PUBLIC HEARING ON
PROPOSED WATER AND WASTEWATER RATES
2015

WATER DEPARTMENT
PHILADELPHIA, PENNSYLVANIA

SUPPLEMENTAL DIRECT TESTIMONY OF
BLACK & VEATCH CORPORATION

DECEMBER 2015

BLACK & VEATCH
building a world of difference™

BEFORE THE
PHILADELPHIA WATER, SEWER AND STORMWATER RATE BOARD

Re Application of the Philadelphia Water Department for Increased Rates and Charges	Fiscal Years 2017-2018

BV-T2: SUPPLEMENTAL DIRECT TESTIMONY OF BLACK & VEATCH CORPORATION

Q1. PLEASE STATE YOUR NAMES AND BUSINESS AFFILIATION.

A. Our names are Prabha N. Kumar, David A. Jagt, and Ann Bui. Our supplemental testimony in this proceeding will be presented as a panel on behalf of the City of Philadelphia Water Department (Water Department). Our respective resumes of experience are appended to the Direct Testimony of Black & Veatch Corporation (BV-T1).

Q2. PLEASE STATE THE PURPOSE OF YOUR SUPPLEMENTAL TESTIMONY.

A. The purpose of this supplemental testimony and related exhibits is to explain (a) the development of stormwater revenue requirements as previously discussed in the direct testimony of Black & Veatch in the cost of service discussions related to the wastewater system; (b) the stormwater incentives and credits program; (c) the development of billable gross area (GA) and impervious area (IA) units of service for the residential, non-residential, and condominium customer classes; (d) the derivation of the system-wide GA and IA rates; and (e) stormwater rate relief options.

Q3. PLEASE EXPLAIN THE APPROACH USED TO DETERMINE THE STORMWATER REVENUE REQUIREMENTS. ARE THERE ANY CHANGES TO THE COST ALLOCATION FACTORS USED IN APPORTIONING THE COSTS BETWEEN SANITARY SEWER AND STORMWATER SERVICES?

A. The stormwater management and related costs are an integral component of the Water Department's wastewater system management. To delineate the stormwater management costs from the Water Department's annual wastewater costs, a cost of service based functional cost allocation approach was used.

As discussed in detail in the direct testimony of Black & Veatch on the wastewater cost of service analysis, the stormwater revenue requirement or cost of service was derived through a multi-step process that involves the following:

a. ***Step 1:*** Aggregated O&M and capital costs by functional components (Conveyance; Pumping; Treatment; Customer; and Industrial Waste).

b. ***Step 2:*** Allocated each functional cost to wastewater cost components. The typical retail wastewater cost components include volume, capacity, strength parameters such as Bio-chemical oxygen demand (BOD) and Total Suspended Solids (TSS), and customer cost parameters such as meters, bills.

c. ***Step 3:*** Apportioned capital component costs and O&M component costs less applicable non-operating revenues to contract customers (wholesale) and retail.

d. ***Step 4:*** Apportioned the net retail component costs between sanitary sewer and stormwater services. Any exclusive stormwater cost such as inlet cleaning costs were allocated entirely to stormwater.

e. ***Step 5:*** Allocated a portion of the retail component cost to Infiltration & Inflow (I&I), and then re-apportioned the I&I cost between retail sanitary sewer and stormwater services.

There isn't any significant change in the cost allocation factors that are used in apportioning the retail component costs between sanitary sewage and stormwater services. A brief description of the cost allocation factors is presented.

- **Conveyance O&M Cost Allocation:** Total retail sewer mains capacity O&M costs were allocated between stormwater and sanitary sewage based on the system-wide ratio of peak wet weather flows to peak dry weather flows. The peak flow ratio analysis was performed using flow data obtained from the Water Department's Long Term Control Plan Update (LTCPU), the Monthly Managers Report (MMR) and other metered volume data. On the basis of this peak flow ratio analysis, 60% of the conveyance O&M expense was allocated to stormwater and 40% to sanitary wastewater, and these factors are the same as those used in the previous rate case.

  The peak wet weather flows reflect the rainfall induced stormwater flows and the peak dry weather flows reflect the sanitary sewage flows including I&I. The rationale for this allocation methodology is that maintenance costs are likely to be influenced by the volume of flows conveyed through the system. Therefore the ratio of peak wet weather flows to peak dry weather flows provides a reasonable technical basis for apportioning the conveyance O&M costs.

- **Conveyance Capital Cost Allocation:** The sewer mains capacity capital cost is allocated 64% to stormwater and 36% to sanitary sewage services based on a cost weighted pipe capacity analysis. These allocation factors, which were affirmed in the 2012 rate proceedings, are based on the pipe capacity of sanitary sewer and stormwater drainage that are further weighted by the cost of construction.

- **Pumping & Treatment O&M and Capital Cost:** A portion of the retail pumping and treatment component cost is allocated to I&I. That I&I cost is allocated 70% to sanitary sewage and 30% to stormwater services based on the ratio of average dry weather flow to average wet weather flow.

- **Customer Costs:** The allocation approach used in allocating customer costs to stormwater is consistent with the method used in the previous rate proceedings. The customer costs are first allocated one-third to water service and two-thirds to the wastewater service based on the proportion of revenues. The wastewater customer costs less the metering costs are further allocated 60% to sanitary sewer and 40% to stormwater services based on the relative revenue requirement levels in Fiscal Year 2017 between the two services.

Table SW-13 in Exhibit BV-E3, presents the total FY 2017 stormwater revenue requirements. Based on the detailed technical cost allocations, the FY 2017 stormwater revenue requirements are estimated at $153,690,000.

Q4. IN THE WASTEWATER COSTS THAT ARE APPORTIONED BETWEEN SANITARY SEWER AND STORMWATER SERVICES, ARE THERE ANY PROPOSED O&M COSTS THAT IMPACT THE LEVEL OF ANNUAL SANITARY SEWER AND STORMWATER REVENUE REQUIREMENTS?

A. In FY 2012, the Water Department initiated the Stormwater Management Incentive Program ("SMIP"), and in FY 2014 implemented the Greened Acres Retrofit Program ("GARP"). These incentive programs were implemented to accelerate the construction of private stormwater management practices to the requirements stipulated in the Consent Order and Agreement ("CO&A"). The Water Department has experienced a positive response from private properties for these two incentive programs, and consequently a full utilization of the SMIP/GARP grants budget during FY 2013 through FY 2015. Further, the completed projects indicate that the cost per private greened acre achieved through these incentive programs is approximately one-third the cost of public greened acre projects executed by the Water Department.

Hence, to sustain the incentive programs, an annual SMIP/GARP grant amount of $15.0 million is included in the FY 2017 through FY 2021 wastewater O&M expenditures. A portion of the annual SMIP/GARP

costs are allocated to certain wholesale contract customers, and the retail portion of the SMIP/GARP O&M costs are allocated between sanitary sewage and stormwater services.

The supplemental paper titled, *"Stormwater Units of Service Analysis"* (Exhibit BV-S4) provides additional details on the SMIP/GARP incentive program.

Q5. PLEASE EXPLAIN THE CUSTOMER CLASSES THAT ARE DEFINED FOR THE STORMWATER MANAGEMENT SERVICE (SWMS) CHARGE.

A. There are three customer classes that are defined for the SWMS charge. Per the Water Department's Regulations Chapter 3, Section 300.0, the three customer classes are the residential, non-residential and condominium classes.

Q6. PLEASE EXPLAIN IF THERE ARE ANY CHANGES TO THE SWMS CHARGE COMPONENTS AND/OR THE ALLOCATION FACTORS TO THE CHARGE COMPONENTS.

A. There are no changes to the SWMS charge components or the allocation factors. As decided in the 2008 rate proceedings, the SWMS charge continues to comprise of two charge components: an IA charge and a GA charge. The parcel area based portion of the stormwater revenue requirements is allocated 20% to GA and 80% to IA. The FY 2017 stormwater GA and IA revenue requirements are presented in Table SW-14 (Exhibit BV-E3).

Q7. PLEASE DESCRIBE HOW THE GROSS AREA (GA) AND IMPERVIOUS AREA (IA) SQUARE FOOTAGE (UNITS OF SERVICE) WERE DEVELOPED FOR THE THREE CUSTOMER CLASSES.

A. The supplemental paper titled, *"Stormwater Units of Service Analysis"* (Exhibit BV-S4) provides a detailed discussion on the methodology used to determine the billable GA and IA square footage (referred herein as the "units of service").

The billable units of service are critical for projecting the stormwater revenues under existing rates, and for developing the GA and IA rates for the test years. A summary of the three-step billable GA and IA units of service development process is presented here.

Step 1: Projection of the Initial GA and IA: The Water Department provided detailed parcel data including information on credits and adjustments for FY 2012 through FY 2015. Utilizing this data, as a first step, the existing level of GA and IA (referred to herein as the "Initial GA and IA") was determined for the Residential, Non-Residential, and Condominium classes by applying the Mean GA and IA of the respective customer classes to the projected number of parcels in each of those classes.

- ***Residential:*** The initial GA and IA were calculated as follows:

  Using the FY 2015 parcel data, the Mean GA and Mean IA for the residential parcels was computed. The Mean Residential GA is 2,110 square feet and the Mean Residential IA is 1,050 square feet. These values are identical to those used in the 2012 rate study and rate proceedings. These Mean GA and Mean IA square footage were then applied to the estimated number of residential parcels to determine the initial GA and IA for this class.

- ***Non-Residential and Condominium:*** The initial GA and IA were calculated as follows:
  Using the FY 2015 parcel data, the Mean GA and Mean IA for the various non-residential and condominium sub-groups were computed. Due to the significant diversity in the types of parcels within the non-residential and Condominium customer classes, the Mean GA and Mean IA were computed at the subgroup level. These Mean GA and Mean IA square footage of each subgroup were then applied to the estimated number of parcels within each subgroup to determine the initial GA and IA for the non-residential and condominium classes.

Table SW-1 (Exhibit BV-E3) presents the Mean GA and Mean IA determined for each of the subgroups within the Non-residential and Condominium customer classes.

Step 2: Projection of the GA and IA Adjustments: Two key factors could impact stormwater GA and IA revenue generation. Hence, to ensure revenue adequacy, rate setting has to account for each of the factors that could impact revenue generation. These two key factors (referred herein as "Adjustment Factors") are:

a. *Stormwater Credits Adjustments:* Stormwater credits which are offered in the form of a reduction in GA and/or IA square footage;
b. *Stormwater Appeals/Data Adjustments:* There are three sources of stormwater appeals/data adjustments: (i) reduction in GA and IA square footage due to data inaccuracies; (ii) reduction in GA and IA due to non-billable Residential Sideyards; and (iii) any potential gain in GA and IA due to City owned vacant lots transitioning to private non-City ownership.

Hence, in the units of service analysis, the billable GA and IA units of service are projected taking in to consideration any potential reduction or gain in billable square footage due to the above two Adjustment Factors.

Table SW-2, Table SW-3, and Table SW-4 (Exhibit BV-E3) present the Adjustments to Number of Parcels, Adjustments to GA, and Adjustments to IA, respectively.

Step 3: Projection of Billable GA and IA: The GA and IA adjustments determined in Step 2 were then applied to the initial GA and IA determined in Step 1 to derive the final billable GA and IA units of service for the Residential, Non-Residential, and Condominium classes of parcels.

Table SW-10 (Exhibit BV-E3) presents the projected system wide billable number of parcels, billable GA, and billable IA for the Test Year FY 2017.

Q8 PLEASE EXPLAIN THE METHODOLOGY USED TO DERIVE THE STORMWATER SYSTEM UNIT COSTS OF THE GA AND IA CHARGE COMPONENTS.

A. The methodology used to derive the system wide unit cost of GA and IA involves a multi-step process to determine the following GA and IA rates in a sequential build-up:

- *"System-wide"* GA and IA Rate (aka "unit cost of service")
- Residential and Non-residential "*Initial"* cost of service GA and IA Rate
- Residential and Non-residential "*Adjusted"* cost of service GA and IA Rate (adjusted for the recovery of discounts)
- Residential and Non-residential *"Final"* cost of service GA and IA Rate (adjusted for the recovery of discounts and lag factor)

Step 1: Determination of GA and IA Revenue Requirements. The approach used to apportion the retail wastewater costs to stormwater GA/IA, and to stormwater Billing & Collection has already been discussed in the previous questions. The revenue requirement to be recovered from the GA and IA SWMS charge in Test Year FY 2017 is $139,736,000. The revenue requirement to be recovered from the billing and collection charge in Test Year FY 2017 is $13,953,000. The summary stormwater revenue requirement results are presented in Table SW-13 (Exhibit BV-E3) and the summary results of the GA and the IA revenue requirements are presented in Table SW-14 (Exhibit BV-E3).

Step 2: Determination of the Billable GA/IA Units of Service in square footage. The approach used to determine the GA and IA units of service was discussed in the previous question. Table SW-10 (Exhibit BV-E3) presents the projected system wide billable number of parcels, billable GA, and billable IA for the Test Year FY 2017.

Step 3: Determination of the "*System-wide*" GA and IA Monthly unit cost of service. The system-wide GA and IA monthly unit costs are derived in terms of dollar per 500 square feet of GA and IA, respectively. To derive this, the Test Year FY 2017 GA and IA revenue requirements are first divided by the corresponding billable GA and IA square footage, and then by 500 to develop the annual unit cost per

500 square feet of GA and per 500 square feet of IA. These values are then divided by 12 to derive the monthly unit cost of service. Table SW-14 (Exhibit BV-E3) presents the projected system wide GA and IA unit cost for the Test Year FY 2017.

Step 4: Determination of the Customer Class Test Year GA and IA Cost of Service. The GA and IA cost of service are developed as follows for the Residential and Non-Residential (includes Condominium) categories of parcels as follows:

- *Residential:* The system GA and IA unit cost that is derived in Step 3 is then applied to the residential billable GA & IA units of service to determine the Test Year FY 2017 Residential cost of service. The residential cost of service for the Test Year FY 2017 is estimated at $60,917,000.
- *Non-Residential:* The residential GA and IA cost of service are then subtracted from the total GA and IA revenue requirements to determine the non-residential GA and IA cost of service for each of the two test years. The non-residential cost of service is then increased by the estimated amount of revenue loss due to CAP. The Test Year FY 2017 revenue loss due to the CAP program is estimated to be $3,417,000. The non-residential cost of service, adjusted for CAP, for the Test Year FY 2017 is estimated at $82,236,000.

