VOLUME 20

PENNSYLVANIA-AMERICAN WATER COMPANY

2022 GENERAL BASE RATE CASE
R-2022-3031672 (WATER)
R-2022-3031673 (WASTEWATER)

DIRECT TESTIMONY AND EXHIBIT OF
NATHAN WALKER

STATEMENT NO. 14
EXHIBIT NO. 14-A

PAWC STATEMENT NO. 14

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

DIRECT TESTIMONY OF
NATHAN D. WALKER

ON BEHALF OF PENNSYLVANIA-AMERICAN WATER COMPANY

CONCERNING

STORMWATER FEE FEASIBILITY STUDY

DOCKET NOS.
R-2022-3031672 (WATER)
R-2022-3031673 (WASTEWATER)

DATE: April 29, 2022

DIRECT TESTIMONY OF
NATHAN D. WALKER

Q. Please state your name and address.

A. My name is Nathan D. Walker. My business address is 1010 Adams Avenue, Audubon, PA 19403.

Q. By whom are you employed?

A. I am employed by Gannett Fleming, Inc.

Q. Please describe your position with Gannett Fleming Inc., and briefly state your general duties and responsibilities.

A. My title is Senior Water Resources Planner. My duties and responsibilities include supporting clients' efforts to comply with stormwater permit requirements, to adopt long-range infrastructure capital improvement plans and resiliency plans, and to establish fees charged to property owners to recover the costs of stormwater management.

Q. What is your educational background?

A. I have a Bachelor of Science degree from the Lehigh University, Bethlehem, Pennsylvania and a Master of Community and Regional Planning from the Temple University, Philadelphia, Pennsylvania.

Q. Would you please describe your professional affiliations?

A. I am a member of the Pennsylvania Water Environment Association where I serve as the Stormwater Committee Chair. I am a member of the American Planning Association, its Pennsylvania Chapter, and the American Institute of Certified Planners (AICP).

Q. Briefly describe your work experience.

A. I joined Gannett Fleming, Inc. in June 2019 as a Senior Water Resources Planner. In that capacity, I assist municipal and commercial clients in complying with requirements imposed by their stormwater discharge permits, developing capital improvement plans, establishing and complying with land use regulations, and formulating stormwater financing strategies. From August 2010 until I joined Gannett Fleming, I was employed as a planner by the consulting engineering firm Amec Foster Wheeler until its 2017 acquisition by Wood, Inc. and, from 2017 to June 2019, by Wood, Inc. My job responsibilities at those companies were similar to those I now have at Gannett Fleming. My other work experience includes employment by the Natural Lands Trust (Media, PA, 2007-2009) and the Montgomery County Planning Commission (Norristown, PA, 2004-2007) as a Community Planner. In that role I assisted municipalities in developing comprehensive plans, natural resource management plans, and open space plans designed to achieve a variety of local goals. I was also employed as the Watershed Specialist for the Montgomery County Conservation District (Collegeville, PA, 2000-2004) and, in that capacity, I represented the County's interests as they related to watershed restoration initiatives and stormwater management strategies.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to explain the Stormwater Fee Feasibility Study ("Feasibility Study") that Gannett Fleming prepared for Pennsylvania-American Water Company ("PAWC" or the "Company"). The Feasibility Study examines the principal challenges to developing and implementing a separate charge to recover the

cost of managing stormwater that enters the combined sewer systems PAWC owns and operates in its Kane, McKeesport, and Scranton service areas. A major part of the Feasibility Study focuses on the technical challenges to collecting, analyzing, verifying and maintaining the data that are needed to establish billing determinants for a stormwater charge based on each landowner's contribution to the stormwater runoff that must be collected, conveyed and treated by the combined sewer systems.

Q. Have you prepared an exhibit to accompany your direct testimony?

A. Yes. PAWC Exhibit No. 14-A is a copy of the Feasibility Study, which sets forth a description of the study's methodological approach, the principal issues addressed in the study and the findings and conclusions that were reached as they pertain to the feasibility of PAWC's establishing a separate stormwater charge for its combined sewer systems.

Q. Is the Company presenting the testimony of any other witness to address stormwater charges for its combined sewer systems?

A. Yes. Bruce W. Aiton, PAWC's Vice President of Engineering, is submitting PAWC Statement No. 3, which discusses PAWC's response to the Feasibility Study.

Q. Briefly describe the purpose of the Feasibility Study.

A. The Feasibility Study was prepared, and is being filed, to comply with Paragraph No. 71.e. of the Joint Petition for Non-Unanimous Settlement ("Settlement") in the consolidated water/wastewater base rate case PAWC filed on April 29, 2020 at Docket Nos. R-2020-3019369 and R-2020-3019371 ("2020 Rate Case"). The Settlement was approved by the Pennsylvania Public Utility Commission ("Commission") in its final order entered on February 25, 2021.

In the 2020 Rate Case, witnesses on behalf of the Commission's Bureau of Investigation and Enforcement and Pennsylvania's Office of Consumer Advocate recommended that PAWC propose separate stormwater rates for its combined sewer systems in its next base rate case. The parties to the Settlement acknowledged and accepted PAWC's position that a number of difficult issues must be addressed before an investor-owned wastewater utility could propose a separate stormwater rate for combined sewer systems. Consequently, the settling parties agreed to the terms of Paragraph No. 71.e. of the Settlement, which provide that PAWC would "propose potential recovery and rate methodology options for stormwater costs of combined sewer systems in its next general wastewater or combined water/wastewater base rate filing" and that such proposals "will include an analysis of the recovery of such stormwater costs through various methodologies."

Accordingly, the Feasibility Study explores the option of implementing a separate stormwater charge for PAWC's combined sewer systems in Scranton, McKeesport and Kane that is based on the most widely-used billing determinant for such charges, specifically, the impervious area of parcels located within the respective service areas of those three systems.

Q. What is stormwater?

A. Stormwater is runoff from rainstorms or snow melt. Higher volumes of precipitation cannot all be absorbed by plants and soils. Moreover, land covered by impervious surfaces such as roads, parking lots, and buildings also cannot absorb any precipitation, which increases the volume of water flowing to pervious surfaces. The water that cannot be absorbed or that does not discharge directly to surface water flows

to the stormwater conveyance network. This network may be privately owned, a municipal separate storm sewer system (referred to as an "MS4"), or into the combined sewer of the entity that provides wastewater service, if the municipality does not have an MS4.

Q. What is a combined sewer system?

A. As its name implies, a combined sewer system combines the functions of collecting, conveying and treating sanitary sewage and stormwater runoff. While an MS4 generally discharges to local creeks, streams and rivers with little or no treatment, a combined sewer system conveys the combination of sanitary sewage and stormwater runoff to a wastewater treatment plant that removes solids and pollutants, breaks down organic matter and restores the oxygen content of the treated water before it is returned to the environment – typically to an outfall at a local creek, stream or river.

Q. Does the collection and conveyance of stormwater runoff increase the cost of operating a combined sewer system?

A. Yes, it does. A combined sewer system should have sufficient capacity to handle the substantially greater volume of combined sanitary and stormwater flows that occur during major wet weather events. That means the combined sewer system must be larger than it would otherwise be if it only collected, conveyed and treated sanitary sewage. It also means that the combined sewer system incurs higher operating and maintenance expenses. If the flow in a combined sewer exceeds its capacity, sewage can back-up into homes and business and the combined flow can exceed the system's treatment capacity, which can force the discharge of untreated sewage to waterways in violation of applicable government permitting requirements.

Q. How are MS4 costs typically recovered in Pennsylvania today?

A. MS4s are owned and operated by municipalities (or, since 2014, by municipal authorities by agreement with the municipality). Until 2014, only Second Class Townships and municipalities with home rule charters could exercise authority to impose separate fees for the cost of stormwater management. In 2014, the Municipality Authorities Act was amended[1] to allow the formation of municipal authorities empowered to manage stormwater and impose fees to recover the costs of stormwater management. This amendment followed changes in the MS4 Program administered by the Pennsylvania Department of Environmental Protection that imposed stricter requirements on the discharge of untreated stormwater to the Waters of the Commonwealth. Prior to 2014, the costs of owning and operating MS4s were generally paid from municipalities' general funds derived from local property taxes. Since the Municipality Authorities Act was amended, a number of municipalities have formed authorities to manage stormwater and impose stormwater fees to recover the associated costs.

Q. How do entities, including municipalities and municipal authorities, that operate combined sewer systems recover the portion of their cost of service relating to stormwater management?

A. Municipalities and municipal authorities that impose stormwater fees may incorporate the cost operating a combined sewer system as one of the components of their stormwater program into their stormwater fee calculation. Without a stormwater fee, communities with combined sewer systems recover the costs of those systems through

[1] Act of July 9, 2014, No. 2014-123, 53 Pa.C.S. §5607(d)(34).

wastewater fees that are based on water usage or through a combination of a flat fee and a variable fee based on water use.

Q. What are the principal reasons offered to support establishing separate stormwater charges?

A. Among others, there are generally four principal reasons offered in support of separate storm water fees: dedicated funding; equity/cost-causation; expanding the potential customer base for recovery of stormwater management costs; and creating incentives for controlling stormwater runoff and the associated costs of stormwater management. I will explain each.

