METHODOLOGY

Capital Budgeting in Philadelphia: Methodology

This appendix is primarily intended to describe the methodology employed in this report. Pew took three general steps: demographic analysis; analysis of investments; and analysis of those investments across demographic indicators. This methodology contains visuals displaying some numbers that were not included in the body of the report. Additional results are available in the attached data supplement.

Step 1: Demographic analysis

The source of the demographic data was the American Community Survey (ACS) five-year estimates ending in 2012, 2015, 2018, and 2021 for each census tract. The demographic indicators included in the analysis were race and ethnicity, household income, and a modified composite "indicators of potential disadvantage" score.

Pew calculated each indicator for every census tract in Philadelphia and then assigned each tract to a group numbered 1 through 4 based on quartile classification. Tracts in Group 1 had the lowest levels of the indicator, while tracts in Group 4 had the highest levels of that indicator within the city.

In identifying appropriate indicators for an equity lens, Pew recognized that analyzing isolated indicators, such as race or income, could mask areas with multiple demographic characteristics that could affect equity overall. As such, Pew adapted the Indicators of Potential Disadvantage (IPD) score developed by the Delaware Valley Regional Planning Commission (DVRPC). The DVRPC says it uses IPD scoring "to meet the nondiscrimination requirements and recommendations of Title VI [of the Civil Rights Act of 1964] and EJ [environmental justice]" for planning, programming, and decision-making. The score analyzes the level of concentration of the nine included indicators among the population of certain areas.

Pew adjusted DVRPC's method by basing the scores only on Philadelphia census tract data rather than regional data. Each census tract was grouped from 1 through 4 for each of the nine indicators, all of which were summed to create a collective IPD score, ranging from a minimum potential score of 9 to a maximum score of 36, to quantify the level of overlap between indicators.

Step 2: Analysis of investments

The city provided Pew with spatial asset data, along with encumbrances from the capital program spanning fiscal 1997 through fiscal 2022, as well as encumbrances from Rebuild spanning fiscal 2018 through fiscal 2023. All encumbrance entries were linked to an asset ID, with codes used to reference assets that would not be included in Pew's analysis, such as those that could not be geocoded to a particular location. Frequent examples of these were Office of Innovation and Technology investments and street paving projects. Pew also did not include assets geocoded to general areas, such as commercial corridors and council districts, because of the specific spatial nature of this analysis.

Pew then joined the asset and encumbrance datasets so that each encumbrance had a single entry with all relevant asset information. Using this joined dataset, Pew coded the data for the following factors: fiscal year group, area of influence, activity, department, and source.

