BEFORE THE
PHILADELPHIA WATER COMMISSIONER

In the Matter of the Philadelphia Water Department's Proposed Increase in Rates for Water and Wastewater Utility Services	FY 2009-2012

DIRECT TESTIMONY OF
WESLEY R. HORNER
ON BEHALF OF NEXT GREAT CITY STORMWATER SUBCOMMITTEE

DATED: December 11, 2008

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Wesley R. Horner. My business address is U.S. Route 1 and Creek Road (formerly known as PA Route 100), P.O. Box 141, Chadds Ford, Pennsylvania 19317.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am currently employed as Senior Advisor for Water Resources at the Environmental Management Center, Brandywine Conservancy. Prior to November 1, 2008, I was employed by CH2M HILL in Philadelphia as Principal Technologist. Before September 8, 2008, when CH2M HILL acquired the staff of Cahill Associates, Inc. (Cahill), I worked for a total of nearly 20 years as Principal Planner at Cahill, 104 South High Street, West Chester, Pennsylvania 19382.

Q. FOR WHOM ARE YOU TESTIFYING IN THIS PROCEEDING?

A. I am testifying on behalf of the Next Great City Stormwater Subcommittee.

Next Great City is comprised of over 100 civic, health, faith, labor, environmental and social service organizations within Philadelphia, all supporting a common-sense, cost-effective agenda to improve the neighborhood environment and to truly make Philadelphia the “Next Great City”. One of the ten policy recommendations advanced by Next Great City is to stop sewer backups and flooding, identified by polling as a top issue for both Philadelphia’s businesses and residents. In that polling, 21 percent of residents had a basement flood after a rainstorm and 31 percent of businesses suffered property

damage from flooding in the previous year. Residents and business owners alike also ranked these as two of the top five changes needed to improve the livability of the city: "Reduce the amount of sewage and other pollution entering our rivers" and "fix the city's water and sewer system to stop leaks and water main breaks". A Next Great City Stormwater Subcommittee was formed to address these issues and recommended that Philadelphia charge a user fee for stormwater management that is based wholly or in part on impervious area and offer credits and incentives to property owners who take effective actions to minimize their property's contribution to our stormwater problem.

Q. PLEASE EXPLAIN THE PURPOSE OF YOUR TESTIMONY.

A. Cahill, and now the Brandywine Conservancy, was retained by the Next Great City Stormwater Subcommittee to evaluate the stormwater rate design component of the Philadelphia Water Department's Proposed Increase in Rates for Water and Wastewater Utility Services FY 2009-2012 (Stormwater Rate Design) and to opine on whether the Stormwater Rate Design is just and reasonable.

Q. PLEASE SUMMARIZE YOUR OPINION ON THE STORMWATER RATE DESIGN.

A. Cahill and the Brandywine Conservancy strongly endorse the Stormwater Rate Design, which they believe is more just and reasonable than the existing water meter-driven system. First, the Stormwater Rate Design will distribute actual stormwater costs in a manner that more accurately reflects real user contribution to the stormwater problem.

Second, the Stormwater Rate Design will incentivize stormwater problem solutions to be undertaken individually across the city to the benefit of all ratepayers.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE, PARTICULARLY AS THEY RELATE TO THE SUBJECT MATTER OF YOUR TESTIMONY.

A. A true and correct copy of my resume is attached to my direct testimony.

I received a Bachelors Degree from Haverford College in 1971 and a Masters Degree in City and Regional Planning from Harvard University's Graduate School of Design in 1975. Since graduate school, I have worked in public government and non-profit settings; the bulk of my experience has been in private environmental consulting.

At Cahill, I was involved in a variety of water-related and usually stormwater-related projects that strived to achieve better balance between land development and water and stormwater impacts. Many of these projects were large in scale, such as Pennsylvania Act 167 Stormwater Management Plans and Pennsylvania River Conservation Plans. I managed development of Pennsylvania's stormwater Best Management Practices Manual (2006), as well as the soon-to-be-released Low Impact Development (LID) Manual for Michigan and LID manual for Southern California. Although I am not a registered licensed engineer, these projects have allowed me to develop an intimate knowledge of stormwater management, methodologies to calculate stormwater, and management

practices designed to prevent and comprehensively mitigate stormwater problems, their total volume, peak rate, and water quality impacts.