Dedicated Funding. Municipal stormwater management activities funded by property taxes and the municipal general fund typically do not have a consistent annual budget for capital projects, infrastructure repair, and water quality projects. By enacting a stormwater fee, municipalities (and municipal authorities) can project annual revenue and can establish long-term capital improvement plans that implement local stormwater management priorities.

Equity/Cost-Causation. Proponents of separate stormwater charges point out that the costs of managing stormwater does not correlate with the billing determinants typically used for wastewater charges, namely, the amount of water used by customers. Rather, stormwater management costs are a function of a number of other factors that contribute to excessive runoff, such as the amount of impervious surface on a parcel, the grade/slope of the parcel, the nature of the soil and its capacity to absorb water, the amount and kind of vegetation on the property, and steps that may have been taken by the landowner to reduce runoff. A properly designed rate structure

should strive to recover costs based on the factors that cause those costs to be incurred. If rates fail to reasonably conform to the major drivers of cost-causation, inter-class and intra-class subsidies can occur. However, given the number and the nature of the factors that drive stormwater management costs (as noted above), there are substantial data-collection and data-analysis issues associated with identifying appropriate cost-based billing determinants for stormwater charges.

Expanding The Customer Base. Recognizing the factors that drive cost-causation for stormwater management, it is apparent that all landowners that discharge stormwater to a combined sewer system contribute to the increased cost of operating a combined sewer system; this includes landowners who do not have a sanitary sewer connection to the combined sewer. For example, a parcel that has no water or wastewater connection but is covered by pavement (such as a parking lot) could be a major contributor of runoff but would not pay anything toward the cost of the combined sewer absent a stormwater charge. Imposing stormwater charges based on billing determinants that reflects appropriate cost-causation factors (such as impervious area) would expand the customer base, provide an additional source of revenue, and correspondingly reduce the costs borne by traditional wastewater customers. Of course, a wastewater utility faces practical problems when a property owner is not subject to termination of water service for failure to pay a stormwater charge, including the ability to actually collect the charge.

Incentives To Control Stormwater Runoff. Customers could reduce their stormwater charges by reducing the factors that form the basis for billing determinants to which those charges are applied. Just as a water customer can reduce its water bill

through conservation (resulting in fewer billing units to which the water rate is applied), a stormwater customer could reduce its stormwater bill by reducing the impervious area to which the stormwater charge is applied. In addition, some tariff provisions for stormwater charges grant credits against stormwater bills for specific actions that reduce runoff, such as creating detention basins or planting water retaining vegetation. However, both of these forms of incentives require the service provider to maintain systems and personnel to administer the program by, for example, periodic reassessments of property conditions (changes in impervious area), allowing landowners to appeal billing determinations, and verifying runoff reduction measures that qualify for credits.

Q. Please describe the primary considerations that may impact a municipality's decision to create and implement a stormwater fee.

A. Before implementing a stormwater fee, a service provider must carefully assess its capacity and capabilities (e.g., time, resources and costs, among other factors) to both establish and properly administer and maintain a stormwater fee. Unlike water and traditional wastewater charges imposed on the basis of metered water usage (an accepted and readily determined metric), the billing determinants for stormwater charges require considerable efforts to identify, quantify, analyze, apply and maintain. Unlike the metrics for water usage, the billing determinants for stormwater charges are spatially-oriented; they must, of necessity, relate to a specific geographic (and identifiable) location that, in turn, must be associated with a specific bill-payer. The characteristics of each parcel must also be assessed based on the criteria used to establish the billing determinants. For example, if impervious area is the basis for

billing, then the characteristics that will be used to determine what is impervious must be established and the impervious areas must be measured. This process requires collecting information from multiple sources, such as county and municipal tax maps, parcel numbers that identify property for tax purposes, geographically-referenced data from Geographic Information Systems (GIS), aerial photography, orthographic projections, utility customer designations (residential, commercial or industrial, for example) and other site-specific references such as actual ground-level observations of impervious areas. The data from these sources must be overlaid, correlated and analyzed to develop information that can be used to develop enforceable stormwater charges.

In addition to the time, resources and cost of developing stormwater charges, a service provider must assess and account for the cost of maintaining the systems, processes and programs necessary to administer those charges. The characteristics of each parcel are subject to changes that affect the relevant billing determinants (such as changes in impervious area). This will require period reanalysis and reassessment of the factors used to make the initial billing determinations. Similarly, there will need to be a process for allowing customers to seek a review of the service provider's determination of the billing determinants used to assess charges. A system must be established to process requests for credits based on customer stormwater management efforts. Finally, given most customer unfamiliarity with stormwater charges, the service provider must establish and maintain robust programs for public outreach and education.

Q. What are the principal methods that municipalities use to calculate separate stormwater rates?

A. Stormwater fees can be calculated several different ways. The Feasibility Study describes the two types of stormwater rates that are most common and generally accepted in Pennsylvania: the Equivalent Residential Unit ("ERU") and measured impervious area. Municipalities deciding which of these two types of rates is more appropriate for their community often consider two factors: 1) the availability of adequate aerial imagery and spatial data, and 2) the municipality's ability to maintain accurate billing data. The ERU rate structure requires a moderate investment by the service provider to calculate the stormwater fee for each ratepayer. The ERU structure also requires additional resources to maintain an accurate billing database. Because of the age and resolution of best-available aerial imagery for McKean County, the ERU rate structure was evaluated in the Feasibility Study for PAWC's Kane service area. Actual measurements of impervious area (in blocks of 500 square feet) were made for the Scranton and McKeesport service areas where aerial imagery is more current. For the Feasibility Study, rate structures that rely on greater analysis of land cover, land use and discharge conditions were not evaluated.

Q. Are you aware of any investor-owned utility charging a separate stormwater rate in Pennsylvania?

A. To the best of my knowledge, only municipalities and municipal authorities have enacted separate stormwater rates in Pennsylvania that are based on the area of impervious cover on a parcel. I am not aware of any stormwater fees implemented by an investor-owned utility in Pennsylvania.

Q. Are you aware of any investor-owned utility charging a separate stormwater fee in the United States?

A. Nearly every year, Western Kentucky University publishes a Stormwater Utility Survey to present trends in stormwater fees across the nation. The Summer 2021 version of this Survey is the most recent, listing 1,851 stormwater fees that are in use across the nation. The Survey presents fees enacted by local municipalities, counties, authorities, sewer districts, and stormwater districts. The Survey does not identify any investor-owned utilities charging a separate stormwater fee.

Q. Please summarize the criteria used in the Feasibility Study to develop a methodology for establishing separate stormwater rates for PAWC.

A. The Feasibility Study reviewed the factors considered by municipalities and municipal authorities when deciding to enact a stormwater fee applied to PAWC. To implement a stormwater fee, communities must review their capacity to: 1) establish a stormwater fee, and 2) maintain a stormwater fee. Communities need to strike a balance between their stormwater goals, the cost of their preferred services, the impact on ratepayers, the cost of data collection, the cost of data maintenance, and the cost of customer service. The Feasibility Study also reviewed seven factors PAWC would need to consider if it were to create a stormwater fee as a non-municipal utility. These factors include questions about PAWC's authority to charge a stormwater fee, the practicality of collecting data needed for developing accurate bills, the process for reconciling varied stormwater management standards used in different municipalities, and PAWC's ability to charge a fee to those with no current sanitary sewer service.

Q. Are you offering an opinion on whether PAWC, as an investor-owned utility, has the legal authority to charge a stormwater fee that is based on factors such as impervious area?

A. No, I am not offering any opinion on that issue. Similarly, I am not offering an opinion on whether PAWC could imposed a stormwater charge on the owner of a parcel that does not have any connection to PAWC's water distribution or wastewater collection systems. I simply note that these are important issues that need to be addressed.

Q. Describe the additional decisions or challenges that the Company, a non-municipal entity, must consider about the feasibility of a stormwater fee?

A. The following are examples of the additional decisions or challenges that are unique to the Company that must be considered if it were to develop a stormwater fee. PAWC would need to select methods for communicating with at least 20 municipalities and three counties about changes in land cover, land use, and parcel delineation that would affect implementation of the stormwater fee. PAWC would need to define a consistent method for billing property owners that make improvements to their property under the varied land development policies that occur in the municipalities across the service areas. PAWC would need to explore methods of billing property owners for impervious area where PAWC does not have a contract to provide sanitary sewer services (*i.e.*, customers that do not contract for sewer service but still discharge stormwater into the combined sewer system). PAWC would need to decide whether to calculate a stormwater fee based on all impervious area within the service areas, all of the impervious area that lies on a parcel of which at least a part of the parcel discharges to the combined sewer, or only the impervious area that discharges to the

combined sewer. In making this last assessment, PAWC would need to evaluate every property and its relative discharge to the combined sewer; this would include a review of terrain and the conveyance network on private property. In summary, the Company would encounter challenges that are unique to a private company in setting up a stormwater fee focused solely on discharge to the combined sewer system and based on impervious area. It is possible PAWC would be prevented from adopting a stormwater fee because of the legal, regulatory, administrative, or technical barriers associated with one or more of these challenges.

Q. Does this complete your direct testimony at this time?

A. Yes, it does.

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION	:	
v.	:	**DOCKET NOS. R-2022-3031672 (WATER)** **R-2022-3031673 (WASTEWATER)**
PENNSYLVANIA-AMERICAN WATER COMPANY	:	

VERIFICATION

I, **Nathan D. Walker**, hereby state that the facts set forth in the pre-marked Statement No. 14 and accompanying exhibits, if any, are true and correct to the best of my knowledge, information, and belief. I understand that this verification is made subject to the provisions and penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities).