Fiscal year group

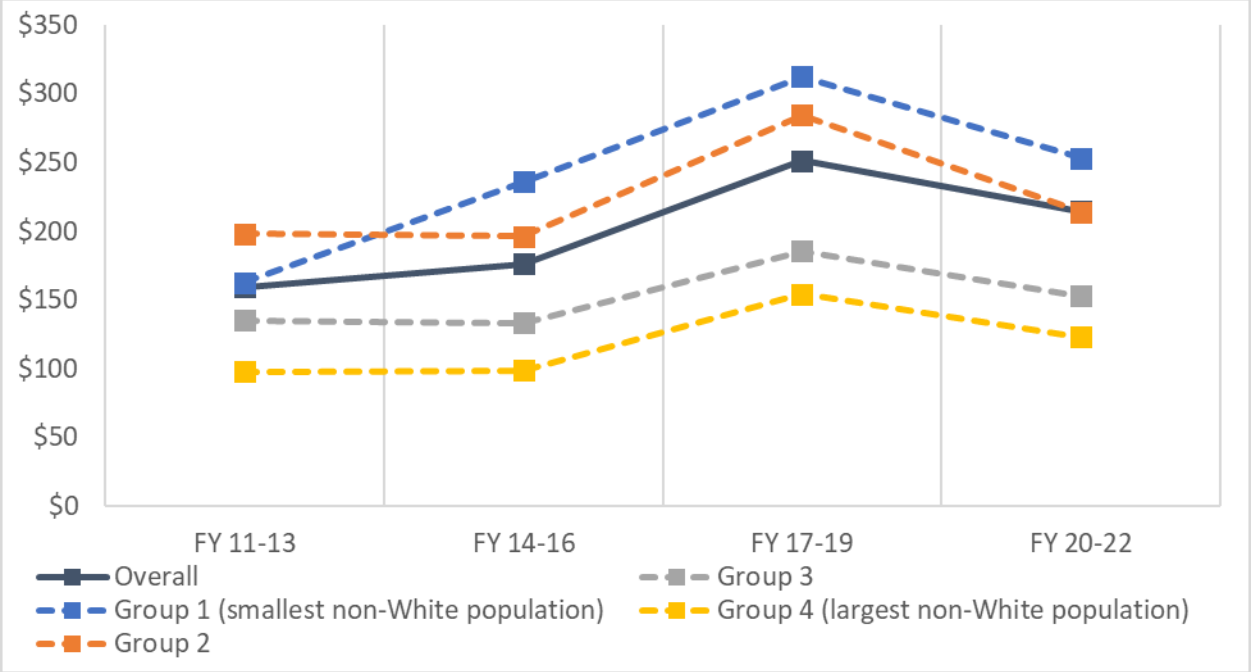
As each encumbrance included fiscal year, Pew then grouped all encumbrances into four sets of three years each: fiscal 2011-13; fiscal 2014-16; fiscal 2017-19; and fiscal 2020-22. The reasoning for grouping years together was to normalize anomalies in any particular year and get a better sense of changes over time. The groups were chosen so that the middle year of each group coincided with the final year of the ACS five-year survey results from 2012, 2015, 2018, and 2021, representing the latest demographic data that would have been available at the time that the city committed funds.

Although the total encumbrances fluctuated over the period of analysis, there was little variation in trends of per capita investment across demographic groups. Using the non-White demographic indicator as an example, it is clear that while per capita levels fluctuated over the period, each group followed similar trend lines. Combined, they had the lowest per capita investment in fiscal 2011-13 and the highest in fiscal 2017-19, though the actual per capita figures varied significantly across groups. (See Figure A.1.)

Figure A.1

Per Capita Investment, by non-White Population Level Across Fiscal Years

FY 2011-22



Notes: Census tracts were classified into four groups of equal size (quartiles) over the four sets of five-year ACS estimates. For each tract, the range of values represented by each group—share of non-White population in this case—varied by year. For the 2021 five-year ACS estimates, for instance, Group 1 represents census tracts with the lowest percentage of non-White residents (≤ 30.3%); Group 2, the

second-lowest (> 30.3% to 69.6%); Group 3, the second-highest (> 69.6% to 94.2%); and Group 4, the highest (> 94.2%). See accompanying data supplement for per capita results for all groups.

Source: Pew analysis of city of Philadelphia capital budget data

Pew analyzed per capita investment for each fiscal year across each demographic group. The results of the analysis across each demographic indicator can be viewed in the accompanying data supplement.

Area of influence

Pew adapted the area of influence factor from Baltimore's measure of the same name to gauge the reach of investment in each type of project included in the analysis. Pew assigned area classifications for each asset based on descriptive data of the asset provided by the city. Working with city officials, Pew developed a series of logic statements to classify each asset as local, multi-neighborhood, or citywide. This was an iterative process, done in conjunction with city stakeholders, as it is a subjective measure.