  Table SW-15 (Exhibit BV-E3) presents the Residential and Non-residential (adjusted for CAP) GA and IA cost of service for the Test Year FY 2017.

Step 5: Determination of the monthly Customer Class *"Initial"* Cost of Service GA and IA Rate. The Initial cost of service GA and IA rates for the Test Year FY 2017 are developed as follows for the Residential and Non-Residential (includes Condominium) categories of parcels:

- *Residential:* The Residential "Initial" cost of service monthly GA and IA charge is determined by multiplying the system-wide GA and IA unit cost derived in step 4 by the residential Mean GA (2,110) and Mean IA (1,050) square feet.
- *Non-Residential:* The non-residential "Initial" cost of service GA and IA rate is determined by dividing the CAP adjusted cost of service determined in Step 4 by the non-residential billable GA and IA units of service.

Table SW-16 (Exhibit BV-E3) presents the Residential *Initial* cost of service GA and IA charge, and the Non-residential *Initial* cost of service GA and IA rates for the Test Year FY 2017.

Step 6: Determination of the monthly Customer Class *"Adjusted"* Cost of Service GA and IA Rate: The Water Department provides bill discounts to certain groups of residential and non-residential

customers including elderly citizens, charities, educational institutions, and the housing authority. To affirm stormwater revenue adequacy, the initial cost of service rates derived in Step 5 needs to be adjusted so as to recover the revenue loss resulting from the discounts. The potential revenue reduction due to discounts is estimated for the Test Year FY 2017, and that amount is reapportioned to all customer sub-groups within the residential and non-residential categories.

Table SW-18 (Exhibit BV-E3) presents the Residential and Non-residential cost of service adjusted to include the proportionate allocation of the discount amount for the Test Year FY 2017, and Table SW-19 (Exhibit BV-E3) presents the *Adjusted* Cost of Service GA and IA rate (adjusted for discount cost recovery).

Step 7: Determination of the monthly Customer Class *"Final"* Cost of Service GA and IA Rate: The cost of service GA and IA rates that are designed for a given Test Year requires the application of a "lag factor". The lag factor reflects a final adjustment to the cost of service rates to recognize the fact that there will be a proration of SWMS charge billings between the existing and proposed rates during the first month following the effective date of the rate increase, as well as the fact that the fiscal year billings will not be fully collected within that fiscal year. Therefore, a wastewater lag factor of 1.058 is applied to the adjusted cost of service GA and IA rates derived in Step 6.

Table SW-19 (Exhibit BV-E3) presents the *Final* Cost of Service GA and IA rates after adjusting for discount recovery, lag factor, and CAP recovery (applies to Non-residential rates only).

Q9. ARE ANY CHANGES PROPOSED TO THE EXISTING CUSTOMER ASSISTANCE PROGRAM (CAP) FOR THE NON-RESIDENTIAL CUSTOMER CLASS?

A. No. The Department is not proposing any changes to the existing Customer Assistance Program. Enrollment for new customers ended in September 2014.

Q10. WHAT IS THE ESTIMATED ANNUAL REVENUE IMPACT OF THE ONGOING CAP PROGRAM?

A. The CAP Program provides the participants a reduction to the SWMS charge. Consequently, it impacts annual stormwater revenue generation. The inset box presents the historical and projected CAP revenue impact. The historical revenue impact data for FY 2012 through the first four months of FY 2016 was provided by the Water Department.

CAP Revenue Impact

FY 2012: $1.147 M
FY 2013: $2.387 M
FY 2014: $4.615 M
FY 2015: $4.164 M
FY 2016: $3.517 M
FY 2017: $3.417 M
FY 2018: $3.317 M
FY 2019: $3.217 M
FY 2020: $3.117 M
FY 2021: $3.017 M

Under the current CAP program, it should be noted that with each succeeding year the number of enrollees will continue to decrease as parcels cease to meet the CAP eligibility requirements and are transitioned to their full parcel area based GA and IA charge.

The FY 2016 revenue impact is estimated to be $3,517,000 by annualizing the average CAP amount from the first three months of FY 2016. For FY 2017 through FY 2021, it is assumed that the annual CAP will decrease $100,000 from the prior year level.

Q11. WILL THE CAP PROGRAM IMPACT REVENUE ADEQUACY, AND HOW IS THE REVENUE LOSS EXPECTED TO BE RECOVERED?

A. The CAP will not affect stormwater revenue adequacy. As discussed in Step 4 of Question 8 in this testimony, the CAP revenue impact of $3.41 Million estimated for Test Year FY 2017 is to be recovered from the non-residential properties by increasing their initial cost of service by the CAP revenue loss amount.

Only non-residential properties are eligible for enrollment in the CAP program and consequently only they benefit from the CAP program fee reduction. Further, the CAP program is not a low income affordability program. It is essentially offered to enable non-residential properties to gradually transition from a meter based stormwater charge to a parcel area based stormwater charge. Therefore, the revenue loss due to the CAP program is recovered only from the non-residential properties by slightly increasing their GA and IA rates. Please also refer to the paper titled *Cost of Service Recovery of Fee Reductions* (Exhibit BV-S2).

Q12. PLEASE EXPLAIN THE IMPACT OF THE ONGOING CAP PROGRAM ON THE NON-RESIDENTIAL MONTHLY GA AND IA RATE.

A. To recover the estimated revenue reduction due to CAP from the non-residential properties, the non-residential GA and IA rates need to be adjusted. The estimated CAP impact on the non-residential monthly GA and IA rates are an addition of $0.024 per 500 square feet on the GA rate and an addition of $0.180 per 500 square feet on the IA rate. Table SW-16 (Exhibit BV-E3) presents the impact of CAP on the non-residential monthly GA and IA rates.

Q13. ARE ANY CHANGES PROPOSED TO THE RESIDENTIAL RATE STRUCTURE? PLEASE EXPLAIN HOW THE RESIDENTIAL MONTHLY STORMWATER CHARGE WILL BE CALCULATED.

A. There are no changes proposed to the residential stormwater rate structure. The Water Department proposes to retain the current residential rate structure which consists of a uniform monthly GA and IA

charge per parcel, and a monthly billing and collection charge per residential account. The monthly stormwater charge is calculated as follows:

- *Residential:* As explained in Steps 5 through 7 of Question 8 in this testimony, the Initial Residential GA and IA charge is calculated based on the Residential Mean GA and Mean IA. These values are then adjusted for the recovery of discounts and for the collection lag. The Test Year FY 2017 uniform monthly GA & IA charge is estimated at $11.97 per month. To this GA and IA charge, a monthly billing and collection charge of $2.20 is added to derive the total residential monthly stormwater charge of $14.17 for FY 2017.

Table SW-19 (Exhibit BV-E3) presents the residential monthly uniform stormwater charge.

Q14. PLEASE EXPLAIN HOW THE NON-RESIDENTIAL MONTHLY STORMWATER CHARGE WILL BE CALCULATED.

A. The derivation of the non-residential *Final* cost of service GA and IA was already explained in the response to Question 8. The monthly GA and IA charge for the non-residential category will be individually calculated for each parcel based on the parcel's specific GA and IA square footage after adjusting for any applicable stormwater credits. The resulting GA and IA square footage is rounded to the next highest multiple of 500 and then divided by 500 to determine the property's *billable* GA and IA units. The GA and IA units are then multiplied by the non-residential *Final* cost of service GA and IA Rate to determine the property's SWMS Charge.

If the computed monthly charge is less than the minimum monthly charge (which is equal to the monthly residential charge), then the minimum charge will apply.

Q15. PLEASE EXPLAIN HOW THE MONTHLY STORMWATER BILLING AND COLLECTION CHARGE IS DETERMINED FOR THE RESIDENTIAL AND NON-RESIDENTIAL CUSTOMER CLASSES.

A. The Test Year FY 2017 customer costs allocated to stormwater reflects the portion of cost of service that is to be recovered through the monthly Billing & Collection charge. The determination of the residential and non-residential monthly Billing & Collection charge involves a multi-step process:

Step 1: Determination of the Stormwater Billing & Collection Test Year FY 2017 Revenue Requirements. The allocation of customer costs to stormwater has already been explained in the Direct Testimony of Black & Veatch on water and wastewater cost of service. The total stormwater Billing & Collection revenue requirements determined for FY 2017 is $ 13,953,000.

Step 2: Determination of the Billable Residential and Non-Residential Accounts. To establish a Billing & Collection charge per account, the FY 2017 total "Equivalent Customer Cost Weighted" Billable Accounts are developed. To develop the cost weighted billable accounts, the total number of non-residential accounts are weighted by a factor of 1.3 and the residential accounts are weighted by a factor of 1.0. The total cost weighted accounts are annualized to determine the total bills for FY 2017.

Step 3: Determination of the *Initial* Residential and Non-Residential Monthly Billing & Collection Charge. The FY 2017 Billing & Collection Charge revenue requirements are divided by the total bills discussed in Step 2 to derive the monthly Billing & Collection charge of $2.03 per bill. This charge is set as the initial Residential monthly Billing & Collection charge. This charge is then factored up by 1.3 to set the initial Non-Residential monthly Billing & Collection charge of $2.64 per bill.

Table SW-17 (Exhibit BV-E3) presents the *initial* residential and non-residential monthly uniform stormwater charge.

Step 3: Determination of the *Final* Residential and Non-Residential Monthly Billing & Collection Charge.

The FY 2017 *Initial* Billing & Collection Charge discussed in Step 3 is then adjusted to account for the recovery of discounts on the billing & collection charge, and for the lag factor that was already discussed in response to Question 8. The *Final* monthly Residential and Non-Residential Billing & Collection charge adjusted for discounts and lag factor are $2.20 and $2.86 per bill, respectively.

Table SW-19 (Exhibit BV-E3) presents the *final* Residential and Non-residential monthly Billing & Collection charge.

Q16. PLEASE EXPLAIN THE STORMWATER CREDIT PROGRAM THAT IS CURRENTLY OFFERED BY THE WATER DEPARTMENT. ARE ANY CHANGES PROPOSED TO THE EXISTING CREDIT PROGRAM?

A. The Water Department currently offers stormwater credits to Non-residential and Condominium customers to provide them the opportunity to reduce their monthly SWMS Charge as well as incentivize property owners to implement and maintain stormwater management practices on-site.

Currently, the following three classes of credits are offered:

- IA Credit: This credit reduces a property's IA charge.
- GA Credit: This credit reduces a property's GA charge.

- NPDES Credit: This credit reduces a property's total GA and IA charge (SWMS charge).

Customers who apply for stormwater credits must be current on their accounts, fulfill the application requirements and adhere to the Department's inspection and reporting obligations. All credits expire four years from their effective date and are subject to renewal. Further detail on the credit program application requirements and procedures are provided in the Water Department's *Stormwater Service Charge Credit and Adjustment Appeals Manual*.

IA Credit: The Water Department grants IA credit for managing stormwater runoff from the IA within a property. Credit is only granted for the portion of IA that is managed by demonstrating: (1) an Impervious Area Reduction (IAR); (2) management of the first inch of stormwater run-off; or (3) discharge to a surface water body.

- *Impervious Area Reduction (IAR):* IARs result in a direct reduction in the billable IA. The Water Department currently offers IAR for the following five practices:
    - Tree Canopy Cover
    - Roof Leader/Downspout Disconnections
    - Pavement Disconnections
    - Green Roofs
    - Porous Pavement
- *Management of the First Inch of Runoff:* For properties which do not drain to a surface water body, IA Credit is granted if the customer can demonstrate management of the first inch of stormwater runoff utilizing one of the three following options:
    - Option 1: Infiltration
    - Option 2: Detention and slow release
    - Option 3: Volume reduction and filtration
- *Surface Discharge*: If customers can demonstrate that the impervious area of the property discharges to a surface water body, then those properties are eligible for IA credits. Credit is only granted for the portion of IA that drains to the surface water body.

GA Credit: The Water Department grants GA credit for (1) managing of the first inch of runoff from IA; or (2) by demonstrating that the open space (i.e. non-impervious area) associated with the property has runoff characteristics less than the threshold value defined in the *Credits and Appeals Adjustments Manual.*

- *Management of the First Inch of Runoff:* GA credit for managing the first inch of runoff is achieved when a parcel is approved for the management of the first inch under the IA credit. The property receives equivalent credit on the GA charge based upon the portion of IA managed.
- *Open Space:* GA credit is granted for open space areas that demonstrate that the runoff potential for the soil and ground cover associated with the property is lower than the value specified in the Water Department's *Credits and Appeals Adjustments Manual*. The Natural Resource Conservation Service Curve Number (NRCS-CN), associated with the property's open space, is used to represent the runoff potential. A lower CN is indicative of the quality of a property's green space and generally represents a lower potential for runoff.

NPDES Credit: NPDES Credit is granted to customers that can demonstrate that their parcel is subject to an active NPDES Permit for industrial stormwater discharge activities and that they are in compliance with the associated permit requirements.

Maximum Total Credit: The Maximum Allowable Credit for Non-Residential and Condominium properties is summarized in the figure below.

Figure 1 – Non-Residential and Condominium Properties Maximum Credit

	Without Surface Discharge	With Surface Discharge
IA Credit	80%	90%
GA Credit	80%	90%
NPDES Credit	7%	7%

The credit program including the types of credits, the associated technical requirements, and the maximum allowable credits were decided during the 2012 rate proceedings. No changes are proposed to this current credit program.

Q17. PLEASE EXPLAIN THE EXPECTED IMPACT OF THE STORMWATER CREDIT PROGRAM ON THE SYSTEM WIDE BILLABLE GA AND IA, AND PROVIDE AN ESTIMATE OF REVENUE IMPACT?

A. In Test Years FY 2017 and FY 2018, the total stormwater GA and IA credits projected to be issued are as follows:

	Test Year FY 17	Test Year FY 18
IA Credit (sf)	98,006,667	107,239,987
GA Credit (sf)	274,831,520	291,187,585

Table SW-5 (Exhibit BV-E3) presents the *projected* reduction in billable GA and IA square footage due to credits. The increase in stormwater credits in each succeeding year is due to the additional anticipated credits for meeting stormwater regulations and credits for the SMIP/GARP completed projects.