For five years (1995-2000), I worked as the Associate Director of the Environmental Management Center at the Brandywine Conservancy, where I directed the Water Based Land Use Regulation program with a major focus on stormwater management. At the Brandywine Conservancy, I developed and managed preparation of the Conservation Design Manual for Delaware, working closely with some of the country's foremost stormwater management experts and directors of the national stormwater programs for the United States Environmental Protection Agency (EPA). I have recently returned to the Brandywine Conservancy to further its work in comprehensive water resources management, including stormwater management and site design.

Additionally, I have designed and conducted dozens of stormwater workshops and seminars in Pennsylvania and beyond for the Pennsylvania Environmental Council, the Chesapeake Bay Foundation, Villanova's Urban Stormwater Partnership (VUSP), county conservation districts, and planning commissions, all designed to teach users how to put new innovative stormwater management practices in place.

As part of this and related work for municipalities, counties, and states, as well as advocacy organizations such as the Delaware Riverkeeper Network, Clean Water Action, Green Valleys Association, and the Brandywine Conservancy, I have developed model stormwater management and broader land management ordinances designed to

operationalize the innovative stormwater management program approaches and practices contained in these technical guidance manuals.

This work on the broader watershed-wide program and policy level has been reinforced by many "real world" site planning projects, development by development, where theory is put into practice and where private land developers have committed to implementing progressive stormwater management that deals successfully with quantity and quality impacts. Although many of these projects have been located in suburban "greenfield" settings, an increasing number have been major re-development projects in urban settings.

In sum, for the last 25 years, I have been heavily involved in all aspects of stormwater management. I have studied both stormwater problems and their causes, as well as innovative ways to solve those problems.

Q. PLEASE DESCRIBE THE EXPERIENCE OF CAHILL (WHERE YOU SPENT MUCH OF YOUR CAREER), PARTICULARLY AS IT RELATES TO THE SUBJECT MATTER OF YOUR TESTIMONY.

A. For well over 25 years, Cahill approached water resource issues – and stormwater management in particular - from an innovative and unconventional perspective, which now has become broadly accepted. Understanding stormwater as part of the larger hydrologic or water system of which it is a critical part was the Cahill hallmark; striving

to accommodate new land development or re-developments in ways that maintain maximum balance in the pre-development cycle was the ultimate objective.

Early on, Cahill viewed problems such as stormwater as more than matters of peak rate control and flood prevention, but as problems with broader water cycle implications and central to problems of water quality management. For years, Cahill designed stormwater management systems that tried to put as much runoff back into the ground as close to the source (point of generation) as possible, using techniques such as porous pavement over recharge beds and naturally landscaped infiltration beds and vegetated roofs. These simple practices, often tucked into the building program for a reduction in disturbed area, achieve excellent volume and peak rate and water quality (and temperature) results. With resultant water cycle balance, environmental benefits are maximized.

In all of this work, Cahill focused on careful identification of the stormwater problem, both quantitatively and qualitatively. Early on, we learned to sort out the impacts of impervious surfaces, but also paid close attention to the problems of compaction in the otherwise pervious landscape. Pollutant loadings, from relatively modest atmospheric deposition on rooftops to the much more intense loadings of highly-trafficked urban streets, are matched to innovative stormwater solutions that remove certain types of pollutants at varying rates.

For some years, Cahill's work focused on developing suburban zones in metropolitan areas across the country. In more recent years, however, there has been a rapidly

developing focus on older urban areas, such as Philadelphia, where the problems of stormwater management have been complicated dramatically by the reality of combined sewer systems, where stormwater problems suddenly become much more complex and difficult and costly to solve; even more is at stake when, along with increased volumes of pollutant-laden stormwater, untreated sewage is included in the mix that is discharged into rivers and estuaries. It is therefore understandable that solving combined sewer overflow (CSO) problems has become a major local, state and national priority.

