

A Housing in the  
Nation's Capital Brief

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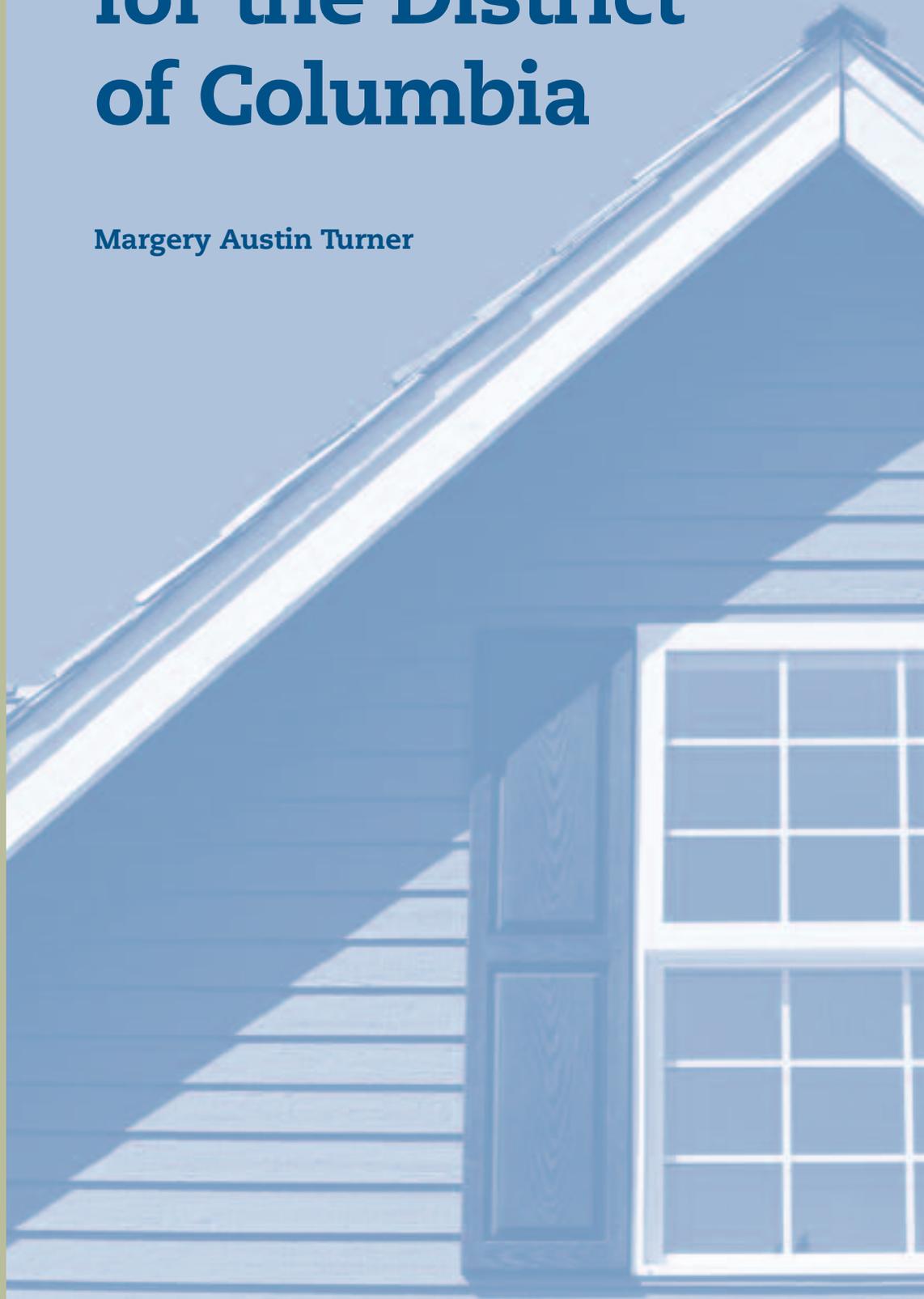
# Housing Production Needs for the District of Columbia

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# Introduction

How many new housing units need to be produced in the District of Columbia in order to accommodate 100,000 more residents? The District government has set a goal of increasing the city's population by 100,000 — both by attracting more residents and by retaining more of those living here already. Achieving this goal will require a wide array of policies, including school improvement and crime reduction. But it will also require the production of more housing units — single-family homes, condominiums, and apartments — to accommodate more residents.

Policy-makers who are developing housing strategies for the city need solid estimates of the level of production required to accommodate anticipated

growth. This *Housing in the Nation's Capital* Brief provides estimates of the number of new housing units needed between 2005 and 2020, under alternative assumptions about the mix of households that can be attracted to live in the city. It was commissioned by the Fannie Mae Foundation to support the work of the District of Columbia's Comprehensive Housing Strategy Task Force. This analysis does not attempt to forecast homeownership rates or to address housing affordability issues. Its purpose is simply to provide reliable estimates of the scale of production that would be required to support the city's aspirations for growth over the next 15 years.

## Summary of Findings

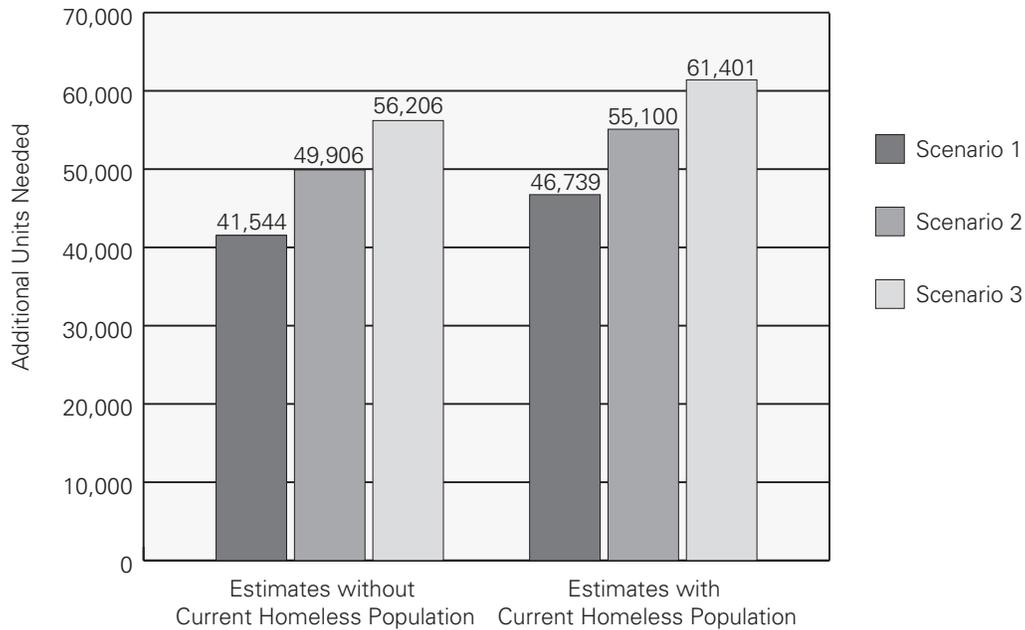
The analysis presented here estimates the city's housing production needs for three basic scenarios. All three start with the city's goal of 100,000 additional residents by 2020, but they reflect different assumptions about the mix of households the city is likely to attract and retain.

- Under **Scenario 1** the city attracts and retains many more families with children and, as a consequence, the size of the average household rises slightly between 2005 and 2020. Under this scenario, 40,900 more households live in the District of Columbia in 2020 than in 2005.
- Under **Scenario 2** the city attracts and retains some more families with children, but remains more attractive to singles and couples, so that the size of the average household falls moderately. Because households are smaller on average, achieving the 100,000 population goal implies that 48,500 more households live in the District in 2020 than in 2005.

- Under **Scenario 3** the city continues to attract and retain more childless singles and couples, so that the average household size falls substantially. This implies that 54,200 more households live in the District in 2020 than in 2005.

For each of these scenarios, we estimate the number and size mix of additional units needed, including units needed to accommodate additional households, to compensate for the inevitable loss of older or deteriorated stock, and to bring vacancy rates to healthy levels. In addition, we estimate the number of units needed to accommodate all of the homeless people currently living in the District of Columbia. Figure 1 summarizes the results for all three scenarios, with and without units needed to accommodate the city's current homeless population.

**Figure 1: Total Estimated Production Needs, 2005–2020**



The total estimated number of new housing units needed by 2020 ranges from 41,544 under Scenario 1 to 56,206 under Scenario 3. These totals imply average annual production levels ranging from 2,770 to 3,747. The more successful the city is in attracting and retaining families with children (an outcome that is probably more sensitive to nonhousing factors such as public school quality than to housing policy), the less aggressive it has to be about expanding the housing supply. The size mix of new units required under the three scenarios differs only modestly. Under all three, roughly half of new units need to have three or more bedrooms.

