or later, 2005-2009, 2000-2004, 1990-1999, 1980-1989, 1970-1979, 1960-1969, 1950-1959, Before 1950)

U.IV. Occupied Housing by Number of Bedrooms (No Bedrooms/ Studio, 1 Bedroom, 2 Bedrooms, 3 Bedrooms, 4 Bedrooms, 5+ Bedrooms)

U.V. Occupied Housing by Number of Occupants Per Room (0.50 or less, 0.51 to 1.00, 1.01 to 1.50, 1.51 to 2.00, 2.01 or more)

U.VI. Occupied Housing by Monthly Gross Rent Level (<$750, $750-1,000, $1,001-1,250, $1,251-1,500, $1,501-$2,000, $2,001-2,500, $2,500+)

U.VII. Occupied Housing by Home Value (<$200,000, $200,000-299,999, $300,000-399,999, $400,000-499,999, $500,000-599,999, $600,000-699,999, $700,000-799,999, $800,000-899,999, $900,000-999,999, $1,000,000+)

U.I.a. Occupied Housing by Tenure over Time

- U.I.a (1) Arlington County, VA
- U.I.a (2) Fairfax County, VA
- U.I.a (3) Prince William County, VA
- U.I.a (4) Montgomery County, MD
- U.I.a (5) Frederick County, MD
- U.I.a (6) Washington Metropolitan Area

U.II.a. Occupied Housing by Type of Building over Time

- U.II.a (1) Arlington County, VA
- U.II.a (2) Fairfax County, VA
- U.II.a (3) Prince William County, VA
- U.II.a (4) Montgomery County, MD
- U.II.a (5) Frederick County, MD
- U.II.a (6) Washington Metropolitan Area

E. Employment and Economic Characteristics

E.I. Employment by sector (2-digit NAICS, 2000-2014)

E.II. Gross regional product (2000-2014)

E.III. Characteristics of At-Place Employment (2014)

- E.III.a. Workers by Industry Sector (2-digit NAICS)
- E.III.b. Average or Median Wage by Industry
- E.III.c. Place of Residence of Workers (in the county, outside the county)
- E.III.d. Mode of Commute to Work for Workers over 16 Years Old (Public transportation, Drove alone, Carpooled, Walked or Biked, Worked at Home, Other)
- E.III.e Workers by Age Group

E.IV. Characteristics of Resident Workers (2014)

- E.III.a. Workers by Industry Sector (2-digit NAICS)
- E.III.b. Average or Median Wage by Industry
- E.III.c. Place of Work of Residents (in the county, outside the county)
- E.III.d. Mode of Commute to Work for Workers over 16 Years Old (Public transportation, Drove alone, Carpooled, Walked or Biked, Worked at Home, Other)

E.V. Share of At-Place Jobs Held by County Residents

E.V.I. Commuting Patterns of County Workers

HM.I. For-Sale Market

- HM.I.a. Number of Sales of Existing and New Homes (2000-2016) (*if new home sales data are available)
- HM.I.b. Prices of Existing and New Homes (2000-2016, median price and <$200,000, $200,000-299,999, $300,000-399,999, $400,000-499,999, $500,000-599,999, $600,000-699,999, $700,000-799,999, $800,000-899,999, $900,000-999,999, $1,000,000+) (*if new home sales data are available)
- H.M.I.c. Current Inventories of Existing Homes by Price (<$200,000, $200,000-299,999, $300,000-399,999, $400,000-499,999, $500,000-599,999, $600,000-699,999, $700,000-799,999, $800,000-899,999, $900,000-999,999, $1,000,000+)
- H.M.I.d. Current Inventories of Existing Homes for Sale by Unit Type (single-family detached, single-family attached/townhome, and multi-family) and Bedroom Size (0, 1, 2, 3, 4+ bedrooms)

HM.II. Rental Market

HM.II.a. Rents by Unit Size/Bedrooms (2000-2016, if data are available from the County)

HM.III. Building Permits by Type of Structure (single-family, multi-family,2000-2014)

A.I. General Affordability Characteristics

A.I.a. Occupied Housing by Gross Rent as a Percent of Household Income (<30%, 30-49%, 50%+)

A.I.b. Occupied Housing by Select Owner Costs as a Percent of Household Income (<30%, 30-49%, 50%+)

A.I.a. Occupied Housing by Gross Rent as a Percent of Household Income (2000-2014)

A.I.a (1) Arlington County, VA

A.I.a (2) Fairfax County, VA

A.I.a (3) Prince William County, VA

A.I.a. (4) Montgomery County, MD

A.I.a. (5) Frederick County, MD

A.I.a. (6) Washington Metropolitan Area

A.I.b. Occupied Housing by Select Owner Costs as a Percent of Household Income (2000-2014)

A.I.b. (1) Arlington County, VA

A.I.b. (2) Fairfax County, VA

A.I.b. (3) Prince William County, VA

A.I.b. (4) Montgomery County, MD

A.I.b. (5) Frederick County, MD

A.I. b. (6) Washington Metropolitan Area

A.II. Detailed Analysis of Cost Burdened Households (Defined as Those Spending 30% of More of Income on Housing)

A.II.a. By Household Income (<$15K, $15-29K, $30-59K, $60-79K, $80-99K, $100-119K, $120-149K, 150-199K, $200-249K, $250K+)

A.II.b. By Percent of Area Median Income (<30% AMI, 30-49% AMI, 50-59% AMI, 60-79% AMI, 80-99% AMI, 100-119% AMI, 120-139% AMI, 140-159% AMI, 160-179% AMI, 180-199% AMI, 200% AMI+)

A.II.c. By Household Type (Family Household-Married, No Kids, Married, w/Kids, Single Parent, Other Family; Non-Family Household-Living Alone, under 65, Living Alone, 65+, Not Living Alone; Female Headed Households)

A.II.d. By Household Size (1, 2, 3, 4+ person)

A.II.e. By Race and Ethnicity (Non-Hispanic - White, one race, Black/African American, one race, Asian, one race, Multi-racial/other ; Hispanic, any race)

A.II.f. By Age of Household Head (<25, 25-34, 35-44, 45-54, 55-64, 65+)

A.II.g. By Disability Status of Household Members (Physical disability, Other disability)

A.III. Housing plus Transportation (H+T) Costs for Select Household Types

Forecasts of Housing Demand

The subgroups included in the forecast tables will be the same as those outlined above in the tables summarizing trends, current conditions and housing affordability.

Number of Households by AMI Group[16], 2014-2040[17]
Number of Households by Household Size (1, 2, 3 or 4+) and AMI, 2014-2040
Number of Households by Select Household Type and AMI, 2014-2040
Number of Households by Age Group of Head of Household, 2014-2040
Number of Worker Households and Non-Worker Households, 2014-2040
Job Growth by Industry and Place of Job, 2015-2040
Job Growth in Loudoun and Current Wage Distribution, 2014-2040
Future Rent Thresholds based on AMI Groups, in current dollars
Number of Households by Unit Type and AMI, 2014-2040
Summary of Forecasted Housing Supply, 2014-2040 [MWCOG 9.0 &/or Build-out Report]
Share of Cost Burdened Owners and Renters Based on Current Ratios and Forecasted Households, 2014-2040

[16] If available and appropriate, 10% AMI intervals will be shown. Some intervals may have too few households to show.
[17] If available and appropriate, 5-year intervals will be shown. Intervals will be no more than 10 years.