Date: April 29, 2022

Nathan D. Walker

STORMWATER FEE FEASIBILITY STUDY

Prepared for

PENNSYLVANIA AMERICAN WATER COMPANY

for the combined sewer service areas in Kane, McKeesport, and Scranton

Prepared by:

GANNETT FLEMING

APRIL 21, 2022

Contents

Appendix

1. FEASIBILITY STUDY BACKGROUND

In Pennsylvania American Water Company's (PAWC) prior wastewater rate case (Docket No. R-2020-3019369), the Joint Petition for Non-Unanimous Settlement of Rate Investigation approved by the Pennsylvania Public Utility Commission (PUC) required that PAWC review potential recovery and rate methodology options for stormwater costs of its combined sewer systems. This Feasibility Study explored the option of a stormwater fee based on impervious area for PAWC's three combined sewer service areas: Scranton, McKeesport, and Kane. In these areas, the flow of stormwater into the sewer requires additional infrastructure management and regulatory compliance services. PAWC has documented these additional costs.

Consistent with the PUC request, the purpose of this Feasibility Study was to consider the feasibility of creating a stormwater fee as a way to set rates that support the services necessary to maintain PAWC's combined sewer system.

This Feasibility Study includes a review of the available spatial and PAWC billing data, followed by a description of the Considerations municipalities and municipal authorities must consider when establishing a stormwater fee. This Feasibility Study then describes additional Considerations that PAWC must consider as a non-municipal entity followed by a preliminary rate calculation. The Feasibility Study ends with a closing discussion that details the common and unique challenges PAWC would face if it were to enact a stormwater fee as a non-municipal entity.

Note: The question of whether PAWC has the legal authority to enact a stormwater fee is not addressed here. Instead, the purpose of this Feasibility Study is to consider the capability of PAWC to administer a fee, including the methodology needed to 1) **Establish** a stormwater fee and then 2) **Maintain** the stormwater fee.

2. STORMWATER FEE CONSIDERATIONS

Communities across Pennsylvania and the nation are establishing long-term stormwater programs to address aging infrastructure, flood mitigation strategies, and water quality mandates. In addition to providing a source of funding dedicated to a defined set of stormwater services, a stormwater fee provides at least the following other benefits to a community.

- Stormwater fees enable the distribution of the cost of stormwater to property owners based on their measured impervious area.
- Stormwater fees promote proactive long-term planning for capital investments.
- Stormwater fees offer ratepayers incentives to reduce their stormwater discharge or enhance how they manage runoff.

To implement a stormwater fee, communities must first review two general Considerations about their capacity to: 1) Establish a stormwater fee and 2) Maintain a stormwater fee. Communities need to strike a balance between their stormwater goals, the cost of their preferred services, the impact on ratepayers, the cost of data collection, the cost of data maintenance, and the cost of customer service. Some of the points communities must decide on within these two broad Considerations are discussed in general terms below. Some communities proceed through a Stormwater Fee Feasibility Study process to test the applicability of a stormwater fee for their constituents and, once complete, decide that it is not worth the investment. Instead, these communities take action by prioritizing services, prioritizing capital projects, working with regional partners, or more aggressively seeking out grant funds. Other communities move ahead with the steps required to establish and maintain a stormwater fee.

Presently, PAWC funds its stormwater programs with revenue collected through its wastewater sewer charges. PAWC has been tasked to look at an alternative funding approach by enacting a stormwater fee that generates revenue to recover the stormwater-related costs for its combined sewer service areas. Specifically, the task associated with this Feasibility Study as agreed upon by PAWC and the PUC is to:

> "Propose potential recovery and rate methodology options for stormwater costs of combined sewer systems. The proposals will include an analysis of the recovery of such stormwater costs through various methodologies including forms of separate stormwater rates, and a description of the customers to whom the rates would apply."

The two **Considerations** evaluated by communities thinking about a stormwater fee apply to PAWC, as discussed below. This section begins with the application of these two Considerations to PAWC and ends with a discussion of a third Consideration that is unique to PAWC, a non-municipal entity asked to consider the feasibility of a stormwater fee.

Consideration 1. Establishing a stormwater fee

1. **What services will the stormwater fee pay for?**
   An early step in establishing a stormwater fee is to define the program of services the fee will fund. PAWC has performed an analysis of the services required to achieve its stated regulatory compliance and infrastructure management goals and these costs are broken out in PAWC's rate filing with the PUC.

2. **What governance structure will oversee the stormwater fee?**
   Municipalities in Pennsylvania have specific legislation by which they can enact a stormwater fee. All municipalities can authorize a municipal authority to adopt a stormwater fee. These authorities can define their service area as a single municipality or coordinate with other municipalities to serve a broader region. Second Class Townships uniquely have enabling legislation that allows them to enact a stormwater fee outside of an authority structure. Home Rule communities may also enact a fee so long as it is consistent with their charter. These options are not available to PAWC.

3. **What is the method for charging a stormwater fee?**
   Impervious area is most often the feature on which communities base a stormwater fee. The measured amount of impervious area on a parcel provides a broad and general indicator of how much runoff a parcel contributes to the stormwater conveyance network. Of course, other factors contribute to the actual amount of stormwater flowing from

a parcel to the conveyance network (soils, slope, treatment features, vegetation, season, soil moisture content, etc.). However, impervious area is a reasonable property characteristic on which to base a fee. Some communities may consider other parcel characteristics when defining the basis for a stormwater fee, including land use, parcel size, and direct discharge to surface water.

4. What is the definition of billable impervious area?

Communities have different definitions of what types of land cover meet the definition of "impervious area". Buildings and pavement are certainly impervious features. However, definitions can vary based on local decisions about what will be used to calculate a parcel's impervious area. These definitions must be clear so that ratepayers are certain about what their bill is for and how it may change if land cover changes.

Depending on the community, features such as crushed gravel yards, baseball infields, and swimming pools may or may not be included as part of a parcel's impervious area. Further, communities often set minimum thresholds for features' dimensions that can be included in the measurement. For instance, the resolution of aerial imagery may not allow for a sufficiently precise measurement of narrow sidewalks (i.e., less than three feet); or impervious area that is below a certain area threshold and generally disconnected from the conveyance network may be able to be excluded from the measurement.

5. Is all impervious area captured accurately and consistently?

PAWC's consultants digitized impervious area using two methods.

a. In McKeesport and Scranton, using recent and high-resolution aerial imagery, PAWC's consultant attempted to autonomously capture impervious area. Using this method, an automated process analyzed aerial imagery and generated an interpretation of land cover based on predefined parameters loaded into the program.

b. In Kane, aerial imagery of adequate quality was not available to enable the automated process, and so impervious area was digitized manually by a Geographic Information System (GIS) technician. A 10% sample of residential parcels was selected for manual impervious area digitization; impervious area on all non-residential parcels was manually digitized.

Following a review of the data collected through the automated process for McKeesport and Scranton, it appears that it is less accurate than the impervious area collected manually by the GIS technician for the Kane service area. Common issues in McKeesport and Scranton data include the misidentification of gravel parking areas as pervious cover, reflective paved surfaces identified as water features, and inconsistent identification of parking areas when vehicles were present. **Figure 1** shows some examples where the automated process misidentified land cover.

The manual process is certainly more labor intensive; however, this method allows the GIS technician to reference additional sources of data (other imagery, property records, street views) for land cover interpretation. Second, the manual method also enables more consistent application of data capture specifications which can be modified to adapt to local conditions and evolving GIS standards. Third, the manual method offers the opportunity to transfer impervious area cut into the wrong parcel when misalignment exists between aerial imagery and parcel data (**Figure 1**).