Providing units to accommodate all of the city's current homeless population increases production needs by only 5,195 units altogether, or 346 per year. Accomplishing this goal would require a modest increase in the share of efficiency units produced, since many homeless people are single individuals and would presumably be accommodated in small units.

The production levels required to meet the city's growth objectives represent a substantial increase over current levels. Even assuming that the average household size rises significantly (as in Scenario 1), annual production would need to climb by at least 40 percent from the production level of 2004, which was the city's peak year for housing construction in nearly 25 years. The vast

majority of additional units will, of course, be produced and financed by the private sector. But the analysis presented here highlights five key challenges that city policies would need to address in order to achieve the target levels of housing production:

- The city's zoning and regulatory requirements should **facilitate and encourage** land assembly and **residential construction**, including opportunities for higher-density development and assistance in overcoming potential opposition to new housing production from existing residents.
- **Housing policies and programs** need to be **explicitly linked to nonhousing strategies** (such as neighborhood revitalization, crime reduction, and school improvements) that are essential to attracting and retaining more residents.
- City agencies should seek to **minimize unnecessary loss of residential stock**, since building new units may cost more than preserving and improving existing properties.
- In order to maintain healthy housing market conditions, the city should **monitor vacancy rates** and encourage new production where vacancies are lowest.

- Finally, the city's regulatory requirements should **promote alternatives to new construction** that expand the housing stock, including conversion of underutilized nonresidential buildings to housing, subdivision of large units, and the creation of auxiliary apartments in single-family properties.

The sections that follow explain how our estimates of housing production needs were developed, provide detailed results from each of the alternative scenarios, and discuss the policy challenges involved in meeting these ambitious production targets.

## Understanding the Sources of Housing Production Needs

Accommodating a growing population represents the single biggest source of new housing production needs. But not every new resident needs a new housing unit, and population growth is not the only source of production needs. Our production estimates incorporate four major sources of need (illustrated by Figure 2): increase in the number of households resulting from population growth, replacement of existing residential units that are demolished or otherwise removed from use, adjustments to achieve healthy vacancy rates, and additional units to accommodate the city's current population of homeless individuals and families. This section presents data and assumptions for each of these sources of production needs, including relevant background information about housing market conditions and trends in the District of Columbia.<sup>1</sup>

**Population growth.** The District of Columbia government has set a goal of increasing the city's total population by 100,000, in part by attracting more residents, but also by retaining more of those

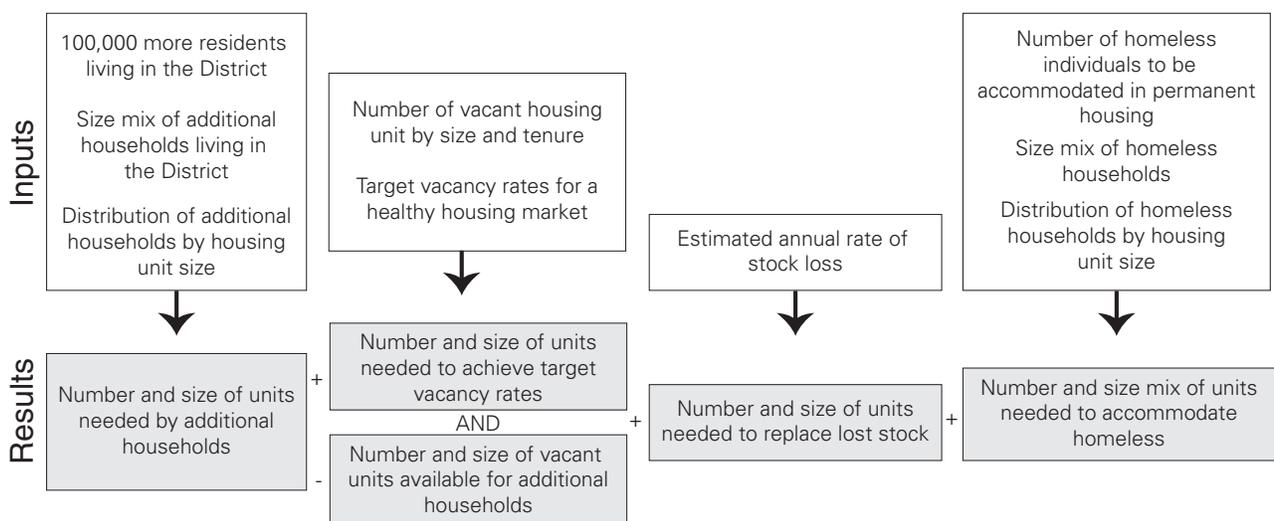
who live here already.<sup>2</sup> The analysis presented here estimates the number of additional housing units that would be needed to accommodate this level of population growth between 2005 and 2020.

A 100,000 increase in the city's population would represent a substantial turnaround. During the 1990s, the District of Columbia lost population because the number of people moving out over the course of the decade exceeded the number of people moving in. Most of this population loss occurred during the first half of the 1990s. Since 2000, census estimates suggest that population has again declined slightly, from 572,000 in 2000 to an estimated 553,500 in 2004. However, the District government has disputed these estimates, arguing that the census methodology for estimating year-to-year population change for the city proved to be unreliable during the 1990s and should not be considered definitive now. Because the number of people moving into the city every year is substantial, it is not unreasonable to think that the 100,000 growth target could be met by 2020 if outmigration can be reduced. For example, as of 2000, 113,000 District residents (about one-fifth of the total population) had moved to the city over the preceding five years.

### **Change in the number and size mix of households.**

The single most important factor for estimating housing production needs is the estimated number of additional households to be accommodated. A household is defined as a group of people living together in a housing unit. During the 1990s, the District of Columbia lost households (as well as population), but the rate of decline in the number of households was considerably smaller than the rate of decline in population because the city was able to attract and retain more singles and childless couples

**Figure 2: Sources of Housing Production Needs**



than households with children. In fact, the number of one- and two-person households living in the District actually increased during the 1990s, while the number of larger households declined substantially. As a consequence, the average size of households living in the District dropped from 2.26 in 1990 to 2.16 in 2000.

The District of Columbia Office of Planning has estimated that the number of households living in the District increased between 2000 and 2005, from 248,338 to 252,000.<sup>3</sup> This estimate is based in part on evidence that the city's housing stock has expanded since 2000 and that new units are being occupied. The city's official 2005 population estimate of 577,500 includes 35,600 people living in group quarters (such as dormitories, nursing homes, and prisons) and 541,900 people living in households. We have adopted these official estimates as the starting point for forecasting housing production needs over the 2005 to 2020 period.

The District government's official forecast of household growth over the next two decades assumes that the number of people living in group quarters remains the same, that the city's total population reaches 672,000 in 2020, and that average household size increases slightly (from 2.16 in 2000 to 2.17 in 2020). This implies that the city is able to both attract and retain many more families with children (larger households) than it did during the 1990s. This official forecast is incorporated in our Scenario 1.

However, because housing production needs are so sensitive to the expected number and size mix of households, we offer two alternative scenarios as well. Scenario 2 assumes that the city is able to attract and retain some more families with children than it did during the 1990s but that it also remains quite attractive to singles and childless couples. Under this scenario, the average household size drops from 2.16 to 2.12. Scenario 3 assumes that the city continues to be most attractive to singles and childless couples. In fact, the anticipated size mix of additional households under this scenario corresponds to the size mix of newcomers to the District between 1995 and 2000, and the average household size drops substantially — to 2.08 by the year 2020.<sup>4</sup>

#### **Preferences for different-sized housing units.**

The size mix of new housing units (the distribution of new units by number of bedrooms) needed over the next 15 years is driven by the size mix of new households. But not all households of the same size necessarily choose the same size of housing unit. Our estimates assume that the distribution of unit size choices for households of different sizes will remain the same as it was in 2000. To illustrate, in 2000,

about one in five single individuals lived in efficiency units, more than two in five lived in one-bedroom units, 17 percent lived in two-bedroom units, and 17 percent lived in units with three or more bedrooms. Based on this evidence, for every 100 additional singles living in the District by 2020, our housing needs estimates call for 22 more efficiency units, 44 more one-bedrooms, 17 more two-bedrooms, and 17 more three-or-more-bedroom units.