A Note on Area Median Income Thresholds

The AMI limits in this forecast will only use the 100 percent Area Median Income for a family of four from the U.S. Department of Housing and Urban Development (HUD). The household size adjustments will follow the same method, but no ceilings or caps will be used. This most notable difference between HUD limits and those forecasted will be for the 80 percent AMI limits, which are generally capped in the Washington Metro Area. Additionally each threshold will be rounded to the nearest dollar ($1.00), instead of the HUD method of rounding up to the nearest $50.00. All forecasts will used the Washington Metro Area AMI, even if the workers' job is outside of the metro.

Household Size Adjustment:

AMI thresholds are dependent on household size. The 100 percent AMI threshold for a 4-person household is equal to the region's AMI and all other households are calculated using a 4-person household as the base as shown in Table 2. AMI limits for households smaller than four people are 100 percent of the 4-person limit *minus* ten percent for each fewer person. AMI limits for households larger than four people are 100 percent of the 4-person limit *plus* eight percent for each additional person.

FY 2015 AMI Limits, Washington Metro Area, Example of Forecast Thresholds

	1-Person	**2-Person**	**3-Person**	**4-Person**	**5-Person**	**6-Person**	**7-Person**	**8-Person**
	70% of 4-person HH	80% of 4-person HH	90% of 4-person HH	100%	108% of 4-person HH	116% of 4-person HH	124% of 4-person HH	132% of 4-person HH
Extremely Low Income Limits (30% AMI)	22,932	26,208	29,484	32,760	35,381	38,002	40,622	43,243
Very Low Income Limits (50% AMI)	38,220	43,680	49,140	54,600	58,968	63,336	67,704	72,072
Low Income Limits (80% AMI)	61,152	69,888	78,624	87,360	94,349	101,338	108,326	115,315
100% AMI	76,440	87,360	98,280	109,200	117,936	126,672	135,408	144,144
120% AMI	91,728	104,832	117,936	131,040	141,523	152,006	162,490	172,973

Source: U.S. Department of Housing and Urban Development and GMU Center for Regional Analysis

Loudoun County Housing Needs Assessment
Housing Demand Forecasts Methodology

The forecasts of household growth and housing demand for Loudoun County described in the report are derived from three main components: 1) housing demand from workers filling net new jobs, 2) housing demand from workers replacing jobs vacated by retirees, and 3) housing demand from non-worker households. This forecasting process relies on local and regional employment forecasts, local population estimates and forecasts, and analysis of U.S. Census Bureau American Community Survey data.

The majority of future housing demand in Loudoun County will be related to employment growth. The employment-driven portion of the housing demand in the GMU consulting team's forecasting model is from workers with a payroll job[1], or a position with a regular wage or salary, in Loudoun County or somewhere else in the Washington DC region. These future workers are expected to live in Loudoun County at the same rates as they currently do. In addition to housing demand associated with net new jobs, these forecasts estimate the amount of housing that will be needed to accommodate replacement workers—that is, workers filling jobs vacated by retirees. The estimates of future employment growth that drive these housing demand forecasts are based on forecasts of employment growth by sector from IHS Economics and the MWCOG.

The remainder of future housing demand in Loudoun County is derived from demographic trends to estimated housing demand from households without a payroll worker. The demographic-driven portion of housing demand in Loudoun County includes housing needed for retirees, students, and some types of self-employed residents. A separate forecasting process based on projected age and sex of the current population[2] was used to determine how many of these households will be expected to prefer to live in the County by 2040.

For both groups, these forecasts include estimates of household characteristics of future households. The household characteristics—including age of the household head, household size and composition, and household incomes—are used to predict housing unit preferences.

[1] Payroll employment is the type of employment that is covered by unemployment insurance and is included in estimates from the Bureau of Labor Statistics and employment forecasts from IHS Economics, which are used for this analysis.
[2] The householder and the head of household is used interchangeably throughout this report.

Key Forecast Parameters

Geography: The forecasts reported in this report focus exclusively on Loudoun County. In order to estimate housing demand associated with new worker households, the job growth within the greater Washington DC region was examined.

Timeframe: The forecasts are for the 2015-2040 period.

Household Characteristics:

Age Groups: We generate forecasts for the age of the head of household in 5 age groups (<35 years old, 35-44 years old, 45-54 years old, 55-65 years old and 65+ years old).

Household Size: We generate forecasts for single-person households, two-person households, three-person households and households with four or more people.

Disability Status: We generate forecasts for households where any member of the household has a disability and for households where no member of the household has a disability.

Area Median Income Groups: We generate forecasts for 21 AMI groups. AMI is commonly used as a basis for grouping households among affordable housing policymakers, planners and advocates. The AMI limits are published annually by HUD for all U.S. metropolitan areas and correspond to the median family income.

Housing Unit Characteristics:

Housing Tenure and Types: We forecast the demand for single-family detached owner, single-family detached renter, single-family attached owner, single-family attached renter, multi-family owner, and multi-family renter. Single-family attached includes townhouses and buildings with 2-4 units. Multi-family includes homes in buildings with at least five units.

Description of Forecasting Process

This methodology is divided into three sections:

I. Estimating household growth and housing demand among **households without a payroll job**
II. Estimating household growth and housing demand for **net new workers and replacement workers**
III. Analyzing **regional housing and commuting characteristics**

I. Household Growth and Housing Demand for Households without a Payroll Job

Households without a payroll job include retirees, students and unincorporated[3] self-employed workers, the majority of whom are living in Loudoun County for a reason not tied to the traditional employment market. Demographic trends are assumed to drive the growth in these types of households. The

[3] Unincorporated self-employment includes individuals who have not created a legal entity or corporation.

forecasted age group and sex of the householder is used to determine the likelihood that a household would not have a payroll job.

Before determining forecasting the number of non-payroll job households in Loudoun County, we first started by forecasting the County population by age group and sex. Then, we determined the number of households that these residents would form. Finally, we estimated what share of these households would not have a payroll job based on current labor force participation rates by age group and sex.

I.a. Population Forecasts by Age:

To forecast the population by age group and sex, we first started by using cohort change ratios.[4] The population in 1990, 2000, 2005, 2010, and 2015 was grouped by 5-year age groups by sex. Between 1990 and 2000, a cohort change ratio was calculated by dividing the 2000 population in each age and sex group by the 1990 population in each age and sex group, but for the age group 10 years younger. The cohort change ratio captures both the "aging up" and net migration of the population by age group and sex. The same was done for the 2000 and 2010 populations and the 2005 and 2015 populations. An average of the 1990-2000, 2000-2010 and 2005-2015 cohort change ratios was applied to the 2015 population to determine the forecasted age and sex of residents over 10 years old in 2025, 2035 and 2040. The use of the overlapping 2000 to 2010 and 2005 to 2015 periods was intentional and done to better capture recent trends that may be missed by equally weighting the 1990-2000 trends. The population and cohort change ratios for Loudoun County are shown in Figure A.

