Connecting to Opportunity:
Access to Jobs via Transit in the Washington, D.C. Region

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"Transit is a critical actor in a complex web of decisionmakers—residents and the public, private and nonprofit sectors—whose actions shape the future of the region."

Findings

An analysis of the public transit systems serving the Washington, D.C. region finds that:

■ **Nearly 90 percent of residents in the Washington region live in neighborhoods with access to transit coverage of some kind, whether bus, Metrorail, or commuter rail.** Coverage rates vary greatly across the region, however, from at or near 100 percent in the District, Arlington, Alexandria and the close-in parts of Montgomery, Prince George's, and Fairfax counties, to smaller shares in Loudoun (72 percent), Prince William (67 percent), and Frederick (41 percent) counties.

■ **Due to broad transit coverage and proximity to job centers, job access via transit is strongest in the District, Arlington, and Alexandria, with access rates dropping based on distance from the core.** However, close-in areas of Montgomery, Prince George's and Fairfax counties can also reach substantial numbers of jobs via transit. Across all jurisdictions, access to employment via transit is higher at the 90-minute commute threshhold than at 60 or 45 minutes, although residents in or near the regional core can still access substantial numbers of jobs at these lower time thresholds.

■ **Transit does a better job providing high-skill residents access to high-skill jobs than it does mid-skill residents to mid-skill jobs and low-skill residents to low-skill jobs.** High-skilled District residents can reach 72 percent (1.1 million) of high-skill jobs in the region via a 90 minute transit ride, while mid-skilled District residents can reach 64 percent (440,000) of mid-skill jobs, and low-skilled residents can reach 62 percent (465,000) of low-skill jobs. This reflects regional labor market dynamics, given the high number and shares of high-skill residents and high-skill jobs in the region. The location of many high-skill jobs in or close to the regional core in areas with strong transit service also contributes to this pattern. Nonetheless, despite the smaller shares, transit also provides access to substantial numbers of good match jobs to low- and mid-skill residents of the District, Arlington, Alexandria, and close-in areas of the inner suburbs.

■ **In many cases, housing costs are out of reach for low- and mid-skill workers in areas identified in this report as offering strong transit access to employment.** Households supported by low- and mid-skill workers can't always afford median rent in transit-rich areas without going above the affordability threshold that housing costs should account for no more than 30 percent of annual earnings. Although the areas in question generally support lower transportation costs by reducing the need for car ownership, wages for low- and mid-skilled workers are low enough that even relatively modest transportation costs are unlikely to offset the housing cost burden.

Public officials, developers and other regional leaders often make land-use, housing and transportation decisions separately. This analysis highlights the importance of acting in an integrated, place-based way to create denser concentrations of transit-accessible jobs and housing (both market rate and affordable) in strategic locations throughout the region. Transportation investments are expensive and require years of planning. Based on the region's growth projections, the current strained transit network and high levels of traffic congestion, the task cannot wait.

Introduction

Metropolitan transportation networks are critical for a region's economic competitiveness. Public transit is a key component of the economic and social fabric of metropolitan areas. While commuting to work is only one reason residents may use a transit system, it is a dominant use: Commutes make up the largest share of transit trips nationwide.[1]

This study examines the question of how effectively transit connects people and jobs within the Washington, D.C. region. Improving transportation connections to employment enhances the efficiency of labor markets for both workers and employers.[2] Years of study, research and practice have tried to address the vexing logistical problems stemming from lack of access to transportation in major metropolitan areas.[3] Today, transportation analysts increasingly consider accessibility to be a better measure of system performance than traditional mobility.[4] It is at least as important for metropolitan residents to be able to access a range of activities, such as jobs, via the transportation system, as it is for systems to simply move vehicles faster and reduce travel times.[5]

One important way workers to get to work is via public transit. While three out of four commutes occur alone in a car, recent statistics show that the share of Americans commuting to work via public transit grew during the 2000s for the first time in decades.[6]

A high-quality public transit network can allow employers to benefit from the clustering and agglomeration of people and businesses, and thereby raise productivity in metro areas. One analysis recommends using access to jobs and labor as a measure of the economic benefit of transportation to metropolitan areas.[7] Transit also supplies travel choices for workers, and is thus especially important to populations that can't afford a car or choose not to have one, perhaps because they live in a high-density, transit-rich neighborhood. In some metropolitan areas, transit can help workers avoid severe rush hour traffic congestion, and reduce the costs of their commutes relative to the costs of owning and operating a car.[8] Moreover, as long-run gasoline prices continue to rise, transit use is predicted to increase as well.[9]

The effectiveness of transit depends upon its reach, frequency, and where it goes—issues that this paper will explore. Of course, transit's connective ability is also dependent upon many other variables outside of transit system design, such as the density of commercial and residential development, where people choose to or can afford to live, where jobs cluster, and whether residents have the right skills for available jobs. The paper also reviews these factors as important context for understanding transit's role and potential in supporting a robust metropolitan economy.

In addition to the transit network, a complex web of private-sector investments, governmental decisions and public attitudes shape the outcomes discussed in this report. Strategically placed bus and rail lines with frequent service are critical, but their ability to effectively connect people to jobs depends upon larger growth patterns, such as the extent to which households and jobs are centralized or decentralized and located in low- or high-density developments. Transit most effectively serves areas with dense population and development.[10]

Research presented here is an adaptation of a 2011 Brookings study, *Missed Opportunity: Transit and Jobs in Metropolitan America*, which reviewed the transit-jobs connection in the nation's largest 100 metropolitan areas. This study uses the detailed database of schedule and geospatial data of transit systems in the Washington region developed by the Brookings Metropolitan Policy Program, combined with analysis of residents' demographic characteristics, regional development patterns, and the types of jobs located in the region.

This report begins by describing the data and methods used to examine transit access and commutes in the Washington, D.C. region. After describing background information on transit usage and population and employment patterns in the region, the report presents a series of measures that characterize transit access and employment opportunities for residents at multiple geographies, including jurisdictions and sub-jurisdictional areas.[11] The report concludes with a range of implications and recommendations for policymakers and other regional stakeholders.

Methodology

This report combines detailed data on employment, transit systems, and household demographics to examine transit accessibility in the Washington region. With some exceptions (noted below and in the Technical Appendix), this report uses the same data sources and methodological specifications as the *Missed Opportunity* report. For a complete description of that report's methodology, please read that report's Appendix 1.

Please see Appendix 2 in this report for a reference map of the region, showing the jurisdictions and subjurisdictional geographies used in the analysis. When possible, the report analyzes data at subjurisdictional geographies within counties called Public Use Microdata Areas (PUMAs). PUMAs are geographic areas that contain populations of 100,000 or more. The use of PUMAs allows for more finely-grained analysis of large jurisdictions.

A specialized GIS extension called *Traffic Analyst* was used to create a model that analyzed travel time via transit between census block group (origin) and every census tract (destination) within the Washington metropolitan area.[12] The model analyzes the morning commute–between 6 a.m. and 9 a.m.–on a Monday. It assumes a traveler departs from the origin every five minutes (using random times within each interval) and combines the results of these 36 trips to create an average travel time to each destination. The model accounts for walking times and speeds (from the origin to the transit stop, between transit stops when transferring, and between the final transit stop and the destination centroid) as well as in-transit time.

Combining the results of the transit model with demographic and employment data, the analysis constructs four primary metrics:

Coverage: the share of working-age residents living in block groups that are considered "served" by transit (i.e., block groups with access to at least one transit stop within 3/4 mile of their population-weighted centroid).

Service frequency: the median "headway," or wait time, for morning rush hour transit service in a block group. The overall service frequency for the region, jurisdictions and smaller areas is calculated as the median of the typical headways in covered block groups, weighted by their working-age populations.

Job access: the number and share of metropolitan jobs the typical working-age resident can reach via transit in 90, 60, and 45 minutes. This measure is only calculated for neighborhoods that can reach at least one other destination within 90 minutes. Job access by region, jurisdiction, and smaller areas is calculated as the average share of jobs reachable within 90 minutes across block groups with transit coverage, weighted by block group working-age population.

"Good match" jobs: the number and share of metropolitan jobs that a resident can reach via transit in 90, 60, or 45 minutes for which he or she has a similar educational background as current workers. A "low-skill good match" job is one held by a worker with a high school diploma or less that a working-age resident with the same level of education can reach via transit; a "mid-skill good match" job is one held by a worker with some college experience or a two-year college degree that a working-age resident with the same level of education can reach via transit; and a "high-skill good match" job is one held by a worker with a four-year college degree or more that a working-age resident with the same level of education can reach via transit. This is a new measure that was not included in the *Missed Opportunity* report.

A 90 minute commute is longer than the typical commute by car or transit. It represents the upper bound of travel time to work, rather than the average commuter experience. The 90 minute threshold used in this report is designed to offer an inclusive portrait of job access via transit; it is not usually desirable, but it is a choice that some workers make based on their available options. Please see page 13, Box 2, "Establishing a Commute-Time Threshold" in the *Missed Opportunity* report for a more detailed explanation of the 90-minute threshold. This paper and the *Missed Opportunity* paper also report out on job accessibility via transit commutes of 60 and 45 minute thresholds.

Data used in the model primarily comes from data purchased from Nielsen. Data on the working-age population (18 to 64 years old), education attainment (population over 25), and on neighborhood income come from the Nielsen Pop-Facts 2010 Database. Census block groups are assigned to one of three categories based on median household income: low-income (less than 80 percent

of the metropolitan area's median income—less than $69,548), middle-income (80 to 120 percent of the metro median income—between $69,548 and $104,322), or high-income (above 120 percent of the metro median income—above $104,322). Data on employment by Census tract and Standard Industry Code are from the Nielsen Business-Facts Database and are current as of the second quarter of 2010.[13]

Data from the 2006-2010 American Community Survey (ACS) 5-year estimates was used to supplement the analysis to examine several topics: commuting patterns, median rental costs, median earnings for jobs by skill level, and educational attainment of workers at the jurisdictional level (the last used to help classify employment by skill level, as described in the technical appendix).[14] For a more detailed explanation of the methodology, please see Appendix 1.

Background on the Washington, D.C. Metropolitan Region

Transit is Widely Used for Commuting

The Washington region has a relatively high rate of transit usage. Fifteen percent (390,000) of the 2.5 million workers in the region use public transportation for their commute, compared to a national average of five percent. Transit usage for commuting to work varies widely between jurisdictions, from a high of almost 40 percent in the District to two percent in Frederick and Loudoun counties. It also varies within jurisdictions: residents of close-in areas of Montgomery, Prince George's and Fairfax counties have higher transit rates than those in farther-out areas of those counties.[15] Please see Appendix 3 for more information on commutes by mode of transportation at the jurisdictional and subjurisdictional level.

The Washington Metropolitan Area Transit Authority (WMATA), which operates the Metrorail and Metrobus systems, accounts for more than 85 percent of passenger rides on both heavy rail and bus rides in the region. In 2010, WMATA had 287 million Metrorail passenger boardings, and 128 million bus passenger boardings, for a total of 416 million passenger trips.[16] Maryland and Virginia commuter rail systems and suburban bus services round out the transit network and provide critical additional services. Please see Appendix 4 for ridership information by transit system.

Transit users in the region have longer commutes than those who drive alone or carpool, as shown in Table 1. Arlington County residents have the shortest transit commute at 34 minutes (and also the shortest driving commute times), while Frederick County has the longest transit commute at 84 minutes. (Times refer to one leg of the commute, not the round trip.)

Transit serves commuters up and down the earnings scale in the Washington region, although transit users are more likely to live in households under or close to the poverty line than those who drive alone or carpool. Regionally, seven percent of transit commuters live in households with earnings below 150 percent of the federal poverty line, compared to five percent of those who drive alone

Table 1. Median Travel Time in Minutes for Commuters by Mode by Jurisdiction, 2006-2010

	All Commuters	Drove Alone	Carpooled	Public Transportation
D.C.	29	26	26	37
Arlington	27	24	25	34
Alexandria	30	26	28	42
Montgomery	33	30	34	50
Prince George's	36	32	35	52
Fairfax	30	27	32	55
Frederick	34	33	41	84
Loudoun	33	32	35	73
Prince William	34	33	40	70

Source: American Community Survey, 2006-2010 5-year estimates

or carpool. This pattern holds for most jurisdictions: for example, in the District, 14 percent of transit commuters are in households with have earnings below 150 percent of the federal poverty line, compared to eight percent of car commuters (including those who drive alone and carpool).[17]

However, many transit commuters are middle- to high-income. Median incomes of individual workers who commute via transit range from about $40,000 in Prince George's County and the District to $75,000 to $85,000 in Loudoun and Prince William counties. In some jurisdictions (Fairfax, Frederick, Loudoun, and Prince William counties), median earnings per transit commuter are higher than earnings for those who drive or carpool. For example, in Fairfax County, the median earnings per transit commuter is $67,000, compared to $57,000 for those who drive alone and $46,000 for those who carpool.[18]

Most workers who commute via public transit live in households with at least one car, although households with more than one worker may rely on a combination of auto use and transit. About 10 percent of households in the region (185,000) do not own a car. Ninety-four percent of these carless households live in areas served by public transportation. Regional car ownership rates suggest that the decision of whether or not to own a car is driven by multiple factors, including cost, neighborhood type and availability of transit options. Almost one-quarter (23 percent) of low-income households in the region are without a vehicle, but only 7 percent of mid-income households and 2 percent of high-income households lack a vehicle, indicating that the cost of owning and maintaining a car is probably a factor. On the other hand, the share of households without cars is much higher in the District (36 percent) and other close-in neighborhoods such as Silver Spring/Takoma Park (15 percent), with their relative density and transit options, than in less dense, more outlying parts of the region.[19] Please see Appendix 5 for additional car ownership rates by jurisdiction and PUMA.

The Majority of Jobs and People are Located Relatively Close to the Regional Core, but Substantial Numbers are also in More Outlying Areas

As the region is defined in this paper, the population was 4.9 million in 2010, with 2.9 million jobs. (Please see Table 2.) The District comprises 12 percent of the region's total population with about 600,000 residents, and the three large inner suburban counties of Montgomery, Prince George's, and Fairfax total about 60 percent of the region's population when combined.

Similarly, while jobs are located throughout the region, they cluster in specific areas, and within a few jurisdictions. The District of Columbia and Fairfax County each house almost one-quarter of the region's jobs, or about 660,000.
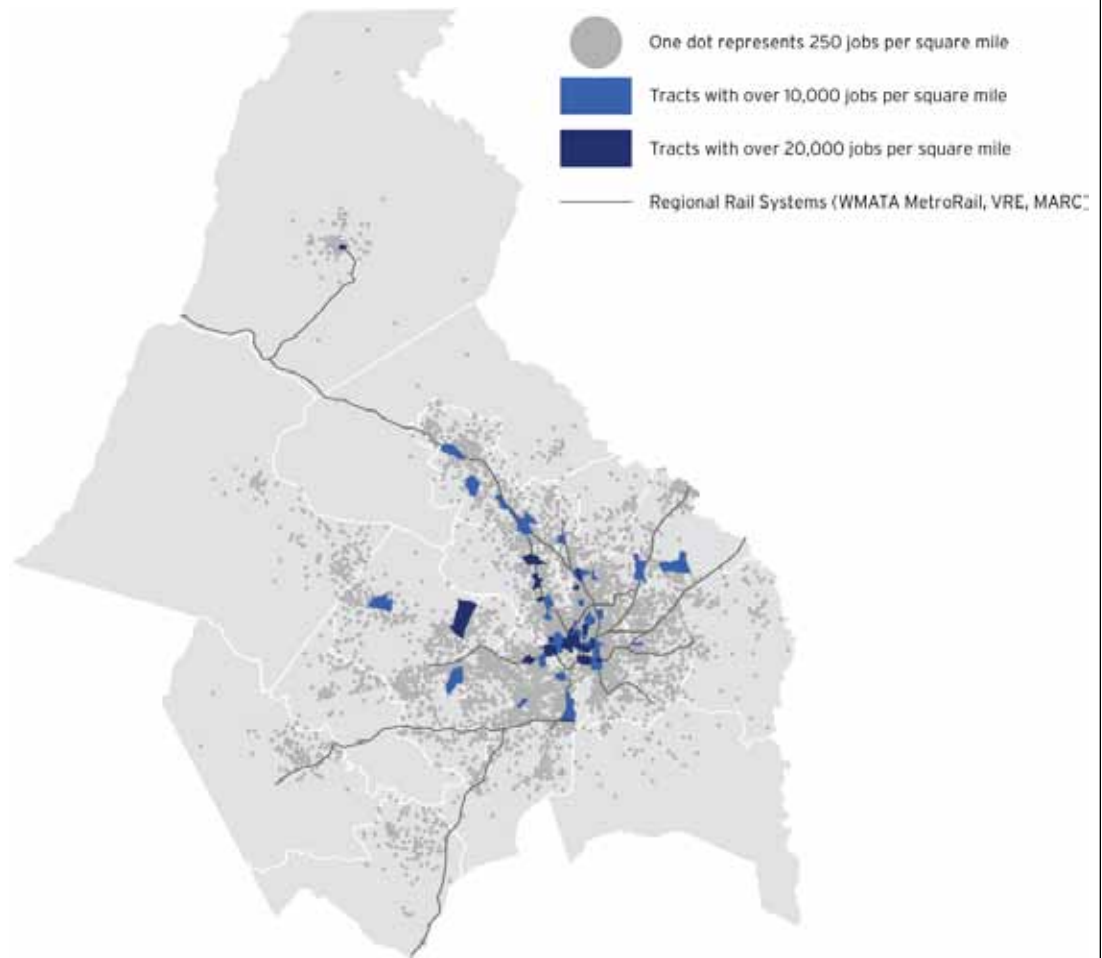
As Figure 1 shows, jobs are concentrated in the core of the region and along major transportation corridors radiating outward from the core, although many jobs are also located in fairly low-density, suburban style developments. Almost 50 percent of the region's jobs are located within the Beltway.

