Housing the Region's Future Workforce

2012-2032

by

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Summary of Key Research Findings

Over the next 20 years, the Washington DC metropolitan area will add 857,334 net new jobs. To ensure that this employment growth can occur, a sufficient supply of housing must be available for these new workers—in the right locations, of the right types, and at affordable prices and rents. This analysis determines amount of housing, as well as the type (single-family and multi-family), tenure (owner and renter), price or rent, and location of housing that will be needed over the next 20 years to accommodate new workers.

Key Findings

- The Washington DC metropolitan area is expected to add **857,334 net new jobs** between 2012 and 2032. The largest share of these net new jobs, 46.9 percent or 401,804 jobs, will be in Professional and Technical Services and Management. While this sector includes many higher wage jobs, new jobs in this sector will also include entry-level positions, with lower starting salaries. The region will add 139,082 jobs in the administrative and waste service sector and 95,024 construction jobs. Together, these sectors account for 27.3 percent of the net new jobs. Wages in these sectors are below average and lower priced housing will be needed to accommodate these workers.

- If each jurisdiction provides enough housing to accommodate all of its future workers, the Washington DC area will need to add **548,298 new housing units** between 2012 and 2032. In order to meet this demand, the region will need to produce 27,415 new housing units each year. This level of residential construction has not been seen since 2006.

- If each jurisdiction maintains its current in-commuting rate and the region houses only a portion of its future workforce, there will be a need for 281,416 net new housing units to house workers who both work and live in the same jurisdiction. There will be a need for an additional 210,283 housing units within the region to accommodate inter-jurisdictional commuters and to maintain the current regional commuting patterns. Combined, a total of 491,698 housing units will be needed within the region to maintain current commuting patterns, which means that the workers in 56,599 households will commute to the Washington DC area from places outside the metro area.

- The types of housing that will be needed for these net new workers reflect the changing demographics of the working age population and the mix of jobs and wages that the region is expecting. The housing demand forecasts imply that **344,624 single-family units** and **203,674 multi-family units** will be needed over the next 20 years.

- There will be a continued shift in the homeownership rates in the Washington DC area. Currently, the region's homeownership rate is 64.5 percent. **Only 56.2 percent of the new**

households resulting from these net new workers will be homeowners, while 43.8 percent will rent.

- The region's new housing must be priced so that it is affordable to these new workers. Based on the housing need forecasts, **44.1 percent of rental units will need to have rents of less than $1,250 a month**, while only 2.4 percent of the rental demand will be for units priced at $2,250 a month or more. About 16.4 percent of the owner-occupied units forecasted need to be valued at less than $200,000 and only 13.5 percent at over $600,000.

Economic Growth and Housing Demand in the Washington DC Area

While the Washington DC area's future economic growth will not continue at the rapid pace it did between 1980 and 2010, current economic forecasts indicate substantial job growth over the next 20 years. Between 2012 and 2032, total regional employment will increase 27.6 percent, adding 857,334 net new jobs (Table 1). But there are potential obstacles that may prevent this job growth from occurring. At the most fundamental level, the projected job growth will not materialize without a sufficient number of workers to fill these new jobs. To attract new workers, the region will need to have a sufficient supply of housing that meets the needs of the future workforce, is affordable given the changing wage structure of the economy, and is located near emerging and growing job centers.

There are significant consequences associated with not having enough housing to accommodate the region's future workforce close to where jobs are projected. Without an adequate supply of housing, there will be untenable strains on the region's transportation and transit networks, and an erosion of the region's economic base. The resources that would be needed to expand the region's transportation capacity to accommodate thousands of additional commuters from outside the region and hundreds of thousands additional inter-jurisdiction commuters are not available. Even if the long-distance commuting capacity could be provided, there would still be a substantial loss of wealth from the region to adjacent jurisdictions and an erosion of the region's tax base. There would also be serious and growing environmental impacts associated with a growing number of workers commuting into the Washington DC metro area each day. Thus, housing the future workforce within the region not only reduces the transportation needs, but also increases local spending and tax revenue, which provides more local funding to for regional investments.

The Washington DC area economy is evolving, and the types of jobs coming to the region over the next 20 years are somewhat different from the jobs added over the past 20 years. Future job growth will be driven primarily by three sectors: Professional and Business Services, Education and Health Services, and Construction. Many of the region's new workers will have substantially lower wages than the current workforce. The sectoral changes in the economy—along with changing demographics that are leading to a younger, more racially and ethnically diverse workforce—will have important implications for the types of housing that will be demanded. In order to accommodate the region's new workforce, there will be greater needs for smaller homes, multi-family buildings, and homes available to renters. Without sufficient housing—in the right locations, of the right types, and at the right prices—the Washington DC area faces the possibility of slower economic growth, increasing traffic congestion and worsening quality of life.

Table 1: Net New Jobs: 2012 – 2032
Washington DC Metropolitan Area

Jurisdiction	Net New Jobs	Percent Change
District of Columbia	**148,507**	**19.8%**
Calvert	10,014	44.0%
Charles	18,831	43.2%
Frederick	36,020	36.5%
Montgomery	129,619	27.1%
Prince George's	60,352	18.8%
Suburban Maryland	**254,836**	**26.4%**
Alexandria	19,257	19.0%
Arlington	30,797	16.7%
Clarke	773	19.8%
Fairfax (a)	133,941	20.4%
Fauquier	7,321	32.6%
Loudoun	103,018	69.7%
Prince William (b)	83,176	54.7%
Spotsylvania (c)	38,062	64.5%
Stafford	28,305	67.0%
Warren	4,075	32.9%
Northern Virginia	**448,725**	**32.5%**
Jefferson Co WV	5,266	34.5%
Washington DC Metro Area	**857,334**	**27.6%**

(a) Includes the cities of Fairfax and Falls Church
(b) Includes the cities of Manassas and Manassas Park
(c) Includes the city of Fredericksburg

Sources: IHS Global Insight, Metropolitan Washington Council of Government, and GMU Center for Regional Analysis

Forecasts of Housing Need to Support Regional Economic Growth

This research builds upon the "Housing the Region's Future Workforce" report published in 2011[1]. Like the 2011 report, the objective of this research is to forecast the amount of housing that will be needed for the region's future workers. These housing forecasts are derived solely from the region's net new workers and therefore excludes units that will be needed for replacement workers and non-working households. As a result, these housing demand forecasts should be considered a lower bound of the region's future comprehensive housing needs. Estimates of employment growth by sector and by jurisdiction form the basis of these housing demand forecasts. Assumptions about workers' wages, age structure, and household composition are used to forecast the amount, type and price of housing that the region will need over the 2012 – 2032 period.

Four main questions are analyzed in this research:

1. **How much housing will be needed to accommodate the region's new workers?** The forecasts estimate the total number of housing units that will be needed to accommodate the Washington DC area's net new workers between 2012 and 2022, and between 2022 and 2032.

2. **Where should this housing be located?** The location of the new housing units is analyzed two ways:
    a. The first method assumes each worker is housed in the same jurisdiction where he/she works. This method keeps the levels of inter-jurisdiction commuting stable and therefore assumes no worsening of traffic congestion. The forecasts of units resulting from this method are referred to as the "By Work Location" estimates.
    b. Alternatively, the second method is based on current commuting patterns. This method assumes that each jurisdiction houses the same share of new workers as it does for existing workers in the region. These forecasts are broken down by workers who are both non-commuters (i.e. people who live and work in the same jurisdiction) and jurisdiction-to-jurisdiction commuters. The forecasts of units resulting from this method are referred to as the "By Current Commuting Patterns" estimates.

3. **What types of housing units will be needed?** These forecasts assess the demand for single-family (detached and attached/townhouse) and multi-family housing. The housing type is further divided by tenure (owner/renter) resulting in four mutually exclusive housing types—single-family owner, single-family renter, multi-family owner and multi-family renter.

4. **What prices and rents will new workers be able to afford?** The forecasts take into account the wages of the net new workers and the number of workers per household to determine the demand for housing at different price and rental levels.

[1] This research is not directly comparable to the 2011 report due to methodological differences. See the Appendix for a detailed methodology.

I. How much housing will be needed for the future workforce?

In order to accommodate the 857,334 estimated net new workers, the Washington DC metropolitan area needs to add 548,298 housing units over the next 20 years. Of these units, 285,596 will be needed between 2012 and 2022, while the remaining 262,702 units will be needed between 2022 and 2032. Table 2 shows the distribution of these housing unit forecasts by jurisdiction, assuming that each new worker is housed in the same jurisdiction in which he or she works.

Table 2: Estimates of Housing Demand: 2012 – 2032
Washington DC Metropolitan Area
By Work Location (a)

Jurisdiction	2012-2022	2022-2032	2012-2032
District of Columbia	**48,920**	**56,320**	**105,240**
Calvert	2,952	3,411	6,363
Charles	5,970	6,120	12,089
Frederick	11,667	10,860	22,527
Montgomery	47,613	36,216	83,829
Prince George's	20,705	15,301	36,006
Suburban Maryland	**88,907**	**71,908**	**160,815**
Alexandria	7,480	5,578	13,058
Arlington	11,876	7,840	19,717
Clarke	178	298	476
Fairfax (b)	44,931	38,137	83,069
Fauquier	2,209	2,293	4,501
Loudoun	33,700	29,667	63,367
Prince William (c)	25,692	23,469	49,161
Spotsylvania (d)	11,164	13,822	24,986
Stafford	7,990	10,173	18,164
Warren	1,016	1,491	2,506
Northern Virginia	**146,235**	**132,769**	**279,004**
Jefferson Co WV	1,533	1,705	3,239
Washington DC Metro Area	**285,596**	**262,702**	**548,298**

(a) The estimates by work location assume all new workers are housed in the jurisdiction in which they work and jurisdiction-to-jurisdiction commuting levels will not increase from present volumes.
(b) Includes the cities of Fairfax and Falls Church
(c) Includes the cities of Manassas and Manassas Park
(d) Includes the city of Fredericksburg

Source: GMU Center for Regional Analysis

In order to meet this housing demand, the region will need to produce 27,415 units annually during the next two decades. While this annual production is consistent with the average level of residential construction between 1990 and 2012, this level of residential construction activity has not been seen in the region since 2006. Moreover, the types of housing that will be needed are projected to differ from those that have been produced historically.

Of course, workers often live and work in different jurisdictions—sometimes by preference and sometimes by necessity. Some of the region's current workforce lives outside of the Washington DC metro area and commute in, which results in serious strains on the region's transportation networks and results in a loss of economic potential within the region. Many others commute from one jurisdiction to another, which has led to severe traffic problems. If current commuting patterns persisted for net new workers, these problems would be aggravated. Under those assumptions, however, the region would still need to add 461,699 housing units over the next two decades, and workers in 56,599 households would commute to the metro area from places outside.

II. Where will this housing be located?

This research forecasts the location of demand for net new housing units using two methods: 1) assuming that all workers live and work in the same jurisdiction ("By Work Location") and 2) assuming that the share of new workers commuting from one jurisdiction to another is the same as the existing inter-jurisdictional commuting rates ("By Current Commuting Patterns").

Using the work location method, the greatest housing demand will be in Northern Virginia, because the majority of the net new jobs forecasted in the region will be in Northern Virginia. Between 2012 and 2032, Northern Virginia is expected to add nearly 450,000 net new jobs. These workers will need an estimated 279,004 new housing units, with more than half of those units forecasted for Fairfax and Loudoun counties. The nearly 255,000 net new workers in Suburban Maryland lead to a demand for 160,815 new units, with more than half in Montgomery County. The District of Columbia is projected to add nearly 150,000 jobs between 2012 and 2032. If the city housed all of its new workers, it will need 105,240 new housing units over the next 20 years.

However, not all workers live in same jurisdiction in which they work. Households may have multiple workers who work in different jurisdictions and these households may choose a home location that is the most convenient for all their workers. Some households choose where to live based on reasons independent of their work location, such as proximity to family or amenities. Some other households, however, cannot find affordable housing close to where they work so they are forced to move further out. To account for these preferences and constraints, future housing demand is also analyzed using current commuting patterns in the region, assuming that new workers will commute the same way current workers do. The forecasts that result from this method lead to increased levels of jurisdiction-to-jurisdiction commuting, which would increase the strain on the region's transit and highways systems and potentially increase the number of commutes to a level beyond current capacity in some locations. As a result, these forecasts reflect a less than optimal scenario.

Table 3, and Figures 1 and 2 show the estimates generated from both methods—by work location and by current commuting pattern. The net new units as determined by the current commuting pattern consist both of those who live and work in the same jurisdiction ("Non-Commuters") and those who work in and live in different jurisdictions within the region ("Commuters"). Because of the current distribution of commuters, the housing unit forecasts by jurisdiction differ considerably from the estimates that assume all workers live in the jurisdiction in which they work. In Suburban Maryland, the demand for housing is higher using the commuting patterns method than it is using the work location method. Northern Virginia would need nearly the same number of housing units using both methods, while the District of Columbia would need 60 percent fewer units using the commuting patterns compared to the estimates that assume the city houses all of its future workers.

These housing demand forecasts do not suggest locations for housing *within* jurisdictions. However, based on the assessment of the need for housing of different types and price/rent ranges (see below), a substantial portion of the housing that will be needed by future workers will need to be located close to

established and growing employment centers, near transit and transportation networks, and in more compact developments.

Table 3: Estimates of Housing Demand: 2012 – 2032
Washington DC Metropolitan Area
By Work Location and Current Commuting Patterns (a)

Jurisdiction	By Work Location	By Current Commuting Patterns		
		Non-Commuters	Commuters	Total by Commuting Pattern
District of Columbia	**105,240**	**29,994**	**11,810**	**41,804**
Calvert	6,363	4,903	3,138	8,041
Charles	12,089	8,205	6,802	15,007
Frederick	22,527	15,049	6,305	21,354
Montgomery	83,829	53,011	29,648	82,660
Prince George's	36,006	19,336	38,363	57,699
Suburban Maryland	**160,815**	**100,504**	**84,256**	**184,760**
Alexandria	13,058	3,040	9,883	12,923
Arlington	19,717	4,438	13,960	18,398
Clarke	476	202	535	738
Fairfax (b)	83,069	45,019	39,451	84,470
Fauquier	4,501	2,761	2,751	5,512
Loudoun	63,367	34,694	13,202	47,897
Prince William (c)	49,161	31,588	20,937	52,525
Spotsylvania (d)	24,986	15,757	4,305	20,062
Stafford	18,164	9,809	6,448	16,257
Warren	2,506	1,593	1,141	2,735
Northern Virginia	**279,004**	**148,902**	**112,614**	**261,516**
Jefferson Co WV	3,239	2,015	1,602	3,617
Reside outside of Region	0	56,599	0	56,599
Washington DC Metro Area	**548,298**	**338,015**	**210,283**	**548,298**

(a) The estimates by work location assume all new workers are housed in the jurisdiction in which they work and jurisdiction-to-jurisdiction commuting levels will not increase from present volumes. The Non-commuters include workers who live in their work jurisdiction based on current commuting patterns. The Commuters include workers who do not live in their work jurisdiction, but live elsewhere within the region and are also based on current commuting patterns.
(b) Includes the cities of Fairfax and Falls Church
(c) Includes the cities of Manassas and Manassas Park
(d) Includes the city of Fredericksburg