[4] a.k.a the Hamilton-Perry Method

Figure A. Population and Cohort Change Ratios, Loudoun County

		Population					Cohort Change Ratios			
Age	Sex	1990	2000	2005	2010	2015	1990 - 2000	2000-2010	2005-2015	Average
<5	Male	3,829	8,382	13,067	13,986	14,541	N/A	N/A	N/A	N/A
5-9	Male	3,408	7,724	10,961	14,712	16,485	N/A	N/A	N/A	N/A
10-14	Male	2,903	6,372	9,867	12,730	16,110	1.66	1.52	1.23	1.47
15-19	Male	2,813	4,701	7,551	9,957	12,871	1.38	1.29	1.17	1.28
20-24	Male	2,818	3,375	5,652	6,516	9,414	1.16	1.02	0.95	1.05
25-29	Male	4,371	5,861	8,004	8,923	9,463	2.08	1.90	1.25	1.74
30-34	Male	4,707	8,440	11,815	11,418	13,352	3.00	3.38	2.36	2.91
35-39	Male	4,100	9,891	12,995	14,545	15,806	2.26	2.48	1.97	2.24
40-44	Male	3,735	8,134	12,835	14,697	16,682	1.73	1.74	1.41	1.63
45-49	Male	3,109	6,031	10,224	13,915	15,611	1.47	1.41	1.20	1.36
50-54	Male	2,136	5,051	7,465	10,576	14,478	1.35	1.30	1.13	1.26
55-59	Male	1,641	3,611	5,883	7,429	10,639	1.16	1.23	1.04	1.14
60-64	Male	1,164	2,221	3,826	5,772	7,293	1.04	1.14	0.98	1.05
65-69	Male	780	1,492	2,283	3,565	5,379	0.91	0.99	0.91	0.94
70-74	Male	547	1,056	1,430	2,116	3,487	0.91	0.95	0.91	0.92
75-79	Male	383	737	1,057	1,537	2,202	0.94	1.03	0.96	0.98
80-84	Male	228	476	692	917	1,443	0.87	0.87	1.01	0.92
85+	Male	142	282	500	767	1,237	0.37	0.51	0.55	0.48
<5	Female	3,784	8,079	12,446	13,552	13,568	N/A	N/A	N/A	N/A
5-9	Female	3,212	7,545	10,885	14,286	15,662	N/A	N/A	N/A	N/A
10-14	Female	2,759	6,166	9,650	12,543	15,810	1.63	1.55	1.27	1.48
15-19	Female	2,672	4,330	7,071	9,276	12,480	1.35	1.23	1.15	1.24
20-24	Female	2,900	3,533	5,459	6,204	9,168	1.28	1.01	0.95	1.08
25-29	Female	4,519	6,444	8,770	9,894	9,738	2.41	2.28	1.38	2.02
30-34	Female	4,739	9,175	12,673	13,248	14,473	3.16	3.75	2.65	3.19
35-39	Female	4,242	9,926	13,446	14,845	16,815	2.20	2.30	1.92	2.14
40-44	Female	3,805	8,135	12,980	14,866	16,455	1.72	1.62	1.30	1.55
45-49	Female	2,989	6,115	10,046	13,826	15,670	1.44	1.39	1.17	1.33
50-54	Female	1,966	5,035	7,493	10,535	13,846	1.32	1.30	1.07	1.23
55-59	Female	1,451	3,616	6,057	7,738	10,555	1.21	1.27	1.05	1.18
60-64	Female	1,134	2,168	3,924	5,897	7,600	1.10	1.17	1.01	1.10
65-69	Female	957	1,552	2,445	4,048	5,851	1.07	1.12	0.97	1.05
70-74	Female	772	1,302	1,757	2,512	4,328	1.15	1.16	1.10	1.14
75-79	Female	577	1,113	1,514	1,938	2,836	1.16	1.25	1.16	1.19
80-84	Female	432	817	1,200	1,507	2,026	1.06	1.16	1.15	1.12
85+	Female	405	711	986	1,518	2,255	0.50	0.57	0.61	0.56

Source: U.S. Census Bureau

To determine the future number of children under ten years old, a ratio of number of children under ten to the number of women between 20 and 44 years old was calculated for 1990, 2000, 2005, 2010 and 2015. The average of this ratio was applied to the forecasted number of women between 20 and 44 years old to estimate the number of children. The child generations rates for Loudoun County are shown in Figure B.

Figure B. Ratio of Females Aged 20-44 to Children <10 years old, i.e. Child Generation Rates, Loudoun County

	Ratio
1990	0.70
2000	0.85
2010	0.96
2015	0.90
Average	0.85

Source: U.S. Census Bureau

Overall population forecasts from the Round 9.0 Cooperative Forecast from Metropolitan Washington Council of Governments (MWCOG) were used to control each forecast. Because the cohort change method relies exclusively on past trends, fast growing areas are predicted to grow at a similarly high rate, indefinitely. As a result, the growth rate resulting from the above cohort change method was 20-60 percent higher than is projected by MWCOG. The difference is largely due to fast growth among the working-age population, which will be captured by the methodology described in Section II. Because this analysis is used to determine households without a payroll job, which will be a result both of current and future population growth, the MWCOG forecasts were used as a control. The population in each age and sex group was proportionally revised downward so that the forecasted overall population growth aligned with MWCOG 9.0.

Using cohort change ratios alone for small area forecasts may lead to large percentage changes because of small absolute changes. For that reason, we then stabilized the changes by taking into account national growth forecasts. To do so, we calculated the share of the population in each age group by sex for both the individual jurisdictions and the nation in 1990, 2000, 2005 2010 and 2015. We then calculated the ratio of each age group by sex in each jurisdiction relative to the nation's share (for example, the percentage of the Loudoun's population that is 25-29 year old and male in 2015 divided by the percentage of the U.S. population that is 25-29 year old and male in the U.S. in 2015). This relative ratio was averaged across the four periods. The average was then applied to the forecasted national share to determine the share of each jurisdiction's population by age group and sex. The process is shown in Figure C for select years for all age groups over 15 years old.