Table 2. Population and Number of Jobs by Jurisdiction, Washington Region, 2010

	Total Population	Share of Total	Number of Jobs	Share of Regional Jobs
D.C.	601,723	12%	660,384	23%
Arlington	207,627	4%	133,036	5%
Alexandria	139,966	3%	101,831	4%
Montgomery	971,777	20%	529,977	18%
Prince George's	863,420	18%	387,320	13%
Fairfax County	1,116,623	23%	666,216	23%
Frederick	233,385	5%	110,521	4%
Loudoun	312,311	6%	138,118	5%
Prince William	454,096	9%	161,784	6%
Region	**4,900,928**	**100%**	**2,889,187**	**100%**

Source: U.S. Census Bureau 2010 Decennial Census, Nielsen Business-Facts Database

Figure 1. Location of Jobs in the Washington, D.C. Region

One dot represents 250 jobs per square mile

Tracts with over 10,000 jobs per square mile

Tracts with over 20,000 jobs per square mile

Regional Rail Systems (WMATA MetroRail, VRE, MARC)

Source: Nielsen Business-Facts Database

Most but not all of the census tracts with high job densities are immediately adjacent to regional rail systems, whether Metro or commuter rail.

Both the Population and the Employment Base Skew Towards High-Skills

Table 3 shows that the Washington, D.C. region is home to a highly educated population. Nearly half of residents over the age of 25 have a Bachelor's degree or higher, compared to a national rate of 28 percent. Residents with a four-year degree or higher make up over half of the total population in Arlington, Alexandria, Fairfax, Loudoun, and Montgomery counties. The District is also home to a highly-educated population (almost 50 percent have a bachelor's degree or higher), but 35 percent have a high school diploma/equivalent or less. Prince George's County has the highest share and numbers of residents with low educational levels.

The regional labor market skews towards high-skilled jobs. Of the nearly 3 million jobs in the region, half (1.45 million) are high-skill, meaning they are held by workers with a Bachelor's or advanced degree. Twenty-four percent of jobs (686,000) are mid-skill and 26 percent (749,000) are low-skill. This distribution is not uniform throughout the region. While every jurisdiction has high-, medium- and low-skills jobs, jobs at different skill levels concentrate in different areas. Please see Table 4. Note that jobs in a given jurisdiction can be filled by residents of any jurisdiction.

Table 3. Educational Attainment of Residents by Jurisdiction

	Population Over 25 by Education Attainment			Share of Jurisdiction's Population by Education Attainment		
	Low	**Mid**	**High**	**Low**	**Mid**	**High**
D.C.	142,830	72,081	196,220	35%	18%	48%
Arlington	29,017	21,435	110,616	18%	13%	69%
Alexandria	24,777	20,057	63,488	23%	19%	59%
Montgomery	151,513	132,881	365,018	23%	20%	56%
Prince George's	221,515	151,500	155,285	42%	29%	29%
Fairfax	150,797	145,426	417,979	21%	20%	59%
Frederick	54,291	43,144	52,991	36%	29%	35%
Loudoun	39,041	42,943	109,992	20%	22%	57%
Prince William	94,778	77,958	95,343	35%	29%	36%
Region	**908,559**	**707,425**	**1,566,932**	**29%**	**22%**	**49%**

Low education attainment = high school diploma/equivalent or less

Mid education attainment = some college or an Associate's degree

High education attainment = Bachelor's degree or Advanced degree

Source: Nielsen Pop-Facts 2010 Database

Jurisdictions with the most jobs overall (the District and Fairfax, Montgomery, and Prince George's counties) account for the highest numbers of jobs at all skill levels. Thus, even when they have lower proportions of jobs at a given skill level than other jurisdictions, their absolute numbers are higher.

High-skill jobs cluster in the core and inner jurisdictions, both in absolute numbers and shares, just as high-skilled residents do. Prince George's County is the only inner jurisdiction with a lower share of high-skill jobs (36 percent) than the regional average. Low- and mid-skill jobs are more dispersed and less concentrated in the core and inner jurisdictions. Prince George's County and the outer suburbs have the highest shares of mid- and low-skill jobs in the region.

Table 4. Jobs in the Washington Region by Skill, 2010

		Jobs by Educational Attainment of Workers					
		Low-Skill		**Mid-Skill**		**High-Skill**	
	Total Jobs	Number	Share	Number	Share	Number	Share
D.C.	660,384	137,324	21%	132,733	20%	390,327	59%
Arlington	133,036	27,582	21%	26,997	20%	78,457	59%
Alexandria	101,831	25,190	25%	21,988	22%	54,652	54%
Montgomery	529,977	128,456	24%	128,017	24%	273,504	52%
Prince George's	387,320	139,503	36%	106,764	28%	141,053	36%
Fairfax	666,216	143,834	22%	151,276	23%	371,106	56%
Frederick	110,521	38,216	35%	33,708	30%	38,597	35%
Loudoun	138,118	47,024	34%	36,894	27%	54,200	39%
Prince William	161,784	62,063	38%	47,439	29%	52,281	32%
Region	**2,889,187**	**749,192**	**26%**	**685,816**	**24%**	**1,454,177**	**50%**

Low education attainment = high school diploma/equivalent or less

Mid education attainment = some college or an Associate's degree

High education attainment = Bachelor's degree or Advanced degree

*Source: Nielsen Business-Facts Database*

Findings

A. Nearly 90 percent of residents in the Washington, D.C. region live in neighborhoods with access to transit service of some kind, with relatively frequent rush-hour service.

Transit Coverage

Eighty-eight percent of residents in the Washington region live in neighborhoods with access to transit coverage of some kind, meaning that they live within three-quarters of a mile of at least one transit stop. Coverage varies by neighborhood characteristics, including proximity to the urban core and neighborhood income levels. Neighborhoods and jurisdictions that are in or closer to Washington, D.C. have higher coverage rates. Washington, D.C., Arlington, and Alexandria have 100 percent transit coverage. Regionwide, residents of low-income neighborhoods have higher coverage (98 percent) than

Figure 2. Transit Coverage in the Washington, D.C. Region by Census Block Group, 2010

Block groups with
transit coverage

Block groups without
transit coverage
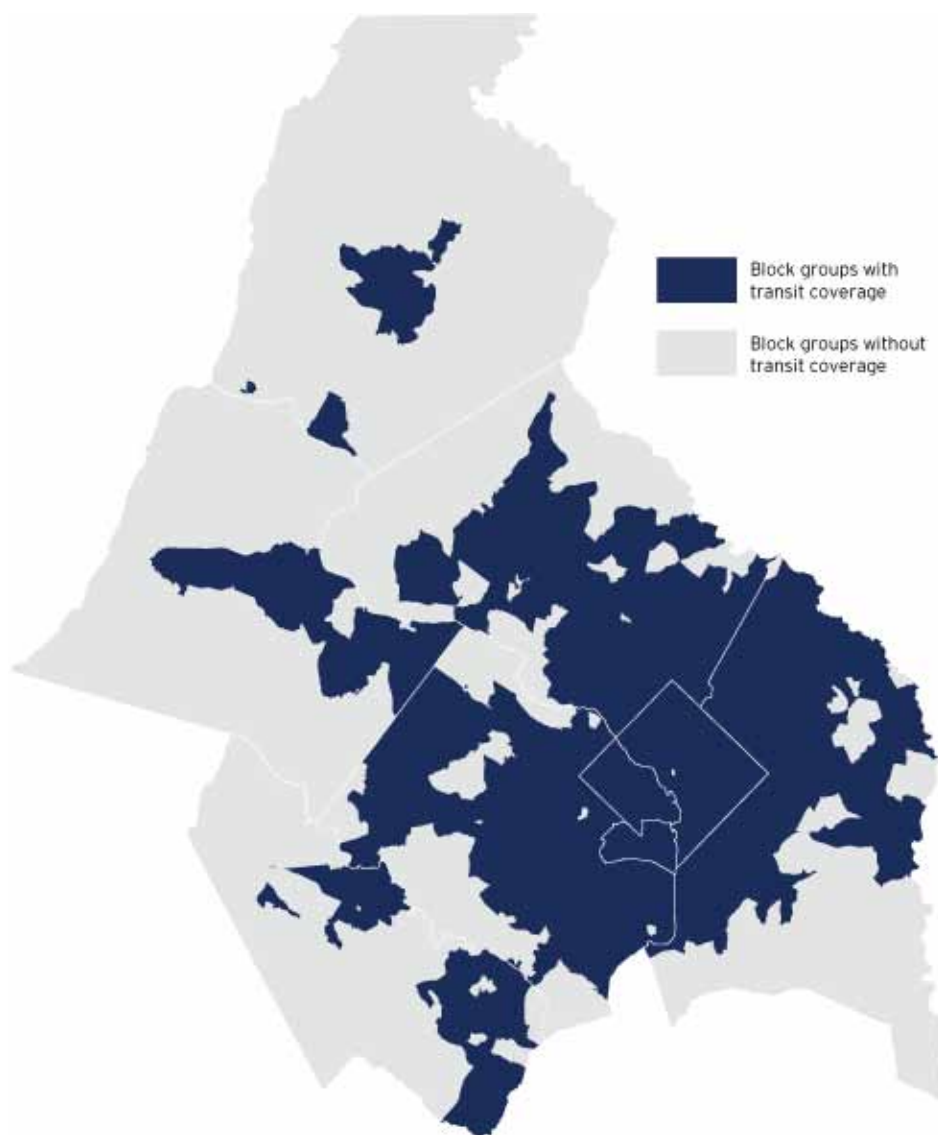
moderate-income neighborhoods (90 percent) and high-income neighborhoods (78 percent). This pattern holds true across all jurisdictions, and is especially pronounced in the outer suburbs.

The three large inner suburban counties of Montgomery, Prince George's, and Fairfax also have high coverage rates, at 95 percent, 89 percent and 92 percent, respectively. Within the counties, rates are lowest in the farther-out areas, at 70 percent in Montgomery County's rural area, 53 percent in southern Prince George's County, and 74 percent in the Centreville-Chantilly area of Fairfax.

With their smaller populations and lower density levels, the outer suburbs have much lower coverage rates, though again, there is variation. Coverage is highest in eastern Prince William County (87 percent), followed by Loudoun (72 percent), western Prince William (51 percent), and Frederick (41 percent). Please see Appendix 6 for more information.

Frequency of morning rush-hour service

Regionally, residents with access to transit see morning rush-hour service once every six minutes. Wait times are generally shorter in closer-in and low-income neighborhoods. In D.C., Arlington, and Alexandria, median rush-hour wait-times are in the three to five minute range.

Median rush-hour wait times for Montgomery, Prince George's, and Fairfax counties are between six and eight minutes. Wait-times in these jurisdictions are shorter in the closer-in areas within the Beltway.

Median rush-hour wait-times are higher in the outer suburbs, ranging from 15 minutes in Prince William County to 18 minutes in Frederick County to 30 minutes in Loudoun County. Within Prince William County, waits are shorter in the eastern portion of the county (13 minutes) than in the western portion (21 minutes). The more infrequent service in outer suburban communities reflects the prevalence of commuter travel via rail and bus. These styles of transit run on fixed schedules with which users are more likely to coordinate their individual commuting schedules. Please see Appendices 6 and 7 for more information.

B. Residents of core jurisdictions (D.C., Arlington, and Alexandria) can reach high numbers of jobs via transit within 90, 60, and 45 minutes, as can residents of close-in areas of the inner suburbs of Montgomery, Prince George's, and Fairfax counties.
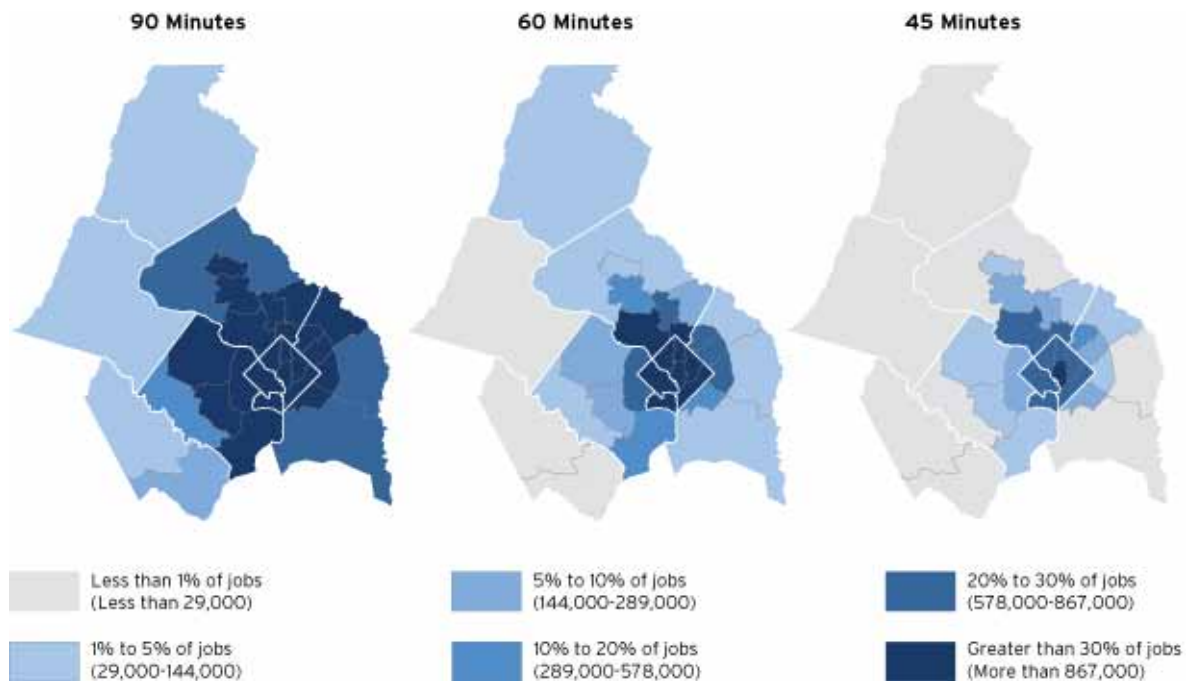
Getting commuters to jobs is only one function of a transit system, but it is arguably its most important. Work commutes make up the largest share of transit trips nationwide.[20] Moreover, as those trips tend to occur during the busiest part of the day, they help reduce congestion on road networks.[21] Transit can compete with other transportation modes if it connects workers with a significant number of jobs in what they regard to be a reasonable and reliable of time. Thus, the share of a metropolitan area's jobs that commuters can reach via transit represents a critical measure of transit quality and workers' access to labor market opportunity.

Figure 3 shows the share of regional jobs that are transit accessible for residents by jurisdiction/subjurisdiction and commute time. For example, residents of the District, Alexandria, Arlington, and many parts of Prince George's, Montgomery, and Fairfax counties can access more than 30 percent of regional jobs via transit within 90 minutes. The farther from the core residents live and the shorter the commute threshold, the lower the percentage of jobs they can reach.

Due to broad transit coverage and proximity to job centers, job access via transit is strongest in the District, Arlington, and Alexandria, with access rates dropping based on distance from the core. Close-in areas of Montgomery, Prince George's, and Fairfax counties can also reach substantial numbers of jobs via transit. Across all jurisdictions, access to employment via transit is higher at the 90-minute commute threshhold than at 60 or 45 minutes, although residents in or near the regional core can still access substantial numbers of jobs at these lower time thresholds. For instance, District residents can reach 67 percent (1.9 million) of the region's 2.9 million jobs via transit in 90 minutes, 42 percent (1.2 million) within 60 minutes, and 28 percent (800,000) within 45 minutes. Combined, residents of Arlington and Alexandria can also reach high shares of jobs via transit: more than 60 percent at 90 minutes, 36 percent at 60 minutes, and 21 percent at 45 minutes.

