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The Economic and Fiscal Impacts of Locating Amazon's HQ2 in Arlington County, Virginia

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Executive Summary

The location of Amazon's HQ2 in Arlington County would generate significant impacts to the benefit of the County's and Commonwealth of Virginia's economies. These economic and fiscal impacts would be seen in job and income growth including the HQ2 workforce and the supporting jobs and personal and business earnings that would be generated annually by HQ2, its workforce, and their families by their spending for goods and service within the Arlington County economy and throughout the Commonwealth of Virginia. This new economic activity would generate substantial new revenues in excess of new public expenditure requirements for both Arlington County and the Commonwealth of Virginia.

These economic impacts would be generated by the construction and related activities to supply the 8 million square feet of office space needed to house up to 50,000 jobs planned for HQ2. These outlays would occur over a proposed base-case period of 20 years (see Appendix II Table C for details). With the occupancy of renovated and newly constructed office space, Amazon's outlays to operate its business functions at HQ2, daily spending by its workforce and household spending by Amazon workers' households residing in Arlington County would generate economic benefits in support of the County's local business base spanning the breadth of the local economy with these benefits recurring annually.

The magnitudes of these economic impacts would be a function of the number of workers comprising the HQ2 workforce in any year building up to the planned total of 50,000 jobs and the number of Amazon workers' households choosing Arlington County as their place-of-residence. In this analysis, total impacts are estimated for the build-out year. These economic impacts can be annualized or calculated for intervening years by prorating the end-period totals according to the projected pace of hiring for the intervening years.

The direct outlays associated with HQ2 construction, operations, and daily worker and annual household spending would generate additional impacts on the Arlington County economy as these outlays are recycled through the County's economy generating new payroll supporting non-Amazon jobs and generating business transaction that further expand the County's and State's economies. Some of these impacts would also extend into the economies of the District of Columbia and Maryland; for example, it is projected that approximately 30 percent of HQ2's workforce would choose to reside outside of the Commonwealth of Virginia.

The economic and fiscal impacts accruing to Arlington County, as the headquarters site for Amazon, are summarized in Table 1 while the economic and fiscal impacts flowing to the Commonwealth of Virginia, inclusive of Arlington County, are reported in Table 2.

The key findings of these analyses are:

- Construction outlays associated with building out the office space requirements totaling 8 million square feet to house Amazon’s HQ2 in Arlington County, including site preparation and on-site infrastructure, soft costs, renovation and new construction and tenant improvements, would total approximately \$5.5 billion and contribute an estimated total of \$6.5 billion to Arlington County’s economy over the construction period.
- These direct construction outlays would also generate up to \$521.8 million in new labor income over the construction period to the benefit of workers residing in Arlington County, supporting up to 5,072 jobs in the County and, in total, would generate \$3.4 billion in new personal earnings and as many as 50,112 full-time, year-round equivalent jobs within the Commonwealth of Virginia.

Table 1

Summary of Amazon’s HQ2 Economic and Fiscal Impacts
on Arlington County at Build-Out
(economic impacts in millions of 2030\$; fiscal flows in millions of 2017\$)

Source	Direct Outlay	Total Output ¹	Personal Earnings ¹	Jobs Supported ¹
Construction ²	\$5,474.8	\$6,476.4	\$521.8	5,072
Post-Construction (annual) ³	\$2,622.9	\$3,339.3	\$248.6	2,310
Post-Construction (annual) ⁴	\$2,643.9	\$3,366.0	\$251.8	2,321

	Revenues	-	Expenditures	=	Fiscal Impact
Fiscal Flows					
@ \$150,000 (annual) ⁵	\$203.985	-	\$151.157	=	\$52.828
@ \$200,000 (annual) ⁵	\$196.770	-	\$144.488	=	\$52.282

Source: The Stephen S. Fuller Institute at the Schar School, GMU

¹See Table 3 or 4 for column notes.

²total impacts over construction period

³impacts recur annually, assuming \$150,000 average salary; dollars need to be adjusted for inflation past 2040.

⁴impacts recur annually, assuming \$200,000 average salary; dollars need to be adjusted for inflation beyond 2040.

⁵calculations based on the residential and indirect job differences associated with alternative average salary levels for HQ2’s employees.

- The direct new annual spending in Arlington County generated following completion of construction is estimated to total \$2.6 billion and to contribute \$3.4 billion to the Arlington County economy.
- HQ2's projected 50,000 on-site jobs would support a payroll ranging between \$10.0 and \$13.3 billion annually with an estimated fifteen percent of these jobs (8,218 to 7,265 depending on average salary level) held by workers residing in Arlington County and 69.5 percent (34,727 to 34,578 depending on average salary level) living in the Commonwealth of Virginia.
- Direct post-construction spending would support an estimated 2,310 to 2,321 indirect and induced new jobs in Arlington County and from 44,321 to 49,498 new jobs statewide spanning the breadth of the economy.
- This new economic activity would generate annual fiscal benefits of \$52.3 to \$52.8 million for Arlington County and from \$328.6 to \$471.9 million for the Commonwealth (in 2017\$s).

Table 2

Summary of Amazon's HQ2 Economic and Fiscal Impacts
on the Commonwealth of Virginia at Build-Out
(economic impacts in millions of 2030\$s; fiscal flows in millions of 2017\$s)

Source	Direct Outlay	Total Output ¹	Personal Earnings ¹	Jobs Supported ¹
Construction ²	\$5,474.8	\$10,686.1	\$3,384.1	50,112
Post-Construction (annual) ³	\$5,053.4	\$9,780.8	\$3,039.2	44,321
Post-Construction (annual) ⁴	\$6,165.1	\$11,932.6	\$3,707.8	49,498

	Revenues ⁵	-	Expenditures ⁶	=	Fiscal Impact
Fiscal Flows ⁷					
@ \$150,000 (annual)	\$438.341	-	\$109.729	=	\$328.612
@ \$200,000 (annual)	\$592.946	-	\$121.038	=	\$471.908

Source: The Stephen S. Fuller Institute at the Schar School, GMU

¹Column and tables notes 1-4 the same as for Table 1.

⁵Individual income tax and sales and use tax revenues

⁶required educational expenditures in support of HQ2-related increases in K-12 school children, direct, indirect and induced, in Northern Virginia.

⁷based on respective average salaries of HQ2 workers residing in the Commonwealth and the average salaries of indirect and induced jobs in the State generated by HQ2-related spending adjusted for job location in Northern Virginia or elsewhere in the State.

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The Economic and Fiscal Impacts of Locating Amazon's HQ2 in Arlington County, Virginia

The objectives of the analyses reported herein are to calculate the demographic, economic, and fiscal impacts of constructing and operating Amazon's HQ2 with its proposed 50,000 worker employment base, 8 million square feet of office, and annual payroll total ranging from \$9.9 to \$13.3 billion at build-out on Arlington County and the Commonwealth of Virginia (see Appendix II Table C for the build-out schedule).

The Analytical Dimensions of Amazon's HQ2

Amazon's HQ2 represents a significant source of demographic, economic and fiscal impact to the benefit of its host jurisdiction. These direct impacts would be a function of HQ2's magnitude of operations and the payroll and non-payroll expenditures associated with the construction of the facilities to house HQ2's workforce, HQ2's continuing expenditures for its annual operations, and the payroll of its workforce and where these outlays are likely to be made and for what goods and services and the fiscal effects (demands of public services and generation of new revenues) that these new jobs and related households would have at the local and State levels.

HQ2, as proposed, would generate up to 50,000 new headquarters jobs in Arlington County at build-out, currently proposed by 2040, occupying a total of 8 million square feet of office space. For this analysis, two annual payrolls for this workforce are considered: one averaging \$150,000 per job and one averaging \$200,000 per job with respective build-out payroll totals of \$9.9 billion and \$13.3 billion (in 2040 dollars).

It is estimated that fifteen percent of these new Amazon workers (8,218 to 7,265) would choose to reside in Arlington with sixty-nine percent of these workers (34,727 to 34,578) residing in the Commonwealth. The remainder would largely reside in Maryland and the District of Columbia. These new households—ranging from 7,100 to 8,000 in Arlington County and approximately 34,300 in Virginia—would generate a total household income ranging from \$7.9 to 9.5 billion (in 2017 \$s) representing new demand for locally provided goods and services and housing, supporting the growth of the local and statewide economies as well as expanding the host jurisdictions' tax bases while correspondingly increasing the demand for publicly provided services.