Figure C. Distribution by Age and Sex in Loudoun County and the Nation, 1990-2015 and Forecasted

		Loudoun Shares		National Shares					Loudoun / National		Loudoun Forecast Share		
Age	**Sex**	**1990**	**2015**	**1990**	**2015**	**2025**	**2030**	**2040**	**1990**	**2015**	**2025**	**2030**	**2040**
15 to 19	M	3.3%	3.4%	3.7%	3.4%	3.1%	3.0%	3.0%	0.89	1.02	3.1%	3.1%	3.2%
20 to 24	M	3.3%	2.5%	3.9%	3.6%	3.3%	3.2%	3.1%	0.83	0.69	1.8%	1.6%	1.4%
25 to 29	M	5.1%	2.5%	4.3%	3.5%	3.4%	3.3%	3.1%	1.18	0.71	1.8%	1.5%	0.8%
30 to 34	M	5.5%	3.6%	4.4%	3.4%	3.6%	3.4%	3.3%	1.25	1.05	3.6%	3.2%	2.8%
35 to 39	M	4.8%	4.2%	4.0%	3.2%	3.4%	3.5%	3.3%	1.20	1.33	5.1%	5.3%	5.1%
40 to 44	M	4.3%	4.4%	3.5%	3.1%	3.2%	3.4%	3.3%	1.24	1.42	4.9%	5.2%	5.4%
45 to 49	M	3.6%	4.2%	2.7%	3.2%	3.0%	3.1%	3.4%	1.33	1.29	3.6%	3.8%	4.2%
50 to 54	M	2.5%	3.9%	2.2%	3.4%	2.8%	2.8%	3.2%	1.12	1.13	2.9%	2.9%	3.2%
55 to 59	M	1.9%	2.8%	2.0%	3.3%	2.9%	2.7%	2.9%	0.95	0.86	2.2%	2.0%	2.0%
60 to 64	M	1.4%	1.9%	2.0%	2.8%	2.9%	2.7%	2.5%	0.68	0.68	2.1%	1.9%	1.8%
65 to 69	M	0.9%	1.4%	1.8%	2.4%	2.8%	2.7%	2.4%	0.50	0.61	1.8%	1.8%	1.7%
70 to 74	M	0.6%	0.9%	1.4%	1.6%	2.2%	2.4%	2.2%	0.46	0.56	1.3%	1.4%	1.4%
75 to 79	M	0.4%	0.6%	1.0%	1.1%	1.7%	1.9%	2.1%	0.46	0.52	0.9%	1.0%	1.2%
80 to 84	M	0.3%	0.4%	0.5%	0.8%	1.0%	1.3%	1.6%	0.49	0.51	0.5%	0.6%	0.7%
85+	M	0.2%	0.3%	0.3%	0.7%	0.8%	1.0%	1.5%	0.49	0.49	0.4%	0.4%	0.7%
15 to 19	F	3.1%	3.3%	3.5%	3.2%	3.0%	2.9%	2.9%	0.89	1.04	3.0%	2.9%	3.1%
20 to 24	F	3.4%	2.4%	3.8%	3.4%	3.1%	3.0%	2.9%	0.89	0.71	1.7%	1.5%	1.2%
25 to 29	F	5.2%	2.6%	4.3%	3.4%	3.2%	3.2%	3.0%	1.23	0.75	2.0%	1.7%	1.0%
30 to 34	F	5.5%	3.9%	4.4%	3.4%	3.4%	3.3%	3.1%	1.25	1.15	4.2%	3.9%	3.6%
35 to 39	F	4.9%	4.5%	4.0%	3.2%	3.3%	3.4%	3.2%	1.22	1.41	5.2%	5.3%	5.2%
40 to 44	F	4.4%	4.4%	3.6%	3.2%	3.2%	3.3%	3.2%	1.23	1.38	4.7%	5.0%	5.1%
45 to 49	F	3.5%	4.2%	2.8%	3.3%	3.0%	3.1%	3.3%	1.23	1.27	3.7%	3.9%	4.2%
50 to 54	F	2.3%	3.7%	2.3%	3.5%	2.9%	2.9%	3.1%	0.98	1.04	2.9%	2.9%	3.2%
55 to 59	F	1.7%	2.8%	2.2%	3.5%	3.0%	2.8%	2.9%	0.76	0.81	2.4%	2.3%	2.4%
60 to 64	F	1.3%	2.0%	2.3%	3.1%	3.2%	2.8%	2.7%	0.58	0.65	2.3%	2.1%	2.0%
65 to 69	F	1.1%	1.6%	2.2%	2.6%	3.1%	3.0%	2.6%	0.50	0.59	2.0%	2.0%	1.8%
70 to 74	F	0.9%	1.2%	1.8%	1.9%	2.6%	2.8%	2.5%	0.49	0.60	1.6%	1.7%	1.6%
75 to 79	F	0.7%	0.8%	1.5%	1.4%	2.1%	2.3%	2.5%	0.45	0.54	1.1%	1.3%	1.4%
80 to 84	F	0.5%	0.5%	1.0%	1.1%	1.3%	1.7%	2.1%	0.49	0.51	0.6%	0.8%	1.0%
85+	F	0.5%	0.6%	0.9%	1.3%	1.3%	1.6%	2.4%	0.54	0.47	0.5%	0.6%	0.8%

These shares were then applied to the overall population forecasts from MWCOG. An average of the two population estimates was used to take into account both historic migration and growth patterns and national trends.

I.b. Households Forecasts by Householder Age and Sex:

We analyzed data from the 2012, 2013 and 2014 American Community Survey (an average of the one year microdata samples) to estimate the percentage of each age group by sex who is a householder (i.e. the head of household) (a headship rate). Figure D shows the headship rate for Loudoun County. A headship rate of zero percent means that everyone in that age and sex group lives in someone else's household (no children run a household). A headship rate of 100 percent means that everyone in that age and sex group runs a household, or has indicated that they do on the survey.

Figure D. Headship Rate, Loudoun County

Age	Male	Female
Under 5	0.0%	0.0%
5 to 9	0.0%	0.0%
10 to 14	0.0%	0.0%
15 to 19	0.3%	0.4%
20 to 24	9.6%	7.8%
25 to 29	31.0%	33.9%
30 to 34	46.2%	35.4%
35 to 39	60.8%	40.1%
40 to 44	63.7%	44.6%
45 to 49	64.1%	44.5%
50 to 54	60.8%	44.1%
55 to 59	69.6%	44.7%
60 to 64	71.0%	50.5%
65 to 69	64.3%	35.1%
70 to 74	55.8%	45.2%
75 to 79	73.1%	32.8%
80 to 84	66.8%	58.8%
85+	59.1%	45.6%

Source: U.S. Census Bureau

Next, we estimated the number of people not in households, i.e. those in group quarters.[5] We assumed that the population in group quarters would grow at one-third the rate of the overall population. In 2015, Loudoun had 1,302 people in group quarters and by 2040, this number is projected to be 1,426. It was assumed that the age distribution of the group quarters population would remain the same as in 2015. Next, this headship rate was applied to the forecasted population expected to be living in households by age and sex group to determine the number of households headed by each age group.

[5] Per the Census definition, "A group quarters is a place where people live or stay, in a group living arrangement, that is owned or managed by an entity or organization providing housing and/or services for the residents. This is not a typical household-type living arrangement." This includes dormitories, nursing homes with full-time medical care, correctional facilities and military barracks.