Of the inner suburban counties, Montgomery County residents can access the highest number and shares of regional jobs via transit at each of the time thresholds, (45 percent of regional jobs at 90 minutes, 19 percent at 60 minutes, and 7 percent at 45 minutes). Prince George's County is next

Figure 3. Share of Regional Jobs Accessible via Transit in 90, 60 and 45 minutes by Jurisdiction and PUMA, 2010

90 Minutes   60 Minutes   45 Minutes

Less than 1% of jobs (Less than 29,000)

1% to 5% of jobs (29,000-144,000)

5% to 10% of jobs (144,000-289,000)

10% to 20% of jobs (289,000-578,000)

20% to 30% of jobs (578,000-867,000)

Greater than 30% of jobs (More than 867,000)

(40 percent of regional jobs at 90 minutes, 15 percent at 60 minutes, and 5 percent at 45 minutes), followed by Fairfax (37 percent of regional jobs at 90 minutes, 10 percent at 60 minutes, and 3 percent at 45 minutes). However, job accessibility ranges widely within each jurisdiction, and residents of close-in neighborhoods in all of the counties are able to reach substantial numbers of jobs via transit at each of the time thresholds, although the numbers do get smaller with shorter transit rides. For instance, residents of Silver Spring/Takoma Park in Montgomery County can reach 59 percent of regional jobs within 90 minutes, residents of College Park/Adelphi in Prince George's County can reach 55 percent within 90 minutes, and residents of the Falls Church area in Fairfax County can reach 52 percent within 90 minutes.

The shares of transit-accessible jobs are much lower in the outer suburbs, in the two to five percent range at 90 minutes, and get smaller at the shorter thresholds. These lower accessibility counts are consistent with the jurisdictions' lower population and employment numbers, longer wait-times for service, and distance from job centers closer to the region's core. The farther out from the core one lives, the less likely the will be to reach employment centers in the core or inner suburbs purely as a matter of time. Please see Appendix 8 for more information.

Table 5 shows the top performing areas in the region (a mixture of jurisdictions and subjurisdictional Public Use Microdata Areas) that provide residents with the greatest access to regional jobs via a 90 minute transit ride, as measured by their "combined access score," based on an area's transit coverage and job access measures.[22] They include all of the District, Arlington, Alexandria, and parts of Montgomery, Prince George's, and Fairfax counties. These areas are mostly, although not exclusively, within the Beltway. Each of these areas also provides access to smaller, but still substantial, numbers of jobs at the 60 and 45 minute time limits.

Table 5. Areas (Jurisdictions and PUMAs) Providing the Greatest Job Accessibility via Transit, 2010

Jurisdiction	Public Use Microdata Area	90 minutes		60 minutes		45 minutes		Combined Access Score	Rank
		Number of regional jobs	Share of regional jobs	Number of regional jobs	Share of regional jobs	Number of regional jobs	Share of regional jobs		
Washington, DC	Downtown-Midtown D.C. (105)	2,063,813	71.4%	1,403,172	48.6%	960,097	33.2%	71.4	1
Washington, DC	North Central D.C. (102)	1,940,123	67.2%	1,264,691	43.8%	840,017	29.1%	67.2	2
Washington, DC	Northeast D.C.-Capitol Hill (103)	1,937,500	67.1%	1,207,686	41.8%	800,832	27.7%	67.1	3
Arlington, VA	n/a	1,916,226	66.3%	1,121,408	38.8%	673,846	23.3%	66.3	4
Washington, DC	West of Rock Creek (101)	1,913,914	66.2%	1,203,320	41.6%	790,637	27.4%	66.2	5
Washington, DC	East of the Anacostia River (104)	1,827,802	63.3%	1,020,460	35.3%	586,675	20.3%	63.3	6
Alexandria, VA	n/a	1,734,924	60.0%	919,382	31.8%	479,364	16.6%	60.0	7
Montgomery County, MD	Silver Spring-Takoma Park (1007)	1,691,922	58.6%	1,023,961	35.4%	462,083	16.0%	58.6	8
Prince George's County, MD	College Park-Adelphi-Chillum (1101)	1,595,260	55.2%	836,680	29.0%	320,965	11.1%	55.2	9
Prince George's County, MD	Bladensburg-Riverdale-New Carrollton (1103)	1,562,585	54.1%	802,069	27.8%	253,895	8.8%	54.1	10
Montgomery County, MD	Kensington-Wheaton-Aspen Hill (1005)	1,551,852	53.7%	838,995	29.0%	230,250	8.0%	53.7	11
Montgomery County, MD	Potomac-Bethesda (1004)	1,543,174	53.4%	869,045	30.1%	417,063	14.4%	51.4	12
Fairfax County, VA	Inside the Beltway-Falls Church (301)	1,492,714	51.7%	587,977	20.4%	163,502	5.7%	51.0	13
Prince George's County, MD	Landover-Walker Mill-Capitol Heights (1104)	1,429,746	49.5%	583,542	20.2%	137,805	4.8%	49.5	14
Prince George's County, MD	Suitland-Hillcrest Heights-Temple Hills (1107)	1,385,448	48.0%	530,515	18.4%	161,190	5.6%	48.0	15
Montgomery County, MD	Rockville-Gaithersburg (1003)	1,262,286	43.7%	469,854	16.3%	150,488	5.2%	42.4	16

C. Transit does a better job of connecting high-skill residents to high-skill jobs than it does connecting low- and mid-skill residents to mid- or low-skill jobs, but still connects low- and mid-skill residents living in centrally located areas to substantial numbers of jobs for which they are likely to be qualified.

Transit's effectiveness in connecting people and jobs depends upon its matchmaking abilities in getting the right people to the right jobs. That is, can people take transit to jobs for which they are appropriate candidates, based on their educational background, aptitudes, and interests? In addition to transit system design, other factors affect transit's ability to be a good matchmaker: the number, location, and types of jobs available and where people live, along with their educational attainment, skills, and work readiness.

We examined the extent to which residents could take transit to jobs where people with similar educational characteristics are employed. "Good match" jobs are those in which the education levels of residents match a job's educational requirements as measured by employers' hiring decisions.

Overall, high-skilled residents can reach higher numbers and shares of "good match" jobs via transit than their low- and mid-skilled neighbors. For instance, high-skilled District residents can reach 72 percent (1,043,000) of all good match jobs in the region via transit in 90 minutes, while mid-skilled District residents can reach 64 percent (437,000) of all good match jobs in the region in the same time period, and low-skilled District residents can reach 62 percent (463,000). Similar patterns play out in the other jurisdictions, with the exception of the outer suburbs, where overall rates of job accessibility are low and the distinctions between the accessibility of types of jobs by skill is more muted.

Table 6 and Figure 4 show the top performing areas that connect residents with good match jobs.[23] All of these "good match" top-performers are also included in the overall job accessibility top-performers. The "good match" ranking includes consideration of job accessibility via transit by skill level and at each of the commuting time thresholds, which reduced the number of top performers from 16 areas to 11.

Transit's greater effective at matching high-skill residents with high-skill jobs is due to several factors. As noted earlier in the paper, the region has high numbers of both high-skilled residents and high-skilled jobs. Forty-nine percent of the region's adult residents over age 25 have a Bachelor's degree or higher; 22 percent are mid-skilled and 29 percent are low-skilled. Fifty percent of regional jobs are high-skill, while 24 percent are mid-skill and 26 percent are low-skill. In other words, transit access to employment replicates the region's general labor market dynamics.

Spatial patterns regarding the location of high-skill jobs and high-skilled residents is also a factor. The jurisdictions with the highest shares of high-skill jobs (D.C., Arlington, Alexandria, Montgomery, and Fairfax) are the same jurisdictions with the highest share of high-skill residents. Three of the five jurisdictions (the District, Arlington, and Alexandria) have fairly densely developed employment centers and are extremely well-served by transit, with 100 percent coverage. Montgomery and Fairfax counties are much larger with variable development patterns throughout, but the close-in areas have high transit coverage rates and job concentrations. However, the location of many (though not all) high-skill jobs in or close to the regional core makes them accessible to residents living in outlying areas, who can rely on the transportation's system radial design to commute in and out of the core. Of course, both Montgomery and Fairfax counties also have less dense, suburban-style job centers and residential developments that are not transit-accessible at all or that involve long trips.

Despite providing greater connectivity to high-skill jobs, transit nonetheless offers access to substantial numbers of low- and mid-skilled jobs for low- and mid-skill residents of the District, Arlington, Alexandria, and close-in inner suburban areas. As shown in Table 6, for example, low-skilled residents of Silver Spring, for example, can reach more than 50 percent (400,000) of regional low-skilled jobs within 90 minutes via transit. Even at shorter time thresholds, the absolute numbers of suitable jobs accessible to low-income Silver Spring residents are still substantial: 220,000 at 60 minutes, and 90,000 at 45 minutes. Using the same area as an example, mid-skilled Silver Spring residents can reach 56 percent (380,000) of regional mid-skill jobs within 90 minutes, 220,000 within 60 minutes, and 100,000 within 45 minutes. Please see Appendix 9 for more information.

The map shows transit is most effective at connecting residents with good match jobs in areas with good transit coverage located close to job centers also well-served by transit, and with at least some relatively dense residential developments. As transit expands in the suburbs (the Silver Line extending

Table 6. Areas (Jurisdictions and PUMAs) Providing Residents with the Greatest Access to Good Match Jobs

Jurisdiction/ Public Use Microdata Area	Regional "Good Match" Jobs Accessible Via Transit - 90 Minutes					
	Low-Skill		Mid-Skill		High-Skill	
	Number	Share	Number	Share	Number	Share
Washington, DC						
West of Rock Creek	455,506	61%	431,704	63%	1,027,322	71%
North Central D.C.	468,575	63%	438,351	64%	1,029,652	71%
Northeast D.C.-Capitol Hill	463,113	62%	438,100	64%	1,035,445	71%
East of the Anacostia River	442,639	59%	414,531	60%	962,629	66%
Downtown-Midtown D.C.	496,336	66%	471,302	69%	1,097,577	75%
Arlington	441,951	59%	429,287	63%	1,039,571	71%
Alexandria	405,391	54%	386,612	56%	940,888	65%
Montgomery County						
Potomac-Bethesda	364,678	49%	346,885	51%	844,889	58%
Silver Spring-Takoma Park	399,482	53%	382,725	56%	912,154	63%
Prince George's County						
College Park-Adelphi-Chillum	391,662	52%	362,914	53%	834,181	57%
Bladensburg-Riverdale-New Carrollton	377,876	50%	350,943	51%	836,231	58%

Jurisdiction/ Public Use Microdata Area	Regional "Good Match" Jobs Accessible Via Transit - 60 Minutes					
	Low-Skill		Mid-Skill		High-Skill	
	Number	Share	Number	Share	Number	Share
Washington, DC						
West of Rock Creek	265,298	35%	257,796	38%	687,814	47%
North Central D.C.	285,728	38%	271,057	40%	705,359	49%
Northeast D.C.-Capitol Hill	271,150	36%	258,040	38%	681,708	47%
East of the Anacostia River	235,653	31%	216,110	32%	556,734	38%
Downtown-Midtown D.C.	316,667	42%	305,615	45%	781,936	54%
Arlington	237,086	32%	233,718	34%	645,335	44%
Alexandria	200,149	27%	188,952	28%	529,122	36%
Montgomery County						
Potomac-Bethesda	195,311	26%	191,018	28%	498,167	34%
Silver Spring-Takoma Park	218,834	29%	220,481	32%	592,318	41%
Prince George's County						
College Park-Adelphi-Chillum	202,105	27%	182,398	27%	434,614	30%
Bladensburg-Riverdale-New Carrollton	190,321	25%	170,642	25%	445,677	31%

Jurisdiction/ Public Use Microdata Area	Regional "Good Match" Jobs Accessible Via Transit - 45 Minutes					
	Low-Skill		Mid-Skill		High-Skill	
	Number	Share	Number	Share	Number	Share
Washington, DC						
West of Rock Creek	163,549	22%	161,485	24%	472,309	32%
North Central D.C.	182,529	24%	170,655	25%	484,964	33%
Northeast D.C.-Capitol Hill	170,168	23%	161,287	24%	471,244	32%
East of the Anacostia River	128,255	17%	117,141	17%	330,295	23%
Downtown-Midtown D.C.	204,881	27%	199,808	29%	561,716	39%
Arlington	134,565	18%	133,277	19%	402,943	28%
Alexandria	103,520	14%	94,552	14%	277,318	19%
Montgomery County						
Potomac-Bethesda	90,277	12%	90,536	13%	244,256	17%
Silver Spring-Takoma Park	91,095	12%	100,291	15%	285,198	20%
Prince George's County						
College Park-Adelphi-Chillum	86,096	11%	75,936	11%	159,730	11%
Bladensburg-Riverdale-New Carrollton	64,855	9%	54,748	8%	141,809	10%

Figure 4. Areas (Jurisdictions and PUMAs) Providing Residents with the Greatest Access to Good Match Jobs

District of Columbia
   101: West of Rock Creek Park
   102: North Central D.C.
   103: Northeast D.C.-Capitol Hill
   104: East of the Anacostia River
   105: Downtown-Midtown D.C.
Arlington
Alexandria
Montgomery County
   1004: Potomac-Bethesda
   1007: Silver Spring-Takoma Park
Prince George's County
   1101: College Park-Adelphi-Chillum
   1103: Bladensburg-Riverdale-New Carrollton

to Dulles Airport, the Purple Line connecting Bethesda and New Carrollton, and the Columbia Pike streetcars in Arlington and Fairfax counties), it will increase transit access on multiple fronts, and likely would result in a map with increased suburban areas highlighted. As discussed earlier in the paper, the location of jobs in the region reflects both centralizing and dispersing tendencies. Nearly one-third of regional jobs are in the core jurisdictions of the District, Arlington, and Alexandria, but another fifty four percent are found in the much larger suburban counties of Montgomery, Prince George's and Fairfax. While many of the jobs in those jurisdictions cluster in close-in areas, the map on page 6 also shows many jobs are dispersed in other parts of the counties characterized by more auto-dependent development patterns. The transit expansions will open up access to jobs in these areas, thus increasing connectivity to jobs both for residents living in farther-out and close-in areas, and of all skill levels.

D. In many cases, housing costs are out of reach for low- and mid-skill workers in areas identified in this report as offering strong transit access to employment.

The federal standard of housing affordability is that housing expenses should account for no more than 30 percent of earnings. Table 7 shows the median rental housing costs, the annual earnings required to afford the median rent, and the median earnings for employed low- and mid-skill workers in the region by PUMA or jurisdiction (earnings data is not available for Loudoun County).

Table 7. Areas (Jurisdictions and PUMAs) with the Greatest Job Accessibility via Transit, Compared with Median Rent and Median Earnings for Low- and Mid-Skill Workers

Jurisdiction/PUMA		Com-bined Access Score	Median Rental Housing Costs	Annual Household Earnings Required to Afford Median Rent*	Affordable to Households with:			
					One Low-Skill Worker	Two Low-Skill Workers	One Mid-Skill Worker	Two Mid-Skill Workers
Washington, D.C.	**Downtown-Midtown D.C. (105)**	**71.4**	**$1,239**	**$49,560**	**No**	**No**	**No**	**Yes**
Washington, D.C.	**North Central D.C. (102)**	**67.2**	**$998**	**$39,920**	**No**	**Yes**	**No**	**Yes**
Washington, D.C.	**Northeast D.C.-Capitol Hill (103)**	**67.1**	**$975**	**$39,000**	**No**	**Yes**	**Yes**	**Yes**
Arlington		**66.3**	**$1,519**	**$60,760**	**No**	**No**	**No**	**Yes**
Washington, D.C.	**West of Rock Creek (101)**	**66.2**	**$1,523**	**$60,920**	**No**	**No**	**No**	**Yes**
Washington, D.C.	**East of the Anacostia River (104)**	**63.3**	**$796**	**$31,840**	**No**	**Yes**	**Yes**	**Yes**
Alexandria		**60.0**	**$1,330**	**$53,200**	**No**	**No**	**No**	**Yes**
Montgomery County, MD	**Silver Spring-Takoma Park (1007)**	**58.6**	**$1,225**	**$49,000**	**No**	**No**	**No**	**Yes**
Prince George's County, MD	**College Park-Adelphi-Chillum (1101)**	**55.2**	**$1,119**	**$44,760**	**No**	**Yes**	**No**	**Yes**
Prince George's County, MD	**Bladensburg-Riverdale-New Carrollton (1103)**	**54.1**	**$1,064**	**$42,560**	**No**	**Yes**	**No**	**Yes**
Montgomery County, MD	**Kensington-Wheaton-Aspen Hill (1005)**	**53.7**	**$1,379**	**$55,160**	**No**	**No**	**No**	**Yes**
Montgomery County, MD	**Potomac-Bethesda (1004)**	**51.4**	**$1,677**	**$67,080**	**No**	**No**	**No**	**Yes**
Fairfax County, VA	**Inside the Beltway-Falls Church (301)**	**51.0**	**$1,392**	**$55,680**	**No**	**No**	**No**	**Yes**
Prince George's County, MD	**Landover-Walker Mill-Capitol Heights (1104)**	**49.5**	**$1,084**	**$43,360**	**No**	**Yes**	**No**	**Yes**
Prince George's County, MD	**Suitland-Hillcrest Heights-Temple Hills (1107)**	**48.0**	**$1,078**	**$43,120**	**No**	**Yes**	**Yes**	**Yes**
Montgomery County, MD	**Rockville-Gaithersburg (1003)**	**42.4**	**$1,446**	**$57,840**	**No**	**No**	**No**	**Yes**
Montgomery County, MD	East Montgomery County (1006)	38.7	$1,444	$57,760	No	No	No	Yes
Fairfax County, VA	Central-Fairfax City (303)	38.4	$1,711	$68,440	No	No	No	Yes
Fairfax County, VA	I-95 Corridor (302)	37.5	$1,402	$56,080	No	Yes	No	Yes
Montgomery County, MD	Germantown (1002)	31.1	$1,416	$56,640	No	No	No	Yes
Prince George's County, MD	Northern Prince George's (1102)	30.5	$1,209	$48,360	No	Yes	No	Yes
Fairfax County, VA	Reston-Great Falls-Vienna (305)	29.8	$1,602	$64,080	No	No	No	Yes
Prince George's County, MD	East Central Prince George's (1105)	19.1	$1,652	$66,080	No	Yes	No	Yes
Montgomery County, MD	Rural Montgomery (1001)	18.6	$1,459	$58,360	No	Yes	No	Yes
Fairfax County, VA	Centreville-Chantilly-SW Fairfax (304)	12.9	$1,555	$62,200	No	No	No	Yes
Prince George's County, MD	Southern Prince George's (1106)	12.3	$1,386	$55,440	No	Yes	No	Yes
Prince William County, VA	Eastern Prince William (502)	4.5	$1,327	$53,080	No	Yes	No	Yes
Prince William County, VA	Western Prince William-Manassas (501)	0.9	$1,330	$53,200	No	Yes	No	Yes
Frederick County, MD		0.7	$1,133	$45,320	No	Yes	No	Yes

Bold indicates PUMAs with top job accessibility via transit
* Assuming that no more than 30% of household earnings should go towards housing
Earnings data not available for Loudoun County
* Source: Median rental costs and earnings: U.S. Census Bureau American Community Survey, 2006-2010 5-year estimates[24]

Median earnings for low-skill workers living in the areas identified in the table range from about $22,000 to $42,000, with median earnings for mid-skill workers ranging from about $35,000 to $53,000. Median rents range from about $800 to $1,700 per month. Based on the federal housing affordability threshold, households need annual earnings ranging from about $32,000 to $67,000 in order to avoid housing costs burdens.