The impacts of locating Amazon's HQ2 in Arlington County would accrue to the County's and to the Commonwealth of Virginia's economies and tax bases during HQ2's construction phases—soft and hard costs, site development and tenant improvements, and continue annually thereafter from outlays to support HQ2's operations as well as from daily on-site spending by HQ2 workers for food and

beverages, retail sales and transportation. These annual outlays related to the place-of-work of Amazon’s workforce would be complemented by these workers’ household spending within their jurisdictions of residence.

As this new HQ2 employee and household spending circulates within the local and State economies, it would generate additional business transactions and support the payroll of local workers and workers located more broadly with this re-spending generating additional income and supporting additional employment within the economy. These economic effects can be measured using “multipliers” calculated by the U.S. Bureau of Economic Analysis for Arlington County and the Commonwealth of Virginia to derive the total contribution of this new spending to these respective economies, the new personal earnings (labor income) generated to the benefit of workers residing in Arlington County and the Commonwealth and the total jobs this new spending would support locally, within the State and beyond.

For construction outlays, these economic impacts would be those spanning the full period of the construction activity; these impacts are calculated based on the totals and do not continue beyond the construction period. The post-construction outlays—HQ2’s operations, employee on-site spending, and workers’ household spending by place-of-residence—would be annual outlays and would recur each year as long as Amazon retains its headquarters in Arlington County. All of these economic activities and the growth that they support would have important fiscal implications for Arlington County and the Commonwealth of Virginia.

The Economic Impacts of Locating Amazon’s HQ2 in Arlington County and the Commonwealth of Virginia

The location of Amazon’s HQ2 in Arlington County would impact the County’s economy throughout the construction period; with the completion of construction, these impacts would have been realized. These economic impacts would span the pre-construction and construction periods including design and engineering services and other soft costs, site development and landscaping, and building renovation or new construction and pre-occupancy improvements including tenant improvements; that is, all direct outlays required to produce the move-in-ready product.

Post-construction economic benefits would recur annually as the office space is delivered over the 2020-2040 period for the lifetime of Amazon’s HQ2 in its Arlington County location. These economic benefits would reflect the continuing expenditures for building and headquarters operations, the on-site spending by HQ2’s workforce and the disposable income that the new HQ2 workers’ households, those choosing to reside in Arlington County and more broadly in the Commonwealth, would bring into the County and State to spend on consumer goods and services.

Construction-Related Economic Impacts of HQ2

The economic impacts generated by the construction of Amazon’s HQ2—its hard and soft costs inclusive of site development, infrastructure and tenant improvements but excluding land acquisition, taxes, insurance and financing costs—are reported in Table 3 for build-out spanning the FY 2019-2037 period. During this period direct outlays for the hard and soft costs and tenant improvements associated with the renovation and new construction of 8 million square feet of office space and preparing these structures for occupancy are projected to total \$5.5 billion (construction costs are inflated at 1.5 percent per year and averaged over the 18-year construction period).

Table 3

The Economic Impacts of Amazon’s HQ2 Total Construction Spending
on Arlington County and the Commonwealth of Virginia
(economic impacts in millions of 2030\$s)

Source	Direct Outlay	Total Output ¹	Personal Earnings ²	Jobs Supported ³
Arlington County	\$5,474.8	\$6,476.4	\$521.8	5,072
Virginia	\$5,474.8	\$10,686.1	\$3,384.1	50,112

Sources: VEDP and The Stephen S. Fuller Institute at the Schar School, GMU.

¹total contribution to the Arlington County and State’s economies.

²generation of new personal earnings beyond HQ2’s payroll accruing to workers residing in Arlington County and the Commonwealth of Virginia.

³jobs supported by the construction and related outlay over the construction period.

The build-out of HQ2’s office space requirements, up to 7 million square feet of new construction and including the outlays for the renovation of up to 1 million square feet of existing office space, over the base-line period of 20 years represents major direct outlays that would generate even greater contributions to these economies, as shown in Table 3. The \$5.5 billion in total construction spending over the construction period would add \$6.5 billion to the Arlington County economy and \$10.7 billion to the Commonwealth of Virginia’s economy over the full construction period. These direct construction outlays would generate significant new taxable personal earnings to the benefit of workers residing in Arlington County and elsewhere in Virginia. For the base-case construction period, these new earnings would translate into 5,072 and 50,112 year-round, full-time equivalent jobs, respectively, for the County and Commonwealth spanning the construction period.

Post-Construction-Related Economic Impacts

The economic impacts generated during the development period, as presented in Table 4, would represent significant contributions to the economies of Arlington County and the Commonwealth of Virginia and to generate significant levels of local and statewide labor income and employment. While these impacts would be fully realized with the completion of construction activity, the daily operations of HQ2, the spending by its workforce, and the spending by the new workers' households choosing to reside in Arlington County and the Commonwealth would continue to generate annual economic benefits as long as Amazon retains its HQ2 in Arlington County. These continuing economic impacts are presented for Arlington County and the Commonwealth in Table 4.

Table 4

Economic Impacts of Amazon's HQ2 Annual Post-Construction Outlays
on Arlington County and the Commonwealth of Virginia
(economic impacts in millions of 2030\$s)

Source	Direct Outlay	Total Output ¹	Personal Earnings ²	Jobs Supported ³
Arlington County				
HQ2 Operations ⁴	\$2,167.0	\$2,722.7	\$195.4	1,554
Employee Spending ⁵	222.9	295.5	26.6	411
Household Spending ⁶	233.0	321.1	26.6	345
Totals	\$2,622.9	\$3,339.3	\$248.6	2,310
Totals ⁷	\$2,643.9	\$3,366.0	\$251.8	2,321
Commonwealth of Virginia				
HQ2 Operations ⁴	\$2,167.0	\$4,086.0	\$1,205.6	13,717
Employee Spending ⁵	222.9	441.6	141.5	2,660
Household Spending ⁶	2,663.5	5,253.2	1,692.1	27,944
Totals	\$5,053.4	\$9,780.8	\$3,039.2	44,321
Totals ⁷	\$6,165.1	\$11,932.6	\$3,707.8	49,498

Sources: VEDP and The Stephen S. Fuller Institute at the Schar School, GMU.

¹total contribution to the Arlington County and State economies.

²generation of new personal earnings beyond HQ2's payroll accruing to workers residing in Arlington County and the State.

³jobs supported by the post-construction outlays annually at the end of the period.

⁴based on 50,000 employees.

⁵on-site daily spending for food and beverages, retail sales and transportation.

⁶local spending for goods and services by households of HQ2 employees residing in Arlington County and the Commonwealth of Virginia with \$150,000 average salary.

⁷total post-construction spending reflecting an average salary of \$200,000.

Arlington County's continuing economic benefits from hosting HQ2 would be realized by a broad base of its local businesses both in support of the business operations of Amazon's HQ2 and its workforce's daily consumption requirements—its on-site spending for food services, retail sales and transportation including parking. The approximately 15 percent of Amazon's workforce who would choose to reside in Arlington County, accounting for from 8,054 to 7,139 households and 8,218 and 7,265 HQ2 workers respectively (depending on HQ2's average salary level), represent a major source of consumer outlays. These households would represent a total household income projected to range between \$1.4 and \$1.7 billion. Based on an average household consumer spending profile, developed by the U.S. Bureau of Labor Statistics, and adjusting for consumer spending that is likely to be captured locally, Arlington County's businesses would likely captured 17.9 percent of average, after tax, consumption spending by these new Amazon workers' households with the State's share being 37.3 percent.

Annual outlays associated with Amazon's operations and workforce spending are estimated to slightly exceed \$2.6 billion annually in Arlington County (in 2017 \$s) contributing up to \$3.4 billion to the County's economy, reflecting a multiplier of 1.27. This annual spending would generate new personal earnings of \$249.8 million that would accrue to workers residing in the County and represent County-based employment—full-time, year-round equivalent—ranging from 2,310 to 2,321 jobs.

These same levels of post-construction spending would generate even greater magnitudes of economic benefits when measured for the Commonwealth of Virginia. The multipliers for the State economy are larger than for Arlington County reflecting its larger and more complex economy, which retains more of these outlays and provides a greater proportion of the services and labor required to service HQ2 at its Arlington County location. As a result the economic impacts, new personal earnings and jobs supported per dollar of outlay would be substantially greater for the Commonwealth than reported for Arlington County.