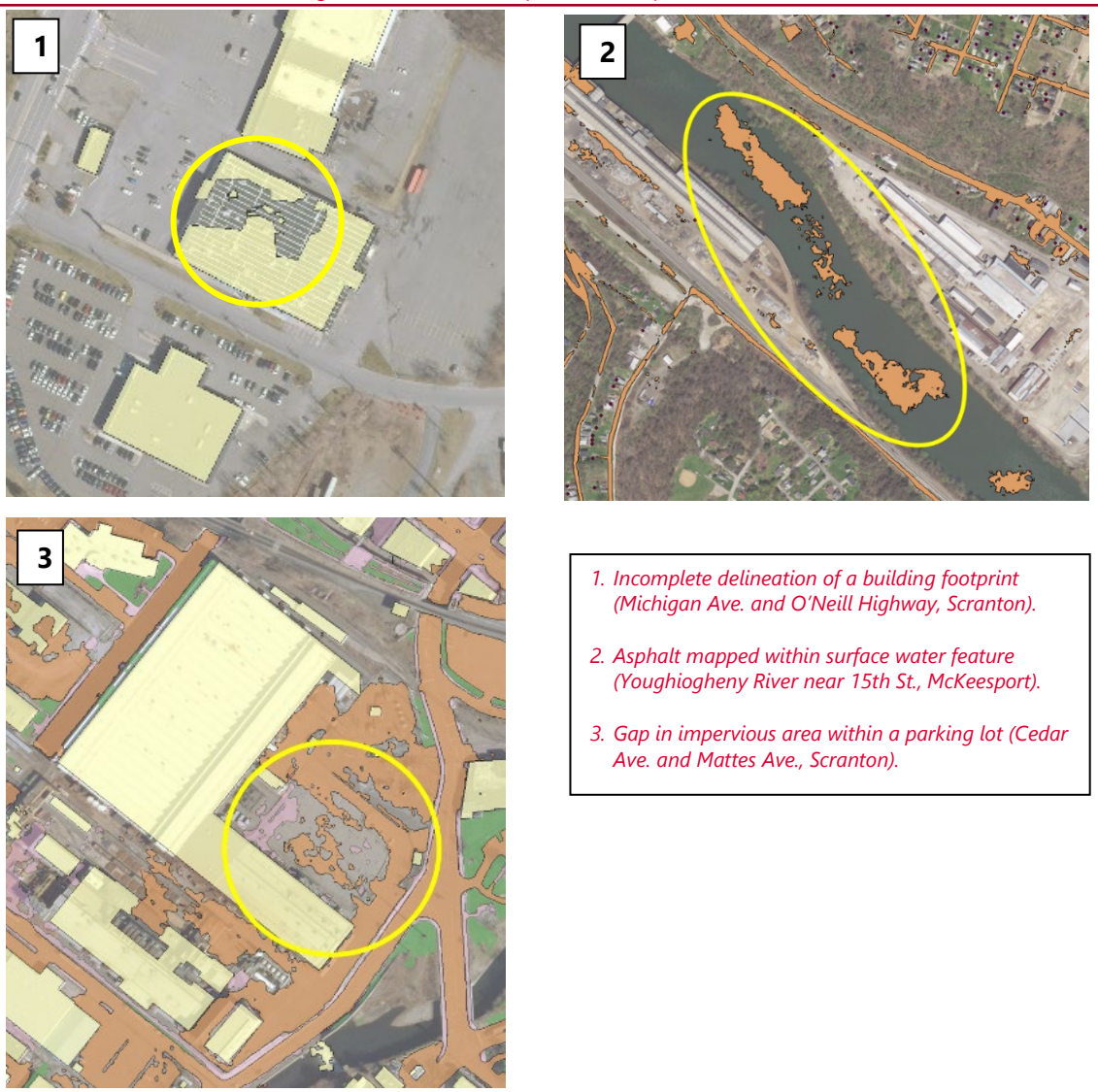
6. Who will pay the stormwater fee?

Communities that enact a stormwater fee generally charge all owners of properties for the impervious area that exists within their parcel. It is common that a parcel must exceed a minimum threshold of impervious area (i.e. 500 SF) in order to be assessed a fee. In some instances, communities charge a stormwater fee to the state, the county, and itself as the municipality, for the impervious area within road the right-of-way.

By charging all properties, communities are able to express their intent to distribute the fee in an equitable manner across all property owners. On rare occasions under specific circumstances, communities exempt certain ratepayers; this is not a recommended approach unless the community can define the reason why the stormwater fee does not

apply to a specific property (or class of property). It is not clear if PAWC has the authority to distribute bills to property owners who have not entered into a contract with PAWC for sanitary sewer services.

Figure 1. Misidentified land cover using automated data capture techniques



7. What is the selected option for a rate structure?

A common rate structure selected by communities that enact a stormwater fee that is based on impervious area uses an Equivalent Residential Unit (ERU). The ERU is typically a measure of the average area of impervious cover on a select sample of residential lots. This ERU is used as the billing unit for all single-family residential properties following a review of whether or not the sample of residential parcels satisfactorily represents the community. The definition of a single-family residential property would need to be defined to account for property conversions, ancillary parcels, and types of dwellings (twins, townhomes, singles). This ERU is then applied as the billing unit to the actual measured impervious area on non-residential parcels.

Where communities have adequate spatial data and administrative capacity to measure and track impervious area for all parcels (both residential and non-residential), they may elect to bill a property owner based on actual measured impervious area.

Although stormwater fee rate structures are generally based on impervious area, there can be variations on this practice. Alternative rate structures consider a tiered ERU rate structure, as well as variations that include total lot area and varying rates for different land uses. Rate structures that require more spatial data and consider more property features may be able to distribute the cost of stormwater management more equitably across ratepayers. However, this additional detail often requires a higher cost to acquire, process, analyze, and maintain the data.

8. What is the method of distributing bills?

Communities generally use one of three methods for distributing stormwater fee bills: property tax bill, sewer/water utility bill, or a stand-alone stormwater bill. PAWC would need to include this fee in its sewer utility bill or as a stand-alone bill; PAWC does not issue property tax bills nor does it have the ability to partner with local tax collectors.

Communities also decide on the timing of distributing bills to ratepayers. Factors considered when making this decision include timing of bills for other fees, timing of tax bills, frequency of bills, alternative bill payment options, and timing of data management.

9. How will impervious area associated with multiple accounts be billed?

Communities need to decide how to bill impervious area when it is associated with multiple accounts. Two examples include:

- Multiple billing accounts may co-exist on a single parcel, such as a group of tenants in a strip mall. In these situations, communities set policies about how to distribute bills across multiple property owners or multiple account owners; or if a stormwater-only bill should be distributed.
- Multiple property owners may share ownership of a single parcel that has shared features, such as a swimming pool owned by a condominium association. Depending on how the association was established, some larger units may have a greater ownership share than smaller units; this detail can help the community distribute the cost across all association members. Depending on the amount of impervious area shared, the community must decide if it is able to justify charging each member an ERU or if the shared parcel should be classified as a non-residential parcel and distribute fractions of ERUs to each member.

10. How is the alignment of aerial imagery and parcel data resolved?

Often, parcel boundaries do not line up with aerial imagery, causing impervious features to bleed across parcel lines. The severity of this issue is different for each community as counties in Pennsylvania that administer parcel data may have varying standards for developing, managing, and correcting spatial data. Misalignment of parcel data with aerial imagery requires communities to establish policies to improve the interface between spatial data from different sources. Options include establishing policies to shift blocks of parcels to match aerial imagery, manually transferring impervious areas across property lines, or accepting the inconsistencies between the data sources and expecting appeal applications from ratepayers.

11. Will credits be available to ratepayers?

Enacting a stormwater fee provides property owners with an incentive to reduce the impervious area on their property. If impervious area is reduced, the ratepayer can inform the community and reduce its fee. In addition, communities have the option to offer credits to ratepayers that allow ratepayers to reduce their fee without removing impervious area. Credit programs have at least three benefits:

1. A defined credit program is another tool the community can use to educate ratepayers about the scope and extent of the stormwater fee.
2. Credits allow ratepayers the opportunity to lower their stormwater fee if they perform an action that reduces the community's cost to perform the defined program of services.
3. A credit program provides community leadership with important talking points about giving ratepayers the opportunity to reduce their own fee.

A credit program adds cost to the community's stormwater program because it takes resources to publicize credit availability, administer the credit application process, and track credits into the billing system. When credits are authorized, it effectively reduces the funds available for the community to implement its defined program of services. In other words, cost reductions earned by ratepayers as credits are typically passed along as higher costs to other ratepayers. Communities must decide if the benefits of a credit program outweigh the costs. If a credit program is offered, the community must decide which activities are eligible for credit, the value of the credit, credit expiration/renewal cycles, and credit application fees.

12. **Will the fee be phased in over time?**
Depending on the billing methodology selected and the cash demand model, communities must select a cycle for bill distribution. Stormwater fees in Pennsylvania are billed monthly, every other month, quarterly, or annually. PAWC bills its sewer customers monthly.

Fees may be billed at the full amount to support the program of services starting in Year 1; or may be phased in to reach their full amount over several years. Depending on the program of services and rate structure, stormwater fees may be a few dollars or hundreds of dollars per residence. Communities consider frequency of billing, rate structure, community demographics, local economic development goals, cash flow demand, administrative capacity, and urgency of stormwater management activities when deciding the pace of rolling out a stormwater fee.

Consideration 2. Maintaining a stormwater fee

1. **What is the method for updating billing units?**
Following the initial billing, communities need to update billing information for subsequent billing cycles. This requires communities to track changes in impervious area, property ownership, land use classification (in the case of an ERU rate structure), and subdivisions. This process is typically informed by periodic activity reports and data updates from county and municipal offices:

    - Real estate transactions;
    - Recorded subdivision plans;
    - Land development as-built plans;
    - Grading permits;
    - Stormwater management permits;
    - Demolition permits;
    - Zoning permits;
    - Stormwater fee credit applications; and
    - Stormwater fee appeals applications.

    Municipal stormwater fee administrators define the process for the flow and cycle of information from these sources to inform billing updates.

2. **What will be the demand for customer service?**
Communities that enact a stormwater fee are served well by a public information campaign prior to initial bill distribution. Such a campaign informs ratepayers of the reason for the fee, the timing of the fee, and the amount of the fee. An information campaign also provides ratepayers with information about their options for appealing the fee by providing more accurate information, applying for credits, or reducing their fee by eliminating impervious area. Even with a thorough information campaign, communities experience many calls during the first implementation stages of a new fee. Communities rely on their customer service staff to answer basic questions about the new fee, as well as routing more complex questions to other municipal stormwater fee administrators.