Households with one low-skill worker could not afford the median rent in any area within the region. Annual earnings fell short of the housing affordability threshold by a wide range: about $1,300 in the District east of the Anacostia River; $14,000 in Bladensburg; $25,000 in Alexandria, and $42,000 in Potomac-Bethesda. Households with two low-skill workers could afford housing in some parts of the District, all neighborhoods in Prince George's County and Prince William, as well as rural Montgomery County, Frederick County, and Fairfax County's I-95 corridor. However, these affordable neighborhoods may not provide the best access to jobs via transit. Consider the sixteen areas identified in Finding B with the greatest transit access to jobs—nine of these 16 areas are not affordable to households with two low-skill workers (the high access areas in Montgomery and Fairfax counties as well as Arlington and Alexandria).

Households supported by one mid-skill worker could afford housing in three areas: the Suitland area of Prince George's County and east of the Anacostia River or the Northeast neighborhoods of the District. All of these areas are PUMAs with high numbers of transit accessible jobs. As with low-skill workers, annual earnings fell short of the housing affordability threshold by a range: about $500 in Landover; $4,000 in northern Prince George's County, $18,000 in Rockville-Gaithersburg; and $26,000 in central Fairfax County-Fairfax City. Households with two mid-skill workers could afford housing in all of the areas.

Based on median wages and rental costs, households with one high-skill worker can afford to live in any PUMA in the region.

As others have noted, a fuller picture of housing affordability also includes transportation costs, since transportation is a major household expense. Housing prices are driven by location and proximity to jobs and amenities, factors which also have a major bearing on transportation costs. Residents of lower-density auto-dependent communities are likely to have higher transportation costs, driven by car ownership, than those living in more densely-developed areas with increased options for walking, biking and transit that can replace or supplement auto use.[25] The areas highlighted in the table are mostly the types of neighborhoods that support lower transportation costs. However, the median wages for low- and mid-skilled workers are low enough that even low transportation costs are unlikely to offset the housing cost burden. For a complete table detailing median earnings and rental housing affordability please see Appendix 10.

DISCUSSION

Public transit is a major asset in the Washington region. It connects hundreds of thousands of workers with employment and provides residents with access to recreation and goods and services. The region's extensive network of transit options—commuter rail, subway, and buses—is the result of massive investments and planning on the part of the region and individual jurisdictions over decades. Indeed, the interstate compact establishing the Washington Metropolitan Area Transit Authority in 1967 stands as a signature achievement of regional cooperation.

Major transit, redevelopment projects and planning efforts currently underway will have profound effects on the region, such as the Metrorail expansion to Dulles Airport and the redevelopment of Tyson's Corner in Fairfax County and of White Flint in Montgomery County. Other efforts would also increase connectivity, such as the light-rail Purple Line linking Montgomery and Prince George's counties, Montgomery County's proposed 160-mile bus rapid transit system, and the proposed Columbia Pike streetcar in Arlington and Fairfax counties.

Yet, transit struggles on several fronts. Plans and infrastructure investments to develop the Metro system laid out decades ago designed to bring residents from outlying areas into and out of the core do not match more recent growth and development patterns, which require more suburb-to-suburb connections. Metrorail currently faces challenges in meeting current ridership demands at peak times at certain stations, and is planning how to meet the needs of a region projected to grow in both population and jobs. And maintaining adequate funding for ongoing operations and maintenance, in addition to system expansion, is a major challenge.[26]

Another challenge is that many of the factors that affect transit's effectiveness lie outside of the authority of any transit agency. The foundation of transit's effectiveness is its reach, frequency, and reliability—issues which an adequately-funded and well-run transit agency can and should address. But transit agencies do not control the choices that households and employers make about where to

locate, the stock and location of affordable housing, developers' decisions about where to site their commercial, residential and industrial projects, or the development of industry clusters that may concentrate jobs of particular types or skill levels in one area. Nor is transit the only barrier to or enabler of employment. Residents of the eastern half of the District and close-in Prince George's County have strong transit access to jobs at all skill levels, yet these parts of the region have higher-than-average unemployment and poverty rates. Transit can better connect residents to employment if residents have the appropriate skills and educational credentials for the types of jobs readily accessible via transit – factors related to education, workforce development and economic development. While transit agencies do have some relationship with economic development efforts, they typically have little to no interaction with education and workforce development institutions.

In short, transit is a critical actor in a complex web of decisionmakers—residents and the public, private and nonprofit sectors—whose actions shape the future of the region.

RECOMMENDATIONS

Public officials, developers, and other regional leaders often make land-use, housing, and transportation decisions separately, and this analysis highlights the importance of acting in an integrated, place-based way. Indeed, one of the major findings related to transit's ability to connect low- and mid-skill residents to employment highlights the shortage of affordable housing located near transit and job centers. A number of actors within the region can play constructive, problem-solving, and active roles to shape the region's transit networks and development patterns so that it remains an attractive and competitive place to live and work. Strong projected job and population growth are likely to put continued pressure on housing affordability in the region, particularly those areas with access to high quality transit service. It should be a high priority for all new transit service to preserve sites for affordable housing and to create incentives to preserve and create new affordable housing options.

1. Two inter-related initiatives led by the Metropolitan Washington Council of Governments (COG)—Region Forward and updated Regional Activity Centers—provide platforms for regional cooperation and action by individual jurisdictions and other stakeholders. Regional leaders from all sectors should embrace these initiatives, and carry the principles into their own state and local work regarding housing, land use, and transportation.

    A. The Region Forward initiative is designed to promote a more accessible, sustainable, and prosperous region. Key goals relate to concentrating employment and affordable housing growth in Regional Activity Centers.

    B. The updated list and definition of Regional Activity Centers (locations that will accommodate the majority of the region's growth in the coming decades) is designed to make the Regional Activity Center framework more useful to local officials and other stakeholders in making land-use, housing, and transportation policy and decisions.

The Metropolitan Washington Council of Governments and the Greater Washington 2050 Coalition launched the Region Forward initiative in 2008 in order to "help the region meet future challenges like accommodating two million more people by 2050, maintaining aging infrastructure, growing more sustainably, and including all residents in future prosperity."[27] A 2010 initial report laid out a series of goals related to land-use, transportation, housing, and education, and a 2012 baseline report identified the region's status on those goals, establishing a baseline for measuring progress in the future.[28] Participation in developing the Region Forward initiative has been broad-based, including elected and appointed officials from all the member jurisdictions and multiple stakeholders from the private and nonprofit sectors.

Many of Region Forward's goals center on the Regional Activity Centers (RACs), which include existing urban centers, employment centers, priority growth areas, traditional towns, and transit hubs. There are 136 RACs in the proposed update, which awaits final approval by the Board of the Council of Governments.[29] The Council of Governments is beginning a Strategic Investment Plan to help local leaders strengthen RACs, tailored to the market strength and physical characteristics of particular RACs (i.e., recognizing that there is no one-size-fits-all approach).

A number of Region Forward's goals closely relate to this report's findings regarding transit accessibility. They are listed below, along with the baseline report's assessment of whether making progress on the goal is a minor, moderate or major challenge.

➤ Beginning in 2012, capture 75 percent of the square footage of new commercial construction and 50 percent of new households in Regional Activity Centers.
  • Major challenge.
➤ The region's transportation system will give priority to management, performance, maintenance and safety of all transportation modes and facilities.
  • Major challenge.
➤ Transportation investments [highway and transit] will link Regional Activity Centers / All Regional Activity Centers will have transit access.
  • Moderate challenge.
➤ By 2020, the housing and transportation costs in Regional Activity Centers will not exceed 45 percent of area median income.
  • Moderate challenge.
➤ Beginning in 2012, at least 80 percent of new or preserved affordable housing units will be located in Regional Activity Centers.
  • Major challenge.
➤ Beginning in 2012, the region will dedicate 15 percent of all new housing units to be affordable–or a comparable amount of existing housing units through rehabilitation or preservation efforts–for households earning less than 80 percent of the regional median income.
  • Moderate challenge.
➤ Beginning in 2012, the region will maintain a minimum of 10 percent of housing stock affordable to households earning less than 80 percent of regional median income.
  • Major Challenge.

Regional leaders from the public, private and nonprofit sectors should actively participate in the Region Forward process to further these goals. Within their own jurisdictions, state and local leaders should align their strategies and investments in transit, economic development, and housing. Affordable housing for low- and mid-skill workers near transit should be a major priority.

2. State and local transportation agencies and WMATA should utilize the analysis and findings of the Transportation Planning Board's (TPB) 2010 "Aspirations Scenario" when considering projects for the TPB's Financially Constrained Long-Range Transportation Plan.
The Transportation Planning Board of the National Capital Region (TPB) is the federally designated body charged with coordinating transportation plans for the region. Members include representatives of state and local governments and the Washington Metropolitan Area Transit Authority (WMATA), which operates Metrorail and Metrobus.

The TPB carries out a number of initiatives. It annually updates the Financially Constrained Long-Range Transportation Plan (CLRP), which identifies the major transportation projects and programs that the region anticipates can be funded and built between now and 2040. Because the plan is fiscally constrained, it is not a wish list, and does not include unfunded projects. The TPB is also in the process of developing a Regional Transportation Priorities Plan (RTPP). The purpose of the RTPP is to identify 10 to 15 transportation strategies as top priorities for TPB's goals for economic opportunity, transportation choices, system safety and efficiency and environmental quality.

In 2010, the TPB released a study examining a range of policy options to address the region's growing congestion and create a "regional land use and transportation 'aspirational' vision." The vision includes the following goals most relevant to this report: developing "economically strong regional activity centers with a mix of jobs, housing, services, and recreation in a walkable environment" and "a web of multi-modal transportation connections with provide convenient access."[30] The report estimated the impact of several land-use and transportation changes working in concert with each other: a regional network of toll lanes, a regional bus rapid transit network, and concentrating growth in mixed-use activity centers around existing and planned transit. These changes together resulted in dramatically reduced road congestion and increased trips via transit, biking, and walking. The effects of the changes in land-use policy were also estimated separately. The scenario assumed that seven percent of the projected jobs and households in 2030 would be relocated into targeted growth areas, and found that such a change, on its own, would

significantly increase transit usage over baseline projections. The report also noted that created mixed-use centers and transit-accessible jobs throughout the region would likely balance transit usage geographically, allowing for less congestion, more reverse commuting, and increased transit use without new infrastructure. The report also sounded a cautionary note: while increased transit use without new infrastructure presents attractive cost-savings and efficiencies, it may also overload the transit system.

As the TPB works with state and local agencies to develop transportation priorities in the future, it should look the potential of land-use changes and transit enhancements identified in the Aspirations scenario to shape growth patterns in the region and improve transportation options.

Some caveats are in order about the TPB's role. It operates in a complex political environment, with two states and the District, strong local governments and the federal presence. Land-use decisions are controlled by local jurisdictions, not a regional body, and transportation funding even to operate the existing system is a major challenge. A recent TPB report noted: "As growth in our region continues to place heavier demands on our transportation network, decision-makers will be challenged to make critical improvements to roads, public transportation, and pedestrian and bicycle facilities while at the same time funding is becoming more limited."[31] Nonetheless, the TPB has a clear leadership role in addressing transportation challenges facing the region. Its membership includes the relevant actors and it is designed to serve as the forum to determine regional transportation plans and priorities.

3. Concentrate development around underutilized Metrorail stations.

Many areas and metro stations in the region (such as the Rosslyn-Ballston corridor) are leaders in transit-oriented development, or are undergoing major transformations to become more dense and take greater advantage of their transit connections (such as White Flint and Tyson's Corner). The areas around other stations, however, do not make full use of their locational advantages by providing easy and pedestrian-friendly access and a range of goods, services, and housing choices.[32] Many of these stations are on the eastern side of the District and in Prince George's County. In redeveloping these areas, leaders should pay special attention that current residents are not priced out by increased housing values, since many transit-accessible, mixed-use communities in the region have relatively high housing prices.[33] Although concerning from a social equity perspective, the high housing prices signal high levels of demand for these types of neighborhoods, which is encouraging from a development perspective.

Many players will have a role in this. WMATA's Office of Real Estate needs to continue to push to develop or sell land that it owns near metro stations, with a focus on creating more transit-oriented development. Local jurisdictions can develop sector or small area plans with community input and develop supporting zoning policies. Developers will need to see the opportunities available in such areas, and be willing to navigate approval processes that are typically more complicated than in greenfield developments.

4. Preserve existing and develop more affordable housing in mature, middle-income transit-accessible neighborhoods.

Low- and mid-skill workers often do not earn enough to afford median rents in neighborhoods with the highest numbers of transit-accessible jobs.

A number of policy and program options can assist with this recommendation, although they will all have to contend with the difficulty of changing "business as usual" practices and possible opposition from residents and officials protective of their neighborhood's current housing stock and characteristics.

Housing Choice Voucher programs can target middle-income neighborhoods for land lord recruitment and counsel recipients to consider such neighborhoods. State and local officials can direct funds such as the Community Development Block Grant and the Low-Income Housing Tax Credit to preserve and develop affordable housing outside of the low-income neighborhoods where such housing is often located. Inclusionary zoning (already in place in several jurisdictions) is another option, in which developers include affordable units in new market-rate developments in exchange for non-monetary compensation such as density bonuses, fee waivers, and expedited permits.[34]

Although the previous discussion and recommendations focus on transit and concentrating growth in regional activity centers, this report does not suggest that transit is always the best or only answer for increasing job access. There is no agreement about the optimum level of transit job access, and the transportation network has different components (roads and transit) that should work together to form a balanced multimodal system. The report also recognizes that a variety of neighborhood types and development patterns (high- and low-density, single- and mixed-use) are attractive to different people and constituencies, and a successful region will value these differences. Some neighborhoods simply do not have the density to support transit, and not every neighborhood needs to or should develop towards higher density.

But given the region's projected growth and the current strain on its road and transit network, denser concentrations of transit-accessible jobs and housing (both market-rate and affordable) in strategic locations throughout the region are critical to achieving a more prosperous future. Transportation investments are expensive and require years of planning. The task cannot wait.

Neighborhood Profiles: How does transit help connect residents in different parts of the region to employment?

The following neighborhood profiles go deeper into specific places to show both the power and limitations of transit as critical infrastructure supporting the region's economic competitiveness. Transit provides mobility for residents, business, and workers, and is a major driver of real estate value.[35] It serves diverse neighborhoods and residents of all types throughout the region. While it is a powerful enabler of employment and other economic activity, it has limited, indirect, or no immediate roles regarding many defining characteristics in the neighborhoods it serves, such as the nature of the housing stock and the income, education, and work-readiness of residents. The following neighborhoods were chosen to represent different faces of the region and illustrate how transit interacts with neighborhood characteristics to provide access to employment.