With all 50,000 HQ2 employees in place in Arlington County, annual spending to the benefit of the Commonwealth's economy would range from \$5.0 billion to \$6.1 billion. The total contribution of this new spending to the Virginia economy, with a multiplier of 1.94, would range from \$9.8 billion to \$11.9 billion, generate new personal (and taxable) earnings ranging from \$3.0 billion to \$3.7 billion annually and support from 39,415 to 44,041 indirect and induced jobs being held by workers residing in Virginia.

The Fiscal Impacts of Locating Amazon's HQ2 in Arlington County and the Commonwealth of Virginia

The framework for the fiscal impact analysis of Amazon's HQ2 is provided by the per capita and per employee fiscal impacts calculated for Arlington County based on its FY 2017 Comprehensive Annual Financial Report as summarized on Table A in Appendix II. These per capita averages for public expenditures and revenues

provide the basis for calculating the fiscal impact of Amazon’s HQ2 reflecting its mix of at-place jobs and HQ2 workers and related indirect and induced workers likely to reside in Arlington County.

Amazon’s HQ2: Jobs and Population, Direct, Indirect and Induced

The data inputs to the fiscal impact analysis for Amazon’s HQ2 on Arlington County and the Commonwealth of Virginia include the HQ2 jobs and Amazon workers’ households (number of residents and number of school-age children) residing in Arlington County and the Commonwealth of Virginia. These inputs are presented in Table 5.

Table 5

Direct and Indirect Jobs and Population Generated by
Amazon’s HQ2 Location In Arlington County

Development Period	Jobs	Population	School-Age
Arlington County			
Direct Impacts			
Build-out @ \$150,000	50,000	17,585	1,513
Build-out @ \$200,000	50,000	15,240	1,377
Indirect Impacts			
Build-out @ \$100,000	2,310	2,358	182
Build-out @ \$200,000	2,321	2,546	195
Commonwealth of Virginia			
Direct Impacts			
Build-out @ \$150,000	50,000	96,870	16,196
Build-out @ \$200,000	50,000	97,654	17,593
Indirect Impacts			
Build-out @ \$150,000	44,321	125,472	22,133
Build-out @ \$200,000	49,498	140,339	24,765

Sources: VEDP and The Stephen S. Fuller Institute at the Schar School, GMU

Arlington County’s Fiscal Impact Analysis Methodology

The objective of this fiscal assessment is to answer the question: If Amazon’s HQ2 was already built-out in Arlington County during the 2017 budget year would it and its employee’s households residing in Arlington County have generated more County revenues than the cost burden of the public services it and its resident workers would have required; that is, would hosting HQ2 generate a fiscal benefit to the County? In order to answer this question, Arlington County’s fiscal impact analysis is based on the expenditure and revenue data presented in the most

current Arlington County Comprehensive Annual Financial Report (CAFR). All data utilized in this fiscal analysis are for 2017. This analysis divides the County's expenditures and revenues into those that serve or are generated by the residents of the County (its population) and those that are related to or generated by the County's non-residential functions (as represented by its employment base, its workers). This assignment of expenditures (demands for County services) and revenues is expressed for the County's 222,800 residents on a per capita basis and for the County's non-residential functions based on its estimated 173,002 at-place jobs across all sectors (private and public) on a per employee basis that existed in 2017.

This analysis of the County's revenues in FY 2017, including all taxes, fees, permits, fines, user charges, and intergovernmental transfers, found that these were divided between residents (population) and non-residential functions (jobs in the County), respectively, on a 62.3% and 37.7% basis. An analysis of the County's expenses (demand for services) for FY 2017 found that these were distributed between residents and non-residential functions, respectively, on a 78.1% and 21.9% basis. These differences in the percentage shares for revenues and expenditures between residents and non-residential functions explain why it is fiscally important for the County to balance residential and non-residential growth. These revenue and expenditure distributions are shown in Table 6.

Table 6

Fiscal Flows in Arlington County for
Resident and Non-Residential Functions, FY 2017
(in 2017 dollars)

Source	Per capita ¹	Per Job ²
Expenditures:		
County-wide average	\$4,207.04	\$1,515.96
Education Only ³	2,135.09	
All Other Expenditures	2,071.95	
Revenues:		
County-wide average	\$3,356.98	\$2,610.72
Real Property	2,281.51	1,101.63
All Other Sources	<u>1,075.47</u>	<u>1,509.09</u>
Net Fiscal Impact	-\$850.06	\$1,094.76

Source: The Stephen S. Fuller Institute at the Schar School, GMU.

¹the County's population in 2017 totaled 222,800 (CAFR, page 247).

²the County's at-place employment in 2017 totaled 173,002 (BLS).

³educational costs per student in FY 2017 were \$18,015.46 based on enrollment of 26,405 (CAFR page 247).

For this analysis, the real estate tax revenue generated by multifamily structures has been included on the residential side of the equation (these data are normally reported as commercial revenue). While tax-exempt properties do not generate real estate tax revenues, these facilities and their employees do place demands on the County's services. In this fiscal analysis the workers (jobs) accommodated in these tax-exempt properties are included on the non-residential side of the fiscal equation. All educational expenditures, the largest single source of County expenditures, are assigned to the resident's (population) side of the equation. Other assignments are based on the identified sources, where these are identified, or based on access or use patterns in the County. Where service patterns cannot be identified, such as for General Government, it is assumed that every resident and every worker in the County has equal access to these services and, therefore, their costs are assigned equally to all residents and workers in the County.

For the fiscal analysis of Amazon's HQ2, this fiscal model has been tailored to reflect the differences between Amazon's HQ2 as a place-of-employment and its workers' households (and HQ2's indirect and induced jobs and their households) and the averages reflecting all current residents and workers in Arlington County as shown in Table 6. These adjustments include an estimate for the real estate tax revenues that would be generated by 8 million square feet of renovated and new office buildings, with a construction value of \$5.5 billion, including estimated land value, in 2017 dollars to house HQ2's planned 50,000 workers. Additionally, the cost of educating the new school-age children of HQ2 workers' household and households associated with indirect and induced jobs linked to HQ2 and locating in Arlington County is calculated in this analysis at the per student cost of \$18,015.46. All other average values, based on the FY 2017 budget, are used even though they may overstate demands for public services given the above-average incomes and demographic profile of the new HQ2 and related households projected to reside in Arlington County should Amazon select the County for its HQ2 location.

The Fiscal Impact of Amazon's HQ2 on Arlington County

These analyses of Amazon's HQ2 fiscal impacts on Arlington County show that the location of HQ2 in Arlington County, with its job base and related tax base, would generate a substantial fiscal benefit to the County that would more than compensate for the fiscal costs associated with the new HQ2 workers' households who would choose to locate in the County as a result of HQ2's location there and the households related to the indirect and induced jobs generated by HQ2-related spending choosing to reside in the County.

These net fiscal benefits for HQ2 at build-out with its planned 50,000 jobs on site, the new households choosing to reside in Arlington County, and the additional indirect and induced jobs generated within the County's economy and their related households, as enumerated on Table 5, are estimated to range between \$52.8 million and \$52.3 million (in 2017 dollars) reflecting two average salary levels, as presented in Tables 7a and 7b. The annual, inflation adjusted value of these

revenues and expenditures are presented in the Appendix II reflecting the differences generated by two average salaries for HQ2’s workforce: \$150,000 and \$200,000.

Table 7a

The Fiscal Impact of the Amazon’s HQ2 on Arlington County At Build-Out:
Direct, Indirect and Induced—Average Employee Salary of \$150,000
(in millions of 2017 dollars)

Source	Residents	Non-Residential
Revenues		
Other Than Real Estate	\$45.500	\$78.940
Real Estate Tax	<u>21.448</u>	<u>58.097</u>
Total Revenues	\$66.948	\$137.037
Expenditures		
Public Schools	\$30.536	-----
Other Expenditures	<u>41.321</u>	<u>\$79.300</u>
Total Expenditures	<u>\$71.857</u>	<u>\$79.300</u>
Fiscal Impact	-\$4.909	\$57.737
Combined Fiscal Impact		\$52.828

Source: The Stephen S. Fuller Institute at the Schar School, GMU

The Fiscal Impact of Amazon’s HQ2 on the Commonwealth of Virginia

The fiscal impact of Amazon’s HQ2 location in Arlington County would generate demands on the Commonwealth of Virginia for services and, at the same time, this growth would generate new revenues that would flow to the State. For the purposes of this fiscal impact analysis, the one mandated increase in State-level spending that would result from the location of Amazon’s HQ2 in Arlington County is the increase in per student contributions to the counties experiencing increases in enrollment tied directly or indirectly to this location decision.