The total households were controlled to match the forecasted number of households from MWCOG, a change of less than 3 percent for the period. This was done primarily to account for any difference in the 2015 base year estimate between the American Community Survey and the Loudoun County Department of Planning and Zoning, April 15, 2016 Estimate Series.

I.c. Non-worker Household Forecasts:

The age and sex of the household head is correlated with the workforce status of the household. Again using the 2012, 2013 and 2014 American Community Surveys, the current percentage of households without a payroll job based on the householder's age group and sex was calculated, as shown in Figure E. This percentage was applied to the forecasted households by the householder's age group and sex.

Figure E. Percent of Households without a Payroll Job, Loudoun County

Age	Male	Female
15 to 19	0%	0%
20 to 24	20%	4%
25 to 29	1%	0%
30 to 34	0%	4%
35 to 39	1%	1%
40 to 44	3%	3%
45 to 49	1%	6%
50 to 54	6%	4%
55 to 59	11%	7%
60 to 64	18%	12%
65 to 69	32%	43%
70 to 74	46%	58%
75 to 79	80%	77%
80 to 84	58%	72%
85+	83%	80%

Source: U.S. Census Bureau

I.d. Non-worker Household Forecasts AMI and Unit Type:

Lastly, the age and sex of the future non-working householder is assumed to drive the household's AMI, housing unit and other characteristics. From the 2012, 2013 and 2014 American Community Surveys, the share of current non-working households in each AMI group and unit type was calculated for each age group by sex. These shares were then applied to the forecasted households by householder age group and sex to distribute all non-working households by AMI, unit type, household size and disability status.

For example, almost one-fifth (18.1 percent) of non-worker households headed by a female aged 75 to 79 years old earned between 10 and 19.9 percent of AMI in Loudoun during the 2012, 2013 and 2014 period. As shown in Figure F, a total of 7.2 percent of the households in this age and sex group owned a single-family detached home and earned between 10 and 19.9 percent of AMI. These calculations were done for each age group by sex. In the future, it is assumed that this will also be the case, with the AMI and unit type demanded being driven by the age and sex of the householder.

Figure F. Households Without a Payroll Job Headed by a Female Aged 75-79 Years Old by Unit Type and AMI Group, Loudoun County

	Share
Earning 10-19.9% of AMI	
Single-Family Detached, Owner	7.2%
Single-Family Detached, Renter	4.2%
Single-Family Attached, Owner	0.0%
Single-Family Attached, Renter	3.1%
Multi-Family, Owner	2.7%
Multi-Family, Renter	0.8%
Total, Earning 10-19.9% of AMI	**18.1%**
All Other AMI Groups	**81.9%**

II. Estimating Household Growth and Housing Demand for Net New Workers and Replacement Workers

II.a. Determine regional job growth by industry:

In this analysis, future job growth has two components: 1) net new job growth and 2) jobs vacated by retirees. Both components were forecasted for the greater Washington DC region. Retirement is included in this analysis because it is assumed that a new worker will be needed somewhere within the industry, typically at a lower level, as current workers "cycle up" to fill the position vacated by the retirement.

Net new job growth: IHS Economics provides job forecasts for 12 main industry sectors: construction, natural resources, and mining; manufacturing; transportation, trade and utilities; information; financial activities; professional and business services; education and health services; leisure and hospitality; other services; federal government; state and local government; and military.

The forecasts were adjusted if they differed significantly from those produced by MWCOG, as was the case for Loudoun County. The IHS Economics forecasts have historically over-estimated the employment growth in Loudoun County and differ significantly from the MWCOG projections, as shown in Figure I.

Figure G. Total Jobs, Loudoun County

	MWCOG Round 9.0	IHS Economics	Final
2015	N/A	156,339	156,339
2015	164,200	163,094	160,258
2020	188,000	207,869	183,486
2025	211,000	267,788	205,934
2030	235,500	324,896	229,846
2035	255,600	374,297	249,463
2040	273,900	430,937	267,324

If the IHS Economics forecasts differed significantly, as in the case for Loudoun, the overall employment growth rate from MWCOG was applied to the IHS Economics 2014 base, which was the last year of IHS data based on public sources (also shown in Figure G). Then, the distribution by sector from IHS Economics was applied.

Jobs vacated by retirees: The 2012, 2013, and 2014 American Community Survey microdata were used to calculate the labor force participation rate for each 5-year age group for the population over 55 years old in the Washington DC Metropolitan Area. Retirees younger than 55 years old were excluded because they may be more likely to re-enter the workforce. Next, 2012, 2013, and 2014 American Community Survey microdata was used to determine the number of workers who were likely to retire in the next decade and the industry of these workers.

These needs were then combined to determine the total need by industry. The totals for Loudoun County are shown in Figure H.

Figure H. Net New Jobs and Retirement Positions, Loudoun County, 2015-2040

	Net New Jobs	Retirees	Total Positions
Professional & Business Services	49,687	4,342	54,029
Transportation, Trade, & Utilities	8,099	6,073	14,171
State & Local Government	9,904	3,380	13,284
Construction, Natural Resources, and Mining	6,404	6,355	12,759
Educational & Health Services	10,068	2,482	12,549
Leisure & Hospitality	9,219	1,509	10,728
Information	6,900	622	7,522
Other Services	3,103	2,925	6,028
Federal Government	889	3,572	4,461
Financial Activities	2,505	1,703	4,208
Manufacturing	289	1,765	2,054
Total	**107,066**	**34,729**	**141,795**

Source: IHS Economics, Round 9.0 Cooperative Forecast from Metropolitan Washington Council of Governments, U.S. Census Bureau, GMU Center for Regional Analysis, Lisa Sturtevant & Associates, LLC

II.b. Assign new jobs to workers by age category:

The first step in moving from new jobs to housing demand is to estimate the age distribution of the new workers. In other words, for each jurisdiction, we assigned some share of new workers in each sector to one of five age groups: under 35, 35-44, 45-54, 55-64 or 65+. We assumed no new workers were aged 65 or older. For replacement workers, it is assumed that for more senior positions, the majority of the workers directly filling the job are already in the region and in the same industry. So, as workers in senior positions retire, their jobs will be filled by another worker in the region, leaving a more junior position vacant, which will be filled by a younger worker.

The demand for different types of housing is associated with individuals' ages and new workers will be younger than the existing workforce. The age distribution is also important for estimating the AMI, as the age of the worker is instrumental in determining his or her wage and household type.

We analyzed data from the 2012, 2013 and 2014 American Community Survey microdata to estimate the age distribution of current workers for each industry sector. We then adjusted the age distribution to account for the fact that new workers would be younger by analyzing 2012, 2013, and 2014 ACS data on the age distribution of workers who had recently moved to the region (movers). Figure I shows the age distribution of workers and movers who work in Loudoun County. Through this analysis, we found that recent movers to Loudoun County were about 92% more likely to be under 34 than existing residents. All other age groups were less likely to be movers: 35-44 (30 percent less likely), 45-54 (60 percent less likely), 55-64 (68 percent less likely), 65+ (39 percent less likely).