Neighborhoods near Metro terminus stations: Similar transit accessibility, all mid- to upper-income, but neighborhoods with higher levels of education have higher earnings and lower unemployment

The neighborhoods of New Carrollton (Prince George's County, MD), Redland (Montgomery County, MD), and Springfield (Fairfax County, VA) are all neighborhoods at the terminus stations of Metrorail lines. New Carrollton is adjacent to the New Carrollton station on the Orange Line and is the only one of the three neighborhoods located completely within the Beltway. Redland is near the Shady Grove stop on the Red Line, and Springfield is near the Franconia/Springfield stop on the Blue Line.

Median household incomes range from $62,000 (New Carrollton), to $90,000 (Springfield) to $116,000 (Redland). Poverty rates are fairly low—3 to 4 percent in Springfield and Redland and six percent in New Carrollton. Unemployment is also fairly low: six percent in New Carrollton and 4 percent in Redland and Springfield. Education levels vary between the areas: 52 percent of adults over 25 have a Bachelor's degree or above in Redland, compared to 41 percent in Springfield and 28 percent in New Carrollton. New Carrollton has the highest rate of commuting by transit at 23 percent, compared with 14 percent in Redland and 9 percent in Springfield. Workers from these areas all have median transit commute times of 45 to 50 minutes. New Carrollton also has the highest share of households without cars (14 percent), compared to 2 to 3 percent in the other two neighborhoods.

Each neighborhood can reach high numbers of jobs via transit within 90 minutes (1.3 million to 1.5 million), and lower, but still substantial numbers at the 60 minute threshold (480,000 to 713,000), and at the 45 minute threshold (88,000 to 102,000). Consistent with the regional pattern, more high-skill good match jobs are transit-accessible from each area than low- or mid-skill jobs. However, given these areas' proximity to regional job centers, substantial numbers of low- and mid-skill good match jobs are still transit-accessible, especially at the 90 and 60 minute thresholds.

At the 45 minute threshold, the nature of the localized job market comes into focus: one-third of the good match jobs that are transit-accessible from New Carrollton are low-skill, compared to
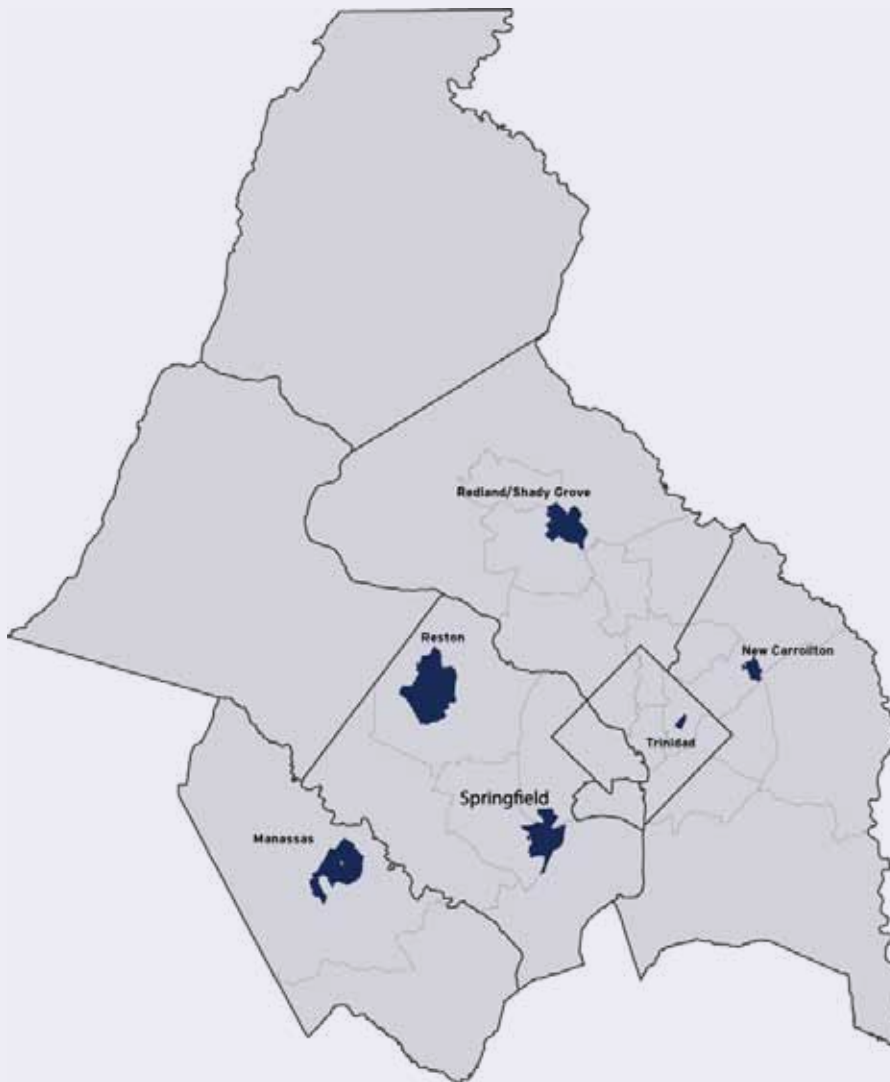
Figure 5. Profiled Neighborhoods

Table 8. Demographics of Profiled Neighborhoods

Neighborhood	Total Population	Total Number of Workers	Share of Workers who Commute via Transit	Median Commute Time via Transit (in minutes)	Median Houshold Income	Residents by Education Attainment:			Share of Residents in Poverty	Unemployment Rate	Residents by Race/Ethnicity:			
						Low	Mid	High			White	Black	Latino	Other
New Carrollton	14,121	6,038	23%	51	$61,737	42%	30%	28%	6%	6%	12%	63%	20%	5%
Redland (Shady Grove)	13,882	9,495	14%	49	$116,065	27%	22%	52%	3%	4%	45%	12%	21%	23%
Springfield	28,794	14,970	9%	46	$90,550	34%	25%	41%	4%	4%	40%	10%	24%	27%
Reston	56,150	30,906	6%	59	$99,918	15%	19%	65%	4%	4%	61%	8%	15%	16%
Trinidad	6,311	2,787	44%	43	$38,580	65%	24%	11%	17%	12%	2%	93%	2%	4%
Manassas	35,648	18,700	4%	75	$75,632	49%	24%	26%	9%	6%	51%	13%	30%	7%

Source: Nielsen Pop-Facts 2010 Database, U.S. Census Bureau American Community Survey 2006-2010 5-year estimates

one-quarter in the other two areas, reflecting that Prince George's County has a higher share of low-skill jobs than Montgomery or Fairfax counties. New Carrollton has a higher share of low-skill residents (42 percent of residents have a high school diploma or less) than the other two neighborhoods, suggesting that the supply and demand sides of the labor market are in synch. However, at the regional level, New Carrollton residents are at a disadvantage, since more high-skill than low- and mid-skill jobs are transit-accessible, and since Prince George's County has fewer jobs than the District and Montgomery and Fairfax counties.

Trinidad: High numbers of transit-accessible jobs does not equal high employment levels

Residents of the Northeast D.C. neighborhood of Trinidad can reach the highest number of jobs via transit of all the profile neighborhoods at each time threshold (1.9 million at 90 minutes, 1.1 million at 60 minutes, and 738,000 at 45 minutes). However, the neighborhood struggles with high unemployment (12 percent) and poverty rates (17 percent) and the lowest median household income ($39,000) of all the profiled neighborhoods. Almost half of the workers in Trinidad commute to work via transit, the highest by far of all the profiled neighborhoods, and almost half of households do not have cars, pointing to high levels of transit-reliance. The median transit commute time is 43 minutes.

Educationally, Trinidad residents are a poor fit with the high-skill nature of the regional labor market. Two-thirds of Trinidad adults have a high school diploma or less, while more than half of the reachable jobs are high-skill at each time threshold. Nonetheless, substantial numbers of low-skill jobs are also transit-accessible. But the high unemployment and poverty figures suggest that Trinidad residents do not or cannot compete for these jobs. On its own, transit access is an insufficient counterweight to serious neighborhood and community disadvantages that contribute to high unemployment rates, even as it provides a vital service to those residents who are employed.

Manassas: A relatively small number of transit-accessible jobs, with more high-income residents using transit

The city of Manassas, an outer suburb surrounded by Prince William County, can reach the smallest number of jobs at all of the time thresholds of the profiled neighborhoods (62,000 at 90 minutes, 26,000 at 60 minutes, and 14,000 at 45 minutes). It has the second-highest share of low-skill adult residents (49 percent) of all the profiled neighborhoods, as well as the second highest poverty rate (nine percent), following Trinidad in both cases. It has some advantages compared to Trinidad, however, with a greater proportion of high-skilled residents (26 percent vs. Trinidad's 11 percent) and a higher median household income ($76,000 vs. Trinidad's $39,000). A relatively low number of workers commute via transit (four percent). Running counter to the regional pattern, slightly higher proportions of low- and mid-skill jobs are transit-accessible than high-skill jobs, reflecting the uneven distribution of jobs by skill level across the region.

Data on the incomes and travel times of transit commuters suggest that most are using VRE or commuter buses to travel into the regional core or inner suburbs for high-skilled jobs. Manassas transit commuters have a median travel time of 75 minutes, and a median income of $88,000, more than double the incomes of workers overall and of workers who drive alone. Transit appears to serve well those who travel into and out of the core, and less well those who need more suburb-to-suburb connections.

Table 9. Transit Access in Profiled Neighborhoods

Neighborhood	Number of Jobs Accessible:				Share of Reachable Jobs that are:		
	Total	Low-Skill	Mid-Skill	High-Skill	Low-Skill	Mid-Skill	High-Skill
90 Minutes							
New Carrollton	1,469,739	353,935	330,755	785,050	24%	23%	53%
Redland (Shady Grove)	1,295,306	288,473	282,207	724,626	22%	22%	56%
Springfield	1,436,655	328,003	314,867	793,784	23%	22%	55%
Reston	955,012	201,649	202,017	551,346	21%	21%	58%
Trinidad	1,904,677	459,169	434,540	1,010,968	24%	23%	53%
Manassas	61,959	23,355	18,512	20,093	38%	30%	32%
60 Minutes							
New Carrollton	712,795	172,912	156,175	383,708	24%	22%	54%
Redland (Shady Grove)	478,972	106,769	109,900	262,302	22%	23%	55%
Springfield	594,633	128,086	121,736	344,810	22%	20%	58%
Reston	103,634	19,574	22,495	61,566	19%	22%	59%
Trinidad	1,114,743	254,687	239,565	620,490	23%	21%	56%
Manassas	26,157	9,781	7,978	8,398	37%	30%	32%
45 Minutes							
New Carrollton	101,810	30,630	16,283	54,229	30%	16%	53%
Redland (Shady Grove)	116,751	39,595	14,116	61,605	34%	12%	53%
Springfield	88,110	33,884	12,990	40,266	38%	15%	46%
Reston	36,739	7,634	4,086	24,586	21%	11%	67%
Trinidad	737,909	153,011	71,010	504,327	21%	10%	68%
Manassas	14,151	5,792	1,169	7,088	41%	8%	50%

Source: Nielsen Pop-Facts 2010 Database, U.S. Census Bureau American Community Survey 2006-2010 5-year estimates

Reston: A sharp drop in the number of transit-accessible jobs from 90 to 60 and 45 minutes, but will see dramatic increases with the completion of the Silver Line

Reston, a planned community on the outskirts of Fairfax County, is home to a highly educated and upper-income population. Two-thirds of adult residents are high-skilled, and the median household income is about $100,000. Six percent of workers commute by transit, with a median travel time of 59 minutes. Nearly one million jobs are transit-accessible at 90 minutes, compared to 104,000 at 60 minutes and 37,000 at 45 minutes. Transit provides residents with strong connections to jobs for which they are suited, since about 60 to 70 percent of reachable jobs are high skill at the different time thresholds.

Reston's transit picture will dramatically change with the completion of the Silver Line, which will link it to the job centers of the Dulles Corridor and Tyson's Corner. Residents commuting into the regional core will still face long travel times, but there will be much greater opportunity for residents to access jobs in Fairfax and Loudoun counties.

Appendix 1. Technical Methodology

Like the national *Missed Opportunities* report, this analysis examines the supply of transportation, and does not focus on individual behavior choices. Also like the national report, the report does not include park-and-ride facilities to accommodate transit users who drive to rail or bus stops and then use transit for the remainder of their commute. We examined data from regional heavy and commuter rail regarding the "driving sheds" of stations with parking lots.[36] However, methodological issues related to predicting behavioral patterns prevented us from incorporating it into the analysis. The different transit authorities provided driving sheds in different scale ranges that were not comparable, and there was also great variation in the size of the driving shed between stations closer to the downtown core and more distant stations, restricting our ability to create a uniform driving distance. Driving sheds for some stations were large enough that they covered multiple stations, sometimes on different lines and across transit systems, or required driving through the employment center of the downtown core to reach a station with a parking lot. Thus, in order to include transit users who drive to transit stations in the model, we would have had to assign driving choices to commuters based on behavioral assumptions, and the model is not equipped for such analysis.

Transit systems: This paper uses a small subset of the original database of 371 transit providers within the nation's 100 largest metropolitan areas that operate on fixed schedules. Transit systems included in this analysis include the following:

1. Arlington Transit
2. CMRT (Central Maryland Regional Transit)
3. DASH (Alexandria Transit Company)
4. DC Circulator
5. Fairfax County Connector
6. City of Fairfax CUE Bus
7. Transit Services of Frederick County
8. Loudoun County Commuter Bus Service
9. Loudoun County Local Bus Service
10. Ride-On Montgomery County Transit
11. MTA (Maryland Transit Authority)
12. Potomac and Rappahannock Transportation Commission
13. Prince George's County Transit
14. VRE (Virginia Railway Express)
15. WMATA (Washington Metropolitan Area Transit Authority)

Defining employment by skill levels: Data on total census tract employment and employment by Standard Industry Classification (SIC) code come from the Nielsen Business-Facts Database and are current as of the second quarter of 2010. In order to designate jobs as low-, middle- or high-skill, we created a two-step process. First, we used the 2006-2010 American Community Survey (ACS) 5-year estimates microdata to create the educational distribution of workers at the jurisdictional level by industry. With the exception of Loudoun County, each county represented a unique "place of work microdata area," allowing us to capture differences in the educational attainment of workers by industry and by jurisdiction.[37] In addition, each industry within a jurisdiction was different, capturing the varied patterns of its workers' education attainment levels. The estimates refer the workers in those jurisdictions, not to residents (though workers may include residents). We categorized workers as high-education attainment if they received a Bachelor's degree or above, medium-education attainment if they received an Associate's degree or had some college experience, and as low-education attainment if they received a high school diploma, the equivalent of a high school diploma, or if they had less than a high school diploma. Second, we then applied these ACS-derived jurisdictional-level educational distributions of workers to jobs at the tract level for each industry, using employment data from the Nielson Business-Facts Database. We categorized jobs as high-skill if they were held by high-education attainment workers, medium-skill if they were held by medium-education attainment workers, and low-skill if they were held by low-education attainment workers. Thus, by using the educational attainment of workers in their current jobs, rather than a system classifying occupations

by education or training requirements, the analysis uses employer hiring decisions to categorize jobs by skill level.[38] Once the distribution was applied to each industry grouping (and selected breakouts in the service and retail industries), we summed all industries within a tract to determine the number of high-, middle-, and low-skilled jobs.

Creating a measure of "good match" jobs: Transit's effectiveness in connecting people and jobs depends upon its matchmaking abilities in getting the right people to the right jobs. If low-skilled workers have excellent transit access to high-skill jobs and not low-skill jobs, or high-skilled workers have excellent transit access to low-skill or mid-skill jobs only, the transit system is not operating optimally. Thus, we created a measure of transit-accessible "good match" jobs: can residents use transit to reach jobs where people with similar educational characteristics are employed? "Good match" jobs are those in which the education levels of residents match a job's rough educational requirements as measured by employers' hiring decisions: i.e., high-skilled jobs with high-skilled residents, medium-skilled jobs with medium-skilled residents, and low-skilled jobs with low-skilled residents. In other words, we consider a job a "good match" for a transit user if it is currently filled by a worker with similar educational characteristics.

This measure is not perfect, since factors other than formal educational attainment affect whether a person is a good fit for a particular job, such as on-the-job training, specific industry or occupational skills, "soft skills" such as interpersonal abilities and punctuality, and care-taking or family responsibilities. Nor does it account for whether the subject-matter educational background of a worker is a good fit for a particular job: for example, a person with a PhD in English literature is high-skilled but not qualified for a high-skilled job in the engineering field. However, educational attainment typically acts as one of the prime labor market signals to employers regarding a job candidate's suitability and is one of the best available proxies.[39]

Geography: In this study the Washington metropolitan region is defined as the jurisdictions included in the footprint of the Metropolitan Washington Council of Governments (COG) as of 2011. The following jurisdictions are included:

Washington, D.C.