HQ2’s direct employment would add approximately 34,300 new households and between 16,200 and 17,600 new school-age children at build-out to the Commonwealth. In addition, HQ2’s spending in the Commonwealth would support from 44,321 and 49,498 indirect and induced jobs and related households. These households, combined with HQ2’s resident workers in Virginia, would generate an estimated total increase in school-age children ranging between 27,100 and 29,980 in Northern Virginia jurisdictions. Based on the State’s FY 2017 contribution to each

jurisdiction, the required costs of this additional enrollment (assuming that all of the school-age children identified attended public school) would range from \$109.7 million to \$121.0 million, depending on the salary profile of the HQ2 workforce.

Table 7b

The Fiscal Impact of the Amazon’s HQ2 on Arlington County At Build-Out:
Direct, Indirect and Induced—Average Employee Salary of \$200,000
(in millions of 2017 dollars)

Source	Residents	Non-Residential
Revenues		
Other Than Real Estate	\$40.579	\$78.957
Real Estate Tax	<u>19.128</u>	<u>58.106</u>
Total Revenues	\$59.707	\$137.063
Expenditures		
Public Schools	\$28.320	-----
Other Expenditures	<u>36.852</u>	<u>\$79.316</u>
Total Expenditures	<u>\$65.172</u>	<u>\$79.316</u>
Fiscal Impact	-\$5.465	\$57.747
Combined Fiscal Impact		\$52.282

Source: The Stephen S. Fuller Institute at the Schar School, GMU

These new residents to the Commonwealth, the holders of HQ2 jobs and the indirect and induced jobs linked to HQ2-related spending in the State, would generate new revenues across all budget categories. The three largest, accounting for 85.3 percent of the State’s revenues in FY 2017, include: individual income taxes accounting for 63.3 percent of total revenues, sales and use taxes accounting for 18.0 percent and corporate income taxes accounting for 4.0 percent.

Estimates can be developed for these major sources of tax revenues. Individual income tax revenue estimates are based exclusively on the average salaries related to HQ2 employees residing in the Commonwealth and the average salaries of the indirect and induced jobholders by place of residence, Northern Virginia or elsewhere in the State. Similarly, estimates for these new jobholders’ exposure to sales and use taxes based on their annual earnings can be calculated.

Other taxable income generated by these households are excluded from this fiscal analysis as these sources may already have existed in the Commonwealth or are not directly generated by the location of HQ2 in Arlington County. These exclusions

would include other taxable income (e.g., investment earnings) and earnings by other wage earners in HQ2 households. The average household income (assuming the average HQ2 salary of \$150,000) of HQ2 workers who would reside in the Commonwealth is estimated at \$228,187. With the HQ2 workers' average salary at \$150,000, this would leave \$78,187 in other household earnings. These excluded earnings would total \$2.7 billion for all HQ2 households residing in the Commonwealth. These earnings of second wage earners would generate an estimated \$122.2 million in individual income tax and \$23.8 million in individual sale and use tax revenues. At the upper end of the proposed HQ2 salary average, these untaxed (non-HQ2 earnings) household incomes would be greater and yield greater income and sales and use tax revenues than at the \$150,000 salary average.

Table 8

Summary of Amazon's HQ2 Annual Fiscal Impacts
on the Commonwealth of Virginia at Build-Out
(in millions of 2017 dollars)

	Revenues ¹	-	Expenditures ²	=	Fiscal Impact
Fiscal Flows ³					
@ \$150,000 (annual)	\$438.341	-	\$109.729	=	\$328.612
@ \$200,000 (annual)	\$592.946	-	\$121.038	=	\$471.908

Source: The Stephen S. Fuller Institute at the Schar School, GMU

¹Individual income tax, sales and use tax, and corporate income tax revenues, construction and post-construction spending, direct, indirect and induced.

²required educational expenditures in support of HQ2-related increases in K-12 school children, direct, indirect and induced, in Northern Virginia.

³based on respective average salaries of HQ2 workers residing in the Commonwealth and the average salaries of indirect and induced jobs in the State generated by construction and post-construction HQ2-related spending adjusted for job location in Northern Virginia or elsewhere in the State.

Households of indirect and induced jobholders would also generate additional incomes excluded from this analysis shown on Table 8. These indirect and induced jobs are estimated to have a household income of \$115,169. With the average annual wage of the indirect worker being \$65,630, reflecting the weighted average of different salaries associated with jobs in Northern Virginia and jobs elsewhere in the State, these additional earnings income would average \$49,541 and would generate a total of \$2.2 billion in taxable earnings. These earnings would yield individual income taxes of \$99.5 million and support individual sales and use taxes totaling \$19.4 million.

Other important sources of annual income tax revenues would include: direct, indirect and induced corporate income, and construction-related earnings (direct, indirect, and induced) and sales and use taxes on these construction-related

earnings and on the purchase of construction materials. The results of these calculations for these revenue sources and the costs for the required State contribution per new student associated directly or indirectly with HQ2 are presented in Table 8 in 2017 dollars at for build-out. These revenues and costs are presented in Appendix II on an annualized and current-year basis (adjusted for inflation) for the FY 2019-FY 2039 period.

These analyses of Amazon's HQ2 direct and indirect fiscal impacts on the Commonwealth of Virginia show that the location of HQ2 in Arlington County would generate revenue flows to the Commonwealth that substantially more than compensate for the required K-12 education costs associated with the new HQ2, workforce and associated households taking up residence within the State and the related indirect and induced jobs and related increase in public school enrollment. This revenue surplus would range from \$328.6 million to \$471.908 million (expressed in 2017 \$s) annually at build-out, depending on the average HQ2 worker salary of \$150,000 or \$200,000, respectively.

Fiscal Impacts Summary

The fiscal impacts on Arlington County of locating and operating Amazon's HQ2 in the County with its planned 50,000 on-site employees and the new residents that would be attracted to live in the County, including indirect and induced employment resulting from this new spending and additional households locating in Arlington to support this new economic activity, would generate a net fiscal benefit to the County. These fiscal benefits for the base-case at full build-out would total \$52.8 million reflecting an average HQ2 employee salary of \$150,000. With an average HQ2 employee salary of \$200,000, this fiscal net benefit would total \$52.3 million. These represent the returns, revenues over expenditures, that would have been generated for Arlington County had HQ2 been in place and built-out in Arlington County in its FY 2017 budget year.

The fiscal benefits accruing to the Commonwealth of Virginia from locating Amazon's HQ2 in Arlington County, comparing only the potential increases in individual income tax and sales and use tax revenues generated by the salaries associated with the new direct, indirect and induced jobs created within the Commonwealth and several sources of business-related tax revenues (corporate, sales and use, construction-related) with the required contributions to the local jurisdictions where the HQ2 and related new workers would reside for the additional K-12 enrollment generated by these new households, would result in a net fiscal benefit to the Commonwealth. These net annual fiscal benefits of these new direct, indirect and induced jobs and related new State residents would range between \$328.612 million and \$471.908 million at build-out (in 2017\$s) under the current budget allocations. The annual, inflation adjusted value of these revenues and expenditures are presented in the Appendix II, reflecting the differences generated by three average salaries scenarios for HQ2's workforce: \$150,000 and \$200,000.

Implications of Economic and Fiscal Impacts

The scale of Amazon’s HQ2, with its up to 50,000 jobs, payroll of \$9.9 to \$13.3 billion and 8 million square feet of building space as projected for 2040 in the base-case build-out would be a significant investment in Arlington County and the Commonwealth of Virginia, even when spread out over a 20-year development period. To put the Amazon HQ2 investment into perspective, it is worth considering the projections for the County and Commonwealth in its absence. These are presented in Table 9.