Source: GMU Center for Regional Analysis

Figure 4: Estimates of Housing Demand By Work Location: 2012 – 2032

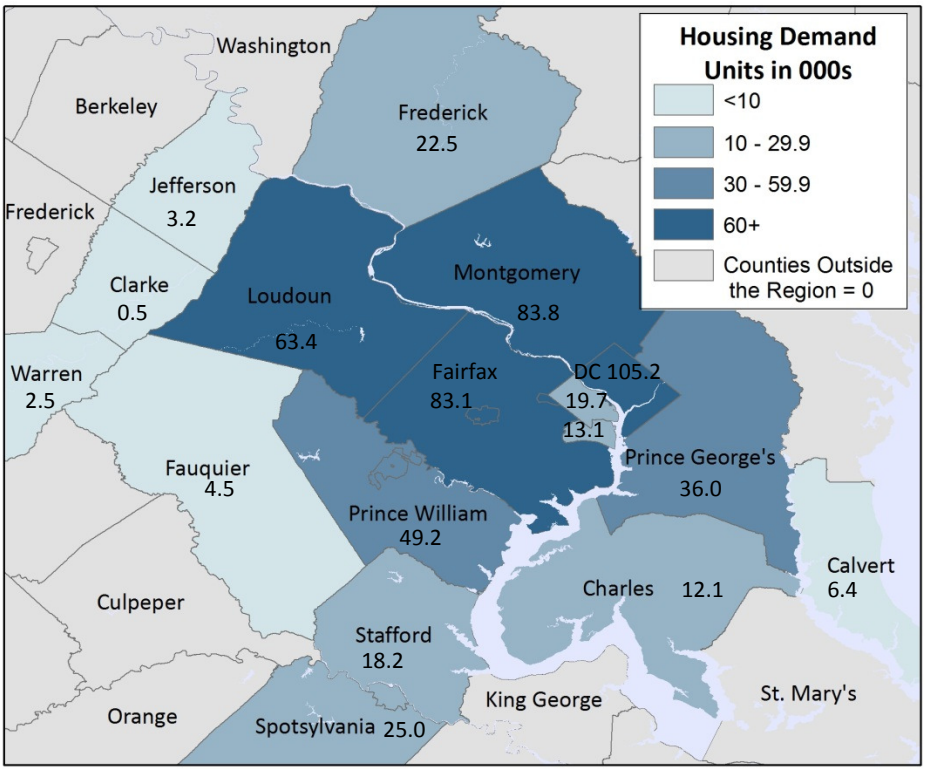
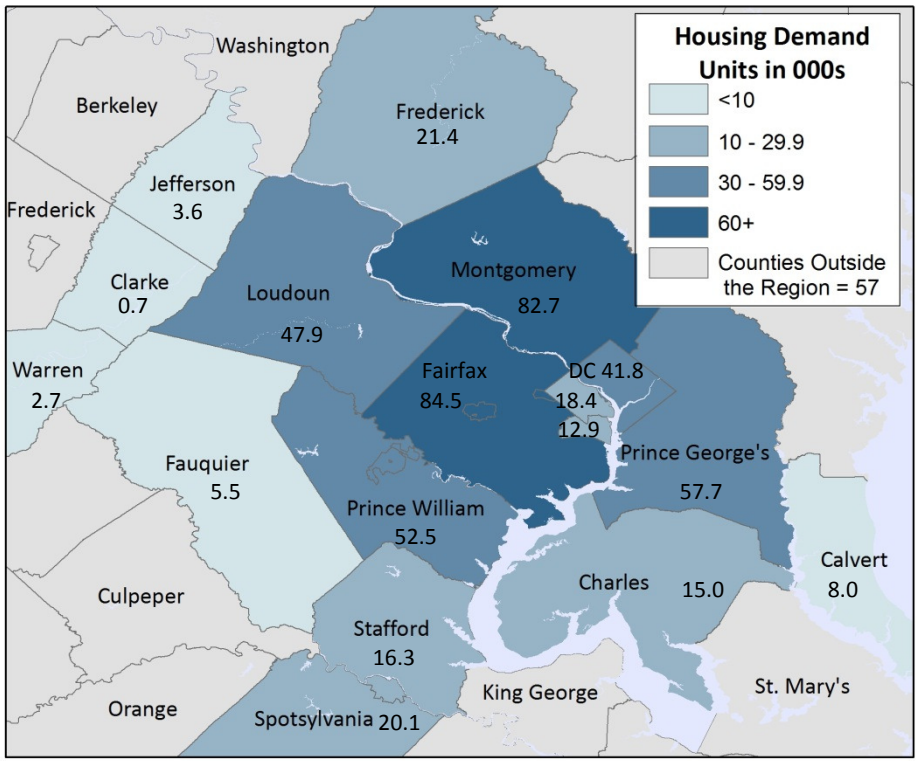


Figure 5: Estimates of Housing Demand By Current Commuting Patterns: 2012 – 2032



Source: GMU Center for Regional Analysis

III. What types of housing units will be needed?

The housing demand forecasts are divided into four housing types—single-family owner, single-family rental, multi-family owner, and multi-family renter. Single-family units include single-family detached homes and single-family attached homes/townhomes. Multi-family units include units in structures with more than one unit and include apartments, condominiums and cooperatives.

Table 4: Comparing Unit Types: Housing Need by Housing Type
Washington DC Metropolitan Area
By Work Location (a)

Jurisdiction	Total Units	Single-Family		Multi-Family	
		Owner	Renter	Owner	Renter
District of Columbia	**105,240**	**27,023**	**10,989**	**11,552**	**55,677**
Calvert	6,363	3,642	1,069	119	1,533
Charles	12,089	6,599	2,057	250	3,184
Frederick	22,527	12,430	3,664	498	5,936
Montgomery	83,829	41,032	10,284	5,731	26,783
Prince George's	36,006	20,585	5,287	905	9,229
Suburban Maryland	**160,815**	**84,288**	**22,360**	**7,502**	**46,665**
Alexandria	13,058	3,173	1,271	1,731	6,882
Arlington	19,717	4,505	2,041	2,480	10,691
Clarke	476	310	66	10	90
Fairfax (b)	83,069	54,519	7,576	5,976	14,998
Fauquier	4,501	2,875	630	95	901
Loudoun	63,367	41,331	8,562	1,317	12,157
Prince William (c)	49,161	30,218	7,360	1,044	10,538
Spotsylvania (d)	24,986	12,698	4,760	467	7,061
Stafford	18,164	10,903	2,858	347	4,055
Warren	2,506	1,547	371	52	537
Northern Virginia	**279,004**	**162,079**	**35,496**	**13,519**	**67,911**
Jefferson Co WV	3,239	1,878	512	70	779
Washington DC Metro Area	**548,298**	**275,268**	**69,356**	**32,643**	**171,032**
			344,624		**203,674**

(a) The estimates by work location assume all new workers are housed in the jurisdiction in which they work and jurisdiction-to-jurisdiction commuting levels will not increase from present volumes.
(b) Includes the cities of Fairfax and Falls Church
(c) Includes the cities of Manassas and Manassas Park
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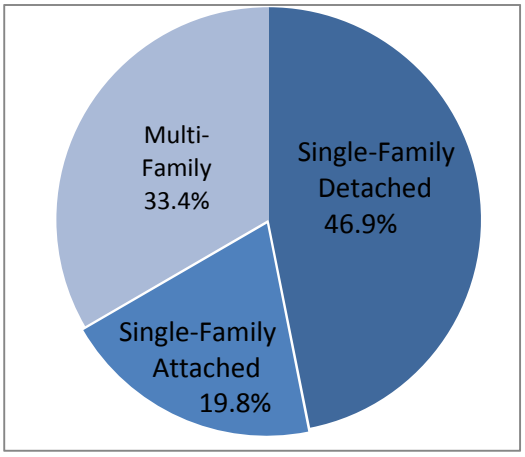
Source: GMU Center for Regional Analysis

Figure 3a. Comparing Unit Types: Existing and Needed

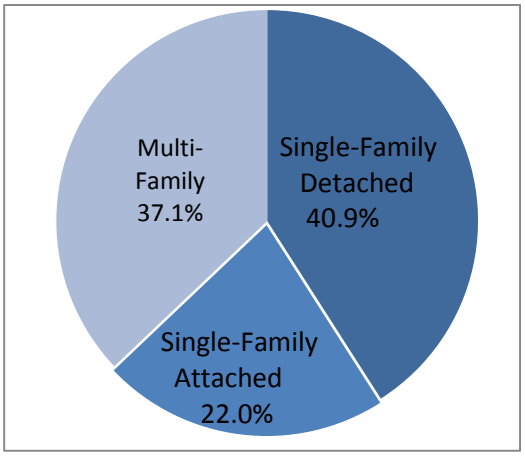
Current Housing Stock



Source: 2009-2011 American Community Survey

Housing Needed for Net New Workers

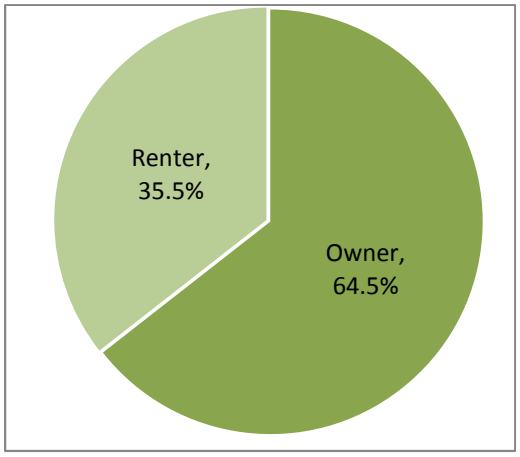
By Work Location (a)



Source: GMU Center for Regional Analysis

Figure 3b. Comparing Owner versus Rental Unit Types: Existing and Needed

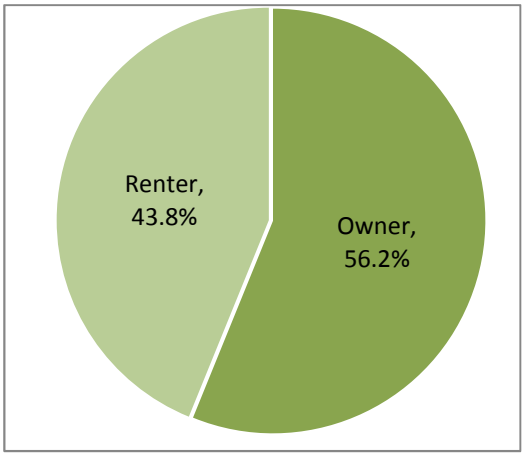
Current Housing Stock



Source: 2009-2011 American Community Survey

Housing Needed for Net New Workers

By Work Location (a)



Source: GMU Center for Regional Analysis

(a) The estimates by work location assume all new workers are housed in the jurisdiction in which they work and jurisdiction-to-jurisdiction commuting levels will not increase from present volumes.

The demographic characteristics of new workers, the types of jobs they will hold and the locations of the forecasted units are used to determine the types of housing units that will be needed to accommodate net new workers to the Washington DC area. As shown in Table 4, the forecasts suggest a need for 344,624 single-family units and 203,674 multi-family units. Of the single-family units, the largest need is for owner-occupied units. Single-family owner housing is projected to be half (50.2 percent) of all housing demand, which is the highest of all housing types. The second largest need will be for multi-family rental units which accounts for 31.2 percent of all housing demand. Single-family renter units and multi-family owner units account for 12.6 percent and 6.0 percent, respectively, of the housing demand forecast.

The younger, more racially and ethnically diverse workforce, coupled with lower household incomes, leads to greater demand for multi-family housing, smaller housing and rental housing. As compared to the current housing stock, a larger share of the future units needed in the region will be multi-family units (Table 5 and Figure 3a). Over 37 percent of the housing that will be needed to accommodate future workers is forecasted to be in multi-family buildings, compared to 33.4 percent of the current housing stock. The analysis suggests that the future demand for multi-family units will be from renter households (84 percent), while only 16 percent of this demand will be from owner households.

There will be a decline in the demand for single-family homes over the forecast period. The forecasted share of single-family homes is 3.8 percentage points less than its current share of the building stock. However, while the demand for single-family detached homes declines fairly substantially over the next 20 years, there will be an increase in demand for single-family attached homes (townhomes, rowhouses, etc).

Table 5: Comparing Unit Types: Existing and Future Housing Washington DC Metropolitan Area
By Work Location (a)

	Current Housing Stock	Housing Needed for Net New Workers
Structure		
Single-Family	**66.6%**	**62.9%**
Single-Family Detached	46.9%	40.9%
Single-Family Attached	19.8%	22.0%
Multi-Family	**33.4%**	**37.1%**
Tenure		
Owner	**64.5%**	**56.2%**
Renter	**35.5%**	**43.8%**

(a) The estimates by work location assume all new workers are housed in the jurisdiction in which they work and jurisdiction-to-jurisdiction commuting levels will not increase from present volumes.

Sources: 2009-2011 American Community Survey, and GMU Center for Regional Analysis

There will also be a downward shift in the homeownership rate among future workers of the Washington DC area. Currently, 64.5 percent of households in the Washington DC area are homeowners. Among future new workers, the projected homeownership rate is just 56.2 percent. During the forecast period, there will be increases in the demand for single-family rental housing, largely caused by the increase in demand for single-family attached homes. A larger share of single-family attached homes is projected to be rental units (30 percent) than their detached counterparts (15 percent). Combined with the increase in demand for multi-family rental units, the share of rental units is forecasted to be 43.8 percent, compared to 35.5 percent of the current housing stock (Figure 3b and Table 5).

During the next 20 years, the Washington DC area will need to produce an average of 27,415 new housing units annually. Over the 1990-2012 period, the region added an average of 28,242 housing units per year, which is consistent with the overall need suggested by the forecasts. However, the housing types and locations of the housing needed over the forecast period differs notably from what has been built in the past. Compared to residential construction over the past two decades, nearly all jurisdictions will need to produce more multi-family and fewer single-family units over the next 20 years. To house workers in the jurisdiction in which they work, relatively more housing will be needed in the closer-in jurisdictions of District of Columbia, Montgomery County, Arlington County and the City of Alexandria. Table 6 and Figures 4 and 5 detail these changes.

Table 6: Comparing Unit Types: Housing Permits and Needed Washington DC Metropolitan Area

By Work Location (a)

Jurisdiction	1990-2012 Average Annual Housing Permits			2012-2032 Annual Average Units Needed			Number of Units Needed above/below 1990-2012 Annual Average		
	SF (b)	MF (c)	Total	SF	MF	Total	SF	MF	Total
District of Columbia	180	988	1,169	1,901	3,361	5,262	1,720	2,373	4,093
Suburban Maryland	7,911	2,041	9,952	5,332	2,708	8,041	(2,578)	668	(1,911)
Northern Virginia	12,303	4,416	16,720	9,879	4,071	13,950	(2,425)	(345)	(2,769)
Washington DC Metro Area	20,769	7,474	28,242	17,231	10,184	27,415	(3,537)	2,710	(827)

(a) The estimates by work location assume all new workers are housed in the jurisdiction in which they work and jurisdiction-to-jurisdiction commuting levels will not increase from present volumes.