Conventional CSO "hard" solutions that engineer costly added storage in CSO systems – to temporarily store CSO flows during storm events – are extremely difficult and costly to achieve. Cahill's "divide and conquer" lot-by-lot toolbox of Best Management Practices (BMPs) - and the philosophy behind this mix of stormwater solutions to put water back into the ground and strive for water cycle balance, offers exciting potential for CSO-plagued urban areas. The bad news is that these solutions, like rain barrels at every house, are extremely decentralized, necessarily very numerous, and therefore hard to manage. The good news is that they are flexible - some of them can be initiated and implemented without waiting for major funding to be put in place to support major public actions. Cahill applied these strategies in Philadelphia, as well as in Pittsburgh, Cincinnati, Syracuse, and other large urban areas.

Q. CAN YOU PROVIDE ANY EXAMPLES OF PROJECTS ON WHICH YOU HAVE WORKED?

A. Yes. One example is the new Woodlawn Library in Wilmington, Delaware, at a site that previously had been developed, paved over, and abandoned in this CSO-characterized city. A stunning new library with substantial adjacent parking and landscaped gardens takes runoff from rooftops and then pipes it into cisterns to be used later for landscape irrigation. Runoff is directed through porous pavement into recharge beds underneath the large parking areas; substantial runoff flow enters subtly depressed rain gardens, landscaped with attractive native species. The net effect is to accommodate substantial new development with a dramatic reduction in both water quality and water quantity impacts. With engineering consultants Greeley and Hanson, we pursued these strategies with Wilmington in their Rockford Road neighborhood, working in a voluntary capacity with residential owners. We undertook studies in larger portions of Wilmington to demonstrate that these "green" stormwater BMP strategies not only can achieve direct stormwater benefits, but also make significant progress in solving the serious CSO problems facing these urban areas.

Another example closer to home is the Penn New School (Sadie Alexander School), built with assistance from the University of Pennsylvania in highly impervious and densely developed West Philadelphia. This innovative K-8 structure redirects substantial stormwater flows from school rooftops and even from adjacent rooftops into sub-surface infiltration beds located under hard-surfaced basketball courts and into massive infiltration systems underneath large grassed athletic fields. The previously paved site, which lacked any stormwater management, was a CSO nightmare; after developing this highly-intensive educational use, significant quantities of stormwater runoff were

removed from the CSO system with this “green” solution – at a small fraction of the cost of other more structural CSO solutions (“gray” solutions).

Q. HAVE YOU DONE OR ARE YOU DOING ANY WORK RELATED TO STORMWATER FOR THE CITY OF PHILADELPHIA?

A. Yes. Cahill, with the Pennsylvania Horticultural Society (PHS), competed for and was awarded by the Philadelphia Water Department (PWD) the contract to prepare the River Conservation Plan for the Delaware (Direct) River. A major thrust of this Pennsylvania Department of Conservation and Natural Resources-funded Plan is developing strategies for the re-development of the city in ways that complement and promote environmental and broader quality-of-life objectives. As such, improved stormwater management is a major part of the Plan; stormwater issues – problems and solutions – are dealt with in detail. My relocation to the Brandywine Conservancy has terminated my involvement on this project.

Q. HAS THIS WORK INFLUENCED YOUR TESTIMONY IN THIS PROCEEDING?

A. No. Neither Cahill nor the Brandywine Conservancy is working for PWD in connection with this proceeding, nor has PWD influenced or attempted to influence this testimony, which is provided solely on behalf of the Next Great City Stormwater Subcommittee.

Q. WHAT MATERIAL DID YOU REVIEW IN PREPARATION OF YOUR TESTIMONY?

A. In preparation of my testimony, I reviewed all materials in this matter that were relevant to the Stormwater Rate Design, including:

- Notice to City Council dated April 4, 2008
- Press Release - PWD Proposed New Water & Sewer Rates
- Q&A -- PWD Proposed New Water and Sewer Rates and Public Hearings
- Binder 1- Philadelphia Water Department Testimony & Exhibits
    - Direct testimony of J Rowe Mckinley & Exhibits JRM1 & JRM 2
    - Supplemental Testimony of J Rowe Mckinley and Exhibit JRM 3
    - Direct Testimony of Joanne Dahme
- Binder 2- Standard Interrogatories
    - Standard Interrogatories: 24-49
        - Standard Interrogatories: 33, 45, and 58
- Binder 4- Standard Interrogatories Attachments 11-27
    - Attachment 25
        - Flooding Reports
    - Attachment 26
        - Stormwater Charge Allocation Community Advisory Committee Final Report
- Binder 5- Revisions to Chapter 3-Rates & Charges of Water Department Regulations
    - Law Department Certification of Proposed Water Regulations
    - Proposed Water Regulations
- Philadelphia Stormwater Management Guidance Manual
- PWD Stormwater Reallocation Presentation materials