**Loss of residential stock.** Over time, housing units inevitably deteriorate and have to be replaced or substantially rebuilt to be habitable. Under some market conditions, housing units may also be converted to nonresidential uses. And in Washington, as in many other cities around the country, severely distressed public housing units are being demolished and replaced under the HOPE VI program. Because of these various sources of stock loss, replacement units need to be included in estimates of total housing production needs.

We estimate an annual rate of stock loss of 0.018 percent, based on internal Office of Planning estimates of the number of housing units demolished between 2000 and 2004. This is less than half the rate of loss that occurred in the 1990s (0.04 percent annually), in part because it only includes one type of loss (demolition). However, it seems reasonable that loss rates would be substantially lower in today's market conditions than in the conditions that prevailed throughout most of the 1990s. Although a substantial share of the demolitions that occurred between 2000 and 2004 were for HOPE VI projects, we include them in our estimate because it seems likely that this type of housing demolition and replacement activity will continue in the coming years.

**Healthy vacancy rates.** A small share of the housing stock is vacant at any given point in time, and vacancies are essential to the healthy functioning of a housing market. If vacancy rates are too low, demand from movers and newcomers will push up rents and prices as they vie for scarce units. And correspondingly, if vacancy rates are high, it makes sense to accommodate some new households within the existing stock without producing new units.

An internal Office of Planning analysis estimates that the District's housing stock has grown by between 5,820 units and 9,978 units since 2000. The lower-bound estimate implies a total 2005 stock of 280,665 and an overall vacancy rate of 10.2 percent, which is consistent with Census and American Communities Survey estimates for total vacancies. We adopt this estimate of the overall housing vacancy rate and assume that the relative rates by unit size and tenure are the same as in 2000.

Conventional wisdom generally defines 5 percent as the “natural” vacancy rate for the rental market, although some economists argue that that this is overly simplistic and that the “natural” rate may differ from one market to another.<sup>5</sup> We have adopted the conventional wisdom and adjust estimated production levels to yield a 5 percent vacancy rate for all sizes of rental housing. This is lower than the city’s current overall rental vacancy rate but higher than the rate for some size categories. We have not found anything written on “natural” vacancy rates in the homeownership market, so we assume that the District’s overall homeownership vacancy rate is “healthy” at the current 3.3 percent and simply apply it to all the different unit sizes. These target rates are then scaled up to reflect the fact that some units in the market are vacant but not yet classified as vacant for sale or for rent.

**Homeless individuals and families.** Recent estimates indicate that 6,026 people are homeless in the District of Columbia.<sup>6</sup> If the city implemented policies to provide housing for homeless people, the total number of new units needed would be higher. Of the homeless, 3,794 are single individuals and 2,232 are in families. We assume an average family size of 2.5 persons. This implies that 4,687 more households

need to be housed between 2005 and 2020. We assume that homeless individuals and families would be accommodated in the smallest units acceptable, given their household size. In other words, our estimates assign single individuals to efficiency units, two-person households to one-bedroom units, and three-person households to two-bedroom units.

### Alternative Futures for the District of Columbia — Housing Production Targets

The number of new housing units needed to accommodate 100,000 additional residents depends on the mix of household types (and sizes) that the District of Columbia attracts and retains. If substantially more families with children were to move into the city and (perhaps more important) stay here, the target of 100,000 more residents could be achieved with fewer additional households — and housing units — than if the city were to continue to be most attractive for singles and childless couples. Figure 3 summarizes the three basic scenarios and the estimated production needs for each. Accommodating the current homeless population in permanent housing adds another 5,195 to the production targets for each scenario. The remainder of this section provides a more complete discussion of results for each of these scenarios.<sup>7</sup>

**Figure 3: Alternative Scenarios for Estimating Housing Production Needs**

1. THE DISTRICT ATTRACTS AND RETAINS MANY MORE FAMILIES WITH CHILDREN	2. THE DISTRICT ATTRACTS AND RETAINS SOME MORE FAMILIES WITH CHILDREN	3. THE DISTRICT CONTINUES TO ATTRACT AND RETAIN MORE SINGLES AND CHILDLESS COUPLES
<p><b>Scenario 1:</b> The city’s population increases by 100,000 and the size of the average household rises.</p> <ul style="list-style-type: none"> <li>■ 292,900 households live in the District by 2020, 40,900 more than in 2005</li> <li>■ average household size of 2.17 in 2020 matches city’s official forecast</li> <li>■ 41,544 additional housing units required by 2020</li> </ul>	<p><b>Scenario 2:</b> The city’s population increases by 100,000 and the size of the average household falls moderately.</p> <ul style="list-style-type: none"> <li>■ 300,500 households live in the District by 2020, 48,500 more than 2005</li> <li>■ average household size of 2.12 in 2020</li> <li>■ 49,906 additional housing units required by 2020</li> </ul>	<p><b>Scenario 3:</b> The city’s population increases by 100,000 and the size of the average household falls substantially.</p> <ul style="list-style-type: none"> <li>■ 306,200 households live in the District by 2020, 54,200 more than 2005</li> <li>■ average household size of 2.08 in 2020 matches size mix of recent in-movers</li> <li>■ 56,206 additional housing units required by 2020</li> </ul>

**Scenario 1.** This scenario assumes that the District of Columbia is able to attract and retain substantially more families with children than it did during the 1990s and consequently that the target of 100,000 new residents could be achieved with the addition of 40,900 more households. The estimated level of housing production required under this scenario totals 41,544, or 2,770 per year on average. This annual production target is 43 percent higher than the number of residential building permits issued in 2004 (1,936) and 2.1 times the average for the 2001–2003 period (1,305). Thus, even under the most optimistic assumptions about the mix of households living in the city, housing production levels would have to increase substantially to accommodate 100,000 new residents. It is worth noting, however, that the average number of building permits issued during the 1990s was only 295, indicating that when market pressures are strong (as they have been in recent years) housing production can increase very dramatically.

About four of every ten new units needed under this scenario are large, consisting of three or more bedrooms (see Figure 4). Roughly the same share are one- or two-bedroom units, and only 17 percent are efficiencies. The primary source of production needs is, of course, growth in the number of households, with replacement of lost stock accounting for only about 2 percent of the total units needed. Adjustments to achieve healthy vacancy rates actually slightly *reduce* the total number of new housing units needed, since vacancy rates are currently high for some categories of housing (especially one- and two-bedroom units).

**Scenario 2.** Under this scenario, the District is able to attract and retain some more families with children than it did during the 1990s but not as many as under Scenario 1, and the average household size drops slightly to 2.12 by the year 2020. The target of 100,000 new residents is achieved with the addition of 48,500 households between 2005 and 2020. The estimated level of housing production required under this scenario totals 49,906, or 3,327 per year on average. This is 20 percent higher than the estimated needs under Scenario 1 and 72 percent above the number of residential building permits issued in the District of Columbia in 2004.

The size mix of new housing units called for under Scenario 2 differs only slightly from Scenario 1 (again, see Figure 4). A somewhat smaller share are large units, and a larger share are one- to two-bedroom units. New households account for 97 percent of the new production needs, with replacements for lost stock accounting for less than 2 percent. Under this scenario, adjustments to achieve healthy vacancy rates also contribute 1 percent to total production needs.

**Scenario 3.** This scenario assumes that the District continues to be most attractive to single individuals and childless couples, rather than to families with children. Because the size of the average household living in the District drops substantially under this vision of the city's future, achieving the target of 100,000 new residents implies an increase of 54,200 in the number of households. A total of 56,206 new housing units would be required to accommodate this level of household growth, an average of 3,747 annually. This is 35 percent above the production requirement under Scenario 1 and almost two times the number of building permits issued in 2004. Thus, if the city continues (as it has in the past) to attract and retain primarily singles and childless couples rather than larger families with children, achieving the city's stated goal of 100,000 new residents will require a very substantial increase in housing production over the next decade and a half.

