

## 11 FINANCIAL CAPABILITY

### 11.1 INTRODUCTION

The United States Environmental Protection Agency (US EPA) suggests that a financial capability assessment should be included in the CSO Long Term Control Plan (LTCP) in order to establish the burden of compliance on both ratepayers and the permittee. The assessment in this section follows the guidelines and methodology as described in the US EPA's "Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development," published February 1997. The purpose of the financial capability assessment is twofold.

First, the affordability process contemplates balancing the pace of environmental improvement with the financial and economic capability of the permittee. The process allows flexibility in scheduling completion of CSO compliance measures, based on the financial capability of the area served. Second, a financial capability can support the determination of funding needs by agencies providing loan and grant monies for capital projects.

The financial capability assessment is a two phased process. The residential indicator is the percentage of median household income (MHI) expended on wastewater management. The financial capability indicator is an assessment of the permittee's debt burden, socioeconomic conditions, and financial operations. These two measures are subsequently entered into a financial capability matrix, suggested by US EPA, to determine the level of financial burden that the existing wastewater management system and the CSO control measures will place on residential customers and the permittee. The US EPA matrix appears in Table 11-8 at the end of this section.

In addition to following guidelines for these two measures, US EPA encourages inclusion of any information that would have a financial impact on CSO compliance by the permittee in the capability report. This assessment, therefore, includes extensive discussion of socioeconomic trends in the Philadelphia area because of the financial challenges that the City and the region faces.

### 11.2 PHASE 1 - CALCULATION OF THE RESIDENTIAL INDICATOR

PWD has projected future revenue requirements and associated rates, taking into account current and future costs to operate, maintain, and replace the PWD's system, currently outstanding debt service, and future debt service resulting from anticipated and identified capital improvements. The focus for evaluating the impact of the residential indicator is the next 20 years (FY 2029)<sup>1</sup>, however it is anticipated that elements of the LTCPU implementation program will continue well beyond this 20 year timeframe.

PWD has developed its financial projections consistent with the manner in which it develops rate projections, with expenses, revenues and capital costs stated in future year dollar terms

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<sup>1</sup> The City of Philadelphia's fiscal year runs from July 1st through June 30<sup>th</sup>.

(*i.e.*, inflated to the future year). Thus, household bills in 2015 (for example), reflect what PWD estimates households are projected to pay in that year. For purposes of the affordability analysis, these future household rates are compared to projected household incomes (also projected to future year dollars) in those specific years. The approach keeps all cost figures on a consistent basis and provides PWD with a realistic picture of actions required to raise needed revenue and comply with its ultimate requirements.

In developing these projections, PWD has sought to estimate the future burden of the LTCPU in addition to the full utility system's long term needs for wastewater and water service, as currently understood. Although PWD provides both water and wastewater (including stormwater) service, they have traditionally maintained separate water and wastewater rates, in accordance with standard cost-of-service criteria. PWD has evaluated the impact of the LTCPU by estimating those capital and operation and maintenance (O&M) costs in conjunction with an estimate of other costs anticipated to be incurred by the utility over the next 20-plus years. The associated rates for wastewater and stormwater are then estimated on an average household basis. The residential indicator is based on that average annual cost per household relative to projected MHI for each year over the forecast period.

### 11.2.1 Key Assumptions

The key assumptions used to develop these projections are:

- The combined sewer area is located within the City limits of Philadelphia, therefore the determination of the residential indicator is based on the retail cost of wastewater service for households in the City of Philadelphia served directly by PWD. The cost of contract sales to wholesale customers outside of the City is anticipated to increase in response to increased costs of service for non-LTCPU related activities
- The projected average growth in MHI is 2.29%. Since 1989, MHI in Philadelphia has grown at a rate which is below both those of the state (2.94%) and national (3.18%) levels. This appears to be a consistent and long-term trend resulting from structural elements of the Philadelphia's demographic and economic makeup, rather than just being the result of cyclical or outlying occurrences. Metered sales (for water/wastewater customers) and associated billable discharges to the wastewater system have been trending downward (*e.g.*, billed water consumption declined approximately 5.4% for FY 2000 to FY 2008). To provide for a conservative estimate, the residential indicator projections assume that consumption will stabilize at current levels
- Costs associated with O&M (including labor and materials) are anticipated to grow at rates experienced in recent years. The costs for O&M of PWD's existing wastewater system are estimated to increase at 4.7% per year throughout the planning period. The inflation rate for the O&M costs for LTCPU related projects is projected to be 3.87%
- Future costs for capital projects are inflated at an annual rate of 3.87%. For the most recent 10 year period, the Engineering News Record City Cost Index – Philadelphia construction cost index and the building cost index have increased at an average annual rate of 4.1% and 3.9% respectively

- The PWD's capital improvement program for non-LTCPU related projects reflects continued investments in facility upgrades and replacements throughout the entire system. The estimated costs for the non-LTCPU capital improvements are approximately \$3.7 billion (water and sewer - 2009 dollars) through Philadelphia's FY 2029 (ending June 30, 2029). The primary capital expenditures generally consist of the following: improvements to water and wastewater treatment plants; rehabilitations and replacement of water mains; rehabilitation and replacement of old sewers and construction of new sewers to relieve unsanitary conditions; and construction of new storm flood relief sewers and storage tanks
- PWD assumes the funding for its capital program will be financed primarily through the issuance of revenue bonds through the municipal bond market, supplemented through PennVest financings. PWD will also utilize pay-as-you-go funding and, to the extent available, miscellaneous grants. Best practices vis-à-vis the municipal bond market requires that PWD's capital debt be structured with various interest rates and maturities. Therefore, rather than specifying an assumed interest rate and bond duration, PWD's Financial Capability analysis utilizes long term experience in defining an annual cost per unit of principal borrowed. PWD has determined that a capital cost factor of 8.059% is appropriate. Costs of O&M associated with the LTCPU were synchronized with the implementation schedule and with escalation factors generally resembling historical cost escalation for PWD's overall O&M program
- Revenue projections for this financial capability assessment rely on PWD's existing cost-of-service based rate structure with forecast revisions reflecting the proportional increase in wastewater and stormwater costs due to implementation of the LTCPU as well as a continuation of the non-rate revenues the City currently generates