The three classifications break down as follows:

Table A.1

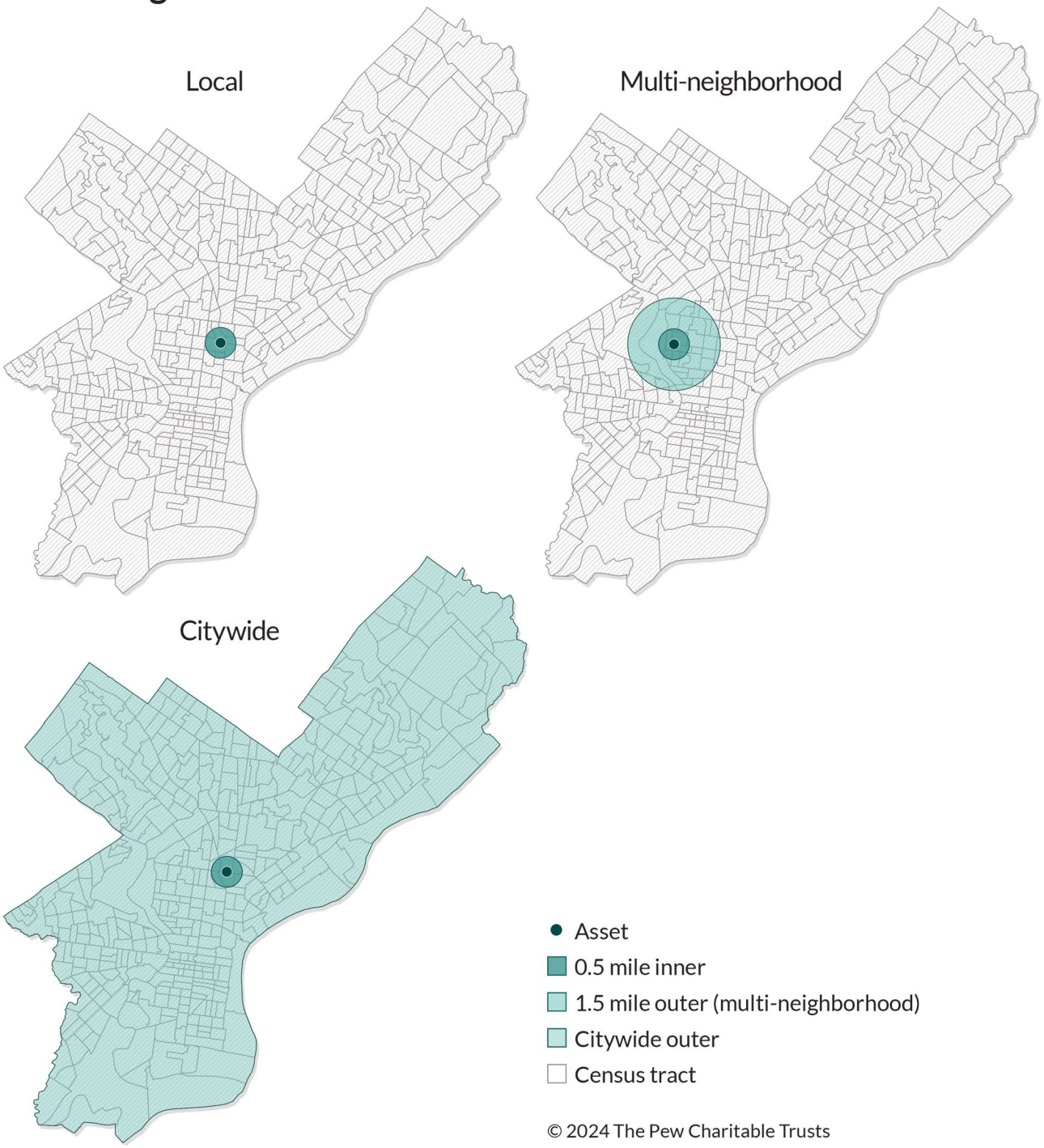
Area of Influence Categories With Description, Examples, and Radius

Classification	Description	Examples	Radius
Local	Assets intended for use primarily by those living close by.	Playgrounds Library branches	100% of encumbrance funds associated with local assets were assigned to the area within a half-mile of the asset location.
Multi-neighborhood	Assets with wider-reaching intended user bases.	Fire stations Health centers	Encumbrance funds were split in half for these assets, with 50% assigned within a half-mile of the asset and the remaining 50% assigned within one mile beyond the initial half-mile.
Citywide	Assets that are intended for the entire city.	Art museum City Hall General infrastructure	Encumbrance funds were split in half for these assets, with 50% assigned within a half-mile, and the remaining 50% assigned to the rest of the city.