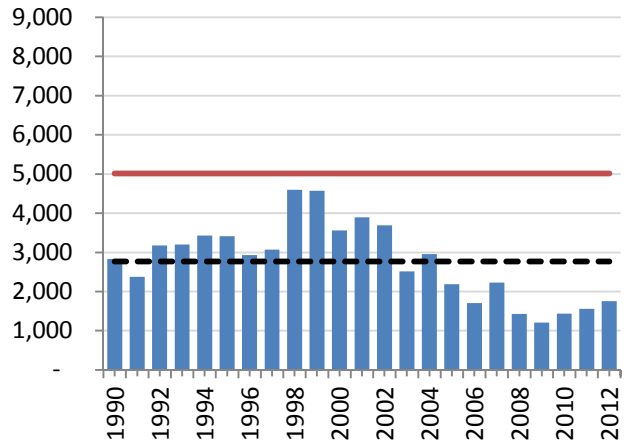
(b) Includes single-family detached units and the majority of single family attached units

(c) Includes structures with more than one unit

Source: GMU Center for Regional Analysis

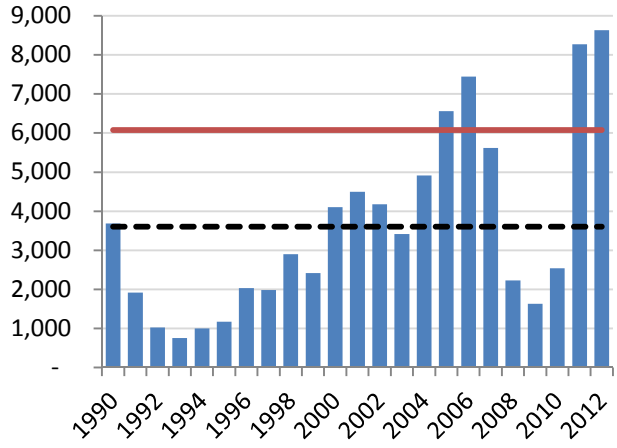
Figure 4: Housing Permits and Housing Needed for Net New Workers: District of Columbia, Montgomery County, Arlington County, and the City of Alexandria

4a: Single-Family Units



1990-2012 Annual Average: 2,770
2012-2032 Annual Needed: 5,016

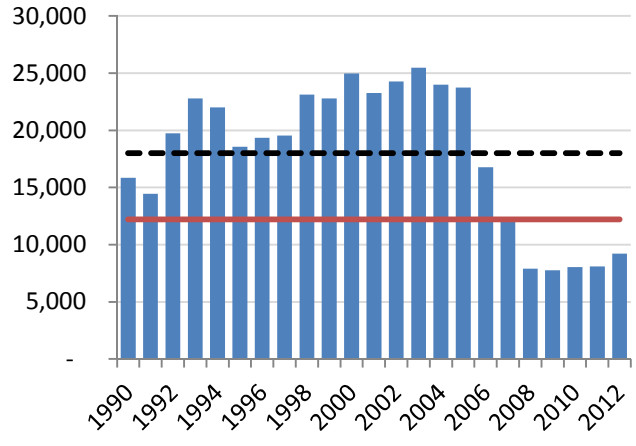
4b: Multi-Family Units



1990-2012 Annual Average: 3,606
2012-2032 Annual Needed: 6,076

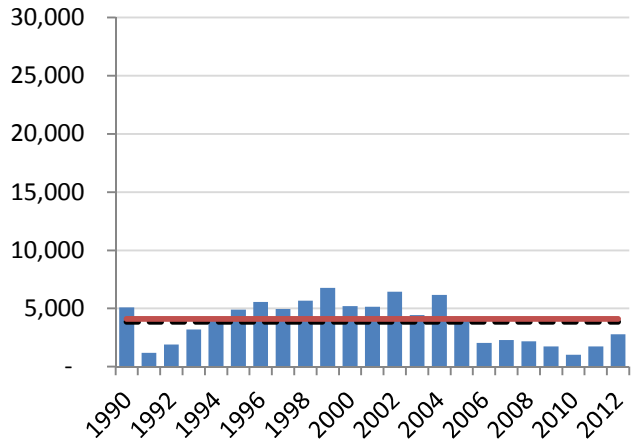
Figure 5: Housing Permits and Housing Needed for Net New Workers: Remainder of Washington DC Metropolitan Area

5a: Single-Family Units



1990-2012 Annual Average: 17,998
2012-2032 Annual Needed: 12,215

5b: Multi-Family Units



1990-2012 Annual Average: 3,867
2012-2032 Annual Needed: 4,107

Sources: U.S. Census Bureau, and GMU Center for Regional Analysis

IV. What housing costs can future new workers afford?

Even with a sufficient supply of housing in optimal locations, new workers may locate outside of the region if housing costs are unaffordable. Or they may choose not to come to work in the region at all, opting for jobs in lower cost regions. The region's housing must be priced so that it is affordable to new workers. The new workers coming to the Washington DC area will have a range of wages and, therefore, there will be a need for housing at a range of prices and rents. While the industries with relatively higher wages will have job growth, there will be substantial employment growth in lower-wage sectors. In addition to the shifting wage structure, a growing share of workers will live alone and will therefore have only one income. As a result, the Washington DC area will need a substantial amount of housing at relatively moderate prices and rents.

Professional, Scientific and Technical Services and Management will account for the largest share of net new job growth (46.9 percent) over the next 20 years. The median wage for this sector is $81,500, which is the second highest median wage. The sectors with the second and third highest net new job growth are the Administrative & Waste Services and Construction sectors. Together, they account for 27.3 percent of the future job growth, but currently account for only 10.5 percent of the jobs in the region. These sectors have the third and fourth lowest median wage, respectively. Table 7 shows net new job growth by sector and the median wage of the sector.

Table 7: Employment Forecasts by Sector: 2012-2032
Washington DC Metropolitan Area

Sector	Net New Jobs	Median Wage
Total	857,334	$48,900
Construction, Natural Resources & Mining	95,024	$36,700
Manufacturing	(6,678)	$57,600
Transportation & Utilities	3,694	$43,900
Wholesale Trade	4,324	$46,800
Retail Trade	17,709	$22,500
Information	25,374	$67,200
Finance & Insurance	7,071	$62,400
Real Estate & Rental/Leasing	3,415	$49,300
Prof, scientific & technical services; Mgt	401,804	$81,500
Admin & waste services	139,082	$29,500
Education	22,329	$45,700
Health Services	71,277	$39,500
Leisure & Hospitality	45,926	$18,300
Other Services	10,599	$37,200
Government	11,414	$83,800
Military	4,969	$69,200

Sources: IHS Global Insight, 2009-2011 American Community Survey, and GMU Center for Regional Analysis

The median wages by sector and by work jurisdiction are combined with assumptions about the average number of workers per household for different household types to calculate household incomes. Affordable rents and homes prices are then based on household incomes. The maximum affordable home price is assumed to be no more than four times the annual household income. The maximum monthly rent that is affordable to a household depends on household income, and is assumed to be no more than 30 percent of the monthly household income (Table 8).

Table 8: Household Income and Maximum Home Prices and Monthly Rents

Household Income	Home Price	Monthly Rent
Less than $50,000	Less than $200,000	Less than $1,250
$50,000-74,999	$200,000-299,999	$1,250-1,314
$75,000-99,999	$300,000-399,999	$1,315-1,749
$100,000-124,999	$400,000-499,999	$1,750-1,874
$125,000-149,999	$500,000-599,999	$1,875-2,249
$150,000 or more	$600,000 or more	$2,250 or more

Source: GMU Center for Regional

About 16 percent of the owner-occupied homes that will be needed to house new workers will need to be priced below $200,000 (Figure 6a and Table 9). An additional 16.9 percent of new owner households will be able to afford homes priced between $200,000 and $299,999. Only 13.5 percent of new owners in the region will be able to afford a home priced at $600,000 or more given then wages and household demographics of new workers. By contrast, 19.1 percent of 2013 home sales were for houses that sold for $600,000 or more.[2]

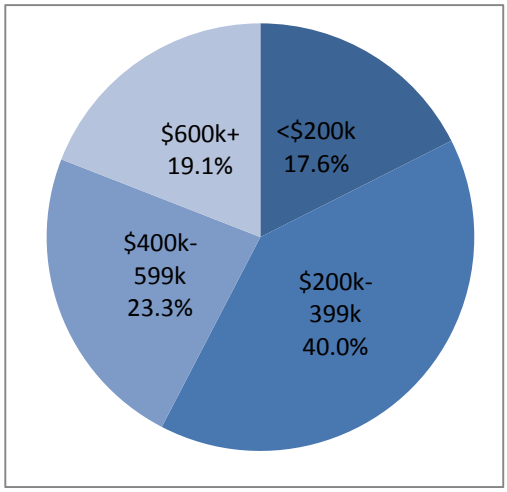
There will be a substantial need for moderately priced rental units to accommodate the region's future workforce. Among new renter households, 44.1 percent will be able to afford a maximum monthly rent of $1,250 (Figure 6b and Table 10). Another 21.2 percent will be able to afford a unit renting for between $1,250 and $1,314. Only 2.4 percent of renter households will have a household income sufficient to afford to rent a unit for $2,250 or more. By contrast, 11.2 percent of current renters are paying $2,250 or more, and a significant share of new rental construction targets this upper income group.

The demand for moderately priced owner and rental units does not mean that all of these more affordable units will be new construction. In some local markets, it would be very difficult to build new units at these lower price and rent levels without significant subsidy. Therefore, these forecasts suggest that a large share of the lower cost housing that will be needed in the future will have to come through preservation of existing affordable housing.

[2] Source: MRIS, January through October 2013 Sales

Figure 6a. Comparing Home Prices: Existing and Needed

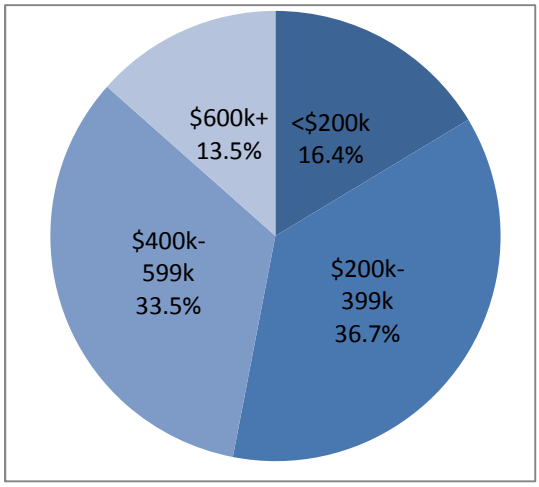
Current Housing Stock



Source: MRIS, Jan-Oct 2013 Sales

Housing Needed for Net New Workers

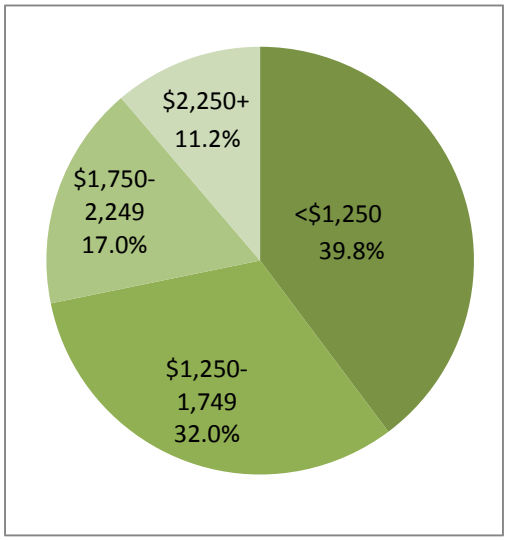
By Work Location (a)



Source: GMU Center for Regional Analysis

Figure 6b. Comparing Rent: Existing and Needed

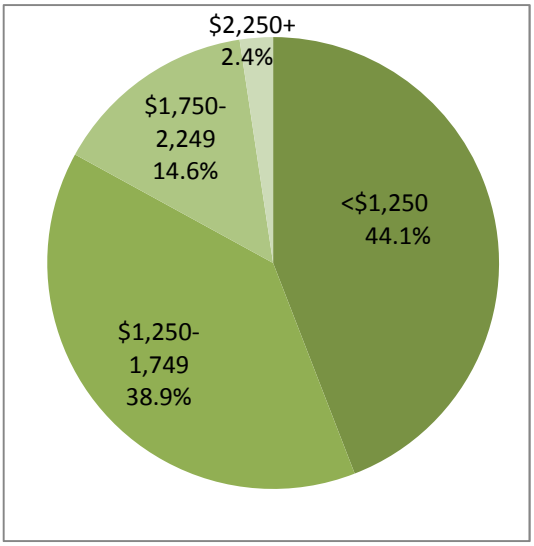
Current Housing Stock



Source: 2009-2011 American Community Survey

Housing Needed for Net New Workers

By Work Location (a)



Source: GMU Center for Regional Analysis

(a) The estimates by work location assume all new workers are housed in the jurisdiction in which they work and jurisdiction-to-jurisdiction commuting levels will not increase from present volumes.

Table 9: Estimates of Housing Demand: 2012-2032
Owner-Occupied Units
Washington DC Metropolitan Area
By Work Location (a)

Jurisdiction	Total Owner-Occupied Units	Home Price (2011 $)			
		Less than $200,000	$200,000-399,999	$400,000-599,999	$600,000 or more
District of Columbia	**38,575**	**5,575**	**17,769**	**12,006**	**3,225**
Calvert	3,761	958	1,460	1,059	285
Charles	6,848	2,011	2,751	1,389	697
Frederick	12,927	3,458	6,974	1,986	510
Montgomery	46,763	9,022	16,699	15,530	5,511
Prince George's	21,490	4,765	8,844	4,663	3,219
Suburban Maryland	**91,790**	**20,214**	**36,727**	**24,627**	**10,223**
Alexandria	4,904	383	2,069	2,014	438
Arlington	6,985	463	2,959	4,297	(734)
Clarke	319	31	143	118	28
Fairfax (b)	60,495	2,227	16,967	23,983	17,317
Fauquier	2,970	464	1,157	1,098	251
Loudoun	42,648	6,309	15,232	16,970	4,137
Prince William (c)	31,263	6,567	8,464	11,544	4,687
Spotsylvania (d)	13,165	4,768	6,360	1,613	425
Stafford	11,250	2,688	3,433	3,943	1,186
Warren	1,598	267	689	517	125
Northern Virginia	**175,598**	**24,167**	**57,473**	**66,097**	**27,861**
Jefferson Co WV	1,948	460	903	465	120
Washington DC Metro Area	**307,911**	**50,417**	**112,872**	**103,194**	**41,429**

(a) The estimates by work location assume all new workers are housed in the jurisdiction in which they work and jurisdiction-to-jurisdiction commuting levels will not increase from present volumes.
(b) Includes the cities of Fairfax and Falls Church
(c) Includes the cities of Manassas and Manassas Park
(d) Includes the city of Fredericksburg

Source: GMU Center for Regional Analysis

Table 10: Estimates of Housing Demand: 2012-2032
Renter-Occupied Units
Washington DC Metropolitan Area
By Work Location (a)

Jurisdiction	Total Renter-Occupied Units	Monthly Rent (2011 $)			
		Less than $1,250	$1,250 - 1,749	$1,750 - 2,249	$2,250 or More
District of Columbia	**66,665**	**28,946**	**25,314**	**10,481**	**1,924**
Calvert	2,602	1,459	958	166	19
Charles	5,241	3,354	1,609	231	47
Frederick	9,599	5,296	3,931	315	57
Montgomery	37,066	17,139	13,580	5,798	550
Prince George's	14,516	8,000	5,366	889	262
Suburban Maryland	**69,025**	**35,248**	**25,444**	**7,399**	**933**
Alexandria	8,154	2,247	3,751	1,938	217
Arlington	12,731	2,303	6,042	4,368	18
Clarke	156	49	90	16	2
Fairfax (b)	22,574	3,848	11,592	5,315	1,820
Fauquier	1,531	710	652	150	19
Loudoun	20,719	9,613	8,551	2,239	317
Prince William (c)	17,898	10,071	5,279	2,210	339
Spotsylvania (d)	11,821	7,633	3,804	336	48
Stafford	6,913	4,252	2,012	575	74
Warren	908	415	413	71	10
Northern Virginia	**103,407**	**41,140**	**42,186**	**17,217**	**2,864**
Jefferson Co WV	1,291	710	501	69	11
Washington DC Metro Area	**240,387**	**106,044**	**93,444**	**35,166**	**5,733**

(a) The estimates by work location assume all new workers are housed in the jurisdiction in which they work and jurisdiction-to-jurisdiction commuting levels will not increase from present volumes.

(b) Includes the cities of Fairfax and Falls Church

(c) Includes the cities of Manassas and Manassas Park

(d) Includes the city of Fredericksburg

Source: GMU Center for Regional Analysis

Policy Implications

Housing Should be Part of a Regional Economic Development Strategy

A sufficient supply of housing is essential to ensuring that the Washington DC area is able to achieve its full economic potential. New jobs cannot be filled without workers available to fill them. And while some workers may be willing to commute long distances or from outside the region, the wage of the job must be high enough to justify the commute and the transportation infrastructure must have the capacity for these workers. Many workers, however, will look elsewhere for jobs if they cannot find appropriate and affordable housing close to work.

