

STORMWATER RATE STUDY

Study Report

B&V PROJECT NO. 199169

PREPARED FOR

City of Takoma Park, Maryland

22 JANUARY 2019

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1.0 Introduction

The City of Takoma Park, Maryland (“City”) Department of Public Works provides stormwater utility services to residents and businesses within the City. The stormwater management operations are supported by an enterprise fund, with revenues generated primarily from stormwater user fees and charges. The stormwater fee was established nearly two decades ago, and is based on impervious area with the stormwater rate defined in terms of Equivalent Residential Unit (“ERU”). While the stormwater rate has been updated over time, the impervious area based ERU value, which the City established at the inception of the stormwater user fee, has been not been updated.

Consistent with best practices in stormwater rate setting, the City desired a review of the impervious area for the City’s system and the associated ERU billing units, and an update of the ERU rate. The City retained Black & Veatch Management Consulting, LLC (Black & Veatch) to perform these analyses as part of the stormwater rate study.

This technical memorandum provides a summary of the study objectives, the study approach, findings, and our recommendations of the stormwater rate study (“Rate Study”).

1.1 STUDY OBJECTIVES

The key rate study objectives are as follows:

- Develop impervious area square footage for the City’s service area based on the most currently available data;
- Determine the ERU square footage value and stormwater billing units based on the updated impervious area square footage;
- Determine an updated stormwater rate for Fiscal Year (FY) 2019 based on the updated ERU value, billing units, and Fiscal Year (FY) 2019 revenue requirements; and
- Develop a stormwater rate schedule for FY 2019 for the City’s existing rate structure.

2.0 Rate Study Approach

To achieve the stated objectives of the study, Black & Veatch defined the study approach as illustrated in Figure 1.

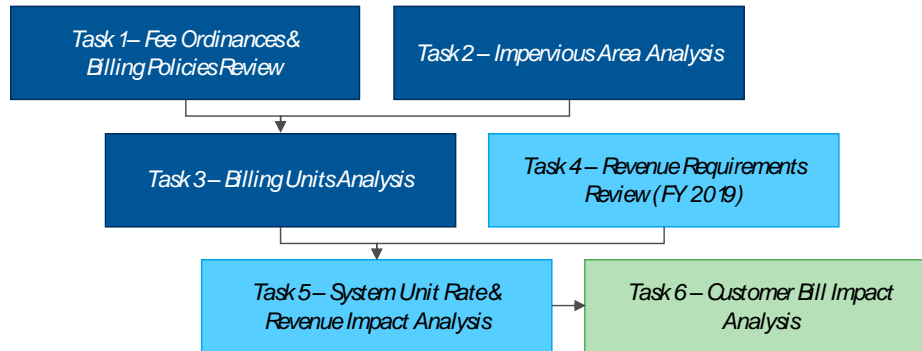


Figure 1: Stormwater Rate Study Approach

- **Task 1 – Ordinances & Billing Policies Review:** This task included a high level of review of the City’s existing stormwater rate ordinances and billing policies based on both available documentation and discussions with City management.
- **Task 2 – Impervious Area Analysis:** This task included a review of available data sources for parcel information, determination of the best available datasets, delineation of stormwater classes based on land use, and the determination of impervious area square footage for all the properties within the City’s jurisdiction.
- **Task 3 – Billing Units Analysis:** This task included the determination of system-wide ERU value, and the development of billing units for the stormwater classes delineated in Task 2.
- **Task 4 – Revenue Requirements Review:** This task included a review of the City’s FY 2019 stormwater revenue requirement budget and affirmation of the revenue requirement with City management.
- **Task 5 – System Unit Rate and Revenue Impact Analysis:** This task included the determination of a system-wide stormwater unit rate based on the updated impervious area and billing units, and an evaluation of the impact on revenue generation due to the updated billing units.
- **Task 6 – Customer Bill Impact Analysis:** This task included an evaluation of the customer bill impact under potential updated stormwater rate under the existing rate structure.

These tasks are discussed further in the following sections of this technical report.

3.0 Fee Ordinances and Billing Policies Review

To assure that any updates to impervious area determination and billing units calculations reflect the City’s existing ordinance stipulations and billing policies, Black & Veatch reviewed the fee ordinances and billing policies. This section presents a summary of the City’s key definitions, the existing rate structure, and the billing policies that are pertinent to this stormwater rate study.

3.1 TERMINOLOGY

The following definitions are currently utilized by the City and are applicable to this rate study.

- **Impervious Surface:** a surface that is compacted or covered with material that is resistant to infiltration by water, including, but not limited to, most conventionally surfaced streets, roofs, sidewalks, patios, driveways, parking lots and any other oiled, graveled, graded, compacted or other surface that impedes the natural infiltration of surface water.
- **Single-family Residential Property:** a developed property the primary purpose of which is providing a permanent dwelling unit and that is classified as residential in the State assessment roll. A single-family detached dwelling, or a townhouse, containing an accessory apartment or second dwelling unit is included in this definition.
- **Other Developed Property:** means developed property other than single-family residential property. Such property shall include, but not be limited to, multifamily dwellings, commercial properties, industrial properties, parking lots, hospitals, private schools, private recreational and cultural facilities, hotels, offices and churches.
- **Undeveloped Property:** any non-single-family residential property which has one-third or less of the base unit of impervious surface area.
- **Base Unit:** means the *median impervious surface area* associated with a single family residential property.
- **Base Rate:** means the stormwater management fee charged on a Base Unit.

