

**Affordability Assessment Matrix and Guidance**  
**Maryland Department of Environment**  
**April 23, 2019**

**Introduction**

Maryland Department of the Environment (MDE) engaged the University of Maryland Environmental Finance Center (EFC) to develop a set of NPDES Municipal Separate Storm Sewer System (MS4) Phase I permittee affordability metrics for stormwater permitting. The affordability assessment matrix builds on the information developed during the previous permit cycle and will assist MDE and the Phase I communities in understanding how the costs of stormwater management can be viewed in context with socioeconomic and broader community considerations. The initial focus for analysis is on how these costs impact households.

The EFC researched existing water service affordability literature, including relevant Environmental Protection Agency (EPA) documents, and developed a draft matrix including three considerations:

- 1) Cost as a percent of:
  - a. Median Household Income
  - b. Low-Income Brackets
- 2) Key Socioeconomic Parameters
- 3) Financial Capability Indicators

The first two categories, which looks at cost as per household and socioeconomic parameters, can be populated by easily-accessed Census Bureau information, as well as data on water, wastewater and stormwater rates provided by the permittee. This analysis assumes that it is relatively easy for the permittees to differentiate stormwater permitting costs between households and among other sectors. Some permittees suggested that the delineation of service areas, households served, and water, wastewater and stormwater rates by census area may take some effort to generate. The data needed for the third category of which examines financial capacity indicators should be accessible through various reports the municipalities produce as part of their fiscal process.<sup>1</sup>

As a matter of process, it would be anticipated that the instructions and data form found in Attachment A would be provided to the permittees, and that MDE would use the information from the data form to fill in the affordability assessment matrix found in Attachment B. Green

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<sup>1</sup> It is anticipated that additional indicators and parameters addressing the costs to other sectors will be considered and developed in the future.

results would indicate meeting indicator guidelines, yellow or red results would indicate exceeding guidelines and potentially signal the need for further explanation from the municipality.

### **Affordability Assessment Parameters and Indicators**

#### *1) Cost as a Percent of Household Income*

##### *a) Median Household Income*

The first matrix parameter is the residential/household affordability of water fees within multiple income statistics. EPA produced a method to assess affordability (1995, 1997) of federal combined sewer overflow (CSO) mitigation and drinking water services. The guidance compares average waste water and drinking water bills against median household income (MHI) to establish a residential indicator (RI) for the service area. A suggested additional residential/household stormwater cost could be 0.25 – 1% depending on the completeness of the stormwater costs estimates.<sup>2</sup> The preliminary interpretation would be if the community is below 4.75 – 5.0% MHI across wastewater, water and stormwater rates, the matrix would contain a green block indicating the guideline was met. Alternately, if the percent MHI was between 5.0 – 5.5% the matrix would contain a yellow block and above 5.5%, it would contain a red block indicating the guideline was exceeded.

The suggested matrix includes drinking, wastewater and stormwater water fees. The literature review and interviews with the Phase I communities indicated that resources (costs and benefits) should be holistically tracked across all water services which would help to move toward integrated water planning (see <https://www.epa.gov/npdes/integrated-planning-municipal-stormwater-and-wastewater>). If this information is readily available, it should be considered.

##### *b) Low-income households*

The second section of the “Cost as a Percent” of household income could include the income bracket breakdown that demonstrates the distribution of income and how water costs impact different sections of the community. The affordability for the average residential customer may be a good characterization of some relatively homogenous communities. However, many Phase I municipalities are not homogenous in income, and the median household income can be very different for different income brackets. Further breakdown by income bracket gives a clearer picture of affordability for households that are in the lower 50% of the median. The Census Bureau reports communities in income brackets in roughly \$15,000 intervals. The sections below describe how this data and other socioeconomic data available from the Census Bureau

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<sup>2</sup> There is little literature on affordability of stormwater rates. PENNVEST, the state agency in Pennsylvania that manages the State Revolving Fund, uses .25% of median household income when processing stormwater project implementation loan requests. (Tesra Schlupp, PENNVEST Project Specialist, personal communication March 14, 2019). The upper end of the proposed range recognizes that a more complete accounting of stormwater program costs would include additional activities beyond stormwater project implementation, such as administration and operations and maintenance.

American Community Survey (<https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>) can be used for affordability indicators.