A strategy to supply sufficient housing for the future workforce is a key component of an overall regional economic development strategy. Regions that have adequate housing to accommodate future workers will have a competitive advantage over other places. Regions with housing close to employment centers also benefit by not having to supply extension additional transportation services and can benefit from additional worker spending in the region.

For the Washington DC area to realize its economic development potential, all jurisdictions need to have a housing policy that reflects their specific housing requirements to accommodate future economic growth and the workforce housing demands that this desired growth implies.

Housing is where the workforce lives. It is where workers spend a large share of their incomes and where they pay their taxes. Recognizing this critical link between housing and regional economic growth is critical to the future vitality of the Washington DC area economy. The Washington DC area cannot achieve its projected growth potential without new workers. And this workforce will not be available to the region's future businesses in the absence of sufficient housing, located to minimize commuting, and priced at levels affordable to new workers. As the structure of the Washington DC area economy evolves and becomes less dependent on the Federal government, it is important for the region to find ways to be as competitive as possible. Without meeting the projected future demand for housing, the Washington DC area will lose position to other metropolitan area economies that have now rebounded from the economic downturn and have achieved a better balance between housing and their future workforce requirements.

Housing Needed for Net New Workers is Just Part of the Total Future Need

These housing demand forecasts are not comprehensive; they include estimates only of the housing that will be needed to accommodate the region's net new workers. The forecasts do not include the housing that will be demanded by the replacement workers in the region over the next 20 years, which is estimated to be 40 percent more than the number of net new workers. Some replacement jobs will result from current workers leaving the region, which will therefore free up a housing unit for another worker. However, a substantial share of the region's replacement workers will need additional housing that is not accounted for in these forecasts. This is particularly true for workers backfilling jobs vacated by retirees. Between 50 and 60 percent of retirees stay in the region in which they were working; while

they may move to a different type of house within the region, they will not make a housing unit available to the workers who move to the region to fill their jobs.

There are additional housing needs in the region for non-working households, including retirees, students, volunteers and interns, which are also not included in these forecasts. Lastly, there will need to be an additional number of vacant housing units to allow for current and future households to move as their needs change. For the 548,298 new units needed to accommodate the net new workers alone, it is estimated that an additional 14,000 units will be needed for this frictional vacancy.

Multi-family Housing, Rental Housing and More Affordable Housing Will Be in Demand

These forecasts suggest that the housing that will be needed for the future workforce will include more multi-family units (including rental and condominium), and will need to include a substantial share of units at moderate prices and rents, compared to the existing housing stock. The reasons for the shift towards smaller, less expensive and rental housing relates to the changing demographics of the labor force and the distribution of wages of new jobs as the region's economy evolves. The workers coming into the region over the next 20 years will be younger than the existing workforce, and they will be more likely to live in one-person households. Furthermore, they will be more likely to work in somewhat lower-wage jobs than current workers.

There has been a surge in multi-family construction in the region over the last few years. However, much of this new rental construction targets the highest end of the market. Housing that is affordable to lower-income working households is very difficult to build in many places in the Washington DC area without significant subsidies or incentives. Local commitment of dedicated funding for affordable housing can help facilitate the development of lower cost housing. However, much of the more affordable housing that will be demanded by new workers is existing, rather than new, housing. Therefore, it is essential that there is an inventory of market rate and subsidized affordable housing units in the region, and that efforts are made to preserve existing lower priced housing, particularly in the fastest-growing and in-demand locations.

Without Sufficient Housing, Traffic Congestion and Quality of Life Worsen

A lack of sufficient housing within the Washington DC area and located in proximity to the region's employment centers and to transit will lead to increased traffic and transit congestion, and will result in longer commutes, lower worker productivity, and declining quality of life for all residents of the region. Increased funding for transportation expansions and improvements beyond those that have been planned currently is unlikely. Therefore, the ability to build out of the region's traffic problems is untenable. Allowing land use and zoning changes that permit the construction of more housing near jobs, which will require less commuting, is a critical implication of these housing demand forecasts.

The lack of housing, increasing traffic congestion and declining quality of life will make it more difficult for businesses to recruit workers and will make it less attractive for new firms to locate in the region. Other parts of the country have achieved a better balance between their housing supply and economic growth. Workers may choose to leave the Washington DC area for places with more affordable housing

closer to jobs and with shorter, less stressful commutes. The pull of the Federal government is lessening. And while the Washington DC area has many amenities that will continue to be attractive to workers and businesses, there are many other choices as both firms and labor are increasingly footloose.

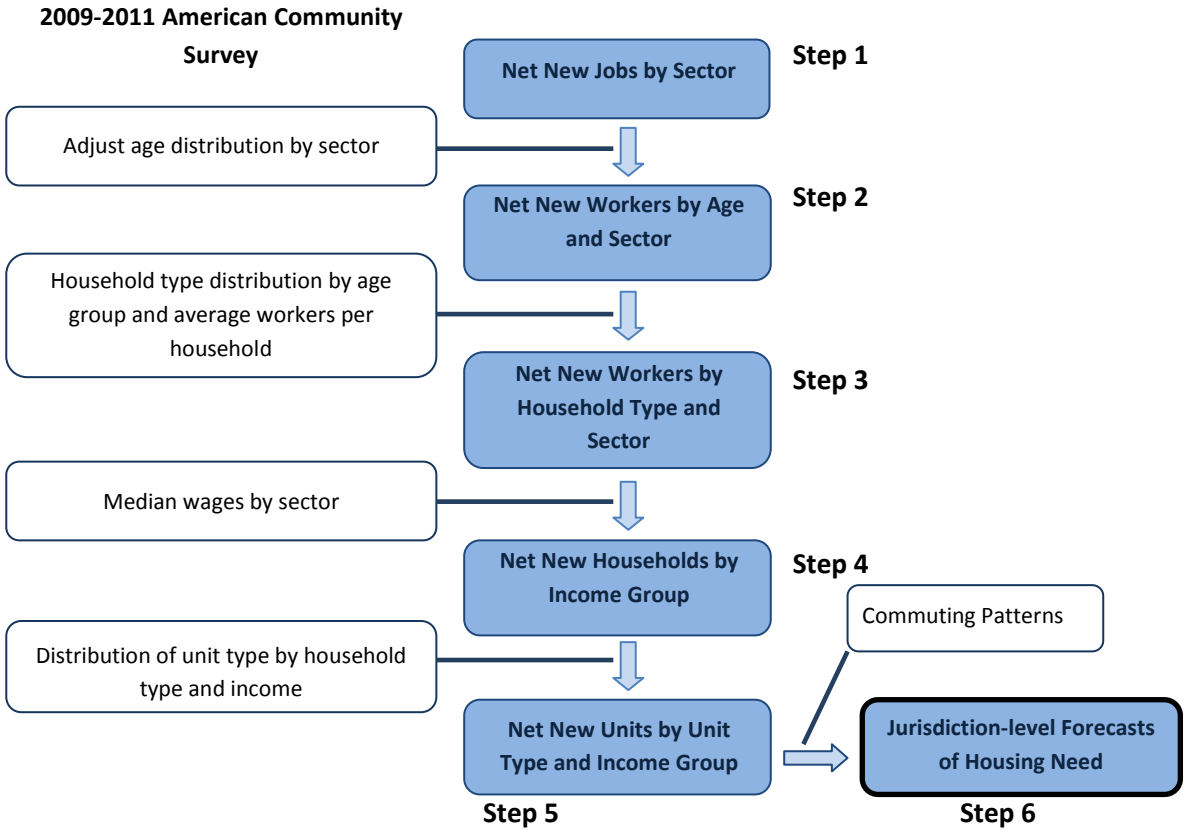
Appendix

Methodology

The housing demand forecasts generated by the Center for Regional Analysis are employment driven forecasts of the need for housing. This is the second housing demand analysis that the Center has produced for the Washington DC area. In addition to updated employment forecasts, the methodology was updated as well to take advantage of more current data and more appropriate assumptions. Because of the methodology changes, making a direct comparison with the 2011 report is not always possible.

Like the 2011 analysis, these forecasts link regional economic employment growth with the availability, location and price of housing. Housing forecasts were generated for 17 jurisdictions or groups of jurisdictions that comprise the Washington DC Metropolitan Statistical Area[3]. These housing forecasts were based on forecasts of job growth by industry sector for each jurisdiction and included an assessment of the amount and type of housing that would be needed to house each jurisdiction's new workers.

Figure A1. Methodology for Forecasting Housing Needs



[3] There are 22 counties and cities in the Washington DC Metropolitan Statistical Area. For this research, several independent cities in Virginia were combined with their surrounding county. The cities of Fairfax and Falls Church are included in the Fairfax County forecasts. The cities of Manassas and Manassas Park are included in the Prince William County forecasts. The city of Fredericksburg is included in the Spotsylvania County forecasts.

The Center conducted a six-step model for generating housing demand forecasts (see Figure A1). Each step in the process was important for modeling not simply the overall demand for housing, but also the need for housing in different jurisdictions, of different types, and at different price/rent points. The characteristics of the housing units needed for the region's future workers depend on the age, household composition, and household income of new workers, which are all factors included in the analysis. This section briefly outlines the methodology and data used to derive the forecasts.

1. Determine job growth by industry

It is important to understand the types of jobs coming to the region so we can develop estimates of worker age and household income, which will determine household composition, housing types and affordability levels. IHS Global Insight provides annual job forecasts for each of the region's jurisdictions. These employment forecasts are based on a county-level econometric model that Global Insight updates regularly. The forecasts include payroll jobs only, excluding unincorporated self-employed persons. Therefore, the Global Insight figures undercount the total employment activity in the region.

The Global Insight forecasts include 13 major industry sectors. In some cases, we split the Global Insight sectors into subsectors if the workers in different subsectors were likely to have different wages. We split the Global Insight transportation, trade and utilities sector into transportation and utilities, wholesale trade and retail trade. We divided the education and health services sector into two sectors. We split the financial services sector into finance and insurance and real estate. Finally, we split the professional and business services sector into professional and technical services/management and administrative/waste services. Sub-regional[4] employment data from the U.S. Bureaus of Labor Statistics was used to divide the sectors. Tables A1-1 through A1-17 summarize the employment change by sector for each jurisdiction.

2. Assign net new jobs to workers by age category

Understanding the age distribution by sector of the region's future workforce is important for estimating housing demand, since the demand for different types of housing is strongly associated with individuals' ages. The first step in moving from jobs to housing demand is to estimate the age distribution of the net new workers. For each jurisdiction and job sector, we assigned some share of the net new workers in each sector to one of three age groups: under 30, 30-44 or 45-64. We assumed no net new workers are aged 65 or older.

New workers will be somewhat younger than the existing workforce We analyzed data from the 2009-2011 American Community Survey (3-year microdata sample) to estimate the age distribution of current

[4] The divisions consist of Washington, DC; the entirety of Northern Virginia; Montgomery and Frederick counties combined; and Prince George's, Calvert and Charles counties combined.

workers for each industry sector. This analysis was done separately for each jurisdiction or combination of jurisdictions if the county/city was too small.[5]

We then adjusted the age distribution to account for the fact that net new workers would be younger by analyzing 2009-2011 ACS data on the age distribution of workers[6] who had recently moved in the Washington DC area. Through this analysis, we found that recent movers were more likely to be 18-29 or 30-44 than existing workers. Recent movers were less likely to be 45-64. Tables A2-1 through A2-17 summarize the age distribution of the net new workers by sector for each jurisdiction.

3. Assign net new workers to a household type and sector

This process of assigning workers to households consisted of two steps: i) determining the type of household to which a worker is most likely to belong based on age and job sector, and then ii) calculating the average number of workers within each household type to determine the number of net new households.

i) Determine the household type

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 assigned each net new worker in each sector to one of 11 household types based on the age group to which they were assigned in the previous analytic step. The 11 household types are listed below.

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

[5] The ACS data can be analyzed by public use microdata area (PUMA). Each PUMA contains at least 100,000 people, based on the 2000 Census. For the analysis of the 2009-2011 ACS data, the cities of Fairfax and Falls Church and Fairfax County are combined. The cities of Manassas and Manassas Park, and Prince William County are combined. The city of Fredericksburg is and Spotsylvania County are combined. Loudoun, Clarke, Warren and Fauquier are combined and the ratios are used for Jefferson, WV.

[6] For calculations using ACS data, a worker is defined as anyone in the labor force.

We used the 2009-2011 ACS 3-year data and analyzed the current distribution of household types for each age group and for each jurisdiction. Thus, for each jurisdiction, we assessed the percent of workers under 30 who live in one-adult households, the percent who live in one-adult, one-child households and so on. From step 2 above, we know how many workers in each sector are in each age group (under 30, 30-44, and 45-64) for each jurisdiction. We used the distribution of household types by age from the 2009-2011 ACS to assign workers in each sector and age group to a household type. Tables A3-1 through A3-17 summarize the distribution of household types by age group for each sector.

ii) Calculate the average number of workers per household

We then used the 2009-2011 ACS 3-year data to calculate the average number of workers in each household. Because this forecast is for net new workers only, this average includes only households with a worker.

The average number of workers in each of the 11 household types is used to convert workers into households. This was calculated by dividing the total number of workers assigned to each household type by the average number of workers in each household type. (See Figure A2 for example.) This step assumes that workers who live in the same household also work in the same sector and jurisdiction. Tables A3-1 through A3-17 summarize the average workers per household by household type for each jurisdiction.

Figure A2. Example of Assigning Workers to Household Types

Assume there were 1,000 net new workers in the construction sector in Fairfax County who were between the ages of 30 and 44. From the 2009-2011 ACS we have the household type distribution for people age 30 to 44 in Fairfax County, as show in the second column of the table below. We use that distribution to assign the 1,000 net new construction workers to a household type, as shown in the fourth column of the table below. We repeat this process for all age groups and all sectors in each jurisdiction.

Household Type	% of all 30-44 year olds in Fairfax County	Average No. of Workers	No. of Net New Construction Workers Age 30-44	No. of Net New Households Associated with New Construction Workers Age 30-44
1 adult	11%	1.00	110	110
1 adult, 1 child	2%	1.00	20	20
2 adults	16%	1.41	160	113
1 adult, 2 child	1%	1.00	10	10
2 adults, 1 child	15%	1.66	150	90
3 adults	4%	2.33	40	17
1 adult, 3+ children	1%	1.00	10	10
2 adults, 2+ children	30%	1.56	300	192
3 adults, 1+ children	9%	2.38	90	38
4+ adults, 1+ children	8%	3.57	80	22
4+ adults	3%	3.59	30	8

Then, we combine workers into households. For example, the 110 workers in the first row of the table above form 110 households, but the 160 workers in the third row form 113 households (160 workers / 1.41 workers per household).

4. Calculate household income in net new households

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 calculated median household incomes for all 11 household types and all industry sectors. Then, we tabulate the total number of households in each of six income categories: less than $50,000; $50,000 – 74,999; $75,000 – 99,999; $100,000 - 124,999; $125,000 – 149,999; and $150,000 and greater.

We used the 2009-2011 ACS 3-year data to calculate the median wages by industry for each jurisdiction. Tables A4-1 through A4-17 summarize the median wages by sector for each jurisdiction. Using the median wage by industry and the average number of workers per household (assuming both are in the same industry), we calculate the household income for each household type and sector for each jurisdiction. We then sum up—across sectors—the number of households in each of the six income categories for each of the ten household types. Thus, we have a count of the numbers of 1 adult households in each income group, the numbers of 1 adult, 1 child households in each income group, and so on.

5. Assign each household a unit type by income group

After step 4, we have a count of the number of households by household type and household income that are associated with net new job growth. Household type and household income 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 in six rent/price categories. The four housing unit types are: single-family (included single-family detached and townhouse/single-family attached) owner and renter, and multi-family owner and renter. The six rent/price categories are associated with the six income groups and represent the maximum rent or home price affordable to households in each income group.