Note:

For the purposes of this Rate Study and in this Report the following terms are used:

- Base Unit is referred to as “Equivalent Residential Unit (ERU Factor)”
- Base Rate is referred to as “Equivalent Residential Rate (ERU Rate)”

3.2 OVERVIEW OF THE EXISTING RATE STRUCTURE

To provide sustainable and dedicated funding for stormwater management, the City established an impervious area-based user fee in 1996. Key aspects of the City’s existing rate structure are as follows:

- **Stormwater Rate Basis:** The system wide stormwater rate is defined as an impervious area based ERU rate.
- **City’s ERU Factor**
 - The City’s ERU Factor, for which a stormwater rate is defined, is based on the calculated median impervious area square footage of single family residential properties;

- The City’s ERU Factor is 1,228 square feet of impervious area. This value was defined in 1996 during the initial fee implementation and is still currently in use.
- **Customer Classification:** Since inception, the City has maintained two types of customer classification for assessing the stormwater fee:
 - **Single Family Residential Property (SWBL-R):** This class includes all Single Family Detached and Single Family Attached Parcels. These properties are billed a uniform flat fee based upon a single ERU.
 - **Other Developed Property (SWBL-C):** This class includes all “other developed properties” in the City that are not exempt from the stormwater fee and undeveloped property as defined by the City. The stormwater fee for each of these properties is calculated by applying the ERU rate to the parcel’s specific ERUs determined based on the property’s actual impervious area.
- **Stormwater Rate Summary:** While the City had retained ERU value of 1,228 square feet as the basic unit of measure since inception, the City has increased the stormwater rate per ERU over the years. Figure 2 presents a historical summary of the City’s stormwater rates.

Annual Stormwater Rate per ERU
FY 1996: \$24.00
FY 1999: \$28.68
FY 2007: \$48.00
FY 2013: \$55.00
FY 2018: \$92.00

Figure 2: Summary of Stormwater Rates

3.3 BILLING POLICIES

In addition to the above definitions, the following current billing policies also influence the determination of the overall billable stormwater units for the City’s stormwater utility:

- **Exemptions:** Properties owned by the following entities are currently exempt from the stormwater fee:
 - City Owned
 - State Owned
 - Maryland - National Capital Parks & Planning Commission
 - Montgomery College
 - Montgomery County School District
 - Prince Georges County
 - Washington Suburban Sanitary Commission
 - Washington Metro Area Transit Authority

Note: As of the writing of this Technical Report, Montgomery County has agreed to pay for County owned properties.

- **Condominiums:** Each unit within a parcel designated as condominium is currently billed a stormwater fee. An individual unit's charge is determined by dividing the parcel's total stormwater fee by the number of condominium units within that parcel.

4.0 Impervious Area Analysis

This section of the report presents a brief discussion on the datasets and the approach used in the impervious area analysis.

4.1 DATA SETS USED IN THE IMPERVIOUS AREA ANALYSIS

To perform the impervious area analysis, Black & Veatch utilized the following data sets as, obtained from the State of Maryland (“State”), Montgomery County (“County”), the City, and information available in the public domain:

Parcel Data

- Source: Montgomery County Planning, Maryland
- Publication Date: 10/5/2018
- Downloaded from <http://montgomeryplanning.org/tools/gis-and-mapping/gis-data/data-downloads/>

This dataset included general parcel attribute information including the parcel polygon boundary, parcel ID (also referred to as the Montgomery County Tax Account Number), parcel area, state land use code, county land use code, owner information (including name and address), site address, number of dwelling units, etc.

Planimetric Data

- Source: Montgomery County Planning, Maryland
- [Period: 2017](#)
- Publication Date: 10/31/2018
- Downloaded from <http://montgomeryplanning.org/tools/gis-and-mapping/gis-data/data-downloads/>

This dataset included impervious area information for all the properties in Montgomery County, which included all the properties in the City’s jurisdiction. Data included impervious area polygons for various feature classes included roofs, roads, parking lots, and other features. The available impervious area features are further discussed in Section 4.3 of this report.

Aerial Imagery from the State of Maryland

- Source: State of Maryland Geographic Information Office / MD iMAP
- Last Updated: 6/16/2016
- File Type: Mr. SID
- Resolution: 6-inch
- Downloaded from <http://imap.maryland.gov/Pages/imagery.aspx>

This dataset included aerial imagery of Montgomery County including the City of Takoma Park.

Aerial Imagery from Public Sources

Black & Veatch also utilized imagery available via ESRI and other publicly available sources (such as Google Maps) in the analysis and re-classification of parcels.

City's Stormwater Billing Account Information

Black & Veatch utilized the City's existing stormwater account information to:

- Review property classifications and identify parcels requiring further review;
- Identify parcels not currently being assessed a stormwater fee; and
- Identify changes in a parcel's impervious area, where data was available and the account could be readily linked to the latest County's parcel data set.

4.2 PARCEL CLASSIFICATION VALIDATION

A critical step in a stormwater rate study is the classification of parcels in to meaningful stormwater classes to recognize the differences in land use characteristics and to support defensible rate structure that enables equitable cost recovery. Parcel classification for the City have not been holistically reviewed since the original study.

To address this, Black & Veatch performed an initial parcel classification and then a subsequent parcel reclassification to calculate the square footage for the ERU based on the latest datasets and to determine the billable ERUs for the different classes of properties. Black & Veatch performed an initial parcel classification and then a subsequent parcel reclassification to calculate the square footage for the ERU based on the latest datasets and to determine the billable ERUs for the different classes of properties. These are further discussed in the following sub-sections.

Appendix A presents a detailed discussion on the parcel classification validation that the Black & Veatch team performed in collaboration with the City staff.

4.3 IMPERVIOUS AREA DETERMINATION

The impervious area square footage for each parcel within the City was determined using the County's 2017 planimetric dataset. Table 1 presents the impervious area feature classes and the associated subclasses that are available in the Planimetric Data Set.

Using the tools available in GIS, Black & Veatch calculated the amount of impervious area within each parcel based upon the parcel polygon boundary and the impervious area features discussed below. All impervious area features within a parcel polygon was initially included.