Arlington County Growth Implications

For Arlington County and the Commonwealth of Virginia their potential demographic, economic and fiscal gains with the location the Amazon’s HQ2 would account for varying shares of their projected growth over the base-case build-out period likely extending their growth trajectory beyond current projections. Arlington County’s small geographic scale constrains its capacity to accommodate horizontal growth, such as single-family housing units, while it has substantially greater capacity to add housing units vertically with these predominantly serving the rental market and smaller households with fewer children.

Table 9

Forecast for Arlington County and the Commonwealth of Virginia
in the Absence of Amazon’s HQ2, 2019-2039
(in billions of current dollars, jobs and population in thousands)

Metric	<u>Arlington County</u>			<u>Commonwealth of Virginia</u>		
	2019	2039	Change	2019	2039	Change
Population	242.2	281.5	39.3	8,593.1	9,852.4	1,259.3
Households	112.3	136.9	24.6	3,289.6	4,030.0	740.4
Jobs	195.3	229.6	34.3	4,072.4	4,537.2	464.8
GCP/GSP ¹	\$37.4	\$90.2	\$52.8	\$565.3	\$1,314.1	\$748.8

Sources: IHS Markit, The Stephen S. Fuller Institute at the Schar School, GMU

¹gross county product/gross state product.

When compared to current forecasts for Arlington County’s growth over the 2019-2039 period, Amazon’s proposed workforce of up to 50,000 (plus the 2,310 indirect and induced jobs) is the one metric that substantially exceeds current forecasts: the County’s job growth projections in the absence of Amazon’s HQ2 have the County’s employment base adding 34,312 jobs over this period but with Amazon’s potential addition of 52,310 jobs (including indirect and induced job growth), assuming that these did not account for any of these previously projected jobs gains, the County’s

employment base would increase by 86,622 jobs or by 44.4 percent rather than by the projected 34,312 jobs or 17.6 percent by 2039. This more than doubling of the County’s job growth over this period would require significant growth of the County’s capacity to accommodate this employment, well beyond the 8 million square feet of office space required by HQ2, and result in additional investment in new office and other commercial spaces during this period.

Table 10

Projected Growth Without and Including Amazon’s HQ2: 2019-2039
(percent change for 20-year period)

Metric	Arlington County		Commonwealth of Virginia	
	Without HQ2	Including HQ2	Without HQ2	Including HQ2
Population Growth	16.2%	24.2%	14.6%	17.2%
Household Growth	21.9	29.9	22.5	24.7
Job Growth	17.6	44.3	11.4	13.7
GCP/GSP ¹ growth	141.2%	246.8%	32.5%	53.7%

Sources: IHS Markit, The Stephen S. Fuller Institute at the Schar School, GMU
¹gross county product/gross state product change over 2019-2039 period not adjusted for inflation.

The current office market in Crystal City/Pentagon City and in Rosslyn, as is true more broadly in Arlington County, has experienced improvement in 2018 following a period of declining absorption dating back to the Sequester in 2014. These two major submarkets have a total of 21.9 million square feet of gross office space with 4.6 million vacant as of mid-year 2018 for a 21.2 percent vacancy rate. Much of this office space is Class B and C that would require substantial renovation to be attractive in today’s market and some would ultimately be repositioned out of the office market. The good news is, according to a mid-year report by NewmarkKnightFrank, these office markets have experienced increasing absorption in 2018 (224,617 square feet in Crystal City/Pentagon City and 548,459 in Rosslyn). This absorption more than doubles the absorption achieved in the Crystal City/Pentagon City submarket over the past two years and reverses the pattern of negative absorption in the Rosslyn submarket experienced since 2014. At present, there is no new office construction underway in these two submarkets. Still, there is sufficient existing space to house Amazon’s short-term requirements in either submarket; this would reduce the current vacancy rate by 50% in either assuming that this vacant space is otherwise suitable for HQ2’s long-range purposes.

While the currently available office space could accommodate HQ2’s short-term requirements, this availability of office space provides the capacity needed to house

the expanded requirements of businesses and their workers generated in support of HQ2, the indirect and induced workforce (and opportunistic business locations) needed to capture the full economic potentials associated with the location of Amazon's HQ2 in Arlington County. These currently above-normal office vacancy rates in these two major Arlington County submarkets, which have presented a fiscal challenge to the County over the past three years, would enable the County to realize the ancillary economic and fiscal benefits from HQ2's location. Alternatively, if these office markets had been more limited, with attendant higher lease rates, these tenants could have been discouraged from co-locating in Arlington County with the resultant losses of these economic and fiscal benefits to neighboring jurisdictions.

To house the new households directly and indirectly related to HQ2, Arlington County would need between 8,233 and 9,065 housing units with 63-70 percent of these being rentals, depending upon the average wage of the HQ2 jobs (See Appendix I for details). While these housing requirements are not proportionally as great as the new work space requirements, they would present a challenge to the County due to an already constrained housing supply, an aging housing stock and growing price pressures in the absence of the new housing demands generated by Amazon's HQ2. One result of this tight housing market would be shifting this new housing demand to adjacent jurisdictions where vacant land is more available to support single-family housing construction.

The increased economic activity that would flow to Arlington County's business base from the location of Amazon's HQ2 in the County, generating construction outlays totaling \$5.5 billion and annual post-construction spending of \$2.6 billion, could increase the County's economic growth rate during the build-out period by as much as 3 percentage points; that is, from an average of 4% per year to more than 7% (not inflation adjusted), assuming all planned growth beyond the addition of Amazon's HQ2 is achieved. With the completion of construction, the annual economic contributions from the presence of HQ2 would increase the County's growth rate by as much as 50% above its projected annual rate in the absence of HQ2.

The total impact on Arlington County's and the Commonwealth's economies over the twenty-year development period planned for HQ2 is captured by comparing the projected economic growth rates projected including HQ2 and in its absence. For the County, its economy is currently projected to grow by 141.2 percent (not adjusted for inflation over the 2019-2039 period; with the addition of HQ2, both its construction impacts and its annual post-construction expenditures, for operations and by HQ2 employees, in combination with already projected growth would increase the economy's growth rate to 246.8 percent, a gain of 75 percent.

These demographic and economic gains are accompanied by a projected surplus of County revenues (taxes) over expenses (demands for county-provide services) attributable to HQ2, its workers and households living in Arlington County,

including indirect and induced growth effects. This budget surplus is estimated to range from \$52.3-\$52.8 million at build-out (in 2017 dollars). If HQ2 had existed (at full build-out) during FY 2017, it would have generated a surplus equivalent to 4.4 percent of the County's total budget.

Commonwealth of Virginia Growth Implications

For the Commonwealth of Virginia the significance of these gains compared to forecasted growth, as seen in Table 10, is much smaller than they would be for Arlington County even though the potential magnitude of these demographic, economic and fiscal gains from the location of Amazon's HQ2 in Arlington County would be much greater in absolute terms than those achieved by Arlington County. This is due to the scale and complexity of the State's economy in contrast to the small geographic size of the County.

The State's employment base is projected to increase by 464,820 jobs between 2019 and 2039, for a total increase of 11.4 percent for that 20-year period. With HQ2's direct and indirect jobs, if these were all net new jobs—with no displacement, the State's job increase would be up by from 73,705 to 78,319 additional jobs for a 13.7 percent gain for this period.

This job growth would be accompanied by household growth. Adding this increase of from 73,705 to 78,319 new households attributable to Amazon's HQ2 to the currently projected 740,380 households would bring the household growth rate to 24.7 percent for the 2019-2039 period, compared to 22.5 percent in the absence of HQ2. While this difference may not appear significant by itself, what makes this more significant is the household income differentials between the Amazon-related household gains and the non-Amazon household gains.

The average household income for the Amazon-related households statewide is projected at \$167,749 (in 2017 \$s) compared to the statewide average of \$97,639. This income differential has significant implications on State revenues; individual income tax revenues accounted for 63.3 percent of the State's total revenues in FY 2017. Sales and use taxes, taxes reflecting resident spending capacity, accounted for 18.0 percent of the State's revenues in FY 2017. Combined, these two revenue sources accounted for 81.3 percent of all State revenues in that budget year. For this reason, new household growth reflecting above-average salaries (and a correspondingly lower demand for State-provided services) would generate a revenue surplus in the State budget and accordingly strengthen the State's fiscal capacity.