Following the guidance in a report titled *Affordability Assessment Tool for Federal Water Mandates*<sup>3</sup>, additional data collection and analyses can better capture affordability across the various community households. The report recommends looking at the three lowest income brackets:

- Less than \$10,000
- \$10,000 - \$14,999
- \$15,000 - \$24,999

The matrix shows “Affordability for Low-Income” households and includes a breakout of renter-occupied low-income households. The percent of water costs as compared to income in the lower income brackets can help determine if the fees associated with water resources present a greater burden for these households than their MHI counterparts. Adding a screening level that separates the renter occupied households helps determine if there are additional lower income considerations.

As noted in the report:

Many renters do not receive water bills because water and wastewater service is included in the cost of rent. The same is true of many residents in public housing. In cities with a high percentage of renters and/or public housing residents, use of MHI and RI [residential indicator] does not capture impacts to landlords and public housing agencies, which must often absorb the cost of increased water and wastewater bills. In many cases, higher water bills mean that public housing authorities will be required to reduce the number of needy renters they serve, unless there can be offsetting increases in public housing budgets.<sup>4</sup>

The percent of water costs can be compared to each MHI in each bracket or within a quintile of income. The table below from the report shows average estimated wastewater bill (only) as a percent MHI within that quintile.<sup>5</sup>

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<sup>3</sup> U.S. Conference of Mayors, American Water Works Association and Water Environment Federation. 2013. “Affordability Assessment Tool for Federal Water Mandates” at pp 16-17. Accessed at <http://www.mayors.org/urbanwater/media/2013/0529-report-WaterAffordability.pdf>.

<sup>4</sup> Id. at 5.

<sup>5</sup> Id. at 23.

**Table 5-1 Hypothetical annual average wastewater bill as percentage of MHI by income category, Butte, Montana**

Income category	Percentage of households	MHI within income quintile	Average estimated wastewater bill as a percentage of MHI
Less than \$20,000	24%	\$10,000	7.50%
\$20,000 to \$39,999	26%	\$29,999	2.50%
\$40,000 to \$74,999	30%	\$57,499	1.30%
\$75,000 to \$99,999	8%	\$87,499	0.86%
\$100,000 to \$199,999	10%	\$149,999	0.50%

*Three-year average ACS estimates were used due to the small size of Butte; one-year estimates are unavailable.*

In the affordability assessment matrix, the same percent ranges would apply to low-income brackets as with the MHI indicator.

MDE could consider allowing the permittees flexibility to submit either information about MHI alone if they think it represents the population served or income brackets and/or quintiles of income for their community along with the costs of stormwater services for households in their community. As part of its narrative, the permittees could also share the percentage of households that are renters or who live in public housing if the community demographic indicates this is a significant demographic for consideration. The purpose is to allow flexibility to select indicators that best represent the demographics and characteristics of their community. The permittee should have the responsibility to fully explain the indicators selected in to represent their context of affordability.

## 2) Key Socioeconomic Indicators

The second matrix category and resulting indicator guidelines address socioeconomic parameters which can be tailored to the municipality. The US Census Bureau American Community Survey includes community characteristics that capture vulnerable populations:

- % Unemployed;
- % Not in the labor force;
- % Of all people with income below poverty;
- % With Social Security income;
- % With cash public assistance income; and
- % With food stamp/SNAP benefits.<sup>6</sup>

As an example based on the guidelines listed in EPA CSO guidance<sup>7</sup>, if unemployment is more

<sup>6</sup> U.S. Census Bureau American Community Survey, obtained from American FactFinder, Income tab, Selected Economic Characteristics table from American Community Survey <http://factfinder.census.gov/>.

<sup>7</sup> U.S. EPA. 1997. "Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development." Accessed at <https://www3.epa.gov/npdes/pubs/csofc.pdf>.

than 1% below the national average the matrix would display a green block indicating the affordability guideline was met. If the unemployment is within 1% or above 1%, the matrix would display yellow or red block indicating the guideline was exceeded.

MDE can allow the permittees flexibility to select additional socioeconomic indicators to include in their affordability assessment or work jointly with each the permittee to identify appropriate additional indicators for that specific community.

### *3) Financial Capacity Indicators*

The third category within the matrix is the financial capacity indicators (FCI) adapted from the EPA CSO affordability guidance.<sup>8</sup> The general obligation bond rating, revenue bond rating, and net debt as percentage of full market property value all indicate how the municipality fairs in reference to debt. A suggested green block threshold within the matrix for high bond ratings and net debt as a percent of full market property value (FMPV) would be below 2%. Correspondingly, a yellow or red block would be displayed if the bond ratings were mid-range or weak or the net debt is above 2-5% of FMPV.