Table 1: Impervious Area Feature Class and Subclasses

1. FEATURE CLASS	2. SUBCLASS	
Building	<ul style="list-style-type: none"> ■ Buildings ■ Ruins ■ Building Under Construction 	<ul style="list-style-type: none"> ■ Overhead Rooftops/Canopies ■ Parking Garage
Bridge	<ul style="list-style-type: none"> ■ Bridge 	
Cultural	<ul style="list-style-type: none"> ■ Smokestacks ■ Cemetary ■ Pool in Ground ■ Pool Above Ground 	<ul style="list-style-type: none"> ■ Pad ■ Storage Tank ■ Track
Transportation	<ul style="list-style-type: none"> ■ Road ■ Parking Lot ■ Runway/Taxiway ■ Driveways 	<ul style="list-style-type: none"> ■ Street Sidewalk ■ Railroad Bed ■ Non-Street Sidewalk

The above impervious area features generally align with the City’s current definition of impervious surface. Table 2 presents a summary of the total number of parcels, the gross area, the impervious area, and the impervious area as a percentage of gross area for the various parcel classification and subclasses.

Table 2: Summary of Parcels, Gross Area and Impervious Area

1	2	3	4	5	6
#	Description	Parcel Count	Total Gross Area (Square Feet)	Total Impervious Area (Square Feet)	Impervious Area as a Percent of Gross Area
Billable					
Residential					
1	Single-Family Residential	3,476	28,654,033	8,087,518	28%
2	Multi-Family	211	3,578,790	1,845,181	52%
Subtotal - Residential		3,687	32,232,823	9,932,699	
Condominium					
3	Condo Residential	23	866,946	449,730	52%
Subtotal - Condominium		23	866,946	449,730	
Non-Residential					
4	Commercial	128	3,057,809	2,462,551	81%
5	Education / Institutional	31	2,341,966	1,211,128	52%
6	Government	3	35,164	29,873	85%
7	Parks / Recreation	-	0	-	0%
8	Transportation	-	-	-	
Subtotal - Non-Residential		162	5,434,939	3,703,552	
Vacant / Undeveloped					
9	Vacant Land	66	575,305	237,531	41%
10	Undeveloped Land	18	120,737	62,444	52%
Subtotal - Vacant / Undeveloped		84	696,042	299,975	
12	Total Billable	3,956	39,230,750	14,385,956	
Non-Billable					
Exempt					
13	Residential	10	267,270	59,863	22%
14	Condominium	-	-	-	
15	Non-Residential	54	3,426,477	934,804	27%
16	Vacant/Undeveloped	125	3,106,884	347,711	11%
Subtotal - Exempt		189	6,800,631	1,342,378	
"Stormwater Undeveloped"					
18	Residential	12	60,324	1,260	2%
19	Condominium	-	-	-	
20	Non-Residential	2	17,946	-	0%
21	Vacant/Undeveloped	97	421,777	8,015	2%
Subtotal - "Stormwater Undeveloped"		111	500,047	9,276	
23	Total Non-Billable	300	7,300,678	1,351,653	
24	Total	4,256	46,531,428	15,737,610	

Notes: Parcel Information including Parcel Count, Gross Area, Actual Impervious Area and Effective Impervious Area is based upon County GIS Parcel Polygons and Planimetric Impervious Area layer .
 Line No. 10 Undeveloped properties classification represents the County Land Use Classification and does not reflect "Undeveloped" Properties as defined in the City Ordinance for stormwater fee exemption purposes.
 "Stormwater Undeveloped" Properties represent properties that meet the City's current definition and have less than one-third of the existing ERU square footage.

5.0 Billing Units Analysis

This section of the report presents a brief overview of the determination of the updated ERU factor, the overall system-wide billing units analysis and subsequent results.

5.1 ERU VALUE DETERMINATION

As explained in Section 2 of this report, per the City’s existing Stormwater Fee Ordinance, an *ERU* is the City’s base stormwater unit, and an ERU is defined as the median impervious area square footage of all properties associated with the Single Family Residential class. The City’s existing designated ERU value is 1,228 square feet of impervious area.

However, based on the latest designation of all Single Family Residential parcels and their associated impervious area obtained from the planimetric data, Black & Veatch determined the updated ERU value to be **2,116 square feet** of impervious area.

The updated ERU value of 2,116 square feet is 888 square feet greater than the existing ERU value of 1,228 square feet. This increase is attributable to two primary factors:

- The existing ERU square footage (which has been retained since the original study in 1996) appears to have been developed solely based on the *building footprint* without consideration of other impervious area features within a parcel such as driveways, patios, etc. Such an approach would logically result in a lower median value for the ERU.
- The latest impervious area determination based on the new planimetric data includes additional impervious area features such as the square footage of driveways, sidewalks, patios, concrete pad, pools, and ancillary buildings. Due to this more holistic inclusion of all impervious area surfaces, the updated Median impervious area of all Single Family Residential parcels is much higher than what was determined in 1996.

Note: The holistic inclusion of additional impervious area features in the determination of a parcel’s overall impervious area is fully consistent with the City’s definition of Impervious Area as presented in Section 3.1 of this Report.

5.2 IMPERVIOUS AREA DISTRIBUTION OF SINGLE FAMILY RESIDENTIAL CLASS

Figure 3 presents the distribution of Single Family Residential Impervious area in the City. The distribution reflects a fair level of diversity, ranging from less than 1,000 square feet to greater than 5,000 square feet of impervious area. Such a diversity in impervious area is rather typical of an urban environment.