We used the 2009-2011 ACS 3-year data to run crosstabulations of housing type (i.e. four types) by household composition (i.e. 11 household types) for each of the six income groups. The results of this analysis show the current distribution of housing types for different household types and household incomes.

We ran this analysis for the following jurisdictions: Washington, DC, for Arlington and Alexandria combined, for Fairfax and Montgomery combined, and for Prince William, Loudoun, Spotsylvania, Prince George's and Frederick combined. We did not run the analysis for all jurisdictions because the sample sizes were too small.

We then applied these distributions to the projected households for each jurisdiction to estimate the need for housing by unit type and rent/price. This step assumes that housing preferences do not change in the future.

We made assumptions about the affordable price and rent levels for households in each income group. The maximum affordable rent was set as a percentage of household income. We assumed that rents

would not exceed 30% of renters' income with incomes below $50,000; 21% of income for renters with incomes between $50,000 and 99,999; and 18% of income for renters with incomes about $100,000.

These rent percentages are based standard definitions of housing burden for the lowest income group and on an analysis of rents as a percentage of household income in the 2009-2011 ACS for the other income groups, knowing that higher income renters tend to spend a lower percentage of their income on rent than do lower income renters. The housing price for homeowners was set at four times household income. Table A5 summarizes the maximum home prices and rents for each income group.

Table A5. Home Value and Monthly Rental Price

Household Income	Home Value	Rental Price (Monthly)
<$50K	Less than $199,999	Less than $1,250
$50-74K	$200,000-299,999	$1,250-1,314
$75-99K	$300,000-399,999	$1,315-1,749
$100-124K	$400,000-499,999	$1,750-1,874
$125-149K	$500,000-599,999	$1,875-2,249
$150K+	$600,000+	$2,250+

6. Develop jurisdiction-level estimates based on in-commuting assumptions

After step 6, we have a count of the number of new housing units needed by type and price needed to accommodate *all* new workers in a jurisdiction. These estimates are "By Work Location" and are roughly comparable to the "High" forecasts in the 2011 report. These forecasts assume that all new workers over the next 20 years will live in the jurisdiction in which they work.

We generated another set of forecasts that assumed that the new jobs in each jurisdiction had the same in-commuting rate associated with existing jobs. For example, 54 percent of Fairfax County jobs are held by people who live in Fairfax. For the set of forecasts based on commuting patterns, we assumed that 54 percent of Fairfax's new workers would be housed in Fairfax. We made this assumption for all the jurisdictions, given their individual current in-commuting rates. These units are referred to the "Non-Commuters" and are most comparable to the "Low" Estimates in the 2011 report.

However, to maintain the regional commuting rates, the inter-jurisdictional commuters are added to these forecasts. Even though only 54 percent of jobs in Fairfax County are held by Fairfax residents, 95 percent are held by those who reside anywhere within the region. This means that 41 percent of Fairfax jobs are held by those who reside outside of Fairfax, but within the region. Table A6 summarizes the in-commuting rates for each jurisdiction.

Study Limitations

The demand for housing depends on many factors. Modeling this housing demand necessarily involves making several simplifying assumptions. Some of the complexity of housing need will be excluded from the analysis and some of the limitations of the research are described briefly in this section.

The housing demand forecasts exclude the housing needed to accommodate replacement workers, as well as other non-paid working households. This analysis excludes the housing needs for replacement workers resulting from the aging of the current workforce ages and retirement. Some retiring workers will leave the region, thus freeing up housing units for new or replacement workers. However, many of the retiring workers will stay in the region. As a result, the housing demand forecasts presented in this report understate the actual need for housing over the next 20 years.

It is assumed that there are no major shifts in the housing unit preferences of future cohorts or in the direction of Federal policies related to homeownership. These forecasts are based on data on the housing characteristics of current residents by age group, household composition and household income in order to make estimates of future housing needs. This method assumes that there are no major changes in the housing unit preferences of future cohorts.

In addition, this research makes no assumptions about the direction of Federal policies related to homeownership which might make owning relatively less attractive or feasible over time. If there are major changes to the federal mortgage interest deduction or to regulation related to down payment and other requirements for securing a home mortgage, then homeownership may be less desirable or less achievable for future workers. Thus, there could be a shift to a need for even more rental housing in the region.

It is assumed that workers' housing location choices are related solely to their place of work. The forecasts by work location were generated to keep current jurisdiction-to-jurisdiction commuting levels constant over the next 20 years. The means to achieving this goal is to place all workers' homes in the jurisdictions in which they work. This is an oversimplification of the decisions people make about where to live. Many households with multiple workers have work places in different jurisdictions. Workers have become increasingly more mobile with respect to work, changing jobs more frequently than in the past. And while telecommuting is still a small part of the labor force, with a very small share of workers regularly working from home, some workers are not tied to a physical workplace. These housing demand forecasts are not meant to suggest that people should live in the same jurisdiction in which they work. Rather, these forecasts provide guidance for the amount of housing that would be required so that workers have the options for affordable housing closer to where they work. The overall quantity of housing needed could be redistributed somewhat throughout the region given other factors that influence housing choice.

Table A1. Job Change by Sector: 2012 - 2032

Table A1-1. District of Columbia

Sector	2012	2022	2032	Change 2012-2022	Change 2022-2032
Total	749,213	818,225	897,719	69,013	79,494
Construction, Natural Resources and Mining	13,483	19,451	23,771	5,968	4,319
Manufacturing	975	901	797	(74)	(103)
Transportation & Utilities	4,096	4,358	4,514	262	156
Wholesale Trade	4,996	5,315	5,505	319	190
Retail Trade	18,683	19,877	20,589	1,194	712
Information	17,267	19,450	22,488	2,184	3,038
Finance & Insurance	16,935	17,045	17,851	110	806
Real Estate & Rental/Leasing	11,157	11,230	11,760	73	531
Prof, scientific and technical services; Management	107,947	146,836	191,506	38,888	44,670
Admin & waste services	45,136	61,397	80,075	16,260	18,678
Education	50,811	55,547	58,234	4,736	2,688
Health Services	63,789	69,734	73,108	5,945	3,374
Leisure & Hospitality	65,325	71,687	73,348	6,362	1,661
Other Services	68,100	68,973	69,501	873	528
Government	242,567	227,294	224,222	(15,273)	(3,072)
Military	17,946	19,131	20,449	1,186	1,318

Sources: IHS Global Insight, U.S. Bureau of Labor Statistics and GMU Center for Regional Analysis

Table A1-2. Calvert County, Maryland

Sector	2012	2022	2032	Change 2012-2022	Change 2022-2032
Total	22,754	27,392	32,768	4,638	5,375
Construction, Natural Resources and Mining	1,892	2,860	3,843	968	983
Manufacturing	579	608	597	29	(11)
Transportation & Utilities	908	1,025	1,131	117	106
Wholesale Trade	744	841	928	96	87
Retail Trade	3,252	3,672	4,053	421	380
Information	126	177	227	50	50
Finance & Insurance	335	364	408	29	44
Real Estate & Rental/Leasing	307	334	374	27	41
Prof, scientific and technical services; Management	1,143	1,541	2,222	397	682
Admin & waste services	862	1,161	1,675	299	514
Education	352	411	483	59	73
Health Services	3,371	3,934	4,629	563	695
Leisure & Hospitality	3,072	3,717	4,264	645	547
Other Services	993	1,094	1,286	101	192
Government	4,489	5,306	6,293	817	987
Military	329	349	355	20	5

Sources: IHS Global Insight, U.S. Bureau of Labor Statistics and GMU Center for Regional Analysis

Table A1-3. Charles County, Maryland

Sector	2012	2022	2032	Change 2012-2022	Change 2022-2032
Total	43,600	52,884	62,431	9,284	9,547
Construction, Natural Resources and Mining	3,391	5,061	6,265	1,669	1,204
Manufacturing	659	741	772	83	31
Transportation & Utilities	2,081	2,358	2,586	277	229
Wholesale Trade	1,706	1,934	2,121	227	188
Retail Trade	7,455	8,447	9,266	993	819
Information	353	508	661	154	153
Finance & Insurance	613	672	753	59	81
Real Estate & Rental/Leasing	563	617	691	54	75
Prof, scientific and technical services; Management	1,864	2,562	3,736	698	1,174
Admin & waste services	1,405	1,931	2,816	526	885
Education	495	598	710	103	112
Health Services	4,740	5,729	6,806	990	1,076
Leisure & Hospitality	5,345	6,555	7,500	1,210	945
Other Services	1,711	1,929	2,285	218	356
Government	10,116	12,073	14,274	1,957	2,202
Military	1,103	1,170	1,188	66	18

Sources: IHS Global Insight, U.S. Bureau of Labor Statistics and GMU Center for Regional Analysis

Table A1-4. Frederick County, Maryland

Sector	2012	2022	2032	Change 2012-2022	Change 2022-2032
Total	98,707	117,376	134,727	18,669	17,351
Construction, Natural Resources and Mining	8,493	11,557	11,576	3,064	19
Manufacturing	4,628	4,594	4,206	(34)	(388)
Transportation & Utilities	1,232	1,367	1,502	136	134
Wholesale Trade	2,965	3,291	3,614	326	323
Retail Trade	11,860	13,164	14,458	1,304	1,294
Information	1,296	1,550	1,900	253	351
Finance & Insurance	4,688	4,897	5,319	208	422
Real Estate & Rental/Leasing	2,044	2,134	2,318	91	184
Prof, scientific and technical services; Management	11,616	16,439	22,487	4,823	6,048
Admin & waste services	5,107	7,228	9,887	2,120	2,659
Education	1,984	2,389	2,760	404	371
Health Services	10,955	13,187	15,235	2,232	2,047
Leisure & Hospitality	9,846	11,308	12,370	1,463	1,062
Other Services	3,760	3,959	4,557	200	598
Government	16,170	17,996	20,183	1,826	2,186
Military	2,063	2,315	2,356	252	41

Sources: IHS Global Insight, U.S. Bureau of Labor Statistics and GMU Center for Regional Analysis

Table A1-5. Montgomery County, Maryland

Sector	2012	2022	2032	Change 2012-2022	Change 2022-2032
Total	478,757	552,331	608,376	73,574	56,045
Construction, Natural Resources and Mining	23,586	38,344	47,612	14,758	9,267
Manufacturing	11,436	10,953	9,392	(483)	(1,561)
Transportation & Utilities	4,660	4,937	4,982	277	46
Wholesale Trade	11,215	11,881	11,992	666	110
Retail Trade	44,861	47,526	47,966	2,665	441
Information	13,052	15,094	17,125	2,042	2,032
Finance & Insurance	22,638	22,842	22,826	204	(16)
Real Estate & Rental/Leasing	9,868	9,957	9,950	89	(7)
Prof, scientific and technical services; Management	74,580	99,675	125,518	25,095	25,844
Admin & waste services	32,791	43,824	55,187	11,033	11,363
Education	10,307	11,817	12,504	1,510	687
Health Services	56,900	65,235	69,027	8,335	3,792
Leisure & Hospitality	39,379	43,935	45,020	4,556	1,085
Other Services	26,271	26,547	28,019	277	1,472
Government	89,862	91,515	92,860	1,653	1,345
Military	7,351	8,248	8,395	897	147

Sources: IHS Global Insight, U.S. Bureau of Labor Statistics and GMU Center for Regional Analysis

Table A1-6. Prince George's County, Maryland

Sector	2012	2022	2032	Change 2012-2022	Change 2022-2032
Total	320,699	355,365	381,052	34,666	25,687
Construction, Natural Resources and Mining	25,561	35,707	42,115	10,147	6,408
Manufacturing	7,437	7,128	6,479	(309)	(650)
Transportation & Utilities	11,044	11,289	10,911	244	(378)
Wholesale Trade	9,058	9,258	8,948	200	(310)
Retail Trade	39,569	40,444	39,091	876	(1,354)
Information	4,977	6,136	7,075	1,159	939
Finance & Insurance	6,362	6,341	6,277	(22)	(63)
Real Estate & Rental/Leasing	5,839	5,819	5,761	(20)	(58)
Prof, scientific and technical services; Management	23,481	29,709	38,327	6,228	8,618
Admin & waste services	17,698	22,393	28,888	4,694	6,496
Education	2,947	3,196	3,335	249	139
Health Services	28,228	30,612	31,942	2,383	1,330
Leisure & Hospitality	28,591	32,193	33,009	3,602	815
Other Services	12,263	12,538	13,060	276	522
Government	89,482	93,948	97,046	4,466	3,098
Military	8,162	8,654	8,788	492	134

Sources: IHS Global Insight, U.S. Bureau of Labor Statistics and GMU Center for Regional Analysis

Table A1-7. City of Alexandria, Virginia

Sector	2012	2022	2032	Change 2012-2022	Change 2022-2032
Total	101,359	112,386	120,616	11,027	8,230
Construction, Natural Resources and Mining	2,517	4,184	5,735	1,667	1,551
Manufacturing	1,176	1,011	737	(164)	(274)
Transportation & Utilities	2,046	2,074	1,817	28	(257)
Wholesale Trade	1,862	1,887	1,654	26	(234)
Retail Trade	7,804	7,912	6,932	108	(980)
Information	1,842	2,126	2,297	284	171
Finance & Insurance	3,622	3,661	3,608	40	(53)
Real Estate & Rental/Leasing	1,625	1,643	1,619	18	(24)
Prof, scientific and technical services; Management	19,747	26,628	34,383	6,881	7,755
Admin & waste services	5,259	7,091	9,157	1,832	2,065
Education	1,730	2,017	2,039	287	22
Health Services	5,950	6,936	7,011	986	75
Leisure & Hospitality	8,795	9,478	9,075	683	(403)
Other Services	13,069	12,521	12,773	(548)	251
Government	22,662	21,541	20,087	(1,121)	(1,454)
Military	1,653	1,673	1,693	21	20

Sources: IHS Global Insight, U.S. Bureau of Labor Statistics and GMU Center for Regional Analysis

Table A1-8. Arlington County, Virginia

Sector	2012	2022	2032	Change 2012-2022	Change 2022-2032
Total	184,006	202,590	214,803	18,584	12,213
Construction, Natural Resources and Mining	2,356	4,394	6,292	2,038	1,897
Manufacturing	652	640	459	(12)	(181)
Transportation & Utilities	3,446	3,473	3,005	26	(467)
Wholesale Trade	3,136	3,160	2,734	24	(425)
Retail Trade	13,144	13,245	11,462	101	(1,783)
Information	4,279	4,847	5,091	567	244
Finance & Insurance	5,043	5,150	4,986	107	(164)
Real Estate & Rental/Leasing	2,263	2,311	2,238	48	(74)
Prof, scientific and technical services; Management	39,136	52,175	65,995	13,039	13,820
Admin & waste services	10,422	13,895	17,575	3,472	3,680
Education	3,665	4,272	4,232	607	(41)
Health Services	12,605	14,691	14,552	2,086	(139)
Leisure & Hospitality	17,233	18,627	17,595	1,394	(1,031)
Other Services	13,502	12,889	12,886	(612)	(3)
Government	42,247	37,809	34,559	(4,438)	(3,250)
Military	10,876	11,012	11,141	136	129

Sources: IHS Global Insight, U.S. Bureau of Labor Statistics and GMU Center for Regional Analysis

Table A1-9. Clarke County, Virginia

Sector	2012	2022	2032	Change 2012-2022	Change 2022-2032
Total	3,899	4,188	4,672	289	484
Construction, Natural Resources and Mining	476	614	735	138	121
Manufacturing	500	422	347	(78)	(75)
Transportation & Utilities	78	76	75	(1)	(1)
Wholesale Trade	71	69	68	(1)	(1)
Retail Trade	296	291	285	(5)	(6)
Information	19	18	21	(1)	2
Finance & Insurance	103	102	113	(1)	11
Real Estate & Rental/Leasing	46	46	51	(0)	5
Prof, scientific and technical services; Management	337	447	644	110	197
Admin & waste services	90	119	172	29	53
Education	142	163	185	21	22
Health Services	488	561	637	73	76
Leisure & Hospitality	267	268	289	2	21
Other Services	170	159	182	(11)	23
Government	775	789	824	14	35
Military	42	43	43	1	1