Inner core
Arlington, VA
Alexandria, VA

Inner suburbs
Fairfax County, VA
Montgomery County, MD
Prince George's County, MD

Outer suburbs
Frederick County, MD
Loudoun County, VA
Prince William County, VA

When possible, the analysis also looks at subjurisdictional geographies within counties called Public Use Microdata Areas (PUMAs). PUMAs are geographic areas that contain populations of 100,000 or more. The use of PUMAs allows for more finely-grained analysis of large jurisdictions.

Virginia is home to independent cities that function politically the same as counties. However, because of their size they are incorporated into the larger surrounding counties when (PUMAs) are created. Since this analysis reports PUMA-level values, the independent cities of Fairfax, Falls Church, Manassas, and Manassas Park are collapsed into their adjacent counties. In reported tables, Falls Church and Fairfax City are included in Fairfax County and Manassas and Manassas Park are included in Prince William County.[40]

This analysis employs a smaller geographic footprint than the U.S. Office of Management and Budget's definition of the metropolitan area, which includes nine more jurisdictions in Maryland, Virginia, and West Virginia.[41] However, the COG membership area included for analysis in this paper comprises the vast majority of the population, development, and transit commutes in the federally-defined region: 88 percent of the total and working-age population and 15 of the 18 transit systems in the federally-defined region, including the most heavily-used ones, such as WMATA Metrorail and Metrobus, as well as the core of the Maryland and Virginia commuter rail lines.[42] Small numbers of workers commute via transit in the excluded jurisdictions: only three percent of all transit commuters in the federally-defined region. With the exception of Charles County, MD, which joined COG in 2012, the outlying counties are not members of the National Capital Region Transportation Planning Board (TPB), the federally-designated regional forum for transportation planning. Please see Appendix 2 for a reference map of the region used in this report.

Appendix 2. Reference Map: the Washington Region, by Jurisdiction and Public Use Microdata Area
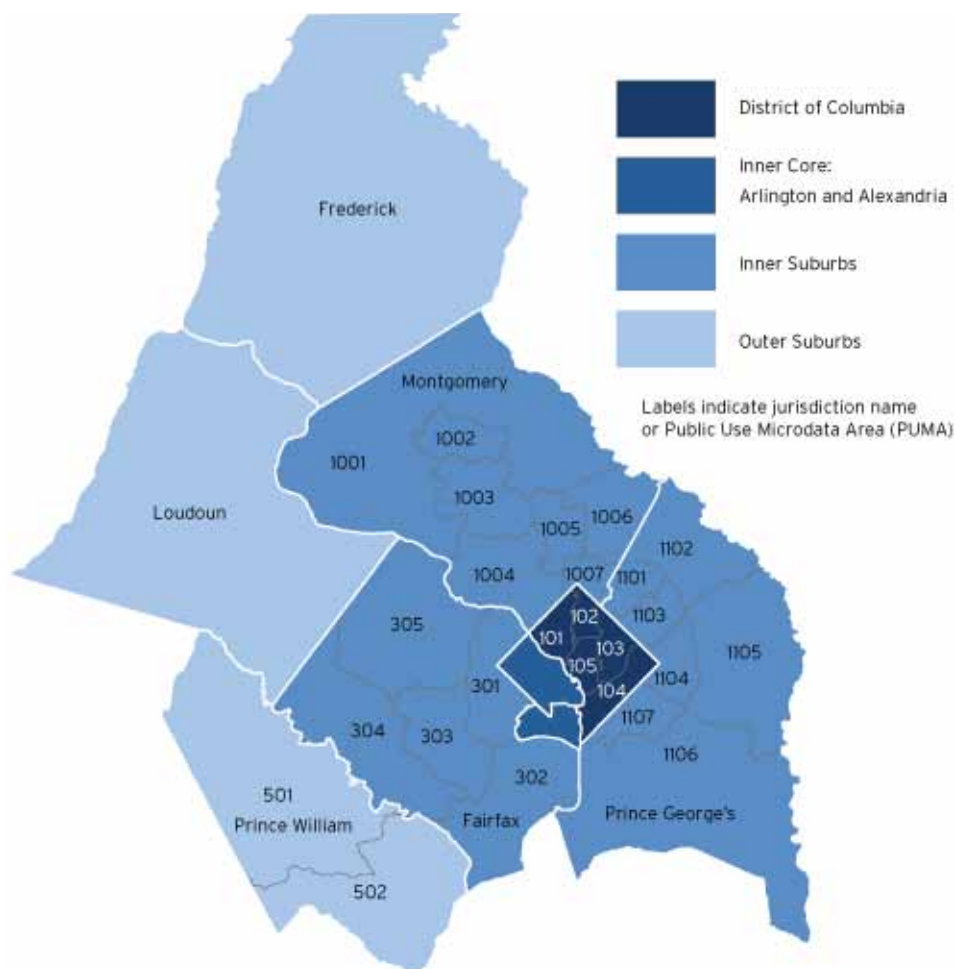
Note: In Fairfax County, PUMA 301 includes Falls Church, PUMA 303 includes Fairfax City. In Prince William County, PUMA 501 includes Manassas and Manassas Park. In the report, the PUMAs are referred to as the following:

D.C.

101: West of Rock Creek Park

102: North Central D.C.

103: Northeast D.C.-Capitol Hill

104: East of the Anacostia River

105: Downtown-Midtown D.C.

Montgomery County

1001: Rural Montgomery

1002: Germantown

1003: Rockville-Gaithersburg

1004: Potomac-Bethesda

1005: Kensington-Wheaton-Aspen Hill

1006: East Montgomery County

1007: Silver Spring-Takoma Park

Prince George's County

1101: College Park-Adelphi-Chillum

1102: Northern Prince George's

1103: Bladensburg-Riverdale-New Carrollton

1104: Landover-Walker Mill-Capitol Heights

1105: East Central Prince George's

1106: Southern Prince George's

1107: Suitland-Hillcrest Heights-Temple Hills

Fairfax County

301: Inside the Beltway-Falls Church

302: I-95 Corridor

303: Central-Fairfax City

304: Centreville-Chantilly-Southwest Fairfax

305: Reston-Great Falls-Vienna

Prince William County

501: Western Prince William-Manassas

502: Eastern Prince William

Appendix 3. Mode of Transportation to Work by Jurisdiction and PUMA

Jurisdiction	Mode of Transportation to Work				
	Total Workers	Drove Alone	Carpooled	Public Transportation	Other*
D.C.	292,979	36%	7%	38%	20%
West of Rock Creek (101)	58,898	40%	6%	33%	22%
North Central D.C. (102)	56,600	37%	7%	42%	13%
Northeast D.C.-Capitol Hill (103)	58,931	38%	7%	38%	17%
East of the Anacostia River (104)	46,719	43%	10%	42%	5%
Downtown-Midtown D.C. (105)	71,831	25%	5%	34%	36%
Arlington	128,181	53%	7%	27%	12%
Alexandria	83,954	61%	9%	22%	9%
Inner Core	212,135	56%	8%	25%	11%
Montgomery	502,308	66%	10%	15%	9%
Rural Montgomery (1001)	65,969	77%	8%	6%	9%
Germantown (1002)	71,333	70%	13%	11%	5%
Rockville-Gaithersburg (1003)	91,089	68%	10%	14%	8%
Potomac-Bethesda (1004)	89,983	62%	7%	16%	14%
Kensington-Wheaton-Aspen Hill (1005)	65,271	62%	13%	19%	6%
East Montgomery County (1006)	58,056	70%	11%	12%	7%
Silver Spring-Takoma Park (1007)	60,629	52%	11%	27%	10%
Prince George's	442,963	64%	13%	17%	6%
College Park-Adelphi-Chillum (1101)	59,576	46%	20%	23%	10%
Northern Prince George's (1102)	70,944	69%	13%	11%	7%
Bladensburg-Riverdale-New Carrollton (1103)	52,454	59%	15%	20%	6%
Landover-Walker Mill-Capitol Heights (1104)	45,468	58%	11%	27%	4%
East Central Prince George's (1105)	89,049	73%	9%	13%	6%
Southern Prince George's (1106)	73,477	72%	11%	12%	5%
Suitland-Hillcrest Heights-Temple Hills (1107)	51,995	61%	11%	25%	3%
Fairfax	586,228	72%	11%	9%	8%
Inside the Beltway-Falls Church (301)	114,494	69%	12%	11%	8%
I-95 Corridor (302)	105,813	69%	11%	14%	7%
Central-Fairfax City (303)	110,216	72%	12%	8%	8%
Centreville-Chantilly-SW Fairfax (304)	96,947	77%	12%	5%	7%
Reston-Great Falls-Vienna (305)	158,758	74%	9%	8%	9%
Inner Suburbs	1,531,499	68%	11%	13%	7%
Frederick	119,462	79%	11%	2%	8%
Loudoun	153,550	79%	10%	2%	9%
Prince William	224,335	71%	16%	5%	7%
Western Prince William-Manassas (501)	106,968	75%	14%	4%	7%
Eastern Prince William (502)	117,367	68%	18%	6%	7%
Outer Suburbs	497,347	75%	13%	4%	8%
Region	2,533,960	65%	11%	15%	9%

*Other indicates those who work at home or commute via bicycle, walking, taxicab, motorcycle, or other means
■ Gray indicates PUMAs   ■ Yellow indicates regional categorizations
Source: U.S. Census Bureau American Community Survey, 2006-2010 5-year estimates

Appendix 4. Ridership by Transit System, Washington, D.C. Region, 2010

Rail	2010 Unlinked Passenger Trips*	Share of all Rail Trips	2010 Passenger Miles (Thousands)
Maryland Transit Administration (MTA)**	8,095,577	3%	254,517
Virginia Railway Express (VRE)	4,016,589	1%	120,532
Washington Metropolitan Area Transit Authority (WMATA)	287,304,340	96%	1,635,967
Total Trips via Rail	**299,416,506**		**2,011,016**
Bus	2010 Unlinked Passenger Trips*	Share of all Bus Trips	2010 Passenger Miles (Thousands)
Arlington Transit - Arlington County (ART)	1,990,402	1%	3,384
City of Alexandria (DASH)	4,283,850	2%	11,301
City of Fairfax CUE Bus (CUE)	929,897	1%	3,869
Fairfax Connector Bus System (Fairfax Connector)	9,629,993	5%	78,926
Loudoun County Commuter Bus Service - Office of Transportation Services (LC Transit)	967,957	1%	31,371
Potomac and Rappahannock Transportation Commission (PRTC)	3,176,349	2%	55,332
Prince George's County Transit (TheBus)	3,447,187	2%	32,231
Ride-On Montgomery County Transit	27,895,008	15%	112,417
Transit Services of Frederick County	707,420	0%	3,353
Washington Metropolitan Area Transit Authority (WMATA)	128,443,887	71%	399,962
Total Trips via Bus	**181,471,950**		**732,147**

*"Unlinked Passenger Trips" is the number of times passengers board public transportation vehicles. Passengers are counted each time they board vehicles no matter how many vehicles they use to travel from their origin to their destination and regardless of whether they pay a fare, use a pass or transfer, ride for free, or pay in some other way. Also called "Boardings".

**MTA rail numbers include all commuter rail (MARC) trips but do not include Baltimore-based heavy rail subway system.

Source: American Public Transit Association, 2012 Public Transportation Fact Book

Appendix 5. Car Ownership by PUMA

Jurisdiction	Households with Zero Vehicles	Share Served by Transit	Share of all Households by Income Without Vehicles:			
			Total	Low-income	Mid-Income	High-Income
D.C.	93,415	100%	36%	44%	27%	11%
West of Rock Creek (101)	9,387	100%	19%	33%	25%	11%
North Central D.C. (102)	15,214	100%	34%	40%	23%	11%
Northeast D.C.-Capitol Hill (103)	15,527	100%	31%	38%	18%	16%
East of the Anacostia River (104)	22,080	100%	41%	43%	10%	6%
Downtown-Midtown D.C. (105)	31,207	100%	49%	52%	42%	2%
Arlington	10,506	100%	11%	18%	12%	5%
Alexandria	7,198	100%	11%	18%	9%	5%
Inner Core	17,704	100%	11%	18%	11%	5%
Montgomery	24,977	99%	7%	17%	6%	2%
Rural Montgomery (1001)	908	76%	2%	-	4%	2%
Germantown (1002)	1,754	100%	4%	9%	3%	1%
Rockville-Gaithersburg (1003)	4,627	99%	7%	20%	5%	2%
Potomac-Bethesda (1004)	4,851	100%	7%	16%	15%	2%
Kensington-Wheaton-Aspen Hill (1005)	4,380	100%	9%	16%	5%	3%
East Montgomery County (1006)	2,180	99%	5%	12%	3%	2%
Silver Spring-Takoma Park (1007)	6,277	100%	15%	21%	10%	3%
Prince George's	24,520	98%	8%	14%	3%	2%
College Park-Adelphi-Chillum (1101)	4,044	100%	13%	15%	4%	4%
Northern Prince George's (1102)	2,587	100%	5%	9%	2%	2%
Bladensburg-Riverdale-New Carrollton (1103)	4,791	100%	14%	18%	4%	-
Landover-Walker Mill-Capitol Heights (1104)	4,783	100%	14%	17%	5%	-
East Central Prince George's (1105)	1,610	94%	3%	6%	3%	2%
Southern Prince George's (1106)	1,248	72%	3%	7%	2%	1%
Suitland-Hillcrest Heights-Temple Hills (1107)	5,457	100%	14%	17%	4%	2%
Fairfax	13,735	99%	4%	10%	4%	1%
Inside the Beltway-Falls Church (301)	4,637	100%	6%	12%	6%	2%
I-95 Corridor (302)	3,253	99%	4%	9%	4%	1%
Central-Fairfax City (303)	1,752	100%	3%	10%	4%	1%
Centreville-Chantilly-SW Fairfax (304)	1,280	93%	2%	0%	3%	1%
Reston-Great Falls-Vienna (305)	2,813	98%	3%	9%	4%	1%
Inner Suburbs	63,232	99%	6%	14%	5%	2%
Frederick	3,460	73%	4%	9%	2%	1%
Loudoun	1,912	76%	2%	6%	3%	1%
Prince William	5,287	88%	4%	8%	3%	1%
Western Prince William-Manassas (501)	2,777	79%	4%	11%	3%	1%
Eastern Prince William (502)	2,510	97%	3%	6%	2%	1%
Outer Suburbs	10,659	81%	3%	8%	2%	1%
Region	185,010	98%	10%	23%	7%	2%

Source: Nielsen Claritas Pop-Facts 2010.