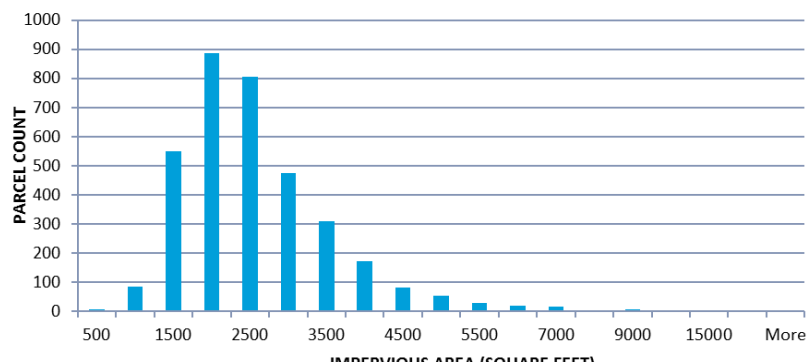


Figure 3: Single Family Residential Impervious Area Distribution

5.3 STORMWATER BILLING UNITS DETERMINATION (ERU APPROACH)

Consistent with the City's existing rate structure, Black & Veatch developed the billing units using the updated impervious area and the updated ERU value of 2,116 square feet. Table 3 presents a summary of the ERUs determined for all the stormwater sub-classes based. For evaluation purposes, the Billable ERUs were estimated under two scenarios.

Table 3: Summary of Parcels, Gross Area, Impervious Area, and ERUs

1	2	3	4	5	6	7	8
#	Description	Parcel Count	Total Gross Area (Square Feet)	Total Impervious Area (Square Feet)	Impervious Area as a Percent of Gross Area	Total ERUs based on Revised ERU Factor ^(a)	Total ERUs based on Revised ERU Factor ^(b)
Billable							
Residential							
1	Single-Family Residential	3,476	28,654,033	8,087,518	28%	3,476	3,823
2	Multi-Family	211	3,578,790	1,845,181	52%	872	872
	Subtotal - Residential	3,687	32,232,823	9,932,699		4,348	4,695
Condominium							
3	Condo Residential	23	866,946	449,730	52%	213	213
	Subtotal -Condominium	23	866,946	449,730		213	213
Non-Residential							
4	Commercial	128	3,057,809	2,462,551	81%	1,164	1,164
5	Education / Institutional	31	2,341,966	1,211,128	52%	572	572
6	Government	3	35,164	29,873	85%	14	14
	Subtotal - Non-Residential	162	5,434,939	3,703,552		1,751	1,751
Vacant / Undeveloped							
7	Vacant Land	66	575,305	237,531	41%	112	112
8	Undeveloped Land	18	120,737	62,444	52%	30	30
9	Subtotal - Vacant / Undeveloped	84	696,042	299,975		142	142
10	Total Billable	3,956	39,230,750	14,385,956		6,453	6,800
Non-Billable							
Exempt							
11	Residential	10	267,270	59,863	22%	28	28
12	Non-Residential	54	3,426,477	934,804	27%	442	442
13	Vacant/Undeveloped	125	3,106,884	347,711	11%	164	164
14	Subtotal - Exempt	189	6,800,631	1,342,378		635	635
"Stormwater Undeveloped"							
15	Residential	12	60,324	1,260	2%	1	1
16	Non-Residential	2	17,946	-	0%	-	-
17	Vacant/Undeveloped	97	421,777	8,015	2%	4	4
18	Subtotal - "Stormwater Undeveloped"	111	500,047	9,276		4	4
19	Total Non-Billable	300	7,300,678	1,351,653		639	639
20	System Total	4,256	46,531,428	15,737,610		7,092	7,439
NOTES							
	Current ERU Square Footage (Current ERU Factor)			1,228			
	Updated ERU Square Footage (Updated ERU Factor)			2,116			
	The Updated ERU Square Footage reflects the median single-family residential property square footage. Parcel Information including Gross Area, Parcel Count, Actual Impervious Area and Effective Impervious Area are based upon County GIS Parcel Polygons and Planimetric data.						
	Line No. 10 Undeveloped properties classification represents the County Land Use Classification and does not reflect "Undeveloped" Properties as defined in the City Ordinance for stormwater fee exemption purposes.						
	"Stormwater Undeveloped" Properties represent properties that meet the City's current definition of having less than 1/3 of an ERU square footage.						
	(a) The ERUs for the Single Family Residential class is deemed to be one ERU parcel, and hence equals the total number of parcels; ERUs for all other classes are derived by dividing the Impervious Area in Column 5 by the Updated ERU Factor of 2,116 square feet.						
	(b) The ERUs for all classes <u>including</u> the Single Family Residential class are derived by dividing the Impervious Area in Column 5 by the Updated ERU Factor of 2,116 square feet.						

■ **Scenario 1:** Column 7 presents the ERUs derived under Scenario 1, where the Single Family Residential class is assigned one ERU per parcel, consistent with the City’s existing billing policy and fee ordinance. The total billable ERUs estimated under this scenario is [6,453 Billable ERUs](#).

- **Single Family Residential Class:** Billable ERUs estimated based on one ERU per Single Family Residential parcel. Consequently, the total billable ERUs is set to equal the total 3,476 number of Single Family Residential Parcels.
- **All Other Stormwater Sub-classes:** Billable ERUs were derived by dividing the updated Impervious Area square footage (Table 3, Column 5) of each sub-class by the current ERU Factor value of 2,116 square feet.

■ **Scenario 2:** Column 8 presents the ERUs derived under Scenario 2, where the billable ERUs for each Single Family Residential parcel is *individually calculated*. The total billable ERUs estimated under this scenario is **6,800 Billable ERUs**.

- Under this scenario, the Billable ERUs for all parcels (including the Single Family Residential parcels) were estimated by dividing the updated Impervious Area square footage (Table 3, Column 5) of each sub-class by the current ERU Factor value of 2,116 square feet.

The difference in total Billable ERUs between the two scenarios is primarily because in Scenario 1, where just one ERU is assigned to each Single Family Residential parcel, the total billable ERUs estimated for that class is 347 ERUs lower than what is estimated under Scenario 2.