Based on conversations with city stakeholders, Pew used a half-mile to define the local area around an asset, as opposed to a quarter-mile, which Baltimore used. Additionally, Pew assigned half of citywide funds to the area outside the local area, while Baltimore assigned that half to a five-mile radius. Figure A.2 displays examples of an asset within each area of influence and the distances for the distribution of encumbrance funds in the analysis.

Figure A.2

Examples of Local, Multi-Neighborhood, and Citywide Assets and Their Assigned Distances



While the assignment of funds to varying distances beyond an asset is extremely important, Pew also considered that not every capital improvement dollar has equal impact. Using the city's asset data, Pew developed eight "activity" categories and assigned one to each asset. Activities included recreational, safety, cultural, public works/city operations (also referred to here and throughout the report as "public works"), transportation, social services, open space, and other.

Table A.2

Activity Categories of Assets With Definitions and Examples

Category	Definition	Examples
Recreational	Structures or land modifications meant for people's enjoyment and active use	Parks, trails, athletic fields
Cultural	Institutions or structures meant for the preservation of history and culture	Museums, libraries, statues
Open space	Areas such as forests, agricultural fields, breezeways, preserves, and coastal lands	Breezeways, conservation areas
Public works	Assets required to sustain the city's operations	City Hall, fuel sites, maintenance garages
Safety	Structures pertaining to public safety	Police and fire stations, detention centers
Transportation	Assets pertaining to the movement of people, animals, and goods from one location to another that are publicly accessible and not attached to recreational sites	Bridges, SEPTA stations
Social services	Buildings that support government services provided for the health and benefit of the community, such as basic education, medical care, and housing	Supportive housing, health centers, senior centers
Other	Assets that cannot be grouped under the other categories because of their uniqueness or vague description	Vacant lots

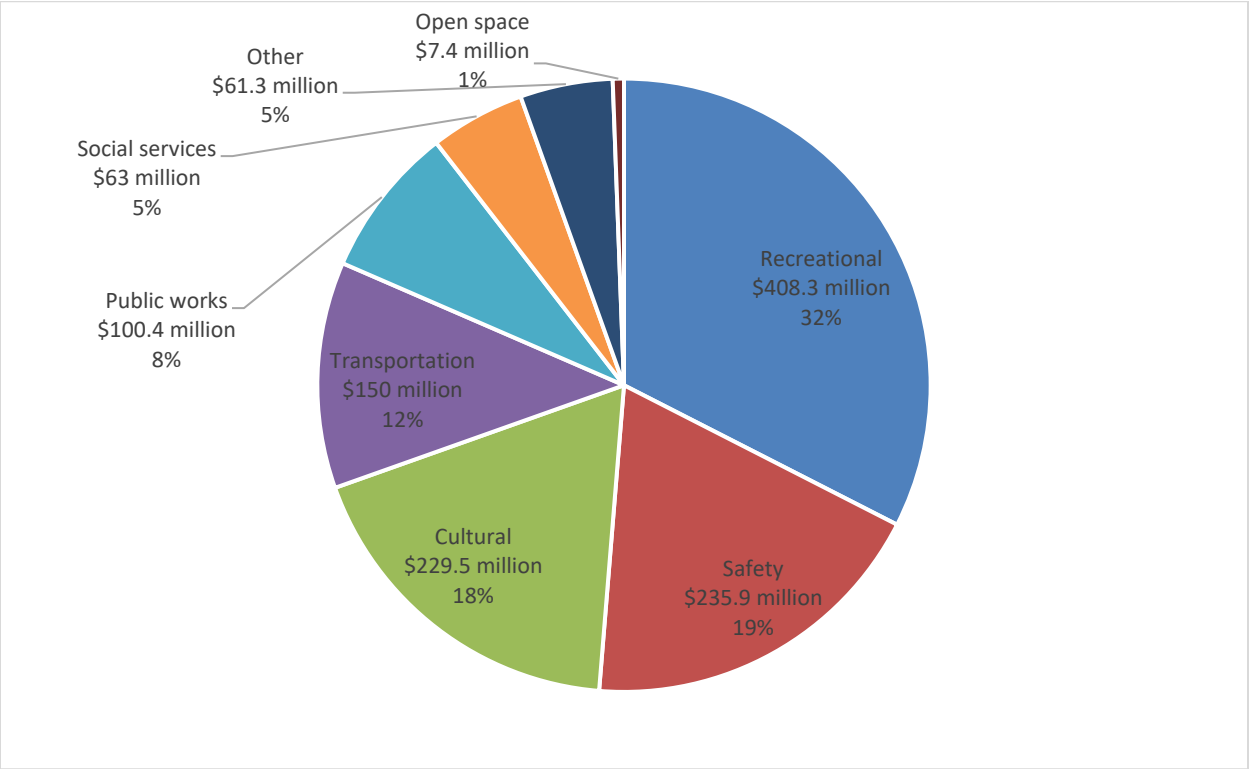
Recreational investments were the largest category, with $408.3 million in encumbrances over the period of study, followed by safety, with $235.9 million, and cultural, with $229.5 million. (See Figure A.3.)