- Stormwater Pre-Discovery Hearings documentation provided in connection with the informal discovery/status tele-conference held on November 6, 2008
- All PWD discovery request responses relating to the Stormwater Rate Design
- Direct Testimony of Jerome Mierzwa
- Direct Testimony of Dennis M. Kalbarczyk

Q. PLEASE BRIEFLY EXPLAIN THE STORMWATER PROBLEM IN PHILADELPHIA.

A. Stormwater is acknowledged as a major problem in Philadelphia, where an existing system of storm drains, inlets, and conveyance piping discharges untreated stormwater into receiving streams and rivers (non-CSO portion of the city) and/or into wastewater treatment plants (CSO portion of the city), where, depending upon the size of the storm event, stormwater is combined with untreated wastewater for discharge into the Delaware or Schuylkill Rivers, or is directed to wastewater treatment plants to complicate their operation.

Additionally, localized flooding problems have worsened in Philadelphia, related to increased storm intensity documented in recent years which exceeds the capacity of the storm sewer system, combined and separated, in certain neighborhoods and along certain blocks. When intense storms occur and runoff is not able to be removed, backups result in the form of street flooding as well as significant basement flooding that includes untreated stormwater runoff as well as untreated sewage. To reduce these impacts, PWD

has mounted its Basement Backup Protection Program, through which reverse valves are installed to prevent these basement backups. The work required as part of this Program is costly and complex (individual owners also make these improvements privately, without participating in the PWD Basement Backup Protection Program).

All of these stormwater-related problems translate into serious environmental and utility operations impacts that need to be corrected through elaborate and costly corrective actions being undertaken by PWD. The Stormwater Rate Design is intended to support these corrective stormwater program actions.

It is important to note here that PWD's corrective program actions to be supported by the Stormwater Rate Design are expenditures to support a decidedly public program which, as costly and ambitious as it is year to year, will require many years to deal completely with Philadelphia's widespread stormwater problems. It is also important to recognize that stormwater problems, including problems with CSOs, are very much the result of private actions – runoff generated at private land developments, in addition to public streets and other developed public areas. Because public action and programming by themselves are not capable of correcting all of the stormwater problems that exist across the city (nor should they be in terms of basic equity), additional private corrective actions are of paramount importance in solving the overall stormwater problem. In other words, PWD's stormwater program, however ambitious, needs to be reinforced with private owner/resident action.

PWD corrective program action needs to be understood in the context of substantially evolving state and federal regulations, including (1) general stormwater management regulations which apply across the country, and (2) added requirements for CSO remediation/mitigation in those older urban areas where combined sewers exist and discharge into waters of the United States.

Through the Federal Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program requires municipalities to obtain permits for discharges of stormwater and other pollutant discharges into receiving waters. When discharges reach a threshold, stormwater permits are required, regardless of whether CSOs exist. Additional program regulations have been established by the EPA for municipalities such as Philadelphia which have combined sewers as part of their stormwater systems. Although the two problems - stormwater and CSOs - are not exactly the same problems, their solutions are substantially physically interrelated and in fact can and should be integrated. To its credit, PWD has mounted such an integrated stormwater approach through the Stormwater Rate Design, through its new stormwater management regulations, through its new BMP guidance manual, and through other related program elements.

All of these elements form the basis of a comprehensive stormwater management program that functions to proactively incentivize stormwater management practices that reduce runoff and reduce runoff into CSOs.

Q. YOU TESTIFIED ABOVE THAT THE STORMWATER RATE DESIGN WILL DISTRIBUTE ACTUAL STORMWATER COSTS IN A MANNER THAT MORE ACCURATELY REFLECTS REAL USER CONTRIBUTION TO THE STORMWATER PROBLEM. PLEASE EXPLAIN.