Sources: IHS Global Insight, U.S. Bureau of Labor Statistics and GMU Center for Regional Analysis

Table A1-10. Fairfax County, Virginia (includes the independent cities of Fairfax and Falls Church)

Sector	2012	2022	2032	Change 2012-2022	Change 2022-2032
Total	655,528	727,997	789,470	72,469	61,473
Construction, Natural Resources and Mining	26,001	35,314	40,473	9,313	5,159
Manufacturing	7,908	6,900	5,032	(1,008)	(1,867)
Transportation & Utilities	14,389	13,793	11,857	(596)	(1,936)
Wholesale Trade	13,092	12,549	10,788	(542)	(1,761)
Retail Trade	54,879	52,606	45,223	(2,273)	(7,383)
Information	23,272	25,214	26,586	1,942	1,372
Finance & Insurance	24,444	23,495	22,654	(949)	(841)
Real Estate & Rental/Leasing	10,970	10,545	10,167	(426)	(377)
Prof, scientific and technical services; Management	189,600	242,494	306,087	52,894	63,593
Admin & waste services	50,493	64,579	81,515	14,086	16,936
Education	15,067	16,690	16,495	1,623	(195)
Health Services	51,814	57,394	56,724	5,580	(670)
Leisure & Hospitality	50,735	51,823	48,568	1,088	(3,255)
Other Services	28,234	25,633	25,568	(2,602)	(65)
Government	87,036	81,278	73,951	(5,758)	(7,327)
Military	7,595	7,690	7,781	95	90

Sources: IHS Global Insight, U.S. Bureau of Labor Statistics and GMU Center for Regional Analysis

Table A1-11. Fauquier County, Virginia

Sector	2012	2022	2032	Change 2012-2022	Change 2022-2032
Total	22,473	26,065	29,794	3,592	3,728
Construction, Natural Resources and Mining	2,549	2,764	2,341	215	(423)
Manufacturing	722	746	659	24	(87)
Transportation & Utilities	663	721	746	58	25
Wholesale Trade	603	656	679	53	22
Retail Trade	2,529	2,750	2,845	221	94
Information	176	220	276	44	56
Finance & Insurance	638	704	821	66	117
Real Estate & Rental/Leasing	286	316	369	30	53
Prof, scientific and technical services; Management	2,018	2,957	4,501	940	1,544
Admin & waste services	537	788	1,199	250	411
Education	729	939	1,122	210	183
Health Services	2,507	3,228	3,858	721	629
Leisure & Hospitality	2,463	2,786	3,112	323	326
Other Services	1,362	1,427	1,721	65	294
Government	4,492	4,862	5,343	369	482
Military	199	201	204	2	2

Sources: IHS Global Insight, U.S. Bureau of Labor Statistics and GMU Center for Regional Analysis

Table A1-12. Loudoun County, Virginia

Sector	2012	2022	2032	Change 2012-2022	Change 2022-2032
Total	147,701	202,492	250,719	54,792	48,227
Construction, Natural Resources and Mining	13,298	18,507	20,152	5,209	1,645
Manufacturing	4,367	5,405	4,982	1,038	(423)
Transportation & Utilities	5,525	6,945	7,471	1,420	526
Wholesale Trade	5,027	6,319	6,798	1,292	479
Retail Trade	21,073	26,489	28,496	5,416	2,007
Information	7,383	10,174	13,194	2,792	3,019
Finance & Insurance	3,498	4,485	5,412	986	927
Real Estate & Rental/Leasing	1,570	2,013	2,429	443	416
Prof, scientific and technical services; Management	22,418	37,566	58,864	15,148	21,298
Admin & waste services	5,970	10,004	15,676	4,034	5,672
Education	2,924	4,243	5,226	1,319	983
Health Services	10,054	14,591	17,970	4,538	3,379
Leisure & Hospitality	14,779	19,422	22,364	4,643	2,942
Other Services	6,110	7,329	9,112	1,219	1,782
Government	22,726	28,185	31,935	5,459	3,751
Military	979	814	637	(165)	(178)

Sources: IHS Global Insight, U.S. Bureau of Labor Statistics and GMU Center for Regional Analysis

Table A1-13. Prince William County, Virginia (includes the independent cities of Manassas and Manassas Park)

Sector	2012	2022	2032	Change 2012-2022	Change 2022-2032
Total	152,103	195,508	235,279	43,406	39,771
Construction, Natural Resources and Mining	13,824	17,167	15,553	3,344	(1,615)
Manufacturing	4,183	4,455	4,089	272	(366)
Transportation & Utilities	5,392	6,573	7,097	1,181	524
Wholesale Trade	4,906	5,980	6,457	1,074	477
Retail Trade	20,565	25,069	27,067	4,504	1,998
Information	1,596	2,241	2,990	646	748
Finance & Insurance	2,956	3,612	4,406	656	794
Real Estate & Rental/Leasing	1,327	1,621	1,978	295	356
Prof, scientific and technical services; Management	16,707	27,079	43,104	10,372	16,025
Admin & waste services	4,449	7,212	11,479	2,762	4,268
Education	3,818	5,402	6,749	1,584	1,347
Health Services	13,131	18,577	23,209	5,447	4,631
Leisure & Hospitality	15,995	20,203	23,399	4,208	3,196
Other Services	5,920	6,842	8,627	922	1,785
Government	30,782	36,839	42,363	6,057	5,524
Military	6,552	6,634	6,712	82	78

Sources: IHS Global Insight, U.S. Bureau of Labor Statistics and GMU Center for Regional Analysis

Table A1-14. Spotsylvania County, Virginia (includes the independent city of Fredericksburg)

Sector	2012	2022	2032	Change 2012-2022	Change 2022-2032
Total	59,007	76,017	97,068	17,010	21,052
Construction, Natural Resources and Mining	2,625	4,209	6,014	1,584	1,805
Manufacturing	1,093	1,185	1,126	91	(59)
Transportation & Utilities	2,447	2,906	3,276	458	370
Wholesale Trade	2,227	2,644	2,981	417	337
Retail Trade	9,335	11,083	12,494	1,748	1,412
Information	847	1,137	1,568	289	431
Finance & Insurance	1,459	1,752	2,229	293	477
Real Estate & Rental/Leasing	655	786	1,001	132	214
Prof, scientific and technical services; Management	4,337	6,881	11,426	2,544	4,545
Admin & waste services	1,155	1,833	3,043	678	1,210
Education	2,590	3,573	4,659	984	1,086
Health Services	8,905	12,287	16,021	3,382	3,734
Leisure & Hospitality	8,575	10,639	12,884	2,064	2,245
Other Services	2,525	2,781	3,660	257	879
Government	9,778	11,863	14,223	2,085	2,359
Military	453	458	464	6	5

Sources: IHS Global Insight, U.S. Bureau of Labor Statistics and GMU Center for Regional Analysis

Table A1-15. Stafford County, Virginia

Sector	2012	2022	2032	Change 2012-2022	Change 2022-2032
Total	42,243	54,685	70,548	12,442	15,862
Construction, Natural Resources and Mining	2,101	3,047	3,779	946	731
Manufacturing	629	760	756	130	(4)
Transportation & Utilities	1,296	1,611	1,868	315	257
Wholesale Trade	1,179	1,466	1,700	287	234
Retail Trade	4,942	6,145	7,125	1,203	980
Information	283	399	566	116	167
Finance & Insurance	3,843	4,976	6,446	1,134	1,470
Real Estate & Rental/Leasing	1,725	2,233	2,893	509	660
Prof, scientific and technical services; Management	3,441	5,590	9,418	2,149	3,827
Admin & waste services	916	1,489	2,508	572	1,019
Education	790	1,153	1,546	363	393
Health Services	2,718	3,966	5,317	1,248	1,350
Leisure & Hospitality	3,676	4,736	5,889	1,060	1,153
Other Services	1,729	2,006	2,676	277	670
Government	10,392	12,493	15,416	2,100	2,924
Military	2,582	2,614	2,645	32	31

Sources: IHS Global Insight, U.S. Bureau of Labor Statistics and GMU Center for Regional Analysis

Table A1-16. Warren County, Virginia

Sector	2012	2022	2032	Change 2012-2022	Change 2022-2032
Total	12,386	14,038	16,461	1,651	2,423
Construction, Natural Resources and Mining	529	776	993	247	217
Manufacturing	852	786	690	(66)	(96)
Transportation & Utilities	540	574	602	34	27
Wholesale Trade	491	523	547	31	25
Retail Trade	2,060	2,190	2,295	131	105
Information	61	69	86	8	17
Finance & Insurance	238	258	305	20	47
Real Estate & Rental/Leasing	107	116	137	9	21
Prof, scientific and technical services; Management	1,070	1,482	2,269	412	787
Admin & waste services	285	395	604	110	210
Education	440	541	653	101	112
Health Services	1,513	1,860	2,245	347	385
Leisure & Hospitality	1,471	1,622	1,815	151	194
Other Services	683	668	814	(15)	146
Government	1,934	2,064	2,291	130	227
Military	114	115	117	1	1

Sources: IHS Global Insight, U.S. Bureau of Labor Statistics and GMU Center for Regional Analysis

Table A1-17. Jefferson County, West Virginia

Sector	2012	2022	2032	Change 2012-2022	Change 2022-2032
Total	15,261	17,754	20,526	2,494	2,772
Construction, Natural Resources and Mining	619	890	1,079	270	190
Manufacturing	897	964	891	67	(72)
Transportation & Utilities	378	429	474	51	46
Wholesale Trade	344	390	431	46	42
Retail Trade	1,442	1,635	1,809	193	174
Information	110	131	163	20	32
Finance & Insurance	297	320	369	23	48
Real Estate & Rental/Leasing	133	144	165	10	22
Prof, scientific and technical services; Management	526	838	1,284	312	446
Admin & waste services	140	223	342	83	119
Education	411	510	602	99	92
Health Services	1,414	1,754	2,071	339	317
Leisure & Hospitality	4,249	4,692	5,220	442	528
Other Services	538	618	811	80	193
Government	3,498	3,948	4,550	450	603
Military	263	271	265	8	(6)

Sources: IHS Global Insight, U.S. Bureau of Labor Statistics and GMU Center for Regional Analysis

Table A2. Age Distribution by Sector

Table A2-1. District of Columbia

Sector	Under 30	30-44	45-64
Construction, Natural Resources and Mining	47%	43%	10%
Manufacturing	23%	43%	35%
Transportation & Utilities	24%	35%	41%
Wholesale Trade	33%	43%	24%
Retail Trade	70%	30%	0%
Information	35%	40%	25%
Finance & Insurance	34%	45%	21%
Real Estate & Rental/Leasing	33%	44%	23%
Prof, scientific and technical services; Management	43%	44%	13%
Admin & waste services	50%	39%	11%
Education	53%	34%	13%
Health Services	43%	39%	18%
Leisure & Hospitality	66%	34%	0%
Other Services	42%	41%	17%
Government	29%	39%	32%
Military	51%	49%	0%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A2-2. Calvert County, Maryland

Sector	Under 30	30-44	45-64
Construction, Natural Resources and Mining	47%	31%	21%
Manufacturing	26%	47%	27%
Transportation & Utilities	24%	33%	44%
Wholesale Trade	69%	16%	15%
Retail Trade	82%	18%	0%
Information	37%	63%	0%
Finance & Insurance	74%	26%	0%
Real Estate & Rental/Leasing	39%	22%	39%
Prof, scientific and technical services; Management	36%	37%	28%
Admin & waste services	48%	22%	30%
Education	36%	38%	26%
Health Services	56%	35%	9%
Leisure & Hospitality	100%	0%	0%
Other Services	33%	28%	39%
Government	27%	35%	38%
Military	51%	49%	0%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A2-3. Charles County, Maryland

Sector	Under 30	30-44	45-64
Construction, Natural Resources and Mining	52%	39%	8%
Manufacturing	43%	33%	24%
Transportation & Utilities	44%	29%	27%
Wholesale Trade	56%	31%	13%
Retail Trade	72%	26%	2%
Information	34%	18%	48%
Finance & Insurance	32%	39%	29%
Real Estate & Rental/Leasing	35%	37%	28%
Prof, scientific and technical services; Management	41%	22%	37%
Admin & waste services	79%	21%	0%
Education	41%	31%	28%
Health Services	59%	26%	14%
Leisure & Hospitality	99%	1%	0%
Other Services	74%	26%	0%
Government	24%	33%	42%
Military	58%	42%	0%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A2-4. Frederick County, Maryland

Sector	Under 30	30-44	45-64
Construction, Natural Resources and Mining	35%	36%	29%
Manufacturing	34%	38%	27%
Transportation & Utilities	54%	32%	14%
Wholesale Trade	38%	41%	21%
Retail Trade	79%	21%	0%
Information	69%	31%	0%
Finance & Insurance	39%	40%	21%
Real Estate & Rental/Leasing	33%	39%	27%
Prof, scientific and technical services; Management	43%	33%	24%
Admin & waste services	69%	31%	0%
Education	36%	37%	27%
Health Services	43%	34%	23%
Leisure & Hospitality	78%	22%	0%
Other Services	65%	29%	6%
Government	19%	31%	50%
Military	80%	20%	0%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A2-5. Montgomery County, Maryland

Sector	Under 30	30-44	45-64
Construction, Natural Resources and Mining	44%	46%	10%
Manufacturing	26%	35%	39%
Transportation & Utilities	37%	34%	28%
Wholesale Trade	29%	43%	28%
Retail Trade	70%	25%	5%
Information	40%	42%	18%
Finance & Insurance	50%	37%	14%
Real Estate & Rental/Leasing	33%	32%	35%
Prof, scientific and technical services; Management	36%	41%	23%
Admin & waste services	53%	42%	4%
Education	29%	33%	38%
Health Services	33%	36%	31%
Leisure & Hospitality	75%	25%	0%
Other Services	36%	34%	30%
Government	23%	36%	41%
Military	61%	39%	0%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A2-6. Prince George's County, Maryland

Sector	Under 30	30-44	45-64
Construction, Natural Resources and Mining	41%	45%	14%
Manufacturing	40%	35%	24%
Transportation & Utilities	41%	37%	23%
Wholesale Trade	42%	37%	20%
Retail Trade	73%	27%	0%
Information	41%	53%	7%
Finance & Insurance	64%	31%	4%
Real Estate & Rental/Leasing	23%	43%	34%
Prof, scientific and technical services; Management	33%	42%	26%
Admin & waste services	55%	41%	4%
Education	47%	31%	22%
Health Services	45%	35%	21%
Leisure & Hospitality	86%	14%	0%
Other Services	47%	36%	17%
Government	37%	34%	29%
Military	66%	34%	0%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A2-7. City of Alexandria, Virginia

Sector	Under 30	30-44	45-64
Construction, Natural Resources and Mining	38%	48%	14%
Manufacturing	22%	45%	33%
Transportation & Utilities	41%	36%	23%
Wholesale Trade	29%	35%	36%
Retail Trade	58%	41%	1%
Information	59%	41%	0%
Finance & Insurance	22%	44%	34%
Real Estate & Rental/Leasing	44%	40%	17%
Prof, scientific and technical services; Management	43%	37%	20%
Admin & waste services	46%	40%	14%
Education	48%	33%	18%
Health Services	37%	43%	20%
Leisure & Hospitality	65%	35%	0%
Other Services	36%	36%	28%
Government	31%	35%	34%
Military	52%	47%	1%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A2-8. Arlington County, Virginia