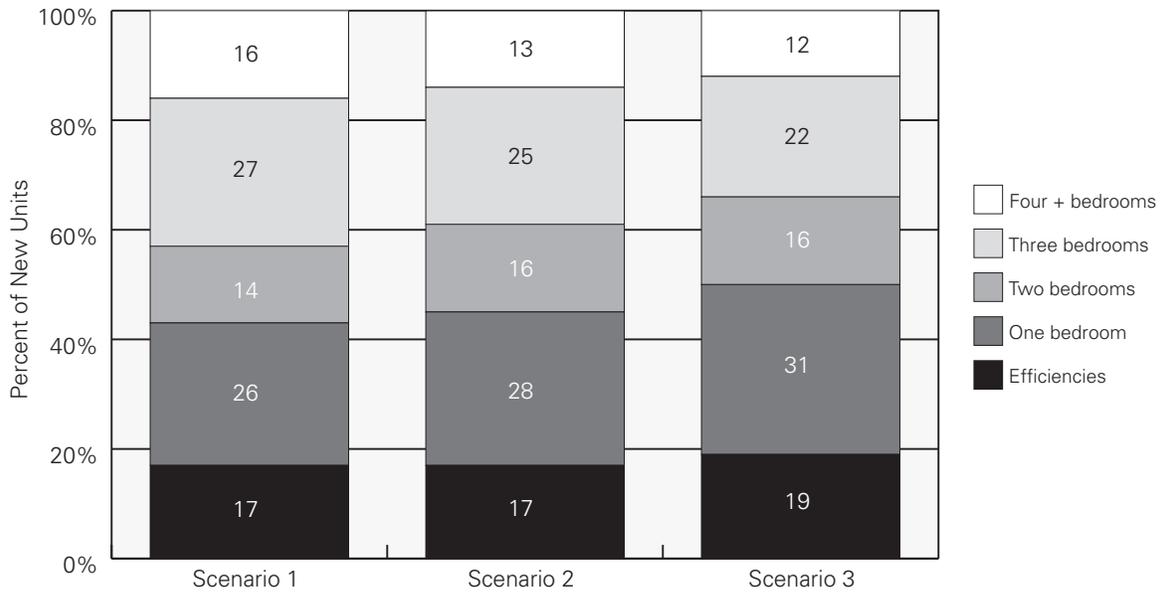
Not surprisingly, the size mix of new housing units needed under Scenario 3 reflects less demand for large units. Only about one-third of new units needed have three or more bedrooms, and 19 percent are efficiencies. Under this scenario, new households account for 97 percent of production needs, replacement of lost stock accounts for only slightly more than 1 percent, and adjustments to achieve healthy vacancy rates account for 2 percent.

**Meeting homeless needs.** If the District of Columbia were to implement policies ensuring permanent housing for all the individuals and families that are literally homeless, the number of new units needed would increase by 5,195, or 346 units per year on average. Because many homeless people are single individuals rather than members of families, accommodating them in permanent housing would increase the number of efficiencies and one-bedroom units required. For example, under Scenario 2, accommodating the homeless population would increase the number of new efficiencies needed from 8,681 (17 percent of all new units) to 12,892 (23 percent of all new units).

## Key Challenges for City Policy

The primary purpose of the analysis presented here is to provide policy-makers with a rigorous set of estimates of the housing production levels that would be required to meet the city's growth objectives. These estimates have helped to inform the work of the District's Comprehensive Housing Strategy Task Force as well as ongoing planning efforts by the District of Columbia government. It is not the purpose of this report to design or recommend policies for achieving future housing production goals. Nonetheless, the analysis presented here (including some of the key assumptions underlying our production estimates)

**Figure 4: Size Mix of New Units Needed**



highlights five key challenges that city policies would need to address in order to achieve the target levels of housing production. This section briefly outlines these policy challenges.

**Encouraging and facilitating more private sector production.** In order to accommodate 100,000 more residents by the year 2020, the city would need to substantially increase levels of new housing production. Even if the District becomes much more successful at attracting and retaining families with children than it has been in the past, the number of new units needed represents a considerable increase over current production levels. The vast majority of this production will, of course, be produced and financed by the private sector. But city government still has an important role to play in encouraging and facilitating higher levels of housing production. For example, the city can and should work with developers to identify any significant bottlenecks in its permitting and approvals processes and work to streamline these processes as much as possible. In addition, the District government could help private developers by maintaining an up-to-date inventory of vacant or underutilized parcels of land throughout the city and facilitating efforts to assemble vacant parcels for new development.

The District Office of Planning estimates that up to 15,000 housing units could potentially be developed in “new neighborhoods” on large parcels of mostly

publicly owned land. In addition, city estimates show the potential for another 11,000 units on scattered vacant sites and 7,200 units on underutilized lots throughout the city.<sup>9</sup> These totals could be increased if higher densities were permitted around Metro stations and along major transportation corridors. Finally, the stock of available housing could be expanded by rehabilitating residential properties that are boarded up or abandoned, by subdividing large units into two or more smaller ones, and by creating auxiliary apartments in existing single-family homes. It is important to note that higher-density development — and, in fact, any major new construction project in an established neighborhood — has the potential to generate serious neighborhood opposition. Therefore, one of the important roles that city government can play is to help build public understanding and support for new residential development, including higher-density development in suitable locations.

**Linking nonhousing strategies with housing policy.** Producing more housing units will not, in and of itself, attract 100,000 more residents to the city. Although housing availability (and costs) can be a barrier to population growth, nonhousing factors play a central role in determining how many residents — and the mix of household types — the city can attract and retain. In fact, most experts would argue that safety, neighborhood amenities (such as parks, libraries, retail shopping opportunities, and — for some types

of households — a lively and diverse nightlife), and school quality are the critical factors for the city to address. Attracting and retaining more families with children is particularly challenging, especially given the long-term problems plaguing the District's public school system.

One of the important lessons suggested by the production needs estimates presented in this brief is that if the city can overcome the challenges involved in attracting and retaining families with children it will not need as many households — or new housing units — to achieve its 100,000 population goal. But if the city continues to attract (and retain) primarily singles and childless couples, more housing production will be needed to accommodate 100,000 more residents by the year 2020. This highlights the importance of thinking strategically about how nonhousing investments can and should be linked to new housing development plans at the neighborhood scale. For example, the city might consider making it a priority to improve nonhousing conditions in selected neighborhoods where excess housing units are already available, so that more households would choose to take advantage of the available stock in these neighborhoods. Correspondingly, the city might try to target the production of new housing units in neighborhoods where nonhousing conditions are especially attractive, so that households attracted by nonhousing amenities will be able to find housing opportunities nearby. And finally, as it develops plans for new neighborhoods (on large, publicly owned sites), the city should give priority to the types of nonhousing investments (cultural activities or school improvements, for example) that align with the types of housing being developed.

**Minimizing unnecessary stock loss.** Our estimates of production needs for the next 15 years assume very low rates of stock loss. This assumption seems reasonable, given the intense market pressures the city is currently experiencing. However, if the city's poorest neighborhoods continue to suffer from distress and disinvestment, or if the city fails to provide incentives and supports for the acquisition and renovation of deteriorated properties, rates of stock loss could be higher and even higher levels of new housing production could be needed. In addition, it is possible that city policies will result in higher rates of demolition (and replacement) associated with the transformation of distressed public and assisted housing communities and the redevelopment of the Anacostia waterfront.

Thus, it would make sense for the city to develop systems for monitoring stock loss and replacement on a regular basis, so that it can assess the extent to which losses are exceeding anticipated levels and more new production may be needed to keep pace. Moreover, given the substantial challenges involved in achieving the levels of production implied by the estimates presented here, it makes sense for the city to try to minimize any unnecessary stock loss. Possible strategies include regulatory and financial incentives for the preservation and reuse of older properties as well as targeted neighborhood improvement strategies to attract more households to live in neighborhoods where the existing stock may be underutilized and at risk of disinvestment.

**Monitoring vacancy rates by neighborhood and type of housing.** Despite the District's hot market conditions, vacancy rates for some types of housing remain somewhat high. Our estimates of production needs assume that new households are accommodated in any excess vacancies before new units have to be produced. Correspondingly, our production estimates call for some extra new units to allow for more vacancies of some types. If vacancy rates remained at their current levels, estimated production needs would be higher, especially for one- and two-bedroom housing units.

This result highlights the importance of monitoring vacancy rates across the city's housing submarkets and regularly assessing potential causes of very high or low rates. Knowing where vacancy rates are especially high or low could help the city target its neighborhood improvement investments to high-vacancy areas, in order to attract more housing demand to these neighborhoods, while it targets more housing production in neighborhoods where vacancy rates are especially low.

**Encouraging alternatives to new housing construction.** New construction is not the only way to add to the stock of housing units. And in many cases, alternatives may be less costly. As discussed earlier, encouraging the preservation and rehabilitation of severely deteriorated structures can prevent the loss of housing stock or bring uninhabitable structures back into productive use. In addition, the housing stock can be expanded by converting nonresidential structures, subdividing large units into several smaller units, or creating auxiliary apartments in single-family properties.

## References

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- Metropolitan Washington Council of Governments. *Homeless Enumeration for the Washington Metropolitan Region, 2005*. Washington, D.C.: Metropolitan Washington Council of Governments.