As detailed in Section 10 of this report, PWD is proposing green infrastructure with targeted traditional infrastructure as its preferred alternative. The recommended plan seeks to reduce CSO frequency and volume through a range of land-based stormwater management techniques or source controls. As described in previous sections, this option will be implemented in stages through 2029. The total capital need for the LTCPU program is \$902 million (Table 11-1), and the total O&M need through 2029 for the LTCPU as it is implemented is \$98 million, both stated in 2009 dollars.

The LTCPU capital program will be implemented within the context of PWD's overall capital improvement program, also summarized in Table 11-1. Total capital expenditures through 2029 of approximately \$4.6 billion (2009 dollars) for improvements to the water and wastewater systems are projected. Of these projected capital expenditures, around \$3.4 billion or 73 % are projected for wastewater and wet weather; including \$902 million for the implementation of the recommended LTCPU through 2029. The remaining projected wastewater expenditures go towards system renewal, replacement, rehabilitation and improvements necessary for adequate and compliant services.

PWD assumes the continuation of its ongoing program related to water main and sewer rehabilitation and replacement and treatment plant upgrades throughout the 20 year period. PWD will also pursue an aggressive storm flood relief program that is intended to be completed within the next decade. The cost of that program is not included in the estimate

Table 11-1 PWD Capital Improvements Program (in billion \$) 2010-2029

Capital Program	Present Dollar Value (2009 Dollars)
Water Treatment and Distribution	\$1.22
Wastewater Treatment and Collection	\$2.12
Storm Flood Relief	\$0.36
Long Term Control Plan	\$0.90
<b>Total Capital Cost</b>	<b>\$4.60</b>

for the LTCPU, although it is expected to have a beneficial impact on the City’s ability to manage wet weather flows in the future.

### 11.2.2 Projected Revenue Requirements and Rate Impacts

For FY 2009 through FY 2029, the annual revenue requirement for PWD’s wastewater system is expected to increase by about \$720 million, from approximately \$350 million to \$1.07 billion in 2029. Annual wastewater system debt service in 2029 is projected to be approximately \$366 million. This amount compares to current (2009) annual wastewater system debt service costs of approximately \$130 million.

PWD is empowered and required under the Philadelphia Home Rule Charter to establish rates for water, wastewater and stormwater at levels that provide sufficient revenue to meet all operating expenses of the water, wastewater and stormwater systems, including interdepartmental charges for services provided to the PWD, and debt service requirements on all obligations issued for the PWD, including specific bond ordinance covenants.

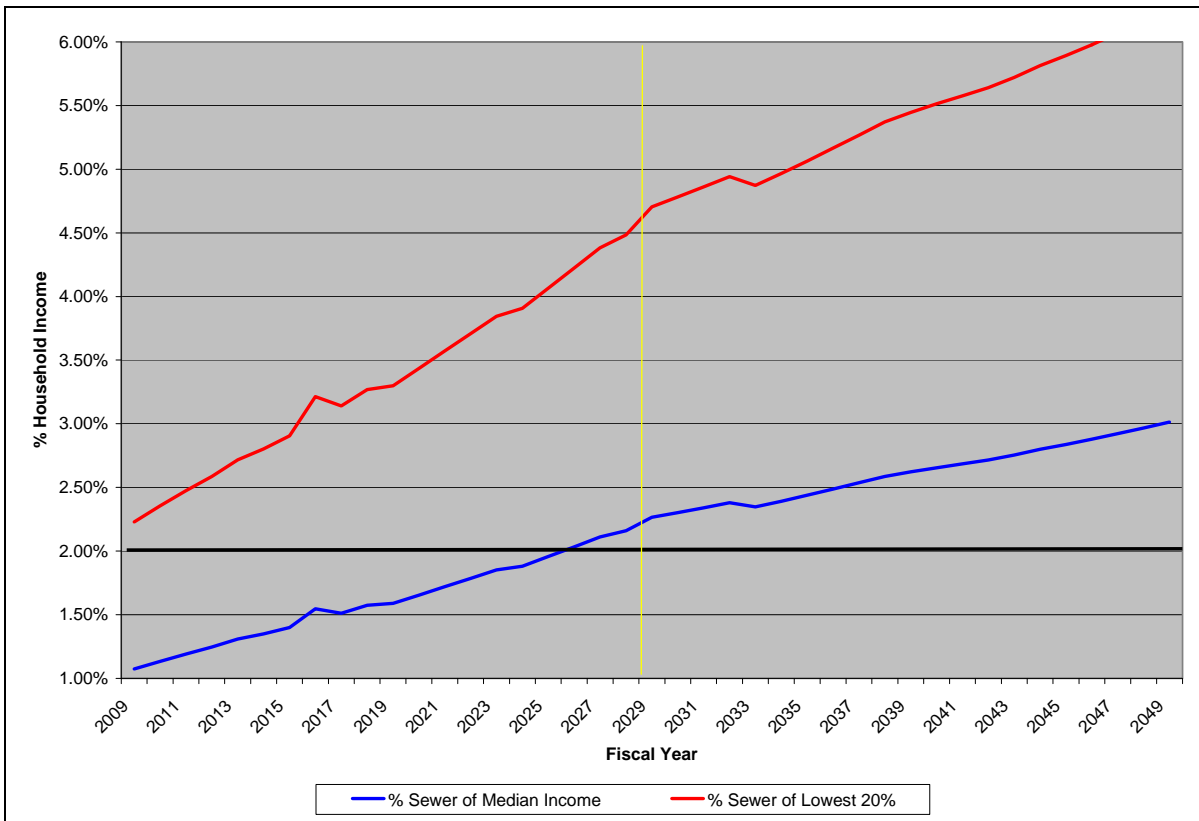
PWD estimates that the typical household in the City currently pays approximately \$400 annually for wastewater services, including stormwater. The most recently available U.S. Census data for MHI in Philadelphia is \$35,431 for 2007. Based upon the projected annual MHI growth of 2.29%, the estimated 2009 MHI would be \$37,072. PWD customers are currently (2009) paying approximately 1.10% of their income for wastewater charges. In addition to the general rates, special rates are applicable to certain properties or customer groups as prescribed by ordinance. Charges are also administered for municipal fire protection and private fire protection and for industrial dischargers of high strength wastewater. Service to customers located outside the City is on a wholesale basis through contracts with various municipalities, authorities and townships. Each wholesale contract has been negotiated on a case-by-case basis, and has a different cost structure and variations in the method for adjusting those wholesale charges to reflect changes in their cost of service.