Sector	Under 30	30-44	45-64
Construction, Natural Resources and Mining	48%	45%	7%
Manufacturing	23%	34%	42%
Transportation & Utilities	33%	34%	33%
Wholesale Trade	50%	36%	15%
Retail Trade	68%	29%	3%
Information	42%	37%	21%
Finance & Insurance	39%	52%	9%
Real Estate & Rental/Leasing	55%	29%	16%
Prof, scientific and technical services; Management	44%	42%	14%
Admin & waste services	47%	43%	10%
Education	49%	37%	14%
Health Services	42%	47%	11%
Leisure & Hospitality	71%	29%	0%
Other Services	42%	47%	11%
Government	26%	34%	40%
Military	27%	67%	6%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A2-9. Clarke County, Virginia

Sector	Under 30	30-44	45-64
Construction, Natural Resources and Mining	43%	40%	17%
Manufacturing	28%	42%	29%
Transportation & Utilities	24%	39%	37%
Wholesale Trade	12%	48%	40%
Retail Trade	74%	26%	0%
Information	22%	48%	30%
Finance & Insurance	49%	38%	13%
Real Estate & Rental/Leasing	33%	43%	25%
Prof, scientific and technical services; Management	39%	45%	16%
Admin & waste services	48%	46%	6%
Education	33%	39%	28%
Health Services	39%	36%	25%
Leisure & Hospitality	81%	19%	0%
Other Services	47%	34%	20%
Government	28%	38%	33%
Military	100%	0%	0%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A2-10. Fairfax County, Virginia (includes the independent cities of Fairfax and I

Sector	Under 30	30-44	45-64
Construction, Natural Resources and Mining	45%	41%	14%
Manufacturing	27%	42%	32%
Transportation & Utilities	40%	32%	28%
Wholesale Trade	26%	40%	34%
Retail Trade	65%	32%	2%
Information	36%	47%	17%
Finance & Insurance	37%	44%	19%
Real Estate & Rental/Leasing	28%	41%	31%
Prof, scientific and technical services; Management	35%	44%	21%
Admin & waste services	52%	44%	5%
Education	42%	34%	23%
Health Services	43%	38%	19%
Leisure & Hospitality	78%	22%	0%
Other Services	48%	34%	18%
Government	33%	34%	33%
Military	56%	44%	0%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A2-11. Fauquier County, Virginia

Sector	Under 30	30-44	45-64
Construction, Natural Resources and Mining	43%	40%	17%
Manufacturing	28%	42%	29%
Transportation & Utilities	24%	39%	37%
Wholesale Trade	12%	48%	40%
Retail Trade	74%	26%	0%
Information	22%	48%	30%
Finance & Insurance	49%	38%	13%
Real Estate & Rental/Leasing	33%	43%	25%
Prof, scientific and technical services; Management	39%	45%	16%
Admin & waste services	48%	46%	6%
Education	33%	39%	28%
Health Services	39%	36%	25%
Leisure & Hospitality	81%	19%	0%
Other Services	47%	34%	20%
Government	28%	38%	33%
Military	100%	0%	0%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A2-12. Loudoun County, Virginia

Sector	Under 30	30-44	45-64
Construction, Natural Resources and Mining	43%	40%	17%
Manufacturing	28%	42%	29%
Transportation & Utilities	24%	39%	37%
Wholesale Trade	12%	48%	40%
Retail Trade	74%	26%	0%
Information	22%	48%	30%
Finance & Insurance	49%	38%	13%
Real Estate & Rental/Leasing	33%	43%	25%
Prof, scientific and technical services; Management	39%	45%	16%
Admin & waste services	48%	46%	6%
Education	33%	39%	28%
Health Services	39%	36%	25%
Leisure & Hospitality	81%	19%	0%
Other Services	47%	34%	20%
Government	28%	38%	33%
Military	100%	0%	0%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A2-13. Prince William County, Virginia (includes the independent cities of Mar

Sector	Under 30	30-44	45-64
Construction, Natural Resources and Mining	45%	48%	7%
Manufacturing	42%	35%	23%
Transportation & Utilities	43%	41%	16%
Wholesale Trade	42%	48%	10%
Retail Trade	78%	22%	0%
Information	60%	40%	0%
Finance & Insurance	43%	31%	25%
Real Estate & Rental/Leasing	23%	32%	44%
Prof, scientific and technical services; Management	36%	42%	21%
Admin & waste services	63%	37%	0%
Education	23%	43%	35%
Health Services	54%	39%	7%
Leisure & Hospitality	84%	16%	0%
Other Services	44%	32%	24%
Government	32%	34%	34%
Military	68%	32%	0%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A2-14. Spotsylvania County, Virginia (includes the independent city of Frederic

Sector	Under 30	30-44	45-64
Construction, Natural Resources and Mining	50%	44%	6%
Manufacturing	15%	38%	47%
Transportation & Utilities	38%	24%	38%
Wholesale Trade	22%	31%	47%
Retail Trade	76%	22%	2%
Information	86%	14%	0%
Finance & Insurance	40%	38%	22%
Real Estate & Rental/Leasing	54%	41%	5%
Prof, scientific and technical services; Management	42%	47%	11%
Admin & waste services	48%	51%	1%
Education	31%	34%	35%
Health Services	36%	44%	20%
Leisure & Hospitality	100%	0%	0%
Other Services	41%	28%	31%
Government	11%	26%	63%
Military	103%	0%	-3%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A2-15. Stafford County, Virginia

Sector	Under 30	30-44	45-64
Construction, Natural Resources and Mining	16%	46%	38%
Manufacturing	41%	25%	34%
Transportation & Utilities	10%	41%	49%
Wholesale Trade	16%	47%	37%
Retail Trade	79%	21%	0%
Information	0%	65%	35%
Finance & Insurance	65%	35%	0%
Real Estate & Rental/Leasing	19%	60%	21%
Prof, scientific and technical services; Management	35%	39%	26%
Admin & waste services	48%	36%	16%
Education	33%	37%	30%
Health Services	43%	39%	18%
Leisure & Hospitality	82%	18%	0%
Other Services	44%	29%	27%
Government	27%	44%	30%
Military	30%	70%	0%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A2-16. Warren County, Virginia

Sector	Under 30	30-44	45-64
Construction, Natural Resources and Mining	43%	40%	17%
Manufacturing	28%	42%	29%
Transportation & Utilities	24%	39%	37%
Wholesale Trade	12%	48%	40%
Retail Trade	74%	26%	0%
Information	22%	48%	30%
Finance & Insurance	49%	38%	13%
Real Estate & Rental/Leasing	33%	43%	25%
Prof, scientific and technical services; Management	39%	45%	16%
Admin & waste services	48%	46%	6%
Education	33%	39%	28%
Health Services	39%	36%	25%
Leisure & Hospitality	81%	19%	0%
Other Services	47%	34%	20%
Government	28%	38%	33%
Military	100%	0%	0%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A2-17. Jefferson County, West Virginia

Sector	Under 30	30-44	45-64
Construction, Natural Resources and Mining	43%	40%	17%
Manufacturing	28%	42%	29%
Transportation & Utilities	24%	39%	37%
Wholesale Trade	12%	48%	40%
Retail Trade	74%	26%	0%
Information	22%	48%	30%
Finance & Insurance	49%	38%	13%
Real Estate & Rental/Leasing	33%	43%	25%
Prof, scientific and technical services; Management	39%	45%	16%
Admin & waste services	48%	46%	6%
Education	33%	39%	28%
Health Services	39%	36%	25%
Leisure & Hospitality	81%	19%	0%
Other Services	47%	34%	20%
Government	28%	38%	33%
Military	100%	0%	0%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A3. Household Types and Workers per Household by Age Group

Table A3-1. District of Columbia

	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
Workers	1.00	1.00	1.53	1.00	1.66	2.56	1.00	1.58	2.45	4.28	3.49
Age Group											
Under 30	45%	4%	30%	2%	3%	7%	1%	2%	1%	4%	0%
30 - 44	43%	5%	22%	3%	8%	2%	3%	9%	3%	1%	1%
45 - 64	46%	3%	26%	1%	5%	7%	1%	5%	4%	2%	2%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A3-2. Calvert County, Maryland

	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
Workers	1.00	1.00	1.25	1.00	1.74	2.38	1.00	1.71	2.58	3.27	3.13
Age Group											
Under 30	13%	5%	32%	2%	22%	2%	0%	20%	2%	1%	1%
30 - 44	11%	5%	9%	1%	11%	2%	1%	45%	10%	3%	2%
45 - 64	19%	2%	38%	1%	9%	9%	0%	7%	7%	5%	3%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A3-3. Charles County, Maryland

	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
Workers	1.00	1.00	1.36	1.00	1.78	2.28	1.00	1.74	2.71	3.32	4.19
Age Group											
Under 30	21%	2%	25%	13%	10%	2%	0%	23%	2%	2%	1%
30 - 44	17%	6%	12%	5%	13%	2%	3%	30%	8%	1%	2%
45 - 64	19%	2%	34%	1%	7%	13%	0%	7%	8%	5%	5%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A3-4. Frederick County, Maryland

	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
Workers	1.00	1.00	1.32	1.00	1.75	2.34	1.00	1.69	2.41	3.56	3.65
Age Group											
Under 30	22%	2%	30%	1%	20%	5%	2%	10%	4%	3%	1%
30 - 44	13%	3%	17%	2%	13%	2%	0%	38%	6%	1%	3%
45 - 64	19%	3%	35%	1%	7%	11%	0%	9%	8%	4%	3%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A3-5. Montgomery County, Maryland

	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
Workers	1.00	1.00	1.34	1.00	1.69	2.23	1.00	1.66	2.28	3.42	3.64
Age Group											
Under 30	27%	3%	38%	3%	9%	6%	0%	7%	3%	3%	1%
30 - 44	19%	5%	17%	2%	14%	2%	2%	27%	6%	2%	5%
45 - 64	23%	3%	27%	1%	8%	10%	0%	11%	7%	6%	4%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A3-6. Prince George's County, Maryland

	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
Workers	1.00	1.00	1.44	1.00	1.83	2.34	1.00	1.78	2.55	3.92	4.07
Age Group											
Under 30	28%	7%	25%	3%	11%	4%	1%	10%	3%	6%	2%
30 - 44	22%	8%	14%	4%	11%	3%	3%	20%	7%	3%	5%
45 - 64	28%	3%	29%	1%	7%	10%	0%	6%	7%	4%	5%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A3-7. City of Alexandria, Virginia

	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
Workers	1.00	1.00	1.67	1.00	1.70	2.78	1.00	1.57	2.74	4.55	3.39
Age Group											
Under 30	42%	2%	40%	0%	5%	4%	0%	4%	0%	2%	1%
30 - 44	39%	2%	23%	3%	12%	3%	1%	14%	2%	0%	1%
45 - 64	47%	1%	28%	0%	4%	6%	0%	6%	5%	1%	2%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A3-8. Arlington County, Virginia

	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
Workers	1.00	1.00	1.68	1.00	1.62	2.79	1.00	1.61	2.45	5.23	4.00
Age Group											
Under 30	42%	1%	41%	0%	2%	8%	0%	1%	0%	4%	1%
30 - 44	39%	2%	25%	2%	11%	1%	0%	15%	2%	2%	1%
45 - 64	40%	2%	28%	1%	6%	7%	0%	8%	3%	3%	2%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A3-9. Clarke County, Virginia

	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
Workers	1.00	1.00	1.42	1.00	1.71	2.32	1.00	1.59	2.41	3.58	3.98
Age Group											
Under 30	19%	3%	38%	2%	15%	5%	0%	9%	2%	3%	5%
30 - 44	12%	3%	15%	2%	17%	2%	1%	38%	6%	1%	2%
45 - 64	19%	2%	34%	1%	8%	9%	0%	13%	7%	4%	3%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A3-10. Fairfax County, Virginia (includes the independent cities of Fairfax and Falls Church)

	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
Workers	1.00	1.00	1.41	1.00	1.66	2.33	1.00	1.56	2.38	3.59	3.57
Age Group											
Under 30	26%	2%	36%	1%	8%	8%	0%	7%	4%	5%	4%
30 - 44	18%	4%	18%	2%	14%	3%	1%	30%	6%	1%	3%
45 - 64	21%	2%	30%	1%	9%	10%	0%	12%	7%	5%	4%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A3-11. Fauquier County, Virginia

	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
Workers	1.00	1.00	1.42	1.00	1.71	2.32	1.00	1.59	2.41	3.58	3.98
Age Group											
Under 30	19%	3%	38%	2%	15%	5%	0%	9%	2%	3%	5%
30 - 44	12%	3%	15%	2%	17%	2%	1%	38%	6%	1%	2%
45 - 64	19%	2%	34%	1%	8%	9%	0%	13%	7%	4%	3%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A3-12. Loudoun County, Virginia

	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
Workers	1.00	1.00	1.42	1.00	1.71	2.32	1.00	1.59	2.41	3.58	3.98
Age Group											
Under 30	19%	3%	38%	2%	15%	5%	0%	9%	2%	3%	5%
30 - 44	12%	3%	15%	2%	17%	2%	1%	38%	6%	1%	2%
45 - 64	19%	2%	34%	1%	8%	9%	0%	13%	7%	4%	3%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A3-13. Prince William County, Virginia (includes the independent cities of Manassas and Manassas Park)

	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
Workers	1.00	1.00	1.47	1.00	1.76	2.36	1.00	1.63	2.42	3.46	3.53
Age Group											
Under 30	23%	4%	26%	2%	13%	5%	0%	12%	5%	2%	5%
30 - 44	12%	4%	12%	3%	13%	3%	2%	36%	10%	1%	4%
45 - 64	18%	2%	31%	0%	8%	10%	0%	10%	8%	8%	5%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A3-14. Spotsylvania County, Virginia (includes the independent city of Fredericksburg)

	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
Workers	1.00	1.00	1.20	1.00	1.78	2.36	1.00	1.53	2.32	3.37	3.80
Age Group											
Under 30	18%	3%	29%	2%	14%	4%	5%	14%	6%	1%	2%
30 - 44	11%	5%	13%	6%	10%	2%	4%	38%	7%	2%	2%
45 - 64	17%	2%	35%	1%	8%	9%	1%	9%	8%	4%	5%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A3-15. Stafford County, Virginia

	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
Workers	1.00	1.00	1.31	1.00	1.70	2.34	1.00	1.56	2.40	3.46	3.21
Age Group											
Under 30	23%	4%	24%	3%	18%	6%	0%	15%	3%	1%	1%
30 - 44	8%	6%	12%	4%	14%	3%	2%	40%	8%	0%	4%
45 - 64	16%	1%	33%	0%	10%	11%	0%	10%	10%	5%	4%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A3-16. Warren County, Virginia

	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
Workers	1.00	1.00	1.42	1.00	1.71	2.32	1.00	1.59	2.41	3.58	3.98
Age Group											
Under 30	19%	3%	38%	2%	15%	5%	0%	9%	2%	3%	5%
30 - 44	12%	3%	15%	2%	17%	2%	1%	38%	6%	1%	2%
45 - 64	19%	2%	34%	1%	8%	9%	0%	13%	7%	4%	3%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A3-17. Jefferson County, West Virginia

	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
Workers	1.00	1.00	1.42	1.00	1.71	2.32	1.00	1.59	2.41	3.58	3.98
Age Group											
Under 30	19%	3%	38%	2%	15%	5%	0%	9%	2%	3%	5%
30 - 44	12%	3%	15%	2%	17%	2%	1%	38%	6%	1%	2%
45 - 64	19%	2%	34%	1%	8%	9%	0%	13%	7%	4%	3%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A4. Median Wages by Sector (2011 dollars)

Table A4-1. Median Wages by Sector (2011 dollars)