## Endnotes

- <sup>1</sup> Detailed tabulations of inputs and results for all the alternative scenarios are provided in Appendix A. We have also estimated the implications for housing production needs if overcrowding were eliminated among current and new households. Underlying assumptions and results for these supplemental estimates are presented in Appendix B.
- <sup>2</sup> More precisely, the goal is to increase the city's population by 100,000 from the Census 2000 population of roughly 572,000. Because the District of Columbia Department of Planning estimates that the city's population increased slightly between 2000 and 2005, the projections reflect a population increase of slightly less than 100,000 between 2005 and 2020.
- <sup>3</sup> See District of Columbia Office of Planning, February 24, 2005 Memorandum Re: Forecasting Growth and Land Demand.
- <sup>4</sup> Note that the distribution of "additional households" reflects not only households moving into the District but also newly formed households (such as a young person who moves out of her family's house into an apartment of her own), household dissolutions (for example, a person who lives alone dies or two individuals who previously maintained their own households in the city move in together to form a single household), and households that move out of the city.
- <sup>5</sup> See Eric S. Belsky, "Rental Vacancy Rates: A Policy Primer," *Housing Policy Debate* 3(3): 793–813; and Stuart A. Gabriel and Frank E. Nothaft, "Rental Housing Markets, the Incidence and Duration of Vacancy, and the Natural Vacancy Rate," *Journal of Urban Economics* 49:121–149.
- <sup>6</sup> See Metropolitan Washington Council of Governments, *Homeless Enumeration for the Washington Metropolitan Region, 2005*, Washington, D.C.: Metropolitan Washington Council of Governments. The Metropolitan Washington Council of Governments uses the U.S. Department of Housing and Urban Development definition of homeless as those who had no shelter at all, were in emergency shelters or transitional housing temporarily, or were in precarious housing and at imminent risk of losing it.
- <sup>7</sup> Appendix A provides detailed tabulations of results for each scenario.
- <sup>8</sup> These figures exclude the large number of units already permitted and in development in the city. Estimates are drawn from two documents completed by the District of Columbia Office of Planning for the Comprehensive Plan Revision: Land Capacity Analysis (February 2005) and Memo on Underutilized Land (March 2005).

# Appendix A: Tabulations of Inputs and Results

## Number of households and housing units in 2005

The city's official estimates place the current number of households living in the District of Columbia at **252,000**. An internal Office of Planning analysis estimates that the District's housing stock has grown (net change) by between 5,820 units and 9,978 units since 2000. The lower-bound estimate implies a total 2005 stock of **280,665** and an overall vacancy rate of 10.2%, which is consistent with Census and American Communities Survey estimates for total vacancies.

## Size mix of housing units in 2005

The distribution of existing housing units by size is assumed to be the same in 2005 as in Census 2000 data.

Efficiencies	13.5%
1 bedroom	30.7%
2 bedrooms	23.3%
3 bedrooms	21.1%
4+ bedrooms	11.5%

## Housing size mix for additional households

Net new households are assumed to distribute themselves across unit size categories according to the Census 2000 distribution of households by size category.

	Efficiencies	1 bedroom	2 bedrooms	3 bedrooms	4+ bedrooms
1 person	22.3%	43.7%	17.4%	12.4%	4.3%
2 people	8.2%	24.6%	30.6%	24.9%	11.7%
3 people	6.3%	15.6%	27.9%	32.8%	17.5%
4 people	5.5%	15.7%	21.2%	33.3%	24.4%
5+ people	5.5%	14.5%	17.8%	30.7%	31.6%

## Rate of stock loss

An annual rate of stock loss of **0.018%** is based on internal Office of Planning estimates of the number of housing units demolished between 2000 and 2004. This rate is less than half the rate of loss that occurred in the 1990s, in part because it includes only one type of loss (demolition). However, it seems reasonable that loss rates would be lower in today's market conditions than in the conditions that prevailed throughout most of the 1990s. Although a substantial share of the 2000–2004 demolitions were for HOPE VI projects, we include them in our estimate because it seems likely that this type of housing replacement activity will continue.

## Vacancy rates

2005 vacancy rates are based on estimates of vacancies by size and tenure from Census 2000. The rates are then scaled so that the overall average rate matches the 10.2% total vacancy rate implied by the 2005 housing stock estimate discussed earlier. This scaling process reflects not only change between 2000 and 2005 in vacancies but also (and more important) additional vacancies that are not classified in the Census as either "for sale" or "for rent." In effect, we are assuming that these undesignated vacancies would ultimately be rented or sold in the same proportions as other vacancies in the market.

	Rental	Owner	Low vacancy rates — especially in the rental market — exacerbate rent and price inflation in the housing market. Encouraging sufficient housing production to "normalize" vacancy rates could help moderate rent and price increases. In addition, where vacancy rates are abnormally high, an increase in demand should use up these excess vacant units before generating the need for new production.
Efficiencies	6.7%	6.9%	
1 bedroom	12.7%	12.1%	
2 bedrooms	18.9%	10.1%	
3 bedrooms	9.7%	4.7%	
4+ bedrooms	8.2%	3.9%	

Therefore, our estimates of production needs should be based on "normal" rather than actual vacancy rates. Specifically, the forecasting model adjusts the number of additional units needed to achieve target vacancy rates for each size category. These targets assume that 5 percent is a "normal" vacancy rate for the rental market and that the average 2005 rate of 3.3 percent is "normal" for the homeownership market. Both of these rates are "scaled up" to account for units not classified as "for sale" or "for rent" to yield target vacancy rates of 10.2 percent for rentals and 6.7 percent for homeownership units.

## DETAILED ASSUMPTIONS — SCENARIO 1A

### Net increase in the number of households, 2005–2020

The city's official projections anticipate that the city's population will increase to 672,000 by 2020, an increase of 100,000 over the 2000 population total. The number of people living in group quarters is expected to remain constant at 35,600. The average size of households is expected to climb from 2.16 in 2000 to 2.17 in 2020. Based on this household size assumption, the city estimates a total of 292,900 households in 2020, an increase of **40,900** from 2005. We project that 13,300 households will be added between 2005 and 2010, 13,600 between 2010 and 2015, and 14,000 between 2015 and 2020.

### Size mix of additional households

We have distributed the net increase in households across household size categories to be consistent with the city's estimates of average household size and population growth. Separate size distributions are calculated for each 5-year segment of the 2005–2020 estimation period.

	2005-2010	2010-2015	2015-2020
1 person	41.0%	40.0%	40.0%
2 people	25.0%	25.0%	22.0%
3 people	16.0%	16.0%	18.0%
4 people	10.0%	10.0%	10.0%
5+ people	8.0%	9.0%	10.0%

### Results

	1990	2000	2005	2010	2015	2020	
Households	249,634	248,338	252,000	265,300	278,900	292,900	
Housing Units	278,489	274,845	280,665	294,150	307,961	322,209	
		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Net New Housing Units Needed		13,485	13,812	14,248	41,544		
Avg Annual Production Targets		2,697	2,762	2,850	2,770		
by source of need		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
due to stock loss		253	253	253	758		
for new households		13,300	13,600	14,000	40,900		
to normalize vacancies		-68	-41	-5	-114		
to accommodate homeless		0	0	0	0		
total		13,485	13,812	14,248	41,544		
by unit size		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Efficiencies		2,381	2,400	2,447	7,228		
1 bedroom		3,522	3,575	3,660	10,758		
2 bedrooms		1,907	1,982	2,055	5,944		
3 bedrooms		3,576	3,675	3,806	11,057		
4 bedrooms		2,098	2,179	2,281	6,558		
total		13,485	13,812	14,248	41,544		
		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Efficiencies		17.7%	17.4%	17.2%	17.4%		
1 bedroom		26.1%	25.9%	25.7%	25.9%		
2 bedrooms		14.1%	14.4%	14.4%	14.3%		
3 bedrooms		26.5%	26.6%	26.7%	26.6%		
4+ bedrooms		15.6%	15.8%	16.0%	15.8%		
total		100.0%	100.0%	100.0%	100.0%		
Source of need by unit size		<b>Efficiencies</b>	<b>1 bedroom</b>	<b>2 bedrooms</b>	<b>3 bedrooms</b>	<b>4+ bedrooms</b>	<b>Total</b>
due to stock loss		102	233	177	159	87	758
for new households		5,327	11,858	9,292	9,209	5,214	40,900
to normalize vacancies		1,798	-1,334	-3,525	1,689	1,258	-114
to accommodate homeless		0	0	0	0	0	0
to correct for crowding		0	0	0	0	0	0
total		7,228	10,758	5,944	11,057	6,558	41,544
Source of need by unit size		<b>Efficiencies</b>	<b>1 bedroom</b>	<b>2 bedrooms</b>	<b>3 bedrooms</b>	<b>4+ bedrooms</b>	<b>Total</b>
due to stock loss		1.4%	2.2%	3.0%	1.4%	1.3%	1.8%
for new households		73.7%	110.2%	156.3%	83.3%	79.5%	98.4%
to normalize vacancies		24.9%	-12.4%	-59.3%	15.3%	19.2%	-0.3%
to accommodate homeless		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
to correct for crowding		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

## DETAILED ASSUMPTIONS — SCENARIO 2A

### Net increase in the number of households, 2005–2020

We generated an alternative set of estimates of change in number of households, still anticipating that the city's population will increase to 672,000 by 2020 and that the number of people living in group quarters will remain constant at 35,600. However, these alternative estimates assume that average household size falls from 2.16 in 2000 to 2.12 in 2020. This household size assumption implies a total of 300,500 households in 2020, an increase of 48,500 from 2005, 13,300 between 2005 and 2010, 17,000 between 2010 and 2015, and 18,200 between 2015 and 2020.