Financial management indicators help determine how great the tax burden is on existing properties within the community. It is an indication whether the community has a relatively high or low tax rate which would indicate potential for concern if additional fees are added. This indicator could be adapted depending on the particular tax base of the municipality.

## **Conclusion**

While there are a host of additional sectors and indicators that could allow for further examination of each jurisdictions' unique situation, the draft affordability assessment matrix for MDE and Phase I communities provides a way to begin collecting information to track an important aspect of stormwater financial accountability planning. Municipal governments and MDE will benefit from determining the existing and future indicators of affordability for water services based on parameters and indicators that not only compare national statistics, but also allow flexibility to place the indicators in context of the characteristics of the community.

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<sup>8</sup> Id. The EPA FCI combines six economic indicators to get an average score. The indicators include the community's bond rating, its net debt, its MHI, the local unemployment rate, the service area's property tax burden, and its property tax collection rate. The EPA matrix has categories for the CSO residential indicator (RI) and average scores of low, medium and high based on the combination of RI and FCI.

## ATTACHMENT A

### **DRAFT Instructions for Data Collection for Preliminary MDE MS4 Phase I Affordability Analysis**

Goal:

To collect and track data related to cost, revenue (short and long-term projections), and financial capacity to assess NPDES MS4 permit affordability.

The affordability assessment is not based on the implementation costs alone within the Financial Assurance Plan (FAP), rather it estimates the current burden of total payment by households. Costs of implementation are being covered by multiple revenue sources. In addition, the costs within the FAP may not include long term maintenance costs or other costs to support the stormwater program. The data captured in the matrix will help assess the long-term sustainability of stormwater funding through recognition that the cost of implementation (and subsequently operations and maintenance) are pulled from multiple sources and that all of these costs need to be teased out and tracked to measure affordability to households.

It is anticipated that additional analysis of other community sectors impacted by stormwater permitting will be part of affordability assessments in the future. At this stage, permittees can share additional information about affordability in narrative form.

#### **Affordability Matrix Parameters and Indicators**

##### ***1. Cost as a Percent of Household Income Median Household Income – all brackets***

- 1.1. What are the sources of funds listed under Article 4202.1(j)(1)(i)4 (i.e. any sources of funds that will be utilized by the county or municipality to meet the requirements of its National Pollutant Discharge Elimination System Phase I Municipal Separate Storm Sewer System Permit)?
- 1.2. What is the percent of the total cost of implementation within each cost category (i.e. how much of the total plan cost is from each cost category)?
- 1.3. What is the monthly cost for an average household for all of these sources?
- 1.4. What is the median household income for the MS4?<sup>9</sup>
  - 1.4.1. Access <http://factfinder.census.gov/>
  - 1.4.2. Type in your municipality<sup>10</sup>

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<sup>9</sup> Instructions adapted from UNC EFC “Water And Wastewater Residential Rates Affordability Assessment Tool.” <https://efc.sog.unc.edu/resource/water-and-wastewater-residential-rates-affordability-assessment-tool>

<sup>10</sup> This is data from the areas within the U.S. Census Bureau’s survey. While stormwater utility fees may be county or city-wide, and thus apply to all of the households in the MS4 boundary other fees (such as water and sewer) may not apply to each household as some are on well or septic service.

- 1.4.3. Select “Income” from the left menu
- 1.4.4. Select “2017 American Community Survey”  
Selected Economic Characteristics (Employment, Commute, Occupation, Income, Health Insurance, Poverty, etc.)
- 1.4.5. Record MHI.