Under the US EPA guidance, a key measure of affordability is the residential indicator: the ratio of the wastewater cost per household to MHI. The residential indicator is compared to US EPA-defined criteria to determine whether costs impose a low, mid-range, or high impact on residential users. Table 11-2 shows US EPA’s residential indicator criteria, which define a “low” impact as a cost per household less than 1.0% MHI, a “mid-range” impact between 1.0 and 2.0%, and “high” impact as greater than 2.0% of MHI.

**Table 11-2 US EPA Residential Indicator**

Residential Indicator	Cost per Household
Low	Less than 1.0% of MHI
Mid-Range	1.0-2.0% of MHI
High	Greater than 2.0% of MHI

Implementation of the PWD’s LTCPU projects along with other necessary wastewater system capital improvements require wastewater system rates to be increased at an annualized rate of approximately 6.18%. The cumulative effects of these increases are shown graphically on Figure 11-1. The primary measure of the affordability (wastewater cost as percent of MHI), the residential indicator, is currently around 1.1%. The residential indicator is expected to rise to approximately 2.27% by 2029); based upon projected average annual household wastewater costs of approximately \$1,321 and a projected MHI of approximately \$58,305. As may be noted in Figure 11-1, the cost, demographic and economic trends will result in continued increases in the percentage of household income to be expended on wastewater services well beyond 2029.

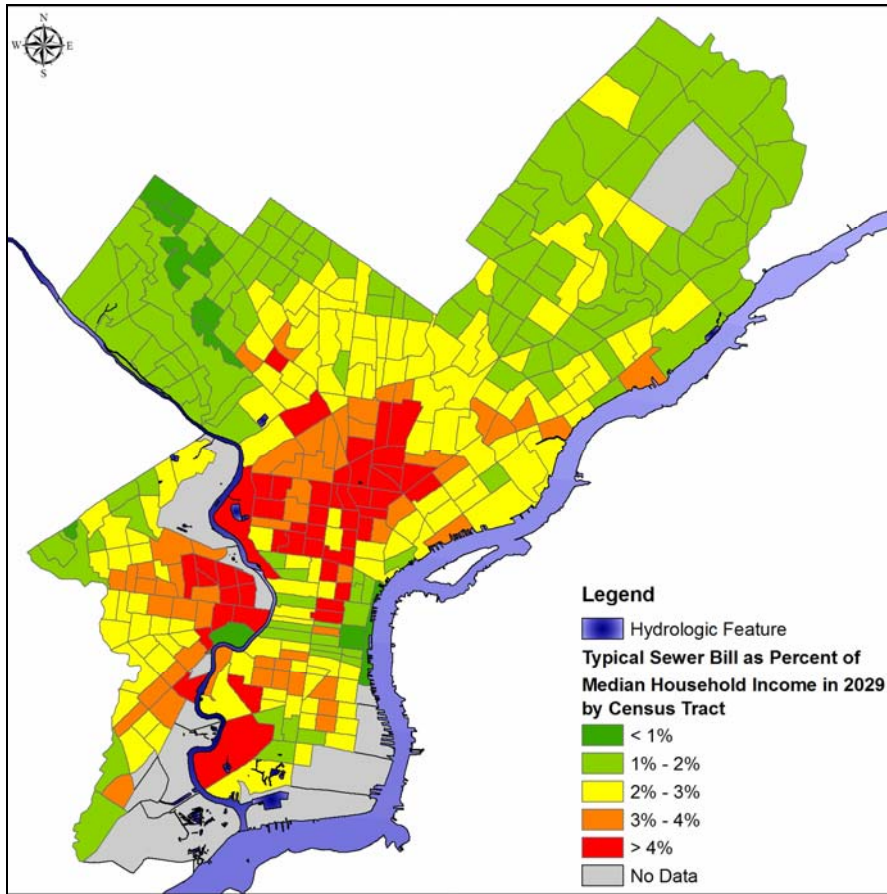


**Figure 11-1 Residential Indicator, 2009-2029 Recommended Plan, 2009-2020 Implementation**

## Philadelphia Combined Sewer Overflow Long Term Control Plan Update

US EPA's residential indicator is based upon the City's MHI. By definition, one half of the households (approximately 279,000) have household incomes that are less than the current \$37,072 median and will be less than the \$58,305 MHI that is projected for 2029. At an average of approximately 2.5 residents per household, the lower half of the MHI population for the City would total approximately 698,000. Therefore, a group that would comprise the 16<sup>th</sup> largest cities within the U.S., (exceeding major cities such as Boston, Baltimore, Washington D.C., and Seattle), would be paying more than 2.27% of their incomes for wastewater services in 2029.