The revenue reduction due to the projected stormwater credits is estimated to be $15.11 Million in Test Year FY 17 and $17.26 Million in Test Year FY 18, as presented in the supplemental paper titled *Cost of Service Recovery of Fee Reductions* (Exhibit BV-S2).

Q19. WILL THE PROJECTED LEVELS OF STORMWATER CREDITS IMPACT REVENUE ADEQUACY, AND HOW IS THE REVENUE LOSS EXPECTED TO BE RECOVERED?

A. The projected stormwater credits will not affect stormwater revenue adequacy. As already explained in response to Q7, the system wide *Initial* GA and IA units of service are reduced by the magnitude of GA and IA credits square footage when determining the *Final* billable GA and IA units of service. Consequently, the system wide GA and IA unit cost of service (explained in Q8) and presented in Table SW-14 (Exhibit BV-E3), and the *Final* Cost of Service GA and IA rates presented in Table SW-19 (Exhibit BV-E3), already account for the equitable recovery of the revenue reduction due to credits from all the stormwater customers. Please also refer to the paper titled *Cost of Service Recovery of Fee Reductions* (Exhibit BV-S2) for a brief explanation on the approach used to recover fee reduction due to credits.

Q20. DOES THIS CONCLUDE YOUR SUPPLEMENTAL TESTIMONY?

A. Yes, it does.

PHILADELPHIA WATER DEPARTMENT
FINANCIAL PLAN:
REVENUE & REVENUE REQUIREMENT ASSUMPTIONS

This document summarizes the assumptions used in developing the revenue and revenue requirement projections for the Philadelphia Water Department's Financial Plan for FY 2016-FY 2021 projection period in conjunction with the FY 2017 - FY 2018 Rate Proceedings.

1. Revenue Projections

a. Projected service revenues under existing rates reflect the adopted rates for Fiscal Year 2015 (effective July 1, 2014).

b. Total system accounts are anticipated to remain stable over the projection period.

c. Projected water usage volume reflects an annual decrease of approximately 0.6% from FY 2016-2019, which is primarily due to the annual reduction in the usage per account associated with 5/8" meter General Service Customers.

- The usage per account associated with 5/8" meter General Service Customers is projected to decrease 1.5% per year based on the 6 year average (1.57% average annual decrease from FY 2010 to FY 2015).
- The projected decrease due to the projected reduction in 5/8" meter General Service Customers is slightly offset by an increase in General Service usage volume in FY 2019-FY 2021 due to an anticipated reduction in theft through implementation of Advanced Metering Infrastructure. The implementation of AMI is anticipated to provide the following additional revenue:
  - FY 2019 – $0.4 Million
  - FY 2020 – $1.25 Million
  - FY 2021 – $2.1 Million

  The projected General Service usage volumes were adjusted to reflect the additional revenues.

d. Projected impervious and gross area stormwater credits, presented as a reduction in billable square footage of gross and impervious area, reflects an average additional incremental reduction of:

- 18.3 Million square feet of gross area per year; and
- 10.4 Million square feet of impervious area per year.

This equates to projected revenue reductions for each fiscal year as shown in the inset box; the increase is due to anticipated credits resulting from development/redevelopment projects meeting stormwater regulations and completed SMIP/GARP projects within the study period.

- FY 2017 - $15.1 Million
- FY 2018 - $17.3 Million
- FY 2019 - $19.6 Million
- FY 2020 - $22.3 Million
- FY 2021 - $25.3 Million

e. The Stormwater Customer Assistance Program is projected as an additional $3.4 M (FY 2017) to $3.0 M (FY 2021) projected revenue reduction over the study period.

f. Projected revenues under existing rates reflect the anticipated cumulative receipts for the water, sanitary sewer, and stormwater services (including retail, City and wholesale receipts) each fiscal year. The receipts for each fiscal year are estimated based on the projected system billings for a fiscal year and the billings of the prior two years and the associated projected collection factors for the fiscal year ("Current Year") and each of the prior two years ("First Year Prior" and "Second Year Prior").

(i) Retail Excluding Stormwater Only: The projected collection factors are based on a review of the historical collection factors provided by the Raftelis Financial Consultants (RFC) Collection Factor reports (RFC Report 3 and RFC Report 4). Figure 1 provides the collection factors used for FY 2013 through FY 2015 and the projected collection factors for FY 2016 to FY 2021. Refer to Appendix 7 for additional detail on determining the collection factors for Retail Excluding Stormwater Only billings.

Figure 1 – Retail Excluding Stormwater Only Collection Factors

Fiscal Year	Current Year	1st Year Prior	2nd Year Prior +	Collection Ever
	%	%	%	%
Historical Collection Factors				
2011			2.00	
2012	83.36	10.39	2.00	95.75
2013	83.29	10.19	2.00	95.48
2014	84.82	9.71		94.53
2015	84.82			85.55
3 Year Average	84.31	10.10		
FY 2016 to FY 2021 Projection Basis				
Projected Collection Factors	84.30	10.00	2.00	96.30

FY 2013 through FY 2015

- Current Year Factor: This factor is applied to "Fiscal Year" Billings, and reflects the "FY" Collection Factor provided for FY 2012, FY 2013; FY 2014; and FY 2015 in RFC Report 3.
- First Year Prior Factor: This factor is applied to the billings of the first prior year. The FY 2012 and FY 2013 factors are derived as that year's "Collection Ever" factor less the sum of that year's Current Year factor and Second Prior Year

factor, respectively; the FY 2014 factor is derived as that year's "Collection Ever" factor less the "Current Year" factor.

- Second Year Prior Factor: This factor is applied to the billings of the second prior year. This factor reflects the historical receipt factor of 2% (based on the FY 2010 billings collected during FY 2012 through FY 2014 per RFC Rpt 4). This 2% rounded factor is applied to FY 2013; FY 2014; and FY 2015.

FY 2016 through FY 2021

- Current Year Factor: Derived as the three year average of FY 13 through FY 15 Current Year factors.
- First Year Prior Factor: Derived as the three year average of FY 12 through FY 14 First Year Prior factors.
- Second Year Prior Factor: Derived as the two year average of the FY 12 and FY 13 Second Year Prior factors.

(ii) Retail Stormwater Only: The projected collection factors are based on a review of the historical collection factors provided by the RFC Collection Factor reports (RFC Report 3 and RFC Report 4). Figure 2 provides the collection factors used for FY 2013 through FY 2015 and the projected collection factors for FY 2016 to FY 2021.

Figure 2 – Retail Stormwater Only Collection Factors

Fiscal Year	Current Year	1st Year Prior	2nd Year Prior +	Collection Ever
	%	%	%	%
Historical Collection Factors				
2011			2.40	
2012	55.58	12.00	2.40	69.98
2013	57.30	8.47	2.40	68.16
2014	54.54	7.27		61.81
2015	54.56			55.09
3-Year Average	55.46	9.25		
FY 2016 to FY 2021 Projection Basis				
Projected Collection Factors	54.00	8.70	2.40	65.10

The same approach as described above for the *Retail Excluding Stormwater Only* was also used to determine the collection factors for Retail Stormwater Only presented in Figure 2. However the second year prior collection factor was estimated based on the projected collections relative to the actual system revenues.

In addition, the projected collection factors were adjusted based on a review of the projected collections relative to the actual system revenues. These adjustments were made to reduce the first year and second year prior collection factors reflected in the historical data (FY 2012 and FY 2011) collection factors which were the initial years of the stormwater only charges, when the prior year collection factors were higher than current levels.

The three year collection rate reflects the sum of receipts collected during the fiscal year in which the bills are issued and in the following two consecutive fiscal years. The receipts for City billings are based on 100% of the projected billings for each fiscal year.

g. Operating Fund and Rate Stabilization Fund interest earnings are projected based on projected fund balances and 0.4% interest earnings rate.
h. Penalties are projected based on 1.45% of billings under existing rates based on the three year historical average from FY 2013 to FY 2015.
i. Miscellaneous revenues are projected based on historical and budgeted levels as presented in the table below.

Figure 3 – Miscellaneous Projected Revenues

Description	Fiscal Years	Projection
Miscellaneous City Revenue	2016 – 2021	$1.96 Million / Year
Other Miscellaneous Income	2016 – 2021	$8.0 Million / year
State and Federal Grants	2016 - 2021	$1.0 Million / year
License and Inspection Permits	2016	$3.0 Million
	2017 – 2021	$2.5 Million / year
Miscellaneous Procurement	2016 - 2021	$0.3 Million / year
Affordability Program Discounts[1]	2018 - 2021	($16.1) Million/ Year to ($18.6)Million / Year

Notes:
1. Affordability Program Discounts are estimated based on $14.3 Million / Year using FY 2015 Rates adjusted for projected overall system annual revenue increases and a general service cost of service adjustment factor of 1.01.

j. Additional service revenues reflect projected revenue increases associated with projected rate increases in fiscal years 2017 to 2021 as necessary to meet senior debt service coverage requirements and maintain the rate stabilization fund balance (see item #4 - Bond Covenants, Transfers, and Fund Balances).

2. Operating Expenses

a. Operating expenses projected for fiscal years 2015 reflect the estimated FY 2015 year end data.

b. Operating expenses are projected for fiscal year 2016 based on the following:

i. The Water Department's approved fiscal year 2016 budget;

ii. Operating expenses are then adjusted to reflect:

- The current actual to budget spending levels of approximately 92%, based on the 3-year historical average actual to budget factors from FY 2013 to FY 2015 (See Appendix 1); and
- Actual to Budget factors by cost classification for each Water Department Division and City Department (which budget costs to be funded by the Water Fund) reflect the three year historical average of the actual to budget ratio, with the following exceptions:

Figure 4 – Actual to Budget Factor Exceptions

Department	Class / Description	Actual to Budget Factor
Water Department Divisions	100	100%
Finance	200 SMIP/GARP	100%
Mayor's Office of Transportation & Utilities	200	96.0%
City Finance	Pension & Pension Obligations	100%
City Finance	500	100%
Revenue	500	100%

iii. Liquidated encumbrances for fiscal year 2016 are projected to be 12.0% of projected Services (class 200) and Materials and Supplies (class 300) expenses.

c. Operating Expenses for fiscal years 2017 through 2021 are projected based on the following:

i. The application of the annual escalation factors to the projected fiscal year 2016 operating expense categories presented in Figure 5; and

ii. The following costs were projected based on the cost increases reflected in the City's Five Year Plan (See table in Appendix 4 for additional detail):
- Public Property
- City Finance – Pension
- City Finance – Pension Obligations
- City Finance – Benefits

Figure 5 – Annual Escalation Factors

Class	Description	Annual Escalation	Basis
100	Labor Costs	FY 2017 - 3.0%: FY 2018 – 2021 - 3.0%	Based on: • Labor Agreement for FY 2017; and • Projection beyond the Labor Agreement (FY 2018 – 2021) based on the last year of the Labor Agreement.
200	Electric Costs	FY 2017 – 0.0% FY 2018 - 2021 - 5.0%	Based on the Water Department's discussions with the City's Energy Procurement Office: • FY 2017 energy costs are expected to be stable; • FY 2018 – 2021 escalation factors are based upon both PWD's long-term historical experience and industry indices for power costs (see Appendix 3).
200	Other Costs	3.5%	Based on FY 2015 Water Fund increase in Class 200 – Other Costs (see Appendix 2).
300	Chemical Costs	FY 2017 –2021 – 3.3%	Based on discussions with the Water Department: • FY 2017 – 2021 escalation factors are based on three year historical average increase in Water Fund Chemical costs (see Appendix 2).
300	Other Costs (excluding chemicals)	2.0%	Based on three year historical average increase in PPI Materials for Construction (see Appendix 3).
400	Equipment	2.25%	Based on three year historical average increase in PPI Construction Machinery & Equipment (see Appendix 3).
500 & 800	Indemnities and Transfers	3.0%	Based on long-term historical average increase in PPI PPI Materials for Construction and Construction Machinery & Equipment (see Appendix 3).

d. Projected Operating Expenses include additional adjustments as presented in Figure 6 on the following pages.
e. Liquidated encumbrances for fiscal years 2017 to 2021 are projected to be 12.0% of projected Services (class 200) and Materials and Supplies (class 300) expenses of each fiscal year.

Figure 6 – Additional Adjustments for Projected Operating Expenses

Department	Class	Fiscal Year(s)	Additional Adjustment Amount	Purpose
Finance	100	2017 to 2021	$56,000 to $64,000	Inclusion of an additional accountant position.
	200	2017 to 2021	$3.55 Million	Additional Stormwater Management Incentive Program (SMIP) and Green Area Retrofit Program (GARP) costs.
	200	2016 to 2017 2018 to 2021	$4.0 Million $1.27 Million	City Grants (contra revenue credits) based on historical experience. FY 2018 to FY 2021 projection reduced to reflect the elimination of the existing City Grant program upon the implementation of the Affordability Program.
	200	2017 2018 to 2021	$1.2 Million $0.6 to $0.7 Million	Additional Basis2 support for the implementation and annual maintenance associated with the Affordability Program.
	800	2017 2018	$1.8 Million $3.5 Million	Reimbursement to the General Fund for an upfront payment to construct a combined sewer outfall.
Human Resources & Admin	100	2017 to 2021	$0.4 Million	Additional staffing positions (Construction Projects Technician, Executive Assistant, Head of Security, and three security staff).
	200	2017 to 2021	$1.0 Million to $1.1 Million	Facilities administration costs, which had been inadvertently dropped from the FY 2016 budget and need to be replaced.
Operations	100	2019 to 2021	$0.8 Million	Additional staffing required after completion of plant expansion.
	200	2017 2018 2019	$1.3 Million $1.2 million $0.1 Million	Additional costs for one-time maintenance requirements.
	200	2017 and 2021	$0.5 Million to $0.6 Million	Additional costs for additional abatements.
	300	2017 and 2021	$0.5 Million to $0.6 Million	Costs for phosphoric acid and parts for equipment repair.