1.5. What is the percent MHI of all income brackets of the estimated cost from 1.3 above?

## **2. Cost as a Percent of Household Income**

### ***Median Household Income – low income bracket, homeowner and renter***

- 2.1. Using data access steps in 1.4, record the percent of households with income for the lower income brackets, <\$10,000 and \$15,000 – \$24,999 (Note: there may be different ranges within the lower bracket depending on municipality).
- 2.2. Divide the monthly cost in 1.3 by the upper bracket value (e.g. \$10,000 and \$24,999 in this example) to obtain percent income.
- 2.3. To retrieve the number of renter occupied households in the lower income categories, access <http://factfinder.census.gov/>.
  - 2.3.1. On the main page select “Advanced Search,” then “Show Me All.” If a popup appears indicating that your geography in ‘Community Facts’ will be retained, select “Continue.”
  - 2.3.2. If you do not see your geography in a box in the top left under “Your Selections,” then use the second textbox in the yellow area under “State, county, or place” and type in the community name.
  - 2.3.3. In the text box in the yellow area under “Topic or Table Name,” type in this code: “B25118.” Select any the most recent of the options that appear.
  - 2.3.4. Click “Go.”
  - 2.3.5. Select “Tenure by Household Income in the Past 12 Months (In 2017 Inflation-Adjusted Dollars)” in the row listing the most recent “ACS 5-year estimates.”
  - 2.3.6. This will give a table of “owner” and “renter” occupied units and income.
- 2.4. Record the number (percent) of renter occupied households in the lower brackets.
- 2.5. Divide the monthly cost in 1.3 by the upper bracket value (if different than 2.1) to determine the percent cost of income.

## **3. Key Socioeconomic Indicators**

- 3.1. Using the data retrieval steps from 1.4 record the national average, state average, and municipal area average for:
  - 3.1.1. Unemployment
  - 3.1.2. MHI
  - 3.1.3. % Not in the labor force
  - 3.1.4. % with Social Security income
  - 3.1.5. % with Supplemental Security income
  - 3.1.6. % with cash public assistance income

3.1.7. % with Food Stamp/SNAP benefits

**4. Permittee Financial Capacity Indicator benchmarks and their ratings**

- 4.1. Bond ratings general obligation bonds, revenue bonds rating from Moodys (<https://www.moodys.com/>) or S&P ([https://www.standardandpoors.com/en\\_US/web/guest/home](https://www.standardandpoors.com/en_US/web/guest/home)).
- 4.2. Net debt as a % of full market property value (FMPV), property tax revenues as % of FMPV, property tax revenue collection rate. Debt information is typically available the community's annual financial statements. FMPV data should be available through community or State assessor's office.

MDE will use the information from the data form in the affordability assessment matrix and any narrative provided by the permittee conjunction with other relevant information as part of its NPDES MS4 program permitting process.

**References**

U.S. EPA. 1997. "Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development." Accessed at <https://www3.epa.gov/npdes/pubs/csofc.pdf>.

U.S. EPA. 2006. Small Drinking Water Systems Variances – Revision of Existing National-Level Affordability Methodology and Methodology to Identify Variance Technologies that are Protective of Public Health. EPA-HQOW-2005-0005; FRL-8035-7. Federal Register 71(41). March 2. Washington, DC. Accessed at <https://www.federalregister.gov/documents/2006/03/02/06-1917/small-drinking-water-systems-variances-revision-of-existing-national-level-affordability-methodology>.

U.S. Conference of Mayors, American Water Works Association and Water Environment Federation. 2013. "Affordability Assessment Tool for Federal Water Mandates." Accessed at <http://www.mayors.org/urbanwater/media/2013/0529-report-WaterAffordability.pdf>.



**DRAFT Affordability Assessment Data Form for  
Maryland Department of Environment NPDES MS4 Permits**

**MUNICIPALITY**

<b>Affordability for the Average Residential Customer (Percent median household income, MHI)</b>				
		MHI (all)	Estimated yearly cost for sources listed in accordance with Article 4202.1(j)(1)(i)4:	Percent of MHI
<b>Affordability for Low-Income Customers &lt;\$25,000</b>				
	Households <\$10,000	Percent	Estimated yearly cost for sources listed in accordance with Article 4202.1(j)(1)(i)4:	<\$10,000 Yearly cost/upper range value
	Households <\$15,000 - 24,999	Percent	Estimated yearly cost for sources listed in accordance with Article 4202.1(j)(1)(i)4:	\$15,000 - 24,999 Yearly cost/upper range value
	Renter-occupied <\$25,000	Percent	Estimated yearly cost for sources listed in accordance with Article 4202.1(j)(1)(i)4:	\$15,000 - 24,999 Yearly cost/upper range value
<b>Key Socioeconomic Indicators*</b>				
	Unemployment (above or below national average)	National average	State Average	MS4
	MHI	National average	State Average	MS4
	% Not in the labor force	National average	State Average	MS4
	% with Social Security income	National average	State Average	MS4
	% with Supplemental Security income	National average	State Average	MS4
	% with cash public assistance income	National average	State Average	MS4
	% with Food Stamp/SNAP benefits	National average	State Average	MS4
<b>Permittee Financial Capacity Indicator benchmarks and their ratings</b>				
	Debt indicators			
	Bond rating GO bonds <sup>^</sup>	Rating and Source		
	Bond rating - Revenue bonds <sup>^^</sup>	Rating and source		
	Net debt as a % of FMPV <sup>^^^</sup>	Percent		
	Financial management indicators			
	Property tax revenues as % of FMPV <sup>^^^</sup>	Percent		
	Property tax revenue collection rate <sup>^^^</sup>	Percent		