The financial impact of the LTCP implementation and other LTCP costs on the lower income population of Philadelphia will be significant. The projected 2029 MHI for the lowest 20% MHI group is less than \$38,000. This group would be paying between 3.5% of their MHI (upper limit of the second quintile) to 7.0% MHI (first quintile) in 2029. This group includes around 158,000 households representing a population of around 396,000. This number is larger than the populations of major cities such as Cincinnati, Minneapolis, Honolulu, Pittsburgh, and Toledo. The disparate impact of the implementation of the LTCP and other necessary wastewater capital improvements upon the City's varying income areas is shown on Figure 11-2. The map shows the projected Residential Indicators for the 368 census tracts within the City of Philadelphia in 2029.



**Figure 11-2 Projected Residential Indicator by Census Tract (2029)**

### 11.2.3 Financing Assumptions

The projections of burden and the residential indicator are sensitive to assumptions regarding debt financing. PWD has traditionally funded its capital programs with a combination of traditional debt (revenue backed bonds), existing reserve funds, grant funding (when available), and the state revolving fund (PennVEST). Although this combination of funding mechanisms may continue to be available, it is assumed that the predominant funding source will be traditional debt (revenue bonds issued through the municipal bond market) supplemented by pay as you go funding and limited grants.

### 11.2.4 Grant Availability

Although PWD will pursue available grant programs, the financial analysis does anticipate grant funding for CSO controls. The amount of grant funding that may become available is expected to be relatively minor in comparison to the projected capital expenditures for the LTCPU.

## 11.3 PHASE 2 - CALCULATION OF PERMITTEE FINANCIAL CAPABILITY INDICATORS

The second phase of the financial capability assessment - calculation of the financial capability indicator for the permittee – includes six items that fall into three general categories of debt, socioeconomic, and financial management indicators. The six items are:

- Bond rating
- Total net debt as a percentage of full market real estate value
- Unemployment rate
- MHI
- Property tax revenues as a percentage of full market property value
- Property tax revenue collection rate

Each item is given a score of three, two, or one, corresponding to ratings of strong, mid-range, or weak, according to US EPA-suggested standards. The overall financial capability indicator is then derived by taking a simple average of the ratings. This value is then entered into the financial capability matrix to be compared with the residential indicator for an overall capability assessment). Table 11-3 contains the six criteria and the ratings that categorize the permittee as strong, mid-range, or weak in each category. Shaded areas of this table indicate the City of Philadelphia's position in each category. Indicators with shading in two ratings such as the bond rating category reflect a score between the two ratings. A discussion of each item follows.

**Table 11-3 US EPA Permittee Financial Capability Indicator Benchmarks**

<b>Indicator</b>	<b>Strong</b>	<b>Mid-Range</b>	<b>Weak</b>
Bond rating	AAA-A (S&P) or Aaa-A (Moody's)	BBB (S&P) Baa (Moody's)	BB-D (S&P) B-C (Moody's)
Overall net debt as a percent of full market property value	< 2%	2% to 5%	> 5%
Unemployment rate	> one percentage point below the national average	± one percentage point of national average	> one percentage point above the national average
MHI	More than 25% above adjusted national MHI	± 25% of adjusted national MHI	> 25% below adjusted national MHI
Property tax revenues as a percent of full market property value	< 2%	2% to 4%	> 4%
Property tax collection rate	> 98%	94% to 98%	< 94%

(Blue areas indicate City of Philadelphia ratings)

*Bond Rating – Indicator 1*

General obligation debt, which is debt backed by the full faith, credit, and taxing power of the City of Philadelphia, has been rated by Moody's Investors Service at Baa1, by Standard & Poor's Corporation at BBB, and by Fitch Investors Service at BBB+.

The PWD issues debt pursuant to the City's Restated General Water and Wastewater Revenue Bond Ordinance of 1989 ("General Ordinance"), which superseded the General Water and Wastewater Revenue Bond Ordinance of 1974 ("Prior Ordinance"). PWD's debt is a special obligation of the City, secured along with previously issued water and wastewater revenue bonds, by a pledge of and security interest in all project revenues established in various funds and accounts, all as defined in the General Ordinance.

PWD's debt is currently rated as A3 by Moody's Investors Service, A by Standard and Poor's and A- by Fitch.<sup>2</sup> Based on the current credit rating of the City and PWD the overall bond rating is between strong and mid-range.

*Net Debt as Percent of Full Market Value – Indicator 2*

Total net debt includes overlapping debt, which is the indebtedness of the School District of Philadelphia and the City of Philadelphia General Bonded Debt in addition to the City of Philadelphia. School District debt totaled \$2,634 million and bonded debt totaled \$4,136 million on June 30, 2008, for total overlapping debt of \$6.77 billion. The percent of total net debt to full market value was 37.30%. The calculation of the above percentage is based on a deduction of \$255.7 million in sinking fund monies from outstanding debt. Self-sustaining debt (*i.e.*, revenue-backed bonds) are also excluded from total debt outstanding. Overall net debt as a percent of full market property value places the City of Philadelphia in the weak range on this measure.

<sup>2</sup> Source: OFFICIAL STATEMENT relating to \$140,000,000 City of Philadelphia, Pennsylvania Water and Wastewater Revenue Bonds, Series 2009A (page 59)



### *Unemployment Rate – Indicator 3*

The unemployment rate for the City of Philadelphia was 7.2% in 2008. The unemployment rate for the Commonwealth of Pennsylvania in 2008 was 5.4%, and the national rate for 2008 was 5.8%.