It is important to note that the use of different approaches in the estimation of system-wide billable ERUs will result in different system-wide base stormwater ERU rate.

5.4 COMPARISON OF TOTAL ERUS

Table 4 presents a comparison of the system-wide billable ERUs between the City’s “existing billing data and current ERU factor” and the “Updated impervious area and updated ERU Factor”. Updating the system-wide impervious area using the latest available planimetric data and including all impervious area features within properties contributes to an increase in the overall system-wide impervious area square footage. It is important to note that the updated impervious area also contributes to a significant increase in the ERU Factor to 2,116 square feet.

As Table 4 indicates, the total Billable ERUs calculated (under the two scenarios presented in Table 3) based on the updated impervious area and the updated ERU Factor, results in total billable ERUs, which are lower than the total number of existing billable ERUs obtained from the City’s existing billing system.

Table 4: Summary Comparison of Estimated Billable ERUs

#	DESCRIPTION	(1) EXISTING DATA / CURRENT ERU FACTOR ^(a)	(2) UPDATED DATA / UPDATED ERU FACTOR SCENARIO 1 ^(b)	(3) UPDATED DATA / UPDATED ERU FACTOR SCENARIO 2 ^(c)
ESTIMATED BILLABLE UNITS (ERUs)				
1	Single Family Residential (SWBL-R)	3,538	3,476	3,823
2	All Other Developed Property (SWBL-C)	4,128	2,977	2,977
3	Total Billable ERUs	7,666	6,453	6,800

Notes: IA: Refers to Impervious Area

- (a) Existing Billable ERUs reflect data the city provided from its billing system; existing ERU rate is the ERU rate that is currently in effect; the current ERU Factor is 1,228 square feet of impervious area.
- (b) Updated Billable ERUs for Single Family Residential reflect the total number of parcels (one ERU per Parcel); existing ERU rate is the ERU rate that is currently in effect; billable ERUs for All Other Developed Property is based on the Updated Impervious Area and the updated ERU Factor of 2,116 square feet of impervious area.
- (c) Updated Billable ERUs for both Single Family Residential and All Other Property classes are derived based on the updated impervious area and the updated ERU Factor of 2,116 square feet of impervious area.

The potential reduction in billable ERUs (in Scenario 1 and Scenario 2), due to the updated impervious data and updated ERU Factor, in turn will have an impact on the base annual stormwater rate (i.e. \$ per ERU) that would be needed to meet the defined FY 2019 revenue needs of the Stormwater Utility.

The potential impact on system-wide stormwater ERU rates and the potential FY 2019 revenue generation implications, for the two updated Billable ERUs scenarios, are discussed in Section 7 of this Report.

6.0 Revenue Requirement Review

Per the scope of work defined for this rate study, the City provided a summary of the FY 2019 anticipated stormwater costs. The FY 2019 stormwater budget the City provided included a summary of the Operations & Maintenance (O&M) and anticipated capital expenditure costs. Table 5 presents a summary of the City’s anticipated FY 2019 stormwater costs.

Table 5: Summary of Anticipated Fiscal Year 2019 Stormwater Costs

#	COST DESCRIPTION	BUDGET AMOUNT
FY 2019 O&M Budget (as Provided by the City)		
1	Personnel	\$145,057
2	Supplies	\$158,000
3	Contract Services	\$181,500
4	Sub-Total: O&M Expenses	\$484,557
FY 2019 Capital Expense Budget (as Provided by the City)		
5	CIP Budget	245,000
6	Sub-Total: CIP Expense	\$245,000
FY 2019 Total Estimated Stormwater Budget		\$729,557

It is important to note that while the above summary provides an estimate of the anticipated O&M and capital expenditures which the City provided during this study, the total FY amount indicated in Table 5 is not to be construed as the total revenue requirement to be generated from stormwater charges. The City currently also has some additional funding sources (including stormwater fund balances and grant funding) that offsets a portion of the fiscal year 2019 costs.

Hence, for the purposes of this rate study, where the objective is primarily to evaluate the magnitude of impact any impervious area update could have on the system-wide ERU rate, the City requested that Black & Veatch use an estimated \$700,000 as the total revenue requirement target. Consequently, the updated system-wide ERUs (discussed in Section 5) was applied to the revenue requirement target of \$700,000 to determine the potential system-wide FY 2019 ERU rate.

The determination of system-wide ERU rate and revenue implications are discussed in the following section of this Report.

7.0 System Unit Rate and Revenue Impact Analysis

As discussed in Section 1 of this Report, one of the primary objectives of this rate study is to evaluate the potential impact any updated system-wide impervious area is likely to have on the City’s ERU rate. In addition, the study was also to evaluate the potential impact on fiscal year revenues if the existing rate is applied to the updated system-wide impervious area. This section of the Report presents the findings on both the potential impact on system-wide ERU rate, and the potential impact on fiscal year revenues.

7.1 SYSTEM UNIT RATE (ERU RATE) IMPACT

Black & Veatch estimated the impact on the system-wide ERU that could result from applying the updated billable ERUs, for the two scenarios discussed in Section 5.3, to the FY 2019 revenue requirement target of \$700,000 that the City provided. Figure 4 presents an illustration of the ERU rate derivation under the two scenarios of billable ERUs.