The result of the fiscal analysis confirms this outcome. Had Amazon's HQ2 base-case build-out been completed in FY 2017, its operations and the earnings of its workers residing in the State in combination with their indirect and induced jobs would have generated a total of \$438.3 million in revenues from individual income taxes and sales and use taxes plus several major business taxes (corporate income, sales and

use, and construction) and a required increase in the State's contribution for K-12 education totaling \$109.7 million (at the \$150,000 average HQ2 salary level) in 2017 dollars, for a revenue surplus of \$328.6 million. At the HQ2 average salary level of \$200,000, this net revenue surplus would have totaled \$471.908 million, in 2017 dollars. Had HQ2 existing in FY 2017, its net fiscal benefit would have generated a budget surplus of 2.3 percent over the balanced budget total of \$20.6 billion as reported in the Comprehensive Annual Financial Report.

Amazon HQ2's impacts on the Commonwealth of Virginia's economy would represent a total contribution of \$10.7 billion to the Gross State Product during the construction period (base-case 2019-2037) and, following the completion of construction, a total annual contribution of \$10.9 billion to the State's Gross State Product thereafter and would accumulate during the build-out period as HQ2 expands its operations. For the Commonwealth, these gains would represent a significant increase in economic growth rate from the current projected rate in the absence of HQ2 of 32.5 percent, not adjusted for inflation, to 53.4 percent with HQ2's economic impacts included for a gain of 64.3 percent.

Closing Observations

The location of Amazon's HQ2 in Arlington County would generate significant and enduring impacts on the County's and Commonwealth of Virginia's economies and their respective fiscal conditions. These economic and fiscal impacts would be seen primarily in: (1) job and income growth, including the HQ2 workforce and the supporting jobs and in the personal and business earnings that HQ2, its workforce and their families would generate annually by their spending for goods and service within the Arlington County economy, in nearby jurisdictions and throughout the Commonwealth of Virginia and (2) the new tax revenues and increased demands for public services that these new direct and related economic activities and associated new residents would generate.

A less quantifiable and important benefit that would accrue to Arlington County and the Commonwealth of Virginia from the location and operation of Amazon's HQ2 would be a positive shift in the County's, Northern Virginia's and State's recent domestic migration patterns. Over the past four years, Northern Virginia and the State have been experiencing net domestic outmigration and, in the process, have been losing highly educated workers and workers with critical skill sets to competing regions.

A principal condition contributing to the increase of these residents' outmigration to other regions is that they have been able to offer competitive quality employment accompanied with lower costs of living. This loss of talent has slowed the region's and State's economic growth and could threaten its ability to achieve its future economic growth potentials. The location of HQ2 in Arlington County would generate a large number of high-skilled jobs directly and indirectly that would offer well-above average salaries and, as a result, would create an employment

environment that would increase the retention of the talent required to support an advanced economy as well as attract increased in-migration of these types of workers and other talent sensing the new opportunities that would come to define the Northern Virginia and statewide economies. Where Northern Virginia and the State have been experiencing a downward shift in the average salaries of their employment bases that has emerged since 2010, the additional of HQ2 and the other business development opportunities it would attract to the Commonwealth, would likely reverse this job-quality trend.

The analyses of the economic and fiscal impacts presented herein provide information regarding the benefits and costs of accommodating this major private investment in Arlington County and the Commonwealth of Virginia. The principal conclusion from these analyses is that location and operation of Amazon's HQ2 in Arlington County would have a substantially beneficial and enduring impact on the diversification of its and the Commonwealth of Virginia's economies and their long-term performance.

**APPENDIX I:
The Residential Impacts of
Locating Amazon's HQ2 in Arlington County**

Where HQ2 Workers Would Live: The Residential Impacts of Locating Amazon's HQ2 in Arlington County on the County and the Commonwealth of Virginia

The location of Amazon's HQ2 in Arlington County, VA would result in an increase in households living both in the County and in the Commonwealth of Virginia. These households would include at least one worker employed at HQ2 or employed in a job supported by HQ2 spending. Two HQ2-wage scenarios are presented here: one averaging \$150,000 per job (\$150,000-wage scenario) and one averaging \$200,000 per job (\$200,000-wage scenario). The difference in the average wage in each scenario would result in different household incomes and, by extension, differing residential characteristics.

At full build-out, Arlington County, VA would have an increase of 9,065 households in the \$150,000-wage scenario and an increase of 8,233 households in the \$200,000-wage scenario as a result of Amazon's HQ2 locating in the County. The Commonwealth of Virginia would have an additional 73,705 net new households in the \$150,000-wage scenario and an additional 78,319 new households in the \$200,000-wage scenario if HQ2 located in Arlington County, VA.

As shown in Table 11, this net increase in households would be the result of two sources of job growth: the Amazon HQ2 jobs and the jobs that are supported by HQ2 payroll and other operations spending.¹ The 50,000 HQ2 jobs would generate the largest demand for housing in Arlington County, VA, resulting in 7,139 or 8,054 net new households, depending upon the scenario. Of all the households with an HQ2 job, 16.7 percent would live in the County in the \$150,000-wage scenario and 14.4 percent would in the \$200,000-wage scenario. In addition to the households with an HQ2 job, the jobs supported by HQ2-spending would generate new household growth. Of all the net new indirect and induced jobs, approximately 40 percent would be located inside the Commonwealth and the remainder would be located elsewhere. This analysis only examines the households resulting from indirect and induced jobs located in Commonwealth. In Arlington County, these Virginia-based indirect and induced jobs would result in an additional net increase of 1,012 or 1,093 net new households in the County, depending upon the scenario. A significantly smaller share of these households would live in the County (about 2%) because these jobs would not be concentrated in the County, resulting in a larger geographic distribution of the households associated with these jobs.

In the Commonwealth of Virginia, 34,278 or 34,290 net new households would have an HQ2 job, depending on the scenario, accounting for about 70 percent of all

¹ See The Economic Impacts of Locating Amazon's HQ2 in Arlington County and the Commonwealth of Virginia starting on page 10 of this report for more detail about the indirect and induced jobs used in this analysis. This housing and demographic analysis only estimates the impacts of indirect and induced jobs located in the Commonwealth of Virginia.

households with an HQ2 job. In the Commonwealth, households with an HQ2 job would be concentrated in Northern Virginia; 96.1 percent or 97.5 percent would live in Northern Virginia, including Arlington, and about two-thirds would live in Northern Virginia, excluding Arlington, depending on the scenario.

Table 11
Households Related to HQ2 At Full Build-Out By Source
By Place of Residence

	Households With an HQ2 Job		Households With a Job Supported by HQ2 Spending (1)	
	\$150k Wage	\$200k Wage	\$150k Wage	\$200k Wage
Arlington County, VA	8,054	7,139	1,012	1,093
Rest of Northern Virginia	25,388	25,817	18,631	21,108
Rest of Virginia	848	1,321	19,772	21,839
Virginia	34,290	34,278	39,415	44,041
D.C.	6,484	6,676	619	676
Maryland	7,988	8,004	2,001	2,227
Elsewhere	479	454	671	750
Total (2)	49,241	49,412	42,706	47,692

Source: The Stephen S. Fuller Institute at the Schar School, GMU

(1) Includes payroll and operations expenditures

(2) A small share of the workers holding HQ2-related jobs are anticipated to cohabitate either with another HQ2-related worker or become part of an existing household. Therefore, the number of households is projected to be fewer than the number of jobs. Only the indirect and induced jobs located in the Commonwealth were analyzed.

In addition to the households with an HQ2 job, the Commonwealth would have a significant increase in households with a job supported by HQ2 spending. The Commonwealth would add 39,415 net new households with a job supported by HQ2 spending in the \$150,000-wage scenario and 44,041 new households in the \$200,000-wage scenario. The difference in households reflects the larger number of jobs supported by the \$200,000-wage scenario as detailed in the following sections. Of all the households with a Virginia-based job supported by HQ2 spending, about 92 percent, would live in the Commonwealth in either scenario.

Altogether, Arlington County, VA would have an additional 9,065 net new households with an HQ2-related job living in the County at full build-out in the \$150,000-wage scenario, or 9.9 percent of all HQ2-related households (Table 12, above). The \$200,000-wage scenario would result in slightly fewer new households in the County, at 8,233, primarily because the HQ2-related workforce with the

highest household incomes are projected to be somewhat less likely to live in the County, based on the patterns of current Professional & Business Service job-holders in the County.