**Notes**

\*Key socioeconomic factors can include other municipally-specific factors  
GO = general obligation  
FMPV = Full market property value  
<sup>^</sup>Rating from Moody's (<https://www.moody.com/>) or S&P ([https://www.standardandpoors.com/en\\_US/web/guest/home](https://www.standardandpoors.com/en_US/web/guest/home))  
<sup>^^</sup>Revenue bond ratings reflect the financial conditions and management capability of a water/wastewater utility. They are repaid with revenues generated from user fees.  
<sup>^^^</sup>Debt information is typically available the community's annual financial statements.  
FMPV data should be available through community or State assessor's office.

**ATTACHMENT B**

**DRAFT Affordability Assessment Matrix for Maryland Department of Environment NPDES MS4 Permits**

		Meets Guideline		Below Guideline
<b>Municipality</b>				
<b>Affordability for the Average Residential Customer (Percent mean household income, MHI)</b>				
	Total water fees as a percent of MHI.	Existing Water/Wastewater percent (<4.5%) <sup>1</sup> AND stormwater costs percent ;(0.25-0.5%) <sup>3</sup> = Combined water/wastewater/stormwater percent (<4.75 – 5.0%) <sup>1</sup>	Combined water/wastewater/stormwater percent 5.0-5.5%	Combined water/wastewater/stormwater >5.5%
<b>Affordability for Low-Income Customers</b>				
	All households <\$25,000 <sup>2</sup>			
	Renter-occupied <\$25,000 <sup>2</sup>			
<b>Key Socioeconomic Indicators (TBD by municipality)</b>				
	Unemployment (above or below national average) <sup>1</sup>	More than 1 percentage below	+/- 1 percentage point	Less than 1 percentage above
	MHI <sup>1</sup>	More than 25% above adjusted national MHI	+/- 25% of adjusted national MHI	More than 25% below adjusted national MHI
<b>Permittee Financial Capacity Indicator benchmarks and their ratings</b>				
	Debt indicators <sup>1</sup>	Strong	Mid-range	Weak
	Bond rating GO bonds <sup>^</sup>	AAA-A (S&P) Aaa-A (Moody's)	BBB (S&P) Baa (Moody's)	BB-D (S&P) Ba-C (Moody's)
	Bond rating - Revenue bonds <sup>^^</sup>	AAA-A (S&P) Aaa-A (Moody's)	BBB (S&P) Baa (Moody's)	BB-D (S&P) Ba-C (Moody's)
	Net debt as a % of FMPV <sup>^^^</sup>	Below 2%	2–5%	Above 5%
	Financial management indicators <sup>1</sup>			
	Property tax revenues as % of FMPV <sup>^^^</sup>	Below 2%	2–5%	Above 5%
	Property tax revenue collection rate <sup>^^^</sup>	Above 98%	94–98%	Below 94%

1) US EPA (1997) "Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development."

Accessed at <https://www3.epa.gov/npdes/pubs/csofc.pdf> and U.S. EPA. 2006. Small Drinking Water Systems Variances – Revision of Existing National-Level Affordability Methodology and Methodology to Identify Variance Technologies that are Protective of Public Health. EPA- HQOW-2005-0005; FRL-8035-7. Federal Register 71(41). March 2. Washington, DC.

2) U.S. Conference of Mayors, American Water Works Association and Water Environment Federation. (COM/AWWA/WEF,2013).

"Affordability Assessment Tool for Federal Water Mandates." Accessed at [www.mayors.org/urbanwater/media/2013/0529-report-WaterAffordability.pdf](http://www.mayors.org/urbanwater/media/2013/0529-report-WaterAffordability.pdf)

3) There is insufficient literature regarding this parameter. PENNVEST uses .25% stormwater costs as an indicator for loan approval. This percentage is proposed as the low end with an upper end of 1%. However, the percentage of stormwater costs should vary depending on the completeness of the municipal estimates. For example, if the estimates include only MS4 implementation, the percent should be smaller. If the estimates include costs of BMP operation and maintenance, inlet and drain operations and maintenance and other stormwater program costs, the percent used could be at the larger end of the range.