### Size mix of additional households

		2005-2010	2010-2015	2015-2020
We have distributed the net increase in households across	1 person	44.0%	43.0%	42.0%
household size categories to be consistent with these alternative	2 people	34.0%	34.0%	32.0%
estimates of average household size and population growth.	3 people	14.0%	13.0%	13.0%
Separate size distributions are calculated for each 5-year	4 people	5.0%	5.0%	7.0%
segment of the 2005–2020 estimation period.	5+ people	3.0%	5.0%	6.0%

### Results

	1990	2000	2005	2010	2015	2020	
Households	249,634	248,338	252,000	265,300	282,300	300,500	
Housing Units	278,489	274,845	280,665	294,160	311,710	330,571	
		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Net New Housing Units Needed		13,495	17,549	18,861	49,906		
Avg Annual Production Targets		2,699	3,510	3,772	3,327		
by source of need		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
due to stock loss		253	253	253	758		
for new households		13,300	17,000	18,200	48,500		
to normalize vacancies		-57	297	408	648		
to accommodate homeless		0	0	0	0		
total		13,495	17,549	18,861	49,906		
by unit size		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Efficiencies		2,489	3,027	3,165	8,681		
1 bedroom		3,773	4,984	5,297	14,054		
2 bedrooms		2,018	2,956	3,228	8,202		
3 bedrooms		3,398	4,271	4,615	12,283		
4+ bedrooms		1,817	2,312	2,556	6,685		
total		13,495	17,549	18,861	49,906		
		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Efficiencies		18.4%	17.2%	16.8%	17.4%		
1 bedroom		28.0%	28.4%	28.1%	28.2%		
2 bedrooms		15.0%	16.8%	17.1%	16.4%		
3 bedrooms		25.2%	24.3%	24.5%	24.6%		
4+ bedrooms		13.5%	13.2%	13.6%	13.4%		
total		100.0%	100.0%	100.0%	100.0%		
Source of need by unit size		<b>Efficiencies</b>	<b>1 bedroom</b>	<b>2 bedrooms</b>	<b>3 bedrooms</b>	<b>4+ bedrooms</b>	<b>Total</b>
due to stock loss		102	233	177	159	87	758
for new households		6,636	14,838	11,350	10,343	5,332	48,500
to normalize vacancies		1,942	-1,017	-3,325	1,781	1,267	648
to accommodate homeless		0	0	0	0	0	0
to correct for crowding		0	0	0	0	0	0
total		8,681	14,054	8,202	12,283	6,685	49,906
Source of need by unit size		<b>Efficiencies</b>	<b>1 bedroom</b>	<b>2 bedrooms</b>	<b>3 bedrooms</b>	<b>4+ bedrooms</b>	<b>Total</b>
due to stock loss		1.2%	1.7%	2.2%	1.3%	1.3%	1.5%
for new households		76.4%	105.6%	138.4%	84.2%	79.8%	97.2%
to normalize vacancies		22.4%	-7.2%	-40.5%	14.5%	19.0%	1.3%
to accommodate homeless		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
to correct for crowding		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

## DETAILED ASSUMPTIONS — SCENARIO 3A

### Net increase in the number of households, 2005–2020

Based on information about the size mix of households moving to the District between 1995 and 2000, we generated a third set of estimates of change in number of households, still anticipating that the city's population will increase to 672,000 by 2020 and that the number of people living in group quarters will remain constant at 35,600. However, these estimates imply a larger drop in the average household size — from 2.16 in 2000 to 2.08 in 2020. This household size assumption implies a total of 306,200 households in 2020, an increase of **54,200** from 2005, 13,300 between 2005 and 2010, 20,000 between 2010 and 2015, and 20,900 between 2015 and 2020.

#### Size mix of additional households

For this scenario, the size distribution of net new households is based on the distribution for households moving into the District between 1995 and 2000.

	2005-2010	2010-2015	2015-2020
1 person	54.0%	54.0%	53.0%
2 people	29.0%	28.0%	28.0%
3 people	9.0%	9.0%	9.0%
4 people	6.0%	6.0%	6.0%
5+ people	2.0%	3.0%	4.0%

#### Results

	1990	2000	2005	2010	2015	2020	
Households	249,634	248,338	252,000	265,300	285,300	306,200	
Housing Units	278,489	274,845	280,665	294,172	315,029	336,871	
		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Net New Housing Units Needed		13,507	20,857	21,842	56,206		
Avg Annual Production Targets		2,701	4,171	4,368	3,747		
by source of need		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
due to stock loss		253	253	253	758		
for new households		13,300	20,000	20,900	54,200		
to normalize vacancies		-46	605	690	1,248		
to accommodate homeless		0	0	0	0		
total		13,507	20,857	21,842	56,206		
by unit size		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Efficiencies		2,711	3,850	3,965	10,526		
1 bedroom		4,121	6,570	6,833	17,524		
2 bedrooms		1,850	3,468	3,689	9,008		
3 bedrooms		3,166	4,588	4,819	12,573		
4+ bedrooms		1,659	2,381	2,536	6,575		
total		13,507	20,857	21,842	56,206		
		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Efficiencies		20.1%	18.5%	18.2%	18.7%		
1 bedroom		30.5%	31.5%	31.3%	31.2%		
2 bedrooms		13.7%	16.6%	16.9%	16.0%		
3 bedrooms		23.4%	22.0%	22.1%	22.4%		
4+ bedrooms		12.3%	11.4%	11.6%	11.7%		
total		100.0%	100.0%	100.0%	100.0%		
Source of need by unit size		<b>Efficiencies</b>	<b>1 bedroom</b>	<b>2 bedrooms</b>	<b>3 bedrooms</b>	<b>4+ bedrooms</b>	<b>Total</b>
due to stock loss		102	233	177	159	87	758
for new households		8,299	17,976	12,084	10,611	5,230	54,200
to normalize vacancies		2,125	-685	-3,253	1,802	1,259	1,248
to accommodate homeless		0	0	0	0	0	0
to correct for crowding		0	0	0	0	0	0
total		10,526	17,524	9,008	12,573	6,575	56,206
Source of need by unit size		<b>Efficiencies</b>	<b>1 bedroom</b>	<b>2 bedrooms</b>	<b>3 bedrooms</b>	<b>4+ bedrooms</b>	<b>Total</b>
due to stock loss		1.0%	1.3%	2.0%	1.3%	1.3%	1.3%
for new households		78.8%	102.6%	134.2%	84.4%	79.5%	96.4%
to normalize vacancies		20.2%	-3.9%	-36.1%	14.3%	19.1%	2.2%
to accommodate homeless		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
to correct for crowding		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

# DETAILED ASSUMPTIONS — SCENARIOS 1B, 2B, AND 3B

## Homeless population

According to the latest Metropolitan Washington Council of Governments survey, there are an estimated 6,026 homeless people in the District of Columbia, of whom 3,794 are single individuals and 2,232 are in families. We assume an average family size of 2.5 persons for homeless persons in families and estimate that providing permanent housing for all literally homeless persons will require 5,195 additional units over the 15-year period.