According to US EPA guidelines, a local variance of greater than 1% from the national rate indicates a weak financial capability. Philadelphia maintained an unemployment rate greater than 1% of the national average for the year 2008. Most recent data from the Department of Labor, Bureau of Labor Statistics shows the unemployment rate for Philadelphia to be as high as 9.7% in March 2009, its highest rate since 1993 and remaining ahead of the state and national averages.

### *MHI – Indicator 4*

The most recent data (2007) from the Census Bureau estimate Philadelphia's MHI to be \$35,431. US EPA guidelines suggest that a variance of greater than 25% below the national MHI figure constitutes a weak rating. Pennsylvania's MHI estimate was \$47,913 and the national estimate was \$50,007 over the same period of time, percent differences of nearly 32 and 36%, respectively.

### *Property Tax Revenues as a Percent of Full Market Property Value – Indicator 5*

The City of Philadelphia assessed valuation is 29.22% of the full market value of real estate. A tax of 33.05 mills is levied on the assessed valuation. Therefore, the property tax levy is 3.305% of assessed valuation, or approximately 1.0% of full market value set by the State Tax Equalization Board. The projected full market value for 2008 was \$41.67 billion. The result shows current year real estate collections to be approximately 0.85% of full market value. Table 11-4 shows assessed valuation, full markets value, tax levy and current year tax collections for real estate taxes.

The US EPA financial capability assessment makes no provision for measuring a local tax burden other than the real estate tax. This gives Philadelphia an artificially strong rating in the property tax revenues as a percent of full market value category.

However, the City of Philadelphia is somewhat unique in that real estate collections are not its primary source of income. The earned income tax levied by the City comprised 23% of the operating revenues in FY 2008, while the property tax only accounted for 6% of revenue. The City's current earned income tax rate is 4.22% of residents' wages. Although real estate taxes are comparatively low, Philadelphia taxpayers are heavily burdened by other local levy, including a Philadelphia sales tax.

Analysis by a Pew Foundation study<sup>3</sup> documents that the total tax burden per household in Philadelphia are about double the average for comparable large cities. For a family of three earning \$50,000 annually, the tax burden in Philadelphia is 17.3% compared to the large city average of 8.8%. The total tax burdens for ten cities in the Pew study are shown on Table 11-5.

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<sup>3</sup> Philadelphia 2009 – The State of The City. The Pew Charitable Trusts – Philadelphia Research Initiative; page 13 (<http://www.pewtrusts.org>)

**Table 11-4 City of Philadelphia, 2003-2008 Adjusted Real Estate Valuation, Real Estate Taxes Levied, and Collection Rates (in millions \$)**

Year	Total Taxable Assessed Valuation	Full Market Value based on State Tax Equalization Board	Adjusted Gross Real Estate Taxes Levied	Amount Collected in Year of Levy	Current Year Property Tax Revenue Collection Rate	Real Estate Tax Collected as Percent of Full Market Value
2008	12,175	41,667	391.1	355.901	91.0%	0.85%
2007	11,615	39,696	391.1	347.5	88.9%	0.88%
2006	11,431	39,600	385.6	339.6	88.1%	0.86%
2005	11,032	37,153	373.5	350.3	93.8%	0.94%
2004	10,946	36,856	372.5	340.9	91.5%	0.92%
2003	10,621	35,384	359.4	326.8	90.9%	0.92%

Source: Pennsylvania State Tax Equalization Board, FY 2008 CAFR, and City of Philadelphia Yearly Supplemental Reports

**Table 11-5 Comparison of Large City Tax Burdens (Family of Three with \$50,000 Income)**

City	Tax Burden	% Income
1 Philadelphia	\$8,629	17.3
2 Baltimore	\$7,105	14.2
3 Detroit	\$6,180	12.4
4 Columbus	\$5,589	11.2
5 Houston	\$4,398	8.8
6 New York	\$4,259	8.5
7 Boston	\$3,892	7.8
8 Washington	\$3,590	7.2
9 Chicago	\$3,547	7.1
10 Phoenix	\$3,403	6.8
<b>Average</b>	<b>\$4,423</b>	<b>8.8</b>

Source: Philadelphia 2009 – The State of The City The Pew Charitable Trusts – Philadelphia Research Initiative; page 13 (<http://www.pewtrusts.org>)

The residential indicator is a national screening parameter and does not account for localized factors which erode the effective household income. The high total tax burden facing Philadelphia households reduces their effective household income. Consequently, measuring the household burden imposed by wastewater costs as a percentage of the MHI (estimated in 2009 to be \$37,072 and projected to be \$58,305 in 2029) may underestimate the financial burden of the projected wastewater costs per household. As was noted in an analysis of the impacts of CSO controls in the Boston region:

*“The greater are the costs of other necessities as a share of MHI, the greater will be the economic burden associated with sewer charges equal to a given percent of MHI.”<sup>4</sup>*

<sup>4</sup> Assessment of the Economic Impact of Additional Combined Sewer Overflow Controls in the Massachusetts Water Resource Authority Service Area (page 13) prepared by Robert N. Stavins, Genia Long, and Judson Jaffee. Analysis Group Incorporated, August 2004.

The impacts of the tax burden in Philadelphia are further exacerbated by the relatively high cost of living in Philadelphia. The American Chamber of Commerce Researchers Association Cost of Living Index for Philadelphia was 1.249 in 2006<sup>5</sup> (*i.e.*, the cost of living in Philadelphia is approximately 25% higher than the national average). The estimated U.S. MHI in 2009 is approximately \$52,500 or 41% higher than the Philadelphia MHI. Thus, the household at the median Philadelphia income faces costs of living that are 25% higher than the national average while earning an income that is about 71% of the national median income.