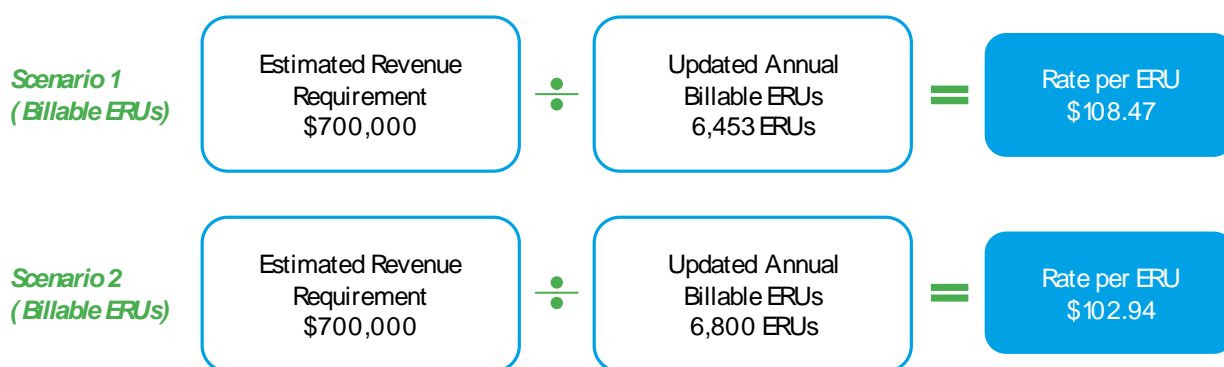


Figure 4: Derivation of System-wide ERU Rate (Base Rate)

Table 6 presents a comparison of the City’s current billable ERUs and current ERU rate (Column 1) and the updated billable ERUs and the associated ERU rate for the two billable ERUs scenarios (Column 2 and Column 3).

As Table 6 indicates, if the City **were to update the billable ERUs in its billing system and continue to use** the ERU rate approach for assessing stormwater charges, then the City would need to update its annual ERU Rate to either \$108.47 (Scenario 1) or to \$102.94 (Scenario 2), to generate the current target stormwater fee revenue requirement of \$700,000.

7.2 FISCAL YEAR 2019 STORMWATER REVENUE IMPACT

On the contrary, if the City were to **update the billable ERUs in its billing system** (either based on Scenario 1 or Scenario 2), but not update the ERU Rate and just continue to apply the existing ERU rate of \$92 for assessing stormwater charges, then the City will potentially face a shortfall with respect to revenue generation.

Table 7 presents a summary of the revenue generation impact under the two **billable ERUs scenarios** and the hypothetical assumption of applying the existing ERU rate to the updated billable ERUs.

Table 6: Summary Comparison of Estimated Billable ERUs and Estimated ERU Rate

#	DESCRIPTION	(1) EXISTING DATA / CURRENT ERU FACTOR ^(a)	(2) UPDATED DATA / UPDATED ERU FACTOR SCENARIO 1 ^(b)	(3) UPDATED DATA / UPDATED ERU FACTOR SCENARIO 2 ^(c)
ESTIMATED BILLABLE UNITS (ERUs)				
1	Single Family Residential (SWBL-R)	3,538	3,476	3,823
2	All Other Developed Property (SWBL-C)	4,128	2,977	2,977
3	Total Billable ERUs	7,666	6,453	6,800
STORMWATER UTILITY FEE REVENUE GOAL				
4	Estimated Revenue Requirement (FY 2019)	\$700,000	\$700,000	\$700,000
REQUIRED RATE				
5	Annual ERU Rate	\$92.00	\$108.47	\$102.94

Notes: IA: Refers to Impervious Area

- (a) Existing Billable ERUs reflect data the city provided from its billing system; existing ERU rate is the ERU rate that is currently in effect; the current ERU Factor is 1,228 square feet of impervious area.
 - (b) Updated Billable ERUs for Single Family Residential reflect the total number of parcels (one ERU per Parcel); existing ERU rate is the ERU rate that is currently in effect; billable ERUs for All Other Developed Property is based on the Updated Impervious Area and the updated ERU Factor of 2,116 square feet of impervious area.
 - (c) Updated Billable ERUs for both Single Family Residential and All Other Property classes are derived based on the updated impervious area and the updated ERU Factor of 2,116 square feet of impervious area.
- \$700,000 is the city’s anticipated revenue requirement from rates to meet stormwater program needs.
- The updated ERU rate in Columns (2) and (3) are derived by dividing the revenue requirement (Line 4) by updated billable ERUs (Line 3)

Table 7: Summary Comparison of Estimated Revenues

#	DESCRIPTION	(1) EXISTING DATA / CURRENT ERU FACTOR ^(a)	(2) UPDATED DATA / UPDATED ERU FACTOR ^(b)
ESTIMATED BILLABLE UNITS (ERUs)			
1	Single Family Residential (SWBL-R)	3,538	3,823
2	All Other Developed Property (SWBL-C)	4,128	2,977
3	Total Billable ERUs	7,666	6,800
STORMWATER UTILITY FEE REVENUE GOAL			
4	Estimated Revenue Requirement (FY 2019)	\$700,000	\$700,000
REVENUE IMPACT ESTIMATE			
5	Current ERU Rate	\$92.00	\$92.00
6	Estimated Revenue	\$705,264	\$625,617
Notes: IA: Refers to Impervious Area			
(a) Existing Billable ERUs reflect data the city provided from its billing system; existing ERU rate is the ERU rate that is currently in effect; the current ERU Factor is 1,228 square feet of impervious area.			
(b) Updated Billable ERUs are derived based on the updated impervious area and the updated ERU Factor of 2,116 square feet of impervious area;			
\$700,000 is the city's anticipated revenue requirement from rates to meet stormwater program needs.			

Section 8 presents a brief discussion on the customer bill impact under the City's existing rate structure.

8.0 Customer Bill Impact Analysis

The policy decisions the City takes on the various aspects of the stormwater fee including the updates to impervious area, transitioning to the updated ERU Factor, retaining or changing the existing rate structure – all have the potential to impact a customer’s bill. This section presents brief insights in to the potential customer bill impact that could result under the following assumptions:

- The City updates the impervious area in the billing system along with the ERU Factor value; and
- The City retains the existing rate structure of a uniform flat fee for the Single Family Residential Property class and individually calculated charges for parcels for the All Other Developed Property class.