## Scenario 1B

### Results

	1990	2000	2005	2010	2015	2020	
Households	249,634	248,338	252,000	266,862	282,025	297,587	
Housing Units	278,489	274,845	280,665	295,881	311,424	327,404	
		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Net New Housing Units Needed		15,216	15,543	15,980	46,739		
Avg Annual Production Targets		3,043	3,109	3,196	3,116		
by source of need		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
due to stock loss		253	253	253	758		
for new households (excluding formerly homeless)		13,300	13,600	14,000	40,900		
to normalize vacancies		-68	-41	-5	-114		
to accommodate homeless		1,732	1,732	1,732	5,195		
total		15,216	15,543	15,980	46,739		
by unit size		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Efficiencies		3,785	3,803	3,851	11,439		
1 bedroom		3,687	3,740	3,825	11,252		
2 bedrooms		2,070	2,146	2,218	6,434		
3 bedrooms		3,576	3,675	3,806	11,057		
4+ bedrooms		2,098	2,179	2,281	6,558		
total		15,216	15,543	15,980	46,739		
		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Efficiencies		24.9%	24.5%	24.1%	24.5%		
1 bedroom		24.2%	24.1%	23.9%	24.1%		
2 bedrooms		13.6%	13.8%	13.9%	13.8%		
3 bedrooms		23.5%	23.6%	23.8%	23.7%		
4+ bedrooms		13.8%	14.0%	14.3%	14.0%		
total		100.0%	100.0%	100.0%	100.0%		
Source of need by unit size		<b>Efficiencies</b>	<b>1 bedroom</b>	<b>2 bedrooms</b>	<b>3 bedrooms</b>	<b>4+ bedrooms</b>	<b>Total</b>
due to stock loss		102	233	177	159	87	758
for new households		5,327	11,858	9,292	9,209	5,214	40,900
to normalize vacancies		1,798	-1,334	-3,525	1,689	1,258	-114
to accommodate homeless		4,211	494	490	0	0	5,195
to correct for crowding		0	0	0	0	0	0
total		11,439	11,252	6,434	11,057	6,558	46,739
Source of need by unit size		<b>Efficiencies</b>	<b>1 bedroom</b>	<b>2 bedrooms</b>	<b>3 bedrooms</b>	<b>4+ bedrooms</b>	<b>Total</b>
due to stock loss		0.9%	2.1%	2.7%	1.4%	1.3%	1.6%
for new households		46.6%	105.4%	144.4%	83.3%	79.5%	87.5%
to normalize vacancies		15.7%	-11.9%	-54.8%	15.3%	19.2%	-0.2%
to accommodate homeless		36.8%	4.4%	7.6%	0.0%	0.0%	11.1%
to correct for crowding		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

## Scenario 2B

### Results

	1990	2000	2005	2010	2015	2020	
Households	249,634	248,338	252,000	266,862	285,425	305,187	
Housing Units	278,489	274,845	280,665	295,892	315,173	335,765	
		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Net New Housing Units Needed		15,227	19,281	20,593	55,100		
Avg Annual Production Targets		3,045	3,856	4,119	3,673		
by source of need		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
due to stock loss		253	253	253	758		
for new households							
(excluding formerly homeless)		13,300	17,000	18,200	48,500		
to normalize vacancies		-57	297	408	648		
to accommodate homeless		1,732	1,732	1,732	5,195		
total		15,227	19,281	20,593	55,100		
by unit size		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Efficiencies		3,893	4,431	4,568	12,892		
1 bedroom		3,937	5,149	5,461	14,547		
2 bedrooms		2,181	3,119	3,391	8,692		
3 bedrooms		3,398	4,271	4,615	12,283		
4+ bedrooms		1,817	2,312	2,556	6,685		
total		15,227	19,281	20,593	55,100		
		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Efficiencies		25.6%	23.0%	22.2%	23.4%		
1 bedroom		25.9%	26.7%	26.5%	26.4%		
2 bedrooms		14.3%	16.2%	16.5%	15.8%		
3 bedrooms		22.3%	22.1%	22.4%	22.3%		
4+ bedrooms		11.9%	12.0%	12.4%	12.1%		
total		100.0%	100.0%	100.0%	100.0%		
Source of need by unit size		<b>Efficiencies</b>	<b>1 bedroom</b>	<b>2 bedrooms</b>	<b>3 bedrooms</b>	<b>4+ bedrooms</b>	<b>Total</b>
due to stock loss		102	233	177	159	87	758
for new households		6,636	14,838	11,350	10,343	5,332	48,500
to normalize vacancies		1,942	-1,017	-3,325	1,781	1,267	648
to accommodate homeless		4,211	494	490	0	0	5,195
to correct for crowding		0	0	0	0	0	0
total		12,892	14,547	8,692	12,283	6,685	55,100
Source of need by unit size		<b>Efficiencies</b>	<b>1 bedroom</b>	<b>2 bedrooms</b>	<b>3 bedrooms</b>	<b>4+ bedrooms</b>	<b>Total</b>
due to stock loss		0.8%	1.6%	2.0%	1.3%	1.3%	1.4%
for new households		51.5%	102.0%	130.6%	84.2%	79.8%	88.0%
to normalize vacancies		15.1%	-7.0%	-38.2%	14.5%	19.0%	1.2%
to accommodate homeless		32.7%	3.4%	5.6%	0.0%	0.0%	9.4%
to correct for crowding		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

# Scenario 3B

## Results

	1990	2000	2005	2010	2015	2020	
Households	249,634	248,338	252,000	266,862	288,425	310,887	
Housing Units	278,489	274,845	280,665	295,903	318,492	342,066	
		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Net New Housing Units Needed		15,238	22,589	23,574	61,401		
Avg Annual Production Targets		3,048	4,518	4,715	4,093		
by source of need		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
due to stock loss		253	253	253	758		
for new households							
(excluding formerly homeless)		13,300	20,000	20,900	54,200		
to normalize vacancies		-46	605	690	1,248		
to accommodate homeless		1,732	1,732	1,732	5,195		
total		15,238	22,589	23,574	61,401		
by unit size		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Efficiencies		4,115	5,254	5,368	14,737		
1 bedroom		4,285	6,734	6,998	18,018		
2 bedrooms		2,014	3,631	3,852	9,497		
3 bedrooms		3,166	4,588	4,819	12,573		
4+ bedrooms		1,659	2,381	2,536	6,575		
total		15,238	22,589	23,574	61,401		
		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Efficiencies		27.0%	23.3%	22.8%	24.0%		
1 bedroom		28.1%	29.8%	29.7%	29.3%		
2 bedrooms		13.2%	16.1%	16.3%	15.5%		
3 bedrooms		20.8%	20.3%	20.4%	20.5%		
4+ bedrooms		10.9%	10.5%	10.8%	10.7%		
total		100.0%	100.0%	100.0%	100.0%		
Source of need by unit size		<b>Efficiencies</b>	<b>1 bedroom</b>	<b>2 bedrooms</b>	<b>3 bedrooms</b>	<b>4+ bedrooms</b>	<b>Total</b>
due to stock loss		102	233	177	159	87	758
for new households		8,299	17,976	12,084	10,611	5,230	54,200
to normalize vacancies		2,125	-685	-3,253	1,802	1,259	1,248
to accommodate homeless		4,211	494	490	0	0	5,195
to correct for crowding		0	0	0	0	0	0
total		14,737	18,018	9,497	12,573	6,575	61,401
Source of need by unit size		<b>Efficiencies</b>	<b>1 bedroom</b>	<b>2 bedrooms</b>	<b>3 bedrooms</b>	<b>4+ bedrooms</b>	<b>Total</b>
due to stock loss		0.7%	1.3%	1.9%	1.3%	1.3%	1.2%
for new households		56.3%	99.8%	127.2%	84.4%	79.5%	88.3%
to normalize vacancies		14.4%	-3.8%	-34.3%	14.3%	19.1%	2.0%
to accommodate homeless		28.6%	2.7%	5.2%	0.0%	0.0%	8.5%
to correct for crowding		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

# Appendix B: Eliminating Overcrowding

These supplemental estimates assume that all households that are currently overcrowded are shifted into the next larger unit size and that no new household occupies a unit that would make it crowded. Estimated rates of overcrowding are based on Census 2000 data. We have applied the standard definition of overcrowding: units with more than one person per room. However, for efficiencies, we assume that occupancy by two persons does not constitute overcrowding.