Sector	District of Columbia	Calvert County, MD	Charles County, MD	Frederick County, MD
Construction, Natural Resources and Mining	39,825	40,729	41,576	41,921
Manufacturing	68,222	73,362	46,839	46,839
Transportation & Utilities	52,401	63,131	36,379	36,681
Wholesale Trade	51,970	41,576	56,003	49,257
Retail Trade	25,456	18,634	20,961	18,328
Information	73,313	33,537	70,680	41,680
Finance & Insurance	83,842	36,587	41,576	44,017
Real Estate & Rental/Leasing	54,049	41,921	29,345	28,297
Prof, scientific and technical services; Management	83,153	68,122	80,441	56,575
Admin & waste services	31,441	32,698	25,153	20,365
Education	51,353	46,773	45,821	42,616
Health Services	45,065	31,441	29,345	34,620
Leisure & Hospitality	27,492	8,315	10,394	16,903
Other Services	54,497	20,961	28,926	29,345
Government	91,178	83,153	67,561	61,094
Military	81,459	62,882	46,773	45,821

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A4-2. Median Wages by Sector (2011 dollars)

Sector	Montgomery County, MD	Prince George's County, MD	City of Alexandria, VA	Arlington County, VA
Construction, Natural Resources and Mining	39,825	39,497	31,769	41,576
Manufacturing	64,443	40,873	52,401	98,744
Transportation & Utilities	46,113	46,773	40,729	47,161
Wholesale Trade	52,401	43,239	49,892	41,921
Retail Trade	24,438	24,105	34,315	25,456
Information	64,443	45,318	43,135	66,026
Finance & Insurance	62,882	39,825	58,040	89,082
Real Estate & Rental/Leasing	48,852	40,729	79,422	45,821
Prof, scientific and technical services; Management	75,877	66,185	78,602	83,842
Admin & waste services	28,297	27,249	33,602	36,681
Education	46,773	46,773	41,748	47,161
Health Services	38,777	36,681	42,053	40,537
Leisure & Hospitality	19,550	14,672	19,041	20,788
Other Services	30,547	29,325	41,921	51,039
Government	88,587	71,266	74,331	93,678
Military	57,641	59,737	83,842	90,623

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A4-3. Median Wages by Sector (2011 dollars)

Sector	Clarke County, VA	Fairfax County, VA*	Fauquier County, VA	Loudoun County, VA
Construction, Natural Resources and Mining	38,458	41,576	38,458	38,458
Manufacturing	46,773	72,758	46,773	46,773
Transportation & Utilities	42,969	43,551	42,969	42,969
Wholesale Trade	47,161	52,948	47,161	47,161
Retail Trade	22,009	27,249	22,009	22,009
Information	83,842	74,837	83,842	83,842
Finance & Insurance	46,773	76,368	46,773	46,773
Real Estate & Rental/Leasing	50,411	49,572	50,411	50,411
Prof, scientific and technical services; Management	81,459	92,226	81,459	81,459
Admin & waste services	31,441	35,340	31,441	31,441
Education	41,239	45,734	41,239	41,239
Health Services	36,314	41,576	36,314	36,314
Leisure & Hospitality	16,292	19,074	16,292	16,292
Other Services	25,153	31,441	25,153	25,153
Government	62,364	85,231	62,364	62,364
Military	45,734	66,185	45,734	45,734

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Table A4-4. Median Wages by Sector (2011 dollars)

Sector	Prince William County, VA**	Spotsylvania County, VA***	Stafford County, VA	Warren County, VA	Jefferson County, WV
Construction, Natural Resources and Mining	33,537	32,584	36,681	38,458	38,458
Manufacturing	54,497	48,875	38,777	46,773	46,773
Transportation & Utilities	43,655	31,441	34,585	42,969	42,969
Wholesale Trade	41,576	40,873	25,456	47,161	47,161
Retail Trade	20,365	21,383	18,634	22,009	22,009
Information	47,857	54,476	47,813	83,842	83,842
Finance & Insurance	36,657	36,681	39,825	46,773	46,773
Real Estate & Rental/Leasing	51,970	48,524	49,892	50,411	50,411
Prof, scientific and technical services; Management	70,218	56,593	84,514	81,459	81,459
Admin & waste services	30,547	27,025	31,441	31,441	31,441
Education	46,113	41,921	39,825	41,239	41,239
Health Services	31,182	36,899	31,182	36,314	36,314
Leisure & Hospitality	13,624	10,480	13,616	16,292	16,292
Other Services	28,511	29,529	25,456	25,153	25,153
Government	76,368	48,875	78,995	62,364	62,364
Military	54,497	44,017	50,912	45,734	45,734

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

* Includes the cities of Fairfax and Falls Church

** Includes the cities of Manassas and Manassas Park

*** Includes the city of Fredericksburg

Table A5. Unit Type by Household Type and Income

Table A5-1. District of Columbia

Less than $50,000

Unit Type	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	10%	8%	16%	6%	8%	23%	3%	11%	14%	6%	34%
SF-renter	7%	7%	10%	30%	22%	23%	34%	28%	34%	41%	29%
MF-owner	7%	4%	3%	0%	4%	2%	0%	0%	0%	4%	0%
MF-renter	76%	81%	71%	64%	67%	52%	63%	61%	51%	49%	37%

$50,000 - $74,999

Unit Type	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	15%	29%	24%	10%	22%	19%	59%	33%	34%	24%	44%
SF-renter	4%	17%	10%	22%	10%	27%	16%	20%	22%	41%	48%
MF-owner	18%	12%	6%	0%	6%	2%	0%	3%	0%	8%	0%
MF-renter	63%	43%	59%	68%	62%	51%	25%	44%	44%	27%	8%

$75,000 - $99,999

Unit Type	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	22%	40%	26%	81%	45%	33%	60%	33%	49%	46%	45%
SF-renter	6%	20%	7%	0%	18%	17%	15%	40%	9%	38%	9%
MF-owner	22%	0%	9%	0%	0%	2%	0%	14%	3%	0%	0%
MF-renter	50%	40%	58%	19%	37%	47%	25%	13%	40%	16%	45%

$100,000 - $124,999

Unit Type	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	17%	86%	30%	55%	42%	27%	75%	96%	35%	34%	94%
SF-renter	2%	0%	10%	45%	11%	42%	10%	0%	18%	28%	0%
MF-owner	37%	9%	9%	0%	12%	2%	0%	0%	0%	0%	0%
MF-renter	43%	5%	51%	0%	35%	30%	15%	4%	46%	38%	6%

$125,000 - $149,999

Unit Type	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	25%	100%	30%	0%	63%	57%	75%	40%	80%	59%	56%
SF-renter	2%	0%	9%	0%	7%	25%	10%	12%	0%	32%	12%
MF-owner	40%	0%	19%	0%	9%	2%	0%	11%	0%	3%	0%
MF-renter	32%	0%	41%	100%	21%	16%	15%	37%	20%	5%	31%

$150,000 or More

Unit Type	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	31%	44%	50%	82%	74%	60%	100%	87%	85%	35%	85%
SF-renter	5%	0%	6%	0%	6%	13%	0%	9%	6%	48%	0%
MF-owner	36%	7%	24%	7%	15%	10%	0%	2%	2%	4%	6%
MF-renter	28%	49%	20%	11%	5%	17%	0%	2%	8%	14%	9%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Note: SF = single-family and includes single-family attached and detached units; MF = multi-family

Table A5-2. Arlington County, Virginia and the City of Alexandria, Virginia

Less than $50,000

Unit Type	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	7%	4%	7%	0%	15%	22%	0%	3%	5%	5%	10%
SF-renter	6%	9%	7%	33%	24%	20%	16%	27%	34%	6%	31%
MF-owner	10%	0%	4%	0%	3%	0%	0%	0%	0%	0%	0%
MF-renter	77%	87%	82%	67%	57%	58%	84%	70%	62%	88%	58%

$50,000 - $74,999

Unit Type	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	10%	0%	11%	48%	15%	30%	59%	39%	15%	9%	24%
SF-renter	3%	28%	7%	10%	8%	16%	16%	28%	24%	23%	18%
MF-owner	19%	0%	9%	0%	8%	19%	0%	0%	0%	12%	0%
MF-renter	68%	72%	74%	42%	69%	35%	25%	32%	62%	56%	59%

$75,000 - $99,999

Unit Type	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	17%	10%	11%	100%	31%	36%	60%	34%	24%	75%	24%
SF-renter	5%	0%	9%	0%	38%	9%	15%	30%	8%	14%	42%
MF-owner	22%	14%	7%	0%	9%	4%	0%	8%	37%	0%	0%
MF-renter	57%	76%	73%	0%	23%	51%	25%	28%	30%	11%	35%

$100,000 - $124,999

Unit Type	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	20%	61%	18%	100%	45%	32%	75%	71%	64%	67%	16%
SF-renter	4%	9%	9%	0%	16%	9%	10%	8%	6%	8%	50%
MF-owner	28%	20%	14%	0%	24%	0%	0%	12%	0%	0%	0%
MF-renter	48%	10%	59%	0%	15%	58%	15%	8%	30%	26%	34%

$125,000 - $149,999

Unit Type	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	31%	29%	28%	87%	30%	23%	75%	84%	36%	38%	72%
SF-renter	5%	71%	13%	13%	17%	54%	10%	7%	0%	51%	0%
MF-owner	29%	0%	15%	0%	12%	15%	0%	0%	0%	0%	0%
MF-renter	35%	0%	44%	0%	41%	8%	15%	9%	64%	11%	28%

$150,000 or More

Unit Type	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	40%	58%	54%	31%	74%	46%	100%	90%	100%	50%	95%
SF-renter	4%	35%	7%	69%	6%	33%	0%	9%	0%	34%	0%
MF-owner	21%	8%	14%	0%	11%	7%	0%	1%	0%	3%	0%
MF-renter	34%	0%	25%	0%	9%	14%	0%	1%	0%	13%	5%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Note: SF = single-family and includes single-family attached and detached units; MF = multi-family

Table A5-3. Fairfax County, Virginia, Fairfax City, Virginia, Falls Church City, Virginia and Montgomery County, Maryland

Less than $50,000

	Household Type										
Unit Type	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	24%	19%	34%	21%	25%	37%	18%	31%	33%	34%	36%
SF-renter	9%	18%	14%	26%	18%	16%	45%	27%	20%	20%	39%
MF-owner	13%	4%	4%	5%	2%	1%	0%	3%	8%	1%	0%
MF-renter	54%	60%	48%	48%	54%	45%	36%	38%	39%	45%	25%

$50,000 - $74,999

	Household Type										
Unit Type	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	30%	46%	35%	57%	47%	51%	40%	51%	49%	47%	60%
SF-renter	7%	11%	9%	16%	18%	13%	46%	20%	17%	22%	17%
MF-owner	16%	9%	7%	2%	1%	4%	5%	3%	2%	1%	6%
MF-renter	47%	34%	49%	25%	34%	32%	9%	25%	32%	30%	17%

$75,000 - $99,999

	Household Type										
Unit Type	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	44%	48%	46%	64%	49%	57%	100%	61%	59%	59%	57%
SF-renter	4%	7%	12%	22%	19%	13%	0%	26%	20%	11%	26%
MF-owner	20%	17%	8%	0%	5%	8%	0%	3%	2%	2%	3%
MF-renter	33%	28%	35%	15%	27%	22%	0%	10%	18%	28%	14%

$100,000 - $124,999

	Household Type										
Unit Type	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	48%	48%	57%	56%	64%	62%	55%	72%	78%	79%	69%
SF-renter	8%	13%	10%	6%	14%	11%	28%	18%	11%	12%	23%
MF-owner	18%	8%	6%	8%	6%	6%	0%	2%	3%	6%	0%
MF-renter	26%	30%	28%	29%	17%	21%	17%	8%	8%	3%	8%

$125,000 - $149,999

	Household Type										
Unit Type	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	64%	75%	69%	60%	72%	77%	100%	83%	83%	73%	85%
SF-renter	6%	15%	6%	40%	8%	10%	0%	15%	15%	18%	9%
MF-owner	14%	5%	9%	0%	8%	2%	0%	1%	2%	2%	0%
MF-renter	17%	5%	16%	0%	12%	11%	0%	1%	0%	6%	6%

$150,000 or More

	Household Type										
Unit Type	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	61%	67%	84%	83%	88%	90%	85%	93%	95%	85%	91%
SF-renter	6%	10%	4%	6%	7%	6%	15%	6%	5%	13%	6%
MF-owner	12%	6%	5%	0%	2%	1%	0%	0%	0%	2%	0%
MF-renter	21%	17%	8%	11%	3%	4%	0%	1%	1%	0%	3%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Note: SF = single-family and includes single-family attached and detached units; MF = multi-family

Table A5-4. Remaining Jurisdictions

Less than $50,000

Unit Type	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	35%	29%	46%	23%	29%	34%	16%	37%	38%	31%	42%
SF-renter	13%	20%	15%	29%	29%	26%	48%	30%	30%	35%	37%
MF-owner	4%	1%	1%	1%	2%	1%	0%	2%	2%	0%	0%
MF-renter	47%	50%	37%	47%	40%	39%	36%	31%	31%	34%	21%

$50,000 - $74,999

Unit Type	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	55%	46%	58%	57%	51%	64%	77%	55%	55%	52%	54%
SF-renter	6%	21%	11%	14%	22%	16%	18%	30%	30%	18%	23%
MF-owner	7%	7%	3%	1%	1%	3%	0%	0%	1%	2%	2%
MF-renter	32%	26%	28%	28%	26%	17%	6%	15%	13%	28%	22%

$75,000 - $99,999

Unit Type	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	64%	60%	72%	79%	70%	75%	49%	77%	71%	73%	65%
SF-renter	8%	13%	10%	13%	15%	11%	51%	15%	16%	20%	17%
MF-owner	7%	3%	3%	0%	1%	2%	0%	1%	1%	0%	1%
MF-renter	21%	24%	15%	8%	14%	12%	0%	7%	11%	7%	16%

$100,000 - $124,999

Unit Type	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	74%	83%	82%	76%	80%	84%	96%	85%	84%	71%	61%
SF-renter	6%	8%	8%	13%	11%	12%	4%	12%	10%	13%	27%
MF-owner	5%	2%	3%	0%	3%	1%	0%	0%	0%	0%	1%
MF-renter	15%	6%	7%	11%	7%	3%	0%	3%	6%	16%	10%

$125,000 - $149,999

Unit Type	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	69%	85%	81%	95%	91%	90%	100%	92%	89%	82%	78%
SF-renter	4%	0%	7%	5%	5%	6%	0%	7%	8%	12%	19%
MF-owner	7%	0%	3%	0%	2%	0%	0%	0%	0%	0%	1%
MF-renter	20%	15%	9%	0%	3%	3%	0%	1%	2%	6%	2%

$150,000 or More

Unit Type	Household Type										
	1 adult	1 adult/ 1 child	2 adults	1 adult/ 2 children	2 adults/ 1 child	3 adults	1 adult/ 3+ children	2 adults/ 2+ children	3 adults/ 1+ children	4+ adults	4+ adults/ 1+ children
SF-owner	76%	85%	92%	94%	93%	95%	51%	95%	95%	90%	90%
SF-renter	5%	2%	4%	0%	3%	2%	49%	4%	5%	7%	9%
MF-owner	4%	4%	1%	0%	1%	2%	0%	0%	0%	0%	0%
MF-renter	15%	9%	2%	6%	4%	1%	0%	0%	0%	3%	1%

Sources: 2009-2011 American Community Survey and GMU Center for Regional Analysis

Note: SF = single-family and includes single-family attached and detached units; MF = multi-family

Table A6. Commuting Patterns

Jurisdiction	Commute from Outside Jurisdiction	Commute from Outside Region
District of Columbia	71%	9%
Calvert	23%	15%
Charles	32%	15%
Frederick	33%	25%
Montgomery	37%	10%
Prince George's	46%	19%
Alexandria	77%	4%
Arlington	77%	7%
Clarke	57%	42%
Fairfax*	46%	5%
Fauquier	39%	20%
Loudoun	45%	9%
Prince William**	36%	6%
Spotsylvania***	37%	18%
Stafford	46%	12%
Warren	36%	31%
Jefferson Co WV	38%	33%

Sources: 2010 Census and GMU Center for Regional Analysis
*Includes the cities of Fairfax and Falls Church
**Includes the cities of Manassas and Manassas Park
***Includes the city of Fredericksburg