Figure I. Workers by Age and Movers, Loudoun County

	Workers by Age		Workers Who Moved in the Past 12 Months by Age		Mover Ratio
	Number	Share of Total	Number	Share of Total	
<35	51,980	34.7%	7,753	66.7%	1.92
35-44	37,330	24.9%	2,023	17.4%	0.70
45-54	36,428	24.3%	1,131	9.7%	0.40
55-64	18,429	12.3%	459	3.9%	0.32
65+	5,540	3.7%	260	2.2%	0.61
Total	149,706	100.0%	11,626	100.0%	1.00

We applied these ratios to the age distribution of existing workers who had earned a wage in each jurisdiction to create an age distribution for new workers. The recent mover ratio was applied to those under 35 first. In some cases, 100 percent of new workers were allocated to this age group. The workers in groups that had workers leftover were distributed among the remaining age groups proportionally, based on the mover rates. We assumed that no new workers were age 65 and older. If a sector only had current workers in one of the age groups, all new workers were allocated to that group. The resulting distribution for Loudoun County is shown in Figure J. When there were job losses in a sector, we used the same age distributions as we used for job gains, which may not be appropriate.

Figure J. Current and Future Age Distribution of Workers, Loudoun County

	Current Workers by Age					Forecasted Age Distribution for New Workers				
Industry	<35	35-44	45-54	55-64	65+	<35	35-44	45-54	55-64	65+
Construction, Natural Resources, & Mining	35%	24%	28%	9%	4%	67%	18%	12%	3%	0%
Manufacturing	22%	28%	30%	18%	2%	42%	27%	20%	10%	0%
Transp., Trade, & Utilities	40%	19%	24%	13%	4%	76%	13%	10%	1%	0%
Information	25%	35%	26%	12%	2%	48%	31%	15%	6%	0%
Financial Activities	30%	22%	30%	11%	7%	57%	20%	18%	6%	0%
Professional & Business Services	31%	29%	23%	13%	4%	60%	23%	11%	5%	0%
Educational & Health Services	35%	27%	23%	12%	3%	68%	19%	9%	4%	0%
Leisure & Hospitality	61%	18%	12%	7%	2%	100%	0%	0%	0%	0%
Other Services	31%	26%	24%	10%	9%	59%	23%	14%	5%	0%
Federal Gov't	27%	21%	32%	13%	6%	52%	20%	21%	7%	0%
State & Local Gov't	23%	29%	28%	16%	4%	45%	27%	18%	10%	0%

Thus, for each sector in each jurisdiction, we estimated the percent of new jobs held by workers in each age group for the workers filling the new jobs that are expected during a 5- year period.

During this forecast, these new workers are "aged up" in ten-year intervals to correspond with the age groups. So, the new workers forecasted to fill jobs in the 2015-2020 period will be ten years older during the 2025-2030 period (i.e. <35 year olds become 35-44, 45-54 become 55-64, and the 55-64 year olds become 65+). Combined, we have the ages of the newest workers, who will be coming to fill the jobs created in the past five years, plus the "aged up" ages of the workers who filled jobs in the earlier periods.

II.c. Assign new workers to a household type:

Age is a determinant of both AMI group and household type both because younger workers are more likely to have lower wage-based incomes than older workers, and they are also more likely to live alone or be in young families. For example, new workers under age 35 are more likely to live in one-person households or two adult-no children households and workers age 35 to 44 are more likely to live in households with children.

For this step of the analysis, we used the 2012, 2013 and 2014 American Community Surveys to assign both an AMI group and one of 11 household types to current workers. Because this forecast is for workers only, only households with a worker are included in this step. The 11 household types are listed in Figure K.

Figure K. Household Types

Household Size	Household Composition
1-person households	1 adult
2-person households	1 adult, 1 child
	2 adults
3-person households	1 adult, 2 child
	2 adults, 1 child
	3 adults
4+ person households	1 adult, 3+ children
	2 adults, 2+ children
	3 adults, 1+ children
	4+ adults / 1+ children
	4+ adults

These workers were then grouped by age and industry. Thus, for each jurisdiction, we assessed what percent of workers under 35 years old lived in 1 adult households, by industry, what percent lived in 2 adult households and so on.

For example, Figure L shows the distribution of workers living in Loudoun County who hold a Professional & Business Service job. About a quarter of these workers under 35 years old live in 2 adult households, including both roommates, partners and married couples. As the worker ages, it is far more likely that he or she lives in a household with children, and only 10.2 percent are in two-adult households. Once the worker reaches 45 years old, the share living in two-adult households begins to rise, likely as the workers become empty-nesters.

Figure L. Distribution of Workers by Household Type and Age Group, Professional & Business Service Jobs, Loudoun County

	<35	35-44	45-54	55-64
1 adult	6.2%	4.6%	8.5%	14.5%
1 adult/ 1 kid	0.5%	1.6%	1.2%	1.2%
2 adults	**25.9%**	**10.2%**	**18.1%**	**47.2%**
1 adult/ 2 kids	0.3%	0.9%	1.5%	0.0%
2 adults/ 1 kid	16.2%	17.5%	15.9%	5.1%
3 adults	9.0%	2.9%	9.7%	15.2%
1 adult/ 3+ kids	0.7%	0.7%	0.2%	0.0%
2 adults/ 2+ kids	17.4%	48.3%	24.4%	0.4%
3 adults/ 1+ kids	5.9%	7.0%	10.7%	6.2%
4+ adults	11.7%	1.4%	4.5%	7.9%
4+ adults/ 1+ kids	6.2%	4.9%	5.2%	2.3%
Total	100.0%	100.0%	100.0%	100.0%

II.d. Assign new workers to an AMI group and determine the number of households

Next, we used the household type and industry of each worker to determine the distribution of each household by AMI using ten percent intervals between 0 and 200 percent of AMI and an additional AMI group for all households earning more than 200 percent AMI. The AMI is dependent upon both the household size and the industry of each worker, so both are used to estimate the number of workers by AMI group and household type.

i) Using the 2012, 2013 and 2014 American Community Survey, the distribution of the AMI groups of current workers by both industry and household was calculated. If a quarter of construction workers in 1 adult households earn between 30 and 39 percent of AMI, then 30% will do so in the future.[6] For example, among workers living in Loudoun and working in the Professional & Business Service Sector, 18.9 percent of single-person households earn more than 200 percent of AMI. Among two-adult households, this share rises to 46.7 percent (Figure M).

[6]The future median income is adjusted so that approximately half the households in the region earn below it and half earn above it. Any shifts in the future distribution are used to update the area median income groups.