Department	Class	Fiscal Year(s)	Additional Adjustment Amount	Purpose
	400	2017 and 2021	$0.1 Million	Additional equipment costs.
	100, 200 and 300	2018	$0.4 Million	One-time costs associated with the implementation of the Advanced Metering Infrastructure (AMI).
	100 and 200	2019 to 2021	($0.2) Million to ($1.9) Million	Projected cost savings as a result of the anticipated implementation of AMI.
	300	2019 to 2021	$0.2 Million to $0.3 Million	Projected cost increases as a result of the anticipated implementation of AMI
Planning & Environmental Services	100	2017 to 2021	$0.8 Million to $1.4 Million	Additional staffing costs for the Office of Watersheds.
	200	2017 to 2021	$0.6 Million to $1.0 Million	Additional stormwater facilities maintenance.
Planning & Engineering	100	2017 to 2021	$0.5 Million to $0.6 Million	Additional staffing costs for the sewer lateral inspection program.
	200	2017 to 2021	$0.6 Million to $0.7 Million	Costs for mark-out of water & sewer infrastructure prior to excavation.
Public Affairs	100	2017 to 2021	$0.1 Million	Additional staffing costs for Creative Affairs Director.
Fleet Management	300	2018 to 2019	$14,000 to $6,000	Projected cost increases as a result of the anticipated implementation of AMI.
	300	2020 to 2021	($23,000) to ($66,000)	Projected cost decreases as a result of the anticipated implementation of AMI.

Department	Class	Fiscal Year(s)	Additional Adjustment Amount	Purpose
City Finance	100	2017 to 2021	$2.3 Million to $3.6 Million	Additional costs for pension, pension obligation, and benefits as a result of staffing additions.
Water Revenue Bureau	100	2017 to 2021	$0.9 to $1.3 Million	Additional staffing to support the Affordability Program.
	200	2017 to 2021	$0.1	Additional space requirements to support the Affordability Program.

3. Debt Service

a. Projected debt service reflects the following anticipated bond issues and assumed interest rates:

i. FY 2015 (Series 2015A Bonds) – $308.6 Million (including original issue premium) based on actual bond issue
ii. FY 2017 – $270.0 Million (5.25% interest rate)
iii. FY 2018 – $275.0 Million (5.25% interest rate)
iv. FY 2019 – $280.0 Million (5.25% interest rate)
v. FY 2020 – $270.0 Million (5.25% interest rate)
vi. FY 2021 – $285.0 Million (5.50% interest rate)

b. Proposed debt service for the proposed bond issues in fiscal years 2017 to 2021 reflects bond issuance in the second half of the fiscal year.
c. Projected debt service for the proposed bond issue in fiscal year 2017 reflects interest only payments through fiscal year 2018.
d. Projected debt service reflects savings from the issuance of Series 2015B Bonds.
e. Projected debt service reflects current Pennvest amortization schedules.
f. The existing and proposed debt service payments over the projection period are presented in Appendix 5.

4. Bond Covenants, Transfers, and Fund Balances

a. Senior Debt Coverage Growth:

- FY 2015: 1.23;
- FY 2016: 1.24;
- FY 2017: 1.25;
- FY 2018: 1.26;
- FY 2019: 1.35;
- FY 2020: 1.35; and
- FY 2021: 1.35

b. Capital Account Deposit.
   - Projected FY 2015 Capital Account Deposit based on 1% of FY 2014 net plant investment (original cost less depreciation), as required.
   - Projected FY 2016 to FY 2021 Capital Account Deposit inflated 2.5% per year based on the average annual increase in net plant investment (excluding construction work in progress) during FY 2013 and FY 2014.
c. Residual Transfer to Construction.

- Projected transfers to maintain the annual cash funded capital of 20% to 25% of the projected annual CIP spend level.

d. Rate Stabilization Fund Transfers.
   - Level overall system revenue increases in fiscal years 2017 and 2018.
   - Maintain the Rate Stabilization Fund balance of $120 to $125 million to provide sufficient funds for extraordinary expenses not captured in the revenue requirements.

e. Beginning Fund Balances. The FY 2015 beginning fund balances based on the FY 2014 Financial Statements.

5. Capital Program

Total capital program for the projection period is estimated as shown in the table below. The projected capital program is based on the proposed FY 2017 to FY 2022 capital program. The FY 2018 to FY 2021 capital program costs are inflated at 4% on an annual basis in accordance with the Water Department's CIP projections.

The projected capital program total annual expenditures for the projection period were provided by the Water Department. The projected total annual expenditures reflect the anticipated capital program expenditures for the projection period. The projected capital expenditures are allocated to the water and wastewater utilities based on the distribution of the projected capital budget.

The projected capital budget and annual expenditures are presented in Figure 7.

Figure 7 –Projected Capital Program Budget and Annual Expenditures

Fiscal Year	2017	2018	2019	2020	2021
CIP Budget					
Water CIP	$114 M	$139 M	$145 M	$150 M	$133 M
Wastewater CIP	$186 M	$194 M	$201 M	$209 M	$235 M
Total CIP Budget	**$300 M**	**$333 M**	**$346 M**	**$359 M**	**$368 M**
CIP Expenditures					
Water CIP	$107 M	$125 M	$125 M	$125 M	$108 M
Wastewater CIP	$175 M	$178 M	$175 M	$175 M	$192 M
Total CIP Expenditures	**$282 M**	**$300 M**	**$300 M**	**$300 M**	**$300 M**

APPENDICES

Appendix 1 – Actual to Budget Factors
Appendix 2 – Water Fund Historical O&M Costs
Appendix 3 – Industry Indices Data
Appendix 4 – O&M Escalation Factors
Appendix 5 – Existing and Projected Debt Service
Appendix 6 – COS Fee Reduction Details
Appendix 7 – Retail Excluding Stormwater Only Collection Factor Calculations

APPENDIX 1

Actual to Budget Factors

Appendix 1
Actual to Budget Factors

		Factor	Historical Average	Actual to Budget Factor			Actual O&M Expense			Budgeted O&M Expense		
		Used	3 Year	2015	2014	2013	2015	2014	2013	2015	2014	2013
Human Resources and Administration												
Salaries & Wages	100	100.00%	95.07%	98.04%	97.33%	89.45%	$ 8,502,816	$ 7,650,763	$ 6,911,366	$ 8,673,039	$ 7,860,450	$ 7,726,550
Services	200	75.98%	75.98%	78.04%	79.36%	67.30%	$ 4,562,319	$ 3,277,947	$ 2,019,108	$ 5,846,000	$ 4,130,600	$ 2,999,990
Materials and Supplies	300	69.40%	69.40%	59.66%	82.01%	72.05%	$ 725,233	$ 632,835	$ 575,822	$ 1,215,550	$ 771,700	$ 799,164
Equipment	400	108.90%	108.90%	98.33%	171.52%	94.67%	$ 413,078	$ 140,816	$ 46,389	$ 420,100	$ 82,100	$ 49,000
Contributions	500	0.00%	0.00%	0.00%	0.00%	0.00%	$ -	$ -	$ -	$ 100,000	$ 100,000	$ 100,000
Transfers	800	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Human Resources and Administration			86.75%	87.38%	90.40%	81.82%	$ 14,203,446	$ 11,702,361	$ 9,552,685	$ 16,254,689	$ 12,944,850	$ 11,674,704
Finance												
Salaries & Wages	100	100.00%	82.47%	87.78%	84.77%	73.40%	$ 2,170,853	$ 1,849,144	$ 1,472,571	$ 2,472,925	$ 2,181,400	$ 2,006,100
Services	200	51.62%	51.62%	65.70%	58.28%	40.51%	$ 4,811,153	$ 4,366,100	$ 5,577,954	$ 7,322,500	$ 7,491,000	$ 13,768,110
SMIP/GARP	2xx	100.00%	104.46%	113.15%	96.54%	95.18%	$ 11,598,134	$ 5,020,143	$ 4,925,776	$ 10,250,000	$ 5,200,000	$ 5,175,000
Materials and Supplies	300	25.78%	25.78%	5.28%	15.26%	47.53%	$ 23,023	$ 124,596	$ 383,299	$ 436,200	$ 816,400	$ 806,436
Equipment	400	64.79%	64.79%	0.00%	92.95%	40.08%	$ -	$ 521,252	$ 244,778	$ 10,800	$ 560,800	$ 610,800
Contributions	500	100.00%					$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	62.12%	62.12%	44.60%	58.25%	85.62%	$ 6,244,621	$ 7,714,419	$ 10,792,914	$ 14,000,000	$ 13,243,100	$ 12,605,000
Subtotal Finance			68.56%	72.04%	66.44%	66.90%	$ 24,847,784	$ 19,595,654	$ 23,397,293	$ 34,492,425	$ 29,492,700	$ 34,971,446
Planning and Engineering												
Salaries & Wages	100	100.00%	88.82%	97.38%	82.27%	86.98%	$ 1,199,514	$ 1,043,846	$ 1,057,108	$ 1,231,738	$ 1,268,860	$ 1,215,300
Services	200	39.95%	39.95%	60.29%	31.24%	32.20%	$ 297,188	$ 155,719	$ 235,838	$ 492,900	$ 498,500	$ 732,500
Materials and Supplies	300	76.27%	76.27%	51.55%	59.36%	129.57%	$ 102,067	$ 105,252	$ 191,888	$ 198,000	$ 177,300	$ 148,100
Equipment	400	18.54%	18.54%	24.77%	12.48%	27.20%	$ 14,614	$ 27,449	$ 30,333	$ 59,000	$ 220,000	$ 111,500
Contributions	500	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Planning and Engineering			70.21%	81.42%	61.55%	68.64%	$ 1,613,383	$ 1,332,266	$ 1,515,167	$ 1,981,638	$ 2,164,660	$ 2,207,400

Note: Spend factors using a 3-year average are shown in yellow and those not using a 3-year average are shown in blue.

Appendix 1
Actual to Budget Factors (Continued)

		Factor Used	Historical Average 3 Year	Actual to Budget Factor 2015	2014	2013	Actual O&M Expense 2015	2014	2013	Budgeted O&M Expense 2015	2014	2013
Operations												
Salaries & Wages	100	100.00%	95.21%	100.61%	94.76%	90.17%	$ 71,789,745	$ 65,710,338	$ 63,390,240	$ 71,357,193	$ 69,343,900	$ 70,297,400
Services	200	88.35%	88.35%	87.21%	84.94%	93.44%	$ 55,277,653	$ 55,165,835	$ 53,779,374	$ 63,381,100	$ 64,948,600	$ 57,556,100
Power	220	80.71%	80.71%	79.44%	79.42%	83.02%	$ 20,427,534	$ 21,440,579	$ 24,375,674	$ 25,714,000	$ 26,994,900	$ 29,362,900
Materials and Supplies	300	87.49%	87.49%	82.35%	84.83%	95.48%	$ 14,703,881	$ 14,625,464	$ 16,475,057	$ 17,855,400	$ 17,240,200	$ 17,255,800
Chemicals	307	98.20%	98.20%	94.32%	104.31%	96.03%	$ 22,324,969	$ 24,446,114	$ 22,602,203	$ 23,668,950	$ 23,435,500	$ 23,537,400
Equipment	400	66.58%	66.58%	77.30%	59.18%	65.12%	$ 1,219,613	$ 1,172,215	$ 994,870	$ 1,577,800	$ 1,980,700	$ 1,527,800
Contributions	500	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Operations			90.59%	91.25%	89.52%	91.02%	$ 185,743,395	$ 182,560,545	$ 181,617,418	$ 203,554,443	$ 203,943,800	$ 199,537,400
Planning & Environmental Services												
Salaries & Wages	100	100.00%	99.12%	96.55%	101.25%	99.99%	$ 12,135,854	$ 11,080,774	$ 10,315,992	$ 12,569,537	$ 10,944,400	$ 10,316,700
Services	200	95.08%	95.08%	100.06%	90.22%	94.19%	$ 22,388,075	$ 17,411,374	$ 18,442,417	$ 22,374,200	$ 19,299,800	$ 19,579,700
Materials and Supplies	300	73.84%	73.84%	73.34%	86.13%	63.69%	$ 989,788	$ 1,015,983	$ 867,520	$ 1,349,600	$ 1,179,600	$ 1,362,100
Equipment	400	50.63%	50.63%	32.20%	62.82%	50.59%	$ 187,954	$ 556,793	$ 470,735	$ 583,650	$ 886,400	$ 930,500
Contributions	500	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Planning & Environmental Services			94.56%	96.81%	93.05%	93.50%	$ 35,701,671	$ 30,064,924	$ 30,096,664	$ 36,876,987	$ 32,310,200	$ 32,189,000
Public Affairs												
Salaries & Wages	100	100.00%	93.76%	95.96%	93.21%	91.69%	$ 2,644,067	$ 2,260,265	$ 2,110,697	$ 2,755,277	$ 2,424,900	$ 2,301,900
Services	200	90.51%	90.51%	91.83%	93.27%	86.21%	$ 8,001,034	$ 7,244,654	$ 6,591,039	$ 8,712,700	$ 7,767,700	$ 7,645,200
Materials and Supplies	300	51.09%	51.09%	41.94%	45.19%	68.57%	$ 156,358	$ 168,011	$ 219,959	$ 372,800	$ 371,800	$ 320,800
Equipment	400	70.16%	70.16%	88.75%	7.32%	114.41%	$ 13,757	$ 1,134	$ 17,734	$ 15,500	$ 15,500	$ 15,500
Contributions	500	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Public Affairs			89.94%	91.22%	91.44%	86.93%	$ 10,815,216	$ 9,674,064	$ 8,939,429	$ 11,856,277	$ 10,579,900	$ 10,283,400

Note: Spend factors using a 3-year average are shown in yellow and those not using a 3-year average are shown in blue.