Efficiencies	1 bedroom	2 bedrooms	3 bedrooms	4+ bedrooms	Total
12.0%	10.0%	5.6%	3.0%	3.4%	7.0%

This scenario also requires that we adjust the distribution of new households by unit size so that none of the net new households is assigned to a unit that would result in overcrowding:

	Efficiencies	1 bedroom	2 bedrooms	3 bedrooms	4+ bedrooms
1 person	22.3%	43.7%	17.4%	12.4%	4.3%
2 people	8.2%	24.6%	30.6%	24.9%	11.7%
3 people	0.0%	21.9%	27.9%	32.8%	17.5%
4 people	0.0%	0.0%	42.4%	33.3%	24.4%
5+ people	0.0%	0.0%	0.0%	68.4%	31.6%

# Scenario 1C

## Results

	1990	2000	2005	2010	2015	2020	
Households	249,634	248,338	252,000	266,862	282,025	297,587	
Housing Units	278,489	274,845	280,665	295,869	311,399	327,364	
		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Net New Housing Units Needed		15,204	15,530	15,965	46,699		
Avg Annual Production Targets		3,041	3,106	3,193	3,113		
by source of need		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
due to stock loss		253	253	253	758		
for new households							
(excluding formerly homeless)		13,300	13,600	14,000	40,900		
to normalize vacancies		-80	-54	-19	-154		
to accommodate homeless		1,732	1,732	1,732	5,195		
total		15,204	15,530	15,965	46,699		
by unit size		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Efficiencies		2,085	2,089	2,099	6,273		
1 bedroom		2,317	2,343	2,416	7,076		
2 bedrooms		3,659	3,710	3,757	11,126		
3 bedrooms		4,498	4,663	4,865	14,026		
4+ bedrooms		2,645	2,725	2,827	8,197		
total		15,204	15,530	15,965	46,699		
		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Efficiencies		13.7%	13.5%	13.1%	13.4%		
1 bedroom		15.2%	15.1%	15.1%	15.2%		
2 bedrooms		24.1%	23.9%	23.5%	23.8%		
3 bedrooms		29.6%	30.0%	30.5%	30.0%		
4+ bedrooms		17.4%	17.5%	17.7%	17.6%		
total		100.0%	100.0%	100.0%	100.0%		
Source of need by unit size		<b>Efficiencies</b>	<b>1 bedroom</b>	<b>2 bedrooms</b>	<b>3 bedrooms</b>	<b>4+ bedrooms</b>	<b>Total</b>
due to stock loss		102	233	177	159	87	758
for new households		4,475	11,110	9,500	10,602	5,214	40,900
to normalize vacancies		1,705	-1,413	-3,505	1,802	1,258	-154
to accommodate homeless		4,211	494	490	0	0	5,195
to correct for crowding		-4,220	-3,347	4,464	1,463	1,640	0
total		6,273	7,076	11,126	14,026	8,197	46,699
Source of need by unit size		<b>Efficiencies</b>	<b>1 bedroom</b>	<b>2 bedrooms</b>	<b>3 bedrooms</b>	<b>4+ bedrooms</b>	<b>Total</b>
due to stock loss		1.6%	3.3%	1.6%	1.1%	1.1%	1.6%
for new households		71.3%	157.0%	85.4%	75.6%	63.6%	87.6%
to normalize vacancies		27.2%	-20.0%	-31.5%	12.8%	15.3%	-0.3%
to accommodate homeless		67.1%	7.0%	4.4%	0.0%	0.0%	11.1%
to correct for crowding		-67.3%	-47.3%	40.1%	10.4%	20.0%	0.0%
total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

# Scenario 2C

## Results

	1990	2000	2005	2010	2015	2020	
Households	249,634	248,338	252,000	266,862	285,425	305,187	
Housing Units	278,489	274,845	280,665	295,887	315,158	335,739	
		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Net New Housing Units Needed		15,222	19,272	20,581	55,074		
Avg Annual Production Targets		3,044	3,854	4,116	3,672		
by source of need		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
due to stock loss		253	253	253	758		
for new households							
(excluding formerly homeless)		13,300	17,000	18,200	48,500		
to normalize vacancies		-63	288	396	622		
to accommodate homeless		1,732	1,732	1,732	5,195		
total		15,222	19,272	20,581	55,074		
by unit size		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Efficiencies		2,293	2,767	2,854	7,914		
1 bedroom		2,771	3,902	4,113	10,787		
2 bedrooms		3,746	4,638	4,962	13,346		
3 bedrooms		4,048	5,105	5,549	14,702		
4+ bedrooms		2,363	2,859	3,103	8,325		
total		15,222	19,272	20,581	55,074		
		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Efficiencies		15.1%	14.4%	13.9%	14.4%		
1 bedroom		18.2%	20.2%	20.0%	19.6%		
2 bedrooms		24.6%	24.1%	24.1%	24.2%		
3 bedrooms		26.6%	26.5%	27.0%	26.7%		
4+ bedrooms		15.5%	14.8%	15.1%	15.1%		
total		100.0%	100.0%	100.0%	100.0%		
Source of need by unit size		<b>Efficiencies</b>	<b>1 bedroom</b>	<b>2 bedrooms</b>	<b>3 bedrooms</b>	<b>4+ bedrooms</b>	<b>Total</b>
due to stock loss		102	233	177	159	87	758
for new households		5,953	14,464	11,523	11,227	5,332	48,500
to normalize vacancies		1,867	-1,057	-3,308	1,852	1,267	622
to accommodate homeless		4,211	494	490	0	0	5,195
to correct for crowding		-4,220	-3,347	4,464	1,463	1,640	0
total		7,914	10,787	13,346	14,702	8,325	55,074
Source of need by unit size		<b>Efficiencies</b>	<b>1 bedroom</b>	<b>2 bedrooms</b>	<b>3 bedrooms</b>	<b>4+ bedrooms</b>	<b>Total</b>
due to stock loss		1.3%	2.2%	1.3%	1.1%	1.0%	1.4%
for new households		75.2%	134.1%	86.3%	76.4%	64.0%	88.1%
to normalize vacancies		23.6%	-9.8%	-24.8%	12.6%	15.2%	1.1%
to accommodate homeless		53.2%	4.6%	3.7%	0.0%	0.0%	9.4%
to correct for crowding		-53.3%	-31.0%	33.4%	10.0%	19.7%	0.0%
total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

# Scenario 3C

## Results

	1990	2000	2005	2010	2015	2020	
Households	249,634	248,338	252,000	266,862	288,425	310,887	
Housing Units	278,489	274,845	280,665	295,899	318,480	342,044	
		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Net New Housing Units Needed		15,234	22,581	23,564	61,379		
Avg Annual Production Targets		3,047	4,516	4,713	4,092		
by source of need		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
due to stock loss		253	253	253	758		
for new households							
(excluding formerly homeless)		13,300	20,000	20,900	54,200		
to normalize vacancies		-50	597	680	1,227		
to accommodate homeless		1,732	1,732	1,732	5,195		
total		15,234	22,581	23,564	61,379		
by unit size		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Efficiencies		2,561	3,613	3,705	9,878		
1 bedroom		3,071	5,439	5,661	14,171		
2 bedrooms		3,635	5,281	5,468	14,383		
3 bedrooms		3,762	5,321	5,648	14,731		
4+ bedrooms		2,205	2,927	3,082	8,215		
total		15,234	22,581	23,564	61,379		
		<b>2005-2010</b>	<b>2010-2015</b>	<b>2015-2020</b>	<b>Total</b>		
Efficiencies		16.8%	16.0%	15.7%	16.1%		
1 bedroom		20.2%	24.1%	24.0%	23.1%		
2 bedrooms		23.9%	23.4%	23.2%	23.4%		
3 bedrooms		24.7%	23.6%	24.0%	24.0%		
4+ bedrooms		14.5%	13.0%	13.1%	13.4%		
total		100.0%	100.0%	100.0%	100.0%		
Source of need by unit size		<b>Efficiencies</b>	<b>1 bedroom</b>	<b>2 bedrooms</b>	<b>3 bedrooms</b>	<b>4+ bedrooms</b>	<b>Total</b>
due to stock loss		102	233	177	159	87	758
for new households		7,723	17,524	12,469	11,254	5,230	54,200
to normalize vacancies		2,062	-732	-3,216	1,854	1,259	1,227
to accommodate homeless		4,211	494	490	0	0	5,195
to correct for crowding		-4,220	-3,347	4,464	1,463	1,640	0
total		9,878	14,171	14,383	14,731	8,215	61,379
Source of need by unit size		<b>Efficiencies</b>	<b>1 bedroom</b>	<b>2 bedrooms</b>	<b>3 bedrooms</b>	<b>4+ bedrooms</b>	<b>Total</b>
due to stock loss		1.0%	1.6%	1.2%	1.1%	1.1%	1.2%
for new households		78.2%	123.7%	86.7%	76.4%	63.7%	88.3%
to normalize vacancies		20.9%	-5.2%	-22.4%	12.6%	15.3%	2.0%
to accommodate homeless		42.6%	3.5%	3.4%	0.0%	0.0%	8.5%
to correct for crowding		-42.7%	-23.6%	31.0%	9.9%	20.0%	0.0%
total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%



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