Table 12

Households Related to HQ2 At Full Build-Out
By Place of Residence

	\$150k Wage	\$200k Wage
Arlington County, VA	9,065	8,233
<i>Share in Arlington County, VA</i>	<i>9.9%</i>	<i>8.5%</i>
Rest of Northern Virginia	44,020	46,926
Northern Virginia, Total	53,085	55,159
<i>Share in Northern Virginia</i>	<i>57.7%</i>	<i>56.8%</i>
Rest of Virginia	20,620	23,160
Virginia, Total	73,705	78,319
<i>Share in Virginia</i>	<i>80.2%</i>	<i>80.7%</i>
D.C.	7,103	7,351
Maryland	9,989	10,231
Elsewhere	1,150	1,204
Total, All Locations	91,947	97,105

Source: The Stephen S. Fuller Institute at the Schar School, GMU

The Commonwealth of Virginia would have 73,705 net new households with an HQ2-related job, including jobs at HQ2 and those supported by HQ2 spending, in the \$150,000-wage scenario. In the \$200,000-wage scenario, the Commonwealth would have 78,319 such households. In either scenario, about 80 percent of all HQ2-related households would live in Virginia and the households would be concentrated in Northern Virginia (57% of all HQ2 households).

Table 13, on page 28, summarizes the characteristics of the households related to HQ, both households with an HQ2 job and households with a job supported by HQ2 operations, in Arlington County, VA and the Commonwealth of Virginia.

In Arlington County, the households associated with HQ2 would include 17,786 or 19,944 people, in the \$200,000-wage and \$150,000-wage scenarios, respectively. The average household size of HQ2-related households would be about 2.2 in both scenarios and all households would include at least one adult worker in an HQ2-

related job. Nearly two-thirds of these households would have more than one adult, while the remaining one-third would live alone.

HQ2-related households in the County would primarily live in units in multifamily buildings and rent. About 70 percent of all HQ2-related households would live in a multifamily building. In the \$150,000-wage scenario, the homeownership rate of HQ2-related households would be 30.2 percent and it would be 36.6 percent in the \$200,000-wage scenario.

In the Commonwealth of Virginia, the households associated with HQ2 would include 237,993 or 222,342 people, in the \$200,000-wage and \$150,000-wage scenarios, respectively. The average household size of HQ2-related households would be about 3.0 in both scenarios and all households would include at least one adult worker in an HQ2-related job. The vast majority (85%) of these households would have more than one adult.

HQ2-related households in the Commonwealth would be most likely to live in single-family detached housing and own their home. More than one-half of all HQ2-related households would live in a single-family detached home in either scenario. In the \$150,000-wage scenario, the homeownership rate of HQ2-related households would be 65.1 percent, and it would be somewhat larger, at 67.5 percent, in the \$200,000-wage scenario.

As with all the estimates in this section, the presence of these households in the County and the Commonwealth would be contingent upon the availability of housing units at prices that are within the households' budgets. Households that cannot find a unit in their desired price range may become shift from ownership to rental units, as possible, or downsize to a less expensive building type in order to live in the County. Alternatively, these households may opt to not live the County or the Commonwealth if they find a house that better suits their needs within a commuting range that is acceptable to both the HQ2-related worker and any other workers in the household.

The HQ2-related households' incomes are shown in Table 13 for both the County and the Commonwealth. In general, households can afford to spend up to 30 percent of their household income on housing costs, either rental costs or ownership costs. Because many of the main commuters in these households would also work in the same jurisdiction as they reside, their transportation costs would be relatively small, which could allow for a larger share of their incomes to be spend on housing costs while still remaining affordable. This would be especially true for households living in Arlington County, VA. Additionally, the household incomes of the HQ2-related households would be larger, on average, compared to all households living their respective geographies, resulting in a higher likelihood that they would be able to find housing that suits their needs within their budget.

Table 13

Characteristics of Amazon HQ2-Related Households
At Full Build-Out, By Place of Residence

	Arlington County, VA		Commonwealth of Virginia	
	\$150k Wage	\$200k Wage	\$150k Wage	\$200k Wage
Households	9,065	8,233	73,705	78,319
Residents	19,944	17,786	222,342	237,993
Average Household Size	2.20	2.16	3.02	3.04
Building Type				
Single-Family Detached	1,001	1,001	41,081	45,857
Single-Family Attached	1,817	1,414	16,309	16,185
Multifamily	6,247	5,818	16,315	16,276
Tenure				
Owner	2,735	3,014	47,970	52,890
Renter	6,330	5,218	25,735	25,429
Owners by Income Group*				
<\$100k	431	307	12,279	12,938
\$100-199.9k	1,049	835	16,451	15,940
\$200-299.9k	772	1,217	11,633	12,566
\$300k+	483	655	7,608	11,446
Renters by Income Group*				
<\$75k	1,415	1,138	11,116	11,491
\$75-124.9k	1,804	1,462	6,628	6,801
\$125-199.9k	1,424	1,130	4,496	4,055
\$200k+	1,687	1,489	3,495	3,082

Source: The Stephen S. Fuller Institute at the Schar School, GMU *in 2016 dollars

The location of Amazon's HQ2 in Arlington County, VA would result in household and population growth in the County and the Commonwealth. This household growth would be driven by the jobs at HQ2 and the jobs generated by HQ2's operations expenditures. At full build-out, the County would gain 9,065 households or 8,233 households, depending upon the average wage of HQ2 jobs. These households would primarily hold an HQ2 job, live in multifamily units and be renters. At full build-out, the Commonwealth of Virginia would gain 73,705 households or 78,319 households, depending upon the average wage of HQ2 jobs. These households would primarily hold a job supported by HQ2 spending, live in single-family detached units and own their home.

**APPENDIX II:
Annual Tables**

**Table A1. Amazon's HQ2 Annual Fiscal Impact
on Arlington County, VA
\$150,000-Wage Scenario**

In millions of current dollars, Assumes 1.5% inflation per year

	Revenue	Expenditures	Net Fiscal Impact
FY 2019	1.681	1.246	0.435
FY 2020	6.740	4.995	1.746
FY 2021	15.346	11.371	3.974
FY 2022	21.900	16.229	5.672
FY 2023	34.117	25.281	8.836
FY 2024	45.278	33.552	11.726
FY 2025	53.508	39.651	13.858
FY 2026	64.606	47.874	16.732
FY 2027	79.779	59.118	20.661
FY 2028	95.393	70.688	24.705
FY 2029	108.067	80.080	27.987
FY 2030	127.486	94.470	33.016
FY 2031	139.952	103.707	36.245
FY 2032	161.943	120.003	41.940
FY 2033	180.421	133.696	46.725
FY 2034	198.892	147.383	51.509
FY 2035	223.476	165.600	57.876
FY 2036	248.753	184.331	64.422
FY 2037	274.738	203.587	71.152
FY 2038	278.859	206.640	72.219
FY 2039	283.042	209.740	73.302

Source: The Stephen S. Fuller Institute at the Schar School, GMU

**Table A2. Amazon's HQ2 Annual Fiscal Impact
on Arlington County, VA
\$200,000-Wage Scenario**

In millions of current dollars, Assumes 1.5% inflation per year

	Revenue	Expenditures	Net Fiscal Impact
FY 2019	1.622	1.191	0.431
FY 2020	6.502	4.774	1.728
FY 2021	14.803	10.870	3.933
FY 2022	21.126	15.513	5.613
FY 2023	32.910	24.166	8.744
FY 2024	43.677	32.072	11.605
FY 2025	51.616	37.901	13.714
FY 2026	62.321	45.762	16.559
FY 2027	76.957	56.510	20.448
FY 2028	92.019	67.569	24.449
FY 2029	104.244	76.547	27.698
FY 2030	122.977	90.302	32.675
FY 2031	135.002	99.131	35.870
FY 2032	156.215	114.709	41.507
FY 2033	174.040	127.797	46.243
FY 2034	191.857	140.880	50.977
FY 2035	215.572	158.294	57.278
FY 2036	239.955	176.198	63.756
FY 2037	265.021	194.604	70.416
FY 2038	268.996	197.523	71.473
FY 2039	273.031	200.486	72.545