Gray indicates PUMAs
Yellow indicates regional categorizations

$$\text{Share} = \frac{\text{Number of housholds without cars at an income level}}{\text{Total number of households at that income level}}$$
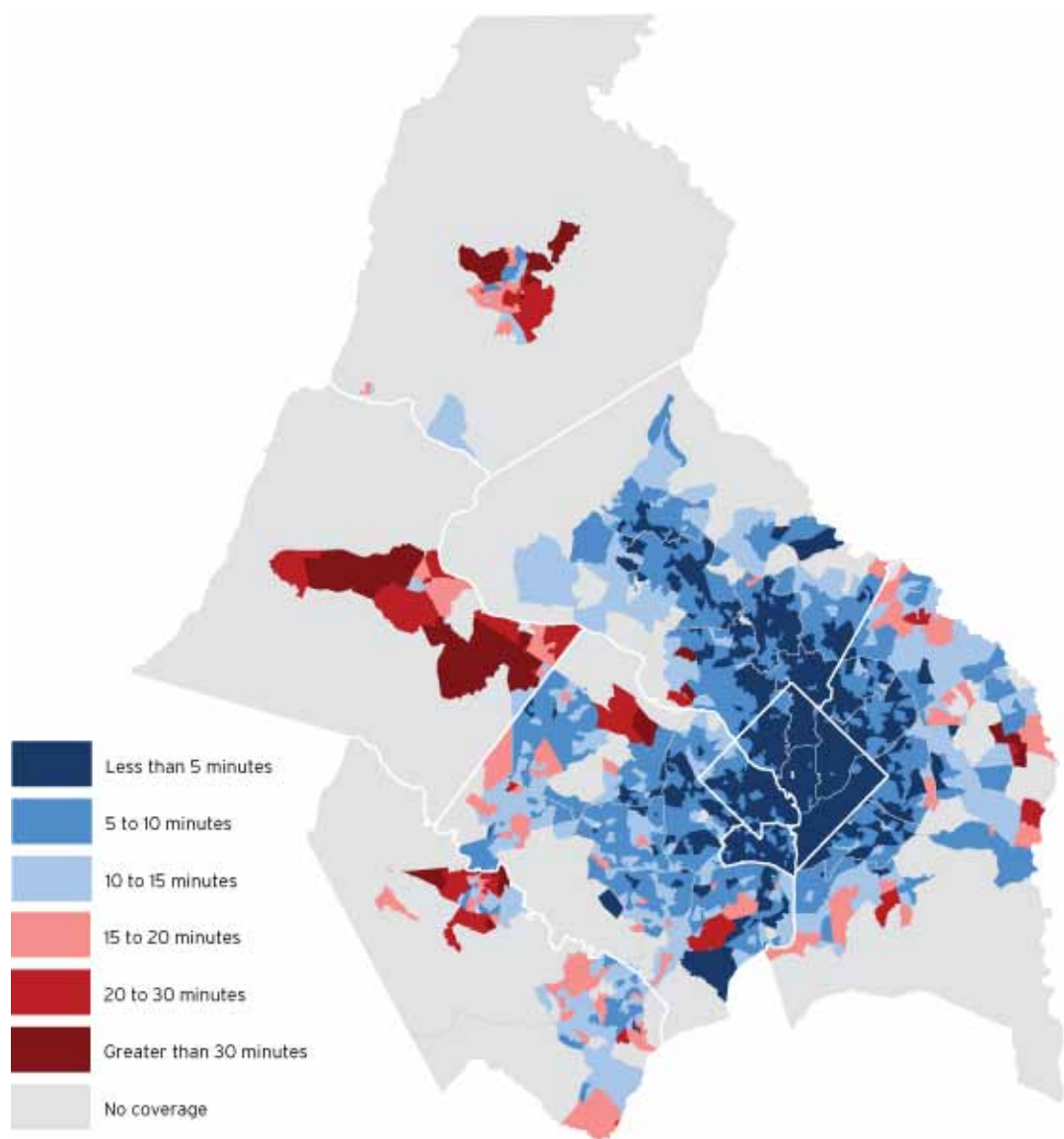
Appendix 6. Transit Coverage and Service Frequency by Jurisdiction and Public Use Microdata Areas (PUMAs), 2010

Coverage and Service Frequency Jurisdiction	Total Popu-lation	Coverage				Service Frequency			
		All	Low Income Neighbor-hoods	Mid Income Neighbor-hoods	High Income Neighbor-hoods	All	Low Income Neighbor-hoods	Mid Income Neighbor-hoods	High Income Neighbor-hoods
D.C.	604,453	100%	100%	100%	100%	3.3	3.3	3.5	3.4
West of Rock Creek (101)	109,673	100%	100%	100%	100%	3.6	3.0	3.6	3.6
North Central D.C. (102)	117,253	100%	100%	100%	100%	3.1	3.1	3.4	3.0
Northeast D.C.-Capitol Hill (103)	136,022	100%	100%	100%	100%	3.3	3.3	3.7	3.2
East of the Anacostia River (104)	125,219	100%	100%	100%	100%	3.3	3.2	3.7	2.9
Downtown-Midtown D.C. (105)	116,286	100%	100%	100%	100%	3.4	3.4	3.2	6.3
Arlington	209,457	100%	100%	100%	100%	4.0	4.2	3.9	4.4
Alexandria	140,912	100%	100%	100%	100%	4.5	4.6	4.4	4.2
Inner Core	350,369	100%	100%	100%	100%	4.2	4.2	4.0	4.3
Montgomery	976,295	95%	100%	99%	88%	5.8	4.2	5.7	8.8
Rural Montgomery (1001)	130,022	70%	-	89%	65%	9.7	-	8.0	9.9
Germantown (1002)	124,305	100%	100%	100%	100%	7.1	5.9	7.1	7.2
Rockville-Gaithersburg (1003)	177,336	97%	100%	100%	94%	6.1	4.9	5.5	7.4
Potomac-Bethesda (1004)	178,758	96%	100%	100%	95%	5.6	4.1	4.6	6.4
Kensington-Wheaton-Aspen Hill (1005)	132,361	100%	100%	100%	100%	4.3	4.0	4.0	5.4
East Montgomery County (1006)	118,655	96%	100%	96%	94%	6.8	4.1	7.9	8.5
Silver Spring-Takoma Park (1007)	114,858	100%	100%	100%	100%	3.6	3.6	3.6	3.4
Prince George's	865,271	89%	98%	88%	70%	6.7	5.2	7.9	11.3
College Park-Adelphi-Chillum (1101)	122,617	100%	100%	100%	100%	4.3	4.0	5.5	12.3
Northern Prince George's (1102)	127,588	98%	100%	100%	91%	9.7	9.7	10.0	7.5
Bladensburg-Riverdale-New Carrollton (1103)	106,944	100%	100%	100%	-	4.8	4.8	5.0	-
Landover-Walker Mill-Capitol Heights (1104)	92,171	100%	100%	100%	-	5.4	5.9	4.7	-
East Central Prince George's (1105)	166,540	86%	91%	94%	77%	11.2	5.6	11.2	12.0
Southern Prince George's (1106)	145,842	53%	60%	56%	46%	10.6	7.4	12.1	11.1
Suitland-Hillcrest Heights-Temple Hills (1107)	103,569	100%	100%	100%	100%	5.0	4.7	6.8	6.9
Fairfax	1,121,934	92%	100%	100%	84%	7.8	5.2	7.5	9.1
Inside the Beltway-Falls Church (301)	224,273	99%	100%	100%	97%	5.2	5.0	5.1	6.0
I-95 Corridor (302)	202,297	97%	100%	100%	91%	7.3	4.9	7.6	8.7
Central-Fairfax City (303)	210,938	100%	100%	100%	100%	8.3	7.1	8.4	8.4
Centreville-Chantilly-SW Fairfax (304)	177,863	74%	100%	98%	57%	12.0	19.1	10.2	12.9
Reston-Great Falls-Vienna (305)	306,563	89%	100%	100%	83%	8.4	7.5	7.5	9.1
Inner Suburbs	2,963,500	92%	99%	96%	84%	6.8	4.8	7.0	8.5
Frederick	234,030	41%	78%	33%	6%	18.1	17.7	21.0	108.9
Loudoun	315,134	72%	90%	87%	64%	29.8	36.1	29.9	26.9
Prince William	458,761	70%	99%	78%	42%	14.9	14.3	14.8	15.3
Western Prince William-Manassas (501)	216,535	51%	98%	77%	22%	21.1	24.2	20.6	19.5
Eastern Prince William (502)	242,226	87%	100%	79%	86%	12.8	12.4	13.6	14.7
Outer Suburbs	1,007,925	64%	92%	65%	49%	18.9	16.9	18.0	19.7
Region	4,926,247	88%	98%	90%	78%	6.2	4.4	6.5	8.4

Source: Nielsen Claritas Pop-Facts 2010.   ▪ Gray indicates PUMAs
▪ Yellow indicates regional categorizations

Appendix 7. Rush Hour Transit Service Frequency in the Washington, D.C. Region by Census Block Group, 2010

Less than 5 minutes
5 to 10 minutes
10 to 15 minutes
15 to 20 minutes
20 to 30 minutes
Greater than 30 minutes
No coverage

Appendix 8. Share of Jobs Accessible on Average via Transit, by Time Threshold, by Jurisdiction and Public Use Microdata Areas (PUMAs), 2010

Job Access								
	90 minutes		**60 minutes**		**45 minutes**		**Combined Access Score***	**Rank**
Jurisdiction	Number of Jobs	Share of Jobs	Number of Jobs	Share of Jobs	Number of Jobs	Share of Jobs		
D.C.	1,940,286	67.2%	1,223,934	42.4%	798,787	27.6%	67.157	
West of Rock Creek (101)	1,913,914	66.2%	1,203,320	41.6%	790,637	27.4%	66.244	5
North Central D.C. (102)	1,940,123	67.2%	1,264,691	43.8%	840,017	29.1%	67.151	2
Northeast D.C.-Capitol Hill (103)	1,937,500	67.1%	1,207,686	41.8%	800,832	27.7%	67.060	3
East of the Anacostia River (104)	1,827,802	63.3%	1,020,460	35.3%	586,675	20.3%	63.264	6
Downtown-Midtown D.C. (105)	2,063,813	71.4%	1,403,172	48.6%	960,097	33.2%	71.432	1
Arlington	1,916,226	66.3%	1,121,408	38.8%	673,846	23.3%	66.324	4
Alexandria	1,734,924	60.0%	919,382	31.8%	479,364	16.6%	60.049	7
Inner Core	1,843,956	63.8%	1,040,877	36.0%	596,322	20.6%	63.823	
Montgomery	1,289,628	44.6%	542,289	18.8%	206,472	7.1%	42.185	
Rural Montgomery (1001)	766,012	26.5%	67,512	2.3%	16,913	0.6%	18.614	24
Germantown (1002)	898,914	31.1%	144,119	5.0%	41,876	1.4%	31.113	20
Rockville-Gaithersburg (1003)	1,262,286	43.7%	469,854	16.3%	150,488	5.2%	42.429	16
Potomac-Bethesda (1004)	1,543,174	53.4%	869,045	30.1%	417,063	14.4%	51.387	12
Kensington-Wheaton-Aspen Hill (1005)	1,551,852	53.7%	838,995	29.0%	230,250	8.0%	53.712	11
East Montgomery County (1006)	1,157,897	40.1%	238,778	8.3%	40,524	1.4%	38.660	17
Silver Spring-Takoma Park (1007)	1,691,922	58.6%	1,023,961	35.4%	462,083	16.0%	58.561	8
Prince George's	1,157,203	40.1%	428,434	14.8%	134,717	4.7%	35.725	
College Park-Adelphi-Chillum (1101)	1,595,260	55.2%	836,680	29.0%	320,965	11.1%	55.215	9
Northern Prince George's (1102)	895,849	31.0%	139,681	4.8%	33,334	1.2%	30.501	21
Bladensburg-Riverdale-New Carrollton (1103)	1,562,585	54.1%	802,069	27.8%	253,895	8.8%	54.084	10
Landover-Walker Mill-Capitol Heights (1104)	1,429,746	49.5%	583,542	20.2%	137,805	4.8%	49.486	14
East Central Prince George's (1105)	640,675	22.2%	79,625	2.8%	16,587	0.6%	19.078	23
Southern Prince George's (1106)	667,590	23.1%	59,076	2.0%	8,017	0.3%	12.342	26
Suitland-Hillcrest Heights-Temple Hills (1107)	1,385,448	48.0%	530,515	18.4%	161,190	5.6%	47.953	15
Fairfax	1,073,893	37.2%	281,482	9.7%	78,997	2.7%	34.119	
Inside the Beltway-Falls Church (301)	1,492,714	51.7%	587,977	20.4%	163,502	5.7%	51.047	13
I-95 Corridor (302)	1,115,452	38.6%	292,370	10.1%	78,163	2.7%	37.458	19
Central-Fairfax City (303)	1,110,781	38.4%	187,244	6.5%	31,326	1.1%	38.446	18
Centreville-Chantilly-SW Fairfax (304)	504,393	17.5%	42,012	1.5%	12,290	0.4%	12.907	25
Reston-Great Falls-Vienna (305)	970,852	33.6%	210,436	7.3%	68,566	2.4%	29.796	22
Inner Suburbs	1,170,972	40.5%	412,934	14.3%	139,937	4.8%	37.258	
Frederick	49,882	1.7%	32,448	1.1%	18,769	0.6%	0.700	30
Loudoun	44,449	1.5%	12,354	0.4%	7,551	0.3%	1.103	28
Prince William	115,892	4.0%	19,688	0.7%	8,943	0.3%	2.813	
Western Prince William-Manassas (501)	49,879	1.7%	19,811	0.7%	10,711	0.4%	0.874	29
Eastern Prince William (502)	148,727	5.1%	19,629	0.7%	8,249	0.3%	4.503	27
Outer Suburbs	80,461	2.8%	18,811	0.7%	10,087	0.3%	1.770	
Region	1,195,723	41.4%	546,963	18.9%	280,280	9.7%	36.420	

Source: Nielsen Claritas Pop-Facts 2010.

■ Gray indicates PUMAs
■ Yellow indicates regional categorizations

Appendix 9. Share of "Good Match" Jobs Accessible on Average via Transit, by Time Threshold, by Jurisdiction and Public Use Microdata Areas (PUMAs), 2010

Jurisdiction	90 Minutes						60 Minutes					
	Number of Jobs			Share of Jobs			Number of Jobs			Share of Jobs		
	Low-Skill Workers	Mid-Skill Workers	High-Skill Workers	Low-Skill Workers	Mid-Skill Workers	High-Skill Workers	Low-Skill Workers	Mid-Skill Workers	High-Skill Workers	Low-Skill Workers	Mid-Skill Workers	High-Skill Workers
D.C.	462,726	437,230	1,043,464	62%	64%	72%	269,687	257,928	706,074	36%	38%	49%
West of Rock Creek (101)	455,506	431,704	1,027,322	61%	63%	71%	265,298	257,796	687,814	35%	38%	47%
North Central D.C. (102)	468,575	438,351	1,029,652	63%	64%	71%	285,728	271,057	705,359	38%	40%	49%
Northeast D.C.-Capitol Hill (103)	463,113	438,100	1,035,445	62%	64%	71%	271,150	258,040	681,708	36%	38%	47%
East of the Anacostia River (104)	442,639	414,531	962,629	59%	60%	66%	235,653	216,110	556,734	31%	32%	38%
Downtown-Midtown D.C. (105)	496,336	471,302	1,097,577	66%	69%	75%	316,667	305,615	781,936	42%	45%	54%
Arlington	441,951	429,287	1,039,571	59%	63%	71%	237,086	233,718	645,335	32%	34%	44%
Alexandria	405,391	386,612	940,888	54%	56%	65%	200,149	188,952	529,122	27%	28%	36%
Inner Core	425,112	408,658	1,003,586	57%	60%	69%	220,073	212,078	602,957	29%	31%	41%
Montgomery	309,019	279,321	720,445	41%	41%	50%	130,913	111,316	316,985	17%	16%	22%
Rural Montgomery (1001)	162,669	169,785	435,127	22%	25%	30%	15,784	16,139	35,076	2%	2%	2%
Germantown (1002)	205,404	195,714	501,623	27%	29%	34%	39,860	34,619	71,292	5%	5%	5%
Rockville-Gaithersburg (1003)	299,324	280,874	693,172	40%	41%	48%	121,933	111,297	246,974	16%	16%	17%
Potomac-Bethesda (1004)	364,678	346,885	844,889	49%	51%	58%	195,311	191,018	498,167	26%	28%	34%
Kensington-Wheaton-Aspen Hill (1005)	364,735	341,763	826,326	49%	50%	57%	182,964	172,656	430,584	24%	25%	30%
East Montgomery County (1006)	268,678	253,722	642,652	36%	37%	44%	61,691	53,494	126,443	8%	8%	9%
Silver Spring-Takoma Park (1007)	399,482	382,725	912,154	53%	56%	63%	218,834	220,481	592,318	29%	32%	41%
Prince George's	296,821	244,453	556,503	40%	36%	38%	115,178	80,906	180,106	15%	12%	12%
College Park-Adelphi-Chillum (1101)	391,662	362,914	834,181	52%	53%	57%	202,105	182,398	434,614	27%	27%	30%
Northern Prince George's (1102)	215,528	198,037	486,001	29%	29%	33%	38,241	32,449	75,249	5%	5%	5%
Bladensburg-Riverdale-New Carrollton (1103)	377,876	350,943	836,231	50%	51%	58%	190,321	170,642	445,677	25%	25%	31%
Landover-Walker Mill-Capitol Heights (1104)	344,735	316,214	758,885	46%	46%	52%	137,486	119,132	314,552	18%	17%	22%
East Central Prince George's (1105)	158,266	139,749	348,707	21%	20%	24%	23,092	17,812	37,364	3%	3%	3%
Southern Prince George's (1106)	155,063	138,931	366,086	21%	20%	25%	16,762	12,398	27,473	2%	2%	2%
Suitland-Hillcrest Heights-Temple Hills (1107)	329,765	303,125	737,650	44%	44%	51%	120,366	105,741	288,391	16%	15%	20%
Fairfax	257,578	228,233	604,801	34%	33%	42%	74,294	57,491	156,111	10%	8%	11%
Inside the Beltway-Falls Church (301)	345,501	325,278	819,294	46%	47%	56%	134,814	119,891	322,082	18%	17%	22%
I-95 Corridor (302)	252,389	231,952	633,651	34%	34%	44%	66,890	57,797	170,555	9%	8%	12%
Central-Fairfax City (303)	258,687	236,108	621,484	35%	34%	43%	54,937	41,251	95,988	7%	6%	7%
Centreville-Chantilly-SW Fairfax (304)	98,473	103,565	312,531	13%	15%	21%	8,413	9,250	25,870	1%	1%	2%
Reston-Great Falls-Vienna (305)	224,026	210,928	555,293	30%	31%	38%	46,438	44,503	126,510	6%	6%	9%
Inner Suburbs	288,841	250,001	643,695	39%	36%	44%	107,897	82,769	225,237	14%	12%	15%
Frederick	17,843	15,038	16,984	2%	2%	1%	11,346	10,390	10,072	2%	2%	1%
Loudoun	15,143	11,537	19,776	2%	2%	1%	5,076	3,437	4,494	1%	1%	0%
Prince William	31,154	28,789	62,635	4%	4%	4%	7,920	6,018	6,126	1%	1%	0%
Western Prince William-Manassas (501)	20,382	15,102	14,522	3%	2%	1%	8,171	5,856	5,691	1%	1%	0%
Eastern Prince William (502)	38,503	34,523	83,652	5%	5%	6%	7,754	6,083	6,311	1%	1%	0%
Outer Suburbs	25,164	21,310	35,567	3%	3%	2%	7,813	5,914	5,829	1%	1%	0%
Region	290,598	244,355	678,207	39%	36%	47%	131,359	101,187	322,620	18%	15%	22%

Source: Nielsen Claritas Pop-Facts 2010.