Figure A.3

METHODOLOGY

Investments Included in Analysis, by Activity Category

FY 2011-22, in dollars and by percentage



Source: Pew analysis of city of Philadelphia capital budget data

Pew analyzed per capita investment for each activity category across each demographic group. The results of the analysis across each demographic indicator can be viewed in the accompanying data supplement.

Department

Each encumbrance in the data provided to Pew had a city department linked to it, which Pew used. Importantly, the aviation and water departments, while included in the city's Capital Program and Budget, are self-sustaining; thus, their associated encumbrances are not included in the data that Pew analyzed.

Table A.3 lists the city departments and their associated encumbrance amounts that could be linked to specific locations and therefore were included in Pew's analysis.

Table A.3

METHODOLOGY

Investments Included in the Analysis, by Department

FY 2011-22

Department	Total encumbrances, FY 2011-22
Parks & Recreation	$330.2 million
Commerce	$196.9 million
Streets	$155.0 million
Police	$116.9 million
Public Property	$81.7 million
Finance	$60.0 million
Fire	$48.8 million
Prisons	$47.7 million
Art museum	$40.5 million
Health	$40.3 million
Free Library	$27.0 million
Fleet Services	$20.4 million
Managing Director's Office	$17.1 million
Human Services	$16.5 million
Zoo	$14.3 million
Office of Homeless Services	$13.5 million
Records	$11.4 million
Fairmount Park Commission	$10.0 million
Transit	$5.3 million
Office of Sustainability	$2.3 million
Office of Innovation and Technology	$0.1 million
Total	**$1.26 billion**

Source: Pew analysis of city of Philadelphia capital budget data

Pew analyzed per capita investment levels for each department included in the data, across each demographic group. The results can be viewed in the accompanying data supplement.