Figure M. Distribution of Workers by Household Type and AMI Group, Professional & Business Service Jobs, Loudoun County

	1 Person Household	2 Adult Household
0-9 AMI	0.9%	0.0%
10-19 AMI	2.5%	0.0%
20-29 AMI	1.4%	0.0%
30-39 AMI	1.5%	0.0%
40-49 AMI	2.5%	1.0%
50-59 AMI	5.1%	3.8%
60-69 AMI	8.2%	1.7%
70-79 AMI	2.7%	3.2%
80-89 AMI	3.5%	1.5%
90-99 AMI	8.4%	1.9%
100-109 AMI	6.4%	1.9%
110-119 AMI	4.7%	1.6%
120-129 AMI	5.7%	3.5%
130-139 AMI	6.3%	2.3%
140-149 AMI	3.5%	6.2%
150-159 AMI	6.2%	5.5%
160-169 AMI	4.0%	4.7%
170-179 AMI	2.6%	6.2%
180-189 AMI	3.0%	3.2%
190-199 AMI	2.1%	5.1%
200+ AMI	18.9%	46.7%

ii) Next, we determined the number of households formed by these workers. The average number of workers in each of the 11 household types by AMI group is used to convert workers into households. The average number of workers in each household type, AMI group and available jurisdiction was calculated using the 2012, 2013 and 2014 American Community Surveys. Figure N shows the average workers per household for Loudoun households with a payroll job. Because only households with workers are included in this step, all households with a single adult must have exactly one worker.

Figure N. Average Workers per Household by AMI Group, Loudoun County

	1 adult	1 adult/ 1 kid	2 adults	1 adult/ 2 kids	2 adults/ 1 kid	3 adults	1 adult/ 3+ kids	2 adults/ 2+ kids	3 adults/ 1+ kids	4+ adults	4+ adults/ 1+ kids
0-9 AMI	1.0	1.0	2.0	1.0	1.8	3.6	1.0	1.9	3.0	3.6	2.4
10-19 AMI	1.0	1.0	2.0	1.0	1.8	2.6	1.0	1.9	3.0	3.6	2.4
20-29 AMI	1.0	1.0	2.0	1.0	1.9	3.0	1.0	1.5	3.0	3.6	3.9
30-39 AMI	1.0	1.0	2.0	1.0	2.0	3.3	1.0	1.6	2.9	4.3	3.7
40-49 AMI	1.0	1.0	2.0	1.0	2.0	3.3	1.0	1.8	2.2	3.4	8.5
50-59 AMI	1.0	1.0	2.0	1.0	2.0	3.3	1.0	1.7	3.0	5.3	3.9
60-69 AMI	1.0	1.0	1.7	1.0	1.6	3.3	1.0	1.8	3.0	6.3	3.3
70-79 AMI	1.0	1.0	1.8	1.0	2.0	3.3	1.0	1.6	2.9	4.5	3.8
80-89 AMI	1.0	1.0	2.0	1.0	1.9	3.3	1.0	1.8	3.0	4.6	3.6
90-99 AMI	1.0	1.0	1.9	1.0	2.0	2.9	1.0	1.9	2.8	4.5	3.8
100-109 AMI	1.0	1.0	1.9	1.0	1.9	2.6	1.0	1.8	2.6	5.0	3.5
110-119 AMI	1.0	1.0	2.0	1.0	1.9	2.5	1.0	2.0	2.9	4.0	4.1
120-129 AMI	1.0	1.0	2.0	1.0	1.9	2.7	1.0	1.9	2.7	4.5	3.9
130-139 AMI	1.0	1.0	1.9	1.0	2.0	2.7	1.0	2.0	2.9	3.8	4.8
140-149 AMI	1.0	1.0	1.9	1.0	1.8	2.9	1.0	2.0	2.6	5.3	3.9
150-159 AMI	1.0	1.0	2.0	1.0	1.9	2.3	1.0	1.9	2.8	4.2	3.5
160-169 AMI	1.0	1.0	1.9	1.0	1.9	2.9	1.0	1.9	2.7	6.2	4.7
170-179 AMI	1.0	1.0	1.8	1.0	1.8	2.9	1.0	2.0	2.9	4.9	3.9
180-189 AMI	1.0	1.0	1.9	1.0	2.0	2.9	1.0	2.0	2.8	6.0	3.8
190-199 AMI	1.0	1.0	1.9	1.0	2.0	2.6	1.0	2.0	2.8	4.2	3.1
200+ AMI	1.0	1.0	1.9	1.0	2.0	2.8	1.0	2.0	2.9	4.4	4.4

II.e. Assign each new household a unit type based on price/rent (AMI) level

We now have a count of the number of households formed by each household type and AMI group based on the number of new jobs coming to the region. Household type and household AMI are both associated with the type of housing demand. Therefore, we use these counts to estimate the need for four different types of housing units by the AMI group. The four housing unit types are: single-family (included single-family detached and single-family attached/townhome) owner and renter, and multi-family owner and renter.

We used the 2012, 2013, and 2014 ACS microdata files to run cross tabulations of housing type (i.e. four types) by household composition (i.e. 11 household types) for each of the 21 AMI groups. The results of this analysis show the current distribution of housing types for different household types and household incomes. Figure O shows the unit type distribution of select household types among Loudoun County Households earning 200 percent or more of AMI. Single adult households are less likely to own their own single-family detached home and more likely to rent a multi-family unit when compared to larger households within this same AMI group.

Figure O. Unit Type by Select Household Type, 200%+ of AMI, Loudoun County

	1 adult	2 adults	3 adults	2 adults/ 2+ kids
Single-Family Detached, Owner	41%	63%	75%	87%
Single-Family Detached, Renter	8%	1%	2%	2%
Single-Family Attached, Owner	25%	28%	12%	10%
Single-Family Attached, Renter	5%	3%	2%	1%
Multi-Family, Owner	5%	2%	0%	1%
Multi-Family, Renter	15%	3%	9%	0%

III. Analyze Regional Housing and Commuting Characteristics

III.a. Determine which households "stay" in the region:

The total forecasted demand exceeds the forecasted supply for the region, so commuting patterns were used to determine the households who would become in-commuters. The location of the main householder's job, the unit type and the AMI group of the household is used to determine who was most likely to live outside the region. The 2012, 2013, and 2014 American Community Survey data was used to get the current share of workers by unit type, AMI group and workplace location who commute. These were then applied to future worker households until the region-wide total could be accommodated within the region.

III.b. Adjust the Median Household Income:

The area median income is the level at which half of families in the region have incomes that are higher and half have incomes that are lower. The median income was re-calculated as necessary, and each component re-run so that these shares were unchanged. The HUD methodology was used to adjust the AMI group limits. The AMI adjustments were trial and error until the splits were achieved.

III.c. Determine the demand for housing in Loudoun County:

Commuting patterns based on workplace location of the main worker (usually the head of household), AMI group, household size and unit type were used to determine which households were most likely to demand housing in the County. For example, Figure P shows the share of households earning 200%+ AMI with a main worker in Fairfax County, Fairfax City or Falls Church City who also live in Loudoun, both by household size and unit type. Currently, 3.4 percent of people living alone, working in Fairfax, earning 200%+ AMI, renting a multi-family unit live in Loudoun. The forecasts assume that 3.4 percent of households in this profile will continue to prefer to live in Loudoun in the future. This distribution was done calculated for all 21 AMI groups and jurisdictions, or combined groups of jurisdictions, as available by Public Use Microdata Areas.