### *Property Tax Collection Rate – Indicator 6*

Real estate tax collections had shown a pattern of increase since the rate was lowered to 34.74 mills on assessed valuation in 2003, however, the collection rate dropped below 90% for 2006 and 2007. The US EPA criterion for a strong rating in this category is a collection rate of more than 98%. Philadelphia's rate is estimated to be 91%, which places it in the weak range for real estate tax collections.

### *Summary of the Six Municipal Financial Capability Indicators*

The City of Philadelphia received a financial capability rating of 1.58, according to the scores on the six items included in the assessment. This is based on a strong-to-mid-range rating of “2.5” on its bond rating; weak ratings of “1” on overall net debt as a percent of full market property value, unemployment rate, MHI, and property tax collection rate; and the strong rating of “3” on its property tax revenues as a percent of full market value of real estate. The 1.58 rating represents the simple average of those scores.

## **11.4 ADDITIONAL SOCIO-ECONOMIC TRENDS IN THE PWD SERVICE AREA**

In addition to following US EPA guidelines for completion of the financial capability assessment matrix, a discussion of socioeconomic trends in the PWD service area is essential to the consideration of scheduling and compliance levels with CSO guidelines. Approximately 70% of the service area population consists of City of Philadelphia residents, and neighboring counties served are limited in the flows that can be sent to PWD's wastewater treatment plants. Therefore, this discussion includes socioeconomic trends in Bucks, Delaware, and Montgomery Counties, but it is focused primarily on demographic and employment conditions and projections for Philadelphia.

### *Philadelphia's Demographic and Economic Trends*

This section advances an analysis of demographic and economic changes that have taken place in Philadelphia and the surrounding suburban counties during the years 1980 to 2008 and for the forecast period of 2010 to 2035. Emphasis is placed upon demographic and economic changes as they impact Philadelphia County. Demographic and economic trends that are analyzed include population, age of population, the number of households, household composition, and income levels.

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<sup>5</sup> American Chamber of Commerce Research Association Cost of Living Index, <http://www.coli.org>.

*Population*

Population levels are a significant indicator in any analysis of demographic and economic changes. Philadelphia’s population is depicted in Table 11-6 for the historic period 1980 through 2007 and the forecast period of 2010 through 2035. During the period 1990 to 2000, the population of Philadelphia decreased significantly from 1,585,577 to 1,517,549, a 4.5% decline. As illustrated in Table 11-6, the Delaware Valley Regional Planning Commission (DVRPC) has projected a small increase in the City of Philadelphia’s population for the forecasted period 2010-2035. However, most recent census data indicates that the City’s population has continued its dramatic decline with a currently estimated population of 1,454,382. Therefore, unless there is a reversal of this trend, the estimated projections for the year 2035 would need to be adjusted significantly downward. In this event, the PWD would anticipate a reduction in the number of residential customers and a corresponding increase in the burden on the remaining households. The Philadelphia County population trend is a reasonable basis for predicting that residential demand for wastewater service in Philadelphia County is not likely to increase significantly during the forecast period.

**Table 11-6 Philadelphia County Population Levels 1980-2035**

1980 Census	1,688,210
1990 Census	1,585,577
2000 Census	1,517,549
2005 – 2007 Census Estimate	1,454,382
2010 Forecast	1,475,613
2020 Forecast	1,474,268
2030 Forecast	1,478,065
2035 Forecast	1,480,023

Source: DVRPC, Analytical Data report “Regional, County, and Municipal Population and Employment Forecasts, 2005-2035,” July 2007

*Minority Population*

The proportion of minority population in the PWD service area varies between 8.9% in Bucks County and 57.3% in Philadelphia based on most recent Census data. Philadelphia’s minority population is over 31% higher than the national average and over 41% higher than the state average. A portion of that population experiences lower incomes, slower growth in income, and greater difficulty meeting the increased burden of utility costs.

*Age of Population*

The age of the local population is also a significant factor in this analysis. In this regard, it should be noted that in 1980, approximately 14% of all Philadelphians were 65 years of age or older (elderly), and in 1990 the number rose to 15.2%. In 2000, the percentage of elderly in the local population decreased to 14.1%, and the most recent data estimate a 13.0% elderly population. The national average is estimated to be 12.5%, so despite the decrease in elderly population within the City, it still remains above average.

An increase in the elderly population is evident in the suburban counties served by the permittee. The elderly population in the surrounding counties increased from 13.8% to

14.3% during the 1990 to 2000 time period. According to the DVRPC<sup>6</sup>, based on population forecasts and the current age distribution, the percent of elderly within Philadelphia and its surrounding communities will increase to roughly 19% of the population by 2025. The DVRPC estimates that the elderly population within Philadelphia will be around 15%, and as high as 22% in Bucks County. As the baby boomer generation ages, the percentage of elderly should increase dramatically.

This trend of the locally aging population is alarming since there appears to be a historic positive correlation in Philadelphia between the percentage of the elderly population and the percentage of the population living in poverty. This is evident in Philadelphia County, based upon population and demographic trends observed between 1970 and 2000. Along with the increased percentage of elderly population, the number of residents living in poverty went from just less than 12% to more than 22%.<sup>7</sup>

It can be reasonably projected, based on the foregoing, that the permittee's customer base will consist of an increasing number of elderly persons, who in many instances are living on limited incomes. Further, an aging customer base indicates limits on future economic expansion.

### *Number of Households*

Another significant factor in this analysis of demographic and economic trends is the number of established households in Philadelphia County. In 1980, 1990, and 2000, there were 634,665, 600,740, and 590,238 households in Philadelphia, respectively. Most recent Census data estimates 557,985 households. The consistent decrease in the number of households is not surprising given the general decline in Philadelphia's population. However, this trend is more alarming when viewed in conjunction with the changes in local household composition, addressed in the following section. These factors suggest that significant income growth in Philadelphia will be unlikely during the forecast period.