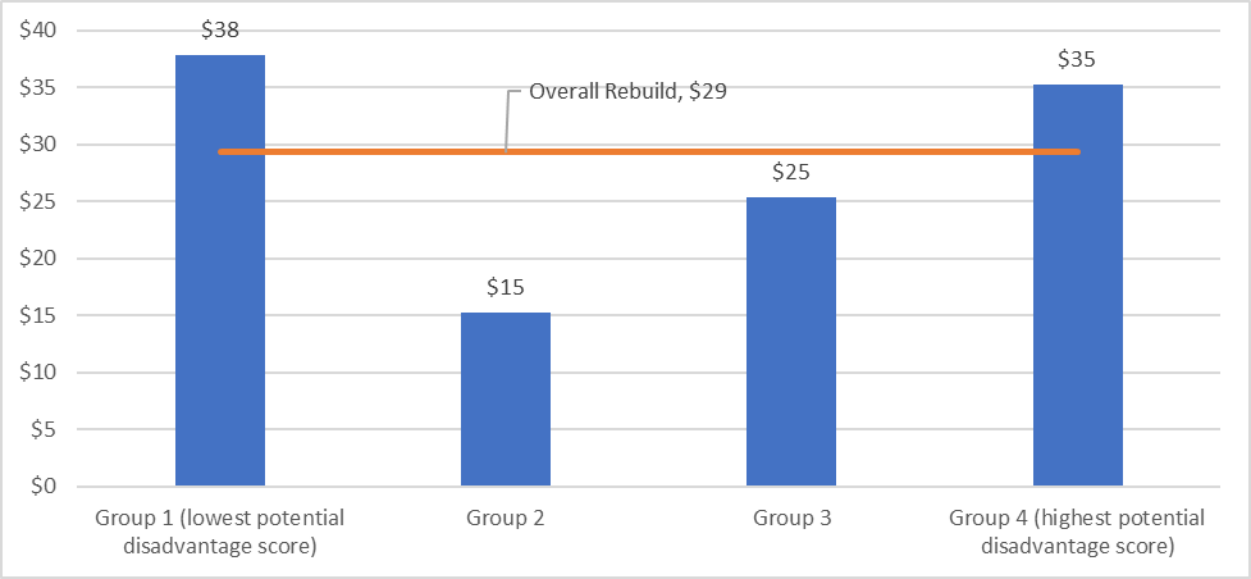
Source

Pew concluded that it was important to analyze capital program and Rebuild program encumbrance data separately. Thus, a “source” variable was created to keep them distinct. Pew analyzed per capita investment levels for both capital and Rebuild encumbrances across each demographic group. Figures A.4 and A.5, below, provide results of the Rebuild-specific analysis discussed in the Rebuild section of this report.

Figure A.4

Rebuild Per Capita Investment for Groups, by Potential Disadvantage Level

FY 2011-22



Notes: Census tracts were classified into four groups of equal size (quartiles) over the four sets of five-year ACS estimates. For each tract, the range of values represented by each group—potential disadvantage score in this case—varied by year. For the 2021 five-year ACS estimates, for instance, Group 1 represents census tracts with the lowest potential disadvantage scores (≤ 18, of a maximum of 36); Group 2, the second-lowest (>18 to 22); Group 3, the second-highest (>22 to 25); and Group 4, the highest (> 25). See accompanying data supplement for per capita results for all groups.

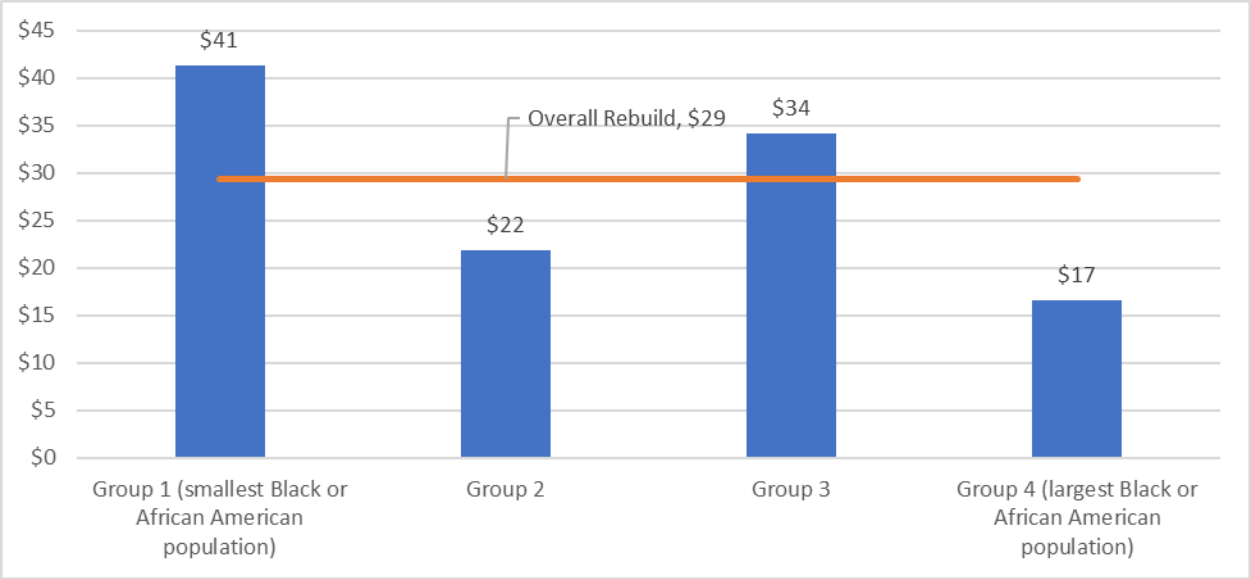
Source: Pew analysis of city of Philadelphia capital budget data