Source: The Stephen S. Fuller Institute at the Schar School, GMU

**Table A3. Amazon's HQ2 Annual Fiscal Impact on Arlington County, VA
By Component At Full Build-Out**
In millions of 2017 \$s

	\$150k Wage	\$200k Wage
<u>Revenues</u>		
Real Estate Property Tax	114.69	110.63
Personal Property Tax	19.62	18.92
Other Local Taxes	45.65	44.04
Licenses, Permits, Fees	2.20	2.13
Charges for Service	9.83	9.48
Fines & Forfeitures	1.20	1.16
State Grants	7.56	7.29
Federal Grants	1.84	1.78
Use of Money	1.35	1.31
Miscellaneous	2.49	2.41
Transfers	(2.45)	(2.36)
Total	203.99	196.77
	\$150k Wage	\$200k Wage
<u>Expenditures</u>		
General Government	11.36	10.86
Judicial Administration	11.05	10.56
Public Safety	25.45	24.33
Environmental Services	17.46	16.69
Health & Welfare	16.40	15.67
Libraries	1.35	1.29
Planning & Community Development	3.94	3.76
Parks & Recreation	3.97	3.79
Education	27.79	26.56
non-Departmental	13.05	12.48
Debt Service	12.23	11.69
Regional Contributions	1.41	1.35
METRO	5.69	5.44
Total	151.16	144.49

Source: The Stephen S. Fuller Institute at the Schar School, GMU

**Table B1. Amazon's HQ2 Annual Fiscal Impact on the Commonwealth of Virginia
\$150,000-Wage Scenario**

In millions of current dollars, Assumes 1.5% inflation per year

	Revenue							Total Revenue	Expenditures (1)	Net Fiscal Impact
	Individual Income Tax	Individual Sales & Use Tax	Corporate Income Tax	Business sales & Use Tax	Sales & Use Tax on Construction Materials	Individual Income Tax from Construction Labor	Sales & Use Tax on Construction Labor			
FY 2019	-	-	-	-	1.93	12.33	2.40	16.67	-	16.669
FY 2020	2.64	0.51	0.15	0.22	1.96	12.52	2.44	20.45	0.918	19.533
FY 2021	10.59	2.06	0.62	0.88	1.99	12.71	2.47	31.33	3.680	27.652
FY 2022	24.12	4.70	1.41	2.01	2.02	12.90	2.51	49.67	8.379	41.287
FY 2023	34.42	6.70	2.01	2.87	2.05	13.09	2.55	63.70	11.957	51.738
FY 2024	53.62	10.44	3.14	4.47	2.08	13.29	2.59	89.62	18.628	70.996
FY 2025	71.16	13.85	4.16	5.93	2.11	13.49	2.63	113.34	24.722	88.617
FY 2026	84.10	16.37	4.92	7.01	2.14	13.69	2.67	130.90	29.215	101.685
FY 2027	101.54	19.77	5.94	8.47	2.18	13.90	2.71	154.49	35.275	119.215
FY 2028	125.38	24.41	7.33	10.46	2.21	14.10	2.75	186.64	43.559	143.085
FY 2029	149.92	29.19	8.77	12.50	2.24	14.32	2.79	219.73	52.084	167.644
FY 2030	169.84	33.06	9.94	14.16	2.28	14.53	2.83	246.64	59.004	187.638
FY 2031	200.36	39.01	11.72	16.71	2.31	14.75	2.87	287.73	69.607	218.122
FY 2032	219.95	42.82	12.87	18.34	2.35	14.97	2.91	314.21	76.413	237.800
FY 2033	254.52	49.55	14.89	21.23	2.38	15.19	2.96	360.71	88.420	272.292
FY 2034	283.56	55.20	16.59	23.65	2.42	15.42	3.00	399.84	98.509	301.326
FY 2035	312.59	60.85	18.28	26.07	2.45	15.65	3.05	438.95	108.594	330.353
FY 2036	351.22	68.38	20.55	29.29	2.49	15.89	3.09	490.91	122.017	368.890
FY 2037	390.95	76.11	22.87	32.60	2.53	16.13	3.14	544.33	135.818	408.508
FY 2038	431.79	84.06	25.26	36.01	2.56	16.37	3.19	599.24	150.006	449.232
FY 2039	438.27	85.32	25.64	36.55	2.60	16.61	3.23	608.23	152.256	455.970

Source: The Stephen S. Fuller Institute at the Schar School, GMU

(1) required educational expenditures in support of HQ2-related increases in K-12 school children, direct, indirect and induced, in Northern Virginia

**Table B2. Amazon's HQ2 Annual Fiscal Impact on the Commonwealth of Virginia
\$200,000-Wage Scenario**

In millions of current dollars, Assumes 1.5% inflation per year

	Revenue							Total Revenue	Expenditures (1)	Net Fiscal Impact
	Individual Income Tax	Individual Sales & Use Tax	Corporate Income Tax	Business sales & Use Tax	Sales & Use Tax on Construction Materials	Individual Income Tax from Construction Labor	Sales & Use Tax on Construction Labor			
FY 2019	-	-	-	-	1.93	12.33	2.40	16.67	-	16.67
FY 2020	3.70	0.72	0.16	0.23	1.96	12.52	2.44	21.74	1.013	20.73
FY 2021	14.84	2.91	0.66	0.94	1.99	12.71	2.47	36.52	4.060	32.46
FY 2022	33.79	6.62	1.50	2.14	2.02	12.90	2.51	61.47	9.242	52.23
FY 2023	48.22	9.44	2.14	3.05	2.05	13.09	2.55	80.54	13.190	67.35
FY 2024	75.11	14.71	3.33	4.75	2.08	13.29	2.59	115.86	20.548	95.32
FY 2025	99.69	19.52	4.42	6.31	2.11	13.49	2.63	148.16	27.270	120.89
FY 2026	117.81	23.07	5.23	7.45	2.14	13.69	2.67	172.05	32.226	139.83
FY 2027	142.24	27.85	6.31	9.00	2.18	13.90	2.71	204.18	38.910	165.27
FY 2028	175.65	34.39	7.79	11.11	2.21	14.10	2.75	248.00	48.048	199.95
FY 2029	210.02	41.12	9.32	13.29	2.24	14.32	2.79	293.09	57.452	235.64
FY 2030	237.93	46.58	10.56	15.05	2.28	14.53	2.83	329.76	65.085	264.67
FY 2031	280.68	54.96	12.45	17.76	2.31	14.75	2.87	385.78	76.781	309.00
FY 2032	308.13	60.33	13.67	19.49	2.35	14.97	2.91	421.85	84.288	337.56
FY 2033	356.54	69.81	15.82	22.55	2.38	15.19	2.96	485.26	97.533	387.73
FY 2034	397.23	77.77	17.63	25.13	2.42	15.42	3.00	538.60	108.662	429.93
FY 2035	437.89	85.74	19.43	27.70	2.45	15.65	3.05	591.91	119.786	472.13
FY 2036	492.02	96.33	21.83	31.12	2.49	15.89	3.09	662.78	134.592	528.19
FY 2037	547.67	107.23	24.30	34.64	2.53	16.13	3.14	735.64	149.816	585.82
FY 2038	604.88	118.43	26.84	38.26	2.56	16.37	3.19	810.54	165.466	645.07
FY 2039	613.96	120.21	27.24	38.84	2.60	16.61	3.23	822.69	167.948	654.75

Source: The Stephen S. Fuller Institute at the Schar School, GMU

(1) required educational expenditures in support of HQ2-related increases in K-12 school children, direct, indirect and induced, in Northern Virginia

Table C. Amazon's HQ2 Job and Office Space Growth by Year

	Office Space: (000s of SF)	Jobs (Direct)
FY 2019	64	-
FY 2020	189	400
FY 2021	314	1,180
FY 2022	230	1,964
FY 2023	426	1,439
FY 2024	376	2,665
FY 2025	263	2,352
FY 2026	353	1,643
FY 2027	480	2,207
FY 2028	480	3,000
FY 2029	369	3,000
FY 2030	575	2,305
FY 2031	336	3,595
FY 2032	624	2,100
FY 2033	496	3,900
FY 2034	480	3,100
FY 2035	648	3,000
FY 2036	648	4,050
FY 2037	648	4,050
FY 2038	-	4,050
FY 2039	-	-
Total	8,000	50,000

Source: VEDP