### *Household Composition*

Family households in Philadelphia numbered 352,331 in 2000, compared to 378,048 in 1990 and 415,891 in 1980. In 2000, 189,291 such households were headed by two parents, compared to 227,187 in 1990 and 280,619 in 1980. The number of female-headed households in this mix was 131,332 in 2000, compared to 122,370 in 1990 and 113,489 in 1980. This is significant because two parent households tend to have higher incomes than non-family households and family households headed by single parents<sup>8</sup>. Illustrative of this point is in the 12 months prior to the last census estimates, 34% of female-headed families in Philadelphia were below the poverty line compared to only 8.5% of married couple families.

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<sup>6</sup> DVRPC, "The Aging of the Baby Boomers: Elderly and Near-Elderly Population Characteristics," January 2007.

<sup>7</sup> In this same context, it should be noted that a significant percentage of children in Philadelphia County live in poverty. In 2006, roughly 35 percent of all children in Philadelphia lived in poverty. This is also an indicator that many households served by the permittee operate under severe economic constraints at present.

<sup>8</sup> US Census Bureau, "Income, Poverty, and Health Insurance Coverage in the United States: 2007."

As noted previously, recent trends reflect a drop in total number of households, which includes an 18% decrease in family households. However, most recent census data estimates that the decrease in the number of married couple families is over 16% since 2000, while the female-headed households have barely dropped 10%. Combined with an increase in non-family households of nearly 17%, the result is a proportional increase in households with historically lower earning potential.

Taken together with the above average population of elderly in the service area, these household composition trends do not forecast significant income growth. An examination of the historical and recent income levels further illustrates this point.

### *Income Levels*

Personal income per capita in Philadelphia decreased from \$17,430 in 1990 to \$16,509 in 2000, compared to a regional increase from \$18,383 to \$27,789 over the same period of time. Recent census estimates show that Philadelphia's per capita income has increased to \$19,875, still significantly lower than the regional and national per capita income estimates of \$34,019 and \$26,178, respectively. Despite the increase in per capita income, 16.5% of the families in Philadelphia, including 136,277 households, must sustain themselves on incomes below \$15,000.

As shown in Figure 11-3, MHI in Philadelphia has significantly lagged behind the national level since the 1970s. Since 1989, MHI in Philadelphia has grown at a rate which is below both those of the state (2.94%) and national (3.18%) levels. This appears to be a consistent and long-term trend resulting from structural elements of the Philadelphia's demographic and economic make-up, rather than being the result of cyclical or outlying occurrences. It is reasonable to expect that this trend in income levels and growth will continue into the future.

From 1990 to 2000, the percentage of all persons with incomes below the poverty level in Philadelphia increased from 20.3% to 22.9%. This trend has continued with the most recent census figure at 24.5%. Given the local increase in unemployment due to the recent economic climate, it is possible that in the near future the number of Philadelphians living in poverty could increase dramatically.

### *Employment Trends in Philadelphia*

Future income growth in Philadelphia is dependent upon prospective economic trends, driven in large part by employment. The affordability of PWD's LTCPU is tied to such economic trends.

The data assembled by the DVRPC in their study entitled "Regional, County, and Municipal Population and Employment Forecasts, 2005-2035", indicates that Philadelphia will experience minimal growth in employment during the forecast period. This estimate focuses on long-term trends and assumptions, and should be evaluated with actual data as available to address any potential long-term shifts that may occur due to the current economic climate and eroding job market. The projected changes in job numbers by employment sector for Philadelphia appear in Table 11-7.

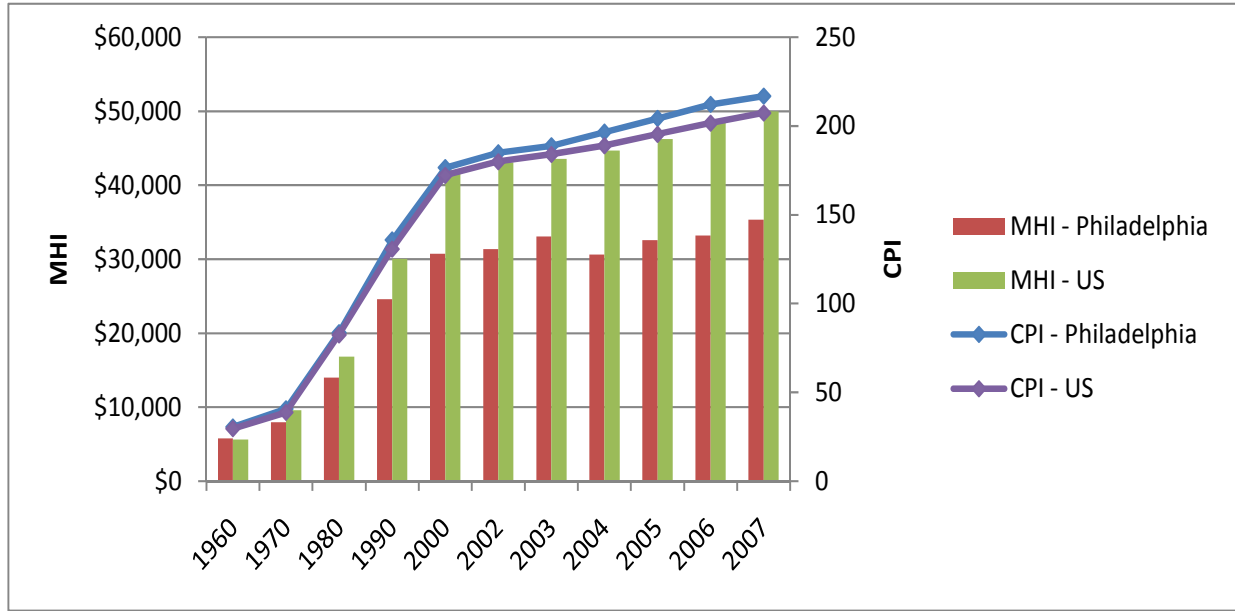


Figure 11-3 MHI Trends and Comparisons

Employment composition in Philadelphia is also not substantially changed in any employment sector during the forecast period, as shown in Table 11-7, although small increases and decreases are shown in some job sectors. Total job forecasts and employment sector forecasts indicate a reversal of past trends, in which employment levels dropped overall. It bears emphasis, however, that Philadelphia County has yet to experience the sizable upward employment trend projected in the above data and the current uncertainty in the job market will negate short-term growth estimates and may potentially hinder long term employment level growth.