3. **Who will manage the appeals and credits process?**

Communities must establish a clear system that tracks changes in billing units resulting from successful ratepayer appeal applications. Appeals may challenge the measured impervious area presented on the bill, the ERU tier, or the land use classification. This process regularly requires a review of information provided by the ratepayer and sometimes a site inspection by a municipal representative.

Communities must also establish a system to track the applicability of credits to a ratepayer's bill and their impact on billing units. This may include decisions on credit applications, collection of credit application fees, credit expiration dates, and credit inspection records.

Consideration 3: A Non-Municipal Stormwater Fee

In the case of PAWC, a third Consideration exists due to the fact it is a non-municipal entity; there are no non-municipal entities in Pennsylvania with a stormwater fee in place. Therefore, PAWC must fully understand if legislation enables it to create a stormwater fee. And if PAWC has the authority to create a stormwater fee, then what is the extent of this authority to bill all parcels and to access municipal records about land cover changes?

1. **Does PAWC have the authority to charge a stormwater fee?**
   There is currently no specific legislation enabling a non-municipal entity to enact a stormwater fee.

2. **What would be the process for collecting data from local municipalities within the PAWC service areas?**
   Most land use decisions in Pennsylvania are regulated by local municipalities. PAWC has no responsibility to oversee changes in land use and land cover. However, the basis for most stormwater fees is land use and land cover. And so, in order to maintain an accurate billing database with accurate stormwater charges, PAWC would need a reliable communications process with all municipalities within the service area about changes in land use and land cover. This would be necessary on a monthly basis to be consistent with current PAWC billing practices.

   PAWC has identified at least 20 municipalities within the three counties that make up the three service areas included in this Feasibility Study. Implementation of a stormwater fee would require contracting and regular communication with the administration of all such entities to track all municipal permits within the combined sewer area for changes to land cover, land use, parcel boundaries, and stormwater credits. PAWC would then need to communicate with each municipality to track when the permitted land use/land cover change is complete so that the stormwater fee can be adjusted if necessary.

3. **What is the process for integrating different stormwater management standards into a billing structure?**
   Each municipality has a different set of permits with different thresholds that trigger landowner applications. As an example, some municipalities in the service area included in this Feasibility Study have an MS4 permit that requires general consistency with the Pennsylvania model stormwater ordinance; other municipalities are not required to adopt this model ordinance. Therefore, a ratepayer in one community may be required to manage stormwater quality and discharge rate to a higher standard than a nearby property owner proposing development in a different municipality. PAWC will need to understand the different development standards and the impact these standards have on the services PAWC provides. With different minimum land development and stormwater management standards across the communities in the Feasibility Study area, PAWC may need to differentiate classes of new impervious area based on degree of treatment. For instance, should a new development constructed with stormwater controls designed to manage the 10-year storm pay the same fee as a new development with stormwater controls designed to manage the 25-year storm?

4. **What is the process for communicating with the counties in the service areas?**
   PAWC currently coordinates communication about property ownership data with the three counties in the Feasibility Study area. This coordination enables PAWC to direct bills to the proper address when property ownership changes and when new subdivisions come online. To support a stormwater fee, PAWC would need to also coordinate documentation on property line adjustments and reverse subdivisions. These lot line changes may not have impacted

PAWC's billing database in the past but will be critical to track if a stormwater fee based on impervious area were to be developed.

Counties across Pennsylvania have different standards for parcel boundary alignment and may perform improvements from time to time. Therefore, before updating impervious area measurements, PAWC will need to coordinate with counties if they adjust the spatial alignment of their parcel boundaries. PAWC would then need to review its impervious area data collection specifications (see **Consideration 1.10**) and revise impervious area according to the new data source from the county.

5. **What method will be used to distribute a bill to properties without sewer service?**
PAWC currently has sanitary sewer service contracts with nearly 47,000 accounts across the three service areas that are part of this Feasibility Study. These accounts currently lie on nearly 39,000 of the over 54,000 parcels within the three service areas. However, impervious area occurs on many of the 15,000 parcels not associated with a PAWC sanitary sewer service contract. PAWC would need to decide if they have the authority to create a stormwater-only bill for these parcels that discharge stormwater from their impervious area to the PAWC combined sewer system. This would include the need to determine method of bill distribution, collection, and enforcement.

If PAWC is not able to distribute bills to these property owners, PAWC would need to consider how to equitably distribute the cost of their stormwater program to just those property owners that receive a bill.

6. **What is the boundary between the MS4 and the combined sewer system?**
If PAWC were to develop a stormwater fee for its three service areas, its program of services would likely focus only on addressing stormwater flows into the combined sewer system. The boundaries between the combined sewer system, the separate storm sewer system, and surface water have not been delineated. To perform this delineation, PAWC would require mapping of the drainage network on both public and private properties to evaluate how it interacts with terrain and points of discharge.

Further, depending on the intensity of a storm event, the capacity of the stormwater conveyance network, and the state of storm sewer maintenance, the boundary between the drainage areas to the combined sewer system, the MS4, and surface water may change. Stormwater may flow overland from the MS4 area to the combined sewer area (and vice versa) during certain events, changing the list of property owners that receive PAWC combined sewer services.

If improvements occur that change the combined sewer drainage area, PAWC would need to apply these changes to impervious area mapping and revise billing units.

7. **What will happen if a municipality creates its own stormwater fee?**
All 20 of the municipalities and three counties that make up the three PAWC services areas that are part of this Feasibility Study could enact their own stormwater fee (**Consideration 1.2**). If they do, they should document the program of services their stormwater fee supports. It may occur that the program of services offered by the municipality overlaps with the program of services provided by PAWC. As of the date of this Feasibility Study, none of the municipalities in this Feasibility Study area have enacted a stormwater fee. If this were to occur, PAWC should evaluate the municipal stormwater program of services to avoid a situation where two parties are charging for the same service.

If a municipality were to create a stormwater fee that duplicated services paid for and performed under a PAWC stormwater fee, PAWC would need to coordinate with that municipality to avoid duplication of fees for the same service. Since PAWC requires PUC approval of tariffed rates, any change in fee to adapt to this municipal decision would need to be coordinated with the PUC as part of a rate case.

3. PRELIMINARY RATE CALCULATION

The stormwater related costs, developed through the cost-of-service studies, as shown in Exhibit 12-F sponsored by Constance Heppenstall are $39,790,000. To recover these costs, **Table 1** shows a preliminary calculation of the monthly stormwater fees that would be charged using the data currently available.

Table 1 Preliminary Residential Rate Calculation	
Stormwater costs	$39,790,000
Total billing units	428,542
Average monthly Residential bill per 500 SF of impervious surface if all impervious area is billed	$7.74
Total billing units linked to a Premise ID	294,850
Average monthly Residential bill per 500 SF of impervious surface if only impervious area associated with a Premise ID is billed	$11.25

Assumptions:

- All impervious area that lies within a parcel within the three service areas will be billed, including impervious area that discharges to the combined sewer system, the MS4, directly to a water body, and directly to a point outside of the service area.
- Impervious area for McKeesport and Scranton was acquired through an automated digitization process and would need to be revised to more accurately calculate rates.

Example calculation

Residential

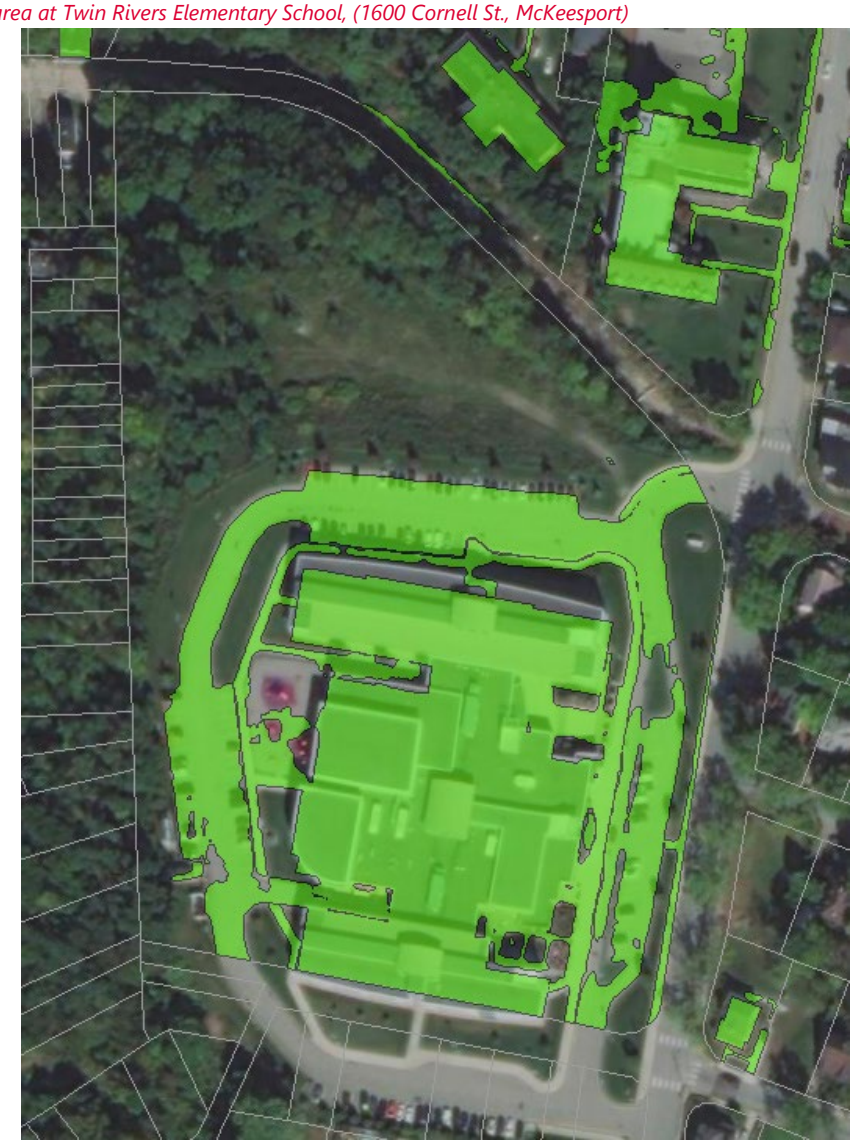
Given the figures above, the average monthly residential bill for each service area is presented in **Table 2**. Stormwater bills would be partially offset by a reduction in the residential wastewater bill.