Gray indicates PUMAs
Yellow indicates regional categorizations

| Jurisdiction | 45 Minutes | | | | | |
| | Number of Jobs | | | Share of Jobs | | |
	Low-Skill Workers	Mid-Skill Workers	High-Skill Workers	Low-Skill Workers	Mid-Skill Workers	High-Skill Workers
D.C.	164,079	158,124	488,670	22%	23%	34%
West of Rock Creek (101)	163,549	161,485	472,309	22%	24%	32%
North Central D.C. (102)	182,529	170,655	484,964	24%	25%	33%
Northeast D.C.-Capitol Hill (103)	170,168	161,287	471,244	23%	24%	32%
East of the Anacostia River (104)	128,255	117,141	330,295	17%	17%	23%
Downtown-Midtown D.C. (105)	204,881	199,808	561,716	27%	29%	39%
Arlington	134,565	133,277	402,943	18%	19%	28%
Alexandria	103,520	94,552	277,318	14%	14%	19%
Inner Core	120,266	114,558	357,133	16%	17%	25%
Montgomery	47,225	41,342	128,305	6%	6%	9%
Rural Montgomery (1001)	4,469	4,255	8,116	1%	1%	1%
Germantown (1002)	12,627	10,000	19,979	2%	1%	1%
Rockville-Gaithersburg (1003)	43,829	38,317	74,492	6%	6%	5%
Potomac-Bethesda (1004)	90,277	90,536	244,256	12%	13%	17%
Kensington-Wheaton-Aspen Hill (1005)	54,063	48,838	109,954	7%	7%	8%
East Montgomery County (1006)	11,712	9,951	19,399	2%	1%	1%
Silver Spring-Takoma Park (1007)	91,095	100,291	285,198	12%	15%	20%
Prince George's	39,577	25,474	54,079	5%	4%	4%
College Park-Adelphi-Chillum (1101)	86,096	75,936	159,730	11%	11%	11%
Northern Prince George's (1102)	10,545	8,816	15,031	1%	1%	1%
Bladensburg-Riverdale-New Carrollton (1103)	64,855	54,748	141,809	9%	8%	10%
Landover-Walker Mill-Capitol Heights (1104)	38,648	28,960	66,126	5%	4%	5%
East Central Prince George's (1105)	5,990	3,812	7,135	1%	1%	0%
Southern Prince George's (1106)	2,918	2,082	2,883	0%	0%	0%
Suitland-Hillcrest Heights-Temple Hills (1107)	38,094	31,662	83,559	5%	5%	6%
Fairfax	21,113	16,049	42,973	3%	2%	3%
Inside the Beltway-Falls Church (301)	38,948	32,889	86,848	5%	5%	6%
I-95 Corridor (302)	19,087	16,021	43,790	3%	2%	3%
Central-Fairfax City (303)	10,149	7,329	14,524	1%	1%	1%
Centreville-Chantilly-SW Fairfax (304)	2,989	2,827	6,674	0%	0%	0%
Reston-Great Falls-Vienna (305)	13,668	14,400	41,781	2%	2%	3%
Inner Suburbs	36,588	27,592	80,429	5%	4%	6%
Frederick	6,702	6,159	6,072	1%	1%	0%
Loudoun	3,080	1,982	2,714	0%	0%	0%
Prince William	3,363	2,737	3,047	0%	0%	0%
Western Prince William-Manassas (501)	4,058	3,223	3,441	1%	0%	0%
Eastern Prince William (502)	2,963	2,574	2,928	0%	0%	0%
Outer Suburbs	3,856	3,128	3,396	1%	0%	0%
Region	62,687	47,736	176,557	8%	7%	12%

Appendix 10. Areas (jurisdictions and PUMAs) with the greatest job accessibility via transit, compared with median rent and median earnings

Jurisdiction / PUMA	Median Rental Housing Costs	Annual Household Earnings Required to Afford Median Rent*	Median Earnings for Low-Skill Job	Affordable?	
				With One Low-Skill Worker	With Two Low-Skill Workers
D.C.					
West of Rock Creek (101)	**$1,523**	**$60,920**	**$24,476**	**N**	**N**
North Central D.C. (102)	**$998**	**$39,920**	**$25,540**	**N**	**Y**
Northeast D.C. - Capitol Hill (103)	**$975**	**$39,000**	**$28,966**	**N**	**Y**
East of the Anacostia River (104)	**$796**	**$31,840**	**$30,492**	**N**	**Y**
Downtown-Midtown D.C. (105)	**$1,239**	**$49,560**	**$22,348**	**N**	**N**
Arlington	**$1,519**	**$60,760**	**$23,412**	**N**	**N**
Alexandria	**$1,330**	**$53,200**	**$25,320**	**N**	**N**
Montgomery					
Rural Montgomery (1001)	$1,459	$58,360	$35,180	N	Y
Germantown (1002)	$1,416	$56,640	$26,636	N	N
Rockville-Gaithersburg (1003)	**$1,446**	**$57,840**	**$26,604**	**N**	**N**
Potomac-Bethesda (1004)	**$1,677**	**$67,080**	**$25,320**	**N**	**N**
Kensington-Wheaton-Aspen Hill (1005)	**$1,379**	**$55,160**	**$23,412**	**N**	**N**
East Montgomery County (1006)	$1,444	$57,760	$27,668	N	N
Silver Spring-Takoma Park (1007)	**$1,225**	**$49,000**	**$22,763**	**N**	**N**
Prince George's County					
College Park-Adelphi-Chillum (1101)	**$1,119**	**$44,760**	**$23,412**	**N**	**Y**
Northern Prince George's (1102)	$1,209	$48,360	$31,041	N	Y
Bladensburg-Riverdale-New Carrollton (1103)	**$1,064**	**$42,560**	**$28,972**	**N**	**Y**
Landover-Walker Mill-Capitol Heights (1104)	**$1,084**	**$43,360**	**$32,989**	**N**	**Y**
East Central Prince George's (1105)	$1,652	$66,080	$38,310	N	Y
Southern Prince George's (1106)	$1,386	$55,440	$42,000	N	Y
Suitland-Hillcrest Heights-Temple Hills (1107)	**$1,078**	**$43,120**	**$35,574**	**N**	**Y**
Fairfax					
Inside the Beltway-Falls Church (301)	**$1,392**	**$55,680**	**$22,200**	**N**	**N**
I-95 Corridor (302)	$1,402	$56,080	$28,459	N	Y
Central-Fairfax City (303)	$1,711	$68,440	$25,868	N	N
Centreville-Chantilly-SW Fairfax (304)	$1,555	$62,200	$30,700	N	N
Reston-Great Falls-Vienna (305)	$1,602	$64,080	$25,410	N	N
Frederick	$1,133	$45,320	$32,409	N	Y
Prince William					
Western Prince William-Manassas (501)	$1,330	$53,200	$31,599	N	Y
Eastern Prince William (502)	$1,327	$53,080	$30,384	N	Y

Bold indicates PUMAs with top job accessibility via transit

Assuming that no more than 30% of household earnings should go towards housing

Earnings data not available for Loudoun County

	Median Earnings for Mid-Skill Job	Affordable?		Median Earnings for High-Skill Job	Affordable?	
		With One Mid-Skill Worker	With Two Mid-Skill Workers		With One High-Skill Worker	With Two High-Skill Workers
	$39,733	N	Y	$75,000	Y	Y
	$34,558	N	Y	$59,594	Y	Y
	$40,656	Y	Y	$68,099	Y	Y
	$37,246	Y	Y	$56,000	Y	Y
	$39,319	N	Y	$70,000	Y	Y
	$40,000	N	Y	$74,498	Y	Y
	$41,388	N	Y	$70,000	Y	Y
	$50,639	N	Y	$81,000	Y	Y
	$42,000	N	Y	$64,000	Y	Y
	$40,000	N	Y	$74,492	Y	Y
	$45,300	N	Y	$83,049	Y	Y
	$36,215	N	Y	$64,818	Y	Y
	$40,000	N	Y	$66,844	Y	Y
	$37,246	N	Y	$63,000	Y	Y
	$34,054	N	Y	$45,575	Y	Y
	$44,695	N	Y	$56,401	Y	Y
	$39,319	N	Y	$52,000	Y	Y
	$42,900	N	Y	$54,000	Y	Y
	$50,820	N	Y	$74,498	Y	Y
	$53,209	N	Y	$71,148	Y	Y
	$45,000	Y	Y	$55,902	Y	Y
	$40,000	N	Y	$72,921	Y	Y
	$43,752	N	Y	$75,556	Y	Y
	$42,689	N	Y	$77,685	Y	Y
	$47,888	N	Y	$77,603	Y	Y
	$43,752	N	Y	$85,000	Y	Y
	$43,550	N	Y	$68,000	Y	Y
	$47,888	N	Y	$75,959	Y	Y
	$43,457	N	Y	$71,148	Y	Y

Endnotes

1. Adie Tomer, Elizabeth Kneebone, Robert Puentes, and Alan Berube, "Missed Opportunity: Transit and Jobs in Metropolitan America" (Washington: Brookings, 2011).

2. National Transportation Policy Project, "Performance Driven: A New Vision for U.S. Transportation Policy" (Washington: Bi-Partisan Policy Center, 2009); and Todd Litman, "Evaluating Accessibility for Transportation Planning (Victoria, BC: Victoria Transport Policy Institute, 2011).

3. See e.g., Jeanette M. Hercik and others, "Overcoming Transportation Barriers: A Path to Self-Sufficiency," ICF International for the U.S. Department of Health and Human Services, Contract No.: 233-02-0094 (2009); Evelyn Blumenthal and Margy Waller, "The Long Journey to Work: A Federal Transportation Policy for Working Families," in *Taking the High Road: A Metropolitan Agenda for Transportation Reform*, B. Katz and R. Puentes, eds. (Washington: Brookings Press, 2005).

4. David Levinson and Emilia Istrate, "Access for Value: Financing Transportation through Land Value Capture " (Washington: Brookings, 2011).

5. National Transportation Policy Project, "Performance Driven."

6. "The State of Metropolitan America: On the Front Lines of Demographic Change" (Washington: Brookings, 2010). Reversing a pair of 40-year trends, the share of Americans that commute by transit increased from 2000 to 2008 (0.5 percent), while the share of those that drive alone to work fell slightly (-0.2 percent).

7. Richard Mudge and Keith Jasper, "Performance Metrics for the Evaluation of Transportation Programs" (Washington: Bi-Partisan Policy Center, 2009).

8. Adie Tomer, "Transit Access and Zero-Vehicle Households," (Washington: Brookings, 2011).

9. Ashley R. Hair and Randy B. Machemeh, "Impact of Rising Fuel Prices on U.S. Transit Ridership," *Journal of the Transportation Research Board,* Vol. 1992 (2007).

10. Robert Lang, "Edgeless Cities: Exploring the Elusive Metropolis" (Washington: Brookings, 2003).

11. Job access analysis applies to working age residents, or residents aged 16 to 64 years old. However, due to data limitations, analysis that refers to the educational attainment of residents and "good match" jobs refers to residents over the age of 25.

12. Brookings contracted with RAPIDIS, a Danish firm, to procure that firm's Traffic Analyst software, which functions as an extension to ESRI's ArcGIS software suit.

13. Nielsen constructs its estimates based on the U.S. Census Bureau's Decennial Censuses and American Community Surveys, InfoUSA, and other sources. The use of the top-down, national data sources in conjunction with bottom-up techniques based on localized data (e.g., postal service listings, new construction data, and Nielsen's Master Address File) allow for internally consistent estimate production at a wide range of geographies including tract and block group. For detailed discussion of estimates methodology, please see www.claritas.com.

14. The American Community Survey surveys 3 million households nationally per year. To produce statistically reliable estimates for smaller geographies, such as census designated places and tracts, multiple years of data must be pooled. For certain analyses, this report used five-year estimates from 2006-2010, based on 60 months' worth of surveys that ask about characteristics within the previous 12 months, meaning they span from January of 2005 through December of 2010. In concert with standard statistical practices, the authors do not consider unweighted microdata counts of less than five to be significant and the analysis does not include them.

    The estimates do not represent any given year, but provide an adjusted estimate for the entire five-year period. This period bridges vastly different points in the economic cycle, starting with a period of modest growth and ending after the onset of the worst downturn since the Great Depression. The combination of such different periods likely mutes the trends studied here.

15. American Community Survey, 2006-2010 5-year estimates

16. "2012 Public Transportation Fact Book," (Washington: American Public Transportation Association, 2012).

17. American Community Survey, 2006-2010 5-year estimates

18. Information on the median income of workers by mode of commute is from the American Community Survey, 2006-2010 5-year estimates.

19. Nielsen Pop-Facts 2010 Database.

20. Analysis of U.S. Department of Transportation 2009 National Household Travel Survey data.

21. Federal Highway Administration, "Congestion: Who is Traveling in the Peak?" National Household Travel Survey Brief (U.S. Department of Transportation, 2007).

22. The "combined access score"is based on an area's transit coverage and job access measures. The share of working-age residents covered by transit is multiplied by the share of jobs reachable in 90 minutes, and the product is multiplied by 100. Sixteen PUMAs have combined access scores above 40 at 90 minutes and are considered high performing PUMAs in this analysis.

23. As with the ranking of areas for job accessibility via transit overall, this ranking relies on the combined access score. In this case, however, we calculated the scores based on transit coverage multiplied by the share of transit-accessible "good match" jobs (high-skill jobs transit-accessible to high-skill residents, mid-skill jobs to mid-skill residents, and low-skill jobs for low-skill residents), and at each time threshold. We narrowed the list of high performers down to 11 from 16 based on a review of the combined access scores at each skill level and time threshold, considering natural breaks in the scores across the different variables (skill and time). Five of the areas from the overall list of top-performers were cut from the good match ranking due to consideration of performance at the 60 and 45 minute thresholds.

24. Median earnings by PUMA/jurisdiction were constructed via ACS 2006-2010 5-year estimates microdata. Within each PUMA/jurisdiction, residents were categorized by their education attainment. A population-weighted median earnings value was determined for each worker category (low-skill workers have a high school diploma or less, mid-skill workers attended some college or have an Associate's Degree, and high-skill workers hold a Bachelor's Degree or higher). Just as education attainment varies between PUMAs/jurisdictions, with some more highly educated than others, so too do median earnings. Earnings refer to the residents of the PUMA/jurisdiction, regardless of the location of their job.

25. Center for Neighborhood Technology. 2011. "H+T in DC: Housing and Transportation Affordability in Washington, DC." Chicago. This analysis used a more expansive definition of housing affordability including transportation costs, and identified substantial changes in the housing affordability landscape, primarily that outlying areas became less affordable based on their higher transportation costs. The new definition of affordability used in the analysis was that housing and transportation costs together should consume no more than 45 percent of Annual Median Income (AMI), defined at $87,623, with housing capped at 30 percent and transportation capped at 15 percent of AMI.

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36. WMATA, MARC, and VRE

37. The Loudoun County place of work PUMA includes Loudoun, Clarke, Warren, and Fauquier counties.

38. The authors gratefully thank Jeff Strohl, Director of Research at the Georgetown Center on Education and the Workforce, for suggesting this methodology for classifying jobs by skill level.

39. Harry J. Holzer and Robert I. Lerman, "America's Forgotten Middle-Skill Jobs: Education and Training Requirements in the Next Decade and Beyond" (Washington: Workforce Alliance, 2007).

40. Falls Church is included in PUMA 301, Fairfax City is included in PUMA 303, and Manassas and Manassas Park are included in PUMA 501. PUMAs 301, 302, 303, 304, and 305 create Fairfax County and PUMAs 501 and 502 create Prince William County.

41. The nine jurisdictions in the federal definition of the region that are not included in this report are Calvert and Charles counties in Maryland; Clarke, Fauquier, Spotsylvania, Stafford and Warren counties in Virginia, the city of Fredericksburg, Virginia, and Jefferson County in West Virginia.

42. The transit systems that operate in the federally-defined region that are not included in this analysis include the Calvert County Public Transportation Division of the Department of Community Resources, Fredericksburg Regional Transit and VanGO in Charles County.

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