Figure A.5

METHODOLOGY

Rebuild Per Capita Investment for Groups, by Black or African American Population Level

FY 2011-22



Notes: Census tracts were classified into four groups of equal size (quartiles) over the four sets of five-year ACS estimates. For each tract, the range of values represented by each group—the share of Black or African American residents in this case—varied by year. For the 2021 five-year ACS estimates, for instance, Group 1 represents census tracts with the lowest percentage of Black or African American residents (≤ 8.65%); Group 2, the second-lowest (> 8.65% to 26.28%); Group 3, the second-highest (> 26.28% to 75.39%); and Group 4, the highest (> 75.39%). See accompanying data supplement for per capita results for all groups.

Source: Pew analysis of city of Philadelphia capital budget data

Pew analyzed per capita investment levels for both the capital program and Rebuild across each demographic group. The results of the analysis across each demographic indicator can be viewed in the accompanying data supplement.

Step 3: Analysis of investments across demographic indicators

The final step was to analyze investment levels by various factors across different indicator groups throughout the city.

METHODOLOGY

To calculate the per capita investment levels, Pew used the area of influence buffers to measure spatially the reach of each investment around an asset. Pew then used ArcMap's Tabulate Intersection tool to calculate the share of each buffer in each of the city's census tracts. Funding was broken down proportionately with the share of a buffer in each census tract. (For example, if a census tract contained 5% of a buffer, then 5% of the investment associated with that asset was attributed to the tract.) Pew then added up the funds for each census tract and aggregated those tracts by demographic indicator group to calculate the allocation of funds by group for each of the indicators. Finally, Pew normalized the distribution by the population within each group to obtain the per capita allocation of encumbrance funds by group for each of the seven indicators. Pew used each corresponding year of ACS demographic data to group the tracts and normalize by population during that year.

Limitations

There are several notable limitations to the study based on data availability, period of time studied, and the methodology employed.

First, as noted, Pew's analysis of city investment was limited to investments that could be pinpointed to a single location. This means that investments covering broader areas, including many citywide street paving projects and commercial corridor-level investments, are not represented in the data. Including these investments might have affected the results to some degree.

Additionally, there are several ways in which one could create the groups of demographic categories. Pew used a quartile classification method based on the methodology in the Baltimore report. In some cases, quartiles covered large ranges. For example, because of the relatively small share of Asian residents in the city, census tracts in the group with the largest Asian population had a share of Asian residents ranging from just 10% to a maximum of 55% of the population in 2021. In contrast, consider a larger population in the city: Black or African American residents. For this indicator, the largest group had a share of Black residents ranging from 76% to 99% of the population.

Another methodology decision that could potentially alter findings was the use of encumbrances, or committed capital funds, rather than completed expenditures as the basis of the analysis. In partnership with city officials who work with the capital investment data, Pew decided that this method was the most accurate for this analysis. The encumbrance represents when the city committed to a particular expenditure, which occurred at a single point in time, as opposed to when the work was done, which could span several years and is more difficult to track.