Appendix 1
Actual to Budget Factors (Continued)

		Factor Used	Historical Average 3 Year	Actual to Budget Factor 2015	2014	2013	Actual O&M Expense 2015	2014	2013	Budgeted O&M Expense 2015	2014	2013
Division of Technology												
Salaries & Wages	100	81.64%	81.64%	89.96%	82.50%	72.12%	$ 5,233,042	$ 4,621,214	$ 4,039,582	$ 5,816,911	$ 5,601,271	$ 5,601,271
Services	200	89.53%	89.53%	88.54%	88.47%	91.82%	$ 10,226,939	$ 9,567,462	$ 9,214,801	$ 11,551,218	$ 10,814,511	$ 10,035,811
Materials and Supplies	300	76.76%	76.76%	88.52%	78.33%	59.32%	$ 1,609,074	$ 944,117	$ 791,307	$ 1,817,650	$ 1,205,350	$ 1,334,050
Equipment	400	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Contributions	500	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Division of Technology			86.00%	88.97%	85.88%	82.76%	$ 17,069,055	$ 15,132,793	$ 14,045,690	$ 19,185,779	$ 17,621,132	$ 16,971,132
Mayor's Office of Transportation & Utilities												
Salaries & Wages	100	96.99%	96.99%	98.74%	92.89%	100.00%	$ 227,983	$ 208,176	$ 169,948	$ 230,886	$ 224,100	$ 169,948
Services	200	96.00%	0.00%		0.00%	0.00%	$ -	$ -	$ -	$ -	$ 86,400	$ 66,400
Materials and Supplies	300	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Equipment	400	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Contributions	500	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Mayor's Office of Transportation & Utilities			77.93%	98.74%	67.05%	71.91%	$ 227,983	$ 208,176	$ 169,948	$ 230,886	$ 310,500	$ 236,348
Police												
Salaries & Wages	100	100.00%					$ -	$ -	$ -	$ -	$ -	$ -
Services	200	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Materials and Supplies	300	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Equipment	400	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Contributions	500	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Police							$ -	$ -	$ -	$ -	$ -	$ -

Note: Spend factors using a 3-year average are shown in yellow and those not using a 3-year average are shown in blue.

Appendix 1
Actual to Budget Factors (Continued)

		Factor Used	Historical Average 3 Year	Actual to Budget Factor 2015	2014	2013	Actual O&M Expense 2015	2014	2013	Budgeted O&M Expense 2015	2014	2013
Public Property												
Salaries & Wages	100	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Services	200	100.00%	100.00%	100.00%	100.00%	100.00%	$ 3,959,919	$ 3,786,428	$ 3,739,360	$ 3,959,919	$ 3,786,428	$ 3,739,360
Materials and Supplies	300	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Equipment	400	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Contributions	500	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Public Property			100.00%	100.00%	100.00%	100.00%	$ 3,959,919	$ 3,786,428	$ 3,739,360	$ 3,959,919	$ 3,786,428	$ 3,739,360
Fleet Management												
Salaries & Wages	100	90.75%	90.75%	87.65%	91.82%	93.02%	$ 2,602,612	$ 2,521,284	$ 2,554,406	$ 2,969,317	$ 2,745,986	$ 2,745,986
Services	200	85.56%	85.56%	99.95%	96.63%	60.10%	$ 1,488,271	$ 1,438,785	$ 894,932	$ 1,489,000	$ 1,489,000	$ 1,489,000
Materials and Supplies	300	95.35%	95.35%	99.01%	98.86%	88.18%	$ 4,232,497	$ 4,225,827	$ 3,769,562	$ 4,274,640	$ 4,274,640	$ 4,274,640
Equipment	400	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Contributions	500	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Fleet Management			92.14%				$ 8,323,380	$ 8,185,896	$ 7,218,900	$ 8,732,957	$ 8,509,626	$ 8,509,626
City Finance												
Salaries & Wages	100	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Benefits	1xx	92.93%	92.93%	90.91%	94.73%	93.60%	$ 48,293,131	$ 41,044,344	$ 40,369,391	$ 53,120,209	$ 43,330,000	$ 43,130,000
Pension	191	100.00%	83.44%	97.29%	78.49%	76.13%	$ 40,861,335	$ 38,305,052	$ 35,507,147	$ 42,000,000	$ 48,800,000	$ 46,638,000
Pension Obligations	190	100.00%	172.27%	97.57%	215.87%	216.88%	$ 11,415,451	$ 22,450,403	$ 20,452,252	$ 11,700,000	$ 10,400,000	$ 9,430,000
Services	200	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Materials and Supplies	300	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Equipment	400	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Contributions	500	100.00%	76.75%	59.09%	92.86%	78.31%	$ 3,840,767	$ 6,036,098	$ 5,090,210	$ 6,500,000	$ 6,500,000	$ 6,500,000
Transfers	800	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Subtotal City Finance			95.62%	92.14%	98.90%	95.95%	$ 104,410,684	$ 107,835,896	$ 101,418,999	$ 113,320,209	$ 109,030,000	$ 105,698,000

Note: Spend factors using a 3-year average are shown in yellow and those not using a 3-year average are shown in blue.

Appendix 1
Actual to Budget Factors (Continued)

		Factor	Historical Average	Actual to Budget Factor			Actual O&M Expense			Budgeted O&M Expense		
		Used	3 Year	2015	2014	2013	2015	2014	2013	2015	2014	2013
Revenue												
Salaries & Wages	100	88.85%	88.85%	87.81%	86.71%	92.14%	$ 10,013,594	$ 9,701,251	$ 10,020,393	$ 11,404,254	$ 11,188,570	$ 10,874,716
Services	200	100.22%	100.22%	99.92%	100.80%	99.93%	$ 4,241,117	$ 4,133,603	$ 4,020,068	$ 4,244,480	$ 4,100,780	$ 4,022,815
Materials and Supplies	300	84.04%	84.04%	98.42%	87.32%	69.45%	$ 630,784	$ 688,157	$ 561,421	$ 640,920	$ 788,120	$ 808,425
Equipment	400	95.00%					$ -	$ -	$ -	$ -	$ -	$ -
Contributions	500	100.00%	24.05%	25.46%	32.07%	11.33%	$ 1,273	$ 481	$ 170	$ 5,000	$ 1,500	$ 1,500
Transfers	800	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Revenue			91.54%	91.36%	90.33%	92.96%	$ 14,886,768	$ 14,523,492	$ 14,602,052	$ 16,294,654	$ 16,078,970	$ 15,707,456
Procurement												
Salaries & Wages	100	89.35%	89.35%	78.66%	90.90%	99.79%	$ 60,866	$ 62,746	$ 68,882	$ 77,383	$ 69,028	$ 69,028
Services	200	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Materials and Supplies	300	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Equipment	400	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Contributions	500	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Procurement			89.35%	78.66%	90.90%	99.79%	$ 60,866	$ 62,746	$ 68,882	$ 77,383	$ 69,028	$ 69,028
Law												
Salaries & Wages	100	90.42%	90.42%	85.29%	90.15%	96.11%	$ 2,137,491	$ 2,192,613	$ 2,281,362	$ 2,506,206	$ 2,432,087	$ 2,373,754
Services	200	73.46%	73.46%	44.77%	96.99%	78.62%	$ 309,631	$ 670,808	$ 543,724	$ 691,614	$ 691,614	$ 691,614
Materials and Supplies	300	47.32%	47.32%	18.60%	38.74%	84.61%	$ 8,002	$ 16,663	$ 36,392	$ 43,010	$ 43,010	$ 43,010
Equipment	400	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Contributions	500	100.00%					$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	0.00%					$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Law			86.14%	75.76%	90.95%	92.06%	$ 2,455,124	$ 2,880,084	$ 2,861,478	$ 3,240,830	$ 3,166,711	$ 3,108,378

Note: Spend factors using a 3-year average are shown in yellow and those not using a 3-year average are shown in blue.

APPENDIX 2

Water Fund Historical O&M Costs

Appendix 2
Water Fund Historical O&M Costs

Description	Account	Sub-Account	Escalation Reference	Historical 2010	2011	2012	2013	2014	2015
PWD Operating and Maintenance Expenses Summary									
	100	Salaries & Wages		$ 101,721,666	$ 101,283,104	$ 100,874,990	$ 104,392,548	$ 108,902,414	$ 118,718,437
	1xx	Benefits		$ 39,974,376	$ 42,279,349	$ 38,395,202	$ 40,369,391	$ 41,044,344	$ 48,293,131
	191	Pension		$ 20,744,208	$ 32,719,112	$ 38,770,167	$ 35,507,147	$ 38,305,052	$ 40,861,335
	190	Pension Obligations		$ 6,749,386	$ 9,449,462	$ 9,843,048	$ 20,452,252	$ 22,450,403	$ 11,415,451
	200	Services		$ 86,087,913	$ 89,667,061	$ 99,145,698	$ 105,058,615	$ 107,218,715	$ 115,563,299
	220	Power		$ 20,191,277	$ 27,311,199	$ 24,841,360	$ 24,375,674	$ 21,440,579	$ 20,427,534
	2xx	SMIP/GARP		$ -	$ -	$ 5,025,000	$ 4,925,776	$ 5,020,143	$ 13,598,134
	300	Materials and Supplies		$ 20,467,579	$ 21,273,199	$ 23,282,558	$ 23,872,227	$ 22,546,905	$ 23,180,707
	307	Chemicals		$ 21,927,884	$ 19,400,817	$ 20,239,205	$ 22,602,203	$ 24,446,114	$ 22,324,969
	400	Equipment		$ 1,618,634	$ 1,564,000	$ 2,082,059	$ 1,804,839	$ 2,419,659	$ 1,849,016
	500	Contributions		$ 4,897,054	$ 5,383,840	$ 3,047,230	$ 5,090,380	$ 6,036,579	$ 3,842,040
	800	Transfers		$ 9,498,869	$ 7,754,262	$ 9,074,729	$ 10,792,914	$ 7,714,419	$ 6,244,621
Total PWD Operating and Maintenance Expenses Summary				**$ 333,878,846**	**$ 358,085,405**	**$ 374,621,246**	**$ 399,243,964**	**$ 407,545,325**	**$ 426,318,674**
PWD Operating and Maintenance Expenses Summary - Annual Increase									
	100	Salaries & Wages			-0.43%	-0.40%	3.49%	4.32%	9.01%
	1xx	Benefits			5.77%	-9.19%	5.14%	1.67%	17.66%
	191	Pension			57.73%	18.49%	-8.42%	7.88%	6.67%
	190	Pension Obligations			40.00%	4.17%	107.78%	9.77%	-49.15%
	200	Services			4.16%	10.57%	5.96%	2.06%	7.78%
	220	Power			35.26%	-9.04%	-1.87%	-12.04%	-4.72%
	2xx	SMIP/GARP					-1.97%	1.92%	170.87%
	300	Materials and Supplies			3.94%	9.45%	2.53%	-5.55%	2.81%
	307	Chemicals			-11.52%	4.32%	11.68%	8.16%	-8.68%
	400	Equipment			-3.38%	33.12%	-13.31%	34.07%	-23.58%
	500	Contributions			9.94%	-43.40%	67.05%	18.59%	-36.35%
	800	Transfers			-18.37%	17.03%	18.93%	-28.52%	-19.05%
Total PWD Operating and Maintenance Expenses Summary - Annual Increase					7.25%	4.62%	6.57%	2.08%	4.61%
PWD Operating and Maintenance Expenses Summary - 3 Year Average Increase									
	100	Salaries & Wages					0.87%	2.45%	5.58%
	1xx	Benefits					0.33%	-0.98%	7.95%
	191	Pension					19.62%	5.39%	1.77%
	190	Pension Obligations					44.71%	33.44%	5.06%
	200	Services					6.86%	6.14%	5.24%
	220	Power					6.48%	-7.75%	-6.31%
	2xx	SMIP/GARP							39.35%
	300	Materials and Supplies					5.26%	1.96%	-0.15%
	307	Chemicals					1.01%	8.01%	3.32%
	400	Equipment					3.70%	15.66%	-3.88%
	500	Contributions					1.30%	3.89%	8.03%
	800	Transfers					4.35%	-0.17%	-11.71%
Total PWD Operating and Maintenance Expenses Summary - 3 Year Average Increase							**6.14%**	**4.41%**	**4.40%**

APPENDIX 3

Industry Indices Data

Appendix 3
Industry Indices Data

Fiscal Year	Price Indices									
	Consumer Price Index All Urban Consumers Philadelphia Area		Producer Price Index Materials for Construction		Producer Price Index Construction Machinery & Equipment		Producer Price Index Industrial Chemicals		Consumer Price Index Electricity Philadelphia Area	
	Raw Number	% Change	Raw Number	% Change	Raw Number	% Change	Raw Number	% Change	Raw Number	% Change
2004	192.4	-	158.7	-	154.8	-	146.8	-	153.2	-
2005	200.9	4.42%	172.5	8.70%	163.6	5.68%	176.7	20.37%	154.3	0.72%
2006	208.9	3.98%	182.4	5.74%	172.4	5.38%	202.9	14.83%	163.7	6.09%
2007	214.2	2.54%	191.0	4.71%	177.5	2.96%	216.6	6.75%	183.7	12.22%
2008	221.6	3.45%	196.5	2.88%	181.7	2.37%	252.1	16.39%	192.1	4.57%
2009	222.9	0.59%	207.6	5.65%	189.5	4.29%	251.8	-0.12%	199.5	3.85%
2010	226.3	1.53%	203.5	-1.97%	190.8	0.69%	256.7	1.95%	202.2	1.35%
2011	230.6	1.90%	208.7	2.56%	193.7	1.52%	296.2	15.39%	203.1	0.45%
2012	236.2	2.43%	216.1	3.55%	201.7	4.13%	321.4	8.51%	205.4	1.13%
2013	240.0	1.61%	220.8	2.17%	208.5	3.37%	302.0	-6.04%	197.2	-3.99%
2014	242.7	1.13%	224.7	1.77%	212.6	1.97%	294.5	-2.48%	196.4	-0.41%
2015	244.2	0.62%	228.7	1.78%	215.7	1.46%	263.5	-10.53%	193.0	-1.73%
3-Year Avg.										
2013		1.98%		2.76%		3.00%		5.57%		-0.83%
2014		1.72%		2.49%		3.15%		-0.19%		-1.11%
2015		1.12%		1.91%		2.26%		-6.41%		-2.05%
10-Year Avg.										
2014		2.35%		3.54%		3.22%		7.21%		2.52%
2015		1.97%		2.86%		2.80%		4.08%		2.26%

Notes: All consumer and producer price indexes are from the Bureau of Labor Statistics. References are provdied below.
Indexes are presented as the fiscal year average based upon the associated Water Department's fiscal year.
Indexes are not seasonally adjusted.