### 11.5 THE FINANCIAL CAPABILITY MATRIX

It was established previously in the Phase One (Residential Indicator) analysis that Philadelphia's residential indicator is projected to fall into the high-range category on the financial capability matrix. The Phase two analysis on the assessment of the financial capability indicators placed Philadelphia in the mid-range category for current conditions. The intersection of these two ratings on the EPA financial capability matrix places the City of Philadelphia in the category of high financial burden, as shown on Table 11-8.

In addition to these strictly numerical measures, socioeconomic trends in the Philadelphia area require careful consideration as level and scheduling of CSO control expenditures are determined.

### 11.6 CONCLUSIONS AND IMPLICATIONS

PWD will be implementing the innovative approach to combined sewer overflow controls detailed elsewhere within this document within the context of its financial and demographic reality. This reality may be summarized by the unprecedented needs for capital reinvestments in the City's water and sewer systems juxtaposed with structural economic and

Table 11-7 Philadelphia County Employment Forecasts by Sector

Sector	2005	2010	2015	2020	2025	2030	2035
Agriculture & Mining	977	919	866	848	806	765	764
Construction	24,172	20,895	20,302	21,436	21,022	20,504	20,557
Manufacturing	50,335	50,077	48,118	49,208	47,549	45,819	45,805
Transportation / Utilities	33,892	33,515	32,770	31,995	31,502	30,941	31,026
Wholesale	23,505	22,881	22,373	22,092	21,706	21,261	21,275
Retail	97,010	91,230	89,277	87,867	86,642	85,260	85,365
FIRE	61,588	54,847	53,678	53,644	53,217	52,406	52,767
Services	318,831	335,615	346,195	342,303	351,950	360,385	361,570
Government	117,048	112,106	110,674	117,046	116,745	116,015	116,454
Federal/Military	677	715	709	700	692	683	685
<b>Total</b>	<b>728,035</b>	<b>722,800</b>	<b>724,962</b>	<b>727,139</b>	<b>731,831</b>	<b>734,039</b>	<b>736,268</b>

Source: DVRPC Employment Forecasts by Sector, based on 2009 economic model run by DVRPC.

Table 11-8 The Financial Capability Matrix at Year 2029

Permittee Financial Capability Indicators Score  (Socioeconomic, Debt and Financial Indicators)	Residential Indicator		
	Low (Below 1.0%)	Mid-Range (Between 1.0 and 2.0%)	High (Above 2.0%)
Weak (Below 1.5)	Medium Burden	High Burden	High Burden
Mid-Range (Between 1.5 and 2.5)	Low Burden	Medium Burden	<b>High Burden</b>
Strong (Above 2.5)	Low Burden	Low Burden	Medium Burden

(Blue areas indicate City of Philadelphia ratings)

demographic changes that will continue to erode both PWD’s ability to finance required capital investments and the citizen’s ability to afford them.

As noted above, PWD’s current capital improvements for its water and sewer systems total \$4.6 billion through 2029. This includes \$3.7 billion for its current systems required to maintain current levels of service and regulatory compliance; and approximately \$900 million (2009 dollars) in new capital expenditures for the implementation of the LTCPU recommended alternatives.

The anticipated tripling of the PWD’s annual wastewater system revenue requirements from approximately \$350 million in 2009 to over \$1 billion in 2029 will be paid for by a rate base whose income is projected to increase by less than 60% during the same period. The results of this will be burden measured as the residential indicator of 2.27% of the median income. A population equivalent to cities larger than Boston, Washington D.C., Baltimore and Seattle will pay more than 2.27% of their household income for wastewater services. The lowest quintile of the households, a population larger than cities such as Cincinnati, Minneapolis,



Pittsburgh or Toledo will face annual wastewater costs totaling between 3.55 to upwards of 7% of their household incomes.

It is reasonable to expect that an implementation schedule (through 2029) imposing residential burdens well above 2.27% for populations the size of major American cities is untenable. The municipal financing market likely would agree with such a conclusion. PWD might face insurmountable difficulties in financing their capital needs as outlined above.

These realities suggest an implementation schedule extending beyond the 2029 deadline. Indeed, through its Green Infrastructure approach to CSO control, PWD fully intends to continue to expand the green features within the City so that control levels will increase and improve well beyond 2029. PWD's Green Infrastructure approach is uniquely suited for incremental and modular implementation and the scheduling context is a completely different paradigm than that of a traditional infrastructure control strategy. A storage and conveyance tunnel, for example, would be of little or marginal benefit before it is fully constructed and operated. CSO control and the resulting water quality benefits would not occur until initiation of operation of at least large portions of the program. In such cases, the regulatory and environmental imperatives might push towards a discrete short term (ten to twenty) year timeframe. PWD's approach however provides for immediate compliance and water quality benefits that will grow annually. The proposed implementation schedule will allow the City of Philadelphia and its watersheds to achieve these benefits within the constraints that the nation's changing economics and demographics have dealt it.