Table 8 and Table 9 present examples of the potential annual bill impact on a Single Family Residential property and a Non-Residential property, respectively. Under the existing rate structure concept of assigning one ERU (Base Unit) along with the associated ERU rate (Base Rate) to each Single Family Residential property, those properties could see an increase of \$16.47 in its annual stormwater fee.

Table 8: Example Annual Bill Impact - Single Family residential Property

	CURRENT DATA & EXISTING FEE	UPDATED DATA AND POTENTIAL FEE
Impervious Area (sf)	601	1,046.90
Gross Area (sf)	7,256	7,256
Assigned ERUs	1	1
Annual Stormwater Fee	\$92.00	\$108.47

Table 9: Example Annual Bill Impact - Non-Residential Property

	CURRENT DATA & EXISTING FEE	UPDATED DATA AND POTENTIAL FEE
Impervious Area (sf)	267,813	341,693
Gross Area (sf)	629,554	629,554
ERU Factor (sf)	1,228	2,116
No. of ERUs	218	161
Annual Rate (\$/ERU)	\$92	\$108.47
Annual Stormwater Fee	\$20,056	\$17,463

9.0 Study Recommendations

The analytical tasks performed in this study, to achieve the stated objectives, provide some key findings. This section presents a summary of the key findings and the Black & Veatch team's recommendations for potential follow-on actions.

9.1 SUMMARY FINDINGS AND IMPACT

■ City's Updated Impervious Area

- The impervious area determined using the latest available planimetric data reflects a more holistic capture of impervious area surfaces, which is consistent with the City's definition of impervious area.
- The updated planimetric data results in an overall increase in Impervious Area square footage relative to what the City has in its billing system.
- The updated data along with the updated land use classifications contributes to the increase in City's ERU Factor (2,116, square feet of impervious area).
- The impervious area analysis indicates a fair level diversity in impervious area among the Single Family Residential parcels.

■ FY 2019 ERU Rate (Base Rate) Impact

- If the City were to generate a target revenue requirement of \$700,000 based on the updated impervious area and the updated ERU Factor, then that would necessitate the annual ERU Rate (Base Rate) to increase from \$92 per ERU to an estimated \$108.47 per ERU.

■ FY 2019 Revenue Impact

- If the City were to update the billing system with the updated impervious area and the associated updated billable ERUs, but continue to calculate the stormwater charge using the existing \$92 ERU rate, then as discussed in the previous section, the potential revenue that the City can generate will be lower than the desired target revenue requirement.

9.2 KEY RECOMMENDATIONS

Based on an objective evaluation of the findings from this study and our nation-wide experience with stormwater user fee development and rate studies, we present in Table 10 a set of key recommendations and associated benefits, for the City's consideration.

Table 10: Summary of Recommendations

#	RECOMMENDATIONS	BENEFITS
1	Updated Impervious Area: Update the billing system with the latest impervious area	Enhances equity of cost recovery as each property’s charge will be based on its latest impervious area
2	Base Unit Approach: Evaluate the Base Unit approach to decide: <ul style="list-style-type: none"> ■ Whether to continue to use the ERU as the Base Unit (OR) ■ Use an alternate Base Unit such as 500 square feet of Impervious Area 	<p><u>Continued using ERU:</u> Would require fewer changes to the billing system.</p> <p><u>Adoption of an Alternate Base Unit:</u> Use of 500 square feet (or similar measure) as a Base Unit may be easier for customers to understand.</p>
3	Transition to Updated ERU Factor: Evaluate the timing to transition to the updated ERU Factor of 2,116 square feet (if continuing with the ERU approach)	The ERU Factor will reflect the latest and more appropriate value for stormwater charge calculations.
4	Transition to Updated ERU Rate: Evaluate the timing of transition to an updated ERU Rate (if continuing with the ERU approach)	If the City desires to use the updated impervious area and continue with the ERU approach, then the ERU Factor and the ERU Rate need to be updated.
5	Rate Structure (Single Family Residential): Consider a change to the flat fee approach for Single Family Residential class. The City could consider transitioning to a Tiered Rate Structure given the extent of diversity of impervious area that exists among the Single Family Residential properties in the City.	Tiered Rate structure will help enhance the equity of cost recovery within the Single Family Residential class, as smaller properties will have a lower stormwater charge and larger properties will have a corresponding higher charge.
6	Parcel Classification Validation: Establish a mechanism to assure that parcels are classified appropriately in to accurate stormwater class	This is a best practice that will enable accurate billing and equitable cost recovery.
7	Parcel ID – Utility Account Mapping: Establish a mechanism to assure that the utility accounts are accurately mapped to the appropriate parcel	This is a best practice that will enable accurate billing and equitable cost recovery.

Given the extent of potential changes to the ERU Factor, the ERU Rate, revenue adequacy and customer bill impact considerations, it would be efficient to evaluate all the aforementioned recommendations holistically as a Phase 2 effort, and define potential changes to stormwater billing policies and/or fee ordinances, the associated implementation actions, and execution timeline

Appendix A Parcel Classification Validation

This section presents a summary of the parcel classification validation task that Black & Veatch performed in conjunction with City staff, to affirm a reasonable level of accuracy of the classification of parcels.

The team performed the validation task using a two-step process as follows:

- **Step 1:** Initial Classification of Parcels based on the *Land Use Codes* assigned to parcels in the Montgomery County parcel dataset; and
- **Step 2:** Reclassification of a few parcels based on a due diligence comparison among the County parcel data set; the City’s stormwater billing dataset; available aerial imagery; and discussion with City staff.

These two steps are discussed further in the following sections.