Index	Series Id (s)	Area	Items	Base Period
CPI - All Urban Consumers - Philadelphia Area	CUURA102SA0, CUUSA102SA0	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD	All Items	1982-84=100
CPI - Electricity - Philadelphia Area	CUURA102SEHF01, CUUSA102SEHF01	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD	Electricity	1982-84=100

Index	Series Id	Group	Items	Base Date
PPI - Materials for Construction	WPUSOP2200	Stage of processing	Materials and components for construction	198200
PPI - Construction Machinery & Equipment	WPU112	Machinery and equipment	Construction machinery and equipment	198200
PPI - Industrial Chemicals	WPU061	Chemicals and allied products	Industrial chemicals	198200

APPENDIX 4

O&M Escalation Factors

Appendix 4
O&M Costs Escalation Factors

Description		2016	2017	2018	2019	2020	2021
Mayor's Budget Escalation Factors							
200	Public Property	3.00%	-0.93%	4.76%	1.91%	1.92%	2.00%
191	City Finance-Pension	0.00%	2.42%	1.66%	1.84%	1.43%	3.00%
190	City Finance-Pension Obligations	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1xx	City Finance-Benefits	4.62%	4.45%	4.59%	6.94%	4.03%	5.00%

Source: Mayor's Budget

APPENDIX 5

Existing & Proposed Debt Service

APPENDIX 5
Existing & Proposed Debt Service (in $000s)

Line No.	Description	Fiscal Year Ending June 30, 2015	2016	2017	2018	2019	2020	2021
	Revenue Bonds							
1	Existing (a)	192,927	198,602	181,580	182,769	133,274	122,358	122,545
	Proposed							
2	Fiscal Year 2015 (b)	0	9,769	13,791	13,791	13,791	13,791	13,791
3	Fiscal Year 2016		0	0	0	0	0	0
4	Fiscal Year 2017 (c)			0	14,175	18,332	18,332	18,332
5	Fiscal Year 2018 (d)				0	18,402	18,402	18,402
6	Fiscal Year 2019 (d)					0	18,737	18,737
7	Fiscal Year 2020 (d)						0	18,068
8	Fiscal Year 2021 (e)							0
9	**Total Proposed**	**0**	**9,769**	**13,791**	**27,966**	**50,525**	**69,262**	**87,329**
10	**Total Revenue Bonds**	**192,927**	**208,370**	**195,371**	**210,735**	**183,799**	**191,619**	**209,874**
	Pennvest Loans							
11	Pennvest Parity Loans	12,343	12,343	12,343	12,927	13,120	13,074	13,074
12	**Total Debt Service**	**205,270**	**220,713**	**207,715**	**223,661**	**196,920**	**204,693**	**222,948**

(a) Assumes the average interest rates of 3.0 % for the Variable Rate Series 1997B Bonds and 4.53% for the Variable Rate Series 2005B Bonds

(b) Reflects actual Series 2015A Bonds debt service

(c) Assumes interest only payments through FY 2018 based on 5.25% interest. Assumed to be issued during the second half of the fiscal year.

(d) Assumes 5.25% interest rate. Assumed to be issued during the second half of the fiscal year.

(e) Assumes 5.50% interest rate. Assumed to be issued during the second half of the fiscal year.

Source: Water Fund's debt amortization schedule.

APPENDIX 6

COS Fee Reductions-Contra Revenue

APPENDIX 6
COS Fee Reductions-Contra Revenue (in $000s)

Description	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Senior Citizen Discount	$3,733	$3,899	$4,045	$4,202	$4,405
PHA Discount	$730	$774	$810	$847	$895
Charity/Hospital/Education Discount	$12,557	$13,285	$13,877	$14,510	$15,300
Stormwater CAP	$3,417	$3,317	$3,217	$3,117	$3,017
Stormwater Credits	$15,110	$17,262	$19,645	$22,265	$25,227
SMIP/GARP	$15,000	$15,000	$15,000	$15,000	$15,000
WRAP (City Grants)[1]	$2,730	-	-	-	-
USEF Grants	$1,270	$1,270	$1,270	$1,270	$1,270
Total	$54,547	$54,807	$57,864	$61,212	$65,114

Notes: 1) WRAP (City Grants) are anticipated to be discontinued with implementation of the new customer affordability program in FY 2018.

APPENDIX 7

Retail Excluding Stormwater Only Collection Factor Calculations

Appendix 7
Retail Excluding Stormwater Only Collection Factor Calculations

Line. No.	*All Billings* [1]				
	Retail*	2012	2013	2014	2015
1	Retail Billings	$ 510,374,617.05	$ 527,193,082.06	$ 562,495,690.38	$ 591,431,023.14
2	Retail Billings Collected (Ever)	$ 485,996,726.56	$ 499,168,368.70	$ 525,731,651.99	$ 500,336,761.22
3	Retail Collections Factor (Ever)	95.22%	94.68%	93.46%	84.60%
4	Retail Billings Collected (FY)	$ 422,528,534.46	$ 435,093,101.28	$ 471,559,931.09	$ 496,042,409.32
5	Retail Collections Factor (FY)	82.79%	82.53%	83.83%	83.87%
	Stormwater Only [2]				
	Retail*	2012	2013	2014	2015
6	Retail StmWtr Only Billings	$ 10,475,743.45	$ 15,401,364.26	$ 18,369,992.05	$ 18,570,350.42
7	Retail StmWtr Only Billings Collected (Ever)	$ 7,331,080.94	$ 10,497,838.04	$ 11,354,273.16	$ 10,230,146.45
8	Retail StmWtr Only Collections Factor (Ever)	69.98%	68.16%	61.81%	55.09%
9	Retail StmWtr Only Billings Collected (FY)	$ 5,822,206.18	$ 8,824,369.69	$ 10,018,326.67	$ 10,131,180.28
10	Retail StmWtr Only Collections Factor (FY)	55.58%	57.30%	54.54%	54.56%
	All Billings Excluding SW Only [3]				
	Retail*	2012	2013	2014	2015
11	Retail Excluding SW Only Billings	$ 499,898,873.60	$ 511,791,717.80	$ 544,125,698.33	$ 572,860,672.72
12	Retail Excluding SW Only Billings Collected (Ever)	$ 478,665,645.62	$ 488,670,530.66	$ 514,377,378.83	$ 490,106,614.77
13	Retail Excluding SW Only Collections Factor (Ever)	95.75%	95.48%	94.53%	85.55%
14	Retail Excluding SW Only Billings Collected (FY)	$ 416,706,328.28	$ 426,268,731.59	$ 461,541,604.42	$ 485,911,229.04
15	Retail Excluding SW Only Collections Factor (FY)	83.36%	83.29%	84.82%	84.82%

Notes:
1. All Retail Billings including Stormwater (SW) Only - Source: RFC Report 3. This compromises all retail billings including storwmater only billings.
2. Stormwater (SW) Only Retail billings - Source: RFC Report 3. This comprises all retail billings for SW Only accounts.
3. The Retail Billings Excluding Stormwater (SW) Only is calculated as All Retail Billings less Retail Stormwater Only Billings.
   (e.g. All Retail Billings Excluding SW Only in Line No. 11 = All Retail Billings in Line No. 1 less Retail StmWtr Only Billings in Line No. 6.)

Cost of Service Recovery of Fee Reductions

Discounts, Credits, Incentives and City Grants

This paper provides an estimate of the magnitude of fee reductions due to billing discounts, stormwater credits, incentives, and Water Revenue Assistance Program (WRAP) City Grants. In addition, it provides a summary of the cost recovery approach used for each program in the current Financial Plan and Cost of Service Study. Figure 1 provides an estimate of the billing reductions due to discounts and credits, and the cost impact of the SMIP/GARP and WRAP programs, for FY 2014 through FY 2018. Figure 2 provides an overview of the approach used to recover the billing reductions due to discounts, credits and CAP, and recover the costs of SMIP/GARP and the WRAP program.

Figure 1: Summary of the Magnitude of Billing Reductions (FY 2014 through FY 2018)

SUMMARY ESTIMATE OF BILLING REDUCTIONS (in thousands of dollars)

Line No.	Description	Total (FY 14)	Total (FY 15)	Total (FY 16)	Total (FY 17)	Total (FY 18)
Billing Discount, WRAP Assistance, & Credit Program						
1	Senior Citizen Discount	$ 3,283	$ 3,594	$ 3,555	$ 3,733	$ 3,899
2	PHA Discount	$ 628	$ 700	$ 681	$ 730	$ 774
3	Charity/Hospital/Education Discount	$ 11,058	$ 11,464	$ 11,869	$ 12,557	$ 13,285
4	Stormwater Customer Assistance Program (CAP) (a)	$ 4,615	$ 4,164	$ 3,517	$ 3,417	$ 3,317
5	Stormwater Credits (b)	$ 10,370	$ 12,131	$ 13,794	$ 15,110	$ 17,262
6	Stormwater SMIP and GARP (c)	$ 5,000	$ 13,598	$ 11,450	$ 15,000	$ 15,000
7	Water Revenue Assistance Program (WRAP) City Grants (d)	$ 3,655	$ 3,930	$ 4,000	$ 4,000	$ 1,270
8	**Total: Billing Discount, Assistance, and Credit Programs**	**$ 38,609**	**$ 49,580**	**$ 48,867**	**$ 54,547**	**$ 54,807**

Notes:
FY 2017 Billing reduction estimates reflect new affordability program rates.
(a) FY 14 and FY 15 figures are based upon PWD provided actuals. FY 16 , FY 17 and FY 18 are projections.

(b) Includes all credits including credits given to complete SMIP/GARP projects. FY 14, FY 15 and FY 16 figures are based upon calculated billings based on existing rates. FY 17 and FY 18 is

projected based on FY 2017 and FY 2018 proposed rates.

(c) This is from PWD's O&M Budget. FY 14 and FY 15 figures are based upon PWD provided actuals. FY 16 is budgeted. FY 17 and FY 18 is a projection.

(d) FY 14 and FY 15 figures are based upon PWD provided actuals. FY 16, FY 17 and FY 18 are projections.

Source of Data:

1, 2, and 3: (FY14) Number of accounts and volume from RFC Rpt1abc; Magnitude of billing reduction calculated in the BV Model.

4: CAP dollar actuals (FY14, FY15 & FY16): Provided by PWD

5. Stormwater Credits Square Feet: (FY 14 & FY 15): Provided by PWD; (FY16, FY1 & FY 18) based upon BV Units of Service Analysis; Magnitude of credits dollar amount calculated in the BV Model. (FY16 , FY17 & FY 18)

6. Stormwater SMIP and GARP: Provided by PWD.

7. Water Revenue Assistance Program (WRAP): FY 2014 provided by PWD.

Figure 2: Summary of the Approach to Cost Recovery of the Billing Reductions

Line No.	Program Name	Approach to Recovery of Billing Reduction
Billing Discounts		
1	Senior Citizen	Recovered from all Residential & Non-Residential customer types *Rationale: 1) History of previous rate proceedings with this recovery approach; 2) Recovery approach is in accordance with EPA guidance on proportional cost recovery of revenue loss due to low income discount programs; and 3) Entire utility benefits from improved collection rates that are likely to result from low income assistance*
2	Philadelphia Housing Authority (PHA)	Recovered from all Residential & Non-Residential customer types *Rationale: 1) History of previous rate proceedings with this recovery approach; and 2) Administrative complexity of upgrading the existing billing system to accommodate any changes.*
3	Charities & Schools; Hospitals & University	Recovered from all Residential & Non-Residential customer types *Rationale: 1) History of previous rate proceedings with this recovery approach; and 2) Administrative complexity of upgrading the existing billing system to accommodate any changes.*

4	Stormwater Customer Assistance Program (CAP)	Recover only from Stormwater Non-Residential Class *Rationale: Only Non-Residential Customers are eligible for and benefit from the program.*

Line No.	Program Name	Approach to Recovery of Billing Reduction
Credits & Incentives		
5	Stormwater Credits	Recovered from all Residential & Non-Residential Stormwater parcels *Rationale: Private Stormwater Management provides a public benefit by reducing, in the long run, PWD's overall stormwater management cost.*
6	Stormwater SMIP & GARP (*This is an O&M Budget Item*)	1. Part of the SMIP & GARP budget is allocated to Sanitary Sewer and recovered via sewer charges from all Residential & Non-Residential Sewer customers 2. The remaining SMIP & GARP budget is allocated to Stormwater and recovered via stormwater charges from all Residential & Non-Residential Stormwater customers *Rationale: 1) Private Stormwater Management provides a public benefit by reducing, in the long run, PWD's overall CSO management cost. 2) Private Greening of Acres occurs at a much lower cost than PWD's public greening of acres, which reduces in the long run the overall CSO management cost for all customers.*
Other Assistance Programs		

7	Water Revenue Assistance Program (WRAP) City Grants	Recovered from all Residential & Non-Residential customer types A total City Grants estimate of $4,000,000 per year included as an O&M expense. This estimate was developed based upon a review of 3-year City Grants and UESF matching grants awarded. *Rationale: Recovery approach is in accordance with EPA guidance on proportional cost recovery of assistance given to low income customers.*

APPENDIX

Table 1 – Estimate of the Number of Recipients of the Discounts, WRAP Assistance, Credits, and Incentives Programs

Line No.	Program Name	Program Type	Water (Accts)	Sewer (Accts)	Stormwater (Accts)
Water, Sewer, and Stormwater Discounts					
1	Senior Citizen	Assistance	20,187	20,169	20,826
2	Philadelphia Housing Authority (PHA)	Assistance	5,898	5,763	7,030
3	Charities/Education/ Hospitals	Assistance	3,105	2,930	3,539
	Percent of Total Accounts		**5.8%**	**6.1%**	**5.7%**
Additional Stormwater Discount, Credits, Incentives					
4	Stormwater Customer Assistance Program	Assistance			600
5	Stormwater Credits (*Number of Parcels)*	Credits			1,054
6	Stormwater SMIP and GARP (*Number of Parcels)*	Incentives			30
7	WRAP City Grants *(Number of Accounts)*	Assistance			10,379

Source:

1, 2 and 3 are projected number of accounts for FY 2017 from Financial Plan

5 –Projected number of parcels estimated to receive credits in FY 2017 per Financial Plan

Table 2 – Summary of Total Residential City Grant Amounts Issued To Eligible Participants

Line #	Type of Agreement	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
1	City Grants for Delinquent Customers (250% or Less of FPL)	$ 1,144,617	$ 1,573,426	$ 3,026,377	$ 3,521,019	$ 3,815,133
2	PWD-UESF Matching Grant for Paid in Full (PIF) Customers (Only for 175% or Less of FPL)	$ 217,045	$ 237,085	$ 165,673	$ 133,443	$ 114,704
3	**Total: City Grant Amounts Issued**	**$ 1,361,663**	**$ 1,810,511**	**$ 3,192,049**	**$ 3,654,461**	**$ 3,929,838**
4	Percent Increase from Prior Year				14.5%	7.5%
5	Three Year Average (FY 2013 thru FY 2015) - Rounded					$ 3,592,120
6	Two-Year Average Increae (FY 14 & FY 15)					11.0%
	Potential City Grant Amount Estimate to Include in FY 17 Budget					**$ 4,000,000**

SMIP/GARP - Cost Amortization

This paper provides a summary of the development of the amortization of the Philadelphia Water Department's ("Water Department") Stormwater Management Incentive Program (SMIP) / Greened Acre Retrofit Program (GARP) cost. An amortization schedule for the SMIP/GARP costs is developed so as to allocate a portion of the amortized costs to wastewater Contract Customers as part of the current Financial Planning and Cost of Service Study.

Figure 1 presents a summary of the annual SMIP/GARP costs estimated for amortization for the period of Fiscal Year (FY) 2013 through FY 2021. Figure 2 presents a summary of the SMIP/GARP Cost Amortization schedule.

The SMIP/GARP costs deemed eligible for inclusion in the amortization reflect the cost of SMIP/GARP funded projects that are expected to be "fully constructed and verified". The FY 2016 costs presented in Figure 1, provided by the Water Department, include SMIP/GARP projects that have already been constructed and verified during FY 2013 through FY 2015. The FY 2017 through FY 2021 costs presented in Figure 1 are projections based on the amount of greened acres estimated to be constructed and verified. The SMIP/GARP costs included in this amortization assumption are only for SMIP/GARP projects constructed and verified within the 'combined sewer' area. As presented in Figure 1, these costs also include PIDC administration and service fees associated with the completed projects.

Figure 2 presents the amortization schedule for two tranches, the first in FY 2016 for all the projects completed and verified through FY 2015, and the second in FY 2019 for all the projects completed and verified during FY 2016 through FY 2018. The second tranche of amortization assumes that the resulting amortized annual costs will be allocated to the wastewater contract customers only during the next cost of service study that is likely to be performed to establish cost of service rates for FY 2019 and beyond.

Figure 1: Summary Estimates of Annual SMIP/GARP Costs Eligible for Amortization

Line #	Fiscal Year	FY2013-15*	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
1	Annual Greened Acres (a)	96.3	121.0	115.0	120.2	134.0	134.0	134.0
2	Completed Project Value (b)	$ 7,473,921	$ 11,636,753	$ 11,353,360	$ 11,631,663	$ 13,701,125	$ 13,701,125	$ 13,701,125
3	Service Fee %	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
4	PIDC Service Fee (c) (Line 2 X Line 3)	$ 112,109	$ 174,551	$ 170,300	$ 174,475	$ 205,517	$ 205,517	$ 205,517
5	PIDC Annual Administrative Fee (d)	$ 225,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
	Annual Costs	PROJECTED SMIP/GARP COMPLETED PROJECT COSTS ELIGIBLE FOR AMORTIZATION						
6	**Total Cost Estimated for Amortization** (Line 2 + Line 4 + Line 5)	**$ 7,811,030**	**$ 11,886,304**	**$ 11,598,660**	**$ 11,881,137**	**$ 13,981,642**	**$ 13,981,642**	**$ 13,981,642**

Notes:

*To be retroactively billed to wholesale customers in FY2016.

(a) SMIP/GARP PROGRAM - AS-BUILT & VERIFIED GREENED ACRE PROJECTIONS (Non-MS4 Area).

(b) SMIP/GARP PROGRAM - AS-BUILT & VERIFIED PROJECT COST PROJECTIONS (Non-MS4 Area).

(c) PIDC service fee calculated based upon completed project value.

(d) Annual Administrative Fee paid to PIDC is $75,000. For FY13-FY15 Annual Administrative fee = $75K/year X 3 years.

Line #	Fiscal Year	Annual Cost	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
1	2015		$ -	$ -	$ -	$ -	$ -	$ -	$ -
2	2016	$ 7,811,030		$ 653,622	$ 653,622	$ 653,622	$ 653,622	$ 653,622	$ 653,622
3	2017	$ -			$ -	$ -	$ -	$ -	$ -
4	2018	$ -				$ -	$ -	$ -	$ -
5	2019	$ 35,366,102					$ 2,959,412	$ 2,959,412	$ 2,959,412
6	2020	$ -						$ -	$ -
7	2021	$ -							$ -
8	**Total Amortized Costs**		-	$ 653,622	$ 653,622	$ 653,622	$ 3,613,033	$ 3,613,033	$ 3,613,033

9	Long Term Bond Interest Rate	5.5%
10	Amortization Term (years)	20

Figure 2: Amortization Schedule of SMIP/GARP Costs (Non-MS4 Area)

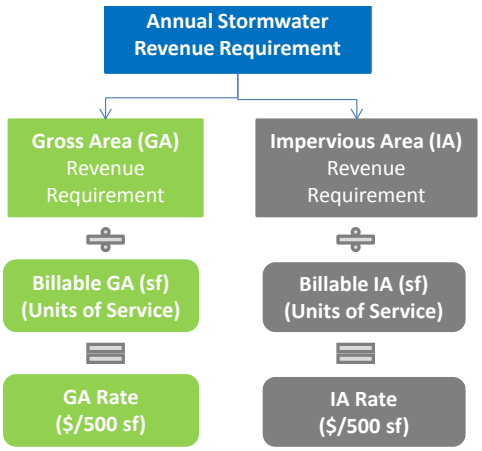
STORMWATER UNITS OF SERVICE ANALYSIS

1.0 Introduction

The Philadelphia Water Department fully transitioned from a 'Meter Size' based Stormwater Management Service Charge ("SWMS Charge") to a 'Parcel Area Based' SWMS Charge, as of July 1, 2013. This charge is included in the customer's monthly water/sewer utility bill.

The SWMS Charge involves two components, namely, the Gross Area ("GA") Charge and the Impervious Area ("IA") Charge. These two charges are calculated based on the GA square footage and the IA square footage of a property and the associated GA and IA Rates.

Figure 1 – Determination of GA and IA Rates



As illustrated in Figure 1, the system wide GA and IA rates are determined based on the estimated GA and IA revenue requirements for a given fiscal year and the billable GA and IA square footage. *The Billable GA and IA Square Footage ("sf") is also referred to as "Units of Service" in this paper.*

As part of the Comprehensive Cost of Service Rate Design and Related Services("Rate Study") performed for the study period of FY 2017 through FY 2021, the GA and IA units of service were projected to support the development of the GA and IA rates.

This technical memorandum explains the methodology used in developing the projections of the billable GA and IA units of service, and discusses the results of the units of service analysis.

2.0 Definitions

This section provides the definitions for key terms used in this technical memorandum.

1. **Gross Area (GA)** - Includes all of the property area within the legally described boundaries except streets, medians and sidewalks in the public right-of-way.
2. **Impervious Area (IA)** - Includes surfaces which are compacted or covered with material that restricts infiltration of water, including semi-pervious surfaces such as compacted clay, most conventionally hardscaped surfaces such as streets, driveways, roofs, sidewalks, parking lots, attached and detached structures, and other similar surfaces.
3. **Stormwater Management Incentives Program (SMIP)** – A stormwater grant program offered by the Water Department to non-residential property owners for stormwater retrofit projects.
4. **Greened Acre Retrofit Program (GARP)** – A stormwater grant program offered by the Water Department to contractors, companies or project aggregators to build large-scale stormwater retrofit projects across multiple properties.

5. **Units of Service** – The system wide billable GA and IA square footage.
6. **Impervious Area Managed -** Impervious area that drains to surface water bodies or to approved Stormwater Management Practices (SMPs). This is referred to as greened acres in the context of the cost of service study. For the purposes of PWD's credit program, IA managed is calculated in square footage.
7. **Impervious Area Reduction -** Impervious area that is directed to a pervious area on a property or, based on the type of land cover, has characteristics similar to a pervious area.
8. **Adjustment Appeals** – PWD's appeal program which enables customers to seek adjustments for billing inaccuracies including inaccurate parcel classification, incorrect parcel identification, residential sideyard, or for errors in the calculation of a parcel's gross and/or impervious area.

3.0 Purpose

The primary purpose of the units of services analysis is to develop reliable estimates of the billable GA and IA units of service for the *study period* of FY 2017 through FY 2021. The billable units of service are critical for projecting the stormwater revenues under existing rates, and for developing the GA and IA rates.

The GA and IA units of service projections are impacted by the following two "Adjustment Factors":

a. ***Stormwater Credits Adjustments:*** This relates to stormwater credits which are offered in the form of a reduction in GA and/or IA square footage;
b. ***Stormwater Appeals/Data Adjustments:*** This relates to reduction in GA and IA square footage due to (i) customer appeals regarding GA and IA data inaccuracies; (ii) Residential Sideyard parcels that become non-billable when such sideyard delineation requests are approved; and (iii) City owned vacant lots that transition to private non-City ownership.

Hence, in the units of service analysis, the billable GA and IA units of service are projected taking in to consideration any potential reduction or gain in billable square footage due to these two Adjustment Factors.

4.0 Units of Service Analysis

This section provides an overview of the methodology used in the determination of the billable GA and IA units of service for the three customer classes, namely, the *Residential, Non-Residential, and Condominium* classes.

4.1 Classification of Parcels

PWD Regulations (Section 300.0) has defined three classes for the purposes of SWMS Charge:

- **Residential Property** - Real estate used exclusively for residential purposes with at least one and no more than four dwelling units.

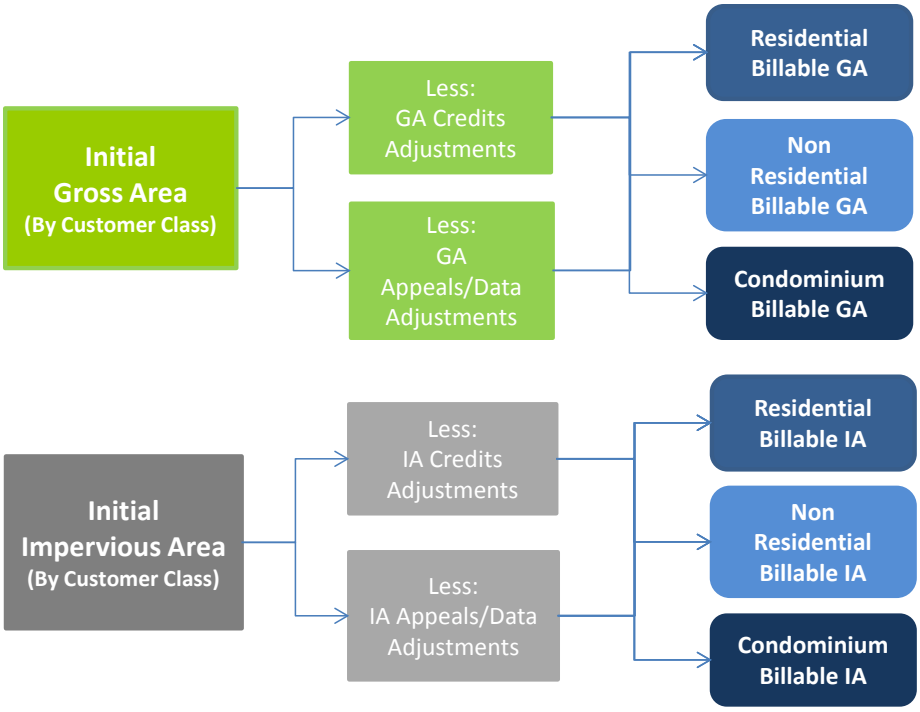
- **Non-residential Property** - Real estate which cannot be classified as either residential or condominium.
- **Condominium Property** – Real estate, portions of which are designated for separate ownership, and the remainder of which is designated for common ownership by the owners of those portions.

In determining the billable unit of service, identical methodology is used for both the Non-Residential and Condominium customer classes. Hence, in this Memorandum, the discussion on the Non-Residential class also encompasses the Condominium class.

4.2 System-Wide Billable GA and IA Units of Service Calculation Framework

Figure 2 illustrates the sequential approach used in the determination of the billable GA and IA square footage. The key steps are as follows:

Figure 2 – Units of Service Analysis Framework



- **Step 1 – Projection of Initial GA and IA:** Project Initial GA and IA square footage for each customer class based on historical data;
- **Step 2 – Projection of GA and IA Adjustments:** Project the magnitude of GA and IA adjustments for each of the two adjustment factors; and
- **Step 3 – Projection of Billable GA and IA:** Derive the billable GA and IA square footage for each customer class by applying the adjustments from Step 2 to the initial GA and IA projected in Step 1.

4.3 Step 1 - Projection of Initial GA and IA

The initial GA and IA refer to the baseline GA and IA square footage prior to the application of any Adjustment Factors referenced in Section 3.0. The Initial GA and IA for the Residential and Non-residential classes are projected by applying the Mean GA and IA to the projected number of parcels in each of those classes.

4.3.1 Residential Initial GA and IA

- *Mean GA & IA:* Based on the Fiscal Year 2015 Residential GA and IA and the number of parcels, the Residential Mean GA is 2,110 square feet and the Mean IA is 1,050 square feet.
- *Projected Number of Parcels:* The annual number of parcels projected for the study period is set to equal the historical two-year average (FY 2014 and FY 2015) number of parcels.
- Initial GA & IA: The Initial GA and IA for each year of the study period is derived by applying the 2,110 Mean GA and 1,050 Mean IA square footage to the annual number of parcels determined for each year of the study period.

4.3.2 Non-Residential Initial GA and IA

- *Mean GA & IA:* Due to the significant diversity in the types of parcels within the non-residential and Condominium customer classes, sub-groups were delineated as illustrated in Table SW-1 in Exhibit BV-E3. The Mean GA and Mean IA for FY 2015 is derived for each of the sub-groups based on the historical two year average (FY 2014 and FY 2015) Mean GA and Mean IA. **Table SW-1** illustrates the FY 2015 Mean GA and Mean IA determined for each of the Non-residential and Condominium sub-groups.
- *Projected Number of Parcels:* The annual number of parcels projected for the study period is set to equal the historical two-year average (FY 2014 and FY 2015) number of parcels.
- Initial GA & IA: The Initial GA and IA for each year of the study period is derived by applying the FY 2015 Mean GA and Mean IA square footage of the sub-groups to the annual number of parcels determined for each year of the study period for each of those sub-groups.

Table SW-2, SW-3, and SW-4 in Exhibit BV-E3 present the results of the Initial Parcel Count (Table SW-2), Initial GA (Table SW-3), and Initial IA (Table SW-4) estimated for the Residential, Non-Residential, and Condominium customer classes.

4.4 Step 2 – Projection of GA and IA Adjustments

The estimation of the potential reduction or gain in the billable GA and IA units involved a distinct analysis of each of the two Adjustment Factors referenced in Section 3, namely:

- Stormwater Credits Adjustments
- Stormwater Appeals/Data Adjustments

The approach used to estimate the impact on GA and IA units of service due to each of these two Adjustment Factors is discussed in this section.

4.4.1 Stormwater Credits Adjustments

Stormwater fee credits, which are offered to Non-residential and Condominium properties for implementing and maintaining on-site stormwater management practices, cause a reduction in stormwater billing and ultimately stormwater revenues. Hence to assure revenue adequacy, potential reduction in the billable GA and IA units of service needs to be determined and accounted for in designing the GA and IA rates.

Various stormwater management activities and/or programs are integral to private onsite stormwater management and could result in the issuance of additional stormwater GA and IA credits during the study period. The Water Department categorizes the sources of credits into three (3) major categories:

1. Impervious Area Reduction practices
2. Stormwater Management Practices
3. Stormwater Grants (SMIP and GARP)

The potential reduction in GA and IA credits, defined in terms of square footage ("sf"), was estimated for each of these three sources of stormwater credits. As **Table 5** in Exhibit BV-E3 indicates, the GA and IA credits due to SMIP/GARP are projected to increase by 315% and 271% respectively from the FY 2016 levels. During the same time, the GA and IA credits for the stomwater management practices are projected to increase only by 24% and 25%, respectively.

The projections were developed based upon a review of the three year historical data (FY 2013 through FY 2015) that the Water Department provided, and using the following approach:

a. **IAR Practices** – The IAR practices refer to stormwater management conditions that occur as a result of existing property conditions and sometimes as a result of the installation of stormwater management practices. The IAR conditions recognized by the Water Department for credit include rooftop disconnections, pavement disconnections, tree canopy coverage, green roof and porous pavement.

   Note: IAR credits are applicable only to the IA charge.

   Average Impervious Area Reduction per Parcel = 14,000 sf

   Average two-year growth in parcels with IAR practices = 13%

   Parcels with IAR Practices (FY 2015 Baseline) = 324

   The potential IA reduction, during the study period, due to these practices was estimated as follows:

   Annual Estimated IAR Credits (sf) = Historical average IAR (sf) per parcel **x** Number of additional IAR parcels projected for the fiscal year

   - *Average IAR (sf) per parcel* – The IAR monthly tracking data obtained from the Water Department reflects a stable monthly trend in the reduction of Impervious Area due the deployment of IAR practices, during the second six months of FY 2015. Therefore the

average IAR per parcel was determined using that six-month trend, and was estimated at 14,000 sf.

- *Projection of Additional IAR Parcels* – The number of IAR parcels from FY 2015 was used as the baseline, and this baseline was increased incrementally each succeeding fiscal year by applying an annual average growth rate in the number of parcels deploying IAR practices. A two-year average annual growth rate of 13% was estimated based on the growth rate in FY 14 and FY 15, and was used to project the number of additional IAR parcels.

Table SW-5 in Exhibit BV-E3 presents the estimated additional number of parcels that are likely to seek IAR credits, and the associated reduction in Impervious Area estimated for *IAR practices*, for the study period.

b. Stormwater Management Practices – The Stormwater Management Practices category includes two sub-categories as follows:

- IA Managed: This subcategory refers to SMPs that are constructed to comply with the Water Department's stormwater regulations, or when a customer is able to direct their runoff to a body of water without the use of PWD infrastructure, otherwise known as a surface water discharge.

  Note: This subcategory of credits provides a customer with both GA and IA credits.

- Open Space: This subcategory refers to open space that exists in a property. Per the Water Department's Regulations, Open Space area is described as non-impervious area that is calculated as GA minus IA within a property. The customer must demonstrate a Natural Resource Conservation Service Curve Number (NRCS-CN) below a certain value, as described in the Credits and Adjustment Appeals Manual, to receive Open Space credit.

  Note: This subcategory provides a customer with GA credits only.

The potential GA and IA reduction during the study period resulting from these two subcategories was estimated as follows:

- Annual Estimated IA Managed (sf) = FY 2015 Average IA Managed (sf) per parcel **x** Number of additional IA Managed parcels projected for the fiscal year
- Annual Estimated Open Space GA (sf) = FY 2015 Average Open Space GA (sf) per parcel **x** Number of additional Open Space GA parcels projected for the fiscal year

- *FY 2015 Average IA Managed (sf) and Open Space (sf) per parcel* **–**The credit program has evolved since its inception. The FY 2015 credits data reflects the Water Department's most current credit program policies. These policies are expected to remain stable during the study period. Hence, the FY 2015 data was deemed a reliable baseline for the issuance of GA and IA credits, as appropriate, for the two subcategories.

Parcel level data on the GA and IA credits issued in FY 2015 was obtained from the Water Department, to determine the square footage of Average GA and Average IA credits that were issued.

A review of the FY 2015 IA Managed credits and the Open Space GA credits data revealed substantive differences in the average GA and IA credits issued per parcel, between the "Surface Discharge" and "Non-Surface Discharge" properties. Hence, the FY 2015 average GA and IA credits were determined distinctly for the two types of stormwater discharges.

Figure 3 presents the results of the FY 2015 average GA and average IA credits for the two types of stormwater discharge and for the two subcategories (IA Managed and Open Space).

Figure 3 – GA and IA Projection Factors for IA Managed and Open Space Subcategories

	FY 2015 Increase in Parcels	FY 2015 Average GA Credit	FY 2015 Average IA Credit
Discharge Type: Non-Surface Discharge		**(sf)**	**(sf)**
Impervious Area Managed	66	14,722	14,722
Open Space	66	31,987	
Discharge Type: Surface Discharge		**(sf)**	**(sf)**
Impervious Area Managed	29	103,464	103,464
Open Space	29	198,884	

- *Projection of Additional IA Managed Parcels* – As indicated in Figure 3, the number of parcels that were issued credits under the IA Managed subcategory in FY 2015, for the Non-Surface and Surface Discharge types, were 66 and 29 parcels, respectively. Discussions with the Water Department staff indicated that it would be reasonable to assume this same volume of additional credit requests, for each succeeding fiscal year of the study period, for both the IA Managed and Open Space subcategories.

  Hence, the number of parcels with IA managed credits at the end of FY 2015 (857 parcels) was assumed to be the baseline, and this figure was increased incrementally each succeeding fiscal year by applying the FY 2015 level of credit activity.

Table SW-5 in Exhibit BV-E3 presents the estimated additional number of parcels that are likely to seek credits for the *Stormwater Management Practices* category, and the associated square footage of GA and IA credits, for the study period.

c. **SMIP and GARP** – The SMIP and GARP are two grant programs that the Water Department offers to reduce the price for qualified non-residential Water Department customers and contractors to design and install stormwater best management practices. The two types of grants, namely the SMIP and GARP are defined in Section 2.0.

The total SMIP/GARP program grant that the Water Department expects to award during the period of FY 2016 through FY 2021 is estimated at $86.45 Million. The estimated amount includes program administration costs, and hence only $84.7 Million is expected to be available for the actual award of SMIP/GARP grants. **Table SW-6** in Exhibit BV-E3 presents a summary of the annual SMIP/GARP program costs, the estimated annual administration costs, and the estimated available annual award amount.

The properties that receive the SMIP/GARP grants also receive GA and IA credits under the Stormwater Management Practices category, on completion and verification of the installation of SMPs. Hence, the potential additional reduction in GA and IA square footage during the study period due to SMIP and GARP needs to be estimated.

Estimation of Potential GA and IA Credits

The potential GA and IA credits resulting from the SMIP and GARP awards are estimated through a two-step approach:

STEP 1: Estimate the amount of "greened acres" that could results from the annual SMIP and GARP award amounts.

STEP 2: Estimate the amount of GA and IA credits for the greened acres constructed.

STEP 1: Based on a review of the FY 2012 through FY 2015 SMIP and GARP completed projects data that the Water Department provided and discussions with the SMIP/GARP technical review team, the projected annual SMIP/GARP award amount was apportioned to two groups of projects.

They are:

- Group 1 Projects: These are projects that are expected to have an average cost per greened acre of approximately $90,000 with projects completed and verified within 12 months from the award.
- Group 2 Projects: These are projects that are expected to have an average cost per greened acre of approximately $150,000 with projects completed and verified within 24 months from the award.

Figure 4 presents a summary of the cost per greened acre and allocation of grants between the Group 1 and Group 2 projects.

Figure 4 – Summary of Group 1 and Group 2 Projection Factors

Project Category	Cost Per Greened Acre	Project Completion	Award Amount Allocation	
			FY 2016	FY 2017 - 2021
Group - 1	$90,000	Within 12 Months	80%	70%

Group - 2	$150,000	Within 24 Months	20%	30%

Using the above criteria, the available grant award amount (which is calculated as the annual SMIP/GARP program budget less administration costs), is first apportioned to Group-1 and Group-2 project categories.

Then using the cost per greened acre of each group, the apportioned award amount is then translated to an estimate of GA and IA managed acres ("greened acres").

STEP 2: The GA and IA managed credits are calculated for the greened acres determined in Step 1, for each fiscal year, taking into account the following factors:

- The timing of the completion of the greened acres for the Group 1 and Group 2 categories; and
- The current stormwater credit policy of 80% GA and 80% IA credits for managed area.

The total GA and IA credits for each fiscal year is calculated as the sum of the GA and IA credits estimated for the Group 1 and Group 2 project categories.

Table SW-7 through Table SW-9 in Exhibit BV-E3 present the details of the calculations used in the estimation of the annual GA and IA credits due to the expected SMIP and GRAP grant awards.

4.4.2 Stormwater Appeals/Data Adjustments

As discussed in Section 3, the three sources of stormwater GA and IA adjustments are: (a) Stormwater customer appeals for GA and IA data inaccuracies; (b) Residential Sideyards that are non-billable; and (c) Transition of City owned parcels to private ownership. Hence, it is important to estimate the potential reduction in GA and IA due to stormwater appeals/data adjustments for the study period of FY 2016 through FY 2021.

a. GA and IA Inaccuracies: GA and IA data inaccuracies have the potential to cause a reduction in the billable GA and IA units of service. The GA and IA data adjustments primarily occur in the Non-residential customer class.

- A review of the appeals data for FY 2013 through FY 2015 obtained from the Water Department indicates a year-to-year decrease in the number of appeals. Hence, it is estimated that during each year of the study period, the number of appeals will continue to gradually decrease as shown in the inset box.

Actual and Projected Number of Appeals

FY 2013: 531	FY 2018: 261
FY 2014: 423	FY 2019: 248
FY 2015: 335	FY 2020: 235
FY 2016: 302	FY 2021: 224

- The two year (FY 2014 & FY 2015) average reduction in GA and IA square footage per appeal is 3,690 and 3,245, respectively. These values are applied to the estimated number of appeals

to determine the reduction in billable GA and IA units of service for each year of the study period.

b. Residential Sideyards: Residential sideyard appeals are only applicable to parcels that are contiguous with a main residential parcel, and have the same ownership as the main residential parcel. An approval of a residential sideyard appeal results in that parcel no longer being a billable parcel and consequently reduces the billable GA and IA units of service.

- A review of the monthly residential sideyards tracking data for FY 2013 through FY 2015 obtained from the Water Department indicates a year-to-year decrease in the number of residential sideyard requests. Hence, it is estimated that during each year of the study period, the number of sideyard appeals will continue to gradually decrease as shown in the inset box.

Actual and Projected Number of Residential Sideyard Appeals

FY 2013:	217	FY 2018:	83
FY 2014:	140	FY 2019:	79
FY 2015:	107	FY 2020:	75
FY 2016:	96	FY 2021:	71
FY 2017:	89		

- The FY 2015 average reduction in GA and IA square footage per appeal is 4,612 and 368, respectively. These values are applied to the estimated number of sideyard appeals to determine the reduction in billable GA and IA units of service for each year of the study period.

c. City Owned Vacant Lots: The transition of ownership from City owned vacant property to a private ownership or vice versa can cause a gain or a reduction in the billable GA and IA units of service. Hence, the impact on the billable units of service was estimated for the study period.

- A review of the monthly tracking data for FY 2013 through FY 2015 obtained from the Water Department indicates that annually approximately 150 vacant parcels have had ownership transition from city owned to privately owned status. Hence, as a conservative projection, it is estimated that during each year of the study period, transition to private ownership will occur at the rate of 10% of the FY 2015 levels, resulting in a gain of approximately 17 parcels annually.

- The FY 2015 average gain in GA and IA square footage per city owner parcel transition is 8,374 and 1,122, respectively. These values are applied to the estimated gain of 17 parcels to determine the gain in billable GA and IA units of service for each year of the study period.

Tables SW-2, SW-3 and SW-4, in Exhibit BV-E3 present the projections of reduction in the number of parcels (Table SW-2); the reduction in billable GA (Table SW-3) and the reduction in billable IA (Table SW-4) by customer class due to Stormwater Appeals/Data Adjustments.

4.5 Projection of Billable GA and IA Units of Service

As illustrated in Figure 2 of Section 4.2, the third and final step in the units of service analysis is to compute the final billable GA and IA units of service for each of the three customer classes. The final

billable GA and IA units of service are derived by deducting the total units of service adjustments (discussed in Section 4.4) from the Initial GA and IA units of service (discussed in Section 4.3).

In addition to Tables SW-2, SW-3, and SW-4, Table SW-10 in Exhibit BV-E3 presents a summary of the billable number of parcels, the billable GA, and the billable IA estimated for each customer class and for each year of the study period.