Table 2 Average Monthly Residential Bill Calculation				
Service Area	**Average impervious area per Residence** (SF)	**Billing Units** (impervious area/500SF – rounded)	**Rate per 500SF of impervious area**	**Monthly bill for average residence**
Scranton	2,422	5	$7.74	$38.69
McKeesport	1,596	3	$7.74	$23.21
Kane	4,374	9	$7.74	$69.63

Non-Residential

Figure 2 presents the impervious area (182,446 SF) mapped for the Twin Rivers Elementary School in McKeesport. This non-residential customer would be charged based on 365 billing units (182,446 SF divided by 500 SF), which would equate to a monthly cost of $2,824.03 based on a unit cost of $7.74 as developed in Table 1. This cost would be much larger than the customer's current wastewater bill. Again, this stormwater bill would be partially offset by a reduction in the wastewater bill.

Figure 2. Impervious area at Twin Rivers Elementary School, (1600 Cornell St., McKeesport)



4. DISCUSSION OF CHALLENGES

All communities enacting a stormwater fee encounter challenges. Many of the decisions communities need to make to address these challenges are described in this Feasibility Study: Establishing a Stormwater Fee (**Consideration 1**) and Maintaining a Stormwater Fee (**Consideration 2**). The decisions for setting policies, establishing the program of services enacting a fee, maintaining data, providing customer service, distributing bills, and collecting payment depends on the size of the community and the community's administrative capacity. Communities typically pass along the costs of these activities to the ratepayer. As more municipalities across Pennsylvania enact stormwater fees, the number of methods for applying solutions to address these Considerations is growing. And although most municipalities have generally good success collecting stormwater fees from ratepayers, some ratepayers are testing their municipality's application of the stormwater fee to their property. These issues are working their way through the Pennsylvania courts.

However, PAWC is not a municipality and therefore must consider a set of questions (**Consideration 3**) that have yet to be tested and have no precedent in Pennsylvania. Combined, these three sets of Considerations pose the following challenges for PAWC, not typically experienced by municipally based stormwater fees.

Communities initiating a stormwater fee encounter costs to both establish and maintain the program. Following each Challenge is a set of **Cost Categories** that PAWC would expect to encounter that are in addition to those costs typically incurred by municipalities or municipalities enacting a stormwater fee.

Challenge 1. Reliance on parcel data administered by multiple counties

Appendix A presents the various sources of data considered as part of this Feasibility Study, including parcel data. PAWC has a system in place for processing changes in parcel ownership and adding accounts associated with new subdivisions and land development.

However, of concern is the accuracy, resolution, and attribute information associated with the parcel data as it relates to impervious area. A stormwater fee would rely on accurate parcel data so that digitized impervious area can be accurately and efficiently linked to a Premise ID for billing. However, the three counties that make up the service area for this Feasibility Study do not manage their parcel data for the purpose of supporting a stormwater fee. The spatial accuracy and drawing standards of parcel data varies across the area evaluated in this Feasibility Study as demonstrated through the following points. These variations impact the consistency by which PAWC could apply a stormwater fee.

- Each county has a different set of attributes fields.
- Each county has different definitions for terms used (land use, dwelling type, etc.).
- Counties have different formats identifying parcels.
- Gaps exist in the unique identifiers and ownership information for some parcels.
- Counties are on different cycles for updating parcel ownership data and entering new subdivisions.
- Alignment of parcels to other sources of spatial data varies between counties.

PAWC's challenge is that it would rely heavily on the parcel data managed by three different counties to support a stormwater fee. When local municipalities enact a stormwater fee, the parcel data is generally consistent across the data set used to inform the fee. Local stormwater fee administrators understand if there are inconsistencies (spatial, format, attribute definitions, update cycle, etc.) in the data and can set defined and specific data management policies to address these inconsistencies. For PAWC, policies to address inconsistencies within county parcel data would need to be established on a county-by-county basis. These policies for addressing each of the bullets listed above would need to be generally consistent with each other across all three counties to support distribution of generally equitable and consistent bills.

Cost Categories:

- **Create Municipal Agreements**. PAWC would need to seek out agreements with each of the local government bodies that are included in the Feasibility Study service area to coordinate timely submittal of updates to parcel spatial data.

- **Develop Data Policies**. PAWC would need to develop specific data management and data use policies for adjusting spatial data received from each county. These county-specific policies would be critical for accounting for the differences in how county parcel data aligns with aerial imagery and impervious area data.
- **Data Management**. PAWC would need to apply data policies to monthly interface updated county parcel spatial data with previously captured impervious area data. Updated parcel changes could be the result of parcel line changes, subdivisions, reverse subdivisions, and spatial data corrections.

Challenge 2. Deciding the extent of impervious area to be billed

The three service areas included in this Feasibility Study cover 84 square miles. Impervious area is distributed broadly across these three landscapes. To proceed with a stormwater fee, PAWC would need to decide if it were to bill based on one of the following four options:

- Bill all the impervious area across all 84 square miles;
- Bill only the impervious area on parcels with a Premise ID;
- Bill only the impervious area that discharges to the combined sewer system; or
- Bill only the impervious area that discharges to the combined sewer system on a parcel with a Premise ID.

Depending on the selected option, PAWC may need to develop a policy for how it could bill a property owner that has not entered into a PAWC contract for sanitary sewer services or delineate the drainage area to the combined sewer (**Consideration 3.6**). In addition, PAWC would need to develop a definition of impervious area, define how varying stormwater management standards across municipalities may impact the stormwater fee calculation, develop data capture specifications, and decide whether the impervious area located within the public right-of-way would be billed.

Once the type and location of impervious area to be billed is defined, PAWC could proceed with impervious area digitization. Typical impervious area digitization requires up-to-date aerial imagery with adequate resolution and angle, preferably in a leaf-off condition. Digitization also requires consistent parcel shapefiles with reliable attributes (land use, structure type, etc.) that allow linkages to property address and billing account information stored as Premise data (**Challenge 1**). During this Feasibility Study, we found that an automated process to capture impervious area is not reliable. Therefore, PAWC would need to duplicate the manual digitization process performed for the Kane service area for the Scranton and McKeesport service areas to ensure that impervious area data capture is available to consistently inform accurate bills.

Ideally, up-to-date aerial imagery would be flown for the specific purpose of digitizing impervious area. PAWC would need to collect any changes in impervious area and parcel configuration occurring between the date of the photograph and the date of the first bill distribution from the 20 municipalities and three counties, in order to print accurate bills. PAWC would then need to track all changes to impervious area (**Challenge 3**).

Cost Categories:

- **Determine Stormwater Fee Service Area**. PAWC would need to determine which of the four options stated above would be used as the extent of impervious area to be charged a stormwater fee. If the fee were only applied to the impervious area discharging to the combined sewer system, the terrain within the service area would need to be mapped to delineate drainage areas.
- **Identify Billing Policies**. PAWC would need to identify the impervious area on parcels associated with a parcel directly linked to a Premise ID. PAWC would need to identify the impervious area on parcels associated with a parcel indirectly linked to a Premise ID. PAWC would need to define strategies for gaining the ability to distribute bills to parcel owners with no link to a Premise ID. PAWC would need to define strategies that prevent parcel owners intending to limit their exposure to the stormwater fee by manipulating links between Premise IDs, parcels, and impervious area.
- **Perform Land Cover Updates**. PAWC would need to contract with each of the twenty municipalities that are included in the Feasibility Study service area to obtain changes to impervious area that occurred between the date of aerial photography and initial bill distribution.

- **Stormwater Conveyance Communication**. PAWC would need to seek out agreements with each of the twenty municipalities that are included in the Feasibility Study service area to coordinate communication of changes in the stormwater conveyance network that may add or remove impervious area discharging to PAWC's combined sewer system. If PAWC only billed impervious area discharging to the combined sewer system, then changes to the stormwater conveyance network occur would prompt PAWC to re-delineate drainage areas and adjust stormwater bills appropriately.

Challenge 3. Regular communication with municipalities for data updates

Twenty municipalities within three counties make up the three service areas included in this Feasibility Study. These municipalities range in size from 79 square miles (Wetmore Township, Kane County) to one-half square mile (Versailles Borough, Allegheny County); and range in population from 1,500 to over 76,000. Therefore, a broad range of forms of municipal government and administrative capacity exists.