INITIAL PARCEL CLASSIFICATION

To develop the initial parcel classification, Black & Veatch utilized the County *Land Use Codes* to first map each land use code to a specific stormwater class, and then further assign each parcel to the stormwater class, based on the parcel’s specific land use code.

Table A-1 presents a summary of the two primary stormwater classes and the land use codes associated with each of those two classes. Table A-2 presents a summary count of parcels assigned to the two stormwater classes based on land use codes.

Table A-1: Stormwater Classes and Associated Land Use Codes

STORMWATER CLASS	LAND USE CODES
Single Family Residential (SFR)	<ul style="list-style-type: none"> ■ Single family detached ■ Single family attached ■ Townhouses ■ Duplex ■ Quadplex ■ Other attached
Non-Residential	<ul style="list-style-type: none"> ■ Condominiums ■ Multi-family ■ Commercial ■ Government ■ Educational / Institutional Other ■ Parks / Recreation ■ Transportation ■ Vacant



Table A-2: Parcel Count Summary Based on Initial Parcel Classification

STORMWATER CLASSES	NUMBER OF PARCELS	PERCENTAGE OF TOTAL
Single Family Residential	3,545	83.3%
Non-Residential		
■ All Other Developed	405	9.5%
■ Vacant	252	5.9%
■ Undeveloped	54	1.3%
Total	4,256	100.0%

Note: the above parcel count by stormwater class is strictly based upon the County’s land use classification.

- It includes all parcels that are currently exempt from the City’s stormwater fee;
- “Undeveloped” parcels are based on the County’s land use code and doesn’t reflect the City’s definition of undeveloped (as defined in the City’s stormwater fee ordinance)
- Properties within the public right-of-way and those designated as easements are not included as part of the parcel count as they are not included in the impervious area analysis.

PARCEL RE-CLASSIFICATION

The current County Land Use classification provided an initial basis for parcel classification. However, to better validate and the accuracy of the classification of parcels, Black & Veatch did a due diligence comparison of the parcels classified based on the County land use code with the parcel classification obtained from the City’s stormwater billing system. Based on this due diligence review, Black & Veatch identified a few classification exceptions and in collaboration with City staff, reclassified some of the parcels in to appropriate classification for the purposes of this stormwater rate study.

Single Family Residential Reclassified as Multi-Family Residential

The project team reclassified 38 properties that were initially designated as Single Family based on County’s land use codes but were found to have more than 2 dwelling units².

Prior to reclassifying, Black & Veatch reviewed the list of multi-family properties (i.e. properties with more than 2 dwelling units) that the City’s Department of Housing and Community Development provided and compared this list against the initial classification performed based on County’s land use codes. Based on

¹ Note – the initial UNDEVELOPED LAND classification is based upon the County Land Use classifications and does not reflect the “Undeveloped” definition that the City uses for its stormwater billing purposes.

² The County designation for Single Family Attached and other supporting included properties with more than 2 dwelling units.

this validation, properties that were initially designated as Single Family Residential Class (based upon County Land Use Code) but were now affirmed to be Multi-Family Residential based on the City's data set, where re-classified as Multi-Family Residential for stormwater billing purposes.

Single Family Residential reclassified as Non-Residential

The project team reclassified 9 properties that were designated as Single Family Residential in the initial classification but were affirmed to be Non-Residential.

Prior to reclassifying, Black & Veatch reviewed all the properties classified as "Commercial" in the City's existing stormwater billing data. To affirm the accuracy of this classification, for each of these parcels, Black & Veatch reviewed the aerial imagery and the land use codes in the tax assessment data. Based on these validation checks and City staff affirmation, for this study, Black & Veatch reclassified the above-mentioned parcels as Non-Residential.

Identification and Exclusion of Stormwater Fee Exempt Properties

Currently, the City excludes two classes of properties from stormwater fees in accordance with the City's stormwater fee ordinance and/or billing policy.

■ Parcels exempt from fee based on ownership

Parcels whose owners are currently exempt from the stormwater fee were flagged and separated out from the initial stormwater categories. Properties owned by the following entities were flagged as exempt from the stormwater fee:

- City Owned
- State Owned
- Maryland - National Capital Parks & Planning Commission
- Montgomery College
- Montgomery County School District
- Prince Georges County
- Washington Suburban Sanitary Commission
- Washington Metro Area Transit Authority

In total, 189 parcels were designated, based on ownership, as "Non-billable Exempt" for stormwater fee purposes.

■ Parcels exempt from fee due to being deemed "Undeveloped"

Under the City's current stormwater fee ordinance, properties which have less than one-third (1/3) of an ERU are defined as "Undeveloped" and are exempt from stormwater fees. Based upon the City's current ERU square footage (i.e. 1,228 square feet), properties with less than 409 square feet of impervious area are currently deemed "Undeveloped". Using the updated parcel level impervious area that Black & Veatch calculated from the planimetric data, Black & Veatch identified all parcels that met

this threshold of 409 square feet of impervious area, reclassified them as “Non-billable Undeveloped”. In total, 111 parcels were designated as “Non-billable Undeveloped” for stormwater fee purposes.

Based on this stormwater fee exemption analysis, a total of 300 parcels (189 ownership exempt + 111 undeveloped exempt) were deemed “Non-billable Parcels” and were excluded from the determination of total billable stormwater units.

Table A-3 presents a summary count of parcels based on the final re-classification of parcels.

Table A-1: Parcel Count Summary Based on Final Parcel Re-Classification

STORMWATER CLASSES	NUMBER OF PARCELS	PERCENTAGE OF TOTAL
Single Family Residential	3,687	93.2%
Non-Residential		
■ All Other Developed	185	4.7%
■ Vacant Land	66	1.7%
■ Undeveloped Land	18	0.5%
Total Billable Parcels	3,956	100.0%
Non-Billable Parcels	300	
Total City Parcels	4,256	