A. The existing stormwater rate program is based on the size of the water supply meter which relates to use of water at the site, but which lacks relatedness to the stormwater problem. Water use is not directly related to stormwater generation. It is true that as water use increases, sites tend to get larger and tend to be more impervious and, therefore, tend to generate more stormwater. However, these relationships are not linear. Certain types of small commercial facilities (e.g., laundries) can use large quantities of public water but generate very small quantities of stormwater, yet are assessed large stormwater fees. Conversely, large parking lots don't use any public water and therefore are assessed no stormwater fees, even though they generate large quantities of stormwater. This existing water meter-based system is significantly flawed technically in terms of stormwater cause and effect. Predicating stormwater fees on water supply meter readings is better than nothing – but not much better.

A more fair and reasonable rate structure would require those who contribute most to the stormwater problem to contribute most to its solution. Stormwater fees or payments intended to solve stormwater problems should relate directly to how much stormwater is being generated, all else being equal. The larger the quantity of stormwater a lot or parcel or use generates, the larger the stormwater fee should be that is intended to cover stormwater program costs.

The Stormwater Rate Design uses two variables, or factors, upon which to base its proposed rates: total impervious area (IA) of the parcel or lot which is given an 80 percent weighting and total gross area (GA) of the parcel which is given a 20 percent weighting. Typically, impervious surfaces are assumed to generate runoff from 100 percent of total precipitation (in fact very small rains during very hot weather months when the impervious cover has been superheated may generate runoff which is somewhat less than 100 percent of total precipitation). Alternatively, stormwater runoff from non-impervious, or pervious, land covers such as lawns and other maintained landscape areas, as well as natural areas such as woods and meadows, is known to vary substantially. Woodland in good condition generates very little runoff, especially in the more permeable soils; on the other hand, lawns in dense neighborhoods which have been subject to a significant amount of human activity and traffic, lawnmowing, and the like (e.g., certain high use areas in Fairmount Park) may have become quite compacted, such that they generate substantial runoff. As storms get larger and more intense, more runoff is generated from these "somewhat pervious" sites, as lawns and other vegetated covers become rapidly saturated and generate runoff.

The challenge here is to develop a formula that fits the many different sites throughout Philadelphia and their broad land use and land cover (i.e., stormwater generating) variability. The proposed 80 percent weighting for impervious cover gives greatest stormwater weighting to the greatest stormwater generator, which is technically appropriate. At the same time, the 20 percent weighting for total site area works to make

the system sensitive also to larger pervious areas which, aggravated by compaction, also contribute to stormwater generation, though not nearly as much as the purely impervious areas. In sum, given the background documentation provided in the Community Advisory Committee's S*tormwater Charge Allocation Final Report*, coupled with our knowledge of stormwater and urban land uses, the 80 percent/20 percent weighting seems both technically justifiable and straightforward to use.

An especially important aspect of the Stormwater Rate Design is its application to all those land uses in the city which have been previously unassessed or unrated – any uses which have no water meters and no public water supply connection. The clearest examples of such uses are parking lots (not connected to other uses), which are quite numerous. The Stormwater Rate Design treats these uses equitably with all other uses, using the 80/20 weighting approach. New rates will be increased dramatically in these cases, as they should be. These uses were being given unfair treatment - a bonus "free ride" - in the past.

It is important to note here that the Stormwater Rate Design is very much the result of availability of new GIS technology which allows PWD to assess these different land covers determined for the many different non-residential parcels, large and small, throughout the city. With the help of various types of aerial data coupled with GIS, tremendous amounts of data can be developed cost effectively and with remarkable accuracy. This technology has enabled the Stormwater Rate Design to move forward as it has.

Q. YOU TESTIFIED ABOVE THAT THE PROPOSED RATES WILL INCENTIVIZE STORMWATER PROBLEM SOLUTIONS TO BE UNDERTAKEN INDIVIDUALLY ACROSS THE CITY TO THE BENEFIT OF ALL RATEPAYERS. PLEASE EXPLAIN.