To secure the necessary flow of data about impervious area and land use required to submit stormwater bills to ratepayers, PAWC would likely need to establish agreements with each community. These agreements would dictate the flow of information about permits, land development plans, stormwater infrastructure improvements, and other land use changes from each municipality to PAWC. PAWC would then need to regularly compile and process the data from these communities in preparation for distribution of monthly bills (**Considerations 3.2, 3.3,** and **3.4**). PAWC would need to consider the cycle of municipal approval of various permit applications and implement a method for reconciling varying municipal definitions and standards for impervious area, land use, and application of land development regulations.

Cost Categories:

- **Maintaining Municipal Agreements**. PAWC would need to seek out agreements with each of the twenty municipalities that are included in the Feasibility Study service area to coordinate timely delivery and processing of updates to changes in impervious area that could result from grading permits, demolition permits, building permits, driveway permits, land developments, etc.

Challenge 4. Billing impervious area not linked to a Premise ID

Approximately 35% of impervious area across all three service areas is not currently linked to a Premise ID. PAWC is actively creating these linkages wherever appropriate, which will reduce the amount of unlinked impervious area to the greatest extent practical. However, there are many parcels that contain impervious area that will never need to enter into a sewer service contract with PAWC (**Consideration 3.6**). For instance, it is common for a structure with sewer service to exist on one parcel that is associated with other parcels that may include only a parking lot (**Figure 3**). In this scenario, which assumes PAWC has the authority to charge a stormwater fee, PAWC could create a stormwater bill for the impervious area on the parcel linked to a Premise ID (shown in green). However, PAWC would need to link the impervious area on these outlying parcels (in red) to the central parcel that is linked to the Premise ID to be able to distribute a bill for the impervious area on all three parcels.

To associate more impervious area with a Premise ID, PAWC could systematically review the three service areas and link parking lots, service yards, and structures on ancillary parcels to parcels served by a PAWC sanitary sewer.

However, there would still be parcels with impervious area that could not be linked to a Premise ID. This scenario presented in Figure 3 is a straightforward example; property ownership details and joint use of parking areas may not always allow for clear linkages between impervious area and Premise IDs.

Municipalities enacting a stormwater fee can address this issue by distributing stormwater-only bills to the owner of ancillary parcels. It is unclear if PAWC can bill this class of landowner with impervious area and no PAWC sewer service contract.

Figure 3. Impervious area on a parcel linked to a parcel served by a Premise ID (green) and impervious area on other parcels not linked to a Premise ID (red) (O'Neil Blvd. and Eden Park Blvd., McKeesport).

If PAWC could not find a way to link parcels with no PAWC sewer services to a PAWC account, it would be possible for property owners to avoid paying a stormwater fee.

Cost Categories:

- **Billing Policies**. PAWC would need to define its ability to distribute and enforce stormwater-only bills to property owners. Since PAWC may not be able distribute stormwater-only bills to certain parcels with impervious area, PAWC would need to review all parcels not spatially joined to a Premise ID and decide if a linkage to a parcel with a Premise ID could be made. If linkage cannot be made, the cost related to this impervious area would be borne by all ratepayers.

5. FEASIBILITY STUDY CONCLUSION

It is becoming more common for municipalities across Pennsylvania to charge property owners a fee to support local stormwater management goals. Local municipalities can develop a fee structure that balances fee administration costs with stormwater program goals and public priorities. It is challenging for communities to strike this balance. However, local municipalities have specific legislation and land use authority that makes them well-suited to establish and maintain a stormwater fee if local leadership desires.

We recommend that PAWC continue to partner with local municipalities in those locations where it is appropriate to separate the flow of stormwater discharging to the combined sewer system. This investment will eventually reduce the operating cost of treating wastewater and managing water resources.

PAWC has been asked to consider the practicality of a stormwater fee for its service areas served by a combined sewer network. Witnesses for parties in the last base rate case contended that it is theoretically possible for PAWC, as the provider of sanitary sewer service, to establish and maintain a separate fee for stormwater management. However, this Feasibility Study describes the four additional Challenges PAWC, as a non-governmental entity, would need to address above and beyond those commonly faced by municipalities when enacting a separate stormwater fee. Although the goal is to equitably distribute the cost of stormwater management within the drainage area to the combined sewer system, a stormwater fee does not appear to be a reasonable solution to achieve that goal. And, in the end, a stormwater fee may not distribute the cost of stormwater services any more equitably than the current rate structure.

In conclusion, the following two Scenarios illustrate how the Challenges defined above would impact PAWC if it were to develop implement, administer, and collect a stormwater fee based on impervious area within the three combined sewer systems. These Challenges, and their impact on the ability to equitably distribute the cost of stormwater management, are substantially amplified under Scenario b.

a. **If PAWC has the authority to distribute stormwater bills to all property owners in the Feasibility Study service area**, PAWC would need to add the following tasks to its water resource management program:
   - Acquire current, high quality aerial imagery data.
   - Acquire up-to-date parcel data.
   - Delineate the drainage area to the combined sewer system and understand how the drainage area changes based on conveyance network condition and storm intensity.
   - Manipulate parcel data projection, formatting, and alignment to gain consistency across parcel data sources and with aerial imagery.
   - Digitize impervious area data based on a data capture specification used across all three service areas.
   - Review approximately 4,300 Premise IDs that are co-located on parcels to decide which ones should receive a stormwater bill.
   - Contract with and regularly communicate with 20 municipalities and three counties regarding changes to land cover, land use, MS4 extent, and stormwater management policy.
   - Translate the various forms of land use and land cover data provided by the municipalities and counties into a standard form for consistent integration and application into the PAWC billing database.
   - Develop various stormwater fee classes based on the varying land development standards and stormwater rate controls used in municipalities across the service area.
   - Associate impervious area on parcels with no Premise ID to parcels with a Premise ID.
   - Create a method for entering into a contract with property owners to distribute stormwater-only bills to parcels with no ability to be linked to a parcel with PAWC sewer service.

   While certain of the tasks listed above could be accomplished by PAWC, many of the more significant tasks would have to be performed by the municipalities that lie within PAWC's service areas for the combined sewer systems. This distribution of the responsibilities reflects the fact that stormwater management is fundamentally a governmental responsibility that requires authority, and access to data, that are largely municipal prerogatives. If PAWC were charged with the responsibility

of implementing and administering a stormwater charge, it would not be feasible for PAWC to do so unless there are comprehensive agreements between PAWC and the municipalities within the relevant service areas, as well as agreements among the municipalities themselves, to perform those tasks and provide the relevant data needed to develop and administer a stormwater cost-recovery program. Even assuming that such comprehensive agreements could be achieved, doing so would require extensive time, resources, and expenditures by PAWC and by the municipalities involved. It would also require official governmental action and authorization by the municipalities themselves.

Further, it is not likely to be feasible for PAWC to practically enforce payment of stormwater fees on properties receiving no other PAWC service. Delinquent or non-payments would either underfund PAWC's stormwater services or require PAWC to push the cost of stormwater services on to those ratepayers that are paying the stormwater fee.

b. **If PAWC does not have the authority to distribute bills to all property owners, but only sewer customers,** the burden of paying for the combined sewer services would fall to a smaller set of ratepayers. Under this Scenario, PAWC would still need to follow through with all but the last action described under Scenario a. above. Then, PAWC could only distribute bills to those parcels that are currently linked to an active Premise ID. Significant areas of impervious cover would not be billed, pushing the cost of PAWC's stormwater services to a smaller set of ratepayers. With this incentive to disassociate impervious area from Premise IDs, owners of parcels with large areas of impervious area discharging to the combined sewer system may take action to avoid the stormwater fee by manipulating parcel boundaries and account information.

If PAWC's authority is limited such that it can issue bills for stormwater charges only to the owners of parcels that have a Premises ID, then a primary goal of implementing stormwater charges (i.e., to recover costs in a manner that more closely tracks cost-causation) would not be achieved because potentially significant contributors to stormwater runoff discharging to PAWC's combined sewer systems could evade paying any part of the cost of stormwater management.

APPENDIX A
Relationship Between Data Sources

On behalf of PAWC, Gannett Fleming coordinated a review of four types of data for each of its three geographical combined sewer service areas: aerial imagery, parcel data, billing account data (Premise files), and impervious surface coverage. This section describes the findings from that analysis about the limits of these data sources for establishing and maintaining a stormwater fee, as well as a description of how these sources of data interface with each other. This analysis was used in the Feasibility Study to describe the methodology that would be needed to establish and maintain a stormwater fee. **Table 3** presents the data files used in the analysis for each service area evaluated, followed by some general observations about the data.

Table 4 provides some statistics about the interface between the four data types. There are several key takeaways from the statistics presented in the table, including:

- 73% of the total Premise IDs are in a one-to-one relationship with a parcel, leaving 12,500 Premise IDs needing special attention when determining a bill recipient.
- 68% of the measured impervious area that lies within a parcel is associated with a Premise ID; the remaining 32% (1,600 acres of impervious area) exists on parcels not currently served by PAWC.