Figure P. Share of Households with a Main Worker in Fairfax County, Fairfax City or Falls Church City living in Loudoun, earning 200%+ of AMI, by Housing Unit Type

	1 Person	2 People	3 People	4+ People
Single-Family Detached, Owner	8.3%	9.2%	15.5%	18.5%
Single-Family Detached, Renter	0.0%	2.9%	4.6%	10.4%
Single-Family Attached, Owner	18.2%	20.7%	17.8%	19.5%
Single-Family Attached, Renter	16.0%	16.1%	0.0%	7.1%
Multi-Family, Owner	4.1%	5.4%	0.0%	0.0%
Multi-Family, Renter	3.4%	1.1%	28.7%	0.0%

A Note on Area Median Income Thresholds

The AMI limits in this forecast use U.S. Department of Housing and Urban Development (HUD) limits and methods when forecasting.

Household Size Adjustment:
AMI thresholds are dependent on household size. The 100 percent AMI threshold for a 4-person household is equal to the region's AMI and all other households are calculated using a 4-person household as the base as shown in Figure Q. AMI limits for households smaller than four people are 100 percent of the 4-person limit *minus* ten percent for each fewer person. AMI limits for households larger than four people are 100 percent of the 4-person limit *plus* eight percent for each additional person.

Figure Q. FY 2015 AMI Limits, Washington DC Metro Area

	1-Person	2-Person	3-Person	4-Person	5-Person	6-Person	7-Person	8-Person
	70% of 4-person HH	80% of 4-person HH	90% of 4-person HH	100%	108% of 4-person HH	116% of 4-person HH	124% of 4-person HH	132% of 4-person HH
Extremely Low Income Limits (30% AMI)	22,932	26,208	29,484	32,760	35,381	38,002	40,622	43,243
Very Low Income Limits (50% AMI)	38,220	43,680	49,140	54,600	58,968	63,336	67,704	72,072
Low Income Limits (80% AMI)	61,152	69,888	78,624	87,360	94,349	101,338	108,326	115,315
100% AMI	76,440	87,360	98,280	109,200	117,936	126,672	135,408	144,144
120% AMI	91,728	104,832	117,936	131,040	141,523	152,006	162,490	172,973

Source: U.S. Department of Housing and Urban Development

Income Limit Adjustments:
After establishing the 100 percent AMI limits for each household size, each 10 percent interval up to 200 percent of AMI are calculated. Unlike the HUD estimates, the limits were not rounded up to the nearest $50. This method was used when forecasting these AMI limits. The forecasts assume that other adjustments considered by HUD for these AMI groups, including ceilings or floors, are not applicable

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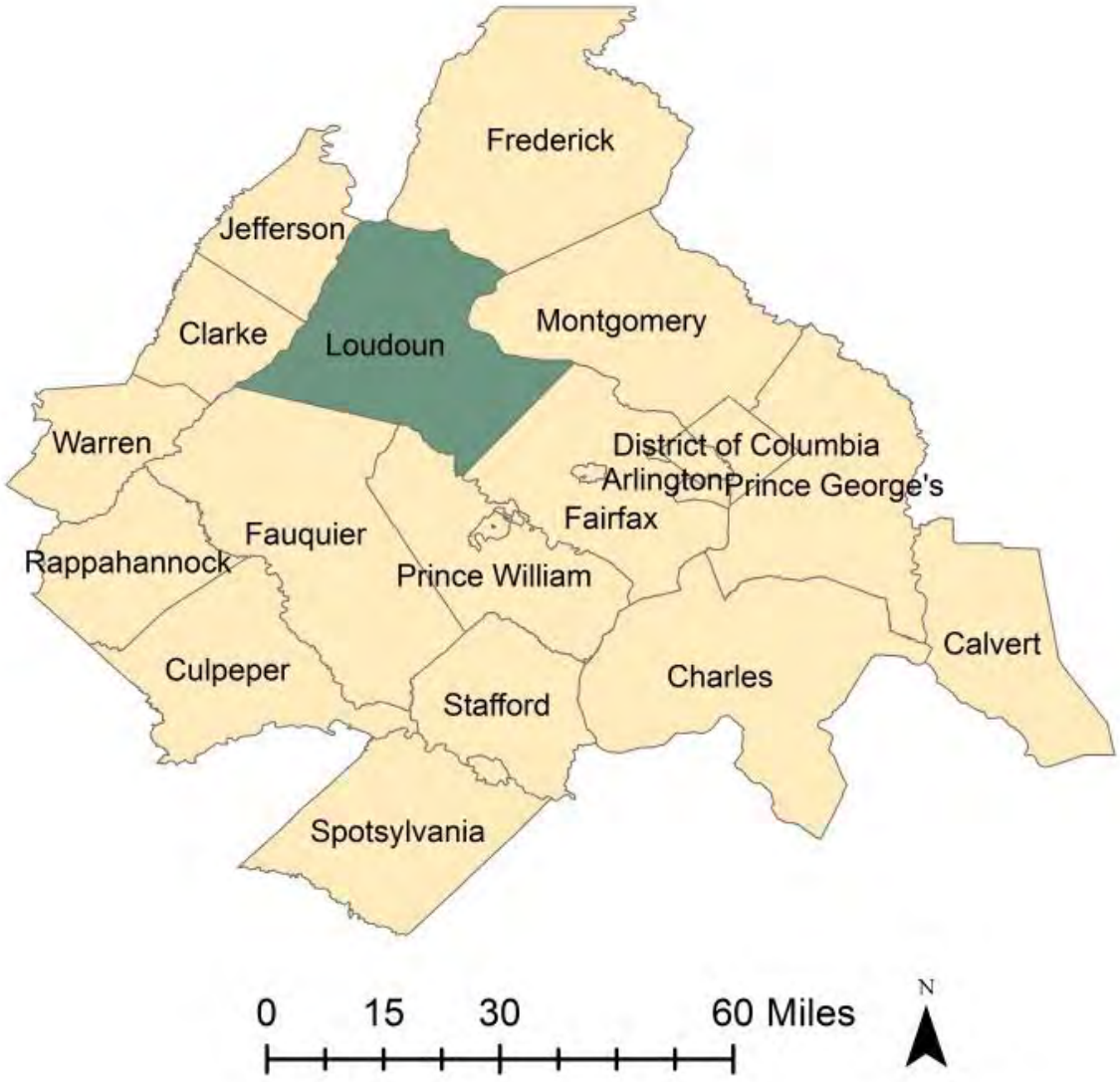
A Note on Geography

Figure R shows the Washington Metropolitan Statistical Area, which is used within the Employment section.

Figure R. Washington DC Metropolitan Statistical Area



A wider region was used for the forecast area, both for jobs and households, as shown in Figure S. The Winchester region and additional counties in West Virginia and Virginia were added to ensure that the full employment shed for future Loudoun workers was used.

Figure S. Greater Washington DC Region