A. Stormwater impacts and their further damage to the environment are costly to us all; in areas with CSOs, these impacts are all the more significant. In larger storm events when combined sewer flows are discharged directly into the receiving waters of the Delaware and the Schuylkill and its tributaries, pollutant discharges include untreated sanitary wastes combined with the nonpoint source load running off of the urban landscape. Clearly, this combined discharge of pollutants leads to water quality problems which adversely impact and limit overall water quality, fish life and vibrancy of the entire aquatic ecosystem, public water supply systems (i.e., intakes) downstream, and human recreational use. The "downstream" concept is further aggravated in this case because the Delaware and Schuylkill are tidally influenced here, meaning that pollutants discharged can actually move upstream during the incoming tides. Additionally, during rain events when combined flows are too small to be directed to CSO outfalls, these flows do reach the wastewater treatment plants, creating fluctuation in flows that must be processed. Such fluctuations with their variations in flow quantities and flow qualities create special challenges for treatment plant operators, as well as inefficiencies in treatment processes. Indirectly, treatment costs increase. To the extent that these stormwater flow fluctuations can be reduced or eliminated in this CSO-system, ratepayers, as well as so much of their natural and human environment, benefit.

PWD has defined a system of credits designed particularly for those ratepayers/parcels where stormwater fees will increase (in some cases, increase significantly) as the result of the Stormwater Rate Design. This system of credits is similarly structured around both total impervious area (IA) and total or gross site area (GA). Credits are quantified based on a sum of managing the first inch of runoff from IA and GA using the US Department of Agriculture-Soil Conservation Service Curve Number (a proxy for runoff characteristics of combinations of soil and ground cover reductions) as part of the crediting calculation.

Credits are issued by PWD based on the provision of Stormwater Management Practices (SMPs), which achieve IA runoff reduction and GA runoff reduction. As credits are issued, stormwater fees are decreased directly, providing a substantial incentive for parcel or lot owners to develop SMPs. These SMPs, discussed in more detail in the city's *Stormwater Management Guidance Manual*, provide a variety of ways to "shave" or redirect stormwater runoff away from direct connection into the storm sewers (combined and uncombined). SMPs include, but are not limited to, a variety of practices such as porous pavement with recharge beds, infiltration dry wells and trenches, planter boxes and tree wells, vegetated roofs, and rain barrels and cisterns. Some of these practices redirect runoff back into the ground (where it would have been directed in the first place); some reduce runoff volumes and peak rates through vegetation and evapotranspiration processes; some capture and re-use runoff, not only mitigating the stormwater problem but reducing the need for costly public water supply for irrigation.

The city through its PWD has mounted an energetic program to demonstrate and promote successful "pilot project" development of a wide variety of these SMPs. Furthermore, these SMPs frequently are associated with overall landscape enhancement and "greening" strategies that serve to improve land values and neighborhood aesthetics. Through this program of strategies lies the hope that private owner actions to reduce stormwater fees and increase their own investment value at the same time will accelerate corrective stormwater action across the city in a kind of public/private mutually reinforcing partnership, even as the city supports its ambitious, though fiscally-constrained, stormwater program with its stormwater fees. In our opinion, this appears to be a clever and technically equitable way to leverage limited resources and structure the overall stormwater program.

Furthermore, as discussed above, individual actions resulting in installation of SMPs which in turn reduce runoff and redirect flows out of the sewers parcel by parcel, also reduce larger problems such as localized flooding and related street and basement flooding problems. Reduction in this flooding decreases – potentially even eliminates – the need for the costly Basement Backup Protection Program and comparable private mitigative efforts, saving both public and private monies. Untold aggravation linked to these problems is avoided.

Reducing stormwater runoff into Philadelphia's CSO system – whether these flows end up at wastewater treatment plants or get discharged into the rivers untreated - can be

expected to (1) make PWD operations more efficient, benefiting all ratepayers, and (2) improve the environment of which all ratepayers are a part. Because the Stormwater Rate Design with its systems of credits as described above can be expected to incentivize private corrective stormwater action on the part of the larger stormwater generators with the most to benefit (i.e., reduction in fees) by installing SMPs, the stormwater problem is reduced, all ratepayers benefit, and the environment is improved – sooner rather than later.