Table 3 Spatial Data used in the Feasibility Study

Source	Kane Service Area	McKeesport Service Area	Scranton Service Area
Pennsylvania American Water	• ServiceAreasWW		
	• McKeanCountParcels2021_WGS84 • KaneWW_Premise	• AlleghenyCounty_AddressPoints202112 • AlleghenyCountyParcels2021_WGS84 • McKeesportWW_Premise	• LackawannaCountyParcels2020_WGS84 • ScrantonWW_Premise
NearMap		• Surfaces_Asphalt_Mar2021 • Surfaces_ConcreteSlab_Mar2021 • Surfaces_LawnGrass_Mar2021 • Surfaces_NaturalSoft_Mar2021 • Surfaces_WaterBody_Mar2021 • BuildingFootrpints_Building_Mar2021 • Hard_Surface	• Surfaces_Asphalt_ Apr2020 • Surfaces_ConcreteSlab_ Apr2020 • Surfaces_LawnGrass_ Apr2020 • Surfaces_NaturalSoft_ Apr2020 • Surfaces_WaterBody_Apr2020 • BuildingFootprints_Building_Apr2020
Gannett Fleming	• ResidentialSampleSet • ResidentialImperviousArea • Non-residentialImperiousArea		
Publicly available	• 2018 PA Emergency Management Agency aerial imagery		

Aerial imagery

- The publicly available aerial imagery used to digitize the impervious area for the Kane service area was taken in leaf-off condition and adequate for the Feasibility Study. For greater precision, future impervious area digitization should be performed using aerial imagery with greater resolution and a flight angle that is more compatible with parcel lines.

- It is our understanding that the aerial imagery used for the McKeesport and Scranton service areas was flown by a PAWC vendor in preparation for this Feasibility Study. We assume the resolution, angle, alignment with parcel data, and date of this imagery was of similar or better quality than the publicly available aerial imagery used for Kane.

Parcel data

- All three service areas had greater than 98% of their parcel polygons associated with a unique parcel identification number (PIN) assigned by the respective county. Some parcels were stacked (meaning duplicate versions of a parcel are located in the same location). PIN format was generally consistent for each county: Allegheny PINs are 16 digit/letter combinations; McKean County PINs are 8- or 9-digit numbers; Lackawanna County PINs are in either an 11- or 13-digit format. Consistent ID format within parcel data can be useful when creating links to spatial and Premise data.

- Parcel boundaries from the three counties that make up the service areas were generally aligned with aerial imagery. However, it was common for digitized impervious area that occurred in close proximity to a parcel border to "bleed" into an adjacent parcel (**Figure 4**). This could be the result of any or all of the following:

    - inaccurate parcel linework,
    - misaligned aerial imagery,
    - varied projections of GIS data, or
    - the angle at which aerial imagery was taken.

Figure 4. Impervious area (in bright green) in a residential neighborhood bleeding over parcel borders (Franklin St. near Boyle Ave., McKeesport).

- Parcel data for the Scranton service area included a "Dwelling_1" field that categorized parcels into six land use classifications. Land use "R" was considered as an option for identifying Residential parcels. However, data from PAWC included customer class by Premise ID that was used in the Feasibility Study.

- Parcel data for the McKeesport service area did not include land use classifications. Therefore, data from PAWC that included customer class by Premise ID was used in the Feasibility Study analysis.

Premise data

- Nearly 95% of all Premise IDs were able to be associated with a parcel polygon (although not all polygons were assigned a county PIN.

- PAWC Premise data includes an "AccountCla" attribute field that describes the type of the account. There are four categories in this field that were used to determine the residential/non-residential status of the account used for analysis in the Feasibility Study. County data provided additional land use information (type of residential structure, condominium, etc.) in the parcel data that could be used to support more granular categorization of accounts.

- In McKeesport, 90% of all Premise IDs were associated with a parcel on a one-to-one basis. **Figure 5** presents a series of single parcels that are associated with a single Premise ID. The blue arrows show examples of parcels associated with multiple Premise IDs.
    - In Kane, 77% of Premise IDs were associated with a parcel on a one-to-one basis;
    - In Scranton, the number of Premise IDs associated with a parcel on a one-to-one basis drops to 67%.

- In McKeesport, 431 parcels (2%) were associated with multiple Premise IDs.
    - In Kane, 190 parcels (7%) were associated with multiple Premise IDs; 3,673 parcels (11%) in Scranton.

Figure 5. Examples of multiple Premise IDs (dot locations) on one parcel (blue arrows) (Adams Ave. and Mulberry St., Scranton).

Impervious area

- The following three-step process was used for digitizing impervious area in PAWC's Kane service area. Baseball infields, swimming pools, and gravel lots were digitized as impervious area. Features less than 300SF in size were not digitized. Sidewalks and other linear features less than four feet in width were not digitized.

    Step 1. Identified Residential parcels (2,167) using county data. Parcels were divided into two classes based on the attributes included in the county parcel data: Residential and Non-residential. The "Land_Use_C" field in the county parcel data included nine parcel classifications. Parcel classification "R" was used to identify the set of

Residential parcels. All other parcels were designated as Non-residential for the purposes of the Feasibility Study.

Step 2. Selected 10% of the Residential parcels at random (225 parcels). Reviewed each parcel in the random sample to confirm single-family residential as the primary use. Parcels that had a different primary use were replaced with parcels confirmed as single-family residential. Reviewed distribution of selected parcels across the service area. Compared the average parcel size of the selected parcels (1.33 acres) to the average size of residential parcels across the service area (1.32 acres). Digitized impervious area on the selected set of parcels. The average impervious area for the selected set of parcels was 4,374 SF. This average amount of impervious area on the sample set could be used as the Equivalent Residential Unit (ERU) in the Kane service area if a stormwater fee were enacted.

Step 3. Identified all Non-residential parcels using county parcel attribute data and digitized the impervious area on each. The total amount of impervious area meeting the data capture specifications for all Non-residential parcels was approximately 214 acres. The ERU calculated in Step 1 could be applied to each Non-residential parcel to define billing units.

- In Kane, County data presents approximately 2,167 parcels with a primary use as Residential. However, many of these 'Residential' parcels were found to be vacant or ancillary parcels adjacent to a parcel under the same ownership that included the dwelling. These ancillary parcels (**Figure 6**) often contained sheds, driveways, and swimming pools. Therefore, it is likely that there are significantly fewer than 2,167 Residential parcels in the Kane service area and the sample set represents more than 10% of the total parcels with Residential as the primary use. Future analysis could review the impervious area associated with a Residential parcel's ancillary parcels as an alternate method for calculating the impervious area associated with a residential unit. PAWC Premise data includes 1,877 accounts designated with an "AccountCla" as Residential, which has some correlation to land cover.

Figure 6. Example of an ancillary parcel linked to a Residential property (Hemlock Ave. and Pennsylvania Ave., Kane).

- Impervious area digitization for McKeesport and Scranton service areas was performed using semi-automated feature extraction. This process identifies six types of land cover (asphalt, concrete, lawn, natural, water, buildings). For this Feasibility Study, these categories were grouped into two broad classes of land cover: Pervious and Impervious. Although this process can analyze land cover for large areas quickly, the accuracy of the data provided to PAWC was

not found to be acceptable for this use. Specific instances of the failure of this process are presented in **Consideration 1.5** above.

- As currently mapped in Scranton, approximately 68% of the impervious area that lies within a parcel could be associated with an existing Premise ID. The remaining 32% of impervious area is not associated with a Premise ID. **Figure 7** presents parcels with at least one Premise ID as light green parcels; parcels with no Premise ID are shown in light gray. Therefore, impervious area in bright green is billable; impervious area shown in dark gray is not billable.
    - 77% of impervious area in McKeesport is associated with an existing Premise ID; 70% of impervious area in Kane is associated with an existing Premise ID.

Figure 7. Impervious area associated with a Premise ID in bright green; impervious area with no Premise ID in dark gray (Greenridge St. and Penn Ave., Scranton).

Table 4 Relationships between Data Sources

	Kane	McKeesport	Scranton
Total Premise IDs	**2,364**	**12,117**	**32,262**
Premise ID linked to a parcel polygon	2,281	11,995	30,534
Single Premise ID linked to a single polygon	1,820	10,880	21,515
Premise IDs co-located on a single polygon	461	1,115	7,283
Premise IDs located on a polygon with no PIN	83	122	1,732
Total Parcels	**2,715**	**18,201**	**33,330**
Parcels with Impervious Area	Not determined	15,780	32,012
Parcels with Impervious Area >500SF	Not determined	13,166	30,224
Parcels linked to a Premise ID	2,010	11,315	25,427
Parcels with Impervious Area >500SF linked to a Premise ID	Not determined	11,064	25,269
Parcels linked to a single Premise ID	1,820	10,880	21,515
Parcels linked to multiple Premise IDs	190	431	3,673
Parcels with no PIN linked to a Premise ID	83	122	1,732
Total Impervious Area in Parcels	**430 ac** Residential: 216 ac (calculated) Non-Residential: 214 ac (measured)	**924 ac**	**3,608 ac**
Parcels with >500SF impervious area	Non-residential: 415	13,166	30,224
Impervious area on parcels with >500 SF IA	Non-residential: 214 ac	917 ac	3,601 ac
Parcels with only a Residential Premise	1,877	9,456	21,643
Parcels with a Non-residential Premise	351	1,859	829
Impervious area on parcels with Premise	303 ac Residential: 216 ac (calculated) Non-Residential: 89 ac (measured)	712 ac	2,357 ac

Note: Data presented in Table 4 does not include corrections of county data for stacked parcels, duplicate PINs, missing PINs, missing polygons, or incorrect parcel lines.