Q. DO YOU HAVE ANY IDEAS FOR HOW THE STORMWATER RATE DESIGN COULD BE FURTHER IMPROVED?

A. Yes. First, PWD could include the crediting program concept for residential uses/parcels so that SMPs can be incentivized across the many different residential parcels in Philadelphia.

As I understand it, Philadelphia residential use/parcel rates already have been established, starting in FY2002 and subsequent years and are not the subject of this rate proposal, including the proposed non-residential crediting program which promotes owner action to reduce stormwater runoff through installing SMPs. Although residential parcel rates have been premised on a scientifically-based analysis which evaluated housing units throughout Philadelphia and their impervious cover, the residential program appears not to be open to the same crediting program proposed for non-residential parcels, meaning that the same excellent provisions for stormwater reduction through SMPs will not be afforded to residential parcels/sites.

I fully acknowledge that such a crediting program for residential parcels is easier said than done. Given the very large number of residential parcels/sites within Philadelphia (approximately 450,000, many more than non-residential parcels/sites), developing a management system which is site- or parcel-specific becomes extremely difficult – even with the power of GIS electronics. And the relatively small quantities of stormwater being generated by each residential parcel/site, regardless of type of residence, make attempts at managing site-specific crediting of individual residential parcels/sites less than cost effective. One can only imagine the complexities - and administrative time requirements - of attempting to deal with each individual residential owner and her/his possible selection of SMPs with calculation of benefits being achieved. Resulting staffing requirements and total program costs would be daunting. Furthermore, it must be understood that individual residential stormwater fees are relatively nominal, as they should be.

Nevertheless, it would be desirable if, just as with the non-residential program, voluntary corrective/mitigative private owner action through installation of SMPs could be reflected in some manner in residential rates. PWD has mounted energetic informational/educational campaigns to promote use of SMPs throughout neighborhoods, including residential areas. These programs should be continued, even expanded. Perhaps awards or prizes could be given, neighborhood by neighborhood, to those residential owners who make the most successful, convincing stormwater management practice applications, engaging neighborhoods in a positive competitive spirit to work

together to improve Philadelphia's environment. Perhaps neighborhoods that demonstrate maximum number of private initiatives get moved to the top of the list for public improvements like "green streets" and other types of public greening projects. Perhaps a program of modest SMP subsidies could be considered by PWD. At minimum, a next step in the residential program should be to continue to promote city-wide education of residential owners in order to increase awareness of the stormwater problem and awareness of each resident's role in solving stormwater problems, so that action on the part of all private owners can work to reinforce PWD's public program efforts.

Second, PWD could include pollutant loading (PL) as a variable in the stormwater fee formula, in addition to total impervious area (IA) and total site area (GA). As I indicated above, the stormwater problem is both one of water quantity and water quality. Stormwater problems, including related CSO aspects that complicate stormwater problems in Philadelphia, relate directly to total quantity of stormwater being generated. The stormwater problem is also linked to quality of runoff being generated. Runoff from relatively "clean" rooftops, for example, is not as problematic as runoff from "hot spot" fast food establishments or gas stations, where auto-related emissions/leakages/residues from frequent "hot" vehicles generate substantial nonpoint source pollutant loadings. In the CSO portion of Philadelphia, these nonpoint source pollutant loadings either are directed to city wastewater treatment plants (when storm flows are quite modest) or are discharged, untreated, directly into receiving waters at CSO outfalls, along with sanitary wastes. In the non-CSO portion of the city, these nonpoint source loadings essentially are

discharged untreated as well. All of these outcomes have varying levels of adverse impact.

As such, a next step in stormwater rate program refinement might be to include the variable of pollutant loading into the rate formula, both in terms of rate calculation and in terms of crediting the benefits achieved by development of SMPs. No doubt, adding this water quality/pollutant loading variable to the Stormwater Rate Design quickly complicates matters beyond the relatively straightforward 80/20 breakdown proposed to drive rate calculations. More study (with possible time delay) is likely to be needed in order to arrive at and justify such a pollutant loading variable. Therefore, I recommend that addition of water quality/pollutant loading be considered in the future.

Q. DOES THIS COMPLETE YOUR TESTIMONY